
Field Investigation Report

**Dow Ludington Plant Site
Exfiltration Study Deep Groundwater
Field Investigation Report**

Prepared for
The Dow Chemical Company

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CH2MHILL

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Abbreviations and Acronyms

bgs	below ground surface
CPT	cone penetrometer test
Dow	The Dow Chemical Company
DW	drinking water
EC	electrical conductivity
FAC	final acute value
facility	Dow Ludington Plant Site Facility, Ludington, Michigan
gpm	gallons per minute
GSI	groundwater-surface water interface
MDNRE	Michigan Department of Natural Resources and Environment
mg/L	milligrams per liter
Microbac	Microbac Laboratories
MS	matrix spike
MSD	matrix spike duplicate
NPDES	National Pollutant Discharge Elimination System
PVC	polyvinyl chloride
QC	quality control
R&C	residential and commercial
TDS	total dissolved solids
TKN	total kjeldahl nitrogen
USEPA	United States Environmental Protection Agency
VAP	vertical aquifer profiling

SECTION 1

Introduction

The Dow Chemical Company (Dow) Ludington Plant Site Facility (facility) was located on 183 acres within an industrialized area of Ludington, Michigan, along the northeastern and eastern shore of Pere Marquette Lake (Figure 1). In July 2009, Dow's Calcium Chloride Business was sold to the Occidental Chemical Corporation. This sale included the production facilities located on the facility, as well as 100 acres of the facility located on the eastern end of Pere Marquette Lake occupied by a series of retention ponds known as the South Pond Area.

An exfiltration study is being performed at the South Pond Area as part of a requirement of the facility National Pollutant Discharge Elimination System (NPDES) permit MI0003026 (Part I, Section A.2) that became effective on January 1, 2008. The results of the initial phase of the study completed in 2008 indicated the ponds were losing more than 500 gallons per minute (gpm) to exfiltration, and the majority of water lost through exfiltration appeared to discharge (vent) to surface water in the Pere Marquette River and Pere Marquette Lake adjacent to the South Pond Area through shallow groundwater. Deep groundwater also appeared to be impacted in some areas; however, the initial phase of the study was not able to determine whether impacted deep groundwater also discharged to surface water or if deep groundwater impacts extend beyond the facility boundaries (CH2M HILL 2009a).

This report represents an extension of the exfiltration study to address data gaps in the understanding of the fate of groundwater affected by exfiltration. The work was conducted on behalf of Dow during August and September 2009 at the South Pond Area in accordance with the requirements of the Michigan Department of Natural Resources and Environment Quality (MDNRE, formerly known as the Michigan Department of Environmental Quality) -approved work plan (CH2M HILL 2008a).

SECTION 2

Objectives and Investigation Approach

The overall purpose of this investigation was to collect sufficient data to determine how much water exfiltrating from the South Pond Area is entering deep groundwater and the fate of impacted deep groundwater. The specific objectives of this investigation were as follows:

- Assess whether concentrations of ammonia, chloride, and total dissolved solids (TDS) are exceeding generic MDNRE criteria in deep groundwater (greater than 50 feet below ground surface [bgs]) beneath the South Pond Area
- Determine the hydraulics of the upper and lower sand aquifers beneath the South Pond Area
- Evaluate aquifer hydraulics to determine if any deep groundwater impacted by exfiltration water could potentially migrate offsite

The field investigation approach was to install seven deep groundwater monitoring wells and four shallow groundwater monitoring wells, in combination with 3 existing shallow monitoring wells, to form seven nested shallow/deep well pairs at various locations across the South Pond Area. These wells were intended to further define the horizontal and vertical extent of chlorides, TDS, and ammonia in deep groundwater; provide an understanding of the lower sand aquifer hydraulics; and supplement the current understanding of the geology beneath the South Pond Area.

Background

During 2006, a field investigation was conducted at the facility and South Pond Area to assess whether chlorides and TDS beneath the facility exceeding the MDNRE Part 201, Public Act 451 drinking water criteria (for chloride, at 250 milligrams per liter [mg/L]) and groundwater-surface water interface (GSI) cleanup criteria (for TDS, at 500 mg/L) were ultimately discharging into Pere Marquette Lake. This investigation concluded that shallow groundwater impacted with chloride and TDS appeared to be venting to Pere Marquette Lake in areas where the facility's primary aquitard unit (the 'lake clay') was not present (CH2M HILL 2007).

In August and September 2008, an exfiltration study was performed at the South Pond Area to assess whether the ponds were losing water via exfiltration to the shallow groundwater and if so, estimate the amount of water loss. Groundwater samples and electrical conductivity (EC) logs from cone penetrometer testing (CPT) soundings, and pond influent and effluent samples were used to determine the mass loading of ammonia, chlorides, TDS, and total kjeldahl nitrogen (TKN) that was exfiltrating from the South Pond Area into groundwater. This study concluded that the South Pond Area was losing between 520 and 580 gpm to exfiltration, and that the majority of water lost through exfiltration appears to discharge to shallow groundwater and then to the Pere Marquette River and Pere Marquette Lake adjacent to the South Pond Area. Some of the deeper CPT soundings and groundwater grab samples indicated that deep groundwater was impacted in some areas; however, the study was not able to determine the fate of impacted deep groundwater and whether impacts extend beyond the facility boundaries (CH2M HILL 2009).

Additional history and facility background are included in previously published reports: *Dow Ludington Plant Site 2006 Groundwater/Surface Water Interface Field Investigation Report* (CH2M HILL 2007) and *Dow Ludington Plant Site Trident Probe Pore Water Investigation* (CH2M HILL 2008b).

3.1 Site Setting

The South Pond Area is a series of retention ponds that hold process water delivered from the plant for the primary purpose of solids settling (Figure 2). The ponds are located at the western end of Pere Marquette Lake and are bordered by Pere Marquette River to the north and east, and wetlands to the south. The ponds are located on top of a low-lying area that has been filled with calcium/magnesium carbonates and hydroxides, gravel, and other non-native fill. The ponds provide four components of treating post-process water:

- Solids settling
- pH reduction
- Heat loss
- Ammonia volatilization and reduction

Currently, post-process water enters the Center Pond through a pipeline that discharges at the northern end of the pond (influent) and then flows to the southern end of the pond. Water delivered to the Center Pond flows to the Secondary Settling and Tertiary Ponds, and then continues through to the Polishing Pond. Water in the Polishing Pond (effluent) then is pumped back to the facility where it is combined with other process wastewater before being discharged to Pere Marquette Lake through Outfall 001 (regulated under the facility's current NPDES permit).

3.2 Site Geology and Hydrogeology

The geologic and hydrogeologic conditions summarized herein are based on previous studies, primarily the *Site Assessment for Ludington Plant Volume I* (Radian 1999), *Dow Ludington Plant Site 2006 Groundwater/Surface Water Interface Field Investigation Report* (CH2M HILL 2007), and the *Plant Site 2008 Exfiltration Study Report* (CH2M HILL 2009). These studies investigated the facility and South Pond Area. Results of the 2006 GSI field investigation indicated there are some significant differences in subsurface geology between the onshore and offshore areas of Pere Marquette Lake (CH2M HILL 2007). There also are notable differences in geology between the facility and the South Pond Area. This section focuses on the geology and hydrogeology beneath and adjacent to the South Pond Area.

3.2.1 Geology

The unconsolidated materials below the facility consist of three primary stratigraphic units, as follows:

- Non-native fill material
- Post-glacial sediments
- Glacial till

Non-Native Fill Material

Non-native fill material is found nearly everywhere across the South Pond Area and varies from 5 to 30 feet thick, with the thickest areas being along the dikes/roads between and around the ponds as indicated in previous investigations. Typically, the fill material is 10 to 20 feet thick and is comprised of calcium/magnesium carbonates and hydroxides, sand, silt, clay, and gravel.

Post-Glacial Sediments

Below the non-native fill layer is a thick sequence of post-glacial sediments. These sediments are predominantly loose to extremely dense silty sands, with frequent lenses of silt, clay, and peat (organics). These post-glacial sediments generally extend to depths greater than 100 feet bgs and likely were deposited by a sequence of aeolian, lacustrine, and fluvial depositional events (Radian 1999).

Immediately below the non-native fill, clay to silty clay was observed in borings and CPT soundings located near Pere Marquette River along the eastern side of the South Pond Area and near the wetlands along the southern side of the South Pond Area. These post-glacial clays are the youngest native soils beneath the pond system, and range between 4 and 25 feet thick.

The predominant post-glacial sands beneath the pond system can be split into two subunits: a silty sand with frequent lenses of silt, clay and/or peat, and a dense to very dense silty sand. Where no major fine-grained soil units are present, the less dense silty sand unit sits directly above the denser silty sand and is approximately 40 to 100 feet thick. The denser silty sand is characterized by a noted increase in density (as determined by the significant increase in pushing force required to advance the CPT probe and the increased stiffness of the sand in borings) and a reduced frequency of silt and/or clay seams. Based on some of the deeper CPT soundings and boring logs across the facility (including the South Pond Area), this dense sand unit ranges from approximately 10 to over 100 feet thick.

A deeper clay layer ranging between 2 and 30 feet thick was found within the upper sand unit and was observed in a number of onshore and offshore CPT soundings, and a few of the deep borings within the South Pond Area. This clay unit appears to have been deposited under lacustrine or deep-water fluvial conditions, as it contains virtually no coarse-grained component and is absent of sand, silt, or gravel seams. There are no varves observed in this clay at any of the CPT sounding logs, indicating no significant seasonal changes in sediment loading. This lake clay appears to pinch out toward Pere Marquette Lake's northern shoreline and is present under much of the southern and western half of the South Pond Area.

Glacial Till

Beneath the post-glacial sediments is a discontinuous glacial till deposit comprised of dense silty clay with trace amounts of gravel and sand. The lateral extent of the glacial clay is not well known or mapped, as the upper boundary typically is found well below 100 feet bgs. The upper surface of this till was not observed in any of the deep borings during this investigation. Across the facility, this deep glacial clay appears to have a high amount of relief, likely because of differential post-glacial weathering.

3.2.2 Hydrogeology

In general, there are four primary hydrostratigraphic units beneath the South Pond Area:

- Upper aquifer comprised of shallow non-native fill material and post-glacial loose silty sand
- Post-glacial "lake clay" aquitard comprised of clay to silty clay
- Lower aquifer comprised of the deeper, dense post-glacial silty sand
- Glacial till aquitard comprised of dense clayey silt or silty clay

The subsurface hydrogeology beneath the South Pond Area is strongly influenced by the presence or absence of the lake clay. This clay unit is the primary aquitard unit beneath much of Pere Marquette Lake and extends beneath much of the southern portion of the South Pond Area.

The upper aquifer is unconfined with saturated conditions occurring from 5 to 17 feet bgs. Previous groundwater elevation data collected in the upper sand aquifer from existing wells around the South Pond Area indicated that groundwater flow was radially away from the approximate center of the pond (CH2M HILL 2009b). The lower sand aquifer is presumed

to be under semiconfined conditions, with hydraulic conditions partially controlled by the presence or absence of overlying lake clay or other intermittent clay and silt seams. Groundwater flow direction within the lower sand aquifer beneath the South Pond Area was unknown prior to this field investigation, as no wells penetrated this hydrostratigraphic unit.

SECTION 4

Field Investigation Results

The field investigation presented in this report was performed in accordance with the *Plant Site Exfiltration Study - Deep Groundwater Field Investigation Work Plan* (CH2M HILL 2008a).

4.1 Field Activities

The fieldwork consisted of the following:

- Rotosonic drilling/installation of seven deep wells (MW-15D, MW-16D, MW-19D, MW-37D, MW-38D, MW-39D, and MW-40D) and four shallow wells (MW-37S, MW-38S, MW-39S, and MW-40S) in the South Pond Area
- Vertical aquifer profiling (VAP) groundwater grab sampling (performed during drilling activities)
- Groundwater sampling (monitoring wells sampled)
- Groundwater elevation data collection from the well nests in the South Pond Area

4.1.1 Rotosonic Drilling, VAP Sampling, and Monitoring Well Installation

Between August 18 and September 17, 2009, 11 monitoring wells (seven deep and four shallow) were drilled and installed in the South Pond Area using rotosonic drilling techniques (Figure 2). Continuous soil logging was performed using 10-foot-long, 6-inch-diameter cores collected by this method.

Groundwater grab samples were collected every 10 feet (beginning at approximately 50 to 60 feet bgs) using a VAP “push ahead” sampling device that was advanced into soil ahead of the rotosonic drill head and allowed to fill with formation groundwater. Groundwater grab samples were unable to be collected by the VAP equipment in some of the low permeability fine-grained soils (clay and silt seams/aquitards) encountered during drilling. In these instances, VAP groundwater grab sampling resumed at the next 10-foot interval that encountered soil that yielded sufficient water. Groundwater collected using the VAP sampling technique was screened in the field for ammonia, chloride, and conductance. Ammonia was screened using a Hach DR890 colorimeter. Chloride was screened using Hach titrator strips. Conductance was screened using a YSI-SCT-30 conductivity meter. Groundwater grab samples were submitted to Microbac Laboratories (Microbac) of Marietta, Ohio, for chloride, TDS, and ammonia analyses. Table 1 provides a summary of the VAP sampling depths, field screening results, and laboratory analytical results.

Field screening results combined with soil logging data aided in selecting the final well screen position at each deep boring location based on the project data quality objectives. Each deep monitoring well was constructed using 2.5-inch Schedule 80 polyvinyl chloride (PVC) casing and a 5-foot, 0.01-slotted PVC screen (Appendix A). Controlled collapse of the native soils was used to fill in the deep borings to the desired depth for setting the deep

monitoring wells, as each of the deep borings was advanced deeper than the final depth of the monitoring well. Global Filter Pack #5 sand was used to fill the annular space around the deep well screens from the bottom of the well to 5 to 10 feet above the well screen. Portland cement grout then was used to fill the remaining annular space, and the well was completed at the surface with an expandable locking cap and a protective steel outer casing.

Each shallow monitoring well was constructed using 2-inch-diameter Schedule 80 PVC casing and a 5-foot, 0.01-slotted PVC screen (Appendix A). Final shallow well screen positions were determined in the *Plant Site Exfiltration Study - Deep Groundwater Field Investigation Work Plan* (CH2M HILL 2008a), so the shallow well screens were placed in the same elevation range (550 to 560 feet above mean sea level). Filter Pack #5 was used to fill the annular space around the well screen from the bottom of the well to 2 feet above the well screen. Approximately 2 feet of 3/8-inch coated bentonite pellets were installed above the filter pack. The remaining annular space was sealed with a bentonite grout and completed at the surface with an expandable locking cap and a protective steel outer casing.

The deep monitoring wells were developed using the air lift technique by lowering tubing to the bottom of the well and pumping air into the well to lift sediment and water through purge tubing. Development of the deep monitoring wells took between 30 and 40 minutes and removed approximately 225 gallons of purge water from each well. The shallow monitoring wells were developed using the surge and purge development technique by surging each well with the pump during development. Development of the shallow monitoring wells ranged from 35 minutes to 1 hour, 25 minutes. The amount of water purged from the shallow monitoring wells ranged from 18 to 70 gallons. Specific details including well development times, volumes, and other details, are provided on the well construction forms included in Appendix B.

On September 22 and 23, 2009, Wade Trim Incorporated surveyed the South Pond Area monitoring wells for horizontal and vertical coordinates. The ground surface and top of casing elevations were surveyed at each well location. Table 5 provides a summary of the well survey details.

4.1.2 Groundwater Well Sampling

Groundwater samples were collected from the South Pond Area monitoring wells on September 22 and 23, 2009. The samples were collected from the monitoring wells via submersible pump or low-flow sampling methods, depending on the depth of the well and the amount of hydraulic head above the well screen. The samples were shipped to Microbac to be analyzed for TDS, using U.S. Environmental Protection Agency (USEPA) Method 160.1, chlorides using USEPA Method 325.2, and ammonia using USEPA Method 350.1. The complete groundwater well sampling analytical results are summarized Table 2.

4.1.3 Groundwater Elevation Measurements

Groundwater elevations were measured from the top of the inner PVC casing at all 15 monitoring wells located within the South Pond Area. Elevation measurements were collected weekly for the first 4 weeks (September 22 through October 12, 2009), and then on November 18, 2009 and January 7, 2010. Monthly water level measurements will continue

in 2010 until April, when the facility annual groundwater monitoring event is scheduled to take place.

4.2 Field Investigation Results

This section presents the results of this field investigation including groundwater analytical results and groundwater elevation data.

4.2.1 Groundwater Analytical Results

All VAP groundwater grab samples and monitoring well groundwater samples were analyzed for TDS using USEPA Method 160.1, chlorides using USEPA Method 325.2, and ammonia using USEPA Method 350.1. Un-ionized ammonia concentrations were calculated using the default method in the MDNRE Operational Memorandum #1 criteria tables under footnote CC for cold water streams.

VAP Sampling

A total of 65 groundwater samples were collected using the VAP sampling technique during installation of deep monitoring wells MW-15D, MW-16D, MW-19D, MW-37D, MW-38D, MW-39D, and MW-40D. Table 1 provides a complete summary of the VAP sample analytical results.

Eleven VAP groundwater grab samples were collected during installation of MW-15D at 47, 57, 72, 77, 87, 97, 107, 117, 127, 137, and 147 feet bgs. Chloride exceeded Residential and Commercial (R&C) I Drinking Water (DW) standards (250 mg/L) in groundwater samples collected at 47 feet bgs and at and below 107 feet bgs. TDS exceeded R&C I DW and generic GSI criteria (500 mg/L) at all sample depths except 72 feet bgs. Un-ionized ammonia exceeded generic GSI criteria (0.029 mg/L) and the final acute value (FAV [0.320 mg/L]) at a sample depth of 47 feet bgs. All un-ionized ammonia samples collected at and below 107 feet bgs exceeded the generic GSI criteria.

Nine VAP groundwater grab samples were collected during installation of MW-16D at 47, 52, 87, 97, 104, 117, 125.5, 134, and 147 feet bgs. No VAP samples were collected between 52 and 87 feet bgs because of the presence of a fine-grained stratigraphic unit (lake clay). Chloride and TDS concentrations exceeded R&C I DW and generic GSI criteria, respectively, for groundwater samples collected at 47 and 52 feet bgs. Un-ionized ammonia concentrations exceeded the generic GSI criteria and FAV at samples collected from 47 to 97 feet bgs. The generic GSI criteria for un-ionized ammonia was exceeded at samples collected from 117 to 134 feet bgs.

Eleven VAP groundwater grab samples were collected during installation of MW-19D at depths of 47, 52, 67, 77, 87, 94, 104, 112, 127, 137, and 147 feet bgs. Chloride and TDS concentrations did not exceed R&C I DW or generic GSI criteria, respectively, for any sample depths at this location. Un-ionized ammonia concentrations ranged from 0.007 to 0.350 mg/L, exceeding the generic GSI criteria and FAV at 47 feet bgs, and the generic GSI criteria only at 52 feet bgs.

Seven VAP groundwater grab samples were collected during installation of MW-37D at 77, 87, 97, 117, 127, 137, and 147 feet bgs. Samples were not collected above 77 feet bgs because

of the presence of the lake clay aquitard unit. TDS concentrations exceeded the generic GSI criteria at 77 feet bgs. There were no chloride exceedances. Un-ionized ammonia concentrations exceeded the generic GSI criteria and FAV at samples collected from 77 to 87 feet bgs, and the generic GSI criteria only, at the sample collected from 97 feet bgs.

Eleven VAP grab groundwater samples were collected during installation of MW-38D at depths of 47, 57, 67, 77, 87, 97, 107, 117, 127, 137, and 147 feet bgs. Chloride exceeded R&C I DW criteria at all sample depths except 137 and 147 feet bgs. TDS concentrations exceeded generic GSI criteria at all sample depths except 147 feet bgs. Un-ionized ammonia concentrations exceeded the generic GSI criteria and FAV at samples collected from 87 to 107 feet bgs, and the generic GSI criteria at samples collected from 47 to 77 and from 117 to 127 feet bgs.

Nine VAP grab groundwater samples were collected from MW-39D at 67, 77, 87, 97, 103, 117, 127, 132, and 147 feet bgs. Chloride and TDS values exceeded R&C I DW and generic GSI criteria at all sample depths. Un-ionized ammonia concentrations exceeded the generic GSI criteria and FAV at samples collected from 67 and 103 feet bgs. The generic GSI criteria for un-ionized ammonia was exceeded at samples collected from 77 to 97 and 127 to 147 feet bgs.

Six VAP groundwater grab samples were collected from MW-40D at 57, 107, 117, 127, 137, and 147 feet bgs. No samples were collected from below 57 and above 106 feet bgs because of the presence of the lake clay unit. Chloride and TDS exceeded R&C I DW and generic GSI criteria, respectively, for the sample collected at 57 feet bgs (above the lake clay unit). Un-ionized ammonia concentrations exceeded the generic GSI criteria and FAV at the sample collected from 57 feet bgs. The generic GSI criteria for un-ionized ammonia was exceeded at samples collected from 107 to 127 feet bgs.

Seven field duplicates, three matrix spike (MS)/matrix spike duplicates (MSDs), one field blank, and five equipment blanks were collected for quality control (QC) purposes during the VAP sampling activities.

Monitoring Well Sampling

On September 22 and 23, 2009, one round of groundwater samples was collected from the South Pond Area monitoring wells. Chloride concentrations in the shallow monitoring wells (screened in the upper sand aquifer) ranged from 65.2 to 2,070 mg/L, while TDS concentrations in the shallow monitoring wells ranged from 400 to 5,670 mg/L. Chloride concentration isopleths are shown for the upper sand aquifer on Figure 3. Ammonia concentrations for the shallow monitoring wells ranged from not detected to 169 mg/L, while un-ionized ammonia concentrations ranged from not detected to 6.42 mg/L. Ammonia concentration isopleths are shown for the upper sand aquifer on Figure 5. Shallow groundwater concentrations exceeded the R&C I DW and generic GSI criteria for chloride and TDS and the FAV and generic GSI criteria for ammonia and un-ionized ammonia in wells MW-15S, MW-16S, MW-19S, MW-37S, MW-38S, MW-39S, and MW-40S.

Chloride groundwater concentrations in the deep monitoring wells ranged from not detected to 1,450 mg/L while TDS concentrations ranged from not detected to 3,270 mg/L. Chloride concentration isopleths are shown for the lower sand aquifer on Figure 4. Deep groundwater concentrations exceeded the R&C I DW and generic GSI criteria for chloride

and TDS, respectively, in wells MW-15D, MW-38D, and MW-39D. Ammonia concentration isopleths are shown for the deep sand aquifer on Figure 6. Ammonia groundwater concentrations in the deep monitoring wells ranged from not detected to 10.8 mg/L while un-ionized ammonia concentrations ranged from not detected to 0.410 mg/L, exceeding the FAV and generic GSI criteria in wells MW-15D, MW-16D, MW-38D, MW-39D, and MW-40D.

Two field duplicates, one MS/MSD, one equipment blank, and one field blank were collected and analyzed during monitoring well sampling activities. A summary of the monitoring well sampling results is included in Table 2.

4.2.2 Groundwater Elevation Summary

Groundwater elevations were collected weekly for 4 weeks (beginning in September 2009) and at two additional times (November 18, 2009 and January 7, 2010) since the monitoring wells were installed. Horizontal flow patterns and vertical gradients within the upper and lower sand aquifers were determined for each of the seven nested well pairs in the South Pond Area. All groundwater elevations collected are summarized in Table 3.

Shallow groundwater (0 to 50 feet bgs) levels were measured for monitoring wells MW-15S, MW-16S, MW-17S, MW-19S, MW-37S, MW-38S, MW-39S, and MW-40S. However, water levels measurements collected from MW-17S were not incorporated into the analyses of the horizontal or vertical gradients because of significant heaving damage to the well casing resulting in an offset of the screen and/or top of casing elevation. This well is scheduled for replacement in the first quarter of 2010. Shallow groundwater flow was found to be generally to the north and radially away from the center of the ponds toward Pere Marquette Lake and Pere Marquette River. A shallow groundwater elevation contour map was generated for the measurements collected on October 9, 2009, and included as Figure 7. Flow patterns were consistent over the time period evaluated (September to January), and these data are representative of the general flow conditions.

Deep groundwater levels were measured for monitoring wells MW-15D, MW-16D, MW-19D, MW-37D, MW-38D, MW-39D, and MW-40D. Deep groundwater flow is to the north-northeast toward the Pere Marquette River. Groundwater elevations remained consistent throughout the weekly and monthly water level measurements. A deep groundwater elevation contour map is included as Figure 8 and is representative of general flow conditions over the time period evaluated.

Groundwater elevations remained relatively consistent throughout the weekly and monthly water level measurements, varying slightly with minor elevation changes in lake/river levels, as shown in the hydrograph presented on Figure 9.

Vertical gradients were calculated for each of the seven nested well pairs for each round of groundwater elevation collected. Vertical gradients were found to be consistently upward in well nests along the lake and river (MW-15, MW16, MW-19, and MW-38). In the interior of the ponds, the vertical gradient is minimally upward at well nest MW-39 with two measurements indicating a slightly upward gradient while the remaining measurements indicated no measurable gradient (essentially zero). The vertical gradient at well nest MW-40 near the center of the ponds is consistently downward. A vertical gradient summary table is included as Table 4.

Data Evaluation

This section provides the following:

- Discussion of geology based upon new soil logging data collected from deep borings
- Discussion of the hydraulics within and between the upper and lower sand aquifers
- Presentation of the horizontal and vertical extent of chloride, TDS, and ammonia and its impacts beneath the South Pond Area

5.1 Geology

The soil borings performed during this field investigation confirmed that the present understanding of the geology beneath the South Pond Area is correct. Because soils beneath the South Pond Area were physically logged during this field investigation, rather than determined through geotechnical methods (CPT sounding soil friction and resistance measurements), some of the geologic details at boring locations could be refined. Overall, the geology encountered matched well with the CPT sounding interpretations, and the primary stratigraphic and hydrostratigraphic units encountered fit within the conceptual site model developed in the first phase of the exfiltration study.

The deep borings performed within the South Pond Area have allowed for improved delineation of the extent of the lake clay aquitard. The lake clay unit was observed in South Pond Area perimeter deep borings MW-16D, MW-19D, MW-37D, and South Pond Area interior deep boring MW-40D. An updated version of the lake clay isopach map, which originally was included in the *Plant Site 2008 Exfiltration Study Report* (CH2M HILL 2009a), is included as Figure 10.

5.2 Hydrogeologic Conditions

Over 3 months, the groundwater flow pattern in the upper sand aquifer was observed to be generally to the north and radially toward Pere Marquette Lake and Pere Marquette River (Figure 7). The groundwater flow pattern in the lower sand aquifer was similar, and observed to be to the north-northeast and toward the Pere Marquette River (Figure 8).

Vertical gradients between the shallow and the deep aquifers indicate that deep groundwater is upwelling into the upper sand aquifer at locations along the Pere Marquette River and Pere Marquette Lake, and groundwater within the upper sand aquifer is venting to surface water directly. In the interior and upgradient (horizontal) zones of the South Pond Area, vertical gradients indicate the potential for downward flow from the upper sand to the lower sand aquifer, but the presence of the lake clay retards this flow, leaving the lower sand aquifer beneath the aquitard free of impacts from chloride and TDS.

Across the South Pond Area, there appears to be a transition from downward to upward vertical gradient from southwest to northeast, with deep groundwater ultimately coming up

from the lower sand aquifer and discharging into Pere Marquette Lake and Pere Marquette River. As there is no lake clay aquitard present in this area, the lake and river surrounding the South Pond Area appear to act as a hydraulic boundary, controlling flow from both the upper and lower sand aquifers. Figure 11 provides the revised conceptual site model of the South Pond Area, reflecting the realization that deep groundwater is migrating upward toward Pere Marquette River.

5.3 Chloride, TDS, and Ammonia Extent

Chloride and TDS concentrations in shallow groundwater of the upper sand aquifer exceed R&C I DW and generic GSI criteria, respectively, across the majority of the South Pond Area, with the highest concentrations occurring near the center of the South Pond Area between the West Pond and Center Pond (CPT-37; Figure 3). The overall horizontal extent of elevated chlorides and TDS in the upper sand aquifer covers the entire South Pond Area. Elevated chlorides and TDS are found throughout the thickness of the upper sand aquifer (Figures 10, 11, 12, and 13). Previous investigation CPT EC logging also indicates that elevated chlorides and TDS likely are found within the lake clay, as EC levels are above background in locations where this aquitard unit is penetrated. However, elevated chloride and TDS do not appear to have completely permeated this aquitard unit.

The Center, Secondary, Tertiary, and Polishing ponds are actively exfiltrating water into the shallow groundwater system directly below the ponds. Although the East and West ponds are currently inactive, their basins are filled with evaporites and calcium/magnesium carbonates and hydroxides, and these areas can contribute to elevated chlorides and TDS to groundwater, through the infiltration of precipitation and the dissolution of the remaining solids in the pond basin.

Chloride and TDS concentrations in deep groundwater of the lower sand aquifer exceed R&C I DW and generic GSI criteria, respectively, along the center and northeastern portion of the South Pond Area (Figure 4). These areas of elevated chloride and TDS concentration within deep groundwater appear to be controlled by the presence of the lake clay aquitard (Figure 8). In areas where the lake clay is present, elevated chlorides and TDS are absent in deep groundwater. Where the upper and lower sand aquifers appear to be directly connected (center and northeast South Pond Area), elevated chlorides and TDS are found at depth. The deep groundwater elevated chlorides and TDS beneath the South Pond Area also appear to come in line with the known plume on the north side of the Pere Marquette River. Groundwater grab sample and CPT EC logging indicate the distribution of elevated chlorides and TDS within lower sand aquifer (Figures 10, 11, 12, and 13). At several locations (CPT-14, CPT-36, and MW-15D), the migration of elevated chlorides and TDS appears to be impeded by other fine-grained units that may be separate from the lake clay aquitard.

The horizontal and vertical extent of ammonia exceeding FAV and generic GSI criteria in the shallow groundwater of the upper sand aquifer appears to be similar to that observed for chloride and TDS (Figure 5). However, it should be noted that CPT groundwater grab samples collected around the perimeter of the pond in the previous 2006 GSI investigation (CH2M HILL 2007) were not analyzed for ammonia, so the extent of ammonia beneath the South Pond Area is not as well defined. Ammonia groundwater concentrations above

generic GSI criteria are present across the South Pond Area, while the FAV criteria are exceeded at MW-19S, MW-37S, and MW-40S (un-ionized ammonia concentrations of 1.41, 6.42, and 3.11 mg/L, respectively).

However, ammonia concentrations in the deep groundwater of the lower sand aquifer do not appear to have good correlation with chloride and TDS extent. In general, ammonia concentrations in deep groundwater are an order of magnitude lower than in the shallow groundwater, although ammonia exceeds the generic GSI criteria at all monitoring wells screened in the lower sand aquifer, with the exception of MW-19D (a nondetect). The FAV criteria were exceeded at only one location (MW-38D). Unlike chloride and TDS, elevated concentrations of ammonia are present below the lake clay aquitard (Figure 6). For example, MW-16D, MW-37D, and MW-40D have elevated groundwater concentrations of ammonia beneath the lake clay as high as 1.49 mg/L (un-ionized), while chloride and TDS concentrations are well below R&C I DW and generic GSI criteria. Ammonia, while reduced in overall concentration, is present at concentrations perceived to be above background in the lower sand aquifer where confined by the lake clay aquitard (Figures 16, 17, 18, and 19).

SECTION 6

Conclusions

As presented in the *Plant Site Exfiltration Study Deep Groundwater Field Investigation Work Plan* (CH2M HILL 2008a), there were three primary objectives of this study, as follows:

- Assess whether concentrations of ammonia, chloride, and TDS are exceeding generic MDNRE criteria in deep groundwater (greater than 50 feet bgs) beneath the South Pond Area
- Determine the hydraulics of the upper and lower sand aquifers beneath the South Pond Area
- Evaluate aquifer hydraulics to determine if deep groundwater impacted by exfiltration water could potentially migrate offsite

The groundwater grab and monitoring well sample quantitative data collected during this field investigation were adequate to meet the objective of assessing the concentrations of ammonia, chloride, and TDS in deep groundwater, relative to MDNRE criteria. Existing shallow monitoring wells and newly added shallow and deep monitoring wells installed within the South Pond Area provided adequate hydraulic data to assess the horizontal and vertical flow directions of both the upper and lower sand aquifers, as well as determine if impacted deep groundwater has the potential to migrate offsite.

The following conclusions are based the data collected during this field investigation:

- Deep groundwater is impacted above MDNRE screening criteria by ammonia, chloride, and TDS beneath the ponds in areas where the lake clay is not present.
- Un-ionized ammonia concentrations exceed the GSI criterion beneath the entire pond area, even in locations where the lake clay is present.
- Shallow groundwater is discharging to Pere Marquette Lake and Pere Marquette River.
- Shallow groundwater is migrating downward within the interior of the ponds and radially toward Pere Marquette River and Pere Marquette Lake.
- Deep groundwater is upwelling to the shallow aquifer along the Pere Marquette River.
- Deep groundwater does not appear to migrate offsite other than to Pere Marquette River and Pere Marquette Lake.

SECTION 7

References

CH2M HILL. 2007. *Dow Ludington Plant Site 2006 Groundwater/Surface Water Interface Field Investigation Report*. May.

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Tables

TABLE 1
VAP Groundwater Grab Sample Results
Plant Site Exfiltration Study Deep Groundwater Field Investigation Report
The Dow Chemical Company
Ludington, Michigan

MW15D								MW16D								MW19D							
Sample Depth	Analytical Results			Un-ionized Ammonia (mg/L)	Field Screening Parameters			Sample Depth	Analytical Results			Un-ionized Ammonia (mg/L)	Field Screening Parameters			Sample Depth	Analytical Results			Un-ionized Ammonia (mg/L)	Field Screening Parameters		
	Chloride (mg/L)	TDS (mg/L)	Ammonia (mg/L)		Chloride (ppm)	Sp Cond (µS/cm ^o)	Dissolved Ammonia (mg/L)		Chloride (mg/L)	TDS (mg/L)	Ammonia (mg/L)		Chloride (ppm)	Sp Cond (µS/cm ^o)	Dissolved Ammonia (mg/L)		Chloride (mg/L)	TDS (mg/L)	Ammonia (mg/L)		Chloride (ppm)	Sp Cond (µS/cm ^o)	Dissolved Ammonia (mg/L)
47	1,830	4,000	8.59	0.326	>638	3,190	>0.60	47	1,520	3,540	22.3	0.847	>638	4,604	>0.60	47	2 U	280	9.2	0.350	<31	456.1	>0.60
57	71.4	656	0.292 U	-	54	393	0.54	52	1,300	2,640	119	4.52	>638	4,367	>0.60	52	2 U	248	5.52	0.210	<31	427.3	>0.60
72	137	448	0.331 U	-	96	766	>0.60	87	2.76	372	39.1	1.49	<31	849	>0.60	67	2 U	254	0.664	0.0252	<31	346.3	>0.60
77	161	544	0.318 U	-	135	802	>0.60	97	2 U	252	11.1	0.422	<31	501	>0.60	77	2 U	254	0.337	0.0128	<31	343	0.53
87	183	804	0.215 U	-	180	914	0.35	104	2.34	256	0.246	0.00935	<31	483.4	>0.60	87	2 U	228	0.413	0.0157	<31	360.4	>0.60
97	238	754	0.732 U	-	232	NR	>0.60	117	6.65 J	274	1.55	0.0589	<31	388.4	>0.60	94	2 U	250	0.338	0.0128	<31	413.6	>0.60
107	696	2,370	4.94	0.188	>638	2,116	>0.60	125.5	2 U	326	3.25	0.124	<31	442.1	>0.60	104	2 U	234	0.393	0.0149	<31	366.2	>0.60
117	869	3,060	4.03	0.153	>638	2,846	>0.60	134	2 U	288	1.42	0.0540	<31	401.2	>0.60	112	2 U	184	0.355	0.0135	<31	357.8	>0.60
127	1,180	2,650	2.26	0.0859	>638	3,160	>0.60	147	2 U	264	0.1 U	-	<31	373.3	0.15	127	4.67	248	0.222	0.00844	<31	386.7	>0.60
137	954	3,300	1.59	0.0604	>638	3,055	>0.60									137	12.5	256	0.213	0.00809	<31	413.1	0.23
147	1,090	2,910	2.99	0.114	>638	3,323	NR									147	4.37	246	0.186	0.00707	<31	378.3	0.36

MW37D								MW38D								MW39D							
Sample Depth	Analytical Results			Un-ionized Ammonia (mg/L)	Field Screening Parameters			Sample Depth	Analytical Results			Un-ionized Ammonia (mg/L)	Field Screening Parameters			Sample Depth	Analytical Results			Un-ionized Ammonia (mg/L)	Field Screening Parameters		
	Chloride (mg/L)	TDS (mg/L)	Ammonia (mg/L)		Chloride (ppm)	Sp Cond (µS/cm ^o)	Dissolved Ammonia (mg/L)		Chloride (mg/L)	TDS (mg/L)	Ammonia (mg/L)		Chloride (ppm)	Sp Cond (µS/cm ^o)	Dissolved Ammonia (mg/L)		Chloride (mg/L)	TDS (mg/L)	Ammonia (mg/L)		Chloride (ppm)	Sp Cond (µS/cm ^o)	Dissolved Ammonia (mg/L)
77	4.73	504	34.6	1.31	<31	920	>0.60	47	959	2,240	5.95	0.226	>638	2,942	>0.60	67	1,440	3070 J	12.6 J	0.479 J	>638	3,976	>0.60
87	2 U	332	9.39	0.357	<31	510	>0.60	57	1,480	3,070	6.12	0.233	>638	4,371	>0.60	77	1430 J	3640 J	8.19 J	0.311 J	>638	3,703	>0.60
97	2 U	328	6.99	0.266	<31	513	>0.60	67	1,710	3,010	5.79	0.220	>638	4,383	>0.60	87	1440 J	3780 J	8.39 J	0.319 J	>638	3,983	>0.60
117	2 U	252	0.297	0.0113	<31	348.1	0.3	77	1,720	3,400	5.66	0.215	>638	4,663	>0.60	97	1490 J	3400 J	7.92 J	0.301 J	>638	4,194	>0.60
127	2 U	264	0.217	0.00825	<31	359.3	0.4	87	1,730	3,700	10.6	0.403	>638	4,880	>0.60	103	1370 J	3700 J	8.76 J	0.333 J	>638	4,138	>0.60
137	2 U	268	0.231	0.00878	<31	361.7	0.44	97	1,790	3,970	11.1	0.422	>638	5,090	>0.60	117	996	2,250	0.221 U	-	>638	2,809	>0.60
147	2 U	338	0.154	0.00585	<31	375.9	>0.60	107	1,750	3,730	10.6	0.403	>638	4,934	>0.60	127	1,470	2,950	5.47	0.208	>638	3,988	>0.60
								117	1,190	2,700	6.32	0.240	>638	3,651	>0.60	132	1,330	3,070	5.26	0.200	>638	4,236	>0.60
								127	1,530	3,280	6.58	0.250	>638	4,095	>0.60	147	1,670	3,010	7.37	0.280	>638	4,358	>0.60
								137	182	738	0.396	0.0150	180	920	>0.60								
								147	60.9	448	0.263	0.0100	54	554	0.24								

MW40D							
Sample Depth	Analytical Results			Un-ionized Ammonia (mg/L)	Field Screening Parameters		
	Chloride (mg/L)	TDS (mg/L)	Ammonia (mg/L)		Chloride (ppm)	Sp Cond (µS/cm ^o)	Dissolved Ammonia (mg/L)
57	1,860	4,000	89.5	3.40	>638	5,650	>0.60
107	2.37	398	4.77	0.181	<31	490.6	>0.60
117	2.04	388	2.51	0.0954	<31	585	>0.60
127	2.42	370	4.96	0.188	<31	617	>0.60
137	2.09	278	0.343 U	-	<31	412.4	0.41
147	2 U	248	0.293 U	-	<31	419.2	0.12

NR - Not recorded
J - Estimated
U - Not detected or not detected at significantly greater than that in an associated blank.
UJ - Nondetect, estimated quantitation limit.
All concentrations compared to PA 451 Part 201 Residential and Commercial (R&C) I Drinking Water (DW) and Groundwater-Surface Water Interface (GSI) Criteria.
- Shading indicates a concentration that exceeds the R&C I DW Criteria (250 mg/L Chloride).
- Bold indicates a concentration that exceeds the R&C GSI Criteria (0.029 mg/L ammonia [un-ionized] & 500 mg/L TDS).
- Italics indicates a concentration that exceeds the Final Acute Value form MDNRE Water Quality Rule 57 (0.320 mg/L un-ionized ammonia) from MDNRE Op Memo 1, Footnote CC (0.029 mg/L un-ionized Ammonia)

TABLE 2

Groundwater Monitoring Well Sampling Results

*Plant Site Exfiltration Study Deep Groundwater Field Investigation Report**The Dow Chemical Company**Ludington, Michigan*

Well ID	Date Collected	Chloride (mg/L)	TDS (mg/L)	Ammonia (mg/L)	Un-ionized Ammonia (mg/L)
MW-15D	9/22/09 12:35	626	2530	4.74	0.180
MW-15S	9/22/09 12:05	1670	3520	7.51	0.285
MW-16D	9/22/09 14:30	2.01	344 U	4.26	0.162
MW-16S	9/23/09 15:40	1380	3470	4.6	0.175
MW-17S	9/23/09 12:05	65.2	400	0.116 U	-
MW-19D	9/22/09 16:35	2.15	190 U	0.298 U	-
MW-19S	9/23/09 17:15	2070	5670	37	1.41
MW-37D	9/22/09 15:25	2 U	280 U	0.787 U	-
MW-37S	9/23/09 16:25	903	2270	169	6.42
MW-38D	9/23/09 8:25	1450	3270	10.8	0.410
MW-38S	9/23/09 8:55	919	2720	4.57	0.174
MW-39D	9/22/09 17:45	967	2540	5.25	0.200
MW-39S	9/22/09 17:15	1230	3020	7.94	0.302
MW-40D	9/22/09 18:50	2 U	452	1.98	0.0752
MW-40S	9/22/09 18:20	1560	4960	81.9	3.11

FD - Field Duplicate

J - Estimated

U - Not detected or not detected at significantly greater than that in an associated blank.

UJ - Nondetect, estimated quantitation limit.

All concentrations compared to PA 451 Part 201 Residential and Commercial (R&C) I Drinking Water (DW) and Groundwater-Surface Water Interface (GSI) Criteria.

- Shading indicates a concentration that exceeds the R&C I DW Criteria (250 mg/L Chloride).

- Bold indicates a concentration that exceeds the R&C I GSI Criteria (0.029 mg/L ammonia [un-ionized] & 500 mg/L TDS).

- Italics indicates a concentration that exceeds the Final Acute Value from MDNRE Water Quality Rule 57 (0.320 mg/L Ammonia) from MDNRE Op Memo 1, Footnote CC

TABLE 3

Groundwater Elevation Data

Plant Site Exfiltration Study Deep Groundwater Field Investigation Report

The Dow Chemical Company

Ludington, Michigan

Monitoring Well ID	Surveyed Elevation at TOC	Depth to Water 9/22/09	Groundwater Elevation 9/22/09	Depth to Water 9/30/09	Groundwater Elevation 9/30/09	Depth to Water 10/7/09	Groundwater Elevation 10/7/09	Depth to Water 10/12/09	Groundwater Elevation 10/12/09	Depth to Water 11/18/09	Groundwater Elevation 11/18/09	Depth to Water 1/7/2010	Groundwater Elevation 1/7/2010
MW-15S	593.42	13.07	580.35	13.18	580.24	13.10	580.32	13.19	580.23	13.08	580.34	12.95	580.47
MW-15D	591.68	11.23	580.45	11.34	580.34	11.27	580.41	11.34	580.34	11.22	580.46	11.08	580.60
MW-16S	588.96	9.08	579.88	9.18	579.78	9.23	579.73	9.23	579.73	9.33	579.63	9.43	579.53
MW-16D	588.73	7.51	581.22	7.62	581.11	7.62	581.11	7.65	581.08	7.54	581.19	7.43	581.30
MW-17S	594.01	7.35	586.66	7.28	586.73	7.23	586.78	7.32	586.69	7.38	586.63	7.18	586.83
MW-19S ¹	589.97	10.64	579.33	10.77	579.20	10.68	579.29	7.99	581.98	10.67	579.30	10.30	579.67
MW-19D	588.38	8.05	580.33	8.01	580.37	7.85	580.53	8.06	580.32	7.88	580.50	NM	N/A
MW-37S	587.94	5.67	582.27	5.43	582.51	5.72	582.22	5.94	582.00	5.78	582.16	NM	N/A
MW-37D	587.83	6.08	581.75	6.06	581.77	5.94	581.89	6.92	580.91	5.86	581.97	NM	N/A
MW-38S	590.67	10.91	579.76	11.04	579.63	10.92	579.75	11.07	579.60	10.43	580.24	10.57	580.10
MW-38D	590.75	10.78	579.97	10.92	579.83	10.80	579.95	10.96	579.79	10.81	579.94	10.62	580.13
MW-39S	601.76	21.09	580.67	21.19	580.57	21.03	580.73	21.22	580.54	21.06	580.70	20.95	580.81
MW-39D	601.70	20.97	580.73	21.12	580.58	20.94	580.76	21.14	580.56	20.96	580.74	20.84	580.86
MW-40S	598.62	16.43	582.19	16.31	582.31	16.45	582.17	16.66	581.96	16.52	582.10	16.37	582.25
MW-40D	598.57	17.06	581.51	17.12	581.45	16.98	581.59	17.16	581.41	17.00	581.57	16.92	581.65

TOC = Top of Casing

NM = Well not measured due to difficulty locating in deep snow.

N/A = Not applicable (groundwater elevation cannot be calculated)

¹Depth to water measurement collected on 10/12/2009 believed to be erroneous.

TABLE 4
South Ponds Monitoring Wells - Vertical Gradient Summary
Plant Site Exfiltration Study Deep Groundwater Field Investigation Report
The Dow Chemical Company
Ludington, Michigan

Well Nest	Screen Midpoint Shallow	Screen Midpoint Deep	GW Elev. Shallow - 9/22/09	GW Elev. Deep - 9/22/09	Unconsolidated (Shallow to Deep) Vertical Gradient (ft/ft) 9/22/09	GW Elev. Shallow - 9/30/09	GW Elev. Deep - 9/30/09	Unconsolidated (Shallow to Deep) Vertical Gradient (ft/ft) 9/30/09	GW Elev. Shallow - 10/7/09	GW Elev. Deep - 10/7/09	Unconsolidated (Shallow to Deep) Vertical Gradient (ft/ft) 10/7/09	GW Elev. Shallow - 10/12/09	GW Elev. Deep - 10/12/09	Unconsolidated (Shallow to Deep) Vertical Gradient (ft/ft) 10/12/09	GW Elev. Shallow - 11/18/09	GW Elev. Deep - 11/18/09	Unconsolidated (Shallow to Deep) Vertical Gradient (ft/ft) 11/18/09	GW Elev. Shallow - 1/7/10	GW Elev. Deep - 1/7/10	Unconsolidated (Shallow to Deep) Vertical Gradient (ft/ft) 1/7/10
15	551.10	484.53	580.35	580.45	-0.002	580.24	580.34	-0.002	580.32	580.41	-0.001	580.23	580.34	-0.002	580.34	580.46	-0.002	580.47	580.60	-0.002
16	555.50	481.62	579.88	581.22	-0.018	579.78	581.11	-0.018	579.73	581.11	-0.019	579.73	581.08	-0.018	579.63	581.19	-0.021	579.53	581.30	-0.024
19	564.60	481.30	579.33	580.33	-0.012	579.20	580.37	-0.014	579.29	580.53	-0.015	581.98	580.32	0.020	579.30	580.50	-0.014	579.30	NA	NA
37	545.79	480.78	582.27	581.75	0.008	582.51	581.77	0.011	582.22	581.89	0.005	582.00	580.91	0.017	582.16	581.97	0.003	NA	NA	NA
38	549.81	483.87	579.76	579.97	-0.003	579.63	579.83	-0.003	579.75	579.95	-0.003	579.60	579.79	-0.003	580.24	579.94	0.005	580.10	580.13	0.000
39	551.70	481.63	580.67	580.73	-0.001	580.57	580.58	0.000	580.73	580.76	0.000	580.54	580.56	0.000	580.70	580.74	-0.001	580.81	580.86	-0.001
40	541.57	481.58	582.19	581.51	0.011	582.31	581.45	0.014	582.17	581.59	0.010	581.96	581.41	0.009	582.10	581.57	0.009	582.25	581.65	0.010

Note: Negative values for vertical gradients indicate upward movement. Positive values indicate downward movement.
NA = Not Available
All elevations in feet above mean sea level

TABLE 5

Monitoring Well Construction Summary and Survey Data

*Plant Site Exfiltration Study Deep Groundwater Field Investigation Report**The Dow Chemical Company**Ludington, Michigan*

Monitoring Well	Northing	Easting	Elevation at TOC	Elevation at Grade	Top of Screen (from Grade)	Bottom of Screen (from Grade)	Top of Screen Elevation	Bottom of Screen Elevation	Total Boring Depth (from Grade)
MW-15S ¹	232095.95	19142570.64	593.42	591.72	39.17	42.17	552.55	549.55	42.17
MW-15D	232096.93	19142609.14	591.68	592.03	105.00	110.00	487.03	482.03	147.00
MW-16S ¹	231318.77	19141629.05	588.96	588.96	31.93	34.93	557.03	554.03	34.93
MW-16D	231306.84	19141604.92	588.73	589.12	105.00	110.00	484.12	479.12	147.00
MW-17S ^{1,2}	229467.65	19143552.99	594.01	588.53	29.77	32.77	558.76	555.76	32.77
MW-19S ¹	231158.16	19143678.54	589.97	589.15	23.05	26.05	566.09	563.09	26.05
MW-19D	231171.61	19143663.25	588.38	588.80	105.00	110.00	483.80	478.80	147.00
MW-37S	230418.96	19141617.33	587.94	588.29	40.00	45.00	548.29	543.29	45.00
MW-37D	230414.64	19141622.31	587.83	588.28	105.00	110.00	483.28	478.28	147.00
MW-38S	231756.99	19143348.28	590.67	591.31	39.00	44.00	552.31	547.31	44.00
MW-38D	231753.21	19143348.29	590.75	591.37	105.00	110.00	486.37	481.37	147.00
MW-39S	231348.00	19142974.64	601.76	602.20	48.00	53.00	554.20	549.20	53.00
MW-39D	231342.51	19142975.12	601.70	602.14	118.00	123.00	484.14	479.14	147.00
MW-40S	230678.18	19142343.36	598.62	599.07	55.00	60.00	544.07	539.07	60.00
MW-40D	230678.43	19142337.47	598.57	599.08	115.00	120.00	484.08	479.08	147.00

Elevations are measured in feet above mean sea level

¹Monitoring well installed previous to 2009 Field Investigation.²Elevations listed may not be accurate due to well casing heaving. Well is scheduled to be replaced in early 2010.

Figures

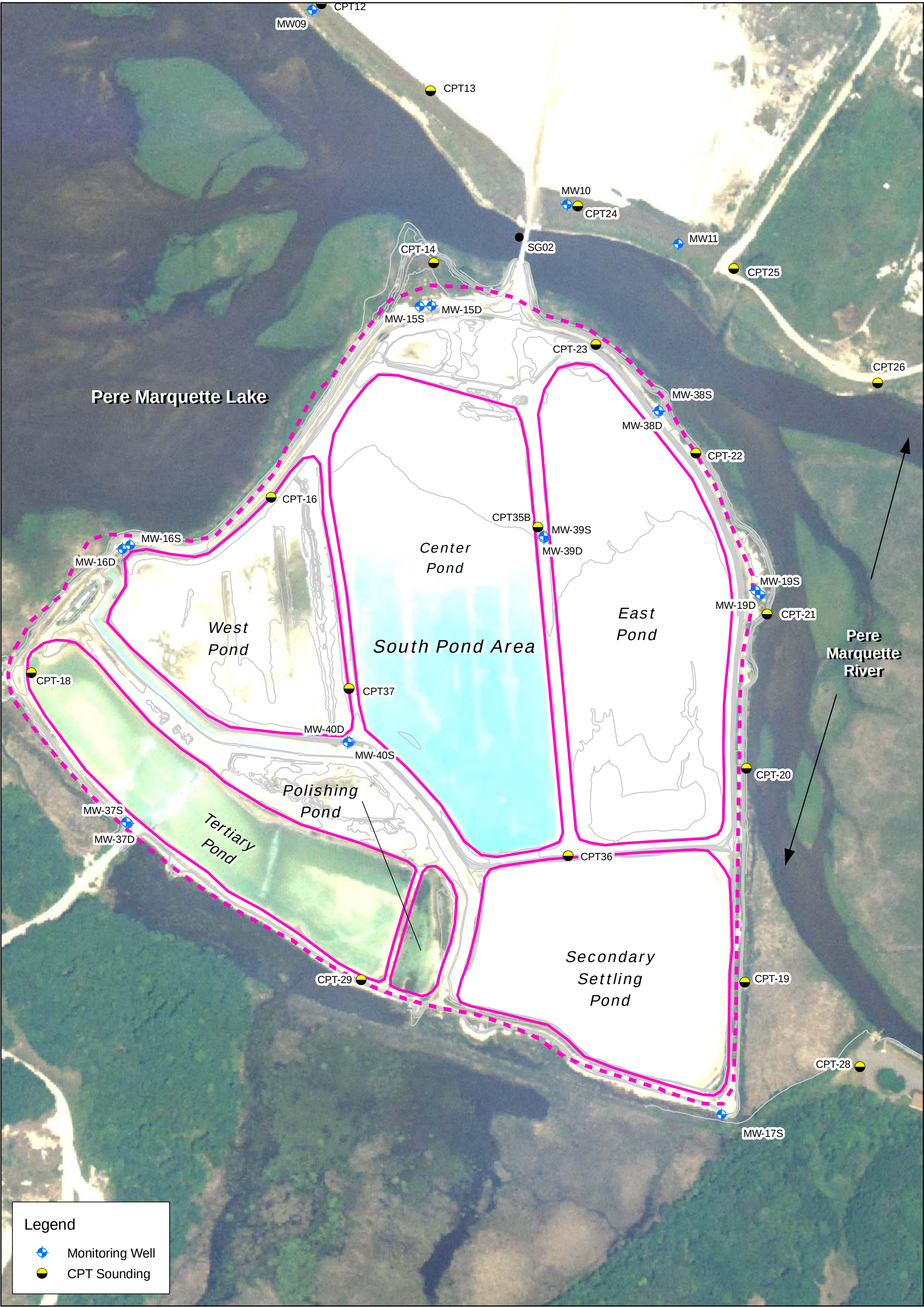
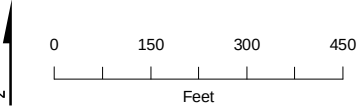


Figure 1
South Pond Area Site Map
Plant Site Exfiltration Study Deep Groundwater FI Report
The Dow Chemical Company
Ludington Plant Site



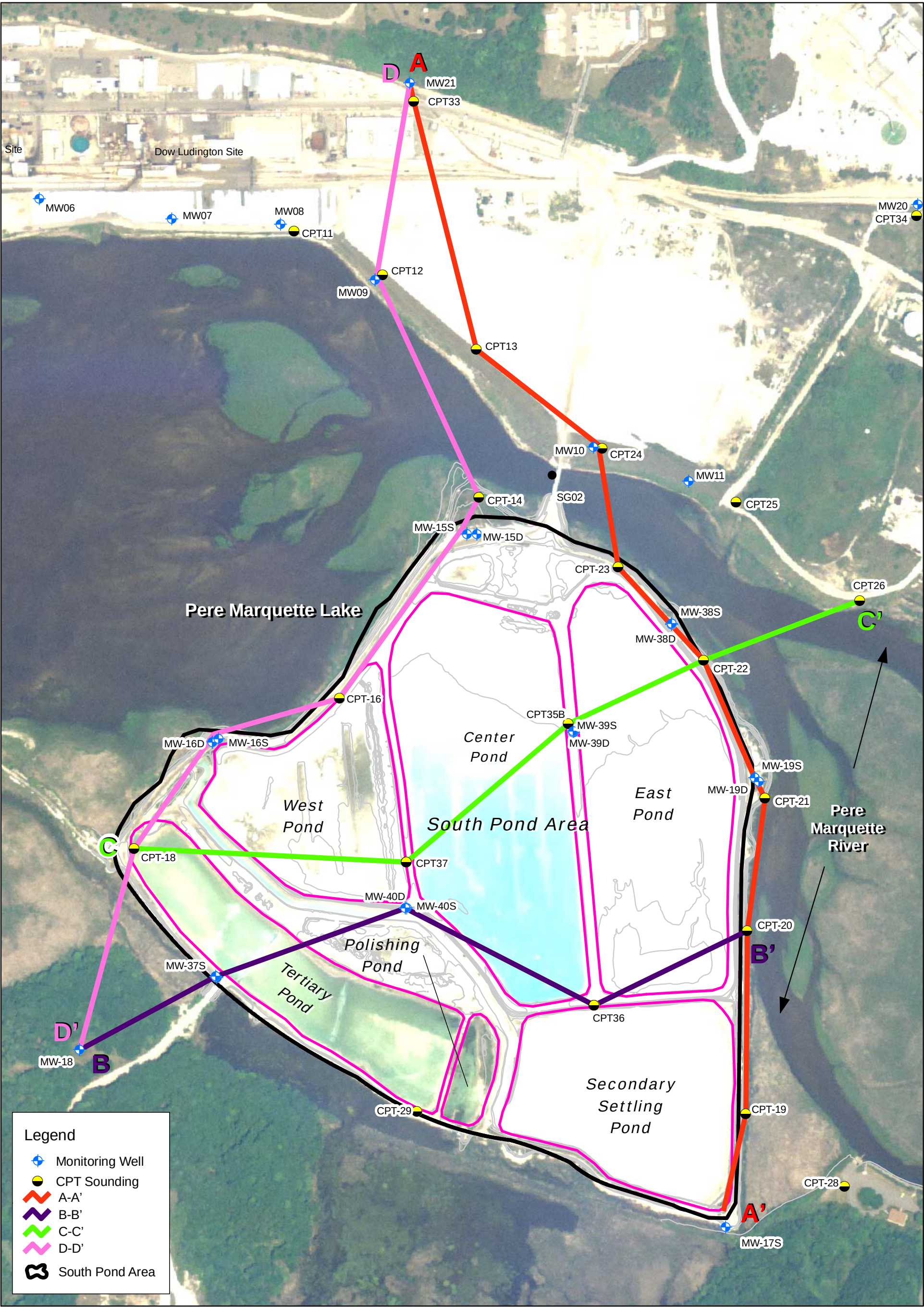
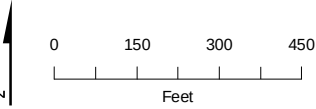


Figure 2
Cross-Section Transect Map
Plant Site Exfiltration Study Deep Groundwater FI Report
The Dow Chemical Company
Ludington Plant Site



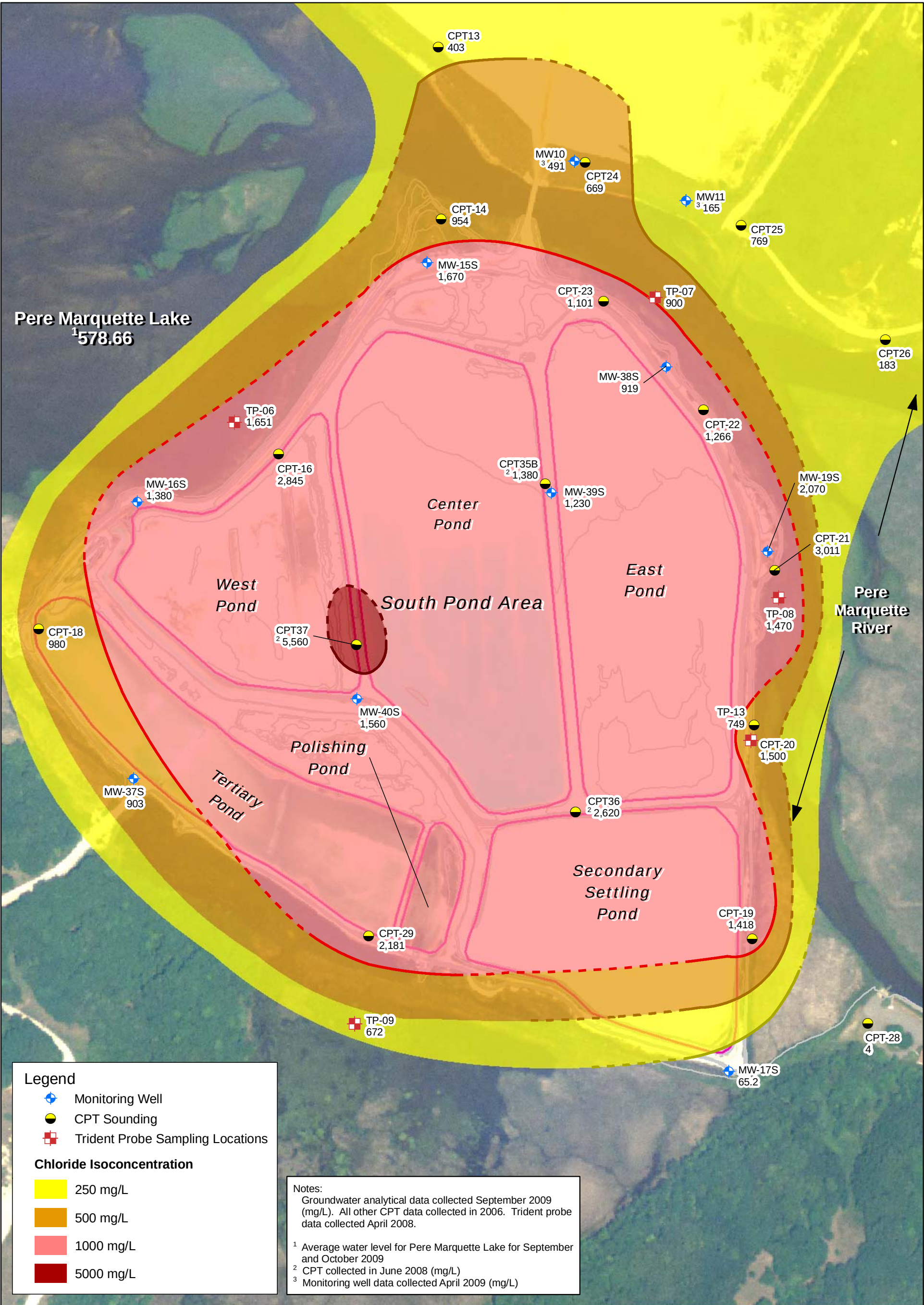
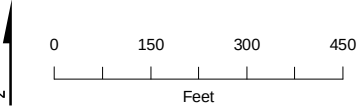


Figure 3
Shallow Monitoring Well Chloride Concentration Contour Map
September 2009
Plant Site Exfiltration Study Deep Groundwater FI Report
The Dow Chemical Company
Ludington Plant Site



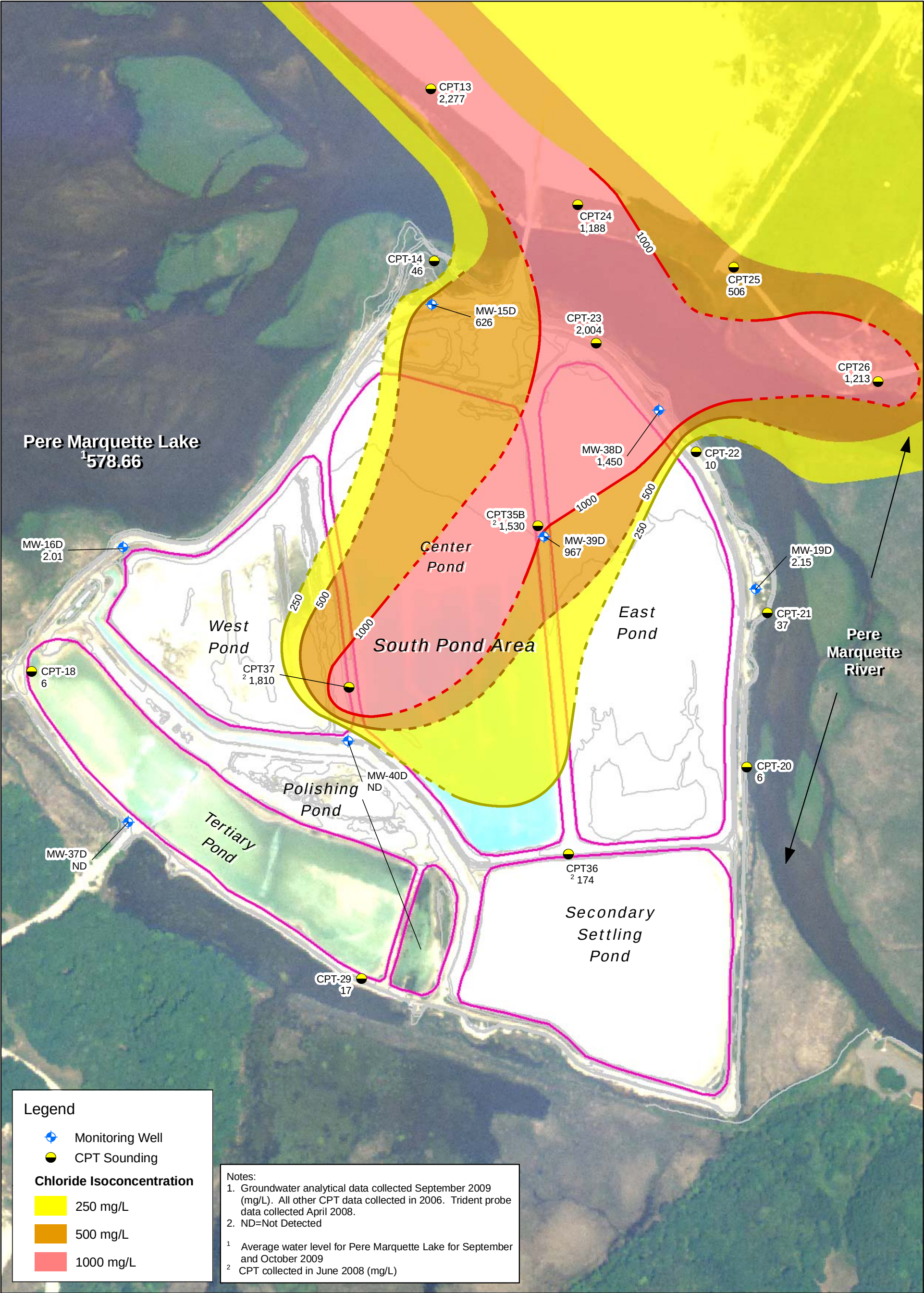
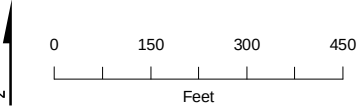


Figure 4
Deep Monitoring Well Chloride Concentration Contour Map
September 2009
Plant Site Exfiltration Study Deep Groundwater FI Report
The Dow Chemical Company
Ludington Plant Site



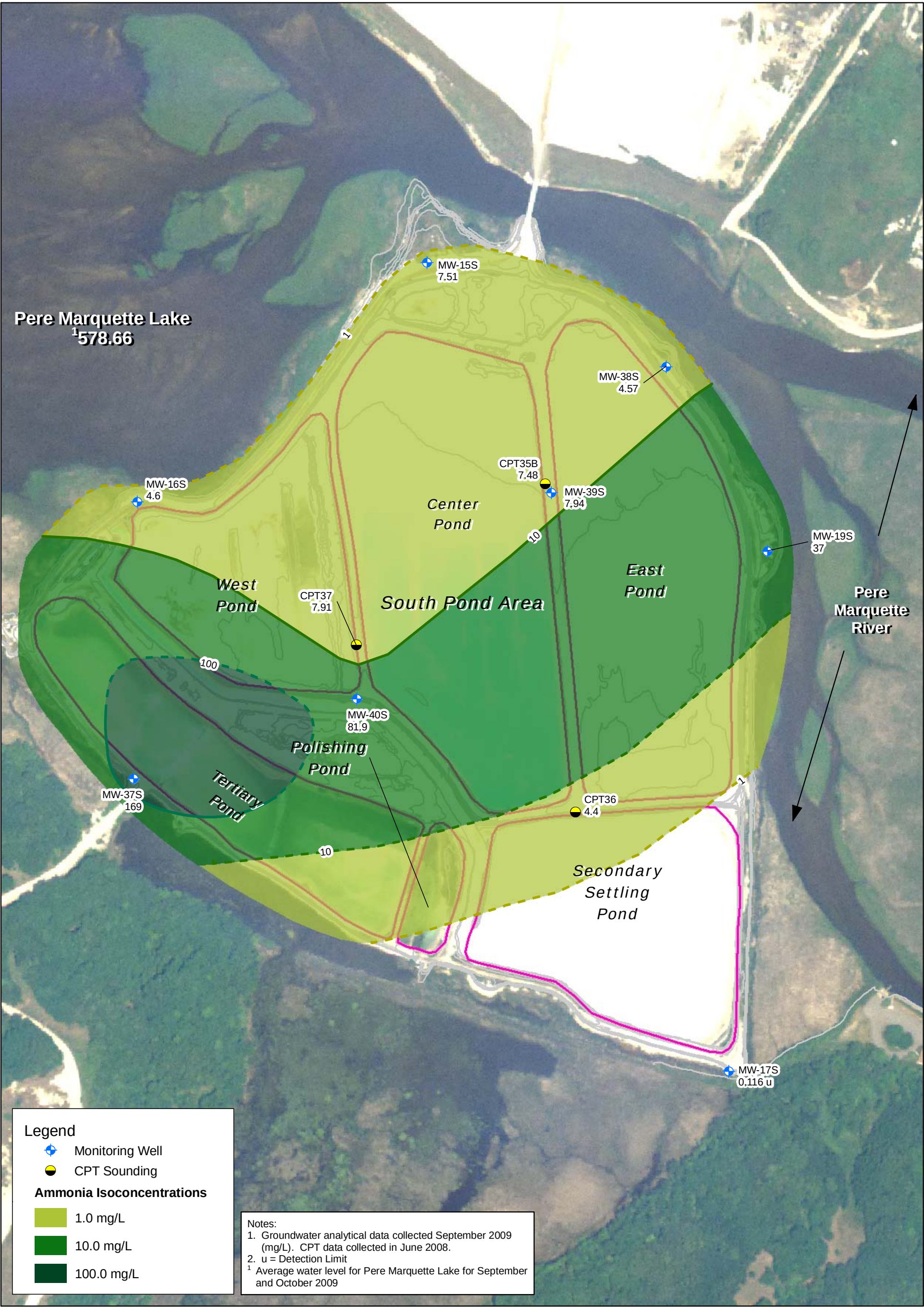


Figure 5
Shallow Monitoring Well Ammonia Concentration Contour Map
September 2009
Plant Site Exfiltration Study Deep Groundwater FI Report
The Dow Chemical Company
Ludington Plant Site

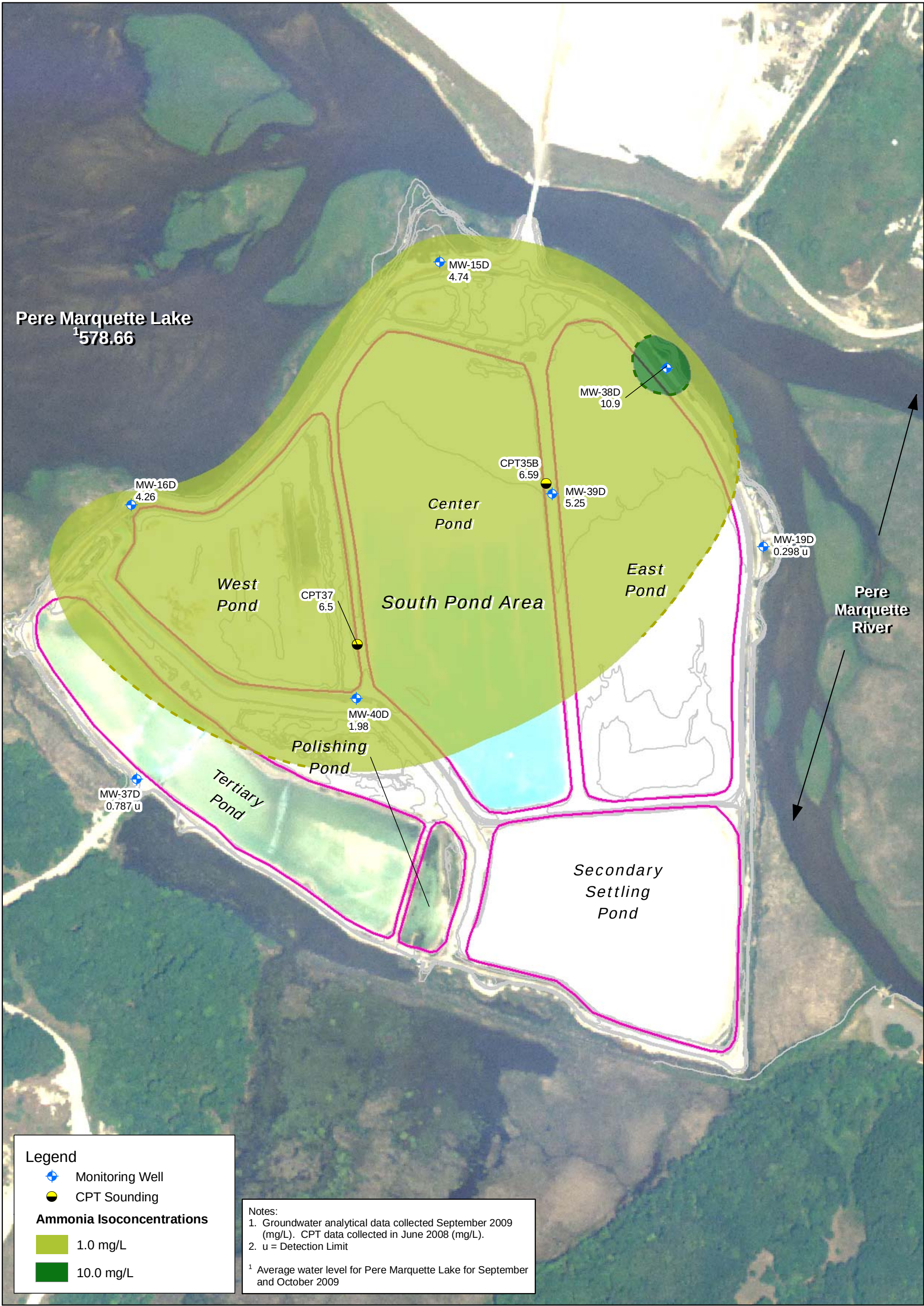
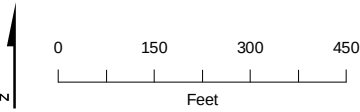


Figure 6
Deep Monitoring Well Ammonia Concentration Contour Map
September 2009
Plant Site Exfiltration Study Deep Groundwater FI Report
The Dow Chemical Company
Ludington Plant Site



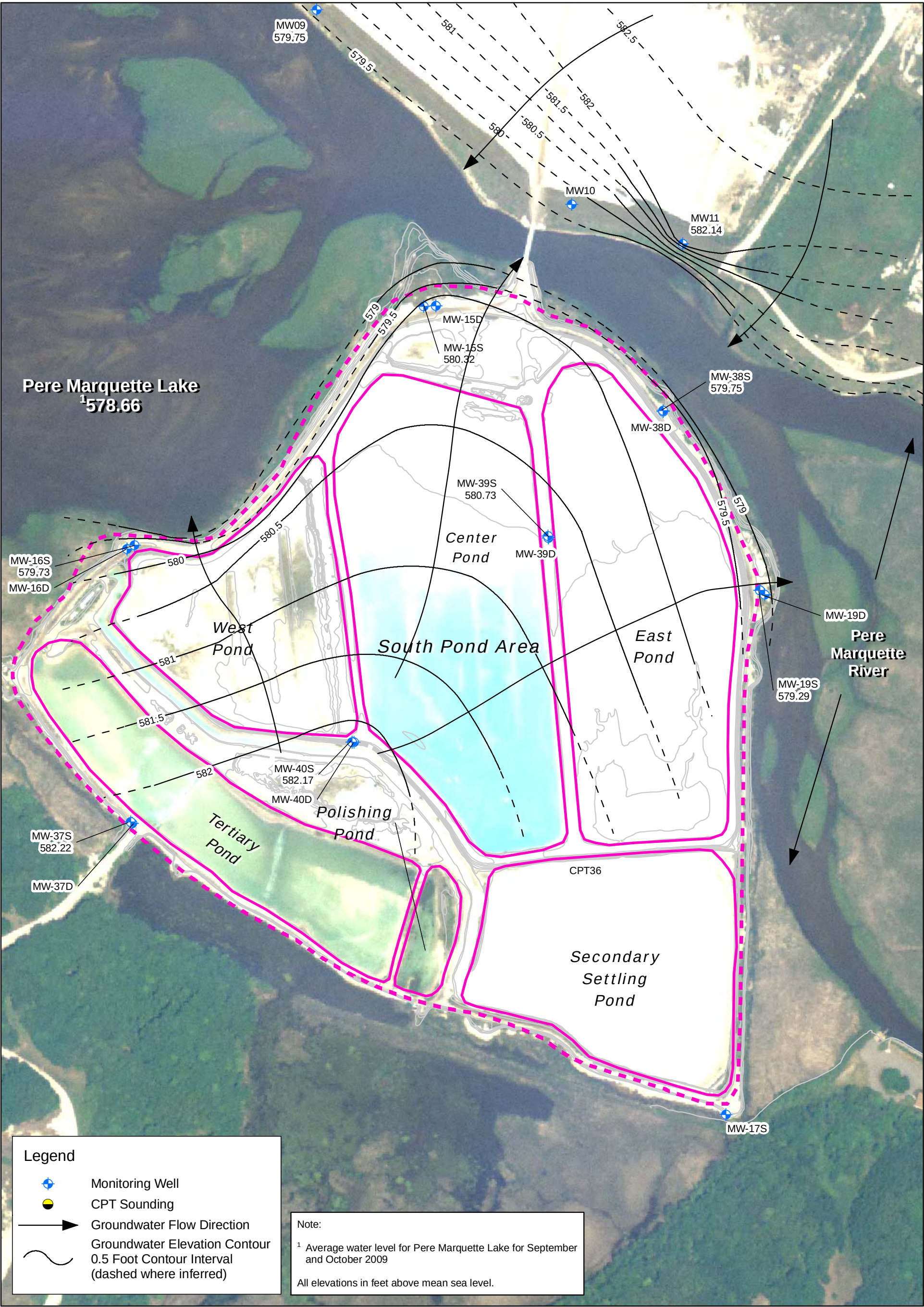


Figure 7
Shallow Groundwater Elevation Map
October 7, 2009
Plant Site Exfiltration Study Deep Groundwater FI Report
The Dow Chemical Company
Ludington Plant Site

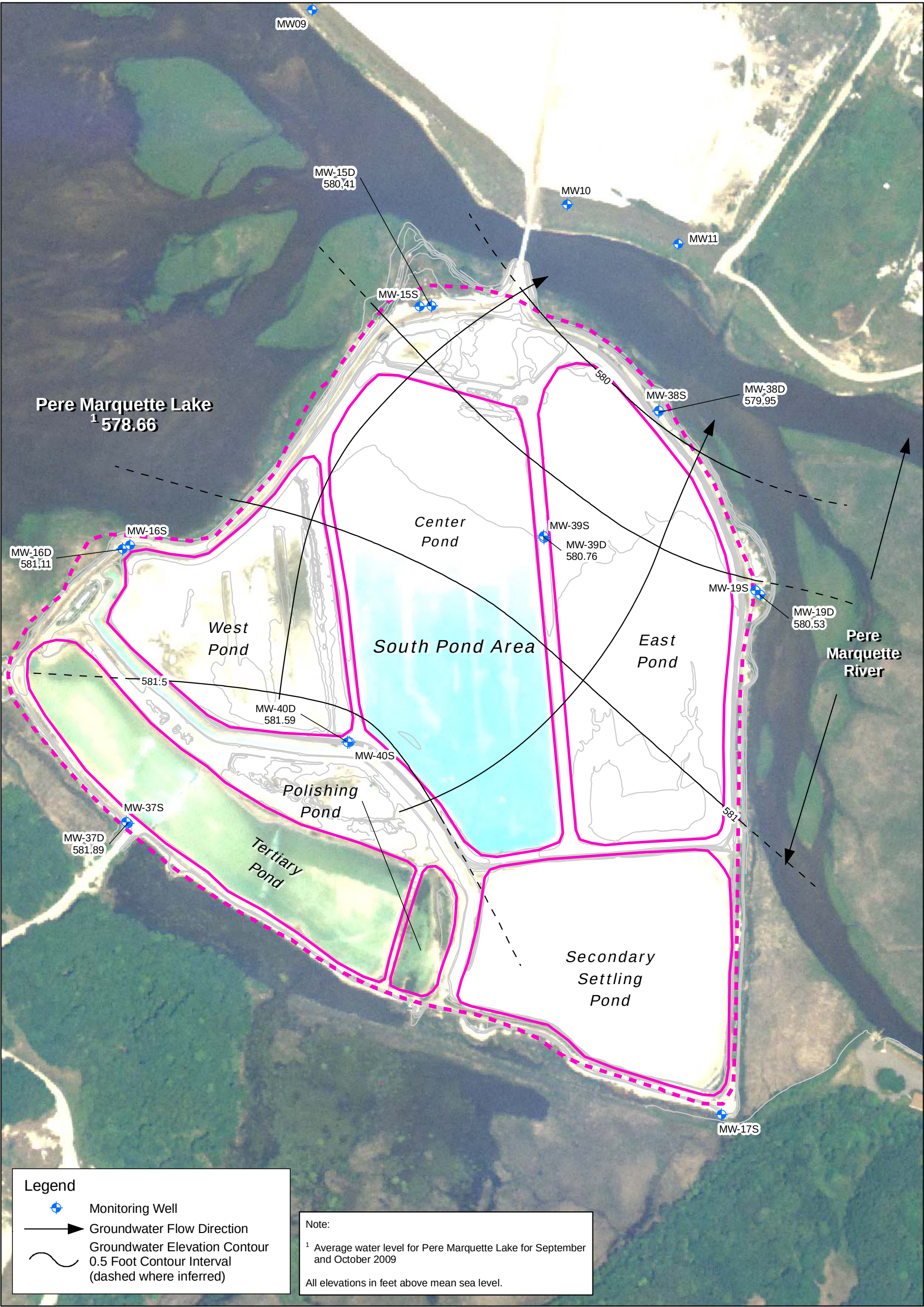


Figure 8
Deep Groundwater Elevation Map
October 7, 2009
Plant Site Exfiltration Study - Deep Groundwater FI Report
The Dow Chemical Company
Ludington Plant Site

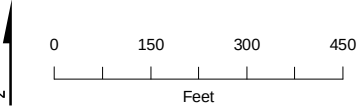
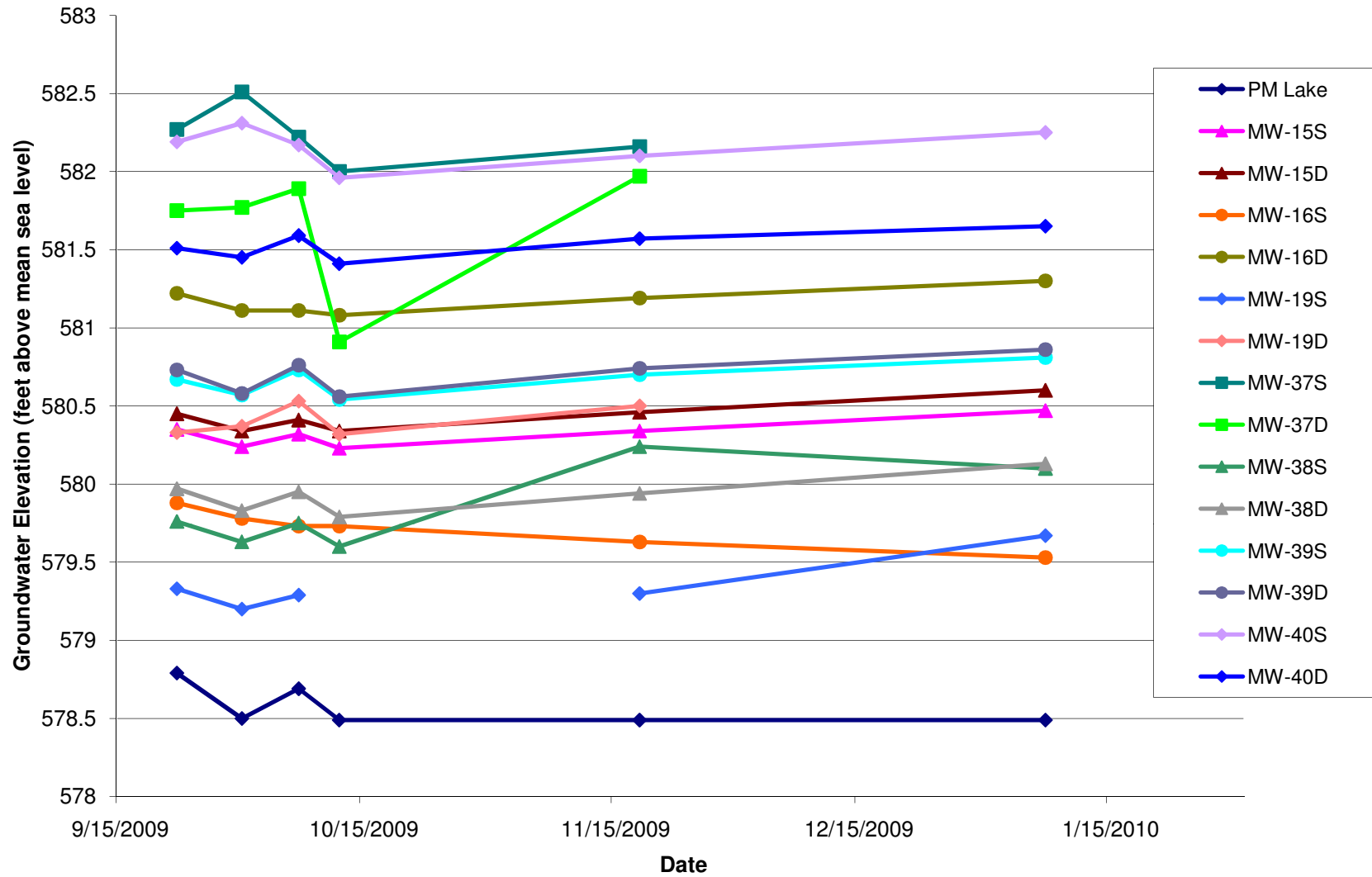


Figure 9 - Groundwater/Surface Water Hydrograph



$$\text{Mass Balance: Mass of Cl}^-/\text{TDS} \sim \left(\text{Influent Mass of Cl}^-/\text{TDS} + \text{Precipitation Mass of Cl}^-/\text{TDS} - \text{Effluent Mass of Cl}^-/\text{TDS} \right)$$

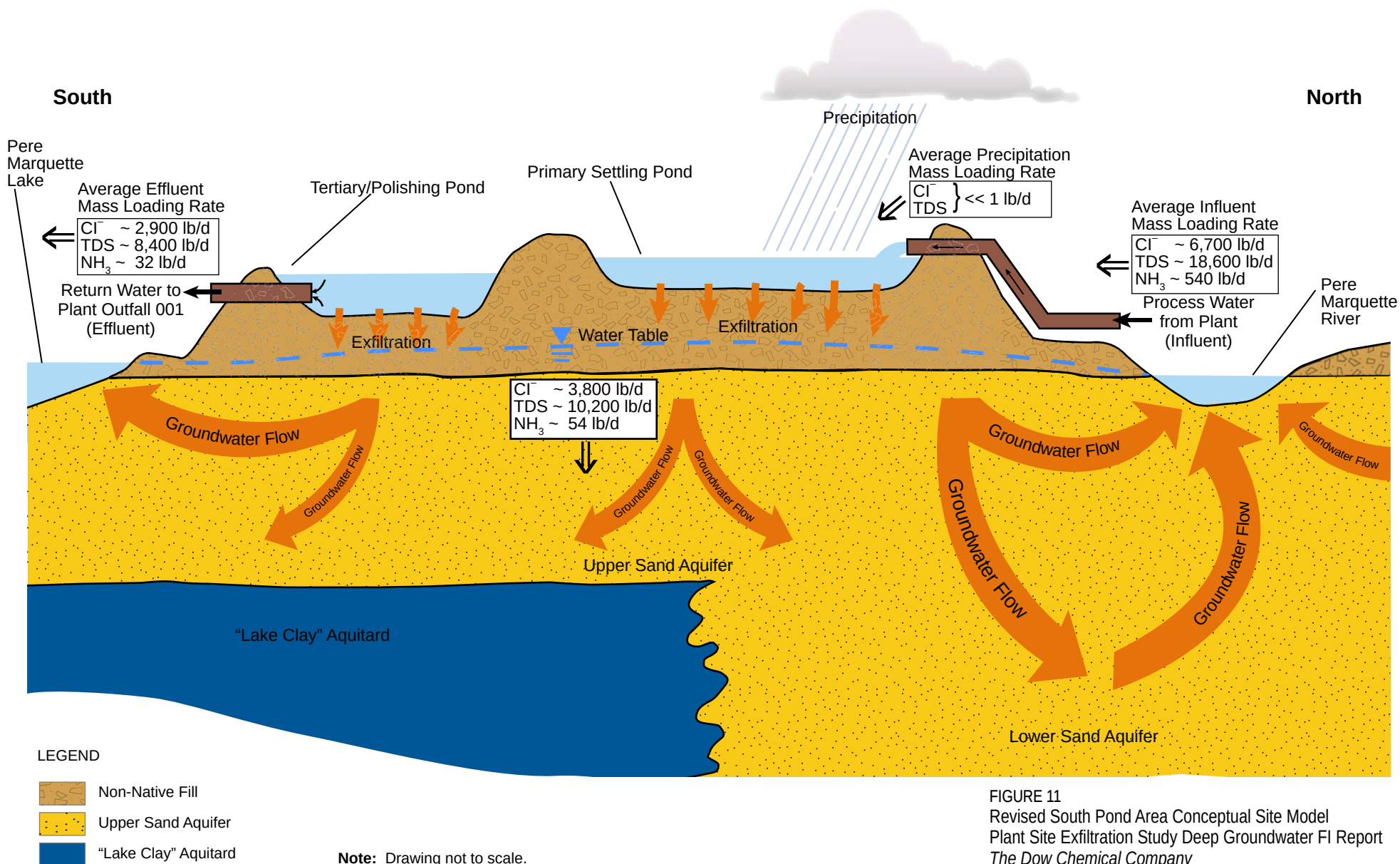


FIGURE 11
 Revised South Pond Area Conceptual Site Model
 Plant Site Exfiltration Study Deep Groundwater FI Report
 The Dow Chemical Company
 Ludington Plant Site

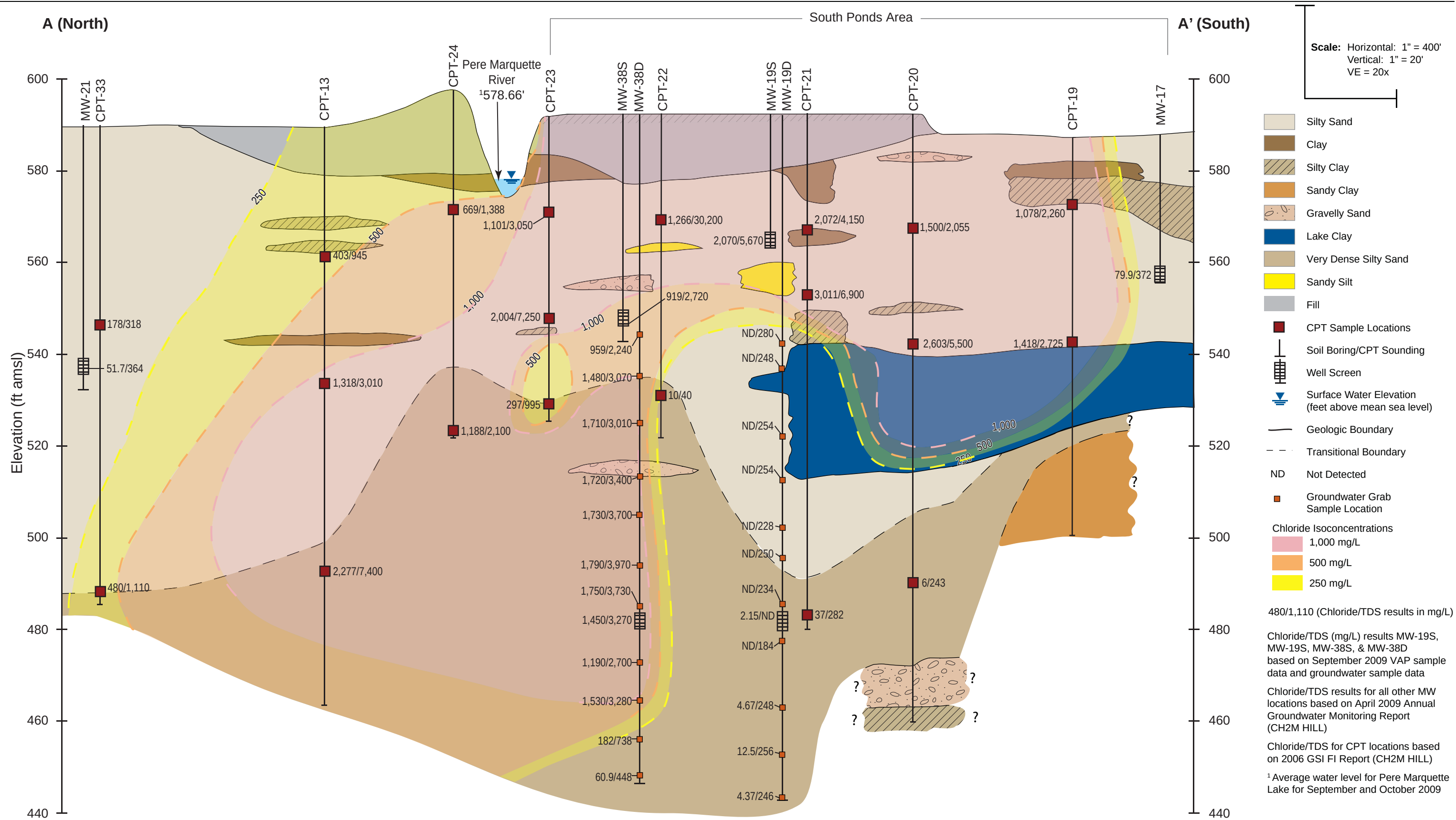
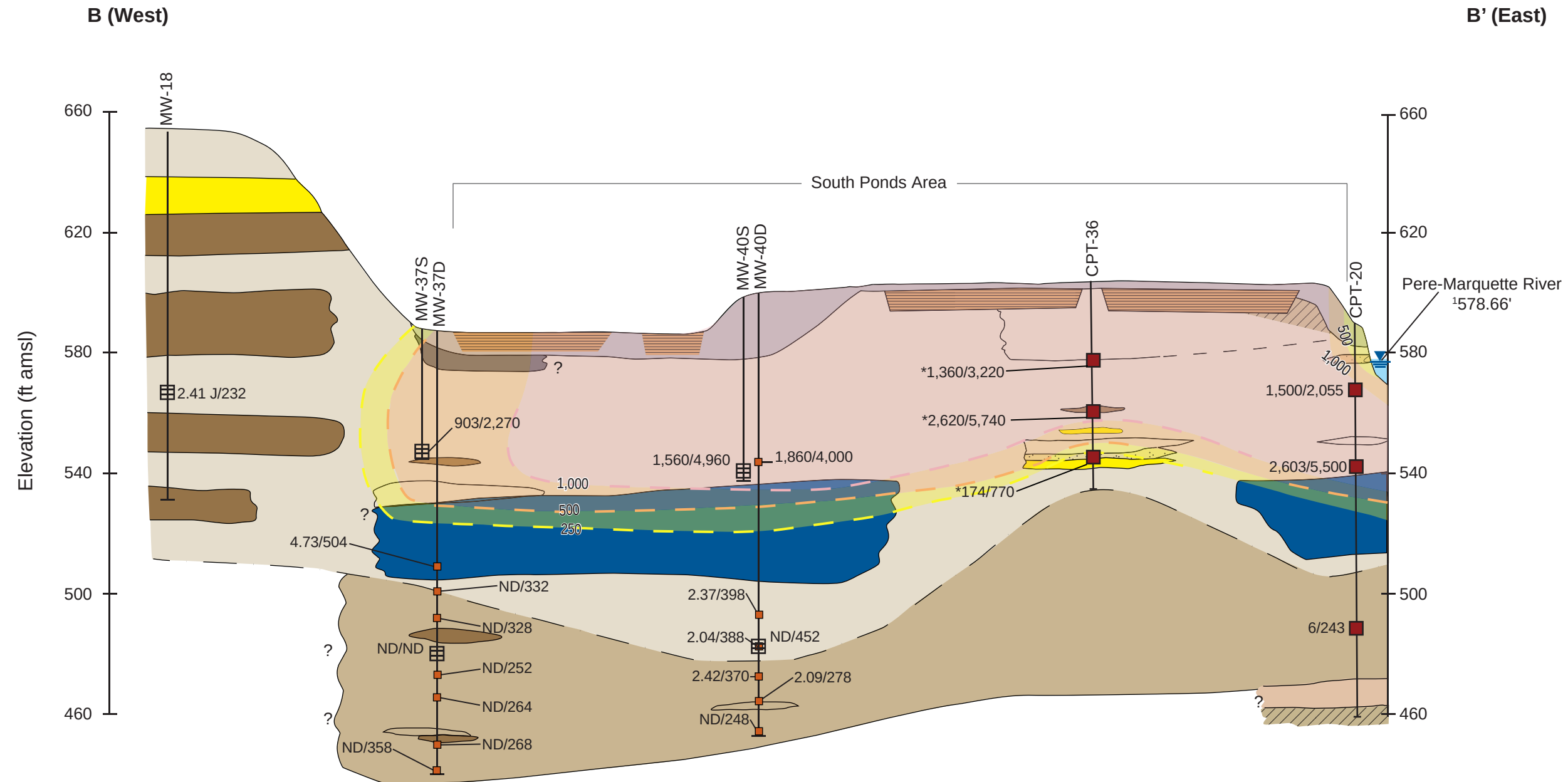


FIGURE 12
Geologic Cross Section A-A' (with Chloride Isopleths)
Plant Site Exfiltration Study Deep Groundwater FI Report
The Dow Chemical Company
Ludington Plant Site



LEGEND

	Fill		Silty Sand with Gravel		Soil Boring/CPT Sounding
	Clay		Very Dense Silty Sand		Well Screen
	Silty Sand		Dense Gravelly Sand		Geologic Boundary
	Silt		Lime Solids		Transitional Boundary
	Lake Clay		Organics		Not Detected
	Silty Clay		CPT Sample Locations		Surface Water Elevation (feet above mean sea level)

Chloride Isoconcentrations (dashed where inferred)

	1,000 mg/L
	500 mg/L
	250 mg/L
	Groundwater Grab Sample Location
	480/1,110 (Chloride/TDS results in mg/L)

Chloride/TDS (mg/L) results for MW-37S, MW-37D, MW-40S, & MW-40D based on September 2009 VAP sample data and groundwater sample data

Chloride/TDS (mg/L) results for all other MW locations based on April 2009 Annual Groundwater Monitoring Report (CH2M HILL)

* Chloride and TDS (mg/L) samples collected in June 2008

Chloride/TDS for all other CPT locations based on 2006 GSI FI Report (CH2M HILL)

¹ Average water level for Pere Marquette Lake for September and October 2009

Scale: Horizontal: 1" = 300'
Vertical: 1" = 40'
VE = 7.5x

FIGURE 13
Geologic Cross Section B-B' (with Chloride Isopleths)
Plant Site Exfiltration Study Deep Groundwater FI Report
The Dow Chemical Company
Ludington Plant Site

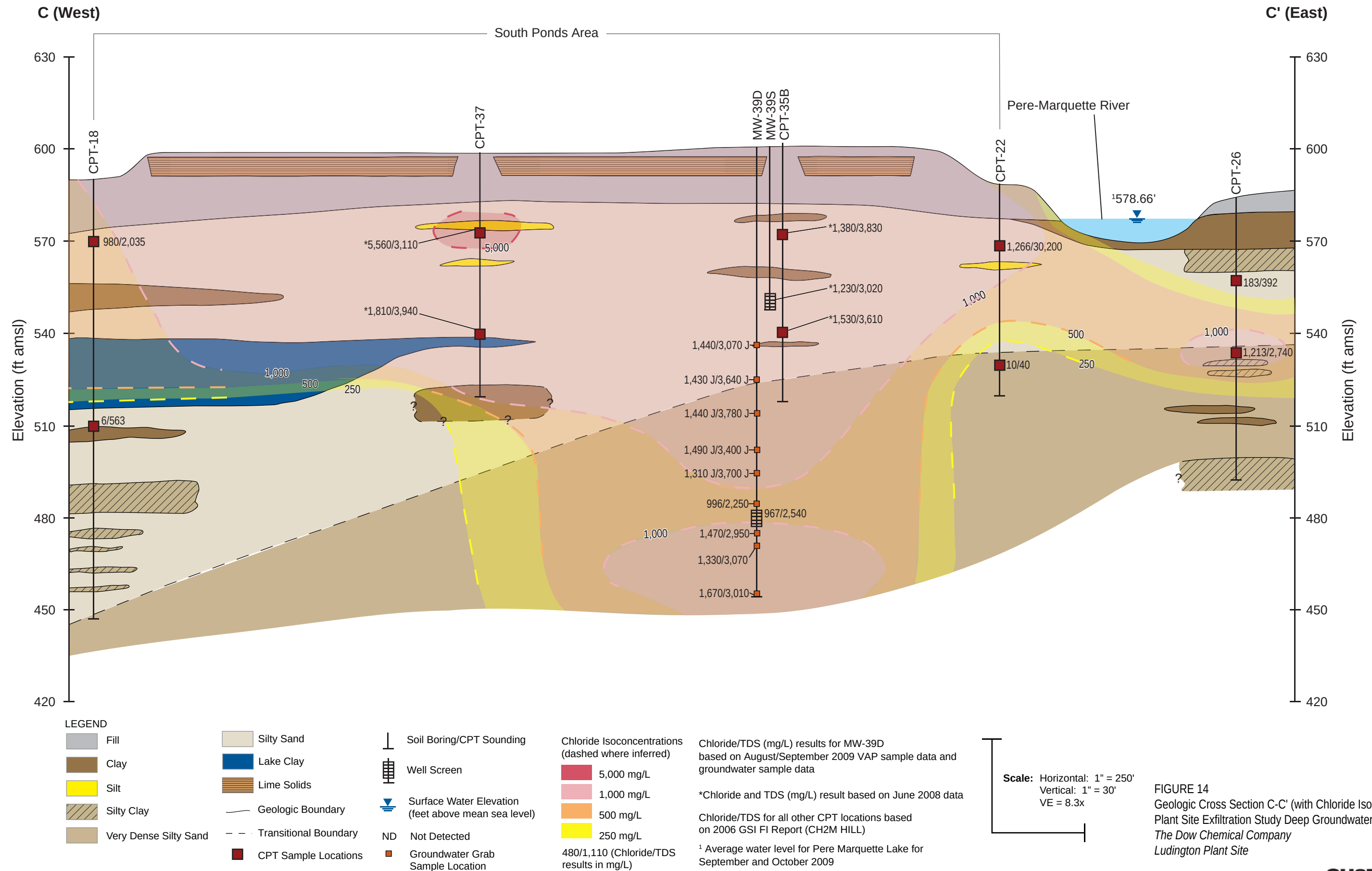
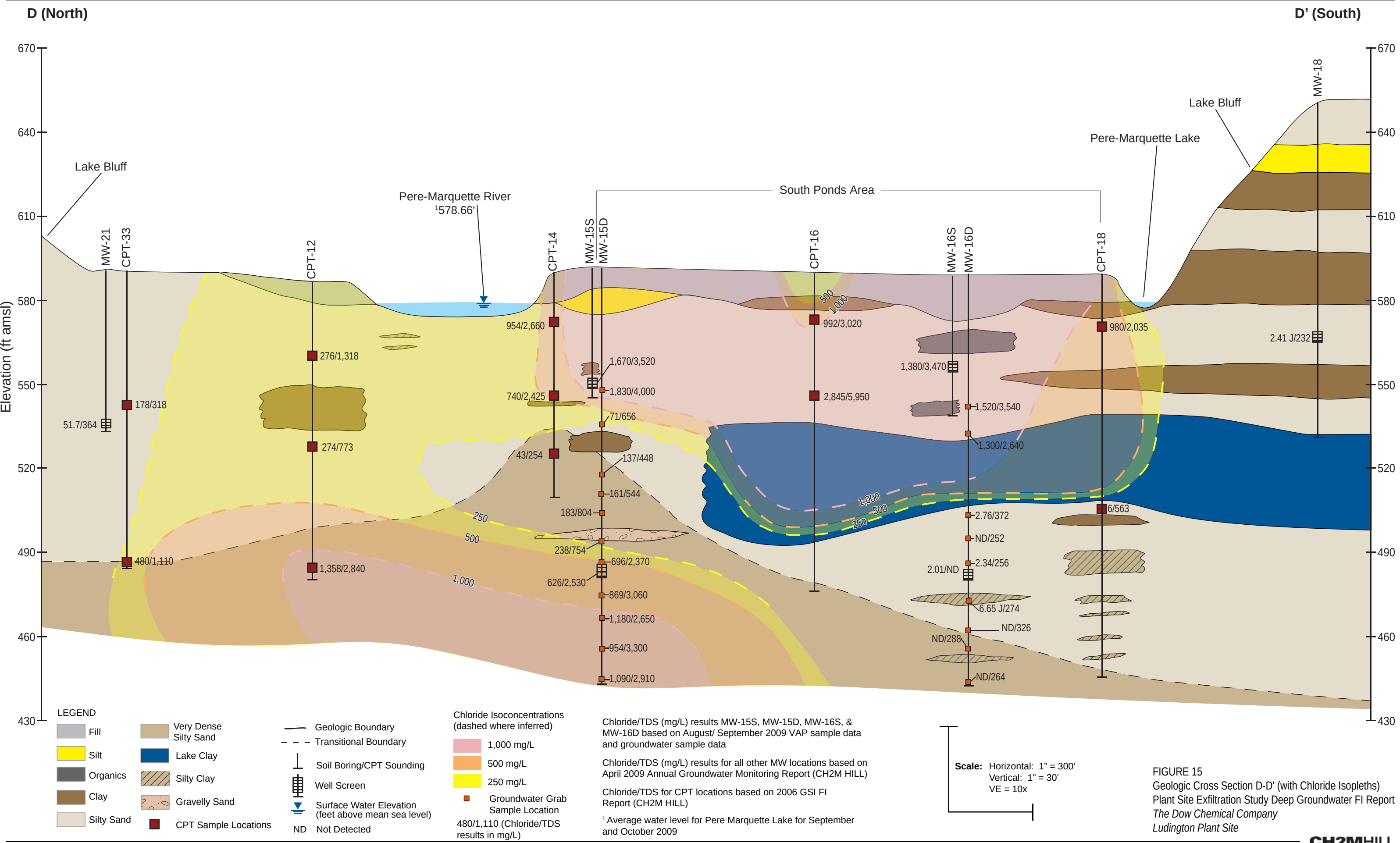


FIGURE 14
Geologic Cross Section C-C' (with Chloride Isoleths)
Plant Site Exfiltration Study Deep Groundwater FI Report
The Dow Chemical Company
Ludington Plant Site



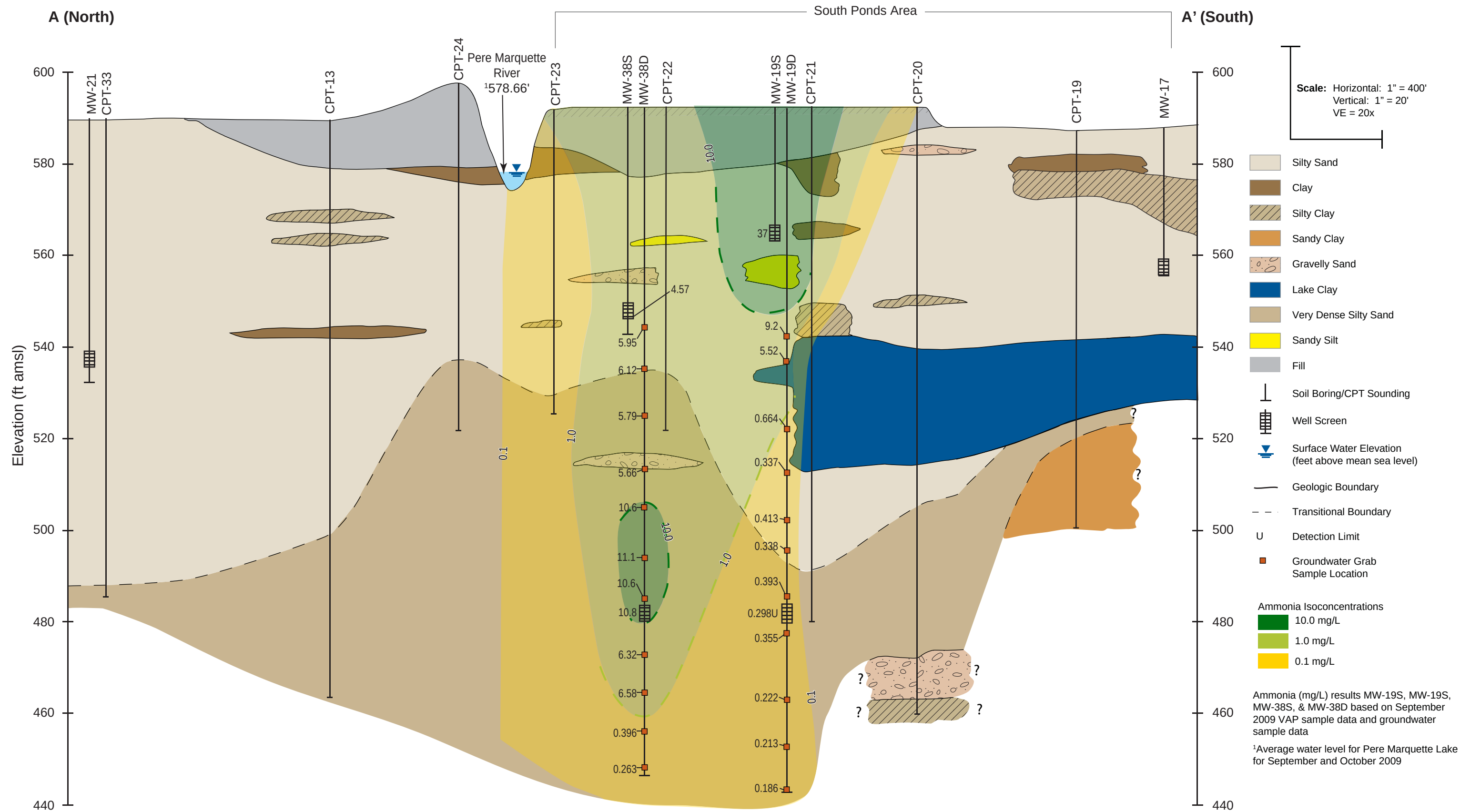
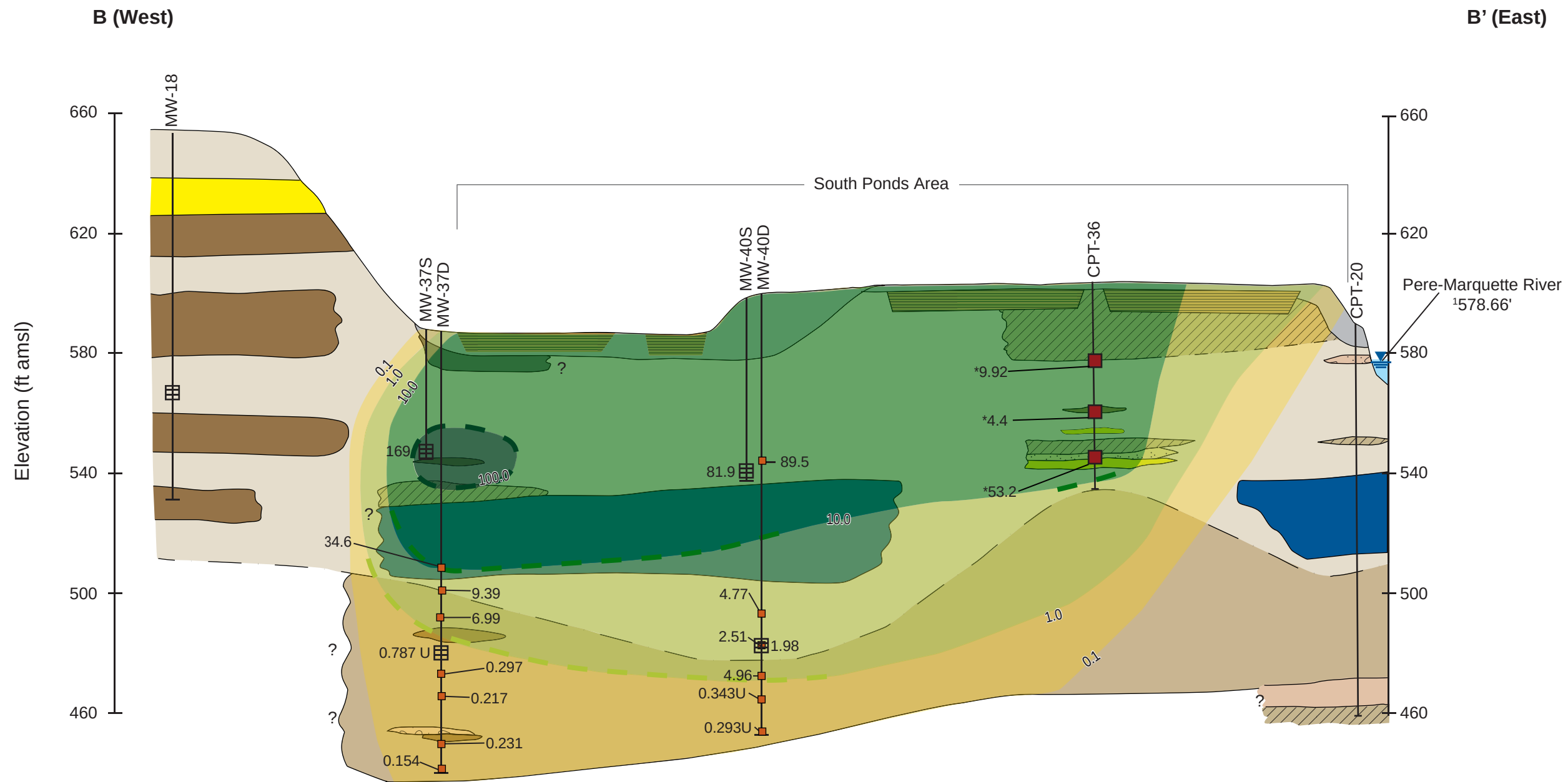


FIGURE 16
Geologic Cross Section A-A' (with Ammonia Isopleths)
Plant Site Exfiltration Study Deep Groundwater FI Report
The Dow Chemical Company
Ludington Plant Site



LEGEND

	Fill		Silty Sand with Gravel		Soil Boring/CPT Sounding
	Clay		Very Dense Silty Sand		Well Screen
	Silty Sand		Dense Gravelly Sand		Geologic Boundary
	Silt		Lime Solids		Transitional Boundary
	Lake Clay		Organics		Detection Limit
	Silty Clay		CPT Sample Locations		Surface Water Elevation (feet above mean sea level)

Chloride Isoconcentrations

	100.0 mg/L
	10.0 mg/L
	1.0 mg/L
	0.1 mg/L
	Groundwater Grab Sample Location

Ammonia (mg/L) results for MW-37S, MW-37D, MW-40S, & MW-40D based on September 2009 VAP sample data and groundwater sample data

* Ammonia (mg/L) samples collected in June 2008

¹ Average water level for Pere Marquette Lake for September and October 2009

Scale: Horizontal: 1" = 300'
Vertical: 1" = 40'
VE = 7.5x

FIGURE 17
Geologic Cross Section B-B' (with Ammonia Isopleths)
Plant Site Exfiltration Study Deep Groundwater FI Report
The Dow Chemical Company
Ludington Plant Site

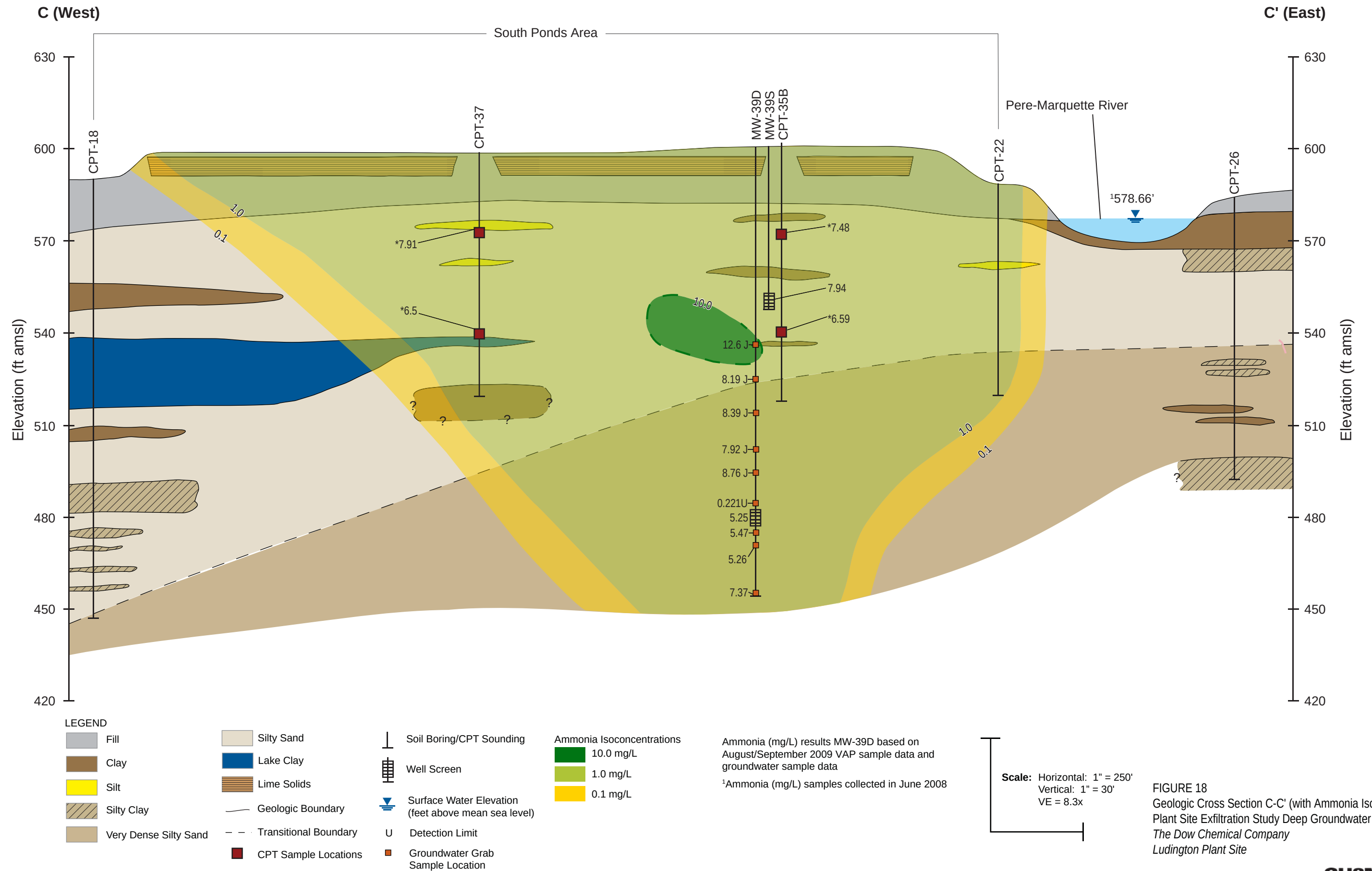
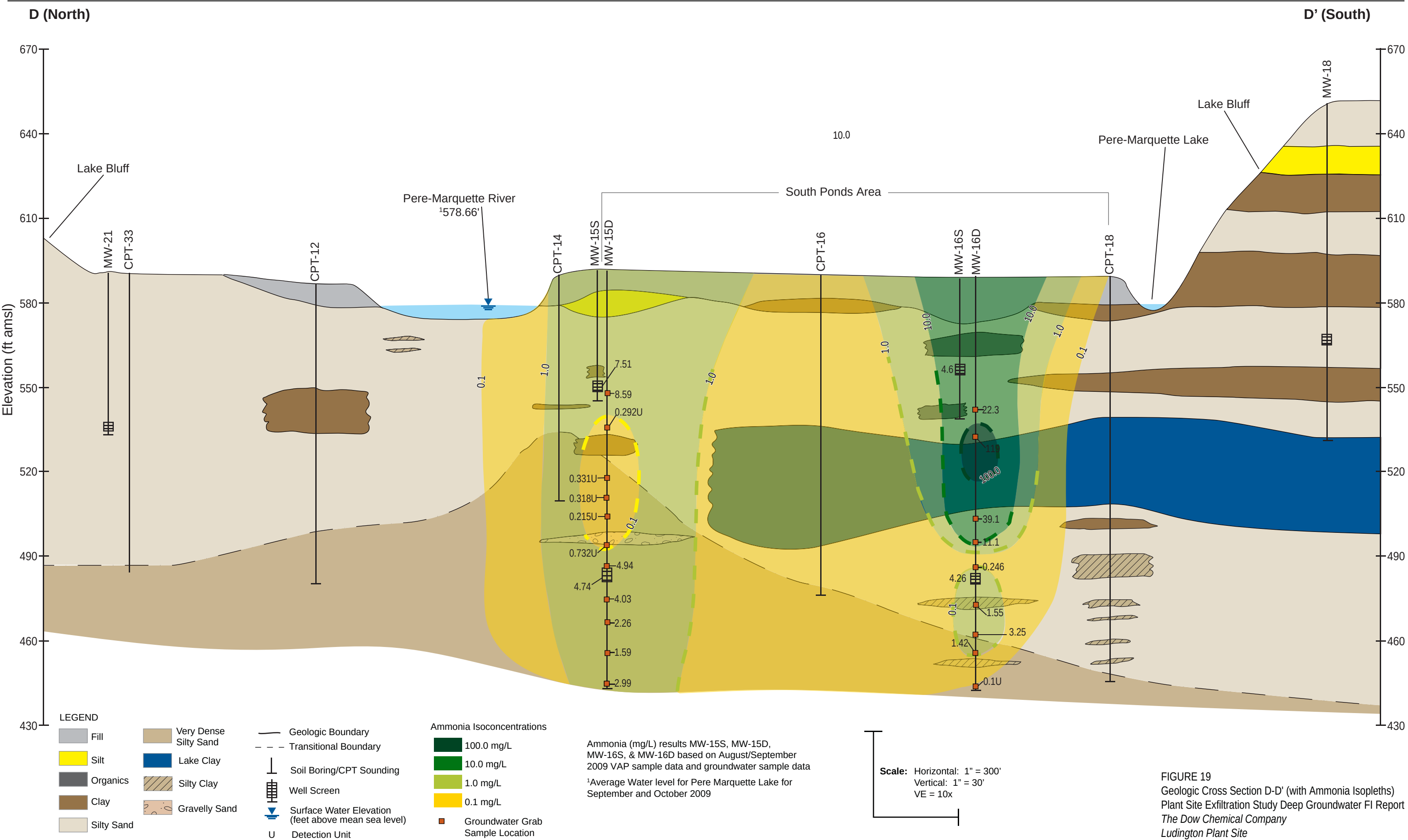


FIGURE 18
Geologic Cross Section C-C' (with Ammonia Isoleths)
Plant Site Exfiltration Study Deep Groundwater FI Report
The Dow Chemical Company
Ludington Plant Site



Appendix A
Boring Logs and Well Construction Forms



PROJECT NUMBER 363838.03.ES	BORING NUMBER MW-15D	SHEET 1 OF
SOIL BORING LOG		

PROJECT : S. Ponds Exfiltration Deep Groundwater Field Investigation				LOCATION : Dow-Ludington		
ELEVATION : 591.68 (toc)				DRILLING CONTRACTOR : Boart-Longyear		
DRILLING METHOD AND EQUIPMENT USED Rotosonic						
WATER LEVELS : 11.09' btoc		START : 8/18/09 12:55		END: 8/19/09 15:20	LOGGER : N. Wilbur	
DEPTH BELOW SURFACE (FT)	INTERVAL (FT)		STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION	COMMENTS	
		RECOVERY (IN)				
		#/TYPE				
					DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. FID (ppm):	
0						
7	1	7.0/7.0	RS	N/A	0-7': Fill - Lime solids with asphalt and gravel.	
17	2	10.0/10.0	RS	N/A	7-15': (SM-ML) Medium-grained sand with some clay, gray	
27	3	10.0/10.0	RS	N/A	15-26': (SP) Fine-grained sand with trace coarse sand and organics, wet, brown	
27	4	10.0/10.0	RS	N/A	26-26.5': (ML-CL) Silty clay seam, green-gray, non-low plasticity	
26.5-30.2': (SP) Fine-medium grained sand with trace small gravel, brown						
30.2-31.2': (CH) Gray-green clay, high placticity, wet						
31.2-37': (SP) Fine-grained sand, brown, wet. 1" gray-green silty seam at 32'						
37	5	7.5/10.0	RS	N/A	37-47': (SP-SW) Fine-medium grained san grading to courser sand, with trace subangular gravel, brown, wet	GW VAP sample collected Sample ID: MW15D-47.0 8/18/2009 13:55 Cl ⁻ : >638 ppm So Cond: 3190 uS/cm ^o NH ₃ : >0.60 mg/L
47	6	6.5/10.0	RS	N/A	47-58.8': (SP) Fine-medium grained sand with trace gravel, brown, wet. 1.5" clay seam (CH), reddish-brown, wet, high placticity	GW VAP sample collected Sample ID: MW15D-57.0 8/18/2009 14:25 Cl ⁻ : 54 ppm So Cond: 393 uS/cm ^o NH ₃ : 0.54 mg/L
57	7	10.0/10.0	RS	N/A	58.8-65.5': (CH) Clay with trace gravel, brown, wet, dense, plastic	GW VAP sample collected Sample ID: MW15D-72.0 8/18/2009 15:10 Cl ⁻ : 96 ppm So Cond: 766 uS/cm ^o NH ₃ : >0.60 mg/L
67	8	7.0/10.0	RS	N/A		GW VAP sample collected Sample ID: MW15D-77.0 8/18/2009 15:37 Cl ⁻ : 135 ppm So Cond: 802 uS/cm ^o NH ₃ : >0.60 mg/L
77	9	4.0/10.0	RS	N/A	65.5-93': (SP) Fine-medium grained sand with trace coarse sand, brown, wet	GW VAP sample collected Sample ID: MW15D-87.0 & MW15D-87.0FD 8/18/2009 16:50 & 16:55 Cl ⁻ : 180 ppm So Cond: 914 uS/cm ^o NH ₃ : 0.35 mg/L
87	10	5.5/10.0	HS	N/A	93-97': (SW) Well graded sand with subangular gravel up to 1" in diameter	GW VAP sample collected Sample ID: MW15D-97.0 8/18/2009 17:26 Cl ⁻ : 232 ppm Sp Cond: NR NH ₃ : >0.60 mg/L
97	11	12.5/20.0	RS	N/A	97-115.8': (SP-SW) Fine-medium grained snad with trace coarse sand and gravel, gravel increasing with depth, brown, wet	GW VAP sample collected Sample ID: MW15D-107.0 8/19/2009 8:50 Cl ⁻ : >638 ppm So Cond: 2116 uS/cm ^o NH ₃ : >0.60 mg/L NOTE: A 20 foot-long sample core used due to the loss of the 10-foot core sample down hole
107						GW VAP sample collected Sample ID: MW15D-117.0 8/19/2009 10:10 Cl ⁻ : >638 ppm So Cond: 2846 uS/cm ^o NH ₃ : >0.60 mg/L
117	12	8.5/10.0	RS	N/A	115.8-117': (GW) Gravel with sand, gravel ranging in size up to 1.5"	
117					117-121.5': (SP-SW) Fine-medium grained sand with gravel (up to 0.5" in diameter), brown, wet	GW VAP sample collected Sample ID: MW15D-127.0 (collected MS/MSD) 8/19/2009 10:59 Cl ⁻ : >638 ppm So Cond: 3160 uS/cm ^o NH ₃ : >0.60 mg/L
127	13	7.0/10.0	RS	N/A	121.5-127': (SP) Medium grained sand, brown, wet	
127					127-131': (SP-SW) Fine-medium grained sand with coarse sand and gravel (up to 2" in diameter), brown, wet	GW VAP sample collected Sample ID: MW15D-137.0 8/19/2009 13:00 Cl ⁻ : >638 ppm So Cond: 3055 uS/cm ^o NH ₃ : >0.60 mg/L
137	14	7.5/10.0	RS	N/A	131-144': (SP) Medium grained sand with trace gravel (< 0.5" in diameter), brown, wet	GW VAP sample collected Sample ID: MW15D-147.0 8/19/2009 15:20 Cl ⁻ : >638 ppm So Cond: 3323 uS/cm ^o NH ₃ : NR
147					144-147': (SP-SM) Fine-medium grained snad with silt, brown-gray, wet	
EOB at 147'						

EOB at 147'

LEGEND
FID Flame Ionization Detector
T Time
SPT Split Spoon Sample



PROJECT NUMBER 363838.03.ES	BORING NUMBER MW-16D	SHEET 1 OF
SOIL BORING LOG		

PROJECT : S. Ponds Exfiltration Deep Groundwater Field Investigation				LOCATION : Dow-Ludington	
ELEVATION : 588.73 (toc)				DRILLING CONTRACTOR : Boart-Longyear	
DRILLING METHOD AND EQUIPMENT USED : Rotosonic					
WATER LEVELS : 7.5' btoc		START : 8/26/09 9:30		END: 8/27/09 12:10	LOGGER : L. Hunt
DEPTH BELOW SURFACE (FT)	INTERVAL (FT)		STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION	COMMENTS
		RECOVERY (IN)			
		#/TYPE			
0	1	4.1/7.0	RS	N/A	0-12.6': Fill - Sand, siltm and clay with gravel, black, gray, and white, wet to moist, loose, soft
7	2	8.9/10.0	RS	N/A	
17	3	10.0/10.0	HS	N/A	14.1-22': (SP) Fine to medium grained sand with trace coarse sand, gray-brown, wet, loose to dense
27	4	10.0/10.0	RS	N/A	
37	5	8.0/10.0	RS	N/A	22.5-27': (SP) Fine to medium grained sand with trace coarse sand, gray-brown, wet, loose to dense
47	6	6.0/10.0	RS	N/A	
57	7	10.0/10.0	RS	N/A	55.3-57': (ML) Sandy silt with trace to little organics, dark gray, wet to moist, firm, non-plastic
67	8	10.0/10.0	RS	N/A	
77	9	10.0/10.0	HS	N/A	60-62': (SP) Medium grained sand with trace coarse sand and organics, dark gray, wet, loose
87	10	10.0/10.0	RS	N/A	
97	11	10.0/10.0	RS	N/A	67-83': (OL) Organic Clay, black with spots of dark brown, moist, firm, strong organic odor
107	12	10.0/10.0	RS	N/A	
117	13	10.0/10.0	RS	N/A	90.5-92': (CL) Sandy clay, gray, moist, firm
127	14	10.0/10.0	RS	N/A	
137	15	6.0/10.0	RS	N/A	95-96.2': (CH) Clay, gray-brown, moist, stiff
147					
					105.2-105.8': (CL) Clay, gray, moist, stiff, low plasticity
					113.6-117': (SC-SM) Clayey sand to silty sand with trace sand in the bottom 0.6', fines upward, gray, wet, dense
					121.8-127': (SM) Silty sand, gray, wet, dense
					135-136.1': (CL) Sandy clay, gray to dark gray, moist to wet, firm
					137-147': (SP) Fine to medium grained sandwith trace coarse sand and gravel, gray-brown, wet, very loose

EOB at 147'

LEGEND
FID Flame Ionization Detector
T Time
SPT Split Spoon Sample



PROJECT NUMBER 363838.03.ES	BORING NUMBER MW-19D	SHEET 1 OF
SOIL BORING LOG		

PROJECT : S. Ponds Exfiltration Deep Groundwater Field Investigation				LOCATION : Dow-Ludington		
ELEVATION : 588.38 (toc)				DRILLING CONTRACTOR : Boart-Longyear		
DRILLING METHOD AND EQUIPMENT USED: Rotosonic						
WATER LEVELS : 7.83' btoc		START : 9/1/09 13:00		END: 9/4/09 12:23	LOGGER : L. Hunt	
DEPTH BELOW SURFACE (FT)			STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION	COMMENTS	
INTERVAL (FT)	RECOVERY (IN)			SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.	
	#/TYPE					
						FID (ppm):
0	1	5.1/7.0	RS	N/A	0-5.1': Fill, gravel, snad, silt, & clay, black, white, & light gray, moist, loose	
7	2	10.0/10.0	RS	N/A	11-12': (CL) Clay with organics and wood, dark gray to black, moist, firm to stiff	
17	3	10.0/10.0	RS	N/A	12-21.5': (SP) Medium grained sand, dark gray, wet, very loose	
21.5-22.5': (SC) Clayey sand, dark gray-brown, wet, loose to dense						
22.5-29': (SP) Medium grained sand, dark gray, wet, very loose						
27	4	10.0/10.0	RS	N/A	29-36.5': (ML) Sandy silt with trace to little organics, dark brown, wet to moist, firm. Fine sand layers (0.03' to 0.3' thick) from 29-34'	
37						
47	5	10.0/10.0	RS	N/A	36.5-47': (SP) Fine-medium grained sand with trace shell fragments, course sand, and organics (wood and roots), dark gray, wet, very loose to loose	GW VAP sample collected Sample ID: MW19D-47.0 (Collected a MS/MSD) 9/1/2009 14:10 Cl ⁻ : <31 ppm So Cond: 456.1 uS/cm° NH ₃ : >0.60 mg/L
57	6	10.0/10.0	RS	N/A	47-53': (SP-SW) Fine-medium grained sand with trace to little course sand and trace organics, gray, wet, very loose	GW VAP sample collected Sample ID: MW19D-52.0 9/1/2009 14:52 Cl ⁻ : <31 ppm So Cond: 427.3 uS/cm° NH ₃ : >0.60 mg/L
					53-54': (SP) Medium grained sand with trace course sand, dark gray, wet, very dense	
					54-57': (CL) Clay with trace gravel and organics, reddish-brown, moist, hard, sandy in spots with sand pockets every 1-2'	
67	7	7.5/10.0	RS	N/A	57-67': (SP) Fine sand with trace medium and course grained sand (trace gravel found from 57-58'), light brown, wet, very loose	GW VAP sample collected Sample ID: MW19D-67.0 & MW19D-67.0FD 9/1/2009 15:25 & 15:27 Cl ⁻ : <31 ppm So Cond: 346.3 uS/cm° NH ₃ : >0.60 mg/L
77	8	8.5/10.0	RS	N/A		GW VAP sample collected Sample ID: MW19D-77.0 9/1/2009 16:20 Cl ⁻ : <31 ppm So Cond: 343 uS/cm° NH ₃ : 0.53 mg/L
					67-87': (SP) Medium grained sand with trace fine to course gravel, gray-brown, wet, loose, no gravel from 82-87'	
87	9	10.0/10.0	RS	N/A		GW VAP sample collected Sample ID: MW19D-87.0 9/1/2009 17:37 Cl ⁻ : <31 ppm So Cond: 360.4 uS/cm° NH ₃ : >0.60 mg/L
97	10	10.0/10.0	RS	N/A	87-94': (SP-SM) Fine-medium grained sand with trace gravel, light brown, wet, loose, fining downward	GW VAP sample collected Sample ID: MW19D-94.0 9/2/2009 11:08 Cl ⁻ : <31 ppm So Cond: 413.6 uS/cm° NH ₃ : >0.60 mg/L
					94-97': (ML-SP) Silty sand	
107	11	10.0/10.0	RS	N/A		GW VAP sample collected Sample ID: MW19D-104.0 & MW19D-104.0FD 9/3/2009 14:45 & 14:47 Cl ⁻ : <31 ppm So Cond: 366.2 uS/cm° NH ₃ : >0.60 mg/L
117	12	4.3/10.0	RS	N/A	97-126.5': (SP) Fine sand with trace medium-course sand and small gravel, light brown, wet, loose	GW VAP sample collected Sample ID: MW19D-112.0 9/4/2009 8:35 Cl ⁻ : <31 ppm So Cond: 357.8 uS/cm° NH ₃ : >0.60 mg/L
127	13	10.0/10.0	RS	N/A		GW VAP sample collected Sample ID: MW19D-127.0 9/4/2009 10:33 Cl ⁻ : <31 ppm So Cond: 386.7 uS/cm° NH ₃ : >0.60 mg/L
					126.5-127': (SM) Silty sand, light brown, wet, dense to very dense	
137	14	16.0/20.0	RS	N/A	127-147': (SP) Fine sand with trace medium grained sand, light brown, wet, loose, silt pocket at 139'	GW VAP sample collected Sample ID: MW19D-137.0 9/4/2009 12:00 Cl ⁻ : <31 ppm So Cond: 413.1 uS/cm° NH ₃ : 0.23 mg/L
147						GW VAP sample collected Sample ID: MW19D-147.0 9/4/2009 12:23 Cl ⁻ : <31 ppm So Cond: 378.3 uS/cm° NH ₃ : 0.36 mg/L

EOB at 147'

EOB at 147'

LEGEND
FID Flame Ionization Detector
T Time
SPT Split Spoon Sample



PROJECT NUMBER 363838.03.ES	BORING NUMBER MW-37D	SHEET 1 OF
SOIL BORING LOG		

PROJECT : S. Ponds Exfiltration Deep Groundwater Field Investigation				LOCATION : Dow-Ludington		
ELEVATION : 587.83 (toc)				DRILLING CONTRACTOR : Boart-Longyear		
DRILLING METHOD AND EQUIPMENT USED Rotosonic						
WATER LEVELS : 5.99' btoc		START : 8/27/09 16:50		END: 8/28/09 13:45	LOGGER : L. Hunt	
DEPTH BELOW SURFACE (FT)			STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION	COMMENTS	
	INTERVAL (FT)					
	RECOVERY (IN)					
	#/TYPE					
0	1	4.0/7.0	RS	N/A	0-7': Fill - gravel, sand, silt, and clay, black, white, and gray, moist, loose	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. FID (ppm):
7	2	10.0/10.0	RS	N/A	7-13': (OL) Organic clay (peat) with roots, black and dark brown, moist, firm	
					13-17': (SC) Clayey fine sand, black to dark gray, moist, loose	
17	3	9.0/10.0	RS	N/A	17-34': (SM) Silty fine sand, balck to dark gray, clayey in spots, light gray and black horizontal laminations at 24' (6" thick), wet, loose	
27	4	10.0/10.0	RS	N/A	34-37': (ML) Sandy silt, dark gray to gray, moist to wet, firm	
37	5	10.0/10.0	RS	N/A	37-47': (SM & OL) Alternating silty sand and organic clay/silt with organics throughout, layers ranging from 0.5-1.5" thick, light gray and dark gray, moist, dense/firm	
47	6	7.0/10.0	RS	N/A	47-51.5': (SM-SC) Silty/Clayey Sand with organics, gray, wet, very loose	
					51.5-57': (CL-ML) Silty clay with organics, dark gray to dark brown, moist, firm	
57	7	10.0/10.0	RS	N/A	57-65.5': (OL) Organic clay, black and mottled dark brown, moist to wet, firm	
					65.5-67': (SC) Clayey sand with organics, light gray to gray with black streaks, moist to wet, loose	
67	8	9.6/10.0	RS	N/A	67-72.5': (SM-SC) Silty to clayey sand with organics (roots and wood), light gray to gray, wet, loose to dense	GW VAP sample collected Sample ID: MW37D-77.0 8/28/2009 8:45 Cl ⁻ : <31 ppm So Cond: 920 uS/cm° NH ₃ : >0.60 mg/L
					72.5-75.6': (CH) Clay with organics, black to dark gray and mottled dark brown, wet, firm	
					75.6-77': (SP) Fine sand, gray-brown, wet, loose	
77	9	8.5/10.0	HS	N/A	77-82.7': (CH) Clay with organics, gray, wet, high plasticity, soft to firm, sand seam at 81.3' (0.3' thick)	GW VAP sample collected Sample ID: MW37D-87.0 8/28/2009 9:21 Cl ⁻ : <31 ppm So Cond: 510 uS/cm° NH ₃ : >0.60 mg/L
					82.7-87': (SP) Fine to medium grained sand, gray brown, wet, loose to dense, silty sand (SM) in pockets	
87	10	10.0/10.0	RS	N/A	87-102': (SP) Fine to medium grained sand with trace coarse sand, gray, wet, dense, organics in 2-3" layers	GW VAP sample collected Sample ID: MW37D-97.0 8/28/2009 10:03 Cl ⁻ : <31 ppm So Cond: 513 uS/cm° NH ₃ : >0.60 mg/L
97	11	10.0/10.0	RS	N/A	102-104.3': (CL) Clay with trace organics and shell fragments, gray, moist, firm to stiff, low plasticity, black peat layers at bottom (2" thick)	GW VAP sample attempted, no water yielded
					104.3-107': (SM) Silty sand with trace medium and coarse sand and organics, gray-brown, moist to wet, dense	
107	12	4.0/10.0	RS	N/A		GW VAP sample collected Sample ID: MW37D-117.0 8/28/2009 11:42 Cl ⁻ : <31 ppm So Cond: 348.1 uS/cm° NH ₃ : 0.30 mg/L
117	13	8.0/10.0	RS	N/A	107-132': (SP) Medium sand with trace coarse sand and clay pockets, light gray-brown, wet, loose	GW VAP sample collected Sample ID: MW37D-127.0 8/28/2009 12:25 Cl ⁻ : <31 ppm So Cond: 359.3 uS/cm° NH ₃ : 0.40 mg/L
127	14	8.0/10.0	HS	N/A	132-133.6': (GP-GW) Medium gravel, rounded, trace sand and silt, gray, wet, loose	GW VAP sample collected Sample ID: MW37D-137.0 8/28/2009 13:11 Cl ⁻ : <31 ppm So Cond: 361.7 uS/cm° NH ₃ : 0.44 mg/L
					133.6-134.6': (CH) Clay, reddish-brown, moist, very stiff, med-high plasticity	
					134.6-137': (SP) Fine to medium sand, gray-brown, wet, loose	
137	15	9.0/10.0	RS	N/A	137-147': (SP-SM) Fine sand, becomes finer with depth, gray-brwon, wet to moist, very dense to dense	GW VAP sample collected Sample ID: MW37D-147.0 8/28/2009 13:58 Cl ⁻ : <31 ppm So Cond: 375.9 uS/cm° NH ₃ : >0.60 mg/L
147						

EOB at 147'

LEGEND
FID Flame Ionization Detector
T Time
SPT Split Spoon Sample



PROJECT NUMBER 363838.03.ES	BORING NUMBER MW-38D	SHEET 1 OF
SOIL BORING LOG		

PROJECT : S. Ponds Exfiltration Deep Groundwater Field Investigation				LOCATION : Dow-Ludington		
ELEVATION : 590.75 (toc)				DRILLING CONTRACTOR : Boart-Longyear		
DRILLING METHOD AND EQUIPMENT USED : Rotosonic						
WATER LEVELS : 10.52' btoc		START : 9/9/09 13:55		END: 9/11/09 11:30	LOGGER : N. Wilbur	
DEPTH BELOW SURFACE (FT)	STANDARD			SOIL DESCRIPTION	COMMENTS	
	PENETRATION					
	TEST					
	RESULTS					
	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	6"-6"-6"-6" (N)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
						FID (ppm):
0						
1	1	6.3/7.0	RS	N/A	0-13.8': Fill - topsoil in first 1.7' with organics, lime solids & gravel below, white, moist	
7						
2	2	9.0/10.0	RS	N/A	13.9-14.9': (ML) Silt with trace coarse sand, organics, black, moist, firm	
17						
3	3	10.0/10.0	RS	N/A	14.9-24': (SP) Medium grained sand with trace gravel, moist to wet, silt seam at 16'	
27						
4	4	10.0/10.0	RS	N/A	24-33': (SP) Fine grained sand, light brown, moist to wet	
37					33-33.2': (ML-CL) Silty clay seam, gray-green, moist, stiff	
5	5	9.0/10.0	RS	N/A	33.2-37': (SW) Fine-coarse grained sand with small gravel (<0.5") brown, wet	GW VAP sample collected Sample ID: MW38D-47.0 9/9/2009 14:45 Cl ⁻ : >638 nom So Cond: 2942 uS/cm ^o NH ₃ : >0.60 mg/L
47					37-56.5': (SP) Fine to medium grained sand with trace coarse sand and gravel, brown, moist to wet, loose	GW VAP sample collected Sample ID: MW38D-57.0 9/9/2009 15:50 Cl ⁻ : >638 nom So Cond: 4371 uS/cm ^o NH ₃ : >0.60 mg/L
57					56.5-57': (SW) Fine-coarse sand with sub-angular gravel	GW VAP sample collected Sample ID: MW38D-67.0 9/9/2009 16:20 Cl ⁻ : >638 nom So Cond: 4383 uS/cm ^o NH ₃ : >0.60 mg/L
67	7	7.2/10.0	RS	N/A	57-74': (SP) Fine to medium grained sand with trace coarse sand and sub-angular gravel (up to 1.5" in diameter), brown, moist, loose	GW VAP sample collected Sample ID: MW38D-77.0 9/10/2009 10:40 Cl ⁻ : >638 nom So Cond: 4663 uS/cm ^o NH ₃ : >0.60 mg/L
77						
8	8	9.6/10.0	RS	N/A	74-77': (SP-GW) Medium grained sand and gravel with trace coarse sand, gravel up to 1.5" in diameter, subangular, brown, moist	GW VAP sample collected Sample ID: MW38D-87.0 9/10/2009 11:45 Cl ⁻ : >638 nom So Cond: 4880 uS/cm ^o NH ₃ : >0.60 mg/L
87						
9	9	10.0/10.0	RS	N/A		GW VAP sample collected Sample ID: MW38D-97.0 & MW38D-97.0FD 9/10/2009 15:40 & 15:45 Cl ⁻ : >638 nom So Cond: 5090 uS/cm ^o NH ₃ : >0.60 mg/L
97						
10	10	9.0/10.0	RS	N/A	77-115.2': (SP) Fine-medium grained sand with trace coarse sand, brown, moist, loose	GW VAP sample collected Sample ID: MW38D-107.0 9/10/2009 16:50 Cl ⁻ : >638 nom So Cond: 4934 uS/cm ^o NH ₃ : >0.60 mg/L
107						
11	11	8.8/10.0	RS	N/A		GW VAP sample collected Sample ID: MW38D-117.0 9/10/2009 18:05 Cl ⁻ : >638 nom So Cond: 3651 uS/cm ^o NH ₃ : >0.60 mg/L
117						
12	12	8.7/10.0	RS	N/A	115.2-117': (SP) Fine to very fine grained sand, brown, moist	GW VAP sample collected Sample ID: MW38D-127.0 (MS/MSD collected) 9/11/2009 9:15 Cl ⁻ : >638 nom So Cond: 4095 uS/cm ^o NH ₃ : >0.60 mg/L
127						
13	13	9.0/10.0	RS	N/A		GW VAP sample collected Sample ID: MW38D-137.0 9/11/2009 10:40 Cl ⁻ : 180 nom So Cond: 920 uS/cm ^o NH ₃ : >0.60 mg/L
137						
14	14	10.0/10.0	RS	N/A	117-143.7': (SP) Fine-medium grained sand with trace coarse sand, brown, moist, loose, silty clay seam at 134.8	GW VAP sample collected Sample ID: MW38D-147.0 9/11/2009 11:30 Cl ⁻ : 54 nom So Cond: 554 uS/cm ^o NH ₃ : 0.24 mg/L
147						
15	15	10.0/10.0	RS	N/A	143.7-145.7': (ML) Silt, brown, moist, firm	
					145.7-147': (SP) Fine-medium grained sand with trace coarse sand, brown, moist, loose	

EOB at 147'

LEGEND
FID Flame Ionization Detector
T Time
SPT Split Spoon Sample



PROJECT NUMBER 363838.03.ES	BORING NUMBER MW-39D	SHEET 1 OF
SOIL BORING LOG		

PROJECT : S. Ponds Exfiltration Deep Groundwater Field Investigation				LOCATION : Dow-Ludington		
ELEVATION : 601.7 (toc)				DRILLING CONTRACTOR : Boart-Longyear		
DRILLING METHOD AND EQUIPMENT USED Rotosonic						
WATER LEVELS : 20.90' btoc		START : 8/20/09 9:10		END: 8/25/09 9:40	LOGGER : L. Hunt	
DEPTH BELOW SURFACE (FT)	INTERVAL (FT)		STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION	COMMENTS	
	RECOVERY (IN)	#/TYPE				
0	1	7.0/7.0	RS	N/A	0-14': Fill - silt, sand, and gravel, white, brown, and light gray, dry to moist, loose to dense	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
7	2	10.0/10.0	RS	N/A	14-16': (GW) Gravel with some silt and sand and trace organics, dark brown, moist, loose	FID (ppm):
17	3	10.0/10.0	RS	N/A	16-18': Fill - silt, sand, and gravel, white, brown, and light gray, dry to moist, loose to dense	
27	4	6.5/10.0	RS	N/A	18-23': (SM) Silty sand, gray to dark brown, moist, loose, organic layer (peat) at 22'	
37	5	9.0/10.0	RS	N/A	23-27': (SM-ML) Silty sand to silt, light to dark gray and white, laminae bedding to blocky, moist, dense to firm	
47	6	9.0/10.0	RS	N/A	27-33.9': (SP) Medium grained sand with trace gravel, dark gray-brown, moist to wet, loose	
57	7	8.0/10.0	RS	N/A	33.9-35.4': (CL) Clay, dark gray, dry to moist, hard	
67	8	5.8/10.0	RS	N/A	35.4-47': (SP) Medium sand with trace coarse sand, light brown to gray, wet, loose. Sandy silt seam with trace organics (ML) from 43.3 to 44.5 feet, greenish gray, wet, dense	
77	9	7.0/10.0	RS	N/A	47-62.5': (SP-SW) Medium grained sand with trace gravel and trace to little coarse sand, light brown to gray, wet, very loose	GW VAP sample collected Sample ID: MW39D-67.0 8/20/2009 10:40 Cl ⁻ : >638 ppm So Cond: 3976 uS/cm ^o NH ₃ : >0.60 mg/L
87	10	7.4/10.0	RS	N/A	62.5-64.1': (CH) Clay, reddish-brown, moist, hard	NOTE: Water smells like rotten eggs
97	11	5.5/10.0	RS	N/A	64.1-67': (SP-SW) Medium grained sand with trace gravel and trace to little coarse sand, light brown to gray, wet, very loose	GW VAP sample collected Sample ID: MW39D-77.0 8/20/2009 11:28 Cl ⁻ : >638 ppm So Cond: 3703 uS/cm ^o NH ₃ : >0.60 mg/L
107	12	7.5/10.0	RS	N/A	67-87': (SP-SW) Medium grained sand with trace coarse sand and gravel, gray to gray-brown, wet, loose. Gravel seams at 69.1' and 78'	GW VAP sample collected Sample ID: MW39D-87.0 8/20/2009 12:17 Cl ⁻ : >638 ppm So Cond: 3983 uS/cm ^o NH ₃ : >0.60 mg/L
117	13	5.0/10.0	RS	N/A	87-97': (SP) Fine sand with trace medium-coarse grained sand, gray-brown, wet, very loose, trace gravel in the top 6"	GW VAP sample collected Sample ID: MW39D-97.0 8/20/2009 15:05 Cl ⁻ : >638 ppm So Cond: 4194 uS/cm ^o NH ₃ : >0.60 mg/L
127	14	7.7/10.0	RS	N/A	97-100.6': (SP) Fine to medium grained sand with trace gravel and coarse sand, gray-brown, wet, very loose	GW VAP sample collected Sample ID: MW39D-103.0 & MW39D-103.0FD 8/21/2009 11:03 & 11:05 Cl ⁻ : >638 ppm So Cond: 4138 uS/cm ^o NH ₃ : >0.60 mg/L
137	15	6.6/10.0	RS	N/A	100.6-107': (SM) Silty sand, light brown, wet, loose to dense	GW VAP sample collected Sample ID: MW39D-117.0 8/24/2009 14:05 Cl ⁻ : >638 ppm So Cond: 2809 uS/cm ^o NH ₃ : >0.60 mg/L
147					107-109': (SP) Fine to medium grained sand with trace gravel and coarse sand, gray-brown, wet, very loose	GW VAP sample collected Sample ID: MW39D-127.0 8/24/2009 15:13 Cl ⁻ : >638 ppm So Cond: 3988 uS/cm ^o NH ₃ : >0.60 mg/L
					109-114.3': (SM) Silty sand, light brown, wet, loose to dense	
					114.3-127': (SP) Fine to medium grained sand with trace gravel and coarse sand, gray-brown, wet, very loose	
					127-144.8': (SM) Silty sand with trace gravel and coarse sand, light brown, wet, loose to very dense	GW VAP sample collected Sample ID: MW39D-132.0 8/25/2009 8:25 Cl ⁻ : >638 ppm So Cond: 4236 uS/cm ^o NH ₃ : >0.60 mg/L
					144.8-147': (SP) Medium grained sand, wet, loose to very loose	GW VAP sample collected Sample ID: MW39D-147.0 8/25/2009 10:45 Cl ⁻ : >638 ppm So Cond: 4358 uS/cm ^o NH ₃ : >0.60 mg/L

EOB at 147'

LEGEND
FID Flame Ionization Detector
T Time
SPT Split Spoon Sample



PROJECT NUMBER 363838.03.ES	BORING NUMBER MW-40D	SHEET 1 OF
SOIL BORING LOG		

PROJECT : S. Ponds Exfiltration Deep Groundwater Field Investigation				LOCATION : Dow-Ludington		
ELEVATION : 598.57 (toc)				DRILLING CONTRACTOR : Boart-Longyear		
DRILLING METHOD AND EQUIPMENT USED Rotosonic						
WATER LEVELS : 16.95' btoc		START : 9/14/09 16:25		END: 9/15/09 14:25	LOGGER : N. Wilbur	
DEPTH BELOW SURFACE (FT)	INTERVAL (FT)		STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION	COMMENTS	
	RECOVERY (IN)	#/TYPE				
0	1	7.0/7.0	RS	N/A	0-8': Fill - gravel and lime solids, gray	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. FID (ppm):
7	2	4.8/10.0	RS	N/A	8-11.2': (SM-CL) Sandy clay mix, brown	
					11.2-14.8': (ML-CL) Silty clay, brown, firm, high plasticity	
17	3	8.3/10.0	RS	N/A	14.8-22.4': Fill - gravel and lime solids with some sand, gray and white	
					22.4-23.4': (SW-SM) Sandy silt with organics (grass and roots), black	
					23.4-25.2': Transistion between sandy silt and sand, black to brown	
27	4	2.6/10.0	RS	N/A	25.2-45': (SP) Fine to medium grained sand, very thin layers of silt throughout, dark brown	
47	6	9.1/10.0	RS	N/A	45-45.4': (OL) Organics (bark, sticks, and leaves), dark brown, thin sand layer at 45.4'	GW VAP sample collected Sample ID: MW40D-57.0 9/15/2009 7:50 Cl ⁻ : >638 ppm So Cond: 5650 uS/cm [°] NH ₃ : >0.60 mg/L
					45.4-50.1': (SM) Silty sand (fine-medium grained), dark brown, wet, semi-plastic	
					50.1-54.1': (ML) Sandy silt, brown, wet to moist, low plasticity, become more stiff with depth	
54.1-60.3': (SP) Fine to medium grained sand, light brown, moist, 2" layer of organics (leaves, bark, sticks) at 55'						
57	7	9.9/10.0	RS	N/A	60.3-63.4': (ML-SP) Sandy silt with thin layers of fine-medium grained sand, gray-brown, semi-stiff, organic layer (sticks and leaves) at 60.3'	No GW VAP sample collected due to fine grained unit
67	8	10.0/10.0	RS	N/A		No GW VAP sample collected due to fine grained unit
77	9	10.0/10.0	RS	N/A	63.4-95': (ML-CL) Silty clay, dark brown, dry to moist, low plasticity, semi-stiff, stiffness increasing slightly with depth, trace shell fragments	No GW VAP sample collected due to fine grained unit
87	10	6.9/10.0	RS	N/A		No GW VAP sample collected due to fine grained unit
97	11	8.9/10.0	RS	N/A		GW VAP sample collected Sample ID: MW40D-107.0 9/15/2009 9:20 Cl ⁻ : <31 ppm So Cond: 490.6 uS/cm [°] NH ₃ : >0.60 mg/L
107	12	6.3/10.0	RS	N/A	95-122.5': (SP) Fine to medium grained sand, light brown, moist, trace coarse sand and shell fragments, silty clay seam at 98.3'	GW VAP sample collected Sample ID: MW40D-117.0 9/15/2009 10:05 Cl ⁻ : <31 ppm So Cond: 585 uS/cm [°] NH ₃ : >0.60 mg/L
117	13	10.0/10.0	RS	N/A	122.5-126.2': (ML-SP) Silty fine grained sand with thin layers of organics throughout, brown, moist, semi-firm	GW VAP sample collected Sample ID: MW40D-127.0 & MW40D-127.0FD 9/15/2009 11:00 & 11:05 Cl ⁻ : <31 ppm So Cond: 617 uS/cm [°] NH ₃ : >0.60 mg/L
127	14	9.5/10.0	RS	N/A	126.2-135.1': (SP) Fine to medium grained sand, light brown, moist, trace coarse sand and shell fragments, 0.2' thick clay seam at 126.8', brown, very plastic, moist, firm	GW VAP sample collected Sample ID: MW40D-137.0 9/15/2009 12:05 Cl ⁻ : <31 ppm So Cond: 412.4 uS/cm [°] NH ₃ : 0.41 mg/L
					135.1-135.6': (ML-CL) silty clay, brown, moist, very firm, plastic	
					135.6-137': (ML-SP) Fine silty sand, brown, dry, layers of organics	
137	15	5.8/10.0	HS	N/A	137-138.5': Fine to medium grained sand with thin (<0.5") clay layers	GW VAP sample collected Sample ID: MW40D-147.0 9/15/2009 14:10 Cl ⁻ : <31 ppm So Cond: 419.2 uS/cm [°] NH ₃ : 0.12 mg/L
					138.5-143': (SP) Fine to medium grained sand, light brown, moist, trace coarse sand and shell fragments	
					143-147': (SP-GW) Fine to medium grained sand and gravel (up to 4" in diameter), angular to sub-angular, light brown, moist	
147						Composite soil smaple collected: MW40D-COMP-SOIL 9/15/2009 14:10

EOB at 147'

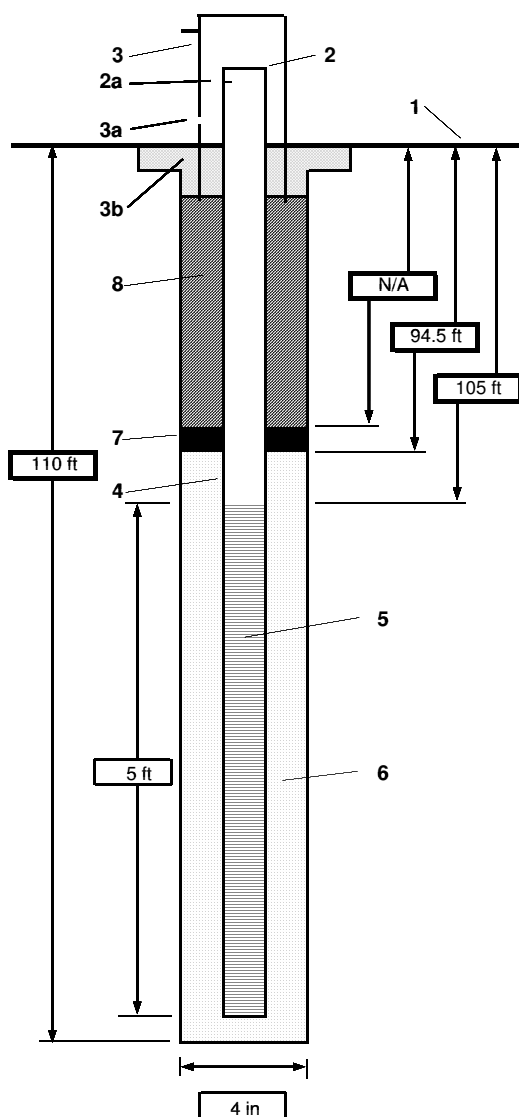
LEGEND

- FID Flame Ionization Detector
- T Time
- SPT Split Spoon Sample



PROJECT NUMBER 363838.03.ES	WELL NUMBER MW-15D
SHEET 1 OF 1	
WELL COMPLETION DIAGRAM	

PROJECT : S. Ponds Exfiltration Deep Groundwater Field Investigation LOCATION : Dow-Ludington
 DRILLING CONTRACTOR : Boart-Longyear
 DRILLING METHOD AND EQUIPMENT USED : Rotosonic
 WATER LEVELS : 11.09' btoc START : 8/19/09 15:50 END : 8/19/09 18:00 LOGGER : L. Hunt

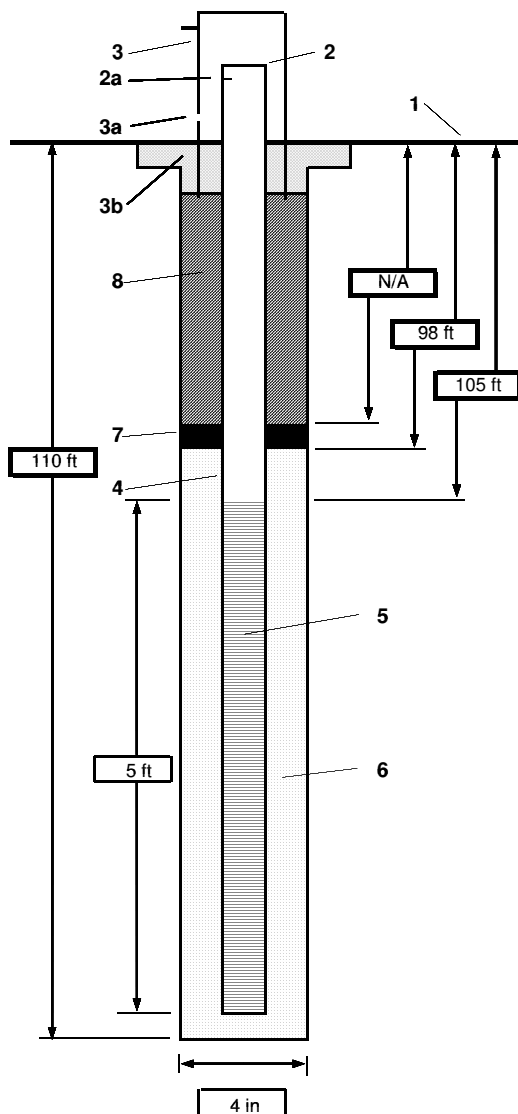


1- Ground elevation at well	592.034
2- Top of casing elevation	591.68
a) vent hole?	
3- Wellhead protection cover type	Flushmount
a) weep hole?	
b) concrete pad dimensions	2' x 2'
4- Dia./type of well casing	2.5" Scheule 80 PVC
5- Type/slot size of screen	0.01"
6- Type screen filter	Filter sand
a) Quantity used	
7- Type of seal	Bentonite Grout
a) Quantity used	
8- Grout	
a) Grout mix used	Bentonite Grout
b) Method of placement	Tremie Pipe
c) Vol. of well casing grout	
Development method	Air lift
Development time	40 minutes
Estimated purge volume	225 gallons
Comments	



PROJECT NUMBER 363838.03.ES	WELL NUMBER MW-16D
SHEET 1 OF 1	
WELL COMPLETION DIAGRAM	

PROJECT : S. Ponds Exfiltration Deep Groundwater Field Investigati LOCATION : Dow-Ludington
 DRILLING CONTRACTOR : Boart-Longyear
 DRILLING METHOD AND EQUIPMENT USED : Rotosonic
 WATER LEVELS : 7.5' btoc START : 8/27/09 13:30 END : 8/27/09 15:20 LOGGER : L. Hunt



1- Ground elevation at well	589.124
2- Top of casing elevation	588.73
a) vent hole?	
3- Wellhead protection cover type	Flushmount
a) weep hole?	
b) concrete pad dimensions	2' x 2'
4- Dia./type of well casing	2.5" Schedule 80 PVC
5- Type/slot size of screen	0.010"
6- Type screen filter	Filter Sand
a) Quantity used	
7- Type of seal	Bentonite grout
a) Quantity used	
8- Grout	
a) Grout mix used	Bentonite grout
b) Method of placement	Tremie pipe
c) Vol. of well casing grout	
Development method	Air lift
Development time	40 minutes
Estimated purge volume	225 gal
Comments	



PROJECT NUMBER
363838.03.ES

WELL NUMBER
MW-19D

SHEET 1 OF 1

WELL COMPLETION DIAGRAM

PROJECT : S. Ponds Exfiltration Deep Groundwater Field Investigati LOCATION : Dow-Ludington

DRILLING CONTRACTOR : Boart-Longyear

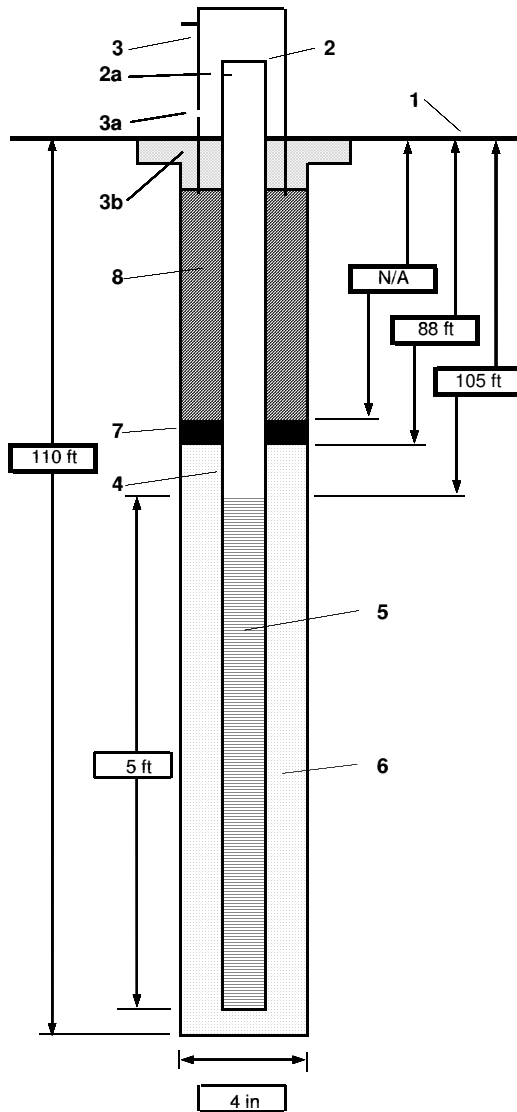
DRILLING METHOD AND EQUIPMENT USED : Rotosonic

WATER LEVELS : 7.83' btoc

START : 9/9/09 9:15

END : 9/9/09 12:25

LOGGER : N. Wilbur

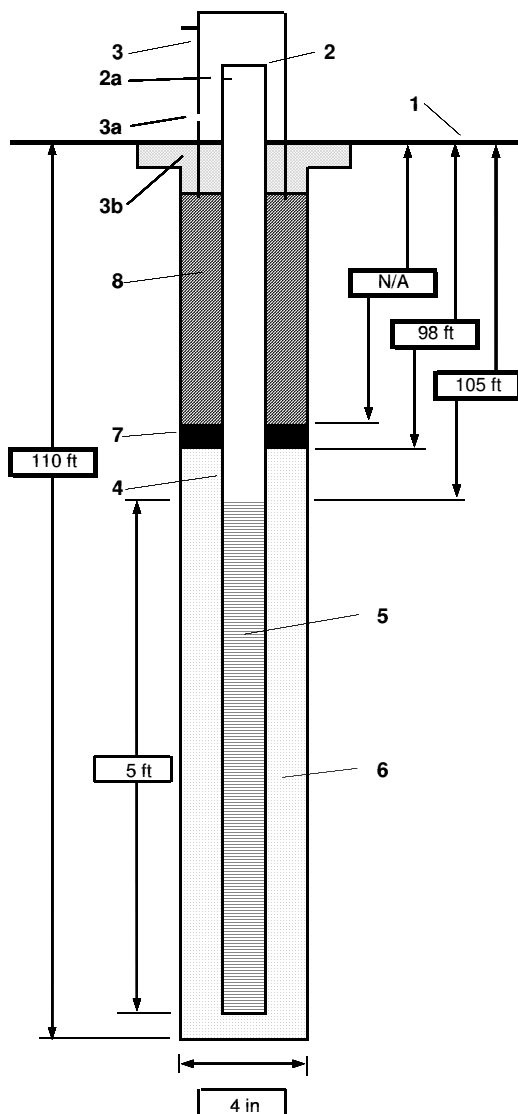


1- Ground elevation at well	588.801
2- Top of casing elevation	588.38
a) vent hole?	
3- Wellhead protection cover type	Flushmount
a) weep hole?	
b) concrete pad dimensions	2' x 2'
4- Dia./type of well casing	2.5" Schedule 80 PVC
5- Type/slot size of screen	0.010"
6- Type screen filter	Filter Sand
a) Quantity used	
7- Type of seal	Bentonite grout
a) Quantity used	
8- Grout	
a) Grout mix used	Bentonite grout
b) Method of placement	Tremie pipe
c) Vol. of well casing grout	
Development method	Air lift
Development time	30 minutes
Estimated purge volume	225 gal
Comments	



PROJECT NUMBER 363838.03.ES	WELL NUMBER MW-37D
SHEET 1 OF 1	
WELL COMPLETION DIAGRAM	

PROJECT : S. Ponds Exfiltration Deep Groundwater Field Investigati LOCATION : Dow-Ludington
 DRILLING CONTRACTOR : Boart-Longyear
 DRILLING METHOD AND EQUIPMENT USED : Rotosonic
 WATER LEVELS : 5.99' btoc START : 8/31/09 11:30 END : 8/27/09 16:30 LOGGER : L. Hunt



1- Ground elevation at well	588.28
2- Top of casing elevation	587.83
a) vent hole?	
3- Wellhead protection cover type	Flushmount
a) weep hole?	
b) concrete pad dimensions	2' x 2'
4- Dia./type of well casing	2.5" Schedule 80 PVC
5- Type/slot size of screen	0.010"
6- Type screen filter	Filter Sand
a) Quantity used	
7- Type of seal	Bentonite grout
a) Quantity used	
8- Grout	
a) Grout mix used	Bentonite grout
b) Method of placement	Tremie pipe
c) Vol. of well casing grout	
Development method	Air lift
Development time	30 minutes
Estimated purge volume	225 gal
Comments	



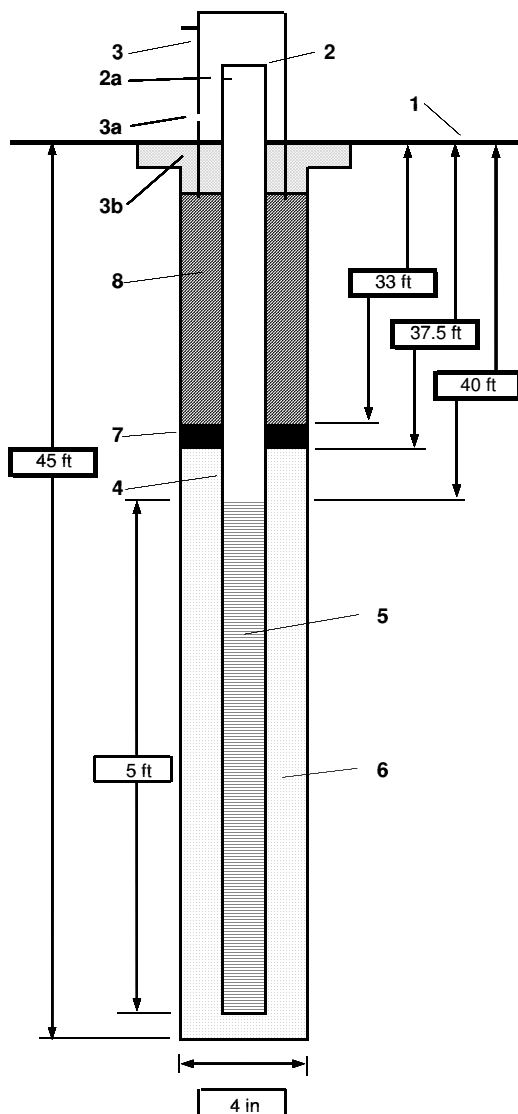
PROJECT NUMBER 363838.03.ES	WELL NUMBER MW-37S	SHEET 1 OF 1
WELL COMPLETION DIAGRAM		

PROJECT : S. Ponds Exfiltration Deep Groundwater Field Investigati LOCATION : Dow-Ludington

DRILLING CONTRACTOR : Boart-Longyear

DRILLING METHOD AND EQUIPMENT USED : Rotosonic

WATER LEVELS : 8.9' btoc START : 8/31/09 11:30 END : 8/27/09 16:30 LOGGER : L. Hunt

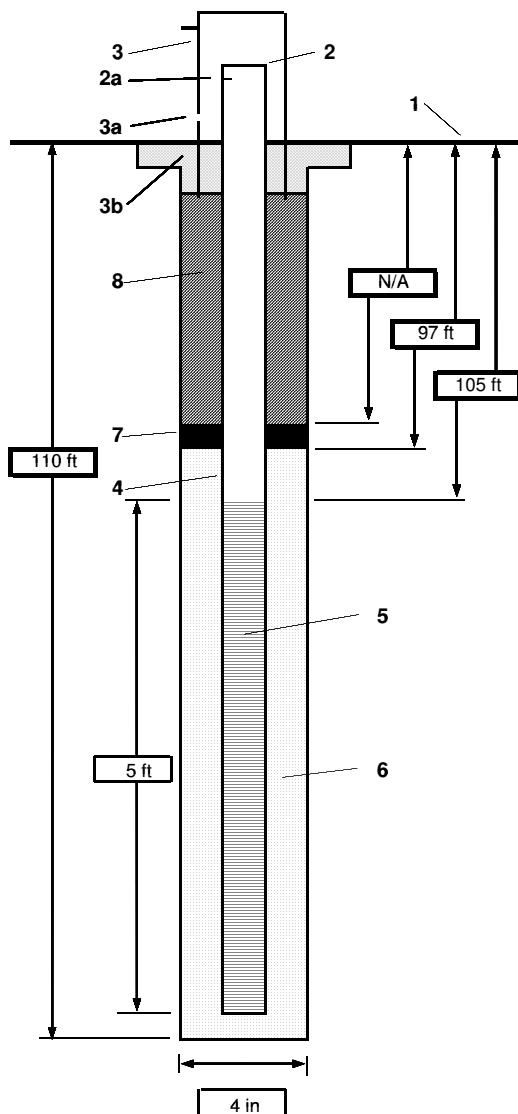


1- Ground elevation at well	588.288
2- Top of casing elevation	587.94
a) vent hole?	
3- Wellhead protection cover type	Flushmount
a) weep hole?	
b) concrete pad dimensions	2' x 2'
4- Dia./type of well casing	2" Schedule 80 PVC
5- Type/slot size of screen	0.010"
6- Type screen filter	Filter Sand
a) Quantity used	
7- Type of seal	Bentonite chips
a) Quantity used	
8- Grout	
a) Grout mix used	Bentonite grout
b) Method of placement	Tremie pipe
c) Vol. of well casing grout	
Development method	Pump and surge
Development time	1 hour 20 minutes
Estimated purge volume	18 gal
Comments	Well went dry during purging.



PROJECT NUMBER 363838.03.ES	WELL NUMBER MW-38D
SHEET 1 OF 1	
WELL COMPLETION DIAGRAM	

PROJECT : S. Ponds Exfiltration Deep Groundwater Field Investigati LOCATION : Dow-Ludington
 DRILLING CONTRACTOR : Boart-Longyear
 DRILLING METHOD AND EQUIPMENT USED : Rotosonic
 WATER LEVELS : 10.52' btoc START : 9/14/09 10:30 END : 9/14/09 12:10 LOGGER : N. Wilbur

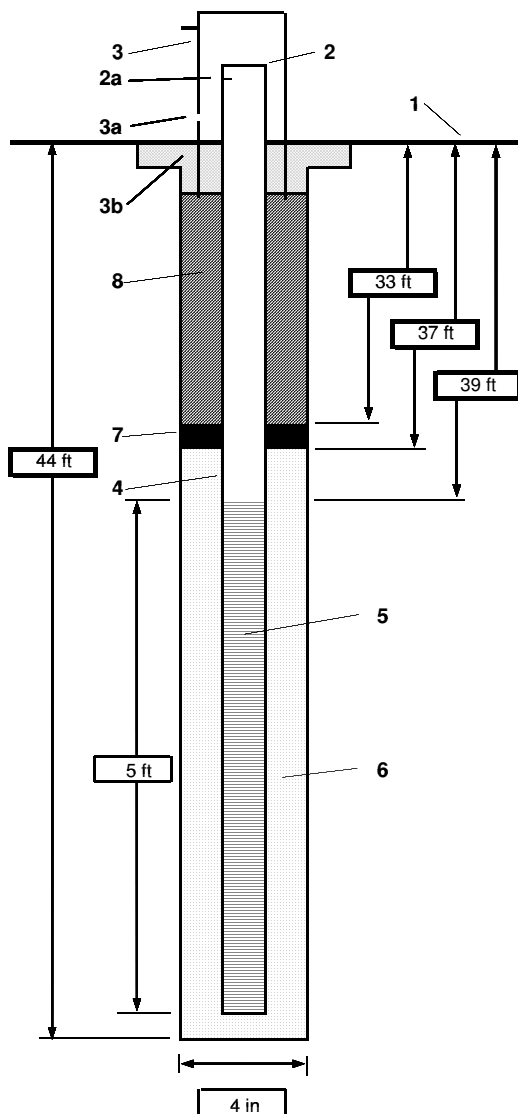


1- Ground elevation at well	591.369
2- Top of casing elevation	590.75
a) vent hole?	
3- Wellhead protection cover type	Flushmount
a) weep hole?	
b) concrete pad dimensions	2' x 2'
4- Dia./type of well casing	2.5" Schedule 80 PVC
5- Type/slot size of screen	0.010"
6- Type screen filter	Filter Sand
a) Quantity used	
7- Type of seal	Bentonite grout
a) Quantity used	
8- Grout	
a) Grout mix used	Bentonite grout
b) Method of placement	Tremie pipe
c) Vol. of well casing grout	
Development method	Air lift
Development time	30 minutes
Estimated purge volume	225 gal
Comments	



PROJECT NUMBER 363838.03.ES	WELL NUMBER MW-38S	SHEET 1 OF 1
WELL COMPLETION DIAGRAM		

PROJECT : S. Ponds Exfiltration Deep Groundwater Field Investigati LOCATION : Dow-Ludington
 DRILLING CONTRACTOR : Boart-Longyear
 DRILLING METHOD AND EQUIPMENT USED : Rotosonic
 WATER LEVELS : 10.84' btoc START : 9/14/09 14:15 END : 9/14/09 15:20 LOGGER : N. Wilbur

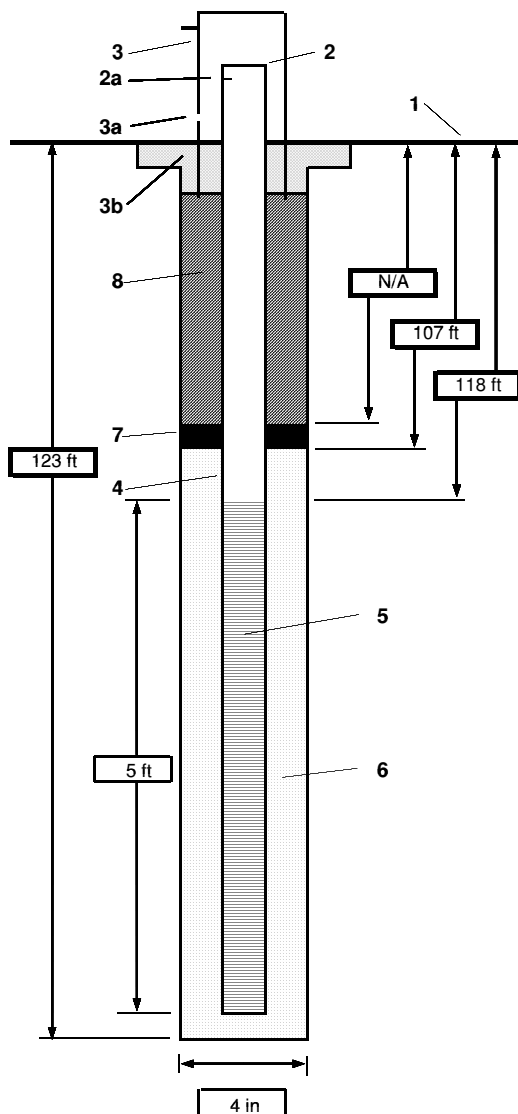


1- Ground elevation at well	591.31
2- Top of casing elevation	590.67
a) vent hole?	
3- Wellhead protection cover type	Flushmount
a) weep hole?	
b) concrete pad dimensions	2' x 2'
4- Dia./type of well casing	2" Schedule 80 PVC
5- Type/slot size of screen	0.010"
6- Type screen filter	Filter Sand
a) Quantity used	
7- Type of seal	Bentonite Chips
a) Quantity used	
8- Grout	
a) Grout mix used	Bentonite grout
b) Method of placement	Tremie pipe
c) Vol. of well casing grout	
Development method	Pump and surge
Development time	45 minutes
Estimated purge volume	50 gallons
Comments	



PROJECT NUMBER 363838.03.ES	WELL NUMBER MW-39D
SHEET 1 OF 1	
WELL COMPLETION DIAGRAM	

PROJECT : S. Ponds Exfiltration Deep Groundwater Field Investigati LOCATION : Dow-Ludington
 DRILLING CONTRACTOR : Boart-Longyear
 DRILLING METHOD AND EQUIPMENT USED : Rotosonic
 WATER LEVELS : 20.90' btoc START : 8/25/09 11:55 END : 8/25/09 14:30 LOGGER : L. Hunt



1- Ground elevation at well	602.135
2- Top of casing elevation	601.7
a) vent hole?	
3- Wellhead protection cover type	Flushmount
a) weep hole?	
b) concrete pad dimensions	2' x 2'
4- Dia./type of well casing	2.5" Schedule 80 PVC
5- Type/slot size of screen	0.010"
6- Type screen filter	Filter Sand
a) Quantity used	
7- Type of seal	Bentonite grout
a) Quantity used	
8- Grout	
a) Grout mix used	Bentonite grout
b) Method of placement	Tremie pipe
c) Vol. of well casing grout	
Development method	Air lift
Development time	40 minutes
Estimated purge volume	225 gal
Comments	



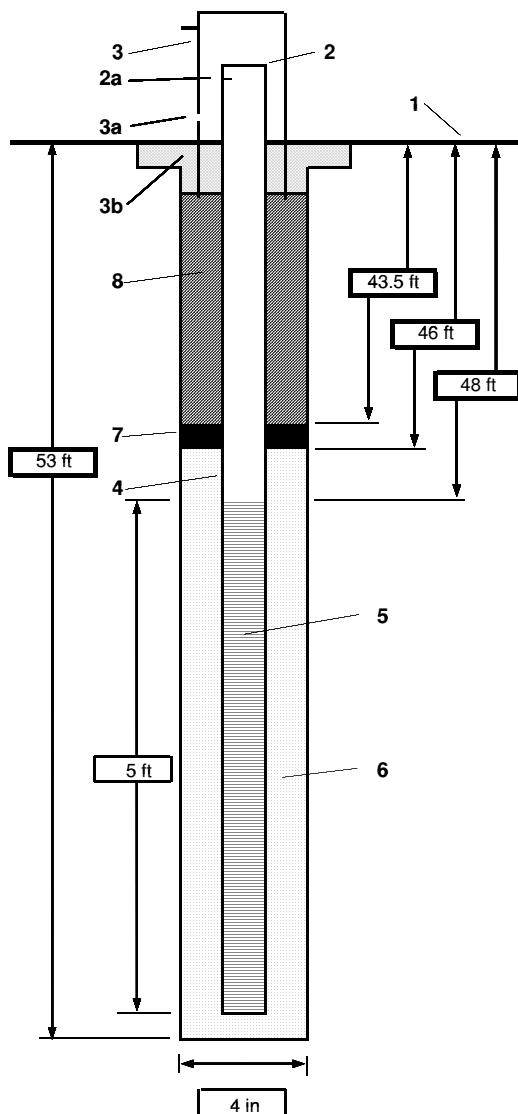
PROJECT NUMBER 363838.03.ES	WELL NUMBER MW-39S	SHEET 1 OF 1
WELL COMPLETION DIAGRAM		

PROJECT : S. Ponds Exfiltration Deep Groundwater Field Investigati LOCATION : Dow-Ludington

DRILLING CONTRACTOR : Boart-Longyear

DRILLING METHOD AND EQUIPMENT USED : Rotosonic

WATER LEVELS : 21.07' btoc START : 8/25/09 15:10 END : 8/25/09 16:30 LOGGER : L. Hunt

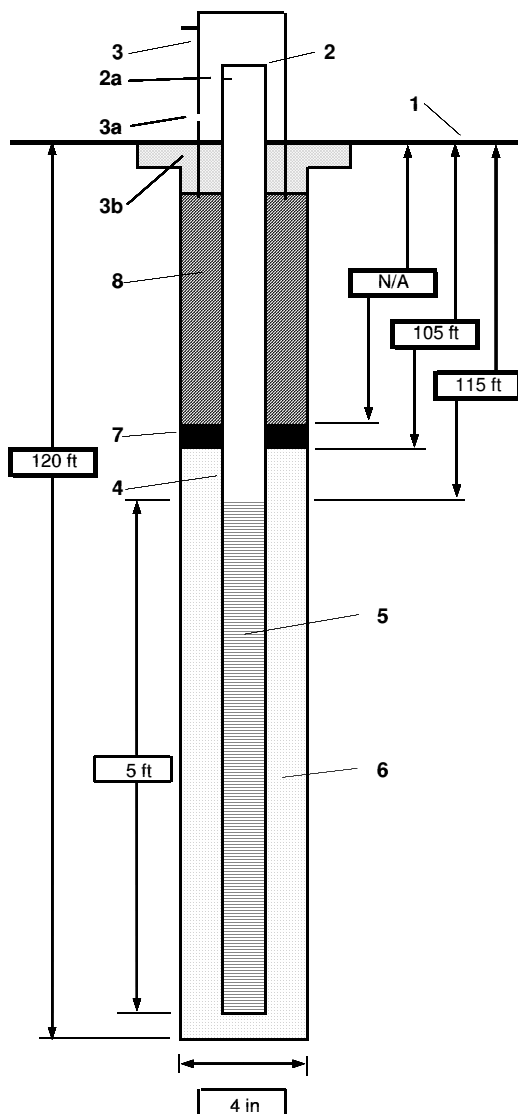


1- Ground elevation at well	602.2
2- Top of casing elevation	601.76
a) vent hole?	
3- Wellhead protection cover type	Flushmount
a) weep hole?	
b) concrete pad dimensions	2' x 2'
4- Dia./type of well casing	2" Schedule 80 PVC
5- Type/slot size of screen	0.010"
6- Type screen filter	Filter Sand
a) Quantity used	
7- Type of seal	Bentonite chips
a) Quantity used	
8- Grout	
a) Grout mix used	Bentonite grout
b) Method of placement	Tremie pipe
c) Vol. of well casing grout	
Development method	Pump and surge
Development time	1 hour 25 minutes
Estimated purge volume	53 gal
Comments	



PROJECT NUMBER 363838.03.ES	WELL NUMBER MW-40D
SHEET 1 OF 1	
WELL COMPLETION DIAGRAM	

PROJECT : S. Ponds Exfiltration Deep Groundwater Field Investigati LOCATION : Dow-Ludington
 DRILLING CONTRACTOR : Boart-Longyear
 DRILLING METHOD AND EQUIPMENT USED : Rotosonic
 WATER LEVELS : 16.95' btoc START : 9/15/09 15:00 9/15/2009 16:50 LOGGER : N. Wilbur

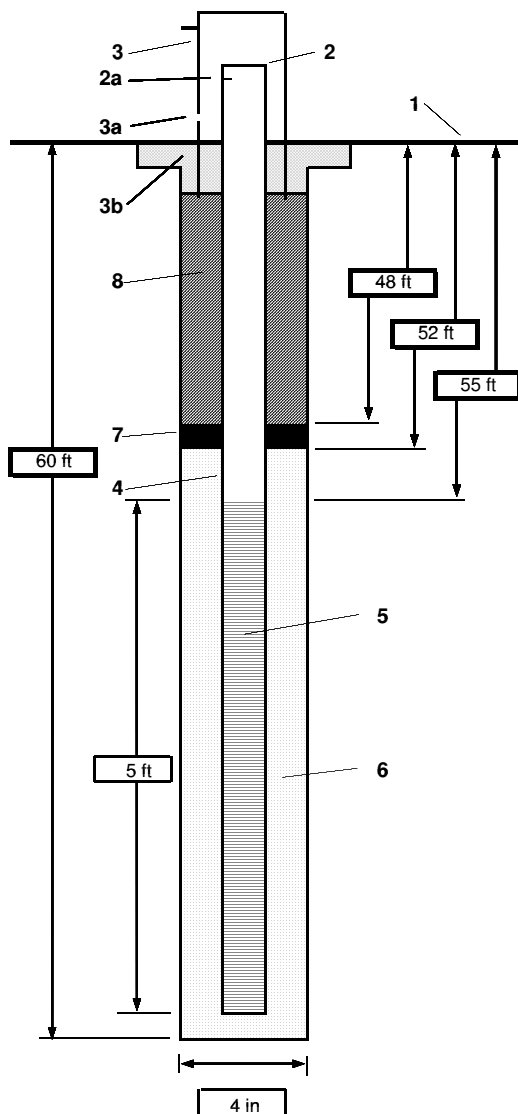


1- Ground elevation at well	599.079
2- Top of casing elevation	598.57
a) vent hole?	
3- Wellhead protection cover type	Flushmount
a) weep hole?	
b) concrete pad dimensions	2' x 2'
4- Dia./type of well casing	2.5" Schedule 80 PVC
5- Type/slot size of screen	0.010"
6- Type screen filter	Filter Sand
a) Quantity used	
7- Type of seal	Bentonite grout
a) Quantity used	
8- Grout	
a) Grout mix used	Bentonite grout
b) Method of placement	Tremie pipe
c) Vol. of well casing grout	
Development method	Air lift
Development time	40 minutes
Estimated purge volume	225 gal
Comments	



PROJECT NUMBER 363838.03.ES	WELL NUMBER MW-40S
SHEET 1 OF 1	
WELL COMPLETION DIAGRAM	

PROJECT : S. Ponds Exfiltration Deep Groundwater Field Investigati LOCATION : Dow-Ludington
 DRILLING CONTRACTOR : Boart-Longyear
 DRILLING METHOD AND EQUIPMENT USED : Rotosonic
 WATER LEVELS : 16.44' btoc START : 9/16/09 8:25 END : 9/14/09 9:40 LOGGER : N. Wilbur



1- Ground elevation at well	599.071
2- Top of casing elevation	598.62
a) vent hole?	
3- Wellhead protection cover type	Flushmount
a) weep hole?	
b) concrete pad dimensions	2' x 2'
4- Dia./type of well casing	2" Schedule 80 PVC
5- Type/slot size of screen	0.010"
6- Type screen filter	Filter Sand
a) Quantity used	
7- Type of seal	Bentonite Chips
a) Quantity used	
8- Grout	
a) Grout mix used	Bentonite grout
b) Method of placement	Tremie pipe
c) Vol. of well casing grout	
Development method	Pump and surge
Development time	35 minutes
Estimated purge volume	70 gallons
Comments	

Appendix B
Data Quality Review Memorandum and
Lab Analytical Reports

Dow Ludington Plant Site August-September 2009 Exfiltration Study Sampling Data Quality Review Vertical Aquifer Profiling Study SDGs - L09080461, L09080542, L09080640, L09080720, L09080726, L09090092, L09090173, L09090260, and L09090356 Monitoring Well Sampling SDG - L09090508

PREPARED FOR: Jon Tortomasi/CH2M HILL
Nicole Wilbur/CH2M HILL

PREPARED BY: Michael Zamboni/CH2M HILL

DATE: November 23, 2009

Introduction

This memorandum presents the results of the data review for the exfiltration study conducted during August-September 2009 at The Dow Chemical Company (Dow) Ludington Plant Site in Ludington, Michigan. The vertical aquifer profiling (VAP) screening consisted of 64 groundwater grab samples collected from seven boring locations. The monitoring well (MW) sampling consisted of groundwater samples collected from 14 monitoring wells. The samples were analyzed for chloride by U.S. Environmental Protection Agency (USEPA) Method 325.2, total dissolved solids (TDS) by USEPA Method 160.1, and ammonia by USEPA Method 350.1. A composite soil sample also was collected to aid in soil cuttings characterization. The VAP study included five equipment blanks, three matrix spike (MS)/matrix spike duplicate (MSD) pairs, and seven field duplicates. The MW sampling included two field duplicates, one MS/MSD pair, one equipment blank, and one field blank. There were 38 method blanks, 38 laboratory control samples (LCS; blank spikes), 34 laboratory control sample duplicates (LCSD; blank spike duplicates), and 17 laboratory replicates associated with this data set. Microbac Laboratories of Marietta, Ohio, analyzed the samples.

The data were reviewed to assess the sample accuracy, precision, and completeness. The review was completed in a manner consistent with the USEPA Contract Laboratory Program (CLP) National Functional Guidelines for Organic Data Review. Quality control (QC) summary forms and data reports were reviewed against the established QC limits. Data qualifiers were added when the QC data indicated a bias. Recommendations on how the results are to be used, and associated comments, are discussed below.

The field samples and related quality assurance (QA)/QC samples were reviewed for the following QC requirements:

- Completeness (that all samples were analyzed for the requested analytical parameters)
- Holding times prior to extraction and analysis
- Field duplicate precision
- Field and equipment blank contamination
- Laboratory replicate precision
- Laboratory method blank contamination
- LCS/LCSD accuracy and precision
- MS/MSD accuracy and precision
- Overall assessment of data

SDG L09080461

Chloride was detected at 20 milligrams per kilogram (mg/kg) in the soil method blank. The sample concentration was greater than five times that in the related blank; therefore, no qualifiers were applied. The MS/MSD was characterized by percent recovery outside control limits for chloride in groundwater. The parent concentration was much greater than (more than five times) the spike amount; therefore, no qualifiers were applied.

Ammonia was characterized by 28 percent relative percent difference (RPD) between MW15D-87.0 and MW15D-87.0FD. These two results were J-qualified as “estimated” because of field duplicate RPD exceeding 20 percent. The data user should use the greater of results between field duplicates. The MSD was characterized by percent recovery less than control limits for ammonia in groundwater (51.1 percent recovery versus 70 percent lower control limit). Qualifiers are not applied based on MS/MSD exceedances alone, and the MS and LCS were characterized by acceptable recovery; therefore, no qualifiers were applied. EQUIP-BLK-1, the equipment blank, contained 0.234 milligram per liter (mg/L) of ammonia. Related results were U-qualified as “not detected at significantly greater than that in an associated blank” if the sample concentration was less than five times that in the blank, considering the dilution factor. If necessary, the result was raised to the quantitation limit. Ammonia in MW15D-97.0, MW15D-87.0, MW15D-87.0FD, MW15D-77.0, MW15D-72.0, and MW15D-75.0 was U-qualified because of equipment blank contamination.

SDG L09080542

A cooler was received at 8 degrees Celsius (°C), which is greater than the upper control limit of 4°C. The samples were received overnight and analyzed within the appropriate holding times. A slight temperature exceedance is not expected to have a significant effect on these particular inorganic analyses. All chloride, total dissolved solids (TDS), and ammonia results in this sample delivery group (SDG) were J-qualified as “estimated” because of temperature preservation in order to document that a QA/QC exceedance has occurred. EQUIP-BLK-1, the equipment blank, contained 0.234 mg/L of ammonia. All related sample concentrations were greater than five times that in the related blank; therefore, no qualifiers were applied.

SDG L09080640

EQUIP-BLK-1, the equipment blank, contained 0.234 mg/L of ammonia. Related results were U-qualified as “not detected at significantly greater than that in an associated blank” if the sample concentration was less than five times that in the blank, considering the dilution factor. If necessary, the result was raised to the quantitation limit. Ammonia in MW16D-104.0 and MW39D-117.0 was U-qualified because of equipment blank contamination.

SDG L09080720

There were no QA/QC exceedances affecting the data quality or usability in this SDG.

SDG L09080726

Chloride was detected in MW16D-117.0FD but not in MW16D-117.0. Therefore, chloride was J-qualified as “estimated” in MW16D-117.0FD and UJ-qualified as “nondetect, estimated quantitation limit” in MW16D-117.0. The data user should use the greater of results between field duplicates.

SDG L09090092

The MS and MSD were characterized by percent recovery slightly less than control limits for chloride in groundwater (85 percent and 76.8 percent, respectively, versus 90 percent lower control limit). The parent sample was nondetect. Qualifiers are not applied based on MS/MSD exceedances alone, and the MS and LCS were characterized by acceptable recovery; therefore, no qualifiers were applied.

SDG L09080173

There were no QA/QC exceedances affecting the data quality or usability in this SDG.

SDG L09090260

The MS/MSD was characterized by percent recovery outside control limits for chloride, TDS, and ammonia in groundwater. The parent concentration was much greater than (more than five times) the spike amount; therefore, no qualifiers were applied. The LCS was characterized by acceptable recovery.

SDG L09090356

EQUIP-BLK-5, the equipment blank, contained 0.101 mg/L of ammonia. Related results were U-qualified as “not detected at significantly greater than that in an associated blank” if the sample concentration was less than five times that in the blank, considering the dilution factor. If necessary, the result was raised to the quantitation limit. Ammonia in MW40D-147.0 and MW40D-137.0 was U-qualified because of equipment blank contamination.

SDG L09090508

PLT-X023, the equipment blank, contained 0.217 mg/L of ammonia and 80 mg/L of TDS. Related results were U-qualified as “not detected at significantly greater than that in an associated blank” if the sample concentration was less than five times that in the blank,

considering the dilution factor. If necessary, the result was raised to the quantitation limit. Ammonia in PLT-X004, PLT-X005, and PLT-X019 and TDS in PLT-X003, PLT-X004, and PLT-X005 were U-qualified because of equipment blank contamination.

Conclusion

The data package was complete as received, and the data are of good overall quality.

Detected results were J-qualified as “estimated” because of various QA/QC exceedances. These results are usable as detects at the reported concentration as long as the data user acknowledges that they may be somewhat inaccurate or imprecise. Often, results are J-qualified simply because they are low (less than the quantitation limit).

Detected results were U-qualified as “not detected at significantly greater than that in an associated blank” if they were less than five times that in an associated blank. Results in this data set were only U-qualified because of equipment blank contamination. If the sample result was less than the quantitation limit, then it was raised to the quantitation limit when U-qualifying. U-qualified results are usable as nondetects at the reported numerical result or quantitation limit as long as the data user acknowledges that the analyte was detected but was not detected at significantly greater than that in an associated blank.

Nondetected results were UJ-qualified as “nondetect, estimated quantitation limit” because of field duplicate RPD. These results are usable as nondetects at the reported quantitation limit as long as the data user acknowledges that the quantitation limit is estimated and may be higher.

The analytical results are acceptable as qualified. No results were rejected; therefore, all results are available for use to the project team for making decisions. There were no holes identified in this data set.

StationID	PLT-MW15D	PLT-MW15D	PLT-MW15D	PLT-MW15D	PLT-MW15D	PLT-MW15D	PLT-MW15D	PLT-MW15D	PLT-MW15D	PLT-MW15D	PLT-MW15D
SampleID	MW15D-107.0	MW15D-117.0	MW15D-127.0	MW15D-127.0D	MW15D-137.0	MW15D-147.0	MW15D-147.0	MW15D-47.0	MW15D-57.0	MW15D-72.0	MW15D-77.0
SiteID	PLT	PLT	PLT	PLT	PLT	PLT	PLT	PLT	PLT	PLT	PLT
Date Collected	8/19/09 8:50	8/19/09 10:10	8/19/09 10:59	8/19/09 10:59	8/19/09 13:00	8/19/09 15:20	8/18/09 13:55	8/18/09 14:25	8/18/09 15:10	8/18/09 15:37	
Parameter	Units										
NITROGEN, AMMONIA (AS N)	mg/L	4.94 =	4.03 =	2.26 =		1.59 =	2.99 =	8.59 =	0.292 U	0.331 U	0.318 U
TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE)	mg/L	2370 =	3060 =	2650 =		3300 =	2910 =	4000 =	656 =	448 =	544 =
CHLORIDE (AS CL)	mg/L	696 =	869 =	1180 =	940 =	954 =	1090 =	1830 =	71.4 =	137 =	161 =

		PLT-MW15D	PLT-MW15D	PLT-MW15D	PLT-MW16D	PLT-MW16D	PLT-MW16D	PLT-MW16D	PLT-MW16D	PLT-MW16D	PLT-MW16D
		MW15D-87.0	MW15D-87.0FD	MW15D-97.0	MW16D-104.0	MW16D-117.0	MW16D-117.0FD	MW16D-117.0FDD	MW16D-125.5	MW16D-134.0	MW16D-147.0
		PLT	PLT	PLT	PLT	PLT	PLT	PLT	PLT	PLT	PLT
		8/18/09 16:50	8/18/09 16:55	8/18/09 17:26	8/26/09 16:20	8/27/09 8:50	8/27/09 8:58	8/27/09 8:58	8/27/09 10:50	8/27/09 11:34	8/27/09 13:22
Parameter	Units										
NITROGEN, AMMONIA (AS N)	mg/L	0.215 U	0.285 U	0.732 U	0.246 U	1.55 =	1.38 =		3.25 =	1.42 =	0.1 U
TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE)	mg/L	666 =	804 =	754 =	256 =	268 =	274 =	260 =	326 =	288 =	264 =
CHLORIDE (AS CL)	mg/L	183 =	181 =	238 =	2.34 =	2 UJ	6.65 J		2 U	2 U	2 U

		PLT-MW16D	PLT-MW16D	PLT-MW16D	PLT-MW16D	PLT-MW19D	PLT-MW19D	PLT-MW19D	PLT-MW19D	PLT-MW19D	PLT-MW19D
		MW16D-47.0	MW16D-52.0	MW16D-87.0	MW16D-97.0	MW19D-104.0	MW19D-104.0D	MW19D-104.0FD	MW19D-112.0	MW19D-127.0	MW19D-137.0
		PLT	PLT	PLT	PLT	PLT	PLT	PLT	PLT	PLT	PLT
		8/26/09 10:25	8/26/09 11:40	8/26/09 14:45	8/26/09 15:32	9/3/09 14:45	9/3/09 14:45	9/3/09 14:47	9/4/09 8:35	9/4/09 10:33	9/4/09 12:00
Parameter	Units										
NITROGEN, AMMONIA (AS N)	mg/L	22.3 =	119 =	39.1 =	11.1 =	0.342 =		0.393 =	0.355 =	0.222 =	0.213 =
TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE)	mg/L	3540 =	2640 =	372 =	252 =	206 =		234 =	184 =	248 =	256 =
CHLORIDE (AS CL)	mg/L	1520 =	1300 =	2.76 =	2 U	2 U	2 U	2 U	2 U	4.67 =	12.5 =

		PLT-MW19D	PLT-MW19D	PLT-MW19D	PLT-MW19D	PLT-MW19D	PLT-MW19D	PLT-MW19D	PLT-MW19D	PLT-MW19D	PLT-MW37D
		MW19D-147.0	MW19D-47.0	MW19D-47.0D	MW19D-52.0	MW19D-67.0	MW19D-67.0FD	MW19D-77.0	MW19D-87.0	MW19D-94.0	MW37D-117.0
		PLT	PLT	PLT	PLT	PLT	PLT	PLT	PLT	PLT	PLT
		9/4/09 12:23	9/1/09 14:10	9/1/09 14:10	9/1/09 14:52	9/1/09 15:25	9/1/09 15:27	9/1/09 16:20	9/1/09 17:37	9/2/09 11:08	8/28/09 11:42
Parameter	Units										
NITROGEN, AMMONIA (AS N)	mg/L	0.186 =	9.2 =		5.52 =	0.63 =	0.664 =	0.337 =	0.413 =	0.338 =	0.297 =
TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE)	mg/L	246 =	280 =		248 =	234 =	254 =	254 =	228 =	250 =	252 =
CHLORIDE (AS CL)	mg/L	4.37 =	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U

		PLT-MW37D	PLT-MW37D	PLT-MW37D	PLT-MW37D	PLT-MW37D	PLT-MW37D	PLT-MW37D	PLT-MW38D	PLT-MW38D	PLT-MW38D
		MW37D-127.0	MW37D-137.0	MW37D-137.0D	MW37D-147.0	MW37D-77.0	MW37D-87.0	MW37D-97.0	MW38D-107.0	MW38D-117.0	MW38D-127.0
		PLT	PLT	PLT	PLT	PLT	PLT	PLT	PLT	PLT	PLT
		8/28/09 12:25	8/28/09 13:11	8/28/09 12:25	8/28/09 13:58	8/28/09 8:45	8/28/09 9:21	8/28/09 10:03	9/10/09 16:50	9/10/09 18:05	9/11/09 9:15
Parameter	Units										
NITROGEN, AMMONIA (AS N)	mg/L	0.217 =	0.231 =		0.154 =	34.6 =	9.39 =	6.99 =	10.6 =	6.32 =	6.58 =
TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE)	mg/L	264 =	268 =		338 =	504 =	332 =	328 =	3730 =	2700 =	3280 =
CHLORIDE (AS CL)	mg/L	2 U	2 U	2 U	2 U	4.73 =	2 U	2 U	1750 =	1190 =	1250 =

		PLT-MW38D	PLT-MW38D	PLT-MW38D	PLT-MW38D	PLT-MW38D	PLT-MW38D	PLT-MW38D	PLT-MW38D	PLT-MW38D	PLT-MW38D
		MW38D-127.0D	MW38D-137.0	MW38D-147.0	MW38D-47.0	MW38D-57.0	MW38D-67.0	MW38D-77.0	MW38D-87.0	MW38D-97.0	MW38D-97.0D
		PLT	PLT	PLT	PLT	PLT	PLT	PLT	PLT	PLT	PLT
		9/11/09 9:15	9/11/09 10:40	9/11/09 11:30	9/9/09 14:45	9/9/09 15:55	9/9/09 16:20	9/10/09 10:40	9/10/09 11:45	9/10/09 15:40	9/10/09 15:40
Parameter	Units										
NITROGEN, AMMONIA (AS N)	mg/L		0.396 =	0.263 =	5.95 =	6.12 =	5.79 =	5.66 =	10.6 =	11.1 =	11 =
TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE)	mg/L		738 =	448 =	2240 =	3070 =	3010 =	3400 =	3700 =	3970 =	
CHLORIDE (AS CL)	mg/L	1530 =	182 =	60.9 =	959 =	1480 =	1710 =	1720 =	1730 =	1750 =	

Parameter	StationID	PLT-MW15D	PLT-MW15D	PLT-MW15D	PLT-MW15D	PLT-MW15D	PLT-MW15D	PLT-MW15D	PLT-MW15D	PLT-MW15D	PLT-MW15D	
	SampleID	MW15D-107.0	MW15D-117.0	MW15D-127.0	MW15D-127.0D	MW15D-137.0	MW15D-147.0	MW15D-47.0	MW15D-57.0	MW15D-72.0	MW15D-77.0	
	SiteID	PLT	PLT	PLT	PLT	PLT	PLT	PLT	PLT	PLT	PLT	
	Date Collected	8/19/09 8:50	8/19/09 10:10	8/19/09 10:59	8/19/09 10:59	8/19/09 13:00	8/19/09 15:20	8/18/09 13:55	8/18/09 14:25	8/18/09 15:10	8/18/09 15:37	
Parameter	Units											
		PLT-MW38D	PLT-MW39D	PLT-MW39D	PLT-MW39D	PLT-MW39D	PLT-MW39D	PLT-MW39D	PLT-MW39D	PLT-MW39D	PLT-MW39D	
		MW38D-97.0FD	MW39D-103.0	MW39D-103.0FD	MW39D-117.0	MW39D-127.0	MW39D-132.0	MW39D-147.0	MW39D-67.0	MW39D-67.0D	MW39D-77.0	
		PLT	PLT	PLT	PLT	PLT	PLT	PLT	PLT	PLT	PLT	
Parameter	Units											
		9/10/09 15:45	8/21/09 11:03	8/21/09 11:05	8/24/09 14:05	8/24/09 15:13	8/25/09 8:25	8/25/09 10:45	8/20/09 10:40	8/20/09 10:40	8/20/09 11:28	
NITROGEN, AMMONIA (AS N)		mg/L	11.1 =	8.6 J	8.76 J	0.221 U	5.47 =	5.26 =	7.37 =	12.6 J	11.7 J	8.19 J
TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE)		mg/L	3940 =	3700 J	3620 J	2250 =	2950 =	3070 =	3010 =	3070 J		3640 J
CHLORIDE (AS CL)		mg/L	1790 =	1310 J	1370 J	996 =	1470 =	1330 =	1670 =	1440 J		1430 J

Parameter	Units	PLT-MW39D	PLT-MW39D	PLT-MW40D	PLT-MW40D	PLT-MW40D	PLT-MW40D	PLT-MW40D	PLT-MW40D	PLT-MW40D	PLT-MW40D
		MW39D-87.0	MW39D-97.0	MW40D-107.0	MW40D-107.0D	MW40D-117.0	MW40D-117.0D	MW40D-127.0	MW40D-127.0FD	MW40D-137.0	MW40D-147.0
		PLT	PLT	PLT	PLT	PLT	PLT	PLT	PLT	PLT	PLT
		8/20/09 12:17	8/20/09 15:05	9/15/09 9:20	9/15/09 9:20	9/15/09 10:05	9/15/09 10:05	9/15/09 11:00	9/15/09 11:05	9/15/09 12:05	9/15/09 14:25
Parameter	Units										
		mg/L	8.39 J	7.92 J	4.77 =	2.51 =	2.48 =	4.55 =	4.96 =	0.343 U	0.293 U
		mg/L	3780 J	3400 J	398 =	388 =		338 =	370 =	278 =	248 =
		mg/L	1440 J	1490 J	2.37 =	2.09 =	2.04 =	2.42 =	2.42 =	2.09 =	2 U

		PLT-MW40D
		MW40D-57.0
		PLT
		9/15/09 7:50
Parameter	Units	
NITROGEN, AMMONIA (AS N)	mg/L	89.5 =
TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE)	mg/L	4000 =
CHLORIDE (AS CL)	mg/L	1860 =

	StationID	PLT-MW15D	PLT-MW15S	PLT-MW16D	PLT-MW16D	PLT-MW16S	PLT-MW17	PLT-MW19D	PLT-MW19D
	SampleID	PLT-X002	PLT-X001	PLT-X003	PLT-X003D	PLT-X020	PLT-X019	PLT-X005	PLT-X005D
	SiteID	PLT	PLT	PLT	PLT	PLT	PLT	PLT	PLT
	Date Collected	9/22/09 12:35	9/22/09 12:05	9/22/09 14:30	9/22/09 14:30	9/23/09 15:40	9/23/09 12:05	9/22/09 16:35	9/22/09 16:35
Parameter	Units								
NITROGEN, AMMONIA (AS N)	mg/L	4.74 =	7.51 =	4.24 =	4.26 =	4.6 =	0.116 U	0.298 U	
TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE)	mg/L	2530 =	3520 =	344 U		3470 =	400 =	190 U	188 =
CHLORIDE (AS CL)	mg/L	626 =	1670 =	2 U	2.01 =	1380 =	65.2 =	2.15 =	

		PLT-MW19S	PLT-MW19S	PLT-MW37D	PLT-MW37S	PLT-MW38D	PLT-MW38D	PLT-MW38S	PLT-MW39D
		PLT-X022	PLT-X022D	PLT-X004	PLT-X021	PLT-X011	PLT-X012	PLT-X013	PLT-X007
		PLT	PLT	PLT	PLT	PLT	PLT	PLT	PLT
		9/23/09 17:15	9/23/09 17:15	9/22/09 15:25	9/23/09 16:25	9/23/09 8:25	9/23/09 8:30	9/23/09 8:55	9/22/09 17:45
Parameter	Units								
NITROGEN, AMMONIA (AS N)	mg/L	37 =		0.787 U	169 =	10.8 =	10.9 =	4.57 =	5.25 =
TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE)	mg/L	5030 =	5670 =	280 U	2270 =	3270 =	3570 =	2720 =	2540 =
CHLORIDE (AS CL)	mg/L	2070 =		2 U	903 =	1450 =	1410 =	919 =	967 =

		PLT-MW39D	PLT-MW39S	PLT-MW40D	PLT-MW40S
		PLT-X008	PLT-X006	PLT-X010	PLT-X009
		PLT	PLT	PLT	PLT
		9/22/09 17:50	9/22/09 17:15	9/22/09 18:50	9/22/09 18:20
Parameter	Units				
NITROGEN, AMMONIA (AS N)	mg/L	5.13 =	7.94 =	1.98 =	81.9 =
TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE)	mg/L	2680 =	3020 =	452 =	4960 =
CHLORIDE (AS CL)	mg/L	1040 =	1230 =	2 U	1560 =



158 Starlite Drive, Marietta, OH 45750 • T:740-373-4071 • F:740-373-4835 • <http://www.microbac.com>

Laboratory Report Number: L09080461

Please find enclosed the analytical results for the samples you submitted to Microbac Laboratories.

Review and compilation of your report was completed by Microbac's Sales and Service Team. If you have questions, comments or require further assistance regarding this report, please contact your team member noted in the reviewed box below at 800-373-4071. Team member e-mail addresses also appear here for your convenience.

Kathy Albertson	<i>Team Chemist/Data Specialist</i>	kalbertson@microbac.com
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Annie Brown	<i>Client Services Specialist</i>	abrown@microbac.com

This report was reviewed on August 28, 2009.

A handwritten signature in black ink that reads "Kathy Albertson".

Kathy Albertson - Team Chemist/Data Specialist

I certify that all test results meet all of the requirements of the accrediting authority listed below. All results for soil samples are reported on a 'dry-weight' basis unless specified otherwise. Analytical results for water and wastes are reported on a 'as received' basis unless specified otherwise. A statement of uncertainty for each analysis is available upon request. This laboratory report shall not be reproduced, except in full, without the written approval of Microbac Laboratories.

This report was certified on August 28, 2009.

A handwritten signature in black ink that reads "David E. Vandenberg".

David Vandenberg - Managing Director

State of origin: Michigan

Accrediting authority: N/A ID:N/A

QAPP: Microbac OVD

This report contains a total of 93 pages.

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Ohio Valley Division
158 Starlite Drive
Marietta, OH 45750

Phone: 800.373.4071
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Microbac REPORT L09080461
PREPARED FOR CH2MHILL, Inc
WORK ID:

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1.0 Introduction

Microbac Laboratories Inc.
REPORT NARRATIVE

Microbac Login No: L09080461

CHAIN OF CUSTODY: The chain of custody number was 14240

SHIPMENT CONDITIONS: The chain of custody forms were received sealed in a cooler. The cooler temperature was 5 degrees C.

SAMPLE MANAGEMENT: All samples received were intact.

I certify that this data package is in compliance with the terms and conditions agreed to by the client and Microbac Laboratories Inc., both technically and for completeness, except for the conditions noted above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or designated person, as verified by the following signature.

Approved: 21-AUG-09


2.0 Data Package

LABORATORY REPORT

L09080461

08/28/09 09:26

Submitted By

Microbac Laboratories Inc.
158 Starlite Drive
Marietta , OH 45750
(740) 373 - 4071

For

Account Name: CH2MHILL, Inc
CH2MHILL
15010 Conference Center Drive Suite 200
Chantilly, VA 20151
Attention: Michael J. Zamboni

Project Number: 2736.006
Project: MI-Dow Ludington
Site: LUDINGTON, MI

P.O. Number: 933464

Sample Analysis Summary

Client ID	Lab ID	Method	Dilution	Date Received
MW15D-CUTTINGS	L09080461-15	D2216-90	1	20-AUG-09



Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-15**
Client ID: **MW15D-CUTTINGS**
Matrix: **Soil**
Workgroup Number: **WG310270**
Collect Date: **08/19/2009 00:01**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **D2216-90**
Analytical Method: **D2216-90**
Analyst: **CPD**
Dilution: **1**
Units: **weight %**

Instrument: **BAL001**
Prep Date: **08/24/2009 08:58**
Cal Date:
Run Date: **08/24/2009 08:58**
File ID: **B1.310270-0110**

Analyte	CAS. Number	Result	Qual	RL	MDL
Percent Solids	10-02-6	92.0		1.00	1.00

2.1 General Chemistry Data

Microbac Laboratories Inc.
GENERAL CHEMISTRY

Microbac Login No: L09080461

METHOD

Analysis: See report for method reference.

HOLDING TIMES

Sample Preparation: All holding times were met.

Sample Analysis: All holding times were met.

PREPARATION

Sample preparation proceeded normally.

BATCH QA/QC

Method Blank: The associated Chloride soil blank had a result at the reporting limit.

Laboratory Control Sample: All acceptance criteria were met.

Duplicates: All acceptance criteria were met.

Matrix Spikes: The MS/MSD recoveries for Chloride and Ammonia exceeded the advisory limits.

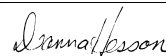
SAMPLES

There were no technical difficulties with the sample group.

I certify that this data package is in compliance with the terms and conditions agreed to by the client and Microbac Laboratories Inc., both technically and for completeness, except for the conditions noted above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or designated person, as verified by the following signature.

Analyst: DIH

Approved: 24-AUG-09



2.1.2 Chloride Data

2.1.2.1 Summary Data

LABORATORY REPORT

L09080461

08/28/09 09:26

Submitted By

Microbac Laboratories Inc.
158 Starlite Drive
Marietta, OH 45750
(740) 373-4071

For

Account Name: CH2MHILL, Inc
CH2MHILL
15010 Conference Center Drive Suite 200
Chantilly, VA 20151
Attention: Michael J. Zamboni

Project Number: 2736.006
Project: MI-Dow Ludington
Site: LUDINGTON, MI

P.O. Number: 933464

Sample Analysis Summary

Client ID	Lab ID	Method	Dilution	Date Received
MW15D-147.0	L09080461-01	325.2	20	20-AUG-09
MW15D-137.0	L09080461-02	325.2	20	20-AUG-09
MW15D-127.0	L09080461-03	325.2	20	20-AUG-09
MW15D-127.0-MS	L09080461-04	325.2	20	20-AUG-09
MW15D-127.0-MSD	L09080461-05	325.2	20	20-AUG-09
MW15D-117.0	L09080461-06	325.2	20	20-AUG-09
MW15D-107.0	L09080461-07	325.2	10	20-AUG-09
MW15D-97.0	L09080461-08	325.2	4	20-AUG-09
MW15D-87.0	L09080461-09	325.2	2	20-AUG-09
MW15D-87.0-FD	L09080461-10	325.2	2	20-AUG-09
MW15D-77.0	L09080461-11	325.2	2	20-AUG-09
MW15D-72.0	L09080461-12	325.2	2	20-AUG-09
MW15D-57.0	L09080461-13	325.2	2	20-AUG-09
MW15D-47.0	L09080461-14	325.2	40	20-AUG-09
MW15D-CUTTINGS	L09080461-15	SM4500-C1	1	20-AUG-09

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-01**
Client ID: **MW15D-147.0**
Matrix: **Water**
Workgroup Number: **WG310251**
Collect Date: **08/19/2009 15:20**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **DIH**
Dilution: **20**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/21/2009 13:49**
Cal Date: **08/21/2009 13:43**
Run Date: **08/21/2009 13:49**
File ID: **SC090821004.018**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	1090		40.0	20.0

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-02**
Client ID: **MW15D-137.0**
Matrix: **Water**
Workgroup Number: **WG310251**
Collect Date: **08/19/2009 13:00**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **DIH**
Dilution: **20**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/21/2009 13:51**
Cal Date: **08/21/2009 13:42**
Run Date: **08/21/2009 13:51**
File ID: **SC090821004.021**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	954		40.0	20.0

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-03**
Client ID: **MW15D-127.0**
Matrix: **Water**
Workgroup Number: **WG310251**
Collect Date: **08/19/2009 10:59**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **DIH**
Dilution: **20**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/21/2009 13:52**
Cal Date: **08/21/2009 13:43**
Run Date: **08/21/2009 13:52**
File ID: **SC090821004.022**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	1180		40.0	20.0

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-04**
Client ID: **MW15D-127.0-MS**
Matrix: **Water**
Workgroup Number: **WG310251**
Collect Date: **08/19/2009 10:59**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **DIH**
Dilution: **20**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/21/2009 13:53**
Cal Date: **08/21/2009 13:43**
Run Date: **08/21/2009 13:53**
File ID: **SC090821004.024**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	958		40.0	20.0

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-05**
Client ID: **MW15D-127.0-MSD**
Matrix: **Water**
Workgroup Number: **WG310251**
Collect Date: **08/19/2009 10:59**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **DIH**
Dilution: **20**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/21/2009 13:53**
Cal Date: **08/21/2009 13:43**
Run Date: **08/21/2009 13:53**
File ID: **SC090821004.025**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	950		40.0	20.0

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-06**
Client ID: **MW15D-117.0**
Matrix: **Water**
Workgroup Number: **WG310251**
Collect Date: **08/19/2009 10:10**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **DIH**
Dilution: **20**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/21/2009 13:54**
Cal Date: **08/21/2009 13:43**
Run Date: **08/21/2009 13:54**
File ID: **SC090821004.026**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	869		40.0	20.0

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-07**
Client ID: **MW15D-107.0**
Matrix: **Water**
Workgroup Number: **WG310251**
Collect Date: **08/19/2009 08:50**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **DIH**
Dilution: **10**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/21/2009 13:54**
Cal Date: **08/21/2009 13:43**
Run Date: **08/21/2009 13:54**
File ID: **SC090821004.027**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	696		20.0	10.0

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-08**
Client ID: **MW15D-97.0**
Matrix: **Water**
Workgroup Number: **WG310251**
Collect Date: **08/18/2009 17:26**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **DIH**
Dilution: **4**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/21/2009 13:55**
Cal Date: **08/21/2009 13:43**
Run Date: **08/21/2009 13:55**
File ID: **SC090821004.028**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	238		8.00	4.00

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-09**
Client ID: **MW15D-87.0**
Matrix: **Water**
Workgroup Number: **WG310251**
Collect Date: **08/18/2009 16:50**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **DIH**
Dilution: **2**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/21/2009 13:55**
Cal Date: **08/21/2009 13:43**
Run Date: **08/21/2009 13:55**
File ID: **SC090821004.029**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	183		4.00	2.00

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-10**
Client ID: **MW15D-87.0-FD**
Matrix: **Water**
Workgroup Number: **WG310251**
Collect Date: **08/18/2009 16:55**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **DIH**
Dilution: **2**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/21/2009 13:56**
Cal Date: **08/21/2009 13:43**
Run Date: **08/21/2009 13:56**
File ID: **SC090821004.030**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	181		4.00	2.00

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-11**
Client ID: **MW15D-77.0**
Matrix: **Water**
Workgroup Number: **WG310251**
Collect Date: **08/18/2009 15:37**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **DIH**
Dilution: **2**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/21/2009 13:58**
Cal Date: **08/21/2009 13:43**
Run Date: **08/21/2009 13:58**
File ID: **SC090821004.033**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	161		4.00	2.00

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-12**
Client ID: **MW15D-72.0**
Matrix: **Water**
Workgroup Number: **WG310251**
Collect Date: **08/18/2009 15:10**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **DIH**
Dilution: **2**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/21/2009 13:59**
Cal Date: **08/21/2009 13:43**
Run Date: **08/21/2009 13:59**
File ID: **SC090821004.034**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	137		4.00	2.00

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-13**
Client ID: **MW15D-57.0**
Matrix: **Water**
Workgroup Number: **WG310251**
Collect Date: **08/18/2009 14:25**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **DIH**
Dilution: **2**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/21/2009 13:59**
Cal Date: **08/21/2009 13:43**
Run Date: **08/21/2009 13:59**
File ID: **SC090821004.035**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	71.4		4.00	2.00

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-14**
Client ID: **MW15D-47.0**
Matrix: **Water**
Workgroup Number: **WG310251**
Collect Date: **08/18/2009 13:55**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **DIH**
Dilution: **40**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/21/2009 14:00**
Cal Date: **08/21/2009 13:43**
Run Date: **08/21/2009 14:00**
File ID: **SC090821004.036**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	1830		80.0	40.0

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: L09080461-15	PrePrep Method: NONE	Instrument: SMARTCHEM
Client ID: MW15D-CUTTINGS	Prep Method: SM4500-Cl(-)-E-2	Prep Date: 08/21/2009 09:10
Matrix: Soil	Analytical Method: SM4500-Cl(-)-E-2	Cal Date: 08/21/2009 13:43
Workgroup Number: WG310261	Analyst: DIH	Run Date: 08/21/2009 14:02
Collect Date: 08/19/2009 00:01	Dilution: 1	File ID: SC090821004.040
Sample Tag: 01	Units: mg/kg	Percent Solid: 92.0

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride, Leachable	16887-00-6	114		22.0	11.0

15 of 15



2.1.2.2 QC Summary Data

METHOD BLANK SUMMARY

Login Number: L09080461
 Blank File ID: SC090821004.010
 Prep Date: 08/21/09 13:44
 Analyzed Date: 08/21/09 13:44
 Analyst: DIH

Work Group: WG310251
 Blank Sample ID: WG310251-01
 Instrument ID: SMARTCHEM
 Method: 325.2

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG310251-02	SC090821004.011	08/21/09 13:45	01
LCS2	WG310251-03	SC090821004.012	08/21/09 13:46	01
MW15D-147.0	L09080461-01	SC090821004.018	08/21/09 13:49	DL01
MW15D-137.0	L09080461-02	SC090821004.021	08/21/09 13:51	DL01
MW15D-127.0	L09080461-03	SC090821004.022	08/21/09 13:52	DL01
DUP	WG310251-05	SC090821004.023	08/21/09 13:52	DL01
MW15D-127.0-MS	L09080461-04	SC090821004.024	08/21/09 13:53	DL01
MW15D-127.0-MSD	L09080461-05	SC090821004.025	08/21/09 13:53	DL01
MW15D-117.0	L09080461-06	SC090821004.026	08/21/09 13:54	DL01
MW15D-107.0	L09080461-07	SC090821004.027	08/21/09 13:54	DL01
MW15D-97.0	L09080461-08	SC090821004.028	08/21/09 13:55	DL01
MW15D-87.0	L09080461-09	SC090821004.029	08/21/09 13:55	DL01
MW15D-87.0-FD	L09080461-10	SC090821004.030	08/21/09 13:56	DL01
MW15D-77.0	L09080461-11	SC090821004.033	08/21/09 13:58	DL01
MW15D-72.0	L09080461-12	SC090821004.034	08/21/09 13:59	DL01
MW15D-57.0	L09080461-13	SC090821004.035	08/21/09 13:59	DL01
MW15D-47.0	L09080461-14	SC090821004.036	08/21/09 14:00	DL01



METHOD BLANK SUMMARY

Login Number: <u>L09080461</u>	Work Group: <u>WG310261</u>
Blank File ID: <u>SC090821004.037</u>	Blank Sample ID: <u>WG310261-01</u>
Prep Date: <u>08/21/09 09:10</u>	Instrument ID: <u>SMARTCHEM</u>
Analyzed Date: <u>08/21/09 14:00</u>	Method: <u>SM4500-Cl(-)-E-2</u>
Analyst: <u>DIH</u>	

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG310261-02	SC090821004.038	08/21/09 14:01	01
LCS2	WG310261-03	SC090821004.039	08/21/09 14:01	01
MW15D-CUTTINGS	L09080461-15	SC090821004.040	08/21/09 14:02	01
DUP	WG310261-05	SC090821004.041	08/21/09 14:03	01

Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L09080461 Prep Date: 08/21/09 13:44 Sample ID: WG310251-01
Instrument ID: SMARTCHEM Run Date: 08/21/09 13:44 Prep Method: 325.2
File ID: SC090821004.010 Analyst: DIH Method: 325.2
Workgroup (AAB#): WG310251 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: SMARTC - 21-AUG-09

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Chloride	1.00	2.00	2.00	1	ND

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1472037

24-AUG-2009 10:46



Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L09080461 Prep Date: 08/21/09 09:10 Sample ID: WG310261-01
Instrument ID: SMARTCHEM Run Date: 08/21/09 14:00 Prep Method: SM4500-Cl(-)-E-
File ID: SC090821004.037 Analyst: DIH Method: SM4500-Cl(-)-E-
Workgroup (AAB#): WG310261 Matrix: Soil Units: mg/kg
Contract #: _____ Cal ID: SMARTC - 21-AUG-09

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Chloride, Leachable	10.0	20.0	20.0	1	*

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1472037

24-AUG-2009 10:46



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09080461 Analyst: DIH Prep Method: 325.2
Instrument ID: SMARTCHEM Matrix: Water Method: 325.2
Workgroup (AAB#): WG310251 Units: mg/L
QC Key: DOWBOA2006 Lot #: STD34512
Sample ID: WG310251-02 LCS File ID: SC090821004.011 Run Date: 08/21/2009 13:45
Sample ID: WG310251-03 LCS2 File ID: SC090821004.012 Run Date: 08/21/2009 13:46

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Chloride	50.0	49.4	98.8	50.0	51.4	103	3.92	90 - 110	10	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 1472038
Report generated: 08/24/2009 10:45



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09080461 Analyst: DIH Prep Method: SM4500-Cl(-)-E-
Instrument ID: SMARTCHEM Matrix: Soil Method: SM4500-Cl(-)-E-
Workgroup (AAB#): WG310261 Units: mg/kg
QC Key: DOWBOA2006 Lot #: STD33071
Sample ID: WG310261-02 LCS File ID: SC090821004.038 Run Date: 08/21/2009 14:01
Sample ID: WG310261-03 LCS2 File ID: SC090821004.039 Run Date: 08/21/2009 14:01

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Chloride, Leachable	500	537	107	500	521	104	3.06	80 - 120	50	



MS/MSD REPORT

Loginnum: <u>L09080461</u>	Cal ID: <u>SMARTCHEM- 21-AUG-09</u>	Worknum: <u>WG310251</u>
Instrument ID: <u>SMARTCHEM</u>	Contract #: _____	Prep Method: <u>325.2</u>
Parent ID: <u>L09080461-03</u>	File ID: <u>SC090821004.022</u>	Dil: <u>20</u>
Sample ID: <u>L09080461-04 MS</u>	File ID: <u>SC090821004.024</u>	Dil: <u>20</u>
Sample ID: <u>L09080461-05 MSD</u>	File ID: <u>SC090821004.025</u>	Dil: <u>20</u>
		Method: <u>325.2</u>
		Matrix: <u>Water</u>
		Units: <u>mg/L</u>

Analyte	Parent	MS Spiked	MS Found	MS %Rec	MSD Spiked	MSD Found	MSD %Rec	%RPD	%Rec Limits	RPD Limit	Q
Chloride	1180	20.0	958	-1090	20.0	950	-1130	0.834	90 - 110	10	*

* FAILS %REC LIMIT

FAILS RPD LIMIT

2.1.3 Ammonia Data

2.1.3.1 Summary Data

LABORATORY REPORT

L09080461

08/28/09 09:26

Submitted By

Microbac Laboratories Inc.
158 Starlite Drive
Marietta, OH 45750
(740) 373-4071

For

Account Name: CH2MHILL, Inc
CH2MHILL
15010 Conference Center Drive Suite 200
Chantilly, VA 20151
Attention: Michael J. Zamboni

Project Number: 2736.006
Project: MI-Dow Ludington
Site: LUDINGTON, MI

P.O. Number: 933464

Sample Analysis Summary

Client ID	Lab ID	Method	Dilution	Date Received
MW15D-147.0	L09080461-01	350.1	1	20-AUG-09
MW15D-137.0	L09080461-02	350.1	1	20-AUG-09
MW15D-127.0	L09080461-03	350.1	1	20-AUG-09
MW15D-127.0-MS	L09080461-04	350.1	1	20-AUG-09
MW15D-127.0-MSD	L09080461-05	350.1	1	20-AUG-09
MW15D-117.0	L09080461-06	350.1	2	20-AUG-09
MW15D-107.0	L09080461-07	350.1	2	20-AUG-09
MW15D-97.0	L09080461-08	350.1	1	20-AUG-09
MW15D-87.0	L09080461-09	350.1	1	20-AUG-09
MW15D-87.0-FD	L09080461-10	350.1	1	20-AUG-09
MW15D-77.0	L09080461-11	350.1	1	20-AUG-09
MW15D-72.0	L09080461-12	350.1	1	20-AUG-09
MW15D-57.0	L09080461-13	350.1	1	20-AUG-09
MW15D-47.0	L09080461-14	350.1	5	20-AUG-09



Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-01**
Client ID: **MW15D-147.0**
Matrix: **Water**
Workgroup Number: **WG310558**
Collect Date: **08/19/2009 15:20**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/26/2009 09:47**
Cal Date: **08/26/2009 09:34**
Run Date: **08/26/2009 09:47**
File ID: **SC090826001.020**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	2.99		0.100	0.0500

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-02**
Client ID: **MW15D-137.0**
Matrix: **Water**
Workgroup Number: **WG310558**
Collect Date: **08/19/2009 13:00**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/26/2009 09:47**
Cal Date: **08/26/2009 09:34**
Run Date: **08/26/2009 09:47**
File ID: **SC090826001.021**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	1.59		0.100	0.0500

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-03**
Client ID: **MW15D-127.0**
Matrix: **Water**
Workgroup Number: **WG310558**
Collect Date: **08/19/2009 10:59**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/26/2009 09:48**
Cal Date: **08/26/2009 09:34**
Run Date: **08/26/2009 09:48**
File ID: **SC090826001.022**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	2.26		0.100	0.0500

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-04**
Client ID: **MW15D-127.0-MS**
Matrix: **Water**
Workgroup Number: **WG310558**
Collect Date: **08/19/2009 10:59**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/26/2009 09:49**
Cal Date: **08/26/2009 09:34**
Run Date: **08/26/2009 09:49**
File ID: **SC090826001.023**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	3.00		0.100	0.0500

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-05**
Client ID: **MW15D-127.0-MSD**
Matrix: **Water**
Workgroup Number: **WG310558**
Collect Date: **08/19/2009 10:59**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/26/2009 09:50**
Cal Date: **08/26/2009 09:34**
Run Date: **08/26/2009 09:50**
File ID: **SC090826001.024**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	2.77		0.100	0.0500

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-06**
Client ID: **MW15D-117.0**
Matrix: **Water**
Workgroup Number: **WG310558**
Collect Date: **08/19/2009 10:10**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **2**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/26/2009 10:39**
Cal Date: **08/26/2009 09:34**
Run Date: **08/26/2009 10:39**
File ID: **SC090826001.066**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	4.03		0.200	0.100

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-07**
Client ID: **MW15D-107.0**
Matrix: **Water**
Workgroup Number: **WG310558**
Collect Date: **08/19/2009 08:50**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **2**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/26/2009 10:41**
Cal Date: **08/26/2009 09:34**
Run Date: **08/26/2009 10:41**
File ID: **SC090826001.067**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	4.94		0.200	0.100

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-08**
Client ID: **MW15D-97.0**
Matrix: **Water**
Workgroup Number: **WG310558**
Collect Date: **08/18/2009 17:26**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/26/2009 09:52**
Cal Date: **08/26/2009 09:34**
Run Date: **08/26/2009 09:52**
File ID: **SC090826001.027**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	0.732		0.100	0.0500

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-09**
Client ID: **MW15D-87.0**
Matrix: **Water**
Workgroup Number: **WG310558**
Collect Date: **08/18/2009 16:50**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/26/2009 09:54**
Cal Date: **08/26/2009 09:34**
Run Date: **08/26/2009 09:54**
File ID: **SC090826001.028**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	0.215		0.100	0.0500

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-10**
Client ID: **MW15D-87.0-FD**
Matrix: **Water**
Workgroup Number: **WG310558**
Collect Date: **08/18/2009 16:55**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/26/2009 09:54**
Cal Date: **08/26/2009 09:34**
Run Date: **08/26/2009 09:54**
File ID: **SC090826001.029**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	0.285		0.100	0.0500

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-11**
Client ID: **MW15D-77.0**
Matrix: **Water**
Workgroup Number: **WG310558**
Collect Date: **08/18/2009 15:37**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/26/2009 09:57**
Cal Date: **08/26/2009 09:34**
Run Date: **08/26/2009 09:57**
File ID: **SC090826001.032**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	0.318		0.100	0.0500

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-12**
Client ID: **MW15D-72.0**
Matrix: **Water**
Workgroup Number: **WG310558**
Collect Date: **08/18/2009 15:10**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/26/2009 09:58**
Cal Date: **08/26/2009 09:34**
Run Date: **08/26/2009 09:58**
File ID: **SC090826001.033**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	0.331		0.100	0.0500

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-13**
Client ID: **MW15D-57.0**
Matrix: **Water**
Workgroup Number: **WG310558**
Collect Date: **08/18/2009 14:25**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/26/2009 09:59**
Cal Date: **08/26/2009 09:34**
Run Date: **08/26/2009 09:59**
File ID: **SC090826001.034**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	0.292		0.100	0.0500

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-14**
Client ID: **MW15D-47.0**
Matrix: **Water**
Workgroup Number: **WG310558**
Collect Date: **08/18/2009 13:55**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **5**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/26/2009 11:12**
Cal Date: **08/26/2009 09:34**
Run Date: **08/26/2009 11:12**
File ID: **SC090826001.081**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	8.59		0.500	0.250

2.1.3.2 QC Summary Data

METHOD BLANK SUMMARY

Login Number: L09080461
 Blank File ID: SC090826001.009
 Prep Date: 08/26/09 09:36
 Analyzed Date: 08/26/09 09:36
 Analyst: JBK

Work Group: WG310558
 Blank Sample ID: WG310558-01
 Instrument ID: SMARTCHEM
 Method: 350.1

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG310558-02	SC090826001.010	08/26/09 09:38	01
MW15D-147.0	L09080461-01	SC090826001.020	08/26/09 09:47	01
MW15D-137.0	L09080461-02	SC090826001.021	08/26/09 09:47	01
MW15D-127.0	L09080461-03	SC090826001.022	08/26/09 09:48	01
MW15D-127.0-MS	L09080461-04	SC090826001.023	08/26/09 09:49	01
MW15D-127.0-MSD	L09080461-05	SC090826001.024	08/26/09 09:50	01
MW15D-97.0	L09080461-08	SC090826001.027	08/26/09 09:52	01
MW15D-87.0	L09080461-09	SC090826001.028	08/26/09 09:54	01
MW15D-87.0-FD	L09080461-10	SC090826001.029	08/26/09 09:54	01
MW15D-77.0	L09080461-11	SC090826001.032	08/26/09 09:57	01
MW15D-72.0	L09080461-12	SC090826001.033	08/26/09 09:58	01
MW15D-57.0	L09080461-13	SC090826001.034	08/26/09 09:59	01
DUP	WG310558-05	SC090826001.036	08/26/09 10:01	01
MW15D-117.0	L09080461-06	SC090826001.066	08/26/09 10:39	DL01
MW15D-107.0	L09080461-07	SC090826001.067	08/26/09 10:41	DL01
MW15D-47.0	L09080461-14	SC090826001.081	08/26/09 11:12	DL01

Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L09080461 Prep Date: 08/26/09 09:36 Sample ID: WG310558-01
Instrument ID: SMARTCHEM Run Date: 08/26/09 09:36 Prep Method: 350.1
File ID: SC090826001.009 Analyst: JBK Method: 350.1
Workgroup (AAB#): WG310558 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: SMARTC - 26-AUG-09

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Nitrogen, Ammonia	0.0500	0.100	-0.0647	1	ND

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1475243

27-AUG-2009 11:48



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09080461 Run Date: 08/26/2009 Sample ID: WG310558-02
Instrument ID: SMARTCHEM Run Time: 09:38 Prep Method: 350.1
File ID: SC090826001.010 Analyst: JBK Method: 350.1
Workgroup (AAB#): WG310558 Matrix: Water Units: mg/L
QC Key: DOWBOA2006 Lot#: STD33211 Cal ID: SMARTC - 26-AUG-09

Analytes	Expected	Found	% Rec	LCS Limits	Q
Nitrogen, Ammonia	2.00	1.88	94.2	90 - 110	

LCS - Modified 03/06/2008
PDF File ID: 1475244
Report generated: 08/27/2009 11:48



MS/MSD REPORT

Loginnum: L09080461 Cal ID: SMARTCHEM- 26-AUG-09
 Instrument ID: SMARTCHEM Contract #: _____
 Parent ID: L09080461-03 File ID: SC090826001.022 Dil: 1
 Sample ID: L09080461-04 MS File ID: SC090826001.023 Dil: 1
 Sample ID: L09080461-05 MSD File ID: SC090826001.024 Dil: 1

Worknum: WG310558
 Prep Method: 350.1
 Method: 350.1
 Matrix: Water
 Units: mg/L

Analyte	Parent	MS Spiked	MS Found	MS %Rec	MSD Spiked	MSD Found	MSD %Rec	%RPD	%Rec Limits	RPD Limit	Q
Nitrogen, Ammonia	2.26	1.00	3.00	74.1	1.00	2.77	51.1	7.98	70 - 125	25	*

* FAILS %REC LIMIT

FAILS RPD LIMIT

2.1.4 Total Dissolved Solids Data

2.1.4.1 Summary Data

LABORATORY REPORT

L09080461

08/28/09 09:26

Submitted By

Microbac Laboratories Inc.
158 Starlite Drive
Marietta, OH 45750
(740) 373-4071

For

Account Name: CH2MHILL, Inc
CH2MHILL
15010 Conference Center Drive Suite 200
Chantilly, VA 20151
Attention: Michael J. Zamboni

Project Number: 2736.006
Project: MI-Dow Ludington
Site: LUDINGTON, MI

P.O. Number: 933464

Sample Analysis Summary

Client ID	Lab ID	Method	Dilution	Date Received
MW15D-147.0	L09080461-01	160.1	1	20-AUG-09
MW15D-137.0	L09080461-02	160.1	1	20-AUG-09
MW15D-127.0	L09080461-03	160.1	1	20-AUG-09
MW15D-127.0-MS	L09080461-04	160.1	1	20-AUG-09
MW15D-127.0-MSD	L09080461-05	160.1	1	20-AUG-09
MW15D-117.0	L09080461-06	160.1	1	20-AUG-09
MW15D-107.0	L09080461-07	160.1	1	20-AUG-09
MW15D-97.0	L09080461-08	160.1	1	20-AUG-09
MW15D-87.0	L09080461-09	160.1	1	20-AUG-09
MW15D-87.0-FD	L09080461-10	160.1	1	20-AUG-09
MW15D-77.0	L09080461-11	160.1	1	20-AUG-09
MW15D-72.0	L09080461-12	160.1	1	20-AUG-09
MW15D-57.0	L09080461-13	160.1	1	20-AUG-09
MW15D-47.0	L09080461-14	160.1	1	20-AUG-09



Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-01**
Client ID: **MW15D-147.0**
Matrix: **Water**
Workgroup Number: **WG310207**
Collect Date: **08/19/2009 15:20**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/20/2009 14:15**
Cal Date:
Run Date: **08/20/2009 14:15**
File ID: **EN.0908201415-18**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		2910		20.0	10.0

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-02**
Client ID: **MW15D-137.0**
Matrix: **Water**
Workgroup Number: **WG310207**
Collect Date: **08/19/2009 13:00**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/20/2009 14:15**
Cal Date:
Run Date: **08/20/2009 14:15**
File ID: **EN.0908201415-17**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		3300		20.0	10.0

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-03**
Client ID: **MW15D-127.0**
Matrix: **Water**
Workgroup Number: **WG310207**
Collect Date: **08/19/2009 10:59**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/20/2009 14:15**
Cal Date:
Run Date: **08/20/2009 14:15**
File ID: **EN.0908201415-14**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		2650		20.0	10.0

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-04**
Client ID: **MW15D-127.0-MS**
Matrix: **Water**
Workgroup Number: **WG310207**
Collect Date: **08/19/2009 10:59**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/20/2009 14:15**
Cal Date:
Run Date: **08/20/2009 14:15**
File ID: **EN.0908201415-15**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		3150		20.0	10.0

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-05**
Client ID: **MW15D-127.0-MSD**
Matrix: **Water**
Workgroup Number: **WG310207**
Collect Date: **08/19/2009 10:59**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/20/2009 14:15**
Cal Date:
Run Date: **08/20/2009 14:15**
File ID: **EN.0908201415-16**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		3150		20.0	10.0

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-06**
Client ID: **MW15D-117.0**
Matrix: **Water**
Workgroup Number: **WG310207**
Collect Date: **08/19/2009 10:10**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/20/2009 14:15**
Cal Date:
Run Date: **08/20/2009 14:15**
File ID: **EN.0908201415-13**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		3060		20.0	10.0

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-07**
Client ID: **MW15D-107.0**
Matrix: **Water**
Workgroup Number: **WG310207**
Collect Date: **08/19/2009 08:50**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/20/2009 14:15**
Cal Date:
Run Date: **08/20/2009 14:15**
File ID: **EN.0908201415-12**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		2370		20.0	10.0

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-08**
Client ID: **MW15D-97.0**
Matrix: **Water**
Workgroup Number: **WG310207**
Collect Date: **08/18/2009 17:26**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/20/2009 14:15**
Cal Date:
Run Date: **08/20/2009 14:15**
File ID: **EN.0908201415-11**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		754		20.0	10.0

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-09**
Client ID: **MW15D-87.0**
Matrix: **Water**
Workgroup Number: **WG310207**
Collect Date: **08/18/2009 16:50**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/20/2009 14:15**
Cal Date:
Run Date: **08/20/2009 14:15**
File ID: **EN.0908201415-09**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		666		20.0	10.0

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-10**
Client ID: **MW15D-87.0-FD**
Matrix: **Water**
Workgroup Number: **WG310207**
Collect Date: **08/18/2009 16:55**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/20/2009 14:15**
Cal Date:
Run Date: **08/20/2009 14:15**
File ID: **EN.0908201415-10**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		804		20.0	10.0

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-11**
Client ID: **MW15D-77.0**
Matrix: **Water**
Workgroup Number: **WG310207**
Collect Date: **08/18/2009 15:37**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/20/2009 14:15**
Cal Date:
Run Date: **08/20/2009 14:15**
File ID: **EN.0908201415-08**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		544		20.0	10.0

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-12**
Client ID: **MW15D-72.0**
Matrix: **Water**
Workgroup Number: **WG310207**
Collect Date: **08/18/2009 15:10**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/20/2009 14:15**
Cal Date:
Run Date: **08/20/2009 14:15**
File ID: **EN.0908201415-07**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		448		20.0	10.0

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-13**
Client ID: **MW15D-57.0**
Matrix: **Water**
Workgroup Number: **WG310207**
Collect Date: **08/18/2009 14:25**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/20/2009 14:15**
Cal Date:
Run Date: **08/20/2009 14:15**
File ID: **EN.0908201415-06**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		656		20.0	10.0

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-14**
Client ID: **MW15D-47.0**
Matrix: **Water**
Workgroup Number: **WG310207**
Collect Date: **08/18/2009 13:55**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/20/2009 14:15**
Cal Date:
Run Date: **08/20/2009 14:15**
File ID: **EN.0908201415-05**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		4000		20.0	10.0

2.1.4.2 QC Summary Data

METHOD BLANK SUMMARY

Login Number: <u>L09080461</u>	Work Group: <u>WG310207</u>
Blank File ID: <u>EN.0908201415-01</u>	Blank Sample ID: <u>WG310207-01</u>
Prep Date: <u>08/20/09 14:15</u>	Instrument ID: <u>OVEN</u>
Analyzed Date: <u>08/20/09 14:15</u>	Method: <u>160.1</u>
Analyst: <u>HJR</u>	

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG310207-02	EN.0908201415-02	08/20/09 14:15	
LCS2	WG310207-03	EN.0908201415-03	08/20/09 14:15	
MW15D-47.0	L09080461-14	EN.0908201415-05	08/20/09 14:15	
MW15D-57.0	L09080461-13	EN.0908201415-06	08/20/09 14:15	
MW15D-72.0	L09080461-12	EN.0908201415-07	08/20/09 14:15	
MW15D-77.0	L09080461-11	EN.0908201415-08	08/20/09 14:15	
MW15D-87.0	L09080461-09	EN.0908201415-09	08/20/09 14:15	
MW15D-87.0-FD	L09080461-10	EN.0908201415-10	08/20/09 14:15	
MW15D-97.0	L09080461-08	EN.0908201415-11	08/20/09 14:15	
MW15D-107.0	L09080461-07	EN.0908201415-12	08/20/09 14:15	
MW15D-117.0	L09080461-06	EN.0908201415-13	08/20/09 14:15	
MW15D-127.0	L09080461-03	EN.0908201415-14	08/20/09 14:15	
MW15D-127.0-MS	L09080461-04	EN.0908201415-15	08/20/09 14:15	
MW15D-127.0-MSD	L09080461-05	EN.0908201415-16	08/20/09 14:15	
MW15D-137.0	L09080461-02	EN.0908201415-17	08/20/09 14:15	
MW15D-147.0	L09080461-01	EN.0908201415-18	08/20/09 14:15	
DUP	WG310207-05	EN.0908201415-19	08/20/09 14:15	

Report Name: BLANK_SUMMARY
 PDF File ID: 1472639
 Report generated 08/24/2009 15:13



Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L09080461 Prep Date: 08/20/09 14:15 Sample ID: WG310207-01
Instrument ID: OVEN Run Date: 08/20/09 14:15 Prep Method: 160.1
File ID: EN.0908201415-01 Analyst: HJR Method: 160.1
Workgroup (AAB#): WG310207 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: OVEN -

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Total Dissolved Solids	5.00	10.0	10.0	1	ND

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1472640

24-AUG-2009 15:13



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09080461 Analyst: HJR Prep Method: 160.1
Instrument ID: OVEN Matrix: Water Method: 160.1
Workgroup (AAB#): WG310207 Units: mg/L
QC Key: DOWB0A2006 Lot #: STD32441
Sample ID: WG310207-02 LCS File ID: EN.0908201415-02 Run Date: 08/20/2009 14:15
Sample ID: WG310207-03 LCS2 File ID: EN.0908201415-03 Run Date: 08/20/2009 14:15

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Total Dissolved Solids	500	492	98.4	500	486	97.2	1.23	80 - 120	25	



MS/MSD REPORT

Loginnum: L09080461 Cal ID: OVEN-
 Instrument ID: OVEN Contract #: _____
 Parent ID: L09080461-03 File ID: EN.0908201415-14 Dil: 1
 Sample ID: L09080461-04 MS File ID: EN.0908201415-15 Dil: 1
 Sample ID: L09080461-05 MSD File ID: EN.0908201415-16 Dil: 1

Worknum: WG310207
 Prep Method: 160.1
 Method: 160.1
 Matrix: Water
 Units: mg/L

Analyte	Parent	MS Spiked	MS Found	MS %Rec	MSD Spiked	MSD Found	MSD %Rec	%RPD	%Rec Limits	RPD Limit	Q
Total Dissolved Solids	2650	500	3150	99.2	500	3150	99.2	0	80 - 120	25	

* FAILS %REC LIMIT

FAILS RPD LIMIT

3.0 Attachments

Microbac Laboratories Inc.
Analyst Listing
August 28, 2009

ADC - ANTHONY D. CANTER	AJF - AMANDA J. FICKIESEN	AJM - ANTHONY J. MOSSBURG
ALB - ANNIE L. BROWN	AML - ANTHONY M. LONG	BLG - BRENDA L. GREENWALT
BRG - BRENDA R. GREGORY	CAA - CASSIE A. AUGENSTEIN	CAF - CHERYL A. FLOWERS
CAH - CHARLES A. HALL	CEB - CHAD E. BARNES	CLC - CHRYS L. CRAWFORD
CLW - CHARISSA L. WINTERS	CPD - CHAD P. DAVIS	CSH - CHRIS S. HILL
DDE - DEBRA D. ELLIOTT	DEL - DON E. LIGHTFRITZ	DEV - DAVID E. VANDENBERG
DGB - DOUGLAS G. BUTCHER	DIH - DEANNA I. HESSON	DLB - DAVID L. BUMGARNER
DLP - DOROTHY L. PAYNE	DLR - DIANNA L. RAUCH	DR - DEANNA ROBERTS
ECL - ERIC C. LAWSON	EDA - ERIN D. AGEE	ERP - ERIN R. PORTER
FJB - FRANCES J. BOLDEN	HAV - HEMA VILASAGAR	HJR - HOLLY J. REED
JBK - JEREMY B. KINNEY	JDH - JUSTIN D. HESSON	JKT - JANE K. THOMPSON
JWR - JOHN W. RICHARDS	JWS - JACK W. SHEAVES	JYH - JI Y. HU
KEB - KATHRYN E. BARNES	KHR - KIM H. RHODES	KRA - KATHY R. ALBERTSON
LKN - LINDA K. NEDEFF	LSB - LESLIE S. BUCINA	MDA - MIKE D. ALBERTSON
MDC - MICHAEL D. COCHRAN	MES - MARY E. SCHILLING	MMB - MAREN M. BEERY
MRT - MICHELLE R. TAYLOR	MSW - MATT S. WILSON	NPM - NATHANIEL P. MILLER
PDM - PIERCE D. MORRIS	RAH - ROY A. HALSTEAD	RB - ROBERT BUCHANAN
REK - ROBERT E. KYER	RLK - ROBIN L. KLINGER	RWC - RODNEY W. CAMPBELL
SDH - SHANA D. HINYARD	SLM - STEPHANIE L. MOSSBURG	SLP - SHERI L. PFALZGRAF
TIP - TAE I. PARRISH	TMB - TIFFANY M. BAILEY	TMM - TAMMY M. MORRIS
VC - VICKI COLLIER	WTD - WADE T. DELONG	

August 28, 2009

Qualkey: STD

Qualifier	Description
*	Surrogate or spike compound out of range
+	Correlation coefficient for the MSA is less than 0.995
<	Result is less than the associated numerical value.
>	Result is greater than the associated numerical value.
A	See the report narrative
B	Analyte present in method blank
B1	Target analyte detected in method blank at or above the method reporting limit
B3	Target analyte detected in calibration blank at or above the method reporting limit
C	Confirmed by GC/MS
CG	Confluent growth
DL	Surrogate or spike compound was diluted out
E	Estimated concentration due to sample matrix interference
EDL	Elevated sample reporting limits, presence of non-target analytes
EMPC	Estimated Maximum Possible Concentration
F, S	Estimated result below quantitation limit; method of standard additions(MSA)
FL	Free Liquid
H1	Sample analysis performed past holding time.
I	Semiquantitative result (out of instrument calibration range)
J	The analyte was positively identified, but the quantitation was below the RL
J,B	Analyte detected in both the method blank and sample above the MDL.
J,P	Estimate; columns don't agree to within 40%
J,S	Estimated concentration; analyzed by method of standard addition (MSA)
L	Sample reporting limits elevated due to matrix interference
L1	The associated blank spike (LCS) recovery was above the laboratory acceptance limits.
L2	The associated blank spike (LCS) recovery was below the laboratory acceptance limits.
M	Matrix effect; the concentration is an estimate due to matrix effect.
N	Tentatively identified compound(TIC)
NA	Not applicable
ND	Not detected at or above the reporting limit (RL).
ND, L	Not detected; sample reporting limit (RL) elevated due to interference
ND, S	Not detected; analyzed by method of standard addition (MSA)
NF	Not found by library search
NFL	No free liquid
NI	Non-ignitable
NR	Analyte is not required to be analyzed
NS	Not spiked
P	Concentrations >40% difference between the two GC columns
Q	One or more quality control criteria fail. See narrative.
QNS	Quantity of sample not sufficient to perform analysis
RA	Reanalysis confirms reported results
RE	Reanalysis confirms sample matrix interference
S	Analyzed by method of standard addition (MSA)
SMI	Sample matrix interference on surrogate
SP	Reported results are for spike compounds only
TIC	Library Search Compound
TNTC	Too numerous to count
U	Undetected; the concentration is below the reported MDL.
UJ	Undetected; the MDL and RL are estimated due to quality control discrepancies.
W	Post-digestion spike for furnace AA out of control limits
X	Exceeds regulatory limit
X, S	Exceeds regulatory limit; method of standard additions (MSA)
Z	Cannot be resolved from isomer - see below

*****Special Notes for Organic Analytes**

1. Acrolein and acrylonitrile by method 624 are semi-quantitative screens only.
2. 1,2-Diphenylhydrazine is unstable and is reported as azobenzene.
3. N-nitrosodiphenylamine cannot be separated from diphenylamine.
4. 3-Methylphenol and 4-Methylphenol are unresolvable compounds.
5. m-Xylene and p-Xylene are unresolvable compounds.
6. The reporting limits for Appendix II/IX compounds by method 8270 are based on EPA estimated PQLs referenced in 40 CFR Part 264, Appendix IX. They are not always achievable for every compound and are matrix dependent.

Fax: 740-373-4835

*Water (W), Soil (S), Solid Waste (SD), Unknown (X)



1000001197

COOLER INSPECTION



Received: 08/20/2009 09:38
Delivery Method: UPS
Opened By: Erin R Porter
Comments:

Login(s): L09080461

Cooler(s)

Cooler #	Temp Gun	Temp	Tracking #	COC #	Comments
0013687	G	5.0	J2029837829	COC14240	

1	Yes	Were shipping coolers sealed?
2	Yes	Were custody seals intact?
3	Yes	Were cooler temperatures in range of 0-6?
4	Yes	Was ice present?
5	Yes	Were COC's received/information complete/signed and dated?
6	Yes	Were sample containers and labels intact and match COC?
7	Yes	Were the correct containers and volumes received?
8	Yes	Were correct preservatives used? (water only)
9	Yes	Were pH ranges acceptable? (voa's excluded)
10	NA	Were VOA samples free of headspace (<6mm)?
11	Yes	Were samples received within EPA hold times?

Look closer. Go further. Do more.

Microbac - Ohio Valley Division
158 Starlite Drive
Marietta, OH 45750
Tel: (740)373-4071 Fax: (740)373-4835

Internal Chain of Custody Report

Login: L09080461

Account: 2736

Project: 2736.006

Samples: 15

Due Date: 03-SEP-2009

Samplenum **Container ID** **Products**
L09080461-01 608119 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	20-AUG-2009 15:48	RLK	
2	ANALYZ	W1	WET	21-AUG-2009 09:46	HJR	JKT
3	STORE	WET	A2	24-AUG-2009 12:59	JKT	DIH

Samplenum **Container ID** **Products**
L09080461-01 608120 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	20-AUG-2009 15:48	RLK	
2	ANALYZ	W1	WET	25-AUG-2009 08:26	DLP	JKT
3	STORE	WET	A2	26-AUG-2009 08:07	JKT	DLP

Samplenum **Container ID** **Products**
L09080461-02 608121 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	20-AUG-2009 15:48	RLK	
2	ANALYZ	W1	WET	21-AUG-2009 09:46	HJR	JKT
3	STORE	WET	A2	24-AUG-2009 12:59	JKT	DIH

Samplenum **Container ID** **Products**
L09080461-02 608122 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	20-AUG-2009 15:48	RLK	
2	ANALYZ	W1	WET	25-AUG-2009 08:26	DLP	JKT
3	STORE	WET	A2	26-AUG-2009 08:07	JKT	DLP

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09080461

Account: 2736

Project: 2736.006

Samples: 15

Due Date: 03-SEP-2009

Samplenum **Container ID** **Products**
L09080461-03 608123 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	20-AUG-2009 15:48	RLK	
2	ANALYZ	W1	WET	21-AUG-2009 09:46	HJR	JKT
3	STORE	WET	A2	24-AUG-2009 12:59	JKT	DIH

Samplenum **Container ID** **Products**
L09080461-03 608124 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	20-AUG-2009 15:48	RLK	
2	ANALYZ	W1	WET	25-AUG-2009 08:26	DLP	JKT
3	STORE	WET	A2	26-AUG-2009 08:07	JKT	DLP

Samplenum **Container ID** **Products**
L09080461-04 608125 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	20-AUG-2009 15:48	RLK	
2	ANALYZ	W1	WET	21-AUG-2009 09:46	HJR	JKT
3	STORE	WET	A2	24-AUG-2009 12:59	JKT	DIH

Samplenum **Container ID** **Products**
L09080461-04 608126 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	20-AUG-2009 15:48	RLK	
2	ANALYZ	W1	WET	25-AUG-2009 08:26	DLP	JKT
3	STORE	WET	A2	26-AUG-2009 08:07	JKT	DLP

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09080461

Account: 2736

Project: 2736.006

Samples: 15

Due Date: 03-SEP-2009

Samplenum **Container ID** **Products**
L09080461-05 608127 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	20-AUG-2009 15:48	RLK	
2	ANALYZ	W1	WET	21-AUG-2009 09:46	HJR	JKT
3	STORE	WET	A2	24-AUG-2009 12:59	JKT	DIH

Samplenum **Container ID** **Products**
L09080461-05 608128 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	20-AUG-2009 15:48	RLK	
2	ANALYZ	W1	WET	25-AUG-2009 08:26	DLP	JKT
3	STORE	WET	A2	26-AUG-2009 08:07	JKT	DLP

Samplenum **Container ID** **Products**
L09080461-06 608129 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	20-AUG-2009 15:48	RLK	
2	ANALYZ	W1	WET	21-AUG-2009 09:46	HJR	JKT
3	STORE	WET	A2	24-AUG-2009 12:58	JKT	DIH

Samplenum **Container ID** **Products**
L09080461-06 608130 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	20-AUG-2009 15:48	RLK	
2	ANALYZ	W1	WET	25-AUG-2009 08:26	DLP	JKT
3	STORE	WET	A2	26-AUG-2009 08:07	JKT	DLP

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09080461

Account: 2736

Project: 2736.006

Samples: 15

Due Date: 03-SEP-2009

Samplenum **Container ID** **Products**
L09080461-07 608131 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	20-AUG-2009 15:48	RLK	
2	ANALYZ	W1	WET	20-AUG-2009 16:12	HJR	JKT
3	ANALYZ	W1	WET	21-AUG-2009 09:46	HJR	JKT
4	STORE	WET	A2	24-AUG-2009 12:58	JKT	DIH

Samplenum **Container ID** **Products**
L09080461-07 608132 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	20-AUG-2009 15:48	RLK	
2	ANALYZ	W1	WET	25-AUG-2009 08:26	DLP	JKT
3	STORE	WET	A2	26-AUG-2009 08:07	JKT	DLP

Samplenum **Container ID** **Products**
L09080461-08 608133 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	20-AUG-2009 15:48	RLK	
2	ANALYZ	W1	WET	21-AUG-2009 09:46	HJR	JKT
3	STORE	WET	A2	24-AUG-2009 12:58	JKT	DIH

Samplenum **Container ID** **Products**
L09080461-08 608134 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	20-AUG-2009 15:48	RLK	
2	ANALYZ	W1	WET	25-AUG-2009 08:26	DLP	JKT
3	STORE	WET	A2	26-AUG-2009 08:07	JKT	DLP

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09080461

Account: 2736

Project: 2736.006

Samples: 15

Due Date: 03-SEP-2009

Samplenum **Container ID** **Products**
L09080461-09 608135 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	20-AUG-2009 15:48	RLK	
2	ANALYZ	W1	WET	21-AUG-2009 09:46	HJR	JKT
3	STORE	WET	A2	24-AUG-2009 12:58	JKT	DIH

Samplenum **Container ID** **Products**
L09080461-09 608136 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	20-AUG-2009 15:48	RLK	
2	ANALYZ	W1	WET	25-AUG-2009 08:26	DLP	JKT
3	STORE	WET	A2	26-AUG-2009 08:07	JKT	DLP

Samplenum **Container ID** **Products**
L09080461-10 608137 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	20-AUG-2009 15:48	RLK	
2	ANALYZ	W1	WET	21-AUG-2009 09:46	HJR	JKT
3	STORE	WET	A2	24-AUG-2009 12:58	JKT	DIH

Samplenum **Container ID** **Products**
L09080461-10 608138 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	20-AUG-2009 15:48	RLK	
2	ANALYZ	W1	WET	25-AUG-2009 08:26	DLP	JKT
3	STORE	WET	A2	26-AUG-2009 08:07	JKT	DLP

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09080461

Account: 2736

Project: 2736.006

Samples: 15

Due Date: 03-SEP-2009

Samplenum **Container ID** **Products**
L09080461-11 608139 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	20-AUG-2009 15:48	RLK	
2	ANALYZ	W1	WET	21-AUG-2009 09:46	HJR	JKT
3	STORE	WET	A2	24-AUG-2009 12:58	JKT	DIH

Samplenum **Container ID** **Products**
L09080461-11 608140 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	20-AUG-2009 15:48	RLK	
2	ANALYZ	W1	WET	25-AUG-2009 08:26	DLP	JKT
3	STORE	WET	A2	26-AUG-2009 08:07	JKT	DLP

Samplenum **Container ID** **Products**
L09080461-12 608141 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	20-AUG-2009 15:48	RLK	
2	ANALYZ	W1	WET	21-AUG-2009 09:46	HJR	JKT
3	STORE	WET	A2	24-AUG-2009 12:58	JKT	DIH

Samplenum **Container ID** **Products**
L09080461-12 608142 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	20-AUG-2009 15:48	RLK	
2	ANALYZ	W1	WET	25-AUG-2009 08:26	DLP	JKT
3	STORE	WET	A2	26-AUG-2009 08:06	JKT	DLP

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09080461

Account: 2736

Project: 2736.006

Samples: 15

Due Date: 03-SEP-2009

Samplenum **Container ID** **Products**
L09080461-13 608143 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	20-AUG-2009 15:48	RLK	
2	ANALYZ	W1	WET	21-AUG-2009 09:46	HJR	JKT
3	STORE	WET	A2	24-AUG-2009 12:58	JKT	DIH

Samplenum **Container ID** **Products**
L09080461-13 608144 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	20-AUG-2009 15:48	RLK	
2	ANALYZ	W1	WET	25-AUG-2009 08:26	DLP	JKT
3	STORE	WET	A2	26-AUG-2009 08:06	JKT	DLP

Samplenum **Container ID** **Products**
L09080461-14 608145 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	20-AUG-2009 15:48	RLK	
2	ANALYZ	W1	WET	21-AUG-2009 09:46	HJR	JKT
3	STORE	WET	A2	24-AUG-2009 12:58	JKT	DIH

Samplenum **Container ID** **Products**
L09080461-14 608146 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	20-AUG-2009 15:48	RLK	
2	ANALYZ	W1	WET	25-AUG-2009 08:26	DLP	JKT
3	STORE	WET	A2	26-AUG-2009 08:07	JKT	DLP

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09080461**Account:** 2736**Project:** 2736.006**Samples:** 15**Due Date:** 03-SEP-2009

<u>Samplenum</u>	<u>Container ID</u>	<u>Products</u>
L09080461-15	608147	PCT-S

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	20-AUG-2009 15:48	RLK	
2	ANALYZ	W1	WET	21-AUG-2009 09:06	DIH	JKT
3	STORE	WET	A2	24-AUG-2009 12:58	JKT	DIH

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login





158 Starlite Drive, Marietta, OH 45750 • T:740-373-4071 • F:740-373-4835 • <http://www.microbac.com>

Laboratory Report Number: L09080542

Please find enclosed the analytical results for the samples you submitted to Microbac Laboratories.

Review and compilation of your report was completed by Microbac's Sales and Service Team. If you have questions, comments or require further assistance regarding this report, please contact your team member noted in the reviewed box below at 800-373-4071. Team member e-mail addresses also appear here for your convenience.

Kathy Albertson	<i>Team Chemist/Data Specialist</i>	kalbertson@microbac.com
Stephanie Mossburg	<i>Team Chemist/Data Specialist</i>	smossburg@microbac.com
Tony Long	<i>Team Chemist/Data Specialist</i>	tlong@microbac.com
Amanda Fickiesen	<i>Client Services Specialist</i>	afickiesen@microbac.com
Annie Brown	<i>Client Services Specialist</i>	abrown@microbac.com

This report was reviewed on September 02, 2009.

A handwritten signature in cursive script that reads "Kathy Albertson".

Kathy Albertson - Team Chemist/Data Specialist

I certify that all test results meet all of the requirements of the accrediting authority listed below. All results for soil samples are reported on a 'dry-weight' basis unless specified otherwise. Analytical results for water and wastes are reported on a 'as received' basis unless specified otherwise. A statement of uncertainty for each analysis is available upon request. This laboratory report shall not be reproduced, except in full, without the written approval of Microbac Laboratories.

This report was certified on September 02, 2009.

A handwritten signature in cursive script that reads "David E. Vandenberg".

David Vandenberg - Managing Director

State of origin: Michigan

Accrediting authority: N/A ID:N/A

QAPP: Microbac OVD

This report contains a total of 54 pages.

Look closer. Go further. Do more.



The Microbac logo consists of the word "Microbac" in a white serif font, centered within a dark teal rectangular box.

Microbac Laboratories, Inc.
Ohio Valley Division
158 Starlite Drive
Marietta, OH 45750

Phone: 800.373.4071
Fax: 740.373.4835

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Click on "Online Data Access"

User ID: jdoe@abc.com

Password: demo

Contact your Microbac service representative to set up a *FREE* account today!

LOOK CLOSER, GO FURTHER, DO MORE.

Microbac REPORT L09080542
PREPARED FOR CH2MHILL, Inc
WORK ID:

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1.0 Introduction

Microbac Laboratories Inc.
REPORT NARRATIVE

Microbac Login No: L09080542

CHAIN OF CUSTODY: The chain of custody number was 14233.

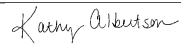
SHIPMENT CONDITIONS: The chain of custody forms were received sealed in a cooler. The cooler temperature was 8 degrees C.

SAMPLE MANAGEMENT: All samples received were intact.

Per client, samples were logged for analyses with temperature anomaly.

I certify that this data package is in compliance with the terms and conditions agreed to by the client and Microbac Laboratories Inc., both technically and for completeness, except for the conditions noted above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or designated person, as verified by the following signature.

Analyst: KRA

Approved: 26-AUG-09


2.0 Data Package

2.1 General Chemistry Data

2.1.1 Chloride Data

2.1.1.1 Summary Data

LABORATORY REPORT

L09080542

09/02/09 12:58

Submitted By

Microbac Laboratories Inc.
158 Starlite Drive
Marietta , OH 45750
(740) 373 - 4071

For

Account Name: CH2MHILL, Inc
CH2MHILL
15010 Conference Center Drive Suite 200
Chantilly, VA 20151
Attention: Michael J. Zamboni

Project Number: 2736.006
Project: MI-Dow Ludington
Site: LUDINGTON, MI

P.O. Number: 935272

Sample Analysis Summary

Client ID	Lab ID	Method	Dilution	Date Received
MW39D-67.0	L09080542-01	325.2	25	24-AUG-09
MW39D-77.0	L09080542-02	325.2	25	24-AUG-09
MW39D-87.0	L09080542-03	325.2	25	24-AUG-09
MW39D-97.0	L09080542-04	325.2	25	24-AUG-09
MW39D-103.0	L09080542-05	325.2	25	24-AUG-09
MW39D-103.0-FD	L09080542-06	325.2	25	24-AUG-09



Report Number: **L09080542**Report Date : **September 2, 2009**

Sample Number: **L09080542-01**
Client ID: **MW39D-67.0**
Matrix: **Water**
Workgroup Number: **WG310604**
Collect Date: **08/20/2009 10:40**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **25**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/26/2009 15:27**
Cal Date: **08/26/2009 15:22**
Run Date: **08/26/2009 15:27**
File ID: **SC090826005.017**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	1440		50.0	25.0

Report Number: **L09080542**Report Date : **September 2, 2009**

Sample Number: **L09080542-02**
Client ID: **MW39D-77.0**
Matrix: **Water**
Workgroup Number: **WG310604**
Collect Date: **08/20/2009 11:28**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **25**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/26/2009 15:28**
Cal Date: **08/26/2009 15:22**
Run Date: **08/26/2009 15:28**
File ID: **SC090826005.018**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	1430		50.0	25.0

Report Number: **L09080542**Report Date : **September 2, 2009**

Sample Number: **L09080542-03**
Client ID: **MW39D-87.0**
Matrix: **Water**
Workgroup Number: **WG310604**
Collect Date: **08/20/2009 12:17**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **25**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/26/2009 15:29**
Cal Date: **08/26/2009 15:22**
Run Date: **08/26/2009 15:29**
File ID: **SC090826005.021**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	1440		50.0	25.0

Report Number: **L09080542**Report Date : **September 2, 2009**

Sample Number: **L09080542-04**
Client ID: **MW39D-97.0**
Matrix: **Water**
Workgroup Number: **WG310604**
Collect Date: **08/20/2009 15:05**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **25**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/26/2009 15:30**
Cal Date: **08/26/2009 15:22**
Run Date: **08/26/2009 15:30**
File ID: **SC090826005.022**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	1490		50.0	25.0

Report Number: **L09080542**Report Date : **September 2, 2009**

Sample Number: **L09080542-05**
Client ID: **MW39D-103.0**
Matrix: **Water**
Workgroup Number: **WG310604**
Collect Date: **08/21/2009 11:03**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **25**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/26/2009 15:31**
Cal Date: **08/26/2009 15:22**
Run Date: **08/26/2009 15:31**
File ID: **SC090826005.023**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	1310		50.0	25.0

Report Number: **L09080542**Report Date : **September 2, 2009**

Sample Number: **L09080542-06**
Client ID: **MW39D-103.0-FD**
Matrix: **Water**
Workgroup Number: **WG310604**
Collect Date: **08/21/2009 11:05**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **25**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/26/2009 15:32**
Cal Date: **08/26/2009 15:22**
Run Date: **08/26/2009 15:32**
File ID: **SC090826005.024**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	1370		50.0	25.0

2.1.1.2 QC Summary Data

METHOD BLANK SUMMARY

Login Number: L09080542
 Blank File ID: SC090826005.027
 Prep Date: 08/26/09 15:33
 Analyzed Date: 08/26/09 15:33
 Analyst: JBK

Work Group: WG310604
 Blank Sample ID: WG310604-01
 Instrument ID: SMARTCHEM
 Method: 325.2

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG310604-02	SC090826005.011	08/26/09 15:23	01
LCS2	WG310604-03	SC090826005.012	08/26/09 15:24	01
MW39D-67.0	L09080542-01	SC090826005.017	08/26/09 15:27	DL01
MW39D-77.0	L09080542-02	SC090826005.018	08/26/09 15:28	DL01
MW39D-87.0	L09080542-03	SC090826005.021	08/26/09 15:29	DL01
MW39D-97.0	L09080542-04	SC090826005.022	08/26/09 15:30	DL01
MW39D-103.0	L09080542-05	SC090826005.023	08/26/09 15:31	DL01
MW39D-103.0-FD	L09080542-06	SC090826005.024	08/26/09 15:32	DL01
DUP	WG310604-05	SC090826005.025	08/26/09 15:32	01

Report Name: BLANK_SUMMARY
 PDF File ID: 1476796
 Report generated 08/28/2009 15:22



Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L09080542 Prep Date: 08/26/09 15:33 Sample ID: WG310604-01
Instrument ID: SMARTCHEM Run Date: 08/26/09 15:33 Prep Method: 325.2
File ID: SC090826005.027 Analyst: JBK Method: 325.2
Workgroup (AAB#): WG310604 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: SMARTC - 26-AUG-09

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Chloride	1.00	2.00	2.00	1	ND

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1476797

28-AUG-2009 15:22



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09080542 Analyst: JBK Prep Method: 325.2
Instrument ID: SMARTCHEM Matrix: Water Method: 325.2
Workgroup (AAB#): WG310604 Units: mg/L
QC Key: DOWBOA2006 Lot #: STD34512
Sample ID: WG310604-02 LCS File ID: SC090826005.011 Run Date: 08/26/2009 15:23
Sample ID: WG310604-03 LCS2 File ID: SC090826005.012 Run Date: 08/26/2009 15:24

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Chloride	50.0	47.8	95.6	50.0	49.2	98.3	2.84	90 - 110	10	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 1476798
Report generated: 08/28/2009 15:22



2.1.2 Ammonia Data

2.1.2.1 Summary Data

LABORATORY REPORT

L09080542

09/02/09 12:58

Submitted By

Microbac Laboratories Inc.
158 Starlite Drive
Marietta , OH 45750
(740) 373 - 4071

For

Account Name: CH2MHILL, Inc
CH2MHILL
15010 Conference Center Drive Suite 200
Chantilly, VA 20151
Attention: Michael J. Zamboni

Project Number: 2736.006
Project: MI-Dow Ludington
Site: LUDINGTON, MI

P.O. Number: 935272

Sample Analysis Summary

Client ID	Lab ID	Method	Dilution	Date Received
MW39D-67.0	L09080542-01	350.1	5	24-AUG-09
MW39D-77.0	L09080542-02	350.1	5	24-AUG-09
MW39D-87.0	L09080542-03	350.1	5	24-AUG-09
MW39D-97.0	L09080542-04	350.1	5	24-AUG-09
MW39D-103.0	L09080542-05	350.1	5	24-AUG-09
MW39D-103.0-FD	L09080542-06	350.1	5	24-AUG-09



Report Number: **L09080542**Report Date : **September 2, 2009**

Sample Number: **L09080542-01**
Client ID: **MW39D-67.0**
Matrix: **Water**
Workgroup Number: **WG310560**
Collect Date: **08/20/2009 10:40**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **5**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/26/2009 11:14**
Cal Date: **08/26/2009 09:34**
Run Date: **08/26/2009 11:14**
File ID: **SC090826001.082**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	12.6		0.500	0.250

Report Number: **L09080542**Report Date : **September 2, 2009**

Sample Number: **L09080542-02**
Client ID: **MW39D-77.0**
Matrix: **Water**
Workgroup Number: **WG310560**
Collect Date: **08/20/2009 11:28**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **5**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/26/2009 11:18**
Cal Date: **08/26/2009 09:34**
Run Date: **08/26/2009 11:18**
File ID: **SC090826001.085**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	8.19		0.500	0.250

Report Number: **L09080542**Report Date : **September 2, 2009**

Sample Number: **L09080542-03**
Client ID: **MW39D-87.0**
Matrix: **Water**
Workgroup Number: **WG310560**
Collect Date: **08/20/2009 12:17**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **5**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/26/2009 11:19**
Cal Date: **08/26/2009 09:34**
Run Date: **08/26/2009 11:19**
File ID: **SC090826001.086**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	8.39		0.500	0.250

Report Number: **L09080542**Report Date : **September 2, 2009**

Sample Number: **L09080542-04**
Client ID: **MW39D-97.0**
Matrix: **Water**
Workgroup Number: **WG310560**
Collect Date: **08/20/2009 15:05**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **5**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/26/2009 11:21**
Cal Date: **08/26/2009 09:34**
Run Date: **08/26/2009 11:21**
File ID: **SC090826001.087**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	7.92		0.500	0.250

Report Number: **L09080542**Report Date : **September 2, 2009**

Sample Number: **L09080542-05**
Client ID: **MW39D-103.0**
Matrix: **Water**
Workgroup Number: **WG310560**
Collect Date: **08/21/2009 11:03**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **5**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/26/2009 11:23**
Cal Date: **08/26/2009 09:34**
Run Date: **08/26/2009 11:23**
File ID: **SC090826001.088**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	8.60		0.500	0.250

Report Number: **L09080542**Report Date : **September 2, 2009**

Sample Number: **L09080542-06**
Client ID: **MW39D-103.0-FD**
Matrix: **Water**
Workgroup Number: **WG310560**
Collect Date: **08/21/2009 11:05**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **5**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/26/2009 11:25**
Cal Date: **08/26/2009 09:34**
Run Date: **08/26/2009 11:25**
File ID: **SC090826001.089**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	8.76		0.500	0.250

2.1.2.2 QC Summary Data

METHOD BLANK SUMMARY

Login Number: L09080542
 Blank File ID: SC090826001.037
 Prep Date: 08/26/09 10:01
 Analyzed Date: 08/26/09 10:01
 Analyst: JBK

Work Group: WG310560
 Blank Sample ID: WG310560-01
 Instrument ID: SMARTCHEM
 Method: 350.1

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG310560-02	SC090826001.038	08/26/09 10:03	01
LCS2	WG310560-03	SC090826001.039	08/26/09 10:03	01
MW39D-67.0	L09080542-01	SC090826001.082	08/26/09 11:14	DL01
MW39D-77.0	L09080542-02	SC090826001.085	08/26/09 11:18	DL01
MW39D-87.0	L09080542-03	SC090826001.086	08/26/09 11:19	DL01
MW39D-97.0	L09080542-04	SC090826001.087	08/26/09 11:21	DL01
MW39D-103.0	L09080542-05	SC090826001.088	08/26/09 11:23	DL01
MW39D-103.0-FD	L09080542-06	SC090826001.089	08/26/09 11:25	DL01
DUP	WG310560-06	SC090826001.090	08/26/09 11:27	DL01

Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L09080542 Prep Date: 08/26/09 10:01 Sample ID: WG310560-01
Instrument ID: SMARTCHEM Run Date: 08/26/09 10:01 Prep Method: 350.1
File ID: SC090826001.037 Analyst: JBK Method: 350.1
Workgroup (AAB#): WG310560 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: SMARTC - 26-AUG-09

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Nitrogen, Ammonia	0.0500	0.100	-0.121	1	*

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1475261

27-AUG-2009 11:54



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09080542 Analyst: JBK Prep Method: 350.1
 Instrument ID: SMARTCHEM Matrix: Water Method: 350.1
 Workgroup (AAB#): WG310560 Units: mg/L
 QC Key: DOWBOA2006 Lot #: STD33211
 Sample ID: WG310560-02 LCS File ID: SC090826001.038 Run Date: 08/26/2009 10:03
 Sample ID: WG310560-03 LCS2 File ID: SC090826001.039 Run Date: 08/26/2009 10:03

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Nitrogen, Ammonia	2.00	1.95	97.5	2.00	1.88	94.0	3.62	90 - 110	25	

LCS_LCS2 - Modified 03/06/2008
 PDF File ID: 1475262
 Report generated: 08/27/2009 11:54



2.1.3 Total Dissolved Solids Data

2.1.3.1 Summary Data

LABORATORY REPORT

L09080542

09/02/09 12:58

Submitted By

Microbac Laboratories Inc.
158 Starlite Drive
Marietta , OH 45750
(740) 373 - 4071

For

Account Name: CH2MHILL, Inc
CH2MHILL
15010 Conference Center Drive Suite 200
Chantilly, VA 20151
Attention: Michael J. Zamboni

Project Number: 2736.006
Project: MI-Dow Ludington
Site: LUDINGTON, MI

P.O. Number: 935272

Sample Analysis Summary

Client ID	Lab ID	Method	Dilution	Date Received
MW39D-67.0	L09080542-01	160.1	1	24-AUG-09
MW39D-77.0	L09080542-02	160.1	1	24-AUG-09
MW39D-87.0	L09080542-03	160.1	1	24-AUG-09
MW39D-97.0	L09080542-04	160.1	1	24-AUG-09
MW39D-103.0	L09080542-05	160.1	1	24-AUG-09
MW39D-103.0-FD	L09080542-06	160.1	1	24-AUG-09



Report Number: **L09080542**Report Date : **September 2, 2009**

Sample Number: **L09080542-01**
Client ID: **MW39D-67.0**
Matrix: **Water**
Workgroup Number: **WG310589**
Collect Date: **08/20/2009 10:40**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/26/2009 14:05**
Cal Date:
Run Date: **08/26/2009 14:05**
File ID: **EN.0908261405-04**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		3070		20.0	10.0

Report Number: **L09080542**Report Date : **September 2, 2009**

Sample Number: **L09080542-02**
Client ID: **MW39D-77.0**
Matrix: **Water**
Workgroup Number: **WG310589**
Collect Date: **08/20/2009 11:28**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/26/2009 14:05**
Cal Date:
Run Date: **08/26/2009 14:05**
File ID: **EN.0908261405-05**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		3640		20.0	10.0

Report Number: **L09080542**Report Date : **September 2, 2009**

Sample Number: **L09080542-03**
Client ID: **MW39D-87.0**
Matrix: **Water**
Workgroup Number: **WG310589**
Collect Date: **08/20/2009 12:17**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/26/2009 14:05**
Cal Date:
Run Date: **08/26/2009 14:05**
File ID: **EN.0908261405-06**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		3780		20.0	10.0

Report Number: **L09080542**Report Date : **September 2, 2009**

Sample Number: **L09080542-04**
Client ID: **MW39D-97.0**
Matrix: **Water**
Workgroup Number: **WG310589**
Collect Date: **08/20/2009 15:05**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/26/2009 14:05**
Cal Date:
Run Date: **08/26/2009 14:05**
File ID: **EN.0908261405-07**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		3400		20.0	10.0

Report Number: **L09080542**Report Date : **September 2, 2009**

Sample Number: **L09080542-05**
Client ID: **MW39D-103.0**
Matrix: **Water**
Workgroup Number: **WG310589**
Collect Date: **08/21/2009 11:03**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/26/2009 14:05**
Cal Date:
Run Date: **08/26/2009 14:05**
File ID: **EN.0908261405-08**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		3700		20.0	10.0

Report Number: **L09080542**Report Date : **September 2, 2009**

Sample Number: **L09080542-06**
Client ID: **MW39D-103.0-FD**
Matrix: **Water**
Workgroup Number: **WG310589**
Collect Date: **08/21/2009 11:05**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/26/2009 14:05**
Cal Date:
Run Date: **08/26/2009 14:05**
File ID: **EN.0908261405-09**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		3620		20.0	10.0

2.1.3.2 QC Summary Data

METHOD BLANK SUMMARY

Login Number: L09080542
 Blank File ID: EN.0908261405-01
 Prep Date: 08/26/09 14:05
 Analyzed Date: 08/26/09 14:05
 Analyst: HJR

Work Group: WG310589
 Blank Sample ID: WG310589-01
 Instrument ID: OVEN
 Method: 160.1

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG310589-02	EN.0908261405-02	08/26/09 14:05	
LCS2	WG310589-03	EN.0908261405-03	08/26/09 14:05	
MW39D-67.0	L09080542-01	EN.0908261405-04	08/26/09 14:05	
MW39D-77.0	L09080542-02	EN.0908261405-05	08/26/09 14:05	
MW39D-87.0	L09080542-03	EN.0908261405-06	08/26/09 14:05	
MW39D-97.0	L09080542-04	EN.0908261405-07	08/26/09 14:05	
MW39D-103.0	L09080542-05	EN.0908261405-08	08/26/09 14:05	
MW39D-103.0-FD	L09080542-06	EN.0908261405-09	08/26/09 14:05	
DUP	WG310589-05	EN.0908261405-13	08/26/09 14:05	

Report Name: BLANK_SUMMARY
 PDF File ID: 1480001
 Report generated 09/02/2009 09:25



Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L09080542 Prep Date: 08/26/09 14:05 Sample ID: WG310589-01
Instrument ID: OVEN Run Date: 08/26/09 14:05 Prep Method: 160.1
File ID: EN.0908261405-01 Analyst: HJR Method: 160.1
Workgroup (AAB#): WG310589 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: OVEN -

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Total Dissolved Solids	5.00	10.0	10.0	1	ND

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1480002

02-SEP-2009 09:25



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09080542 Analyst: HJR Prep Method: 160.1
Instrument ID: OVEN Matrix: Water Method: 160.1
Workgroup (AAB#): WG310589 Units: mg/L
QC Key: DOWBOA2006 Lot #: STD32441
Sample ID: WG310589-02 LCS File ID: EN.0908261405-02 Run Date: 08/26/2009 14:05
Sample ID: WG310589-03 LCS2 File ID: EN.0908261405-03 Run Date: 08/26/2009 14:05

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Total Dissolved Solids	500	502	100	500	504	101	0.398	80 - 120	25	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 1480003
Report generated: 09/02/2009 09:25



3.0 Attachments

Microbac Laboratories Inc.
Analyst Listing
September 2, 2009

ADC - ANTHONY D. CANTER	AJF - AMANDA J. FICKIESEN	AJM - ANTHONY J. MOSSBURG
ALB - ANNIE L. BROWN	AML - ANTHONY M. LONG	BLG - BRENDA L. GREENWALT
BRG - BRENDA R. GREGORY	CAA - CASSIE A. AUGENSTEIN	CAF - CHERYL A. FLOWERS
CAH - CHARLES A. HALL	CEB - CHAD E. BARNES	CLC - CHRYS L. CRAWFORD
CLW - CHARISSA L. WINTERS	CPD - CHAD P. DAVIS	CSH - CHRIS S. HILL
DDE - DEBRA D. ELLIOTT	DEL - DON E. LIGHTFRITZ	DEV - DAVID E. VANDENBERG
DGB - DOUGLAS G. BUTCHER	DIH - DEANNA I. HESSON	DLB - DAVID L. BUMGARNER
DLP - DOROTHY L. PAYNE	DLR - DIANNA L. RAUCH	DR - DEANNA ROBERTS
ECL - ERIC C. LAWSON	EDA - ERIN D. AGEE	ERP - ERIN R. PORTER
FJB - FRANCES J. BOLDEN	HAV - HEMA VILASAGAR	HJR - HOLLY J. REED
JBK - JEREMY B. KINNEY	JDH - JUSTIN D. HESSON	JKT - JANE K. THOMPSON
JWR - JOHN W. RICHARDS	JWS - JACK W. SHEAVES	JYH - JI Y. HU
KEB - KATHRYN E. BARNES	KHR - KIM H. RHODES	KRA - KATHY R. ALBERTSON
LKN - LINDA K. NEDEFF	LSB - LESLIE S. BUCINA	MDA - MIKE D. ALBERTSON
MDC - MICHAEL D. COCHRAN	MES - MARY E. SCHILLING	MMB - MAREN M. BEERY
MRT - MICHELLE R. TAYLOR	MSW - MATT S. WILSON	NPM - NATHANIEL P. MILLER
PDM - PIERCE D. MORRIS	RAH - ROY A. HALSTEAD	RB - ROBERT BUCHANAN
REK - ROBERT E. KYER	RLK - ROBIN L. KLINGER	RWC - RODNEY W. CAMPBELL
SDH - SHANA D. HINYARD	SLM - STEPHANIE L. MOSSBURG	SLP - SHERI L. PFALZGRAF
TIP - TAE I. PARRISH	TMB - TIFFANY M. BAILEY	TMM - TAMMY M. MORRIS
VC - VICKI COLLIER	WTD - WADE T. DELONG	

September 02, 2009

Qualkey: STD

Qualifier	Description
*	Surrogate or spike compound out of range
+	Correlation coefficient for the MSA is less than 0.995
<	Result is less than the associated numerical value.
>	Result is greater than the associated numerical value.
A	See the report narrative
B	Analyte present in method blank
B1	Target analyte detected in method blank at or above the method reporting limit
B3	Target analyte detected in calibration blank at or above the method reporting limit
C	Confirmed by GC/MS
CG	Confluent growth
DL	Surrogate or spike compound was diluted out
E	Estimated concentration due to sample matrix interference
EDL	Elevated sample reporting limits, presence of non-target analytes
EMPC	Estimated Maximum Possible Concentration
F, S	Estimated result below quantitation limit; method of standard additions(MSA)
FL	Free Liquid
H1	Sample analysis performed past holding time.
I	Semiquantitative result (out of instrument calibration range)
J	The analyte was positively identified, but the quantitation was below the RL
J,B	Analyte detected in both the method blank and sample above the MDL.
J,P	Estimate; columns don't agree to within 40%
J,S	Estimated concentration; analyzed by method of standard addition (MSA)
L	Sample reporting limits elevated due to matrix interference
L1	The associated blank spike (LCS) recovery was above the laboratory acceptance limits.
L2	The associated blank spike (LCS) recovery was below the laboratory acceptance limits.
M	Matrix effect; the concentration is an estimate due to matrix effect.
N	Tentatively identified compound(TIC)
NA	Not applicable
ND	Not detected at or above the reporting limit (RL).
ND, L	Not detected; sample reporting limit (RL) elevated due to interference
ND, S	Not detected; analyzed by method of standard addition (MSA)
NF	Not found by library search
NFL	No free liquid
NI	Non-ignitable
NR	Analyte is not required to be analyzed
NS	Not spiked
P	Concentrations >40% difference between the two GC columns
Q	One or more quality control criteria fail. See narrative.
QNS	Quantity of sample not sufficient to perform analysis
RA	Reanalysis confirms reported results
RE	Reanalysis confirms sample matrix interference
S	Analyzed by method of standard addition (MSA)
SMI	Sample matrix interference on surrogate
SP	Reported results are for spike compounds only
TIC	Library Search Compound
TNTC	Too numerous to count
U	Undetected; the concentration is below the reported MDL.
UJ	Undetected; the MDL and RL are estimated due to quality control discrepancies.
W	Post-digestion spike for furnace AA out of control limits
X	Exceeds regulatory limit
X, S	Exceeds regulatory limit; method of standard additions (MSA)
Z	Cannot be resolved from isomer - see below

*****Special Notes for Organic Analytes**

1. Acrolein and acrylonitrile by method 624 are semi-quantitative screens only.
2. 1,2-Diphenylhydrazine is unstable and is reported as azobenzene.
3. N-nitrosodiphenylamine cannot be separated from diphenylamine.
4. 3-Methylphenol and 4-Methylphenol are unresolvable compounds.
5. m-Xylene and p-Xylene are unresolvable compounds.
6. The reporting limits for Appendix II/IX compounds by method 8270 are based on EPA estimated PQLs referenced in 40 CFR Part 264, Appendix IX. They are not always achievable for every compound and are matrix dependent.



1. The first step in the process is to identify the problem or issue that needs to be addressed. This involves gathering information and understanding the context of the problem.

2. Once the problem is identified, the next step is to define the objectives and goals of the project. This helps to clarify what needs to be achieved and provides a clear direction for the team.

3. The third step is to develop a plan or strategy to address the problem. This involves breaking down the problem into smaller, manageable tasks and determining the resources needed to complete them.

4. The fourth step is to implement the plan. This involves putting the strategy into action and monitoring progress regularly to ensure that the project is on track.

5. The final step is to evaluate the results of the project. This involves assessing the outcomes against the objectives and goals and identifying any areas for improvement.

Microbac

Phone: 740-373-4071
Fax: 740-373-4835

CHAIN-OF-CUSTODY RECORD

Company Name:		Project Contact:		Contact Phone #:	
Project Contact:		Turn Around Requirements:		Location:	
Project ID:		Sampler (print):		Signature:	
Sample I.D. No.	Comp	Grab	Date	Time	Matrix*
MW39D-67.0		X	8-20-09	1040	W
MW39D-77.0		X		1128	W
MW39D-87.0		X		1217	W
MW39D-97.0		X		1505	W
MW39D-103.0		X	8-21-09	1103	W
MW39D-103.0FD		X		1105	W
*SAMPLES COLLECTED ON 8-20-08-21; STORED HALI					
TIME					
Relinquished by: (Signature)					
Relinquished by: (Signature)					
Date					
Time					
F (					
F (					
Microbac OVD					
Received: 08/24/2009 10:02					
By: ROBIN KLINGER					
221000001263					
TOTAL # (LAB USE)					
Program					
CWA					
RCRA					
DOD					
AFCEE					
Other					
ADDITIONAL REQUIREMENTS					
Received by: (Signature)					
Date					
Time					
Remarks:					

*Water (W), Soil (S), Solid Waste (SD), Unknown (X)



1000001263

COOLER INSPECTION



Received: 08/24/2009 10:02
Delivery Method: UPS
Opened By: Robin Klinger
Comments:

Login(s): L09080542

Cooler(s)

Cooler #	Temp Gun	Temp	Tracking #	COC #	Comments
0013954	H	8.0	1Z1R19E04425868773	14233	

1	Yes	Were shipping coolers sealed?
2	Yes	Were custody seals intact?
3	No	Were cooler temperatures in range of 0-6?
4	No	Was ice present?
5	No	Were COC's received/information complete/signed and dated?
6	Yes	Were sample containers and labels intact and match COC?
7	Yes	Were the correct containers and volumes received?
8	Yes	Were correct preservatives used? (water only)
9	Yes	Were pH ranges acceptable? (voa's excluded)
10	NA	Were VOA samples free of headspace (<6mm)?
11	Yes	Were samples received within EPA hold times?

Discrepancies:

3	Cooler temp is out.	
4	Ice is melted.	

Look closer. Go further. Do more.

Microbac - Ohio Valley Division
158 Starlite Drive
Marietta, OH 45750
Tel: (740)373-4071 Fax: (740)373-4835

Internal Chain of Custody Report

Login: L09080542

Account: 2736

Project: 2736.006

Samples: 6

Due Date: 07-SEP-2009

Samplenum **Container ID** **Products**
L09080542-01 608871 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	25-AUG-2009 12:38	JKT	
2	ANALYZ	W1	WET	26-AUG-2009 12:47	HJR	JKT
3	STORE	WET	A2	27-AUG-2009 09:37	JKT	JBK

Samplenum **Container ID** **Products**
L09080542-01 608872 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	25-AUG-2009 12:38	JKT	
2	ANALYZ	W1	WET	25-AUG-2009 13:06	DLP	JKT
3	STORE	WET	A2	26-AUG-2009 08:06	JKT	DLP

Samplenum **Container ID** **Products**
L09080542-02 608873 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	25-AUG-2009 12:38	JKT	
2	ANALYZ	W1	WET	26-AUG-2009 12:47	HJR	JKT
3	STORE	WET	A2	27-AUG-2009 09:37	JKT	JBK

Samplenum **Container ID** **Products**
L09080542-02 608874 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	25-AUG-2009 12:38	JKT	
2	ANALYZ	W1	WET	25-AUG-2009 13:06	DLP	JKT
3	STORE	WET	A2	26-AUG-2009 08:06	JKT	DLP

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09080542

Account: 2736

Project: 2736.006

Samples: 6

Due Date: 07-SEP-2009

Samplenum **Container ID** **Products**
L09080542-03 608875 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	25-AUG-2009 12:38	JKT	
2	ANALYZ	W1	WET	26-AUG-2009 12:47	HJR	JKT
3	STORE	WET	A2	27-AUG-2009 09:37	JKT	JBK

Samplenum **Container ID** **Products**
L09080542-03 608876 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	25-AUG-2009 12:38	JKT	
2	ANALYZ	W1	WET	25-AUG-2009 13:06	DLP	JKT
3	STORE	WET	A2	26-AUG-2009 08:06	JKT	DLP

Samplenum **Container ID** **Products**
L09080542-04 608877 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	25-AUG-2009 12:38	JKT	
2	ANALYZ	W1	WET	26-AUG-2009 12:47	HJR	JKT
3	STORE	WET	A2	27-AUG-2009 09:37	JKT	JBK

Samplenum **Container ID** **Products**
L09080542-04 608878 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	25-AUG-2009 12:38	JKT	
2	ANALYZ	W1	WET	25-AUG-2009 13:06	DLP	JKT
3	STORE	WET	A2	26-AUG-2009 08:06	JKT	DLP

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09080542

Account: 2736

Project: 2736.006

Samples: 6

Due Date: 07-SEP-2009

Samplenum **Container ID** **Products**
L09080542-05 608879 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	25-AUG-2009 12:38	JKT	
2	ANALYZ	W1	WET	26-AUG-2009 12:47	HJR	JKT
3	STORE	WET	A2	27-AUG-2009 09:37	JKT	JBK

Samplenum **Container ID** **Products**
L09080542-05 608880 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	25-AUG-2009 12:38	JKT	
2	ANALYZ	W1	WET	25-AUG-2009 13:06	DLP	JKT
3	STORE	WET	A2	26-AUG-2009 08:06	JKT	DLP

Samplenum **Container ID** **Products**
L09080542-06 608881 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	25-AUG-2009 12:38	JKT	
2	ANALYZ	W1	WET	26-AUG-2009 12:47	HJR	JKT
3	STORE	WET	A2	27-AUG-2009 09:38	JKT	JBK

Samplenum **Container ID** **Products**
L09080542-06 608882 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	25-AUG-2009 12:38	JKT	
2	ANALYZ	W1	WET	25-AUG-2009 13:07	DLP	JKT
3	STORE	WET	A2	26-AUG-2009 08:06	JKT	DLP

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login





158 Starlite Drive, Marietta, OH 45750 • T:740-373-4071 • F:740-373-4835 • <http://www.microbac.com>

Laboratory Report Number: L09080640

Please find enclosed the analytical results for the samples you submitted to Microbac Laboratories.

Review and compilation of your report was completed by Microbac's Sales and Service Team. If you have questions, comments or require further assistance regarding this report, please contact your team member noted in the reviewed box below at 800-373-4071. Team member e-mail addresses also appear here for your convenience.

Kathy Albertson	<i>Team Chemist/Data Specialist</i>	kalbertson@microbac.com
Stephanie Mossburg	<i>Team Chemist/Data Specialist</i>	smossburg@microbac.com
Tony Long	<i>Team Chemist/Data Specialist</i>	tlong@microbac.com
Amanda Fickiesen	<i>Client Services Specialist</i>	afickiesen@microbac.com
Annie Brown	<i>Client Services Specialist</i>	abrown@microbac.com

This report was reviewed on September 04, 2009.

A handwritten signature in cursive script that reads "Kathy Albertson".

Kathy Albertson - Team Chemist/Data Specialist

I certify that all test results meet all of the requirements of the accrediting authority listed below. All results for soil samples are reported on a 'dry-weight' basis unless specified otherwise. Analytical results for water and wastes are reported on a 'as received' basis unless specified otherwise. A statement of uncertainty for each analysis is available upon request. This laboratory report shall not be reproduced, except in full, without the written approval of Microbac Laboratories.

This report was certified on September 04, 2009.

A handwritten signature in cursive script that reads "David E. Vandenberg".

David Vandenberg - Managing Director

State of origin: Michigan

Accrediting authority: N/A ID:N/A

QAPP: Microbac OVD

This report contains a total of 71 pages.

Look closer. Go further. Do more.



The Microbac logo consists of the word "Microbac" in a white serif font, centered within a dark teal rectangular box.

Microbac Laboratories, Inc.
Ohio Valley Division
158 Starlite Drive
Marietta, OH 45750

Phone: 800.373.4071
Fax: 740.373.4835

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LOOK CLOSER, GO FURTHER, DO MORE.

Microbac REPORT L09080640
PREPARED FOR CH2MHILL, Inc
WORK ID:

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1.0 Introduction

Microbac Laboratories Inc.
REPORT NARRATIVE**Microbac Login No:** L09080640**CHAIN OF CUSTODY:** The chain of custody number was 14234**SHIPMENT CONDITIONS:** The chain of custody forms were received sealed in a cooler. The cooler temperature was 4 degrees C.**SAMPLE MANAGEMENT:** All samples received were intact.

L09080640-01	MW39D-127.0
L09080640-02	MW39D-132.0
L09080640-03	MW39D-147.0
L09080640-04	EQUIP-BLK-1
L09080640-05	MW16D-47.0
L09080640-06	MW16D-52.0
L09080640-07	MW16D-87.0
L09080640-08	MW16D-97.0
L09080640-09	MW16D-104.0
L09080640-10	MW39D-117.0

I certify that this data package is in compliance with the terms and conditions agreed to by the client and Microbac Laboratories Inc., both technically and for completeness, except for the conditions noted above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or designated person, as verified by the following signature.

Approved: 28-AUG-09



2.0 Data Package

2.1 General Chemistry Data

2.1.1 Chloride Data

2.1.1.1 Summary Data

LABORATORY REPORT

L09080640

09/04/09 16:54

Submitted By

Microbac Laboratories Inc.
158 Starlite Drive
Marietta, OH 45750
(740) 373-4071

For

Account Name: CH2MHILL, Inc
CH2MHILL
15010 Conference Center Drive Suite 200
Chantilly, VA 20151
Attention: Michael J. Zamboni

Project Number: 2736.006
Project: MI-Dow Ludington
Site: LUDINGTON, MI

P.O. Number: 935272

Sample Analysis Summary

Client ID	Lab ID	Method	Dilution	Date Received
MW39D-127.0	L09080640-01	325.2	20	27-AUG-09
MW39D-132.0	L09080640-02	325.2	20	27-AUG-09
MW39D-147.0	L09080640-03	325.2	20	27-AUG-09
EQUIP-BLK-1	L09080640-04	325.2	1	27-AUG-09
MW16D-47.0	L09080640-05	325.2	20	27-AUG-09
MW16D-52.0	L09080640-06	325.2	20	27-AUG-09
MW16D-87.0	L09080640-07	325.2	1	27-AUG-09
MW16D-97.0	L09080640-08	325.2	1	27-AUG-09
MW16D-104.0	L09080640-09	325.2	1	27-AUG-09
MW39D-117.0	L09080640-10	325.2	20	27-AUG-09



Report Number: **L09080640**Report Date : **September 4, 2009**

Sample Number: **L09080640-01**
Client ID: **MW39D-127.0**
Matrix: **Water**
Workgroup Number: **WG311101**
Collect Date: **08/24/2009 15:13**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **20**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/01/2009 14:50**
Cal Date: **09/01/2009 13:58**
Run Date: **09/01/2009 14:50**
File ID: **SC090901008.084**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	1470		40.0	20.0

Report Number: **L09080640**Report Date : **September 4, 2009**

Sample Number: **L09080640-02**
Client ID: **MW39D-132.0**
Matrix: **Water**
Workgroup Number: **WG311101**
Collect Date: **08/25/2009 08:25**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **20**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/01/2009 14:51**
Cal Date: **09/01/2009 13:58**
Run Date: **09/01/2009 14:51**
File ID: **SC090901008.085**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	1330		40.0	20.0

Report Number: **L09080640**Report Date : **September 4, 2009**

Sample Number: **L09080640-03**
Client ID: **MW39D-147.0**
Matrix: **Water**
Workgroup Number: **WG311101**
Collect Date: **08/25/2009 10:45**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **20**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/01/2009 14:53**
Cal Date: **09/01/2009 13:58**
Run Date: **09/01/2009 14:53**
File ID: **SC090901008.086**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	1670		40.0	20.0

Report Number: **L09080640**Report Date : **September 4, 2009**

Sample Number: **L09080640-04**
Client ID: **EQUIP-BLK-1**
Matrix: **Water**
Workgroup Number: **WG311101**
Collect Date: **08/24/2009 15:08**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/01/2009 14:07**
Cal Date: **09/01/2009 13:58**
Run Date: **09/01/2009 14:07**
File ID: **SC090901008.024**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6		ND	2.00	1.00

ND Not detected at or above the reporting limit (RL).

Report Number: **L09080640**Report Date : **September 4, 2009**

Sample Number: **L09080640-05**
Client ID: **MW16D-47.0**
Matrix: **Water**
Workgroup Number: **WG311101**
Collect Date: **08/26/2009 10:25**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **20**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/01/2009 14:54**
Cal Date: **09/01/2009 13:58**
Run Date: **09/01/2009 14:54**
File ID: **SC090901008.087**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	1520		40.0	20.0

Report Number: **L09080640**Report Date : **September 4, 2009**

Sample Number: **L09080640-06**
Client ID: **MW16D-52.0**
Matrix: **Water**
Workgroup Number: **WG311101**
Collect Date: **08/26/2009 11:40**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **20**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/01/2009 14:55**
Cal Date: **09/01/2009 13:58**
Run Date: **09/01/2009 14:55**
File ID: **SC090901008.088**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	1300		40.0	20.0

Report Number: **L09080640**Report Date : **September 4, 2009**

Sample Number: **L09080640-07**
Client ID: **MW16D-87.0**
Matrix: **Water**
Workgroup Number: **WG311101**
Collect Date: **08/26/2009 14:45**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/01/2009 14:31**
Cal Date: **09/01/2009 13:58**
Run Date: **09/01/2009 14:31**
File ID: **SC090901008.064**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	2.76		2.00	1.00

Report Number: **L09080640**Report Date : **September 4, 2009**

Sample Number: **L09080640-08**
Client ID: **MW16D-97.0**
Matrix: **Water**
Workgroup Number: **WG311101**
Collect Date: **08/26/2009 15:32**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/01/2009 14:32**
Cal Date: **09/01/2009 13:58**
Run Date: **09/01/2009 14:32**
File ID: **SC090901008.065**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6		ND	2.00	1.00

ND Not detected at or above the reporting limit (RL).

Report Number: **L09080640**Report Date : **September 4, 2009**

Sample Number: **L09080640-09**
Client ID: **MW16D-104.0**
Matrix: **Water**
Workgroup Number: **WG311101**
Collect Date: **08/26/2009 16:20**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/01/2009 14:33**
Cal Date: **09/01/2009 13:58**
Run Date: **09/01/2009 14:33**
File ID: **SC090901008.066**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	2.34		2.00	1.00

Report Number: **L09080640**Report Date : **September 4, 2009**

Sample Number: **L09080640-10**
Client ID: **MW39D-117.0**
Matrix: **Water**
Workgroup Number: **WG311101**
Collect Date: **08/24/2009 14:05**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **20**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/01/2009 14:56**
Cal Date: **09/01/2009 13:58**
Run Date: **09/01/2009 14:56**
File ID: **SC090901008.089**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	996		40.0	20.0

2.1.1.2 QC Summary Data

METHOD BLANK SUMMARY

Login Number: L09080640
 Blank File ID: SC090901008.010
 Prep Date: 09/01/09 13:59
 Analyzed Date: 09/01/09 13:59
 Analyst: JBK

Work Group: WG311101
 Blank Sample ID: WG311101-01
 Instrument ID: SMARTCHEM
 Method: 325.2

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG311101-02	SC090901008.011	09/01/09 13:59	01
LCS2	WG311101-03	SC090901008.012	09/01/09 14:00	01
EQUIP-BLK-1	L09080640-04	SC090901008.024	09/01/09 14:07	01
DUP	WG311101-05	SC090901008.034	09/01/09 14:13	DL01
MW16D-87.0	L09080640-07	SC090901008.064	09/01/09 14:31	01
MW16D-97.0	L09080640-08	SC090901008.065	09/01/09 14:32	01
MW16D-104.0	L09080640-09	SC090901008.066	09/01/09 14:33	01
MW39D-127.0	L09080640-01	SC090901008.084	09/01/09 14:50	DL01
MW39D-132.0	L09080640-02	SC090901008.085	09/01/09 14:51	DL01
MW39D-147.0	L09080640-03	SC090901008.086	09/01/09 14:53	DL01
MW16D-47.0	L09080640-05	SC090901008.087	09/01/09 14:54	DL01
MW16D-52.0	L09080640-06	SC090901008.088	09/01/09 14:55	DL01
MW39D-117.0	L09080640-10	SC090901008.089	09/01/09 14:56	DL01

Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L09080640 Prep Date: 09/01/09 13:59 Sample ID: WG311101-01
Instrument ID: SMARTCHEM Run Date: 09/01/09 13:59 Prep Method: 325.2
File ID: SC090901008.010 Analyst: JBK Method: 325.2
Workgroup (AAB#): WG311101 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: SMARTC - 01-SEP-09

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Chloride	1.00	2.00	2.00	1	ND

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1479929

02-SEP-2009 09:17



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09080640 Analyst: JBK Prep Method: 325.2
Instrument ID: SMARTCHEM Matrix: Water Method: 325.2
Workgroup (AAB#): WG311101 Units: mg/L
QC Key: DOWBOA2006 Lot #: STD34512
Sample ID: WG311101-02 LCS File ID: SC090901008.011 Run Date: 09/01/2009 13:59
Sample ID: WG311101-03 LCS2 File ID: SC090901008.012 Run Date: 09/01/2009 14:00

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Chloride	50.0	49.2	98.5	50.0	51.5	103	4.53	90 - 110	10	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 1479930
Report generated: 09/02/2009 09:17



2.1.2 Ammonia Data

2.1.2.1 Summary Data

LABORATORY REPORT

L09080640

09/04/09 16:54

Submitted By

Microbac Laboratories Inc.
158 Starlite Drive
Marietta , OH 45750
(740) 373 - 4071

For

Account Name: CH2MHILL, Inc
CH2MHILL
15010 Conference Center Drive Suite 200
Chantilly, VA 20151
Attention: Michael J. Zamboni

Project Number: 2736.006
Project: MI-Dow Ludington
Site: LUDINGTON, MI

P.O. Number: 935272

Sample Analysis Summary

Client ID	Lab ID	Method	Dilution	Date Received
MW39D-127.0	L09080640-01	350.1	2	27-AUG-09
MW39D-132.0	L09080640-02	350.1	2	27-AUG-09
MW39D-147.0	L09080640-03	350.1	4	27-AUG-09
EQUIP-BLK-1	L09080640-04	350.1	1	27-AUG-09
MW16D-47.0	L09080640-05	350.1	10	27-AUG-09
MW16D-52.0	L09080640-06	350.1	50	27-AUG-09
MW16D-87.0	L09080640-07	350.1	25	27-AUG-09
MW16D-97.0	L09080640-08	350.1	4	27-AUG-09
MW16D-104.0	L09080640-09	350.1	1	27-AUG-09
MW39D-117.0	L09080640-10	350.1	1	27-AUG-09



Report Number: **L09080640**Report Date : **September 4, 2009**

Sample Number: **L09080640-01**
Client ID: **MW39D-127.0**
Matrix: **Water**
Workgroup Number: **WG310918**
Collect Date: **08/24/2009 15:13**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **2**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/31/2009 09:28**
Cal Date: **08/31/2009 09:10**
Run Date: **08/31/2009 09:28**
File ID: **SC090831001.026**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	5.47		0.200	0.100

Report Number: **L09080640**Report Date : **September 4, 2009**

Sample Number: **L09080640-02**
Client ID: **MW39D-132.0**
Matrix: **Water**
Workgroup Number: **WG310918**
Collect Date: **08/25/2009 08:25**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **2**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/31/2009 09:28**
Cal Date: **08/31/2009 09:10**
Run Date: **08/31/2009 09:28**
File ID: **SC090831001.027**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	5.26		0.200	0.100

Report Number: **L09080640**Report Date : **September 4, 2009**

Sample Number: **L09080640-03**
Client ID: **MW39D-147.0**
Matrix: **Water**
Workgroup Number: **WG310918**
Collect Date: **08/25/2009 10:45**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **4**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/31/2009 09:58**
Cal Date: **08/31/2009 09:10**
Run Date: **08/31/2009 09:58**
File ID: **SC090831001.045**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	7.37		0.400	0.200

Report Number: **L09080640**Report Date : **September 4, 2009**

Sample Number: **L09080640-04**
Client ID: **EQUIP-BLK-1**
Matrix: **Water**
Workgroup Number: **WG310918**
Collect Date: **08/24/2009 15:08**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/31/2009 09:30**
Cal Date: **08/31/2009 09:10**
Run Date: **08/31/2009 09:30**
File ID: **SC090831001.029**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	0.234		0.100	0.0500

Report Number: **L09080640**Report Date : **September 4, 2009**

Sample Number: **L09080640-05**
Client ID: **MW16D-47.0**
Matrix: **Water**
Workgroup Number: **WG310918**
Collect Date: **08/26/2009 10:25**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **10**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/31/2009 10:00**
Cal Date: **08/31/2009 09:10**
Run Date: **08/31/2009 10:00**
File ID: **SC090831001.046**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	22.3		1.00	0.500

Report Number: **L09080640**Report Date : **September 4, 2009**

Sample Number: **L09080640-06**
Client ID: **MW16D-52.0**
Matrix: **Water**
Workgroup Number: **WG310918**
Collect Date: **08/26/2009 11:40**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **50**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/31/2009 10:38**
Cal Date: **08/31/2009 09:10**
Run Date: **08/31/2009 10:38**
File ID: **SC090831001.058**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	119		5.00	2.50

Report Number: **L09080640**Report Date : **September 4, 2009**

Sample Number: **L09080640-07**
Client ID: **MW16D-87.0**
Matrix: **Water**
Workgroup Number: **WG310918**
Collect Date: **08/26/2009 14:45**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **25**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/31/2009 10:25**
Cal Date: **08/31/2009 09:10**
Run Date: **08/31/2009 10:25**
File ID: **SC090831001.055**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	39.1		2.50	1.25

Report Number: **L09080640**Report Date : **September 4, 2009**

Sample Number: **L09080640-08**
Client ID: **MW16D-97.0**
Matrix: **Water**
Workgroup Number: **WG310918**
Collect Date: **08/26/2009 15:32**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **4**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/31/2009 10:05**
Cal Date: **08/31/2009 09:10**
Run Date: **08/31/2009 10:05**
File ID: **SC090831001.049**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	11.1		0.400	0.200

Report Number: **L09080640**Report Date : **September 4, 2009**

Sample Number: **L09080640-09**
Client ID: **MW16D-104.0**
Matrix: **Water**
Workgroup Number: **WG311429**
Collect Date: **08/26/2009 16:20**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/04/2009 11:20**
Cal Date: **09/04/2009 11:07**
Run Date: **09/04/2009 11:20**
File ID: **SC090904002.020**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	0.246		0.100	0.0500

Report Number: **L09080640**Report Date : **September 4, 2009**

Sample Number: **L09080640-10**
Client ID: **MW39D-117.0**
Matrix: **Water**
Workgroup Number: **WG311429**
Collect Date: **08/24/2009 14:05**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/04/2009 11:20**
Cal Date: **09/04/2009 11:07**
Run Date: **09/04/2009 11:20**
File ID: **SC090904002.021**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	0.221		0.100	0.0500

2.1.2.2 QC Summary Data

METHOD BLANK SUMMARY

Login Number: L09080640
 Blank File ID: SC090831001.039
 Prep Date: 08/31/09 09:39
 Analyzed Date: 08/31/09 09:39
 Analyst: JBK

Work Group: WG310918
 Blank Sample ID: WG310918-01
 Instrument ID: SMARTCHEM
 Method: 350.1

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS2	WG310918-03	SC090831001.011	08/31/09 09:14	01
MW39D-127.0	L09080640-01	SC090831001.026	08/31/09 09:28	DL01
MW39D-132.0	L09080640-02	SC090831001.027	08/31/09 09:28	DL01
EQUIP-BLK-1	L09080640-04	SC090831001.029	08/31/09 09:30	01
DUP	WG310918-06	SC090831001.036	08/31/09 09:37	01
LCS	WG310918-02	SC090831001.040	08/31/09 09:41	01
MW39D-147.0	L09080640-03	SC090831001.045	08/31/09 09:58	DL01
MW16D-47.0	L09080640-05	SC090831001.046	08/31/09 10:00	DL01
MW16D-97.0	L09080640-08	SC090831001.049	08/31/09 10:05	DL01
MW16D-87.0	L09080640-07	SC090831001.055	08/31/09 10:25	DL01
MW16D-52.0	L09080640-06	SC090831001.058	08/31/09 10:38	DL01

METHOD BLANK SUMMARY

Login Number: L09080640
 Blank File ID: SC090904002.009
 Prep Date: 09/04/09 11:09
 Analyzed Date: 09/04/09 11:09
 Analyst: DIH

Work Group: WG311429
 Blank Sample ID: WG311429-01
 Instrument ID: SMARTCHEM
 Method: 350.1

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
MW16D-104.0	L09080640-09	SC090904002.020	09/04/09 11:20	01
MW39D-117.0	L09080640-10	SC090904002.021	09/04/09 11:20	01
DUP	WG311429-05	SC090904002.037	09/04/09 11:34	DL01
LCS	WG311429-02	SC090904002.064	09/04/09 11:59	01



METHOD BLANK REPORT

Login Number: L09080640 Prep Date: 08/31/09 09:39 Sample ID: WG310918-01
Instrument ID: SMARTCHEM Run Date: 08/31/09 09:39 Prep Method: 350.1
File ID: SC090831001.039 Analyst: JBK Method: 350.1
Workgroup (AAB#): WG310918 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: SMARTC - 31-AUG-09

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Nitrogen, Ammonia	0.0500	0.100	0.100	1	ND

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1480202

04-SEP-2009 14:50



Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L09080640 Prep Date: 09/04/09 11:09 Sample ID: WG311429-01
Instrument ID: SMARTCHEM Run Date: 09/04/09 11:09 Prep Method: 350.1
File ID: SC090904002.009 Analyst: DIH Method: 350.1
Workgroup (AAB#): WG311429 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: SMARTC - 04-SEP-09

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Nitrogen, Ammonia	0.0500	0.100	0.100	1	ND

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1480202

04-SEP-2009 14:50



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09080640 Run Date: 09/04/2009 Sample ID: WG311429-02
Instrument ID: SMARTCHEM Run Time: 11:59 Prep Method: 350.1
File ID: SC090904002.064 Analyst: DIH Method: 350.1
Workgroup (AAB#): WG311429 Matrix: Water Units: mg/L
QC Key: DOWBOA2006 Lot#: STD33211 Cal ID: SMARTC - 04-SEP-09

Analytes	Expected	Found	% Rec	LCS Limits	Q
Nitrogen, Ammonia	2.00	1.97	98.5	90 - 110	

LCS - Modified 03/06/2008
PDF File ID: 1483038
Report generated: 09/04/2009 14:50



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09080640 Analyst: JBK Prep Method: 350.1
 Instrument ID: SMARTCHEM Matrix: Water Method: 350.1
 Workgroup (AAB#): WG310918 Units: mg/L
 QC Key: DOWB0A2006 Lot #: STD33211
 Sample ID: WG310918-02 LCS File ID: SC090831001.040 Run Date: 08/31/2009 09:41
 Sample ID: WG310918-03 LCS2 File ID: SC090831001.011 Run Date: 08/31/2009 09:14

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Nitrogen, Ammonia	2.00	1.91	95.6	2.00	1.87	93.5	2.23	90 - 110	25	



2.1.3 Total Dissolved Solids Data

2.1.3.1 Summary Data

LABORATORY REPORT

L09080640

09/04/09 16:54

Submitted By

Microbac Laboratories Inc.
158 Starlite Drive
Marietta, OH 45750
(740) 373-4071

For

Account Name: CH2MHILL, Inc
CH2MHILL
15010 Conference Center Drive Suite 200
Chantilly, VA 20151
Attention: Michael J. Zamboni

Project Number: 2736.006
Project: MI-Dow Ludington
Site: LUDINGTON, MI

P.O. Number: 935272

Sample Analysis Summary

Client ID	Lab ID	Method	Dilution	Date Received
MW39D-127.0	L09080640-01	160.1	1	27-AUG-09
MW39D-132.0	L09080640-02	160.1	1	27-AUG-09
MW39D-147.0	L09080640-03	160.1	1	27-AUG-09
EQUIP-BLK-1	L09080640-04	160.1	1	27-AUG-09
MW16D-47.0	L09080640-05	160.1	1	27-AUG-09
MW16D-52.0	L09080640-06	160.1	1	27-AUG-09
MW16D-87.0	L09080640-07	160.1	1	27-AUG-09
MW16D-97.0	L09080640-08	160.1	1	27-AUG-09
MW16D-104.0	L09080640-09	160.1	1	27-AUG-09
MW39D-117.0	L09080640-10	160.1	1	27-AUG-09



Report Number: **L09080640**Report Date : **September 4, 2009**

Sample Number: **L09080640-01**
Client ID: **MW39D-127.0**
Matrix: **Water**
Workgroup Number: **WG310807**
Collect Date: **08/24/2009 15:13**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/28/2009 10:50**
Cal Date:
Run Date: **08/28/2009 10:50**
File ID: **EN.0908281050-06**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		2950		20.0	10.0

Report Number: **L09080640**Report Date : **September 4, 2009**

Sample Number: **L09080640-02**
Client ID: **MW39D-132.0**
Matrix: **Water**
Workgroup Number: **WG310807**
Collect Date: **08/25/2009 08:25**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/28/2009 10:50**
Cal Date:
Run Date: **08/28/2009 10:50**
File ID: **EN.0908281050-07**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		3070		20.0	10.0

Report Number: **L09080640**Report Date : **September 4, 2009**

Sample Number: **L09080640-03**
Client ID: **MW39D-147.0**
Matrix: **Water**
Workgroup Number: **WG310807**
Collect Date: **08/25/2009 10:45**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/28/2009 10:50**
Cal Date:
Run Date: **08/28/2009 10:50**
File ID: **EN.0908281050-08**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		3010		20.0	10.0

Report Number: **L09080640**Report Date : **September 4, 2009**

Sample Number: **L09080640-04**
Client ID: **EQUIP-BLK-1**
Matrix: **Water**
Workgroup Number: **WG310807**
Collect Date: **08/24/2009 15:08**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/28/2009 10:50**
Cal Date:
Run Date: **08/28/2009 10:50**
File ID: **EN.0908281050-05**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids			ND	10.0	5.00

ND Not detected at or above the reporting limit (RL).

Report Number: **L09080640**Report Date : **September 4, 2009**

Sample Number: **L09080640-05**
Client ID: **MW16D-47.0**
Matrix: **Water**
Workgroup Number: **WG310807**
Collect Date: **08/26/2009 10:25**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/28/2009 10:50**
Cal Date:
Run Date: **08/28/2009 10:50**
File ID: **EN.0908281050-09**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		3540		20.0	10.0

Report Number: **L09080640**Report Date : **September 4, 2009**

Sample Number: **L09080640-06**
Client ID: **MW16D-52.0**
Matrix: **Water**
Workgroup Number: **WG310807**
Collect Date: **08/26/2009 11:40**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/28/2009 10:50**
Cal Date:
Run Date: **08/28/2009 10:50**
File ID: **EN.0908281050-10**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		2640		20.0	10.0

Report Number: **L09080640**Report Date : **September 4, 2009**

Sample Number: **L09080640-07**
Client ID: **MW16D-87.0**
Matrix: **Water**
Workgroup Number: **WG310807**
Collect Date: **08/26/2009 14:45**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/28/2009 10:50**
Cal Date:
Run Date: **08/28/2009 10:50**
File ID: **EN.0908281050-11**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		372		20.0	10.0

Report Number: **L09080640**Report Date : **September 4, 2009**

Sample Number: **L09080640-08**
Client ID: **MW16D-97.0**
Matrix: **Water**
Workgroup Number: **WG310807**
Collect Date: **08/26/2009 15:32**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/28/2009 10:50**
Cal Date:
Run Date: **08/28/2009 10:50**
File ID: **EN.0908281050-12**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		252		20.0	10.0

Report Number: **L09080640**Report Date : **September 4, 2009**

Sample Number: **L09080640-09**
Client ID: **MW16D-104.0**
Matrix: **Water**
Workgroup Number: **WG310807**
Collect Date: **08/26/2009 16:20**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/28/2009 10:50**
Cal Date:
Run Date: **08/28/2009 10:50**
File ID: **EN.0908281050-13**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		256		20.0	10.0

Report Number: **L09080640**Report Date : **September 4, 2009**

Sample Number: **L09080640-10**
Client ID: **MW39D-117.0**
Matrix: **Water**
Workgroup Number: **WG310807**
Collect Date: **08/24/2009 14:05**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/28/2009 10:50**
Cal Date:
Run Date: **08/28/2009 10:50**
File ID: **EN.0908281050-04**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		2250		20.0	10.0

2.1.3.2 QC Summary Data

METHOD BLANK SUMMARY

Login Number: <u>L09080640</u>	Work Group: <u>WG310807</u>
Blank File ID: <u>EN.0908281050-01</u>	Blank Sample ID: <u>WG310807-01</u>
Prep Date: <u>08/28/09 10:50</u>	Instrument ID: <u>OVEN</u>
Analyzed Date: <u>08/28/09 10:50</u>	Method: <u>160.1</u>
Analyst: <u>HJR</u>	

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG310807-02	EN.0908281050-02	08/28/09 10:50	
LCS2	WG310807-03	EN.0908281050-03	08/28/09 10:50	
MW39D-117.0	L09080640-10	EN.0908281050-04	08/28/09 10:50	
EQUIP-BLK-1	L09080640-04	EN.0908281050-05	08/28/09 10:50	
MW39D-127.0	L09080640-01	EN.0908281050-06	08/28/09 10:50	
MW39D-132.0	L09080640-02	EN.0908281050-07	08/28/09 10:50	
MW39D-147.0	L09080640-03	EN.0908281050-08	08/28/09 10:50	
MW16D-47.0	L09080640-05	EN.0908281050-09	08/28/09 10:50	
MW16D-52.0	L09080640-06	EN.0908281050-10	08/28/09 10:50	
MW16D-87.0	L09080640-07	EN.0908281050-11	08/28/09 10:50	
MW16D-97.0	L09080640-08	EN.0908281050-12	08/28/09 10:50	
MW16D-104.0	L09080640-09	EN.0908281050-13	08/28/09 10:50	
DUP	WG310807-05	EN.0908281050-17	08/28/09 10:50	

Report Name: BLANK_SUMMARY
 PDF File ID: 1480017
 Report generated 09/02/2009 09:28



Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L09080640 Prep Date: 08/28/09 10:50 Sample ID: WG310807-01
Instrument ID: OVEN Run Date: 08/28/09 10:50 Prep Method: 160.1
File ID: EN.0908281050-01 Analyst: HJR Method: 160.1
Workgroup (AAB#): WG310807 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: OVEN -

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Total Dissolved Solids	5.00	10.0	10.0	1	ND

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1480018

02-SEP-2009 09:28



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09080640 Analyst: HJR Prep Method: 160.1
Instrument ID: OVEN Matrix: Water Method: 160.1
Workgroup (AAB#): WG310807 Units: mg/L
QC Key: DOWBOA2006 Lot #: STD32441
Sample ID: WG310807-02 LCS File ID: EN.0908281050-02 Run Date: 08/28/2009 10:50
Sample ID: WG310807-03 LCS2 File ID: EN.0908281050-03 Run Date: 08/28/2009 10:50

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Total Dissolved Solids	500	492	98.4	500	500	100	1.61	80 - 120	25	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 1480019
Report generated: 09/02/2009 09:28



3.0 Attachments

Microbac Laboratories Inc.
Analyst Listing
September 4, 2009

ADC - ANTHONY D. CANTER	AJF - AMANDA J. FICKIESEN	AJM - ANTHONY J. MOSSBURG
ALB - ANNIE L. BROWN	AML - ANTHONY M. LONG	BLG - BRENDA L. GREENWALT
BRG - BRENDA R. GREGORY	CAA - CASSIE A. AUGENSTEIN	CAF - CHERYL A. FLOWERS
CAH - CHARLES A. HALL	CEB - CHAD E. BARNES	CLC - CHRYS L. CRAWFORD
CLW - CHARISSA L. WINTERS	CPD - CHAD P. DAVIS	CSH - CHRIS S. HILL
DDE - DEBRA D. ELLIOTT	DEL - DON E. LIGHTFRITZ	DEV - DAVID E. VANDENBERG
DGB - DOUGLAS G. BUTCHER	DIH - DEANNA I. HESSON	DLB - DAVID L. BUMGARNER
DLP - DOROTHY L. PAYNE	DLR - DIANNA L. RAUCH	DR - DEANNA ROBERTS
ECL - ERIC C. LAWSON	EDA - ERIN D. AGEE	ERP - ERIN R. PORTER
FJB - FRANCES J. BOLDEN	HAV - HEMA VILASAGAR	HJR - HOLLY J. REED
JBK - JEREMY B. KINNEY	JDH - JUSTIN D. HESSON	JKT - JANE K. THOMPSON
JWR - JOHN W. RICHARDS	JWS - JACK W. SHEAVES	JYH - JI Y. HU
KEB - KATHRYN E. BARNES	KHR - KIM H. RHODES	KRA - KATHY R. ALBERTSON
LKN - LINDA K. NEDEFF	LSB - LESLIE S. BUCINA	MDA - MIKE D. ALBERTSON
MDC - MICHAEL D. COCHRAN	MES - MARY E. SCHILLING	MMB - MAREN M. BEERY
MRT - MICHELLE R. TAYLOR	MSW - MATT S. WILSON	NPM - NATHANIEL P. MILLER
PDM - PIERCE D. MORRIS	RAH - ROY A. HALSTEAD	RB - ROBERT BUCHANAN
REK - ROBERT E. KYER	RLK - ROBIN L. KLINGER	RWC - RODNEY W. CAMPBELL
SDH - SHANA D. HINYARD	SLM - STEPHANIE L. MOSSBURG	SLP - SHERI L. PFALZGRAF
TIP - TAE I. PARRISH	TMB - TIFFANY M. BAILEY	TMM - TAMMY M. MORRIS
VC - VICKI COLLIER	WTD - WADE T. DELONG	

September 04, 2009

Qualkey: STD

Qualifier	Description
*	Surrogate or spike compound out of range
+	Correlation coefficient for the MSA is less than 0.995
<	Result is less than the associated numerical value.
>	Result is greater than the associated numerical value.
A	See the report narrative
B	Analyte present in method blank
B1	Target analyte detected in method blank at or above the method reporting limit
B3	Target analyte detected in calibration blank at or above the method reporting limit
C	Confirmed by GC/MS
CG	Confluent growth
DL	Surrogate or spike compound was diluted out
E	Estimated concentration due to sample matrix interference
EDL	Elevated sample reporting limits, presence of non-target analytes
EMPC	Estimated Maximum Possible Concentration
F, S	Estimated result below quantitation limit; method of standard additions(MSA)
FL	Free Liquid
H1	Sample analysis performed past holding time.
I	Semiquantitative result (out of instrument calibration range)
J	The analyte was positively identified, but the quantitation was below the RL
J,B	Analyte detected in both the method blank and sample above the MDL.
J,P	Estimate; columns don't agree to within 40%
J,S	Estimated concentration; analyzed by method of standard addition (MSA)
L	Sample reporting limits elevated due to matrix interference
L1	The associated blank spike (LCS) recovery was above the laboratory acceptance limits.
L2	The associated blank spike (LCS) recovery was below the laboratory acceptance limits.
M	Matrix effect; the concentration is an estimate due to matrix effect.
N	Tentatively identified compound(TIC)
NA	Not applicable
ND	Not detected at or above the reporting limit (RL).
ND, L	Not detected; sample reporting limit (RL) elevated due to interference
ND, S	Not detected; analyzed by method of standard addition (MSA)
NF	Not found by library search
NFL	No free liquid
NI	Non-ignitable
NR	Analyte is not required to be analyzed
NS	Not spiked
P	Concentrations >40% difference between the two GC columns
Q	One or more quality control criteria fail. See narrative.
QNS	Quantity of sample not sufficient to perform analysis
RA	Reanalysis confirms reported results
RE	Reanalysis confirms sample matrix interference
S	Analyzed by method of standard addition (MSA)
SMI	Sample matrix interference on surrogate
SP	Reported results are for spike compounds only
TIC	Library Search Compound
TNTC	Too numerous to count
U	Undetected; the concentration is below the reported MDL.
UJ	Undetected; the MDL and RL are estimated due to quality control discrepancies.
W	Post-digestion spike for furnace AA out of control limits
X	Exceeds regulatory limit
X, S	Exceeds regulatory limit; method of standard additions (MSA)
Z	Cannot be resolved from isomer - see below

*****Special Notes for Organic Analytes**

1. Acrolein and acrylonitrile by method 624 are semi-quantitative screens only.
2. 1,2-Diphenylhydrazine is unstable and is reported as azobenzene.
3. N-nitrosodiphenylamine cannot be separated from diphenylamine.
4. 3-Methylphenol and 4-Methylphenol are unresolvable compounds.
5. m-Xylene and p-Xylene are unresolvable compounds.
6. The reporting limits for Appendix II/IX compounds by method 8270 are based on EPA estimated PQLs referenced in 40 CFR Part 264, Appendix IX. They are not always achievable for every compound and are matrix dependent.



COC No. A 14234

158 Starlite Drive

Marietta, OH 45750



Microbac

Phone: 740-373-4071

Fax: 740-373-4835

CHAIN-OF-CUSTODY RECORD

Company Name: CH2MHILL		Project Contact: Mike Zumboni		Contact Phone #: 703-376-5111		Turn Around Requirements: Standard		Location: LUDINGTON, MI		Project ID: Bow LUDINGTON		Sampler (print): Lauren Hunt		Signature: Lauren Hunt		Program: ☐ CWA ☐ RCRA ☐ DOD ☐ AFCEE ☐ Other		
Sample I.D. No.	Comp	Grab	Date	Time	Matrix*	Hold	NUMBER OF CONTAINERS	Dissolved Ammonia	TDS & CHLORIDE	TOTAL # (LAB USE)								ADDITIONAL REQUIREMENTS
MW39D-127.0	X	X	8-24-09	1513	W	2	2	1	1									
MW39D-132.0	X	X	8-25-09	0825	W	2	2	1	1									
MW39D-147.0	X	X	↓	1045	W	2	2	1	1									
EQUIP-BK-1	X	X	8-24-09	1508	W	2	2	1	1									
MW16D-47.0	X	X	8-26-09	1025	W	2	2	1	1									
MW16D-52.0	X	X	8-26-09	1140	W	2	2	1	1									
MW16D-87.0	X	X	↓	1445	W	2	2	1	1									
MW16D-97.0	X	X	↓	1532	W	2	2	1	1									
MW16D-104.0	X	X	8-26-09	1620	W	2	2	1	1									
*SAMPLES COLLECTED ON 8-24 & 8-25, SHORTENED HOLD TIMES.																		
Relinquished by: (Signature)		Date		Time		Microbac OVD		Received: 08/27/2009 09:43		221000001334		Date		Time		Received by: (Signature)		
Relinquished by: (Signature)		Date		Time		By: ERIN PORTER		ERIN PORTER				Remarks:						



1000001334

COOLER INSPECTION



Received: 08/27/2009 09:43
Delivery Method: UPS
Opened By: Erin R Porter
Comments:

Login(s): L09080640

Cooler(s)

Cooler #	Temp Gun	Temp	Tracking #	COC #	Comments
0012112	G	4.0	J2029837614	COC14234	

1	Yes	Were shipping coolers sealed?
2	Yes	Were custody seals intact?
3	Yes	Were cooler temperatures in range of 0-6?
4	Yes	Was ice present?
5	No	Were COC's received/information complete/signed and dated?
6	Yes	Were sample containers and labels intact and match COC?
7	Yes	Were the correct containers and volumes received?
8	Yes	Were correct preservatives used? (water only)
9	No	Were pH ranges acceptable? (voa's excluded)
10	NA	Were VOA samples free of headspace (<6mm)?
11	Yes	Were samples received within EPA hold times?

Discrepancies:

5	MW39D-117.0 not on coc 8/24/09@1405 per bottle	Per J. Tortomasi, sample MW39D-117.0 is to be logged for NH3, Cl and TDS.
9	MW16D-52.0 didn't PH due to matrix	

Look closer. Go further. Do more.

Microbac - Ohio Valley Division
158 Starlite Drive
Marietta, OH 45750
Tel: (740)373-4071 Fax: (740)373-4835

Internal Chain of Custody Report

Login: L09080640

Account: 2736

Project: 2736.006

Samples: 10

Due Date: 10-SEP-2009

Samplenum **Container ID** **Products**
L09080640-01 609786 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	28-AUG-2009 08:28	JKT	
2	ANALYZ	W1	WET	28-AUG-2009 10:34	HJR	JKT
3	STORE	WET	A2	01-SEP-2009 14:40	RLK	JBK

Samplenum **Container ID** **Products**
L09080640-01 609787 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	28-AUG-2009 08:28	JKT	
2	ANALYZ	W1	WET	28-AUG-2009 10:33	TMM	JKT
3	STORE	WET	A2	31-AUG-2009 08:54	JKT	TMM

Samplenum **Container ID** **Products**
L09080640-02 609788 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	28-AUG-2009 08:28	JKT	
2	ANALYZ	W1	WET	28-AUG-2009 10:34	HJR	JKT
3	STORE	WET	A2	01-SEP-2009 14:40	RLK	JBK

Samplenum **Container ID** **Products**
L09080640-02 609789 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	28-AUG-2009 08:28	JKT	
2	ANALYZ	W1	WET	28-AUG-2009 10:33	TMM	JKT
3	STORE	WET	A2	31-AUG-2009 08:54	JKT	TMM

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09080640

Account: 2736

Project: 2736.006

Samples: 10

Due Date: 10-SEP-2009

Samplenum **Container ID** **Products**
L09080640-03 609790 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	28-AUG-2009 08:28	JKT	
2	ANALYZ	W1	WET	28-AUG-2009 10:34	HJR	JKT
3	STORE	WET	A2	01-SEP-2009 14:40	RLK	JBK

Samplenum **Container ID** **Products**
L09080640-03 609791 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	28-AUG-2009 08:28	JKT	
2	ANALYZ	W1	WET	28-AUG-2009 10:33	TMM	JKT
3	STORE	WET	A2	31-AUG-2009 08:54	JKT	TMM

Samplenum **Container ID** **Products**
L09080640-04 609792 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	WET	28-AUG-2009 08:28	JKT	
2	STORE	WET	A2	01-SEP-2009 14:40	RLK	JBK

Samplenum **Container ID** **Products**
L09080640-04 609793 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	28-AUG-2009 08:28	JKT	
2	ANALYZ	W1	WET	28-AUG-2009 10:33	TMM	JKT
3	STORE	WET	A2	31-AUG-2009 08:54	JKT	TMM

Samplenum **Container ID** **Products**
L09080640-05 609794 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	WET	28-AUG-2009 08:28	JKT	
2	STORE	WET	A2	01-SEP-2009 14:40	RLK	JBK

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09080640

Account: 2736

Project: 2736.006

Samples: 10

Due Date: 10-SEP-2009

Samplenum **Container ID** **Products**
L09080640-05 609795 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	WET	28-AUG-2009 08:28	JKT	
2	STORE	WET	A2	31-AUG-2009 08:54	JKT	TMM

Samplenum **Container ID** **Products**
L09080640-06 609796 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	28-AUG-2009 08:28	JKT	
2	ANALYZ	W1	WET	28-AUG-2009 10:35	HJR	JKT
3	STORE	WET	A2	01-SEP-2009 14:40	RLK	JBK

Samplenum **Container ID** **Products**
L09080640-06 609797 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	28-AUG-2009 08:28	JKT	
2	ANALYZ	W1	WET	28-AUG-2009 10:33	TMM	JKT
3	STORE	WET	A2	31-AUG-2009 08:54	JKT	TMM

Samplenum **Container ID** **Products**
L09080640-07 609798 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	28-AUG-2009 08:28	JKT	
2	ANALYZ	W1	WET	28-AUG-2009 10:35	HJR	JKT
3	STORE	WET	A2	01-SEP-2009 14:40	RLK	JBK

Samplenum **Container ID** **Products**
L09080640-07 609799 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	28-AUG-2009 08:28	JKT	
2	ANALYZ	W1	WET	28-AUG-2009 10:33	TMM	JKT
3	STORE	WET	A2	31-AUG-2009 08:54	JKT	TMM

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09080640

Account: 2736

Project: 2736.006

Samples: 10

Due Date: 10-SEP-2009

Samplenum **Container ID** **Products**
L09080640-08 609800 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	28-AUG-2009 08:28	JKT	
2	ANALYZ	W1	WET	28-AUG-2009 10:34	HJR	JKT
3	STORE	WET	A2	01-SEP-2009 14:40	RLK	JBK

Samplenum **Container ID** **Products**
L09080640-08 609801 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	28-AUG-2009 08:28	JKT	
2	ANALYZ	W1	WET	28-AUG-2009 10:33	TMM	JKT
3	STORE	WET	A2	31-AUG-2009 08:54	JKT	TMM

Samplenum **Container ID** **Products**
L09080640-09 609802 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	28-AUG-2009 08:28	JKT	
2	ANALYZ	W1	WET	28-AUG-2009 10:35	HJR	JKT
3	STORE	WET	A2	01-SEP-2009 14:40	RLK	JBK

Samplenum **Container ID** **Products**
L09080640-09 609803 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	28-AUG-2009 08:28	JKT	
2	ANALYZ	W1	WET	28-AUG-2009 10:33	TMM	JKT
3	STORE	WET	A2	03-SEP-2009 16:18	RLK	DLP

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09080640**Account:** 2736**Project:** 2736.006**Samples:** 10**Due Date:** 10-SEP-2009

Samplenum **Container ID** **Products**
L09080640-10 609804 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	28-AUG-2009 08:28	JKT	
2	ANALYZ	W1	WET	28-AUG-2009 10:35	HJR	JKT
3	STORE	WET	A2	01-SEP-2009 14:40	RLK	JBK

Samplenum **Container ID** **Products**
L09080640-10 609805 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	28-AUG-2009 08:28	JKT	
2	ANALYZ	W1	WET	28-AUG-2009 10:33	TMM	JKT
3	STORE	WET	A2	03-SEP-2009 16:18	RLK	DLP

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login





158 Starlite Drive, Marietta, OH 45750 • T:740-373-4071 • F:740-373-4835 • <http://www.microbac.com>

Laboratory Report Number: L09080720

Please find enclosed the analytical results for the samples you submitted to Microbac Laboratories.

Review and compilation of your report was completed by Microbac's Sales and Service Team. If you have questions, comments or require further assistance regarding this report, please contact your team member noted in the reviewed box below at 800-373-4071. Team member e-mail addresses also appear here for your convenience.

Kathy Albertson	<i>Team Chemist/Data Specialist</i>	kalbertson@microbac.com
Stephanie Mossburg	<i>Team Chemist/Data Specialist</i>	smossburg@microbac.com
Tony Long	<i>Team Chemist/Data Specialist</i>	tlong@microbac.com
Amanda Fickiesen	<i>Client Services Specialist</i>	afickiesen@microbac.com
Annie Brown	<i>Client Services Specialist</i>	abrown@microbac.com

This report was reviewed on September 04, 2009.

A handwritten signature in cursive script that reads "Kathy Albertson".

Kathy Albertson - Team Chemist/Data Specialist

I certify that all test results meet all of the requirements of the accrediting authority listed below. All results for soil samples are reported on a 'dry-weight' basis unless specified otherwise. Analytical results for water and wastes are reported on a 'as received' basis unless specified otherwise. A statement of uncertainty for each analysis is available upon request. This laboratory report shall not be reproduced, except in full, without the written approval of Microbac Laboratories.

This report was certified on September 04, 2009.

A handwritten signature in cursive script that reads "David E. Vandenberg".

David Vandenberg - Managing Director

State of origin: Michigan

Accrediting authority: N/A ID:N/A

QAPP: Microbac OVD

This report contains a total of 54 pages.

Look closer. Go further. Do more.



The Microbac logo consists of the word "Microbac" in a white serif font, centered within a dark teal rectangular box.

Microbac Laboratories, Inc.
Ohio Valley Division
158 Starlite Drive
Marietta, OH 45750

Phone: 800.373.4071
Fax: 740.373.4835

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LOOK CLOSER, GO FURTHER, DO MORE.

Microbac REPORT L09080720
PREPARED FOR CH2MHILL, Inc
WORK ID:

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1.0 Introduction

Microbac Laboratories Inc.
REPORT NARRATIVE

Microbac Login No: L09080720

CHAIN OF CUSTODY: The chain of custody number was 14236

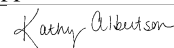
SHIPMENT CONDITIONS: The chain of custody forms were received sealed in a cooler. The cooler temperature was 3 degrees C.

SAMPLE MANAGEMENT: All samples received were intact.

L09080720-01	MW37D-147.0
L09080720-02	MW37D-137.0
L09080720-03	MW37D-117.0
L09080720-04	MW37D-77.0
L09080720-05	MW37D-87.0
L09080720-06	MW37D-97.0

I certify that this data package is in compliance with the terms and conditions agreed to by the client and Microbac Laboratories Inc., both technically and for completeness, except for the conditions noted above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or designated person, as verified by the following signature.

Approved: 01-SEP-09



2.0 Data Package

2.1 General Chemistry Data

2.1.1 Chloride Data

2.1.1.1 Summary Data

LABORATORY REPORT

L09080720

09/04/09 16:53

Submitted By

Microbac Laboratories Inc.
158 Starlite Drive
Marietta , OH 45750
(740) 373 - 4071

For

Account Name: CH2MHILL, Inc
CH2MHILL
15010 Conference Center Drive Suite 200
Chantilly, VA 20151
Attention: Michael J. Zamboni

Project Number: 2736.006
Project: MI-Dow Ludington
Site: LUDINGTON, MI

P.O. Number: 935272

Sample Analysis Summary

Client ID	Lab ID	Method	Dilution	Date Received
MW37D-147.0	L09080720-01	325.2	1	31-AUG-09
MW37D-137.0	L09080720-02	325.2	1	31-AUG-09
MW37D-117.0	L09080720-03	325.2	1	31-AUG-09
MW37D-77.0	L09080720-04	325.2	1	31-AUG-09
MW37D-87.0	L09080720-05	325.2	1	31-AUG-09
MW37D-97.0	L09080720-06	325.2	1	31-AUG-09



Report Number: **L09080720**Report Date : **September 4, 2009**

Sample Number: **L09080720-01**
Client ID: **MW37D-147.0**
Matrix: **Water**
Workgroup Number: **WG311103**
Collect Date: **08/28/2009 13:58**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/01/2009 14:33**
Cal Date: **09/01/2009 13:58**
Run Date: **09/01/2009 14:33**
File ID: **SC090901008.067**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6		ND	2.00	1.00

ND Not detected at or above the reporting limit (RL).

Report Number: **L09080720**Report Date : **September 4, 2009**

Sample Number: **L09080720-02**
Client ID: **MW37D-137.0**
Matrix: **Water**
Workgroup Number: **WG311103**
Collect Date: **08/28/2009 13:11**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/01/2009 14:34**
Cal Date: **09/01/2009 13:58**
Run Date: **09/01/2009 14:34**
File ID: **SC090901008.068**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6		ND	2.00	1.00

ND Not detected at or above the reporting limit (RL).

Report Number: **L09080720**Report Date : **September 4, 2009**

Sample Number: **L09080720-03**
Client ID: **MW37D-117.0**
Matrix: **Water**
Workgroup Number: **WG311103**
Collect Date: **08/28/2009 11:42**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/01/2009 14:35**
Cal Date: **09/01/2009 13:58**
Run Date: **09/01/2009 14:35**
File ID: **SC090901008.071**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6		ND	2.00	1.00

ND Not detected at or above the reporting limit (RL).

Report Number: **L09080720**Report Date : **September 4, 2009**

Sample Number: **L09080720-04**
Client ID: **MW37D-77.0**
Matrix: **Water**
Workgroup Number: **WG311103**
Collect Date: **08/28/2009 08:45**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/01/2009 14:36**
Cal Date: **09/01/2009 13:58**
Run Date: **09/01/2009 14:36**
File ID: **SC090901008.072**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	4.73		2.00	1.00

Report Number: **L09080720**Report Date : **September 4, 2009**

Sample Number: **L09080720-05**
Client ID: **MW37D-87.0**
Matrix: **Water**
Workgroup Number: **WG311103**
Collect Date: **08/28/2009 09:21**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/01/2009 14:36**
Cal Date: **09/01/2009 13:58**
Run Date: **09/01/2009 14:36**
File ID: **SC090901008.073**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6		ND	2.00	1.00

ND Not detected at or above the reporting limit (RL).

Report Number: **L09080720**Report Date : **September 4, 2009**

Sample Number: **L09080720-06**
Client ID: **MW37D-97.0**
Matrix: **Water**
Workgroup Number: **WG311103**
Collect Date: **08/28/2009 10:03**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/01/2009 14:37**
Cal Date: **09/01/2009 13:58**
Run Date: **09/01/2009 14:37**
File ID: **SC090901008.074**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6		ND	2.00	1.00

ND Not detected at or above the reporting limit (RL).

2.1.1.2 QC Summary Data

METHOD BLANK SUMMARY

Login Number: L09080720
 Blank File ID: SC090901008.038
 Prep Date: 09/01/09 14:16
 Analyzed Date: 09/01/09 14:16
 Analyst: JBK

Work Group: WG311103
 Blank Sample ID: WG311103-01
 Instrument ID: SMARTCHEM
 Method: 325.2

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG311103-02	SC090901008.039	09/01/09 14:16	01
LCS2	WG311103-03	SC090901008.040	09/01/09 14:17	01
DUP	WG311103-05	SC090901008.057	09/01/09 14:27	01
MW37D-147.0	L09080720-01	SC090901008.067	09/01/09 14:33	01
MW37D-137.0	L09080720-02	SC090901008.068	09/01/09 14:34	01
MW37D-117.0	L09080720-03	SC090901008.071	09/01/09 14:35	01
MW37D-77.0	L09080720-04	SC090901008.072	09/01/09 14:36	01
MW37D-87.0	L09080720-05	SC090901008.073	09/01/09 14:36	01
MW37D-97.0	L09080720-06	SC090901008.074	09/01/09 14:37	01

Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L09080720 Prep Date: 09/01/09 14:16 Sample ID: WG311103-01
Instrument ID: SMARTCHEM Run Date: 09/01/09 14:16 Prep Method: 325.2
File ID: SC090901008.038 Analyst: JBK Method: 325.2
Workgroup (AAB#): WG311103 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: SMARTC - 01-SEP-09

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Chloride	1.00	2.00	2.00	1	ND

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1479950

02-SEP-2009 09:18



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09080720 Analyst: JBK Prep Method: 325.2
Instrument ID: SMARTCHEM Matrix: Water Method: 325.2
Workgroup (AAB#): WG311103 Units: mg/L
QC Key: DOWBOA2006 Lot #: STD34512
Sample ID: WG311103-02 LCS File ID: SC090901008.039 Run Date: 09/01/2009 14:16
Sample ID: WG311103-03 LCS2 File ID: SC090901008.040 Run Date: 09/01/2009 14:17

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Chloride	50.0	52.0	104	50.0	50.6	101	2.75	90 - 110	10	



2.1.2 Ammonia Data

2.1.2.1 Summary Data

LABORATORY REPORT

L09080720

09/04/09 16:53

Submitted By

Microbac Laboratories Inc.
158 Starlite Drive
Marietta , OH 45750
(740) 373 - 4071

For

Account Name: CH2MHILL, Inc
CH2MHILL
15010 Conference Center Drive Suite 200
Chantilly, VA 20151
Attention: Michael J. Zamboni

Project Number: 2736.006
Project: MI-Dow Ludington
Site: LUDINGTON, MI

P.O. Number: 935272

Sample Analysis Summary

Client ID	Lab ID	Method	Dilution	Date Received
MW37D-147.0	L09080720-01	350.1	1	31-AUG-09
MW37D-137.0	L09080720-02	350.1	1	31-AUG-09
MW37D-117.0	L09080720-03	350.1	1	31-AUG-09
MW37D-77.0	L09080720-04	350.1	20	31-AUG-09
MW37D-87.0	L09080720-05	350.1	5	31-AUG-09
MW37D-97.0	L09080720-06	350.1	4	31-AUG-09



Report Number: **L09080720**Report Date : **September 4, 2009**

Sample Number: **L09080720-01**
Client ID: **MW37D-147.0**
Matrix: **Water**
Workgroup Number: **WG311429**
Collect Date: **08/28/2009 13:58**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/04/2009 11:27**
Cal Date: **09/04/2009 11:07**
Run Date: **09/04/2009 11:27**
File ID: **SC090904002.029**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	0.154		0.100	0.0500

Report Number: **L09080720**Report Date : **September 4, 2009**

Sample Number: **L09080720-02**
Client ID: **MW37D-137.0**
Matrix: **Water**
Workgroup Number: **WG311429**
Collect Date: **08/28/2009 13:11**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/04/2009 11:30**
Cal Date: **09/04/2009 11:07**
Run Date: **09/04/2009 11:30**
File ID: **SC090904002.032**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	0.231		0.100	0.0500

Report Number: **L09080720**Report Date : **September 4, 2009**

Sample Number: **L09080720-03**
Client ID: **MW37D-117.0**
Matrix: **Water**
Workgroup Number: **WG311429**
Collect Date: **08/28/2009 11:42**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/04/2009 11:31**
Cal Date: **09/04/2009 11:07**
Run Date: **09/04/2009 11:31**
File ID: **SC090904002.033**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	0.297		0.100	0.0500

Report Number: **L09080720**Report Date : **September 4, 2009**

Sample Number: **L09080720-04**
Client ID: **MW37D-77.0**
Matrix: **Water**
Workgroup Number: **WG311429**
Collect Date: **08/28/2009 08:45**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **20**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/04/2009 11:32**
Cal Date: **09/04/2009 11:07**
Run Date: **09/04/2009 11:32**
File ID: **SC090904002.034**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	34.6		2.00	1.00

Report Number: **L09080720**Report Date : **September 4, 2009**

Sample Number: **L09080720-05**
Client ID: **MW37D-87.0**
Matrix: **Water**
Workgroup Number: **WG311429**
Collect Date: **08/28/2009 09:21**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **5**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/04/2009 11:33**
Cal Date: **09/04/2009 11:07**
Run Date: **09/04/2009 11:33**
File ID: **SC090904002.035**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	9.39		0.500	0.250

Report Number: **L09080720**Report Date : **September 4, 2009**

Sample Number: **L09080720-06**
Client ID: **MW37D-97.0**
Matrix: **Water**
Workgroup Number: **WG311429**
Collect Date: **08/28/2009 10:03**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **4**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/04/2009 11:34**
Cal Date: **09/04/2009 11:07**
Run Date: **09/04/2009 11:34**
File ID: **SC090904002.036**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	6.99		0.400	0.200

2.1.2.2 QC Summary Data

METHOD BLANK SUMMARY

Login Number: L09080720
 Blank File ID: SC090904002.009
 Prep Date: 09/04/09 11:09
 Analyzed Date: 09/04/09 11:09
 Analyst: DIH

Work Group: WG311429
 Blank Sample ID: WG311429-01
 Instrument ID: SMARTCHEM
 Method: 350.1

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
MW37D-147.0	L09080720-01	SC090904002.029	09/04/09 11:27	01
MW37D-137.0	L09080720-02	SC090904002.032	09/04/09 11:30	01
MW37D-117.0	L09080720-03	SC090904002.033	09/04/09 11:31	01
MW37D-77.0	L09080720-04	SC090904002.034	09/04/09 11:32	DL01
MW37D-87.0	L09080720-05	SC090904002.035	09/04/09 11:33	DL01
MW37D-97.0	L09080720-06	SC090904002.036	09/04/09 11:34	DL01
DUP	WG311429-05	SC090904002.037	09/04/09 11:34	DL01
LCS	WG311429-02	SC090904002.064	09/04/09 11:59	01

METHOD BLANK REPORT

Login Number: L09080720 Prep Date: 09/04/09 11:09 Sample ID: WG311429-01
Instrument ID: SMARTCHEM Run Date: 09/04/09 11:09 Prep Method: 350.1
File ID: SC090904002.009 Analyst: DIH Method: 350.1
Workgroup (AAB#): WG311429 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: SMARTC - 04-SEP-09

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Nitrogen, Ammonia	0.0500	0.100	0.100	1	ND

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1483049

04-SEP-2009 14:56



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09080720 Run Date: 09/04/2009 Sample ID: WG311429-02
Instrument ID: SMARTCHEM Run Time: 11:59 Prep Method: 350.1
File ID: SC090904002.064 Analyst: DIH Method: 350.1
Workgroup (AAB#): WG311429 Matrix: Water Units: mg/L
QC Key: DOWBOA2006 Lot#: STD33211 Cal ID: SMARTC - 04-SEP-09

Analytes	Expected	Found	% Rec	LCS Limits	Q
Nitrogen, Ammonia	2.00	1.97	98.5	90 - 110	

LCS - Modified 03/06/2008
PDF File ID: 1483050
Report generated: 09/04/2009 14:56



2.1.3 Total Dissolved Solids Data

2.1.3.1 Summary Data

LABORATORY REPORT

L09080720

09/04/09 16:53

Submitted By

Microbac Laboratories Inc.
158 Starlite Drive
Marietta, OH 45750
(740) 373-4071

For

Account Name: CH2MHILL, Inc
CH2MHILL
15010 Conference Center Drive Suite 200
Chantilly, VA 20151
Attention: Michael J. Zamboni

Project Number: 2736.006
Project: MI-Dow Ludington
Site: LUDINGTON, MI

P.O. Number: 935272

Sample Analysis Summary

Client ID	Lab ID	Method	Dilution	Date Received
MW37D-147.0	L09080720-01	160.1	1	31-AUG-09
MW37D-137.0	L09080720-02	160.1	1	31-AUG-09
MW37D-117.0	L09080720-03	160.1	1	31-AUG-09
MW37D-77.0	L09080720-04	160.1	1	31-AUG-09
MW37D-87.0	L09080720-05	160.1	1	31-AUG-09
MW37D-97.0	L09080720-06	160.1	1	31-AUG-09



Report Number: **L09080720**Report Date : **September 4, 2009**

Sample Number: **L09080720-01**
Client ID: **MW37D-147.0**
Matrix: **Water**
Workgroup Number: **WG310949**
Collect Date: **08/28/2009 13:58**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/31/2009 14:00**
Cal Date:
Run Date: **08/31/2009 14:00**
File ID: **EN.0908311400-11**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		338		20.0	10.0

Report Number: **L09080720**Report Date : **September 4, 2009**

Sample Number: **L09080720-02**
Client ID: **MW37D-137.0**
Matrix: **Water**
Workgroup Number: **WG310949**
Collect Date: **08/28/2009 13:11**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/31/2009 14:00**
Cal Date:
Run Date: **08/31/2009 14:00**
File ID: **EN.0908311400-16**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		268		20.0	10.0

Report Number: **L09080720**Report Date : **September 4, 2009**

Sample Number: **L09080720-03**
Client ID: **MW37D-117.0**
Matrix: **Water**
Workgroup Number: **WG310949**
Collect Date: **08/28/2009 11:42**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/31/2009 14:00**
Cal Date:
Run Date: **08/31/2009 14:00**
File ID: **EN.0908311400-19**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		252		20.0	10.0

Report Number: **L09080720**Report Date : **September 4, 2009**

Sample Number: **L09080720-04**
Client ID: **MW37D-77.0**
Matrix: **Water**
Workgroup Number: **WG310949**
Collect Date: **08/28/2009 08:45**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/31/2009 14:00**
Cal Date:
Run Date: **08/31/2009 14:00**
File ID: **EN.0908311400-14**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		504		20.0	10.0

Report Number: **L09080720**Report Date : **September 4, 2009**

Sample Number: **L09080720-05**
Client ID: **MW37D-87.0**
Matrix: **Water**
Workgroup Number: **WG310949**
Collect Date: **08/28/2009 09:21**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/31/2009 14:00**
Cal Date:
Run Date: **08/31/2009 14:00**
File ID: **EN.0908311400-10**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		332		20.0	10.0

Report Number: **L09080720**Report Date : **September 4, 2009**

Sample Number: **L09080720-06**
Client ID: **MW37D-97.0**
Matrix: **Water**
Workgroup Number: **WG310949**
Collect Date: **08/28/2009 10:03**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/31/2009 14:00**
Cal Date:
Run Date: **08/31/2009 14:00**
File ID: **EN.0908311400-15**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		328		20.0	10.0

2.1.3.2 QC Summary Data

METHOD BLANK SUMMARY

Login Number: L09080720
 Blank File ID: EN.0908311400-01
 Prep Date: 08/31/09 14:00
 Analyzed Date: 08/31/09 14:00
 Analyst: HJR

Work Group: WG310949
 Blank Sample ID: WG310949-01
 Instrument ID: OVEN
 Method: 160.1

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG310949-02	EN.0908311400-02	08/31/09 14:00	
LCS2	WG310949-03	EN.0908311400-03	08/31/09 14:00	
MW37D-87.0	L09080720-05	EN.0908311400-10	08/31/09 14:00	
MW37D-147.0	L09080720-01	EN.0908311400-11	08/31/09 14:00	
MW37D-77.0	L09080720-04	EN.0908311400-14	08/31/09 14:00	
MW37D-97.0	L09080720-06	EN.0908311400-15	08/31/09 14:00	
MW37D-137.0	L09080720-02	EN.0908311400-16	08/31/09 14:00	
MW37D-117.0	L09080720-03	EN.0908311400-19	08/31/09 14:00	
DUP	WG310949-05	EN.0908311400-24	08/31/09 14:00	

Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L09080720 Prep Date: 08/31/09 14:00 Sample ID: WG310949-01
Instrument ID: OVEN Run Date: 08/31/09 14:00 Prep Method: 160.1
File ID: EN.0908311400-01 Analyst: HJR Method: 160.1
Workgroup (AAB#): WG310949 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: OVEN -

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Total Dissolved Solids	5.00	10.0	10.0	1	ND

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1482622

04-SEP-2009 11:27



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09080720 Analyst: HJR Prep Method: 160.1
Instrument ID: OVEN Matrix: Water Method: 160.1
Workgroup (AAB#): WG310949 Units: mg/L
QC Key: DOWBOA2006 Lot #: STD32441
Sample ID: WG310949-02 LCS File ID: EN.0908311400-02 Run Date: 08/31/2009 14:00
Sample ID: WG310949-03 LCS2 File ID: EN.0908311400-03 Run Date: 08/31/2009 14:00

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Total Dissolved Solids	500	494	98.8	500	506	101	2.40	80 - 120	25	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 1482623
Report generated: 09/04/2009 11:27



3.0 Attachments

Microbac Laboratories Inc.
Analyst Listing
September 4, 2009

ADC - ANTHONY D. CANTER	AJF - AMANDA J. FICKIESEN	AJM - ANTHONY J. MOSSBURG
ALB - ANNIE L. BROWN	AML - ANTHONY M. LONG	BLG - BRENDA L. GREENWALT
BRG - BRENDA R. GREGORY	CAA - CASSIE A. AUGENSTEIN	CAF - CHERYL A. FLOWERS
CAH - CHARLES A. HALL	CEB - CHAD E. BARNES	CLC - CHRYS L. CRAWFORD
CLW - CHARISSA L. WINTERS	CPD - CHAD P. DAVIS	CSH - CHRIS S. HILL
DDE - DEBRA D. ELLIOTT	DEL - DON E. LIGHTFRITZ	DEV - DAVID E. VANDENBERG
DGB - DOUGLAS G. BUTCHER	DIH - DEANNA I. HESSON	DLB - DAVID L. BUMGARNER
DLP - DOROTHY L. PAYNE	DLR - DIANNA L. RAUCH	DR - DEANNA ROBERTS
ECL - ERIC C. LAWSON	EDA - ERIN D. AGEE	ERP - ERIN R. PORTER
FJB - FRANCES J. BOLDEN	HAV - HEMA VILASAGAR	HJR - HOLLY J. REED
JBK - JEREMY B. KINNEY	JDH - JUSTIN D. HESSON	JKT - JANE K. THOMPSON
JWR - JOHN W. RICHARDS	JWS - JACK W. SHEAVES	JYH - JI Y. HU
KEB - KATHRYN E. BARNES	KHR - KIM H. RHODES	KRA - KATHY R. ALBERTSON
LKN - LINDA K. NEDEFF	LSB - LESLIE S. BUCINA	MDA - MIKE D. ALBERTSON
MDC - MICHAEL D. COCHRAN	MES - MARY E. SCHILLING	MMB - MAREN M. BEERY
MRT - MICHELLE R. TAYLOR	MSW - MATT S. WILSON	NPM - NATHANIEL P. MILLER
PDM - PIERCE D. MORRIS	RAH - ROY A. HALSTEAD	RB - ROBERT BUCHANAN
REK - ROBERT E. KYER	RLK - ROBIN L. KLINGER	RWC - RODNEY W. CAMPBELL
SDH - SHANA D. HINYARD	SLM - STEPHANIE L. MOSSBURG	SLP - SHERI L. PFALZGRAF
TIP - TAE I. PARRISH	TMB - TIFFANY M. BAILEY	TMM - TAMMY M. MORRIS
VC - VICKI COLLIER	WTD - WADE T. DELONG	

September 04, 2009

Qualkey: STD

Qualifier	Description
*	Surrogate or spike compound out of range
+	Correlation coefficient for the MSA is less than 0.995
<	Result is less than the associated numerical value.
>	Result is greater than the associated numerical value.
A	See the report narrative
B	Analyte present in method blank
B1	Target analyte detected in method blank at or above the method reporting limit
B3	Target analyte detected in calibration blank at or above the method reporting limit
C	Confirmed by GC/MS
CG	Confluent growth
DL	Surrogate or spike compound was diluted out
E	Estimated concentration due to sample matrix interference
EDL	Elevated sample reporting limits, presence of non-target analytes
EMPC	Estimated Maximum Possible Concentration
F, S	Estimated result below quantitation limit; method of standard additions(MSA)
FL	Free Liquid
H1	Sample analysis performed past holding time.
I	Semiquantitative result (out of instrument calibration range)
J	The analyte was positively identified, but the quantitation was below the RL
J,B	Analyte detected in both the method blank and sample above the MDL.
J,P	Estimate; columns don't agree to within 40%
J,S	Estimated concentration; analyzed by method of standard addition (MSA)
L	Sample reporting limits elevated due to matrix interference
L1	The associated blank spike (LCS) recovery was above the laboratory acceptance limits.
L2	The associated blank spike (LCS) recovery was below the laboratory acceptance limits.
M	Matrix effect; the concentration is an estimate due to matrix effect.
N	Tentatively identified compound(TIC)
NA	Not applicable
ND	Not detected at or above the reporting limit (RL).
ND, L	Not detected; sample reporting limit (RL) elevated due to interference
ND, S	Not detected; analyzed by method of standard addition (MSA)
NF	Not found by library search
NFL	No free liquid
NI	Non-ignitable
NR	Analyte is not required to be analyzed
NS	Not spiked
P	Concentrations >40% difference between the two GC columns
Q	One or more quality control criteria fail. See narrative.
QNS	Quantity of sample not sufficient to perform analysis
RA	Reanalysis confirms reported results
RE	Reanalysis confirms sample matrix interference
S	Analyzed by method of standard addition (MSA)
SMI	Sample matrix interference on surrogate
SP	Reported results are for spike compounds only
TIC	Library Search Compound
TNTC	Too numerous to count
U	Undetected; the concentration is below the reported MDL.
UJ	Undetected; the MDL and RL are estimated due to quality control discrepancies.
W	Post-digestion spike for furnace AA out of control limits
X	Exceeds regulatory limit
X, S	Exceeds regulatory limit; method of standard additions (MSA)
Z	Cannot be resolved from isomer - see below

*****Special Notes for Organic Analytes**

1. Acrolein and acrylonitrile by method 624 are semi-quantitative screens only.
2. 1,2-Diphenylhydrazine is unstable and is reported as azobenzene.
3. N-nitrosodiphenylamine cannot be separated from diphenylamine.
4. 3-Methylphenol and 4-Methylphenol are unresolvable compounds.
5. m-Xylene and p-Xylene are unresolvable compounds.
6. The reporting limits for Appendix II/IX compounds by method 8270 are based on EPA estimated PQLs referenced in 40 CFR Part 264, Appendix IX. They are not always achievable for every compound and are matrix dependent.



COC No. A 14236

158 Starlite Drive
Marietta, OH 45750

Microbac

Phone: 740-373-4071
Fax: 740-373-4835

CHAIN-OF-CUSTODY RECORD

Company Name: CH2MHILL		Contact Phone #: 703-376-5111		Program ☐ CWA ☐ RCRA ☐ DOD ☐ AFCEE ☐ Other	
Project Contact: Mike Zamboni		Location: LUONINGTON MI		ADDITIONAL REQUIREMENTS	
Turn Around Requirements: Standard					
Project ID: DOW LUONINGTON					
Sampler (print): Lauren Hunt		Signature: <i>Lauren Hunt</i>			
Sample I.D. No.	Comp	Grab	Date	Time	Matrix*
MW37D-147.0	X	X	8-28-09	1358	W
MW37D-137.0	X	X		1311	W
MW37D-117.0	X	X		1142	W
MW37D-72.0	X	X		0845	W
MW37D-87.0	X	X		0921	W
MW37D-97.0	X	X		1003	W
NUMBER OF CONTAINERS					
Hold					
TDS & CHLORIDE					
Dissolved Ammonia					
TOTAL # (LAB USE)					
Date					
Time					
Received by: (Signature)					
Remarks:					
e					
Balanced hr 221000001416					
Microbac OVD					
Received: 08/29/2009 10:31					
By: DON LIGHTFRITZ					
Don E Lightfritz					
Relinquished by: (Signature)					
Date					
Time					
Relinquished by: (Signature)					
Date					
Time					

*Water (W), Soil (S), Solid Waste (SD), Unknown (X)



1000001416

COOLER INSPECTION



Received: 08/29/2009 10:31
Delivery Method: UPS
Opened By: Don Lightfritz
Comments:

Login(s): L09080720

Cooler(s)

Cooler #	Temp Gun	Temp	Tracking #	COC #	Comments
0010299	H	3.0	J2029837669	COC14236	

1	Yes	Were shipping coolers sealed?
2	Yes	Were custody seals intact?
3	Yes	Were cooler temperatures in range of 0-6?
4	Yes	Was ice present?
5	Yes	Were COC's received/information complete/signed and dated?
6	Yes	Were sample containers and labels intact and match COC?
7	Yes	Were the correct containers and volumes received?
8	Yes	Were correct preservatives used? (water only)
9	Yes	Were pH ranges acceptable? (voa's excluded)
10	NA	Were VOA samples free of headspace (<6mm)?
11	Yes	Were samples received within EPA hold times?

Look closer. Go further. Do more.

Microbac - Ohio Valley Division
158 Starlite Drive
Marietta, OH 45750
Tel: (740)373-4071 Fax: (740)373-4835

Internal Chain of Custody Report

Login: L09080720

Account: 2736

Project: 2736.006

Samples: 6

Due Date: 14-SEP-2009

Samplenum **Container ID** **Products**
L09080720-01 610724 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	31-AUG-2009 14:44	JKT	
2	ANALYZ	W1	WET	31-AUG-2009 15:16	HJR	JKT
3	STORE	WET	A2	01-SEP-2009 14:40	RLK	JBK

Samplenum **Container ID** **Products**
L09080720-01 610725 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	31-AUG-2009 14:44	JKT	
2	ANALYZ	W1	WET	03-SEP-2009 08:08	DLP	JKT
3	STORE	WET	A2	03-SEP-2009 16:18	RLK	DLP

Samplenum **Container ID** **Products**
L09080720-02 610726 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	31-AUG-2009 14:44	JKT	
2	ANALYZ	W1	WET	31-AUG-2009 15:16	HJR	JKT
3	STORE	WET	A2	01-SEP-2009 14:40	RLK	JBK

Samplenum **Container ID** **Products**
L09080720-02 610727 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	31-AUG-2009 14:44	JKT	
2	ANALYZ	W1	WET	03-SEP-2009 08:08	DLP	JKT
3	STORE	WET	A2	03-SEP-2009 16:18	RLK	DLP

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09080720

Account: 2736

Project: 2736.006

Samples: 6

Due Date: 14-SEP-2009

Samplenum **Container ID** **Products**
L09080720-03 610728 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	31-AUG-2009 14:44	JKT	
2	ANALYZ	W1	WET	31-AUG-2009 15:16	HJR	JKT
3	STORE	WET	A2	01-SEP-2009 14:40	RLK	JBK

Samplenum **Container ID** **Products**
L09080720-03 610729 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	31-AUG-2009 14:44	JKT	
2	ANALYZ	W1	WET	03-SEP-2009 08:08	DLP	JKT
3	STORE	WET	A2	03-SEP-2009 16:18	RLK	DLP

Samplenum **Container ID** **Products**
L09080720-04 610730 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	31-AUG-2009 14:44	JKT	
2	ANALYZ	W1	WET	31-AUG-2009 15:16	HJR	JKT
3	STORE	WET	A2	01-SEP-2009 14:40	RLK	JBK

Samplenum **Container ID** **Products**
L09080720-04 610731 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	31-AUG-2009 14:44	JKT	
2	ANALYZ	W1	WET	03-SEP-2009 08:08	DLP	JKT
3	STORE	WET	A2	03-SEP-2009 16:18	RLK	DLP

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09080720

Account: 2736

Project: 2736.006

Samples: 6

Due Date: 14-SEP-2009

Samplenum **Container ID** **Products**
L09080720-05 610732 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	31-AUG-2009 14:44	JKT	
2	ANALYZ	W1	WET	31-AUG-2009 15:15	HJR	JKT
3	STORE	WET	A2	01-SEP-2009 14:40	RLK	JBK

Samplenum **Container ID** **Products**
L09080720-05 610733 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	31-AUG-2009 14:44	JKT	
2	ANALYZ	W1	WET	03-SEP-2009 08:08	DLP	JKT
3	STORE	WET	A2	03-SEP-2009 16:18	RLK	DLP

Samplenum **Container ID** **Products**
L09080720-06 610734 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	31-AUG-2009 14:44	JKT	
2	ANALYZ	W1	WET	31-AUG-2009 15:15	HJR	JKT
3	STORE	WET	A2	01-SEP-2009 14:40	RLK	JBK

Samplenum **Container ID** **Products**
L09080720-06 610735 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	31-AUG-2009 14:44	JKT	
2	ANALYZ	W1	WET	03-SEP-2009 08:08	DLP	JKT
3	STORE	WET	A2	03-SEP-2009 16:18	RLK	DLP

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login





158 Starlite Drive, Marietta, OH 45750 • T:740-373-4071 • F:740-373-4835 • <http://www.microbac.com>

Laboratory Report Number: L09080726

Please find enclosed the analytical results for the samples you submitted to Microbac Laboratories.

Review and compilation of your report was completed by Microbac's Sales and Service Team. If you have questions, comments or require further assistance regarding this report, please contact your team member noted in the reviewed box below at 800-373-4071. Team member e-mail addresses also appear here for your convenience.

Kathy Albertson	<i>Team Chemist/Data Specialist</i>	kalbertson@microbac.com
Stephanie Mossburg	<i>Team Chemist/Data Specialist</i>	smossburg@microbac.com
Tony Long	<i>Team Chemist/Data Specialist</i>	tlong@microbac.com
Amanda Fickiesen	<i>Client Services Specialist</i>	afickiesen@microbac.com
Annie Brown	<i>Client Services Specialist</i>	abrown@microbac.com

This report was reviewed on September 10, 2009.

Kathy Albertson - Team Chemist/Data Specialist

I certify that all test results meet all of the requirements of the accrediting authority listed below. All results for soil samples are reported on a 'dry-weight' basis unless specified otherwise. Analytical results for water and wastes are reported on a 'as received' basis unless specified otherwise. A statement of uncertainty for each analysis is available upon request. This laboratory report shall not be reproduced, except in full, without the written approval of Microbac Laboratories.

The reported results are related only to the samples analyzed as received.

Client: Michael J. Zamboni, CH2MHILL, Chantilly, VA, 20151

This report was certified on September 10, 2009.

David Vandenberg - Managing Director

State of origin: Michigan

Accrediting authority: N/A ID:N/A

QAPP: Microbac OVD

This report contains a total of 54 pages.

Look closer. Go further. Do more.



The Microbac logo consists of the word "Microbac" in a white serif font, centered within a dark teal rectangular box.

Microbac Laboratories, Inc.
Ohio Valley Division
158 Starlite Drive
Marietta, OH 45750

Phone: 800.373.4071
Fax: 740.373.4835

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LOOK CLOSER, GO FURTHER, DO MORE.

Microbac REPORT L09080726
PREPARED FOR CH2MHILL, Inc
WORK ID:

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1.0 Introduction

Microbac Laboratories Inc.
REPORT NARRATIVE

Microbac Login No: L09080726

CHAIN OF CUSTODY: The chain of custody number was 14237

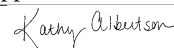
SHIPMENT CONDITIONS: The chain of custody forms were received sealed in a cooler. The cooler temperature was 2 degrees C.

SAMPLE MANAGEMENT: All samples received were intact.

L09080726-01	MW16D-117.0
L09080726-02	MW16D-147.0
L09080726-03	MW16D-134.0
L09080726-04	MW16D-117.0FD
L09080726-05	MW16D-125.5
L09080726-06	MW37D-137.0

I certify that this data package is in compliance with the terms and conditions agreed to by the client and Microbac Laboratories Inc., both technically and for completeness, except for the conditions noted above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or designated person, as verified by the following signature.

Approved: 01-SEP-09



2.0 Data Package

2.1 General Chemistry Data

2.1.1 Chloride Data

2.1.1.1 Summary Data

LABORATORY REPORT

L09080726

09/10/09 15:02

Submitted By

Microbac Laboratories Inc.
158 Starlite Drive
Marietta, OH 45750
(740) 373-4071

For

Account Name: CH2MHILL, Inc
CH2MHILL
15010 Conference Center Drive Suite 200
Chantilly, VA 20151
Attention: Michael J. Zamboni

Project Number: 2736.006
Project: MI-Dow Ludington
Site: LUDINGTON, MI

P.O. Number: 935272

Sample Analysis Summary

Client ID	Lab ID	Method	Dilution	Date Received
MW16D-117.0	L09080726-01	325.2	1	29-AUG-09
MW16D-147.0	L09080726-02	325.2	1	29-AUG-09
MW16D-134.0	L09080726-03	325.2	1	29-AUG-09
MW16D-117.0FD	L09080726-04	325.2	1	29-AUG-09
MW16D-125.5	L09080726-05	325.2	1	29-AUG-09
MW37D-137.0	L09080726-06	325.2	1	29-AUG-09



Report Number: **L09080726**Report Date : **September 10, 2009**

Sample Number: **L09080726-01**
Client ID: **MW16D-117.0**
Matrix: **Water**
Workgroup Number: **WG311103**
Collect Date: **08/27/2009 08:50**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/01/2009 14:38**
Cal Date: **09/01/2009 13:58**
Run Date: **09/01/2009 14:38**
File ID: **SC090901008.075**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6		ND	2.00	1.00

ND Not detected at or above the reporting limit (RL).

Report Number: **L09080726**Report Date : **September 10, 2009**

Sample Number: **L09080726-02**
Client ID: **MW16D-147.0**
Matrix: **Water**
Workgroup Number: **WG311103**
Collect Date: **08/27/2009 13:22**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/01/2009 14:39**
Cal Date: **09/01/2009 13:58**
Run Date: **09/01/2009 14:39**
File ID: **SC090901008.076**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6		ND	2.00	1.00

ND Not detected at or above the reporting limit (RL).

Report Number: **L09080726**Report Date : **September 10, 2009**

Sample Number: **L09080726-03**
Client ID: **MW16D-134.0**
Matrix: **Water**
Workgroup Number: **WG311103**
Collect Date: **08/27/2009 11:34**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/01/2009 14:39**
Cal Date: **09/01/2009 13:58**
Run Date: **09/01/2009 14:39**
File ID: **SC090901008.077**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6		ND	2.00	1.00

ND Not detected at or above the reporting limit (RL).

Report Number: **L09080726**Report Date : **September 10, 2009**

Sample Number: **L09080726-04**
Client ID: **MW16D-117.0FD**
Matrix: **Water**
Workgroup Number: **WG311103**
Collect Date: **08/27/2009 08:58**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/01/2009 14:40**
Cal Date: **09/01/2009 13:58**
Run Date: **09/01/2009 14:40**
File ID: **SC090901008.078**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	6.65		2.00	1.00

Report Number: **L09080726**Report Date : **September 10, 2009**

Sample Number: **L09080726-05**
Client ID: **MW16D-125.5**
Matrix: **Water**
Workgroup Number: **WG311103**
Collect Date: **08/27/2009 10:50**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/01/2009 14:40**
Cal Date: **09/01/2009 13:58**
Run Date: **09/01/2009 14:40**
File ID: **SC090901008.079**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6		ND	2.00	1.00

ND Not detected at or above the reporting limit (RL).

Report Number: **L09080726**Report Date : **September 10, 2009**

Sample Number: **L09080726-06**
Client ID: **MW37D-137.0**
Matrix: **Water**
Workgroup Number: **WG311103**
Collect Date: **08/28/2009 12:25**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/01/2009 14:41**
Cal Date: **09/01/2009 13:58**
Run Date: **09/01/2009 14:41**
File ID: **SC090901008.080**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6		ND	2.00	1.00

ND Not detected at or above the reporting limit (RL).

2.1.1.2 QC Summary Data

METHOD BLANK SUMMARY

Login Number: L09080726
 Blank File ID: SC090901008.038
 Prep Date: 09/01/09 14:16
 Analyzed Date: 09/01/09 14:16
 Analyst: JBK

Work Group: WG311103
 Blank Sample ID: WG311103-01
 Instrument ID: SMARTCHEM
 Method: 325.2

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG311103-02	SC090901008.039	09/01/09 14:16	01
LCS2	WG311103-03	SC090901008.040	09/01/09 14:17	01
DUP	WG311103-05	SC090901008.057	09/01/09 14:27	01
MW16D-117.0	L09080726-01	SC090901008.075	09/01/09 14:38	01
MW16D-147.0	L09080726-02	SC090901008.076	09/01/09 14:39	01
MW16D-134.0	L09080726-03	SC090901008.077	09/01/09 14:39	01
MW16D-117.0FD	L09080726-04	SC090901008.078	09/01/09 14:40	01
MW16D-125.5	L09080726-05	SC090901008.079	09/01/09 14:40	01
MW37D-137.0	L09080726-06	SC090901008.080	09/01/09 14:41	01



Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L09080726 Prep Date: 09/01/09 14:16 Sample ID: WG311103-01
Instrument ID: SMARTCHEM Run Date: 09/01/09 14:16 Prep Method: 325.2
File ID: SC090901008.038 Analyst: JBK Method: 325.2
Workgroup (AAB#): WG311103 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: SMARTC - 01-SEP-09

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Chloride	1.00	2.00	2.00	1	ND

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1479954

02-SEP-2009 09:19



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09080726 Analyst: JBK Prep Method: 325.2
Instrument ID: SMARTCHEM Matrix: Water Method: 325.2
Workgroup (AAB#): WG311103 Units: mg/L
QC Key: DOWBOA2006 Lot #: STD34512
Sample ID: WG311103-02 LCS File ID: SC090901008.039 Run Date: 09/01/2009 14:16
Sample ID: WG311103-03 LCS2 File ID: SC090901008.040 Run Date: 09/01/2009 14:17

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Chloride	50.0	52.0	104	50.0	50.6	101	2.75	90 - 110	10	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 1479955
Report generated: 09/02/2009 09:19



2.1.2 Ammonia Data

2.1.2.1 Summary Data

LABORATORY REPORT

L09080726

09/10/09 15:02

Submitted By

Microbac Laboratories Inc.
158 Starlite Drive
Marietta, OH 45750
(740) 373-4071

For

Account Name: CH2MHILL, Inc
CH2MHILL
15010 Conference Center Drive Suite 200
Chantilly, VA 20151
Attention: Michael J. Zamboni

Project Number: 2736.006
Project: MI-Dow Ludington
Site: LUDINGTON, MI

P.O. Number: 935272

Sample Analysis Summary

Client ID	Lab ID	Method	Dilution	Date Received
MW16D-117.0	L09080726-01	350.1	1	29-AUG-09
MW16D-147.0	L09080726-02	350.1	1	29-AUG-09
MW16D-134.0	L09080726-03	350.1	1	29-AUG-09
MW16D-117.0FD	L09080726-04	350.1	1	29-AUG-09
MW16D-125.5	L09080726-05	350.1	2	29-AUG-09
MW37D-137.0	L09080726-06	350.1	1	29-AUG-09



Report Number: **L09080726**Report Date : **September 10, 2009**

Sample Number: **L09080726-01**
Client ID: **MW16D-117.0**
Matrix: **Water**
Workgroup Number: **WG311726**
Collect Date: **08/27/2009 08:50**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/09/2009 16:50**
Cal Date: **09/09/2009 16:38**
Run Date: **09/09/2009 16:50**
File ID: **SC090909007.020**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	1.55		0.100	0.0500

Report Number: **L09080726**Report Date : **September 10, 2009**

Sample Number: **L09080726-02**
Client ID: **MW16D-147.0**
Matrix: **Water**
Workgroup Number: **WG311726**
Collect Date: **08/27/2009 13:22**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/09/2009 16:50**
Cal Date: **09/09/2009 16:38**
Run Date: **09/09/2009 16:50**
File ID: **SC090909007.021**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7		ND	0.100	0.0500

ND Not detected at or above the reporting limit (RL).

Report Number: **L09080726**Report Date : **September 10, 2009**

Sample Number: **L09080726-03**
Client ID: **MW16D-134.0**
Matrix: **Water**
Workgroup Number: **WG311726**
Collect Date: **08/27/2009 11:34**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/09/2009 16:52**
Cal Date: **09/09/2009 16:38**
Run Date: **09/09/2009 16:52**
File ID: **SC090909007.022**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	1.42		0.100	0.0500

Report Number: **L09080726**Report Date : **September 10, 2009**

Sample Number: **L09080726-04**
Client ID: **MW16D-117.0FD**
Matrix: **Water**
Workgroup Number: **WG311726**
Collect Date: **08/27/2009 08:58**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/09/2009 16:52**
Cal Date: **09/09/2009 16:38**
Run Date: **09/09/2009 16:52**
File ID: **SC090909007.023**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	1.38		0.100	0.0500

Report Number: **L09080726**Report Date : **September 10, 2009**

Sample Number: **L09080726-05**
Client ID: **MW16D-125.5**
Matrix: **Water**
Workgroup Number: **WG311726**
Collect Date: **08/27/2009 10:50**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **2**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/09/2009 16:54**
Cal Date: **09/09/2009 16:38**
Run Date: **09/09/2009 16:54**
File ID: **SC090909007.024**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	3.25		0.200	0.100

Report Number: **L09080726**Report Date : **September 10, 2009**

Sample Number: **L09080726-06**
Client ID: **MW37D-137.0**
Matrix: **Water**
Workgroup Number: **WG311726**
Collect Date: **08/28/2009 12:25**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/09/2009 16:54**
Cal Date: **09/09/2009 16:38**
Run Date: **09/09/2009 16:54**
File ID: **SC090909007.025**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	0.217		0.100	0.0500

2.1.2.2 QC Summary Data

METHOD BLANK SUMMARY

Login Number: L09080726
 Blank File ID: SC090909007.009
 Prep Date: 09/09/09 16:39
 Analyzed Date: 09/09/09 16:39
 Analyst: JBK

Work Group: WG311726
 Blank Sample ID: WG311726-01
 Instrument ID: SMARTCHEM
 Method: 350.1

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG311726-02	SC090909007.010	09/09/09 16:41	01
LCS2	WG311726-03	SC090909007.011	09/09/09 16:41	01
MW16D-117.0	L09080726-01	SC090909007.020	09/09/09 16:50	01
MW16D-147.0	L09080726-02	SC090909007.021	09/09/09 16:50	01
MW16D-134.0	L09080726-03	SC090909007.022	09/09/09 16:52	01
MW16D-117.0FD	L09080726-04	SC090909007.023	09/09/09 16:52	01
MW16D-125.5	L09080726-05	SC090909007.024	09/09/09 16:54	DL01
MW37D-137.0	L09080726-06	SC090909007.025	09/09/09 16:54	01
DUP	WG311726-05	SC090909007.035	09/09/09 17:03	DL01

Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L09080726 Prep Date: 09/09/09 16:39 Sample ID: WG311726-01
Instrument ID: SMARTCHEM Run Date: 09/09/09 16:39 Prep Method: 350.1
File ID: SC090909007.009 Analyst: JBK Method: 350.1
Workgroup (AAB#): WG311726 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: SMARTC - 09-SEP-09

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Nitrogen, Ammonia	0.0500	0.100	0.100	1	ND

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1486511

10-SEP-2009 13:26



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09080726 Analyst: JBK Prep Method: 350.1
 Instrument ID: SMARTCHEM Matrix: Water Method: 350.1
 Workgroup (AAB#): WG311726 Units: mg/L
 QC Key: DOWBOA2006 Lot #: STD33211
 Sample ID: WG311726-02 LCS File ID: SC090909007.010 Run Date: 09/09/2009 16:41
 Sample ID: WG311726-03 LCS2 File ID: SC090909007.011 Run Date: 09/09/2009 16:41

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Nitrogen, Ammonia	2.00	1.85	92.6	2.00	1.82	90.8	1.97	90 - 110	25	

LCS_LCS2 - Modified 03/06/2008
 PDF File ID: 1486512
 Report generated: 09/10/2009 13:26



2.1.3 Total Dissolved Solids Data

2.1.3.1 Summary Data

LABORATORY REPORT

L09080726

09/10/09 15:02

Submitted By

Microbac Laboratories Inc.
158 Starlite Drive
Marietta, OH 45750
(740) 373-4071

For

Account Name: CH2MHILL, Inc
CH2MHILL
15010 Conference Center Drive Suite 200
Chantilly, VA 20151
Attention: Michael J. Zamboni

Project Number: 2736.006
Project: MI-Dow Ludington
Site: LUDINGTON, MI

P.O. Number: 935272

Sample Analysis Summary

Client ID	Lab ID	Method	Dilution	Date Received
MW16D-117.0	L09080726-01	160.1	1	29-AUG-09
MW16D-147.0	L09080726-02	160.1	1	29-AUG-09
MW16D-134.0	L09080726-03	160.1	1	29-AUG-09
MW16D-117.0FD	L09080726-04	160.1	1	29-AUG-09
MW16D-125.5	L09080726-05	160.1	1	29-AUG-09
MW37D-137.0	L09080726-06	160.1	1	29-AUG-09



Report Number: **L09080726**Report Date : **September 10, 2009**

Sample Number: **L09080726-01**
Client ID: **MW16D-117.0**
Matrix: **Water**
Workgroup Number: **WG310949**
Collect Date: **08/27/2009 08:50**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/31/2009 14:00**
Cal Date:
Run Date: **08/31/2009 14:00**
File ID: **EN.0908311400-13**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		268		20.0	10.0

Report Number: **L09080726**Report Date : **September 10, 2009**

Sample Number: **L09080726-02**
Client ID: **MW16D-147.0**
Matrix: **Water**
Workgroup Number: **WG310949**
Collect Date: **08/27/2009 13:22**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/31/2009 14:00**
Cal Date:
Run Date: **08/31/2009 14:00**
File ID: **EN.0908311400-17**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		264		20.0	10.0

Report Number: **L09080726**Report Date : **September 10, 2009**

Sample Number: **L09080726-03**
Client ID: **MW16D-134.0**
Matrix: **Water**
Workgroup Number: **WG310949**
Collect Date: **08/27/2009 11:34**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/31/2009 14:00**
Cal Date:
Run Date: **08/31/2009 14:00**
File ID: **EN.0908311400-20**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		288		20.0	10.0

Report Number: **L09080726**Report Date : **September 10, 2009**

Sample Number: **L09080726-04**
Client ID: **MW16D-117.0FD**
Matrix: **Water**
Workgroup Number: **WG310949**
Collect Date: **08/27/2009 08:58**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/31/2009 14:00**
Cal Date:
Run Date: **08/31/2009 14:00**
File ID: **EN.0908311400-21**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		274		20.0	10.0

Report Number: **L09080726**Report Date : **September 10, 2009**

Sample Number: **L09080726-05**
Client ID: **MW16D-125.5**
Matrix: **Water**
Workgroup Number: **WG310949**
Collect Date: **08/27/2009 10:50**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/31/2009 14:00**
Cal Date:
Run Date: **08/31/2009 14:00**
File ID: **EN.0908311400-12**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		326		20.0	10.0

Report Number: **L09080726**Report Date : **September 10, 2009**

Sample Number: **L09080726-06**
Client ID: **MW37D-137.0**
Matrix: **Water**
Workgroup Number: **WG310949**
Collect Date: **08/28/2009 12:25**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/31/2009 14:00**
Cal Date:
Run Date: **08/31/2009 14:00**
File ID: **EN.0908311400-18**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		264		20.0	10.0

2.1.3.2 QC Summary Data

METHOD BLANK SUMMARY

Login Number: <u>L09080726</u>	Work Group: <u>WG310949</u>
Blank File ID: <u>EN.0908311400-01</u>	Blank Sample ID: <u>WG310949-01</u>
Prep Date: <u>08/31/09 14:00</u>	Instrument ID: <u>OVEN</u>
Analyzed Date: <u>08/31/09 14:00</u>	Method: <u>160.1</u>
Analyst: <u>HJR</u>	

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG310949-02	EN.0908311400-02	08/31/09 14:00	
LCS2	WG310949-03	EN.0908311400-03	08/31/09 14:00	
MW16D-125.5	L09080726-05	EN.0908311400-12	08/31/09 14:00	
MW16D-117.0	L09080726-01	EN.0908311400-13	08/31/09 14:00	
MW16D-147.0	L09080726-02	EN.0908311400-17	08/31/09 14:00	
MW37D-137.0	L09080726-06	EN.0908311400-18	08/31/09 14:00	
MW16D-134.0	L09080726-03	EN.0908311400-20	08/31/09 14:00	
MW16D-117.0FD	L09080726-04	EN.0908311400-21	08/31/09 14:00	
DUP	WG310949-05	EN.0908311400-24	08/31/09 14:00	

Report Name: BLANK_SUMMARY
 PDF File ID: 1482625
 Report generated 09/04/2009 11:27



Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L09080726 Prep Date: 08/31/09 14:00 Sample ID: WG310949-01
Instrument ID: OVEN Run Date: 08/31/09 14:00 Prep Method: 160.1
File ID: EN.0908311400-01 Analyst: HJR Method: 160.1
Workgroup (AAB#): WG310949 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: OVEN -

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Total Dissolved Solids	5.00	10.0	10.0	1	ND

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1482626

04-SEP-2009 11:27



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09080726 Analyst: HJR Prep Method: 160.1
 Instrument ID: OVEN Matrix: Water Method: 160.1
 Workgroup (AAB#): WG310949 Units: mg/L
 QC Key: DOWBOA2006 Lot #: STD32441
 Sample ID: WG310949-02 LCS File ID: EN.0908311400-02 Run Date: 08/31/2009 14:00
 Sample ID: WG310949-03 LCS2 File ID: EN.0908311400-03 Run Date: 08/31/2009 14:00

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Total Dissolved Solids	500	494	98.8	500	506	101	2.40	80 - 120	25	



3.0 Attachments

Microbac Laboratories Inc.
Analyst Listing
September 10, 2009

ADC - ANTHONY D. CANTER	AJF - AMANDA J. FICKIESEN	AJM - ANTHONY J. MOSSBURG
ALB - ANNIE L. BROWN	AML - ANTHONY M. LONG	BLG - BRENDA L. GREENWALT
BRG - BRENDA R. GREGORY	CAA - CASSIE A. AUGENSTEIN	CAF - CHERYL A. FLOWERS
CAH - CHARLES A. HALL	CEB - CHAD E. BARNES	CLC - CHRYS L. CRAWFORD
CLW - CHARISSA L. WINTERS	CPD - CHAD P. DAVIS	CSH - CHRIS S. HILL
DDE - DEBRA D. ELLIOTT	DEL - DON E. LIGHTFRITZ	DEV - DAVID E. VANDENBERG
DGB - DOUGLAS G. BUTCHER	DIH - DEANNA I. HESSON	DLB - DAVID L. BUMGARNER
DLP - DOROTHY L. PAYNE	DLR - DIANNA L. RAUCH	DR - DEANNA ROBERTS
ECL - ERIC C. LAWSON	EDA - ERIN D. AGEE	ERP - ERIN R. PORTER
FJB - FRANCES J. BOLDEN	HAV - HEMA VILASAGAR	HJR - HOLLY J. REED
JBK - JEREMY B. KINNEY	JDH - JUSTIN D. HESSON	JKT - JANE K. THOMPSON
JWR - JOHN W. RICHARDS	JWS - JACK W. SHEAVES	JYH - JI Y. HU
KEB - KATHRYN E. BARNES	KHR - KIM H. RHODES	KRA - KATHY R. ALBERTSON
LKN - LINDA K. NEDEFF	LSB - LESLIE S. BUCINA	MDA - MIKE D. ALBERTSON
MDC - MICHAEL D. COCHRAN	MES - MARY E. SCHILLING	MMB - MAREN M. BEERY
MRT - MICHELLE R. TAYLOR	MSW - MATT S. WILSON	NPM - NATHANIEL P. MILLER
PDM - PIERCE D. MORRIS	RAH - ROY A. HALSTEAD	RB - ROBERT BUCHANAN
REK - ROBERT E. KYER	RLK - ROBIN L. KLINGER	RWC - RODNEY W. CAMPBELL
SDH - SHANA D. HINYARD	SLM - STEPHANIE L. MOSSBURG	SLP - SHERI L. PFALZGRAF
TIP - TAE I. PARRISH	TMB - TIFFANY M. BAILEY	TMM - TAMMY M. MORRIS
VC - VICKI COLLIER	WTD - WADE T. DELONG	

September 10, 2009

Qualkey: STD

Qualifier	Description
*	Surrogate or spike compound out of range
+	Correlation coefficient for the MSA is less than 0.995
<	Result is less than the associated numerical value.
>	Result is greater than the associated numerical value.
A	See the report narrative
B	Analyte present in method blank
B1	Target analyte detected in method blank at or above the method reporting limit
B3	Target analyte detected in calibration blank at or above the method reporting limit
C	Confirmed by GC/MS
CG	Confluent growth
DL	Surrogate or spike compound was diluted out
E	Estimated concentration due to sample matrix interference
EDL	Elevated sample reporting limits, presence of non-target analytes
EMPC	Estimated Maximum Possible Concentration
F, S	Estimated result below quantitation limit; method of standard additions(MSA)
FL	Free Liquid
H1	Sample analysis performed past holding time.
I	Semiquantitative result (out of instrument calibration range)
J	The analyte was positively identified, but the quantitation was below the RL
J,B	Analyte detected in both the method blank and sample above the MDL.
J,P	Estimate; columns don't agree to within 40%
J,S	Estimated concentration; analyzed by method of standard addition (MSA)
L	Sample reporting limits elevated due to matrix interference
L1	The associated blank spike (LCS) recovery was above the laboratory acceptance limits.
L2	The associated blank spike (LCS) recovery was below the laboratory acceptance limits.
M	Matrix effect; the concentration is an estimate due to matrix effect.
N	Tentatively identified compound(TIC)
NA	Not applicable
ND	Not detected at or above the reporting limit (RL).
ND, L	Not detected; sample reporting limit (RL) elevated due to interference
ND, S	Not detected; analyzed by method of standard addition (MSA)
NF	Not found by library search
NFL	No free liquid
NI	Non-ignitable
NR	Analyte is not required to be analyzed
NS	Not spiked
P	Concentrations >40% difference between the two GC columns
Q	One or more quality control criteria fail. See narrative.
QNS	Quantity of sample not sufficient to perform analysis
RA	Reanalysis confirms reported results
RE	Reanalysis confirms sample matrix interference
S	Analyzed by method of standard addition (MSA)
SMI	Sample matrix interference on surrogate
SP	Reported results are for spike compounds only
TIC	Library Search Compound
TNTC	Too numerous to count
U	Undetected; the concentration is below the reported MDL.
UJ	Undetected; the MDL and RL are estimated due to quality control discrepancies.
W	Post-digestion spike for furnace AA out of control limits
X	Exceeds regulatory limit
X, S	Exceeds regulatory limit; method of standard additions (MSA)
Z	Cannot be resolved from isomer - see below

*****Special Notes for Organic Analytes**

1. Acrolein and acrylonitrile by method 624 are semi-quantitative screens only.
2. 1,2-Diphenylhydrazine is unstable and is reported as azobenzene.
3. N-nitrosodiphenylamine cannot be separated from diphenylamine.
4. 3-Methylphenol and 4-Methylphenol are unresolvable compounds.
5. m-Xylene and p-Xylene are unresolvable compounds.
6. The reporting limits for Appendix II/IX compounds by method 8270 are based on EPA estimated PQLs referenced in 40 CFR Part 264, Appendix IX. They are not always achievable for every compound and are matrix dependent.



158 Starlite Drive

Phone: 740-373-4071

Marietta, OH 45750

Fax: 740-373-4835

CHAIN-OF-CUSTODY RECORD

Microbac

[illegible]

*Water (W), Soil (S), Solid Waste (SD), Unknown (X)

Page _____ of _____



1000001417

COOLER INSPECTION



Received: 08/29/2009 10:36
Delivery Method: UPS
Opened By: Don Lightfritz
Comments:

Login(s): L09080726

Cooler(s)

Cooler #	Temp Gun	Temp	Tracking #	COC #	Comments
0013125	H	2.0	J2142820999	COC14237	

1	Yes	Were shipping coolers sealed?
2	Yes	Were custody seals intact?
3	Yes	Were cooler temperatures in range of 0-6?
4	Yes	Was ice present?
5	Yes	Were COC's received/information complete/signed and dated?
6	Yes	Were sample containers and labels intact and match COC?
7	Yes	Were the correct containers and volumes received?
8	Yes	Were correct preservatives used? (water only)
9	Yes	Were pH ranges acceptable? (voa's excluded)
10	NA	Were VOA samples free of headspace (<6mm)?
11	Yes	Were samples received within EPA hold times?

Look closer. Go further. Do more.

Microbac - Ohio Valley Division
158 Starlite Drive
Marietta, OH 45750
Tel: (740)373-4071 Fax: (740)373-4835

Internal Chain of Custody Report

Login: L09080726

Account: 2736

Project: 2736.006

Samples: 6

Due Date: 14-SEP-2009

Samplenum **Container ID** **Products**
L09080726-01 610767 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	31-AUG-2009 15:22	JKT	
2	ANALYZ	W1	WET	31-AUG-2009 15:36	DLP	RLK
3	STORE	WET	A2	01-SEP-2009 14:40	RLK	JBK

Samplenum **Container ID** **Products**
L09080726-01 610768 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	31-AUG-2009 15:22	JKT	
2	ANALYZ	W1	WET	03-SEP-2009 08:08	DLP	JKT
3	STORE	WET	A2	03-SEP-2009 16:18	RLK	DLP
4	STORE	W1	WET	04-SEP-2009 08:49	DIH	RLK
5	ANALYZ	W1	WET	08-SEP-2009 08:36	TMM	JKT
6	STORE	WET	A2	08-SEP-2009 16:07	JKT	TMM

Samplenum **Container ID** **Products**
L09080726-02 610769 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	31-AUG-2009 15:22	JKT	
2	ANALYZ	W1	WET	31-AUG-2009 15:36	DLP	RLK
3	STORE	WET	A2	01-SEP-2009 14:40	RLK	JBK

Samplenum **Container ID** **Products**
L09080726-02 610770 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	31-AUG-2009 15:22	JKT	
2	ANALYZ	W1	WET	03-SEP-2009 08:08	DLP	JKT
3	STORE	WET	A2	08-SEP-2009 16:07	JKT	TMM

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09080726

Account: 2736

Project: 2736.006

Samples: 6

Due Date: 14-SEP-2009

Samplenum **Container ID** **Products**
L09080726-03 610771 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	31-AUG-2009 15:22	JKT	
2	ANALYZ	W1	WET	31-AUG-2009 15:36	DLP	RLK
3	STORE	WET	A2	01-SEP-2009 14:40	RLK	JBK

Samplenum **Container ID** **Products**
L09080726-03 610772 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	31-AUG-2009 15:22	JKT	
2	ANALYZ	W1	WET	03-SEP-2009 08:08	DLP	JKT
3	STORE	WET	A2	08-SEP-2009 16:07	JKT	TMM

Samplenum **Container ID** **Products**
L09080726-04 610773 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	31-AUG-2009 15:22	JKT	
2	ANALYZ	W1	WET	31-AUG-2009 15:36	DLP	RLK
3	STORE	WET	A2	01-SEP-2009 14:40	RLK	JBK

Samplenum **Container ID** **Products**
L09080726-04 610774 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	31-AUG-2009 15:22	JKT	
2	ANALYZ	W1	WET	03-SEP-2009 08:08	DLP	JKT
3	STORE	WET	A2	08-SEP-2009 16:07	JKT	TMM

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09080726**Account:** 2736**Project:** 2736.006**Samples:** 6**Due Date:** 14-SEP-2009

Samplenum **Container ID** **Products**
L09080726-05 610775 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	31-AUG-2009 15:22	JKT	
2	ANALYZ	W1	WET	31-AUG-2009 15:36	DLP	RLK
3	STORE	WET	A2	01-SEP-2009 14:40	RLK	JBK

Samplenum **Container ID** **Products**
L09080726-05 610776 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	31-AUG-2009 15:22	JKT	
2	ANALYZ	W1	WET	03-SEP-2009 08:08	DLP	JKT
3	STORE	WET	A2	08-SEP-2009 16:07	JKT	TMM

Samplenum **Container ID** **Products**
L09080726-06 610777 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	31-AUG-2009 15:22	JKT	
2	ANALYZ	W1	WET	31-AUG-2009 15:36	DLP	RLK
3	STORE	WET	A2	01-SEP-2009 14:40	RLK	JBK

Samplenum **Container ID** **Products**
L09080726-06 610778 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	31-AUG-2009 15:22	JKT	
2	ANALYZ	W1	WET	03-SEP-2009 08:08	DLP	JKT
3	STORE	WET	A2	08-SEP-2009 16:07	JKT	TMM

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login





158 Starlite Drive, Marietta, OH 45750 • T:740-373-4071 • F:740-373-4835 • <http://www.microbac.com>

Laboratory Report Number: L09090092

Please find enclosed the analytical results for the samples you submitted to Microbac Laboratories.

Review and compilation of your report was completed by Microbac's Sales and Service Team. If you have questions, comments or require further assistance regarding this report, please contact your team member noted in the reviewed box below at 800-373-4071. Team member e-mail addresses also appear here for your convenience.

Kathy Albertson	<i>Team Chemist/Data Specialist</i>	kalbertson@microbac.com
Stephanie Mossburg	<i>Team Chemist/Data Specialist</i>	smossburg@microbac.com
Tony Long	<i>Team Chemist/Data Specialist</i>	tlong@microbac.com
Amanda Fickiesen	<i>Client Services Specialist</i>	afickiesen@microbac.com
Annie Brown	<i>Client Services Specialist</i>	abrown@microbac.com

This report was reviewed on September 15, 2009.

Kathy Albertson - Team Chemist/Data Specialist

I certify that all test results meet all of the requirements of the accrediting authority listed below. All results for soil samples are reported on a 'dry-weight' basis unless specified otherwise. Analytical results for water and wastes are reported on a 'as received' basis unless specified otherwise. A statement of uncertainty for each analysis is available upon request. This laboratory report shall not be reproduced, except in full, without the written approval of Microbac Laboratories.

The reported results are related only to the samples analyzed as received.

Client: Michael J. Zamboni, CH2MHILL, Chantilly, VA, 20151

This report was certified on September 15, 2009.

David Vandenberg - Managing Director

State of origin: Michigan

Accrediting authority: N/A ID:N/A

QAPP: Microbac OVD

This report contains a total of 68 pages.

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The Microbac logo consists of the word "Microbac" in a white serif font, centered within a dark teal rectangular box.

Microbac Laboratories, Inc.
Ohio Valley Division
158 Starlite Drive
Marietta, OH 45750

Phone: 800.373.4071
Fax: 740.373.4835

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Microbac REPORT L09090092
PREPARED FOR CH2MHILL, Inc
WORK ID:

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1.0 Introduction

Microbac Laboratories Inc.
REPORT NARRATIVE**Microbac Login No:** L09090092**CHAIN OF CUSTODY:** The chain of custody number was 14238**SHIPMENT CONDITIONS:** The chain of custody forms were received sealed in a cooler. The cooler temperature was 3 degrees C.**SAMPLE MANAGEMENT:** All samples received were intact.

L09090092-01	MW19D-47.0
L09090092-02	MW19D-47.0
L09090092-03	MW19D-47.0
L09090092-04	MW19D-52.0
L09090092-05	MW19D-67.0
L09090092-06	MW19D-67.0-FD
L09090092-07	MW19D-77.0
L09090092-08	MW19D-87.0
L09090092-09	MW19D-94.0
L09090092-10	EQUIP BLK-2

I certify that this data package is in compliance with the terms and conditions agreed to by the client and Microbac Laboratories Inc., both technically and for completeness, except for the conditions noted above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or designated person, as verified by the following signature.

Approved: 08-SEP-09



2.0 Data Package

2.1 General Chemistry Data

METHOD

HOLDING TIMES

Sample Analysis: All holding times were met.

PREPARATION

BATCH QA/QC

Method Blank: All acceptance criteria were met.

Laboratory Control Sample: All acceptance criteria were met.

Duplicates: All acceptance criteria were met.

Matrix Spikes: The MS/MSD recoveries exceeded the advisory limits for Chloride.

SAMPLES

There were no technical difficulties with the sample group.

I certify that this data package is in compliance with the terms and conditions agreed to by the client and Microbac Laboratories Inc., both technically and for completeness, except for the conditions noted above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or designated person, as verified by the following signature.

Analyst: DIH

Approved: 09-SEP-09

Linnafors

2.1.1 Chloride Data

2.1.1.1 Summary Data

LABORATORY REPORT

L09090092

09/15/09 16:31

Submitted By

Microbac Laboratories Inc.
158 Starlite Drive
Marietta , OH 45750
(740) 373 - 4071

For

Account Name: CH2MHILL, Inc
CH2MHILL
15010 Conference Center Drive Suite 200
Chantilly, VA 20151
Attention: Michael J. Zamboni

Project Number: 2736.006
Project: MI-Dow Ludington
Site: LUDINGTON, MI

P.O. Number: 935272

Sample Analysis Summary

Client ID	QC Type	Lab ID	Method	Dilution	Date Received
MW19D-47.0		L09090092-01	325.2	1	03-SEP-09
MW19D-47.0	MS	L09090092-02	325.2	1	03-SEP-09
MW19D-47.0	MSD	L09090092-03	325.2	1	03-SEP-09
MW19D-52.0		L09090092-04	325.2	1	03-SEP-09
MW19D-67.0		L09090092-05	325.2	1	03-SEP-09
MW19D-67.0-FD		L09090092-06	325.2	1	03-SEP-09
MW19D-77.0		L09090092-07	325.2	1	03-SEP-09
MW19D-87.0		L09090092-08	325.2	1	03-SEP-09
MW19D-94.0		L09090092-09	325.2	1	03-SEP-09
EQUIP BLK-2		L09090092-10	325.2	1	03-SEP-09



Report Number: **L09090092**Report Date : **September 15, 2009**

Sample Number: **L09090092-01**
Client ID: **MW19D-47.0**
Matrix: **Water**
Workgroup Number: **WG311599**
Collect Date: **09/01/2009 14:10**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **DIH**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/08/2009 12:04**
Cal Date: **09/08/2009 11:59**
Run Date: **09/08/2009 12:04**
File ID: **SC090908002.016**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6		ND	2.00	1.00

ND Not detected at or above the reporting limit (RL).

Report Number: **L09090092**Report Date : **September 15, 2009**

Sample Number: **L09090092-02**
Client ID: **MW19D-47.0**
Matrix: **Water**
Workgroup Number: **WG311599**
Collect Date: **09/01/2009 14:10**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **DIH**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/08/2009 12:06**
Cal Date: **09/08/2009 12:00**
Run Date: **09/08/2009 12:06**
File ID: **SC090908002.018**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	17.0		2.00	1.00

Report Number: **L09090092**Report Date : **September 15, 2009**

Sample Number: **L09090092-03**
Client ID: **MW19D-47.0**
Matrix: **Water**
Workgroup Number: **WG311599**
Collect Date: **09/01/2009 14:10**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **DIH**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/08/2009 12:07**
Cal Date: **09/08/2009 11:59**
Run Date: **09/08/2009 12:07**
File ID: **SC090908002.021**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	15.4		2.00	1.00

Report Number: **L09090092**Report Date : **September 15, 2009**

Sample Number: **L09090092-04**
Client ID: **MW19D-52.0**
Matrix: **Water**
Workgroup Number: **WG311599**
Collect Date: **09/01/2009 14:52**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **DIH**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/08/2009 12:08**
Cal Date: **09/08/2009 12:00**
Run Date: **09/08/2009 12:08**
File ID: **SC090908002.022**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6		ND	2.00	1.00

ND Not detected at or above the reporting limit (RL).

Report Number: **L09090092**Report Date : **September 15, 2009**

Sample Number: **L09090092-05**
Client ID: **MW19D-67.0**
Matrix: **Water**
Workgroup Number: **WG311599**
Collect Date: **09/01/2009 15:25**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **DIH**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/08/2009 12:08**
Cal Date: **09/08/2009 12:00**
Run Date: **09/08/2009 12:08**
File ID: **SC090908002.023**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6		ND	2.00	1.00

ND Not detected at or above the reporting limit (RL).

Report Number: **L09090092**Report Date : **September 15, 2009**

Sample Number: L09090092-06	PrePrep Method: NONE	Instrument: SMARTCHEM
Client ID: MW19D-67.0-FD	Prep Method: 325.2	Prep Date: 09/08/2009 12:09
Matrix: Water	Analytical Method: 325.2	Cal Date: 09/08/2009 12:00
Workgroup Number: WG311599	Analyst: DIH	Run Date: 09/08/2009 12:09
Collect Date: 09/01/2009 15:27	Dilution: 1	File ID: SC090908002.024
Sample Tag: 01	Units: mg/L	

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6		ND	2.00	1.00

ND Not detected at or above the reporting limit (RL).

Report Number: **L09090092**Report Date : **September 15, 2009**

Sample Number: L09090092-07	PrePrep Method: NONE	Instrument: SMARTCHEM
Client ID: MW19D-77.0	Prep Method: 325.2	Prep Date: 09/08/2009 12:10
Matrix: Water	Analytical Method: 325.2	Cal Date: 09/08/2009 12:00
Workgroup Number: WG311599	Analyst: DIH	Run Date: 09/08/2009 12:10
Collect Date: 09/01/2009 16:20	Dilution: 1	File ID: SC090908002.025
Sample Tag: 01	Units: mg/L	

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6		ND	2.00	1.00

ND Not detected at or above the reporting limit (RL).

Report Number: **L09090092**Report Date : **September 15, 2009**

Sample Number: **L09090092-08**
Client ID: **MW19D-87.0**
Matrix: **Water**
Workgroup Number: **WG311599**
Collect Date: **09/01/2009 17:37**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **DIH**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/08/2009 12:10**
Cal Date: **09/08/2009 12:00**
Run Date: **09/08/2009 12:10**
File ID: **SC090908002.026**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6		ND	2.00	1.00

ND Not detected at or above the reporting limit (RL).

Report Number: **L09090092**Report Date : **September 15, 2009**

Sample Number: **L09090092-09**
Client ID: **MW19D-94.0**
Matrix: **Water**
Workgroup Number: **WG311599**
Collect Date: **09/02/2009 11:08**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **DIH**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/08/2009 12:11**
Cal Date: **09/08/2009 12:00**
Run Date: **09/08/2009 12:11**
File ID: **SC090908002.027**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6		ND	2.00	1.00

ND Not detected at or above the reporting limit (RL).

Report Number: **L09090092**Report Date : **September 15, 2009**

Sample Number: **L09090092-10**
Client ID: **EQUIP BLK-2**
Matrix: **Water**
Workgroup Number: **WG311599**
Collect Date: **09/01/2009 14:08**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **DIH**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/08/2009 12:12**
Cal Date: **09/08/2009 12:00**
Run Date: **09/08/2009 12:12**
File ID: **SC090908002.028**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6		ND	2.00	1.00

ND Not detected at or above the reporting limit (RL).

2.1.1.2 QC Summary Data

METHOD BLANK SUMMARY

Login Number: L09090092
 Blank File ID: SC090908002.010
 Prep Date: 09/08/09 12:01
 Analyzed Date: 09/08/09 12:01
 Analyst: DIH

Work Group: WG311599
 Blank Sample ID: WG311599-01
 Instrument ID: SMARTCHEM
 Method: 325.2

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG311599-02	SC090908002.011	09/08/09 12:01	01
LCS2	WG311599-03	SC090908002.012	09/08/09 12:02	01
MW19D-47.0	L09090092-01	SC090908002.016	09/08/09 12:04	01
DUP	WG311599-05	SC090908002.017	09/08/09 12:05	01
MW19D-47.0	L09090092-02	SC090908002.018	09/08/09 12:06	01
MW19D-47.0	L09090092-03	SC090908002.021	09/08/09 12:07	01
MW19D-52.0	L09090092-04	SC090908002.022	09/08/09 12:08	01
MW19D-67.0	L09090092-05	SC090908002.023	09/08/09 12:08	01
MW19D-67.0-FD	L09090092-06	SC090908002.024	09/08/09 12:09	01
MW19D-77.0	L09090092-07	SC090908002.025	09/08/09 12:10	01
MW19D-87.0	L09090092-08	SC090908002.026	09/08/09 12:10	01
MW19D-94.0	L09090092-09	SC090908002.027	09/08/09 12:11	01
EQUIP BLK-2	L09090092-10	SC090908002.028	09/08/09 12:12	01



METHOD BLANK REPORT

Login Number: L09090092 Prep Date: 09/08/09 12:01 Sample ID: WG311599-01
Instrument ID: SMARTCHEM Run Date: 09/08/09 12:01 Prep Method: 325.2
File ID: SC090908002.010 Analyst: DIH Method: 325.2
Workgroup (AAB#): WG311599 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: SMARTC - 08-SEP-09

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Chloride	1.00	2.00	-3.87	1	*

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1485171

09-SEP-2009 10:48



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09090092 Analyst: DIH Prep Method: 325.2
Instrument ID: SMARTCHEM Matrix: Water Method: 325.2
Workgroup (AAB#): WG311599 Units: mg/L
QC Key: DOWBOA2006 Lot #: STD34512
Sample ID: WG311599-02 LCS File ID: SC090908002.011 Run Date: 09/08/2009 12:01
Sample ID: WG311599-03 LCS2 File ID: SC090908002.012 Run Date: 09/08/2009 12:02

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Chloride	50.0	49.4	98.9	50.0	48.1	96.2	2.78	90 - 110	10	



MS/MSD REPORT

Loginnum: L09090092 Cal ID: SMARTCHEM- 08-SEP-09
 Instrument ID: SMARTCHEM Contract #: _____
 Parent ID: L09090092-01 File ID: SC090908002.016 Dil: 1
 Sample ID: L09090092-02 MS File ID: SC090908002.018 Dil: 1
 Sample ID: L09090092-03 MSD File ID: SC090908002.021 Dil: 1

Worknum: WG311599
 Prep Method: 325.2
 Method: 325.2
 Matrix: Water
 Units: mg/L

Analyte	Parent	MS Spiked	MS Found	MS %Rec	MSD Spiked	MSD Found	MSD %Rec	%RPD	%Rec Limits	RPD Limit	Q
Chloride	ND	20.0	17.0	85	20.0	15.4	76.8	10.1	90 - 110	10	*#

* FAILS %REC LIMIT

FAILS RPD LIMIT

2.1.2 Ammonia Data

2.1.2.1 Summary Data

LABORATORY REPORT

L09090092

09/15/09 16:31

Submitted By

Microbac Laboratories Inc.
158 Starlite Drive
Marietta, OH 45750
(740) 373-4071

For

Account Name: CH2MHILL, Inc
CH2MHILL
15010 Conference Center Drive Suite 200
Chantilly, VA 20151
Attention: Michael J. Zamboni

Project Number: 2736.006
Project: MI-Dow Ludington
Site: LUDINGTON, MI

P.O. Number: 935272

Sample Analysis Summary

Client ID	QC Type	Lab ID	Method	Dilution	Date Received
MW19D-47.0		L09090092-01	350.1	5	03-SEP-09
MW19D-47.0	MS	L09090092-02	350.1	5	03-SEP-09
MW19D-47.0	MSD	L09090092-03	350.1	5	03-SEP-09
MW19D-52.0		L09090092-04	350.1	4	03-SEP-09
MW19D-67.0		L09090092-05	350.1	1	03-SEP-09
MW19D-67.0-FD		L09090092-06	350.1	1	03-SEP-09
MW19D-77.0		L09090092-07	350.1	1	03-SEP-09
MW19D-87.0		L09090092-08	350.1	1	03-SEP-09
MW19D-94.0		L09090092-09	350.1	1	03-SEP-09
EQUIP BLK-2		L09090092-10	350.1	1	03-SEP-09



Report Number: **L09090092**Report Date : **September 15, 2009**

Sample Number: **L09090092-01**
Client ID: **MW19D-47.0**
Matrix: **Water**
Workgroup Number: **WG311889**
Collect Date: **09/01/2009 14:10**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **5**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/11/2009 11:15**
Cal Date: **09/11/2009 11:01**
Run Date: **09/11/2009 11:15**
File ID: **SC090911001.023**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	9.20		0.500	0.250

Report Number: **L09090092**Report Date : **September 15, 2009**

Sample Number: **L09090092-02**
Client ID: **MW19D-47.0**
Matrix: **Water**
Workgroup Number: **WG311889**
Collect Date: **09/01/2009 14:10**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **5**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/11/2009 11:17**
Cal Date: **09/11/2009 11:01**
Run Date: **09/11/2009 11:17**
File ID: **SC090911001.024**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	10.3		0.500	0.250

Report Number: **L09090092**Report Date : **September 15, 2009**

Sample Number: **L09090092-03**
Client ID: **MW19D-47.0**
Matrix: **Water**
Workgroup Number: **WG311889**
Collect Date: **09/01/2009 14:10**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **5**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/11/2009 11:17**
Cal Date: **09/11/2009 11:01**
Run Date: **09/11/2009 11:17**
File ID: **SC090911001.025**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	10.1		0.500	0.250

Report Number: **L09090092**Report Date : **September 15, 2009**

Sample Number: **L09090092-04**
Client ID: **MW19D-52.0**
Matrix: **Water**
Workgroup Number: **WG311889**
Collect Date: **09/01/2009 14:52**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **4**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/11/2009 11:19**
Cal Date: **09/11/2009 11:01**
Run Date: **09/11/2009 11:19**
File ID: **SC090911001.026**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	5.52		0.400	0.200

Report Number: **L09090092**Report Date : **September 15, 2009**

Sample Number: **L09090092-05**
Client ID: **MW19D-67.0**
Matrix: **Water**
Workgroup Number: **WG311889**
Collect Date: **09/01/2009 15:25**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/11/2009 11:19**
Cal Date: **09/11/2009 11:01**
Run Date: **09/11/2009 11:19**
File ID: **SC090911001.027**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	0.630		0.100	0.0500

Report Number: **L09090092**Report Date : **September 15, 2009**

Sample Number: **L09090092-06**
Client ID: **MW19D-67.0-FD**
Matrix: **Water**
Workgroup Number: **WG311889**
Collect Date: **09/01/2009 15:27**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/11/2009 11:20**
Cal Date: **09/11/2009 11:01**
Run Date: **09/11/2009 11:20**
File ID: **SC090911001.028**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	0.664		0.100	0.0500

Report Number: **L09090092**Report Date : **September 15, 2009**

Sample Number: L09090092-07	PrePrep Method: NONE	Instrument: SMARTCHEM
Client ID: MW19D-77.0	Prep Method: 350.1	Prep Date: 09/11/2009 11:21
Matrix: Water	Analytical Method: 350.1	Cal Date: 09/11/2009 11:01
Workgroup Number: WG311889	Analyst: DIH	Run Date: 09/11/2009 11:21
Collect Date: 09/01/2009 16:20	Dilution: 1	File ID: SC090911001.029
Sample Tag: 01	Units: mg/L	

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	0.337		0.100	0.0500

Report Number: **L09090092**Report Date : **September 15, 2009**

Sample Number: **L09090092-08**
Client ID: **MW19D-87.0**
Matrix: **Water**
Workgroup Number: **WG311889**
Collect Date: **09/01/2009 17:37**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/11/2009 11:24**
Cal Date: **09/11/2009 11:01**
Run Date: **09/11/2009 11:24**
File ID: **SC090911001.032**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	0.413		0.100	0.0500

Report Number: **L09090092**Report Date : **September 15, 2009**

Sample Number: **L09090092-09**
Client ID: **MW19D-94.0**
Matrix: **Water**
Workgroup Number: **WG311889**
Collect Date: **09/02/2009 11:08**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/11/2009 11:24**
Cal Date: **09/11/2009 11:01**
Run Date: **09/11/2009 11:24**
File ID: **SC090911001.033**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	0.338		0.100	0.0500

Report Number: **L09090092**Report Date : **September 15, 2009**

Sample Number: **L09090092-10**
Client ID: **EQUIP BLK-2**
Matrix: **Water**
Workgroup Number: **WG311889**
Collect Date: **09/01/2009 14:08**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/11/2009 11:26**
Cal Date: **09/11/2009 11:01**
Run Date: **09/11/2009 11:26**
File ID: **SC090911001.034**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7		ND	0.100	0.0500

ND Not detected at or above the reporting limit (RL).

2.1.2.2 QC Summary Data

METHOD BLANK SUMMARY

Login Number: L09090092
 Blank File ID: SC090911001.009
 Prep Date: 09/11/09 11:03
 Analyzed Date: 09/11/09 11:03
 Analyst: DIH

Work Group: WG311889
 Blank Sample ID: WG311889-01
 Instrument ID: SMARTCHEM
 Method: 350.1

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS2	WG311889-03	SC090911001.011	09/11/09 11:05	01
MW19D-47.0	L09090092-01	SC090911001.023	09/11/09 11:15	DL01
MW19D-47.0	L09090092-02	SC090911001.024	09/11/09 11:17	DL01
MW19D-47.0	L09090092-03	SC090911001.025	09/11/09 11:17	DL01
MW19D-52.0	L09090092-04	SC090911001.026	09/11/09 11:19	DL01
MW19D-67.0	L09090092-05	SC090911001.027	09/11/09 11:19	01
MW19D-67.0-FD	L09090092-06	SC090911001.028	09/11/09 11:20	01
MW19D-77.0	L09090092-07	SC090911001.029	09/11/09 11:21	01
MW19D-87.0	L09090092-08	SC090911001.032	09/11/09 11:24	01
MW19D-94.0	L09090092-09	SC090911001.033	09/11/09 11:24	01
EQUIP BLK-2	L09090092-10	SC090911001.034	09/11/09 11:26	01
DUP	WG311889-06	SC090911001.038	09/11/09 11:29	01
LCS	WG311889-02	SC090911001.056	09/11/09 11:46	01

Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L09090092 Prep Date: 09/11/09 11:03 Sample ID: WG311889-01
Instrument ID: SMARTCHEM Run Date: 09/11/09 11:03 Prep Method: 350.1
File ID: SC090911001.009 Analyst: DIH Method: 350.1
Workgroup (AAB#): WG311889 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: SMARTC - 11-SEP-09

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Nitrogen, Ammonia	0.0500	0.100	0.100	1	ND

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1489913

15-SEP-2009 11:46



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09090092 Analyst: DIH Prep Method: 350.1
Instrument ID: SMARTCHEM Matrix: Water Method: 350.1
Workgroup (AAB#): WG311889 Units: mg/L
QC Key: DOWBOA2006 Lot #: STD33211
Sample ID: WG311889-02 LCS File ID: SC090911001.056 Run Date: 09/11/2009 11:46
Sample ID: WG311889-03 LCS2 File ID: SC090911001.011 Run Date: 09/11/2009 11:05

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Nitrogen, Ammonia	2.00	1.96	98.2	2.00	1.96	97.8	0.413	90 - 110	25	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 1489914
Report generated: 09/15/2009 11:46



MS/MSD REPORT

Loginnum: L09090092 Cal ID: SMARTCHEM- 11-SEP-09
 Instrument ID: SMARTCHEM Contract #: _____
 Parent ID: L09090092-01 File ID: SC090911001.023 Dil: 5
 Sample ID: L09090092-02 MS File ID: SC090911001.024 Dil: 5
 Sample ID: L09090092-03 MSD File ID: SC090911001.025 Dil: 5

Worknum: WG311889
 Prep Method: 350.1
 Method: 350.1
 Matrix: Water
 Units: mg/L

Analyte	Parent	MS Spiked	MS Found	MS %Rec	MSD Spiked	MSD Found	MSD %Rec	%RPD	%Rec Limits	RPD Limit	Q
Nitrogen, Ammonia	9.20	1.00	10.3	111	1.00	10.1	94.5	1.64	70 - 125	25	

* FAILS %REC LIMIT

FAILS RPD LIMIT

2.1.3 Total Dissolved Solids Data

2.1.3.1 Summary Data

LABORATORY REPORT

L09090092

09/15/09 16:31

Submitted By

Microbac Laboratories Inc.
158 Starlite Drive
Marietta, OH 45750
(740) 373-4071

For

Account Name: CH2MHILL, Inc
CH2MHILL
15010 Conference Center Drive Suite 200
Chantilly, VA 20151
Attention: Michael J. Zamboni

Project Number: 2736.006
Project: MI-Dow Ludington
Site: LUDINGTON, MI

P.O. Number: 935272

Sample Analysis Summary

Client ID	QC Type	Lab ID	Method	Dilution	Date Received
MW19D-47.0		L09090092-01	160.1	1	03-SEP-09
MW19D-47.0	MS	L09090092-02	160.1	1	03-SEP-09
MW19D-47.0	MSD	L09090092-03	160.1	1	03-SEP-09
MW19D-52.0		L09090092-04	160.1	1	03-SEP-09
MW19D-67.0		L09090092-05	160.1	1	03-SEP-09
MW19D-67.0-FD		L09090092-06	160.1	1	03-SEP-09
MW19D-77.0		L09090092-07	160.1	1	03-SEP-09
MW19D-87.0		L09090092-08	160.1	1	03-SEP-09
MW19D-94.0		L09090092-09	160.1	1	03-SEP-09
EQUIP BLK-2		L09090092-10	160.1	1	03-SEP-09

Report Number: **L09090092**Report Date : **September 15, 2009**

Sample Number: **L09090092-01**
Client ID: **MW19D-47.0**
Matrix: **Water**
Workgroup Number: **WG311399**
Collect Date: **09/01/2009 14:10**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/03/2009 14:45**
Cal Date:
Run Date: **09/03/2009 14:45**
File ID: **EN.0909031445-14**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		280		20.0	10.0

Report Number: **L09090092**Report Date : **September 15, 2009**

Sample Number: **L09090092-02**
Client ID: **MW19D-47.0**
Matrix: **Water**
Workgroup Number: **WG311399**
Collect Date: **09/01/2009 14:10**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/03/2009 14:45**
Cal Date:
Run Date: **09/03/2009 14:45**
File ID: **EN.0909031445-11**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		788		20.0	10.0

Report Number: **L09090092**Report Date : **September 15, 2009**

Sample Number: **L09090092-03**
Client ID: **MW19D-47.0**
Matrix: **Water**
Workgroup Number: **WG311399**
Collect Date: **09/01/2009 14:10**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/03/2009 14:45**
Cal Date:
Run Date: **09/03/2009 14:45**
File ID: **EN.0909031445-17**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		784		20.0	10.0

Report Number: **L09090092**Report Date : **September 15, 2009**

Sample Number: **L09090092-04**
Client ID: **MW19D-52.0**
Matrix: **Water**
Workgroup Number: **WG311399**
Collect Date: **09/01/2009 14:52**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/03/2009 14:45**
Cal Date:
Run Date: **09/03/2009 14:45**
File ID: **EN.0909031445-18**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		248		20.0	10.0

Report Number: **L09090092**Report Date : **September 15, 2009**

Sample Number: **L09090092-05**
Client ID: **MW19D-67.0**
Matrix: **Water**
Workgroup Number: **WG311399**
Collect Date: **09/01/2009 15:25**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/03/2009 14:45**
Cal Date:
Run Date: **09/03/2009 14:45**
File ID: **EN.0909031445-15**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		234		20.0	10.0

Report Number: **L09090092**Report Date : **September 15, 2009**

Sample Number: **L09090092-06**
Client ID: **MW19D-67.0-FD**
Matrix: **Water**
Workgroup Number: **WG311399**
Collect Date: **09/01/2009 15:27**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/03/2009 14:45**
Cal Date:
Run Date: **09/03/2009 14:45**
File ID: **EN.0909031445-12**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		254		20.0	10.0

Report Number: **L09090092**Report Date : **September 15, 2009**

Sample Number: **L09090092-07**
Client ID: **MW19D-77.0**
Matrix: **Water**
Workgroup Number: **WG311399**
Collect Date: **09/01/2009 16:20**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/03/2009 14:45**
Cal Date:
Run Date: **09/03/2009 14:45**
File ID: **EN.0909031445-19**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		254		20.0	10.0

Report Number: **L09090092**Report Date : **September 15, 2009**

Sample Number: **L09090092-08**
Client ID: **MW19D-87.0**
Matrix: **Water**
Workgroup Number: **WG311399**
Collect Date: **09/01/2009 17:37**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/03/2009 14:45**
Cal Date:
Run Date: **09/03/2009 14:45**
File ID: **EN.0909031445-16**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		228		20.0	10.0

Report Number: **L09090092**Report Date : **September 15, 2009**

Sample Number: **L09090092-09**
Client ID: **MW19D-94.0**
Matrix: **Water**
Workgroup Number: **WG311399**
Collect Date: **09/02/2009 11:08**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/03/2009 14:45**
Cal Date:
Run Date: **09/03/2009 14:45**
File ID: **EN.0909031445-13**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		250		20.0	10.0

Report Number: **L09090092**Report Date : **September 15, 2009**

Sample Number: **L09090092-10**
Client ID: **EQUIP BLK-2**
Matrix: **Water**
Workgroup Number: **WG311399**
Collect Date: **09/01/2009 14:08**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/03/2009 14:45**
Cal Date:
Run Date: **09/03/2009 14:45**
File ID: **EN.0909031445-20**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids			ND	10.0	5.00

ND Not detected at or above the reporting limit (RL).

2.1.3.2 QC Summary Data

3.0 Attachments

Microbac Laboratories Inc.
Analyst Listing
September 15, 2009

ADC - ANTHONY D. CANTER	AJF - AMANDA J. FICKIESEN	AJM - ANTHONY J. MOSSBURG
ALB - ANNIE L. BROWN	AML - ANTHONY M. LONG	BLG - BRENDA L. GREENWALT
BRG - BRENDA R. GREGORY	CAA - CASSIE A. AUGENSTEIN	CAF - CHERYL A. FLOWERS
CAH - CHARLES A. HALL	CEB - CHAD E. BARNES	CLC - CHRYS L. CRAWFORD
CLW - CHARISSA L. WINTERS	CPD - CHAD P. DAVIS	CSH - CHRIS S. HILL
DDE - DEBRA D. ELLIOTT	DEL - DON E. LIGHTFRITZ	DEV - DAVID E. VANDENBERG
DGB - DOUGLAS G. BUTCHER	DIH - DEANNA I. HESSON	DLB - DAVID L. BUMGARNER
DLP - DOROTHY L. PAYNE	DLR - DIANNA L. RAUCH	DR - DEANNA ROBERTS
ECL - ERIC C. LAWSON	EDA - ERIN D. AGEE	ERP - ERIN R. PORTER
FJB - FRANCES J. BOLDEN	HAV - HEMA VILASAGAR	HJR - HOLLY J. REED
JBK - JEREMY B. KINNEY	JDH - JUSTIN D. HESSON	JKT - JANE K. THOMPSON
JWR - JOHN W. RICHARDS	JWS - JACK W. SHEAVES	JYH - JI Y. HU
KEB - KATHRYN E. BARNES	KHR - KIM H. RHODES	KRA - KATHY R. ALBERTSON
LKN - LINDA K. NEDEFF	LSB - LESLIE S. BUCINA	MDA - MIKE D. ALBERTSON
MDC - MICHAEL D. COCHRAN	MES - MARY E. SCHILLING	MMB - MAREN M. BEERY
MRT - MICHELLE R. TAYLOR	MSW - MATT S. WILSON	NPM - NATHANIEL P. MILLER
PDM - PIERCE D. MORRIS	RAH - ROY A. HALSTEAD	RB - ROBERT BUCHANAN
REK - ROBERT E. KYER	RLK - ROBIN L. KLINGER	RWC - RODNEY W. CAMPBELL
SDH - SHANA D. HINYARD	SLM - STEPHANIE L. MOSSBURG	SLP - SHERI L. PFALZGRAF
TIP - TAE I. PARRISH	TMB - TIFFANY M. BAILEY	TMM - TAMMY M. MORRIS
VC - VICKI COLLIER	WTD - WADE T. DELONG	

September 15, 2009

Qualkey: STD

Qualifier	Description
*	Surrogate or spike compound out of range
+	Correlation coefficient for the MSA is less than 0.995
<	Result is less than the associated numerical value.
>	Result is greater than the associated numerical value.
A	See the report narrative
B	Analyte present in method blank
B1	Target analyte detected in method blank at or above the method reporting limit
B3	Target analyte detected in calibration blank at or above the method reporting limit
C	Confirmed by GC/MS
CG	Confluent growth
DL	Surrogate or spike compound was diluted out
E	Estimated concentration due to sample matrix interference
EDL	Elevated sample reporting limits, presence of non-target analytes
EMPC	Estimated Maximum Possible Concentration
F, S	Estimated result below quantitation limit; method of standard additions(MSA)
FL	Free Liquid
H1	Sample analysis performed past holding time.
I	Semiquantitative result (out of instrument calibration range)
J	The analyte was positively identified, but the quantitation was below the RL
J,B	Analyte detected in both the method blank and sample above the MDL.
J,P	Estimate; columns don't agree to within 40%
J,S	Estimated concentration; analyzed by method of standard addition (MSA)
L	Sample reporting limits elevated due to matrix interference
L1	The associated blank spike (LCS) recovery was above the laboratory acceptance limits.
L2	The associated blank spike (LCS) recovery was below the laboratory acceptance limits.
M	Matrix effect; the concentration is an estimate due to matrix effect.
N	Tentatively identified compound(TIC)
NA	Not applicable
ND	Not detected at or above the reporting limit (RL).
ND, L	Not detected; sample reporting limit (RL) elevated due to interference
ND, S	Not detected; analyzed by method of standard addition (MSA)
NF	Not found by library search
NFL	No free liquid
NI	Non-ignitable
NR	Analyte is not required to be analyzed
NS	Not spiked
P	Concentrations >40% difference between the two GC columns
Q	One or more quality control criteria fail. See narrative.
QNS	Quantity of sample not sufficient to perform analysis
RA	Reanalysis confirms reported results
RE	Reanalysis confirms sample matrix interference
S	Analyzed by method of standard addition (MSA)
SMI	Sample matrix interference on surrogate
SP	Reported results are for spike compounds only
TIC	Library Search Compound
TNTC	Too numerous to count
U	Undetected; the concentration is below the reported MDL.
UJ	Undetected; the MDL and RL are estimated due to quality control discrepancies.
W	Post-digestion spike for furnace AA out of control limits
X	Exceeds regulatory limit
X, S	Exceeds regulatory limit; method of standard additions (MSA)
Z	Cannot be resolved from isomer - see below

*****Special Notes for Organic Analytes**

1. Acrolein and acrylonitrile by method 624 are semi-quantitative screens only.
2. 1,2-Diphenylhydrazine is unstable and is reported as azobenzene.
3. N-nitrosodiphenylamine cannot be separated from diphenylamine.
4. 3-Methylphenol and 4-Methylphenol are unresolvable compounds.
5. m-Xylene and p-Xylene are unresolvable compounds.
6. The reporting limits for Appendix II/IX compounds by method 8270 are based on EPA estimated PQLs referenced in 40 CFR Part 264, Appendix IX. They are not always achievable for every compound and are matrix dependent.



158 Starlite Drive
Marietta, OH 45750



CHAIN-OF-CUSTODY RECORD

Phone: 740-373-4071

Fax: 740-373-4835

[illegible]

*Water (W), Soil (S), Solid Waste (SD), Unknown (X)



1000001510

COOLER INSPECTION



Received: 09/03/2009 09:44
Delivery Method: UPS
Opened By: Robin Klinger
Comments:

Login(s): L09090092

Cooler(s)

Cooler #	Temp Gun	Temp	Tracking #	COC #	Comments
0014012	H	3.0	J2142823585	COC14238	

1	Yes	Were shipping coolers sealed?
2	Yes	Were custody seals intact?
3	Yes	Were cooler temperatures in range of 0-6?
4	Yes	Was ice present?
5	Yes	Were COC's received/information complete/signed and dated?
6	Yes	Were sample containers and labels intact and match COC?
7	Yes	Were the correct containers and volumes received?
8	Yes	Were correct preservatives used? (water only)
9	Yes	Were pH ranges acceptable? (voa's excluded)
10	NA	Were VOA samples free of headspace (<6mm)?
11	Yes	Were samples received within EPA hold times?

Look closer. Go further. Do more.

Microbac - Ohio Valley Division
158 Starlite Drive
Marietta, OH 45750
Tel: (740)373-4071 Fax: (740)373-4835

Internal Chain of Custody Report

Login: L09090092

Account: 2736

Project: 2736.006

Samples: 10

Due Date: 17-SEP-2009

Samplenum **Container ID** **Products**
L09090092-01 612715 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	03-SEP-2009 16:13	RLK	
2	ANALYZ	W1	WET	03-SEP-2009 16:19	DLP	RLK
3	STORE	WET	A2	10-SEP-2009 11:15	RLK	DIH

Samplenum **Container ID** **Products**
L09090092-01 612716 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	03-SEP-2009 16:13	RLK	
2	ANALYZ	W1	WET	08-SEP-2009 08:36	TMM	JKT
3	STORE	WET	A2	11-SEP-2009 08:01	RLK	TMM

Samplenum **Container ID** **Products**
L09090092-02 612717 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	03-SEP-2009 16:13	RLK	
2	ANALYZ	W1	WET	03-SEP-2009 16:19	DLP	RLK
3	STORE	WET	A2	10-SEP-2009 11:15	RLK	DIH

Samplenum **Container ID** **Products**
L09090092-02 612718 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	03-SEP-2009 16:13	RLK	
2	ANALYZ	W1	WET	08-SEP-2009 08:36	TMM	JKT
3	STORE	WET	A2	11-SEP-2009 08:01	RLK	TMM

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09090092

Account: 2736

Project: 2736.006

Samples: 10

Due Date: 17-SEP-2009

Samplenum **Container ID** **Products**
L09090092-03 612719 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	03-SEP-2009 16:13	RLK	
2	ANALYZ	W1	WET	03-SEP-2009 16:19	DLP	RLK
3	STORE	WET	A2	10-SEP-2009 11:16	RLK	DIH

Samplenum **Container ID** **Products**
L09090092-03 612720 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	WET	03-SEP-2009 16:13	RLK	
2	STORE	WET	A2	11-SEP-2009 08:01	RLK	TMM

Samplenum **Container ID** **Products**
L09090092-04 612721 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	03-SEP-2009 16:13	RLK	
2	ANALYZ	W1	WET	03-SEP-2009 16:19	DLP	RLK
3	STORE	WET	A2	10-SEP-2009 11:15	RLK	DIH

Samplenum **Container ID** **Products**
L09090092-04 612722 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	03-SEP-2009 16:13	RLK	
2	ANALYZ	W1	WET	08-SEP-2009 08:36	TMM	JKT
3	STORE	WET	A2	11-SEP-2009 08:01	RLK	TMM

Samplenum **Container ID** **Products**
L09090092-05 612723 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	03-SEP-2009 16:13	RLK	
2	ANALYZ	W1	WET	03-SEP-2009 16:19	DLP	RLK
3	STORE	WET	A2	10-SEP-2009 11:16	RLK	DIH

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09090092

Account: 2736

Project: 2736.006

Samples: 10

Due Date: 17-SEP-2009

Samplenum **Container ID** **Products**
L09090092-05 612724 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	03-SEP-2009 16:13	RLK	
2	ANALYZ	W1	WET	08-SEP-2009 08:36	TMM	JKT
3	STORE	WET	A2	11-SEP-2009 08:01	RLK	TMM

Samplenum **Container ID** **Products**
L09090092-06 612725 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	03-SEP-2009 16:13	RLK	
2	ANALYZ	W1	WET	03-SEP-2009 16:19	DLP	RLK
3	STORE	WET	A2	10-SEP-2009 11:16	RLK	DIH

Samplenum **Container ID** **Products**
L09090092-06 612726 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	03-SEP-2009 16:13	RLK	
2	ANALYZ	W1	WET	08-SEP-2009 08:36	TMM	JKT
3	STORE	WET	A2	11-SEP-2009 08:01	RLK	TMM

Samplenum **Container ID** **Products**
L09090092-07 612727 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	03-SEP-2009 16:13	RLK	
2	ANALYZ	W1	WET	03-SEP-2009 16:19	DLP	RLK
3	STORE	WET	A2	10-SEP-2009 11:15	RLK	DIH

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09090092

Account: 2736

Project: 2736.006

Samples: 10

Due Date: 17-SEP-2009

Samplenum **Container ID** **Products**
L09090092-07 612728 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	03-SEP-2009 16:13	RLK	
2	ANALYZ	W1	WET	08-SEP-2009 08:36	TMM	JKT
3	STORE	WET	A2	11-SEP-2009 08:01	RLK	TMM

Samplenum **Container ID** **Products**
L09090092-08 612729 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	03-SEP-2009 16:13	RLK	
2	ANALYZ	W1	WET	03-SEP-2009 16:19	DLP	RLK
3	STORE	WET	A2	10-SEP-2009 11:16	RLK	DIH

Samplenum **Container ID** **Products**
L09090092-08 612730 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	03-SEP-2009 16:13	RLK	
2	ANALYZ	W1	WET	08-SEP-2009 08:36	TMM	JKT
3	STORE	WET	A2	08-SEP-2009 16:07	JKT	TMM
4	STORE	WET	A2	11-SEP-2009 08:01	RLK	TMM

Samplenum **Container ID** **Products**
L09090092-09 612731 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	03-SEP-2009 16:13	RLK	
2	ANALYZ	W1	WET	03-SEP-2009 16:19	DLP	RLK
3	STORE	WET	A2	10-SEP-2009 11:16	RLK	DIH

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09090092

Account: 2736

Project: 2736.006

Samples: 10

Due Date: 17-SEP-2009

Samplenum **Container ID** **Products**
L09090092-09 612732 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	03-SEP-2009 16:13	RLK	
2	ANALYZ	W1	WET	08-SEP-2009 08:35	TMM	JKT
3	STORE	WET	A2	11-SEP-2009 08:01	RLK	TMM

Samplenum **Container ID** **Products**
L09090092-10 612733 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	03-SEP-2009 16:13	RLK	
2	ANALYZ	W1	WET	03-SEP-2009 16:19	DLP	RLK
3	STORE	WET	A2	10-SEP-2009 11:15	RLK	DIH

Samplenum **Container ID** **Products**
L09090092-10 612734 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	03-SEP-2009 16:13	RLK	
2	ANALYZ	W1	WET	08-SEP-2009 08:35	TMM	JKT
3	STORE	WET	A2	11-SEP-2009 08:01	RLK	TMM

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login





158 Starlite Drive, Marietta, OH 45750 • T:740-373-4071 • F:740-373-4835 • <http://www.microbac.com>

Laboratory Report Number: L09090173

Please find enclosed the analytical results for the samples you submitted to Microbac Laboratories.

Review and compilation of your report was completed by Microbac's Sales and Service Team. If you have questions, comments or require further assistance regarding this report, please contact your team member noted in the reviewed box below at 800-373-4071. Team member e-mail addresses also appear here for your convenience.

Kathy Albertson	<i>Team Chemist/Data Specialist</i>	kalbertson@microbac.com
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Annie Brown	<i>Client Services Specialist</i>	abrown@microbac.com

This report was reviewed on September 17, 2009.

Kathy Albertson - Team Chemist/Data Specialist

I certify that all test results meet all of the requirements of the accrediting authority listed below. All results for soil samples are reported on a 'dry-weight' basis unless specified otherwise. Analytical results for water and wastes are reported on a 'as received' basis unless specified otherwise. A statement of uncertainty for each analysis is available upon request. This laboratory report shall not be reproduced, except in full, without the written approval of Microbac Laboratories.

The reported results are related only to the samples analyzed as received.

Client: Michael J. Zamboni, CH2MHILL, Chantilly, VA, 20151

This report was certified on September 17, 2009.

David Vandenberg - Managing Director

State of origin: Michigan

Accrediting authority: N/A ID:N/A

QAPP: Microbac OVD

This report contains a total of 60 pages.

Look closer. Go further. Do more.



The Microbac logo consists of the word "Microbac" in a white serif font, centered within a dark teal rectangular box.

Microbac Laboratories, Inc.
Ohio Valley Division
158 Starlite Drive
Marietta, OH 45750

Phone: 800.373.4071
Fax: 740.373.4835

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LOOK CLOSER, GO FURTHER, DO MORE.

Microbac REPORT L09090173
PREPARED FOR CH2MHILL, Inc
WORK ID:

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1.0 Introduction

Microbac Laboratories Inc.
REPORT NARRATIVE

Microbac Login No: L09090173

CHAIN OF CUSTODY: The chain of custody number was 14239

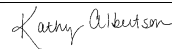
SHIPMENT CONDITIONS: The chain of custody forms were received sealed in a cooler. The cooler temperature was 3 degrees C.

SAMPLE MANAGEMENT: All samples received were intact.

L09090173-01	EQUIP-BLK-3
L09090173-02	MW19D-127.0
L09090173-03	MW19D-112.0
L09090173-04	MW19D-104.0
L09090173-05	MW19D-104.0-FD
L09090173-06	MW19D-137.0
L09090173-07	MW19D-147.0

I certify that this data package is in compliance with the terms and conditions agreed to by the client and Microbac Laboratories Inc., both technically and for completeness, except for the conditions noted above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or designated person, as verified by the following signature.

Approved: 10-SEP-09



2.0 Data Package

2.1 General Chemistry Data

2.1.1 Chloride Data

2.1.1.1 Summary Data

LABORATORY REPORT

L09090173

09/17/09 09:03

Submitted By

Microbac Laboratories Inc.
158 Starlite Drive
Marietta , OH 45750
(740) 373 - 4071

For

Account Name: CH2MHILL, Inc
CH2MHILL
15010 Conference Center Drive Suite 200
Chantilly, VA 20151
Attention: Michael J. Zamboni

Project Number: 2736.006
Project: MI-Dow Ludington
Site: LUDINGTON, MI

P.O. Number: 935272

Sample Analysis Summary

Client ID	Lab ID	Method	Dilution	Date Received
EQUIP-BLK-3	L09090173-01	325.2	1	09-SEP-09
MW19D-127.0	L09090173-02	325.2	1	09-SEP-09
MW19D-112.0	L09090173-03	325.2	1	09-SEP-09
MW19D-104.0	L09090173-04	325.2	1	09-SEP-09
MW19D-104.0-FD	L09090173-05	325.2	1	09-SEP-09
MW19D-137.0	L09090173-06	325.2	1	09-SEP-09
MW19D-147.0	L09090173-07	325.2	1	09-SEP-09



Report Number: **L09090173**Report Date : **September 17, 2009**

Sample Number: **L09090173-01**
Client ID: **EQUIP-BLK-3**
Matrix: **Water**
Workgroup Number: **WG312003**
Collect Date: **09/04/2009 10:25**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **DIH**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/14/2009 09:50**
Cal Date: **09/14/2009 09:20**
Run Date: **09/14/2009 09:50**
File ID: **SC090914001.059**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6		ND	2.00	1.00

ND Not detected at or above the reporting limit (RL).

Report Number: **L09090173**Report Date : **September 17, 2009**

Sample Number: **L09090173-02**
Client ID: **MW19D-127.0**
Matrix: **Water**
Workgroup Number: **WG312003**
Collect Date: **09/04/2009 10:33**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **DIH**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/14/2009 09:51**
Cal Date: **09/14/2009 09:20**
Run Date: **09/14/2009 09:51**
File ID: **SC090914001.060**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	4.67		2.00	1.00

Report Number: **L09090173**Report Date : **September 17, 2009**

Sample Number: **L09090173-03**
Client ID: **MW19D-112.0**
Matrix: **Water**
Workgroup Number: **WG312003**
Collect Date: **09/04/2009 08:35**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **DIH**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/14/2009 09:51**
Cal Date: **09/14/2009 09:20**
Run Date: **09/14/2009 09:51**
File ID: **SC090914001.061**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6		ND	2.00	1.00

ND Not detected at or above the reporting limit (RL).

Report Number: **L09090173**Report Date : **September 17, 2009**

Sample Number: **L09090173-04**
Client ID: **MW19D-104.0**
Matrix: **Water**
Workgroup Number: **WG312003**
Collect Date: **09/03/2009 14:45**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **DIH**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/14/2009 09:52**
Cal Date: **09/14/2009 09:20**
Run Date: **09/14/2009 09:52**
File ID: **SC090914001.062**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6		ND	2.00	1.00

ND Not detected at or above the reporting limit (RL).

Report Number: **L09090173**Report Date : **September 17, 2009**

Sample Number: **L09090173-05**
Client ID: **MW19D-104.0-FD**
Matrix: **Water**
Workgroup Number: **WG312002**
Collect Date: **09/03/2009 14:47**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **DIH**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/14/2009 09:54**
Cal Date: **09/14/2009 09:20**
Run Date: **09/14/2009 09:54**
File ID: **SC090914001.065**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6		ND	2.00	1.00

ND Not detected at or above the reporting limit (RL).

Report Number: **L09090173**Report Date : **September 17, 2009**

Sample Number: **L09090173-06**
Client ID: **MW19D-137.0**
Matrix: **Water**
Workgroup Number: **WG312002**
Collect Date: **09/04/2009 12:00**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **DIH**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/14/2009 09:55**
Cal Date: **09/14/2009 09:20**
Run Date: **09/14/2009 09:55**
File ID: **SC090914001.066**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	12.5		2.00	1.00

Report Number: **L09090173**Report Date : **September 17, 2009**

Sample Number: **L09090173-07**
Client ID: **MW19D-147.0**
Matrix: **Water**
Workgroup Number: **WG312002**
Collect Date: **09/04/2009 12:23**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **DIH**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/14/2009 09:56**
Cal Date: **09/14/2009 09:20**
Run Date: **09/14/2009 09:56**
File ID: **SC090914001.069**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	4.37		2.00	1.00

2.1.1.2 QC Summary Data

METHOD BLANK SUMMARY

Login Number: L09090173
 Blank File ID: SC090914001.010
 Prep Date: 09/14/09 09:21
 Analyzed Date: 09/14/09 09:21
 Analyst: DIH

Work Group: WG312002
 Blank Sample ID: WG312002-01
 Instrument ID: SMARTCHEM
 Method: 325.2

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG312002-02	SC090914001.011	09/14/09 09:21	01
LCS2	WG312002-03	SC090914001.012	09/14/09 09:22	01
DUP	WG312002-05	SC090914001.018	09/14/09 09:26	DL01
MW19D-104.0-FD	L09090173-05	SC090914001.065	09/14/09 09:54	01
MW19D-137.0	L09090173-06	SC090914001.066	09/14/09 09:55	01
MW19D-147.0	L09090173-07	SC090914001.069	09/14/09 09:56	01



METHOD BLANK SUMMARY

Login Number: L09090173
 Blank File ID: SC090914001.036
 Prep Date: 09/14/09 09:37
 Analyzed Date: 09/14/09 09:37
 Analyst: DIH

Work Group: WG312003
 Blank Sample ID: WG312003-01
 Instrument ID: SMARTCHEM
 Method: 325.2

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG312003-02	SC090914001.037	09/14/09 09:37	01
LCS2	WG312003-03	SC090914001.038	09/14/09 09:38	01
EQUIP-BLK-3	L09090173-01	SC090914001.059	09/14/09 09:50	01
MW19D-127.0	L09090173-02	SC090914001.060	09/14/09 09:51	01
MW19D-112.0	L09090173-03	SC090914001.061	09/14/09 09:51	01
MW19D-104.0	L09090173-04	SC090914001.062	09/14/09 09:52	01
DUP	WG312003-05	SC090914001.063	09/14/09 09:53	01



Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L09090173 Prep Date: 09/14/09 09:21 Sample ID: WG312002-01
Instrument ID: SMARTCHEM Run Date: 09/14/09 09:21 Prep Method: 325.2
File ID: SC090914001.010 Analyst: DIH Method: 325.2
Workgroup (AAB#): WG312002 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: SMARTC - 14-SEP-09

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Chloride	1.00	2.00	2.00	1	ND

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1490066

15-SEP-2009 12:18



Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L09090173 Prep Date: 09/14/09 09:37 Sample ID: WG312003-01
Instrument ID: SMARTCHEM Run Date: 09/14/09 09:37 Prep Method: 325.2
File ID: SC090914001.036 Analyst: DIH Method: 325.2
Workgroup (AAB#): WG312003 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: SMARTC - 14-SEP-09

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Chloride	1.00	2.00	-1.73	1	ND

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1490066

15-SEP-2009 12:18



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09090173 Analyst: DIH Prep Method: 325.2
Instrument ID: SMARTCHEM Matrix: Water Method: 325.2
Workgroup (AAB#): WG312002 Units: mg/L
QC Key: DOWB0A2006 Lot #: STD35142
Sample ID: WG312002-02 LCS File ID: SC090914001.011 Run Date: 09/14/2009 09:21
Sample ID: WG312002-03 LCS2 File ID: SC090914001.012 Run Date: 09/14/2009 09:22

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Chloride	50.0	50.6	101	50.0	49.6	99.3	1.83	90 - 110	10	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 1490067
Report generated: 09/15/2009 12:18



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09090173 Analyst: DIH Prep Method: 325.2
Instrument ID: SMARTCHEM Matrix: Water Method: 325.2
Workgroup (AAB#): WG312003 Units: mg/L
QC Key: DOWBOA2006 Lot #: STD35142
Sample ID: WG312003-02 LCS File ID: SC090914001.037 Run Date: 09/14/2009 09:37
Sample ID: WG312003-03 LCS2 File ID: SC090914001.038 Run Date: 09/14/2009 09:38

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Chloride	50.0	47.9	95.8	50.0	48.4	96.9	1.13	90 - 110	10	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 1490067
Report generated: 09/15/2009 12:18



2.1.2 Ammonia Data

2.1.2.1 Summary Data

LABORATORY REPORT

L09090173

09/17/09 09:03

Submitted By

Microbac Laboratories Inc.
158 Starlite Drive
Marietta , OH 45750
(740) 373 - 4071

For

Account Name: CH2MHILL, Inc
CH2MHILL
15010 Conference Center Drive Suite 200
Chantilly, VA 20151
Attention: Michael J. Zamboni

Project Number: 2736.006
Project: MI-Dow Ludington
Site: LUDINGTON, MI

P.O. Number: 935272

Sample Analysis Summary

Client ID	Lab ID	Method	Dilution	Date Received
EQUIP-BLK-3	L09090173-01	350.1	1	09-SEP-09
MW19D-127.0	L09090173-02	350.1	1	09-SEP-09
MW19D-112.0	L09090173-03	350.1	1	09-SEP-09
MW19D-104.0	L09090173-04	350.1	1	09-SEP-09
MW19D-104.0-FD	L09090173-05	350.1	1	09-SEP-09
MW19D-137.0	L09090173-06	350.1	1	09-SEP-09
MW19D-147.0	L09090173-07	350.1	1	09-SEP-09



Report Number: **L09090173**Report Date : **September 17, 2009**

Sample Number: **L09090173-01**
Client ID: **EQUIP-BLK-3**
Matrix: **Water**
Workgroup Number: **WG312223**
Collect Date: **09/04/2009 10:25**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/16/2009 09:34**
Cal Date: **09/16/2009 09:27**
Run Date: **09/16/2009 09:34**
File ID: **SC090916001.015**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7		ND	0.100	0.0500

ND Not detected at or above the reporting limit (RL).

Report Number: **L09090173**Report Date : **September 17, 2009**

Sample Number: **L09090173-02**
Client ID: **MW19D-127.0**
Matrix: **Water**
Workgroup Number: **WG312223**
Collect Date: **09/04/2009 10:33**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/16/2009 09:36**
Cal Date: **09/16/2009 09:27**
Run Date: **09/16/2009 09:36**
File ID: **SC090916001.016**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	0.222		0.100	0.0500

Report Number: **L09090173**Report Date : **September 17, 2009**

Sample Number: **L09090173-03**
Client ID: **MW19D-112.0**
Matrix: **Water**
Workgroup Number: **WG312223**
Collect Date: **09/04/2009 08:35**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/16/2009 09:36**
Cal Date: **09/16/2009 09:27**
Run Date: **09/16/2009 09:36**
File ID: **SC090916001.017**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	0.355		0.100	0.0500

Report Number: **L09090173**Report Date : **September 17, 2009**

Sample Number: **L09090173-04**
Client ID: **MW19D-104.0**
Matrix: **Water**
Workgroup Number: **WG312223**
Collect Date: **09/03/2009 14:45**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/16/2009 09:39**
Cal Date: **09/16/2009 09:27**
Run Date: **09/16/2009 09:39**
File ID: **SC090916001.020**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	0.342		0.100	0.0500

Report Number: **L09090173**Report Date : **September 17, 2009**

Sample Number: **L09090173-05**
Client ID: **MW19D-104.0-FD**
Matrix: **Water**
Workgroup Number: **WG312223**
Collect Date: **09/03/2009 14:47**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/16/2009 09:40**
Cal Date: **09/16/2009 09:27**
Run Date: **09/16/2009 09:40**
File ID: **SC090916001.021**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	0.393		0.100	0.0500

Report Number: **L09090173**Report Date : **September 17, 2009**

Sample Number: **L09090173-06**
Client ID: **MW19D-137.0**
Matrix: **Water**
Workgroup Number: **WG312223**
Collect Date: **09/04/2009 12:00**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/16/2009 09:41**
Cal Date: **09/16/2009 09:27**
Run Date: **09/16/2009 09:41**
File ID: **SC090916001.022**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	0.213		0.100	0.0500

Report Number: **L09090173**Report Date : **September 17, 2009**

Sample Number: **L09090173-07**
Client ID: **MW19D-147.0**
Matrix: **Water**
Workgroup Number: **WG312223**
Collect Date: **09/04/2009 12:23**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/16/2009 09:41**
Cal Date: **09/16/2009 09:27**
Run Date: **09/16/2009 09:41**
File ID: **SC090916001.023**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	0.186		0.100	0.0500

2.1.2.2 QC Summary Data

METHOD BLANK SUMMARY

Login Number: L09090173
 Blank File ID: SC090916001.009
 Prep Date: 09/16/09 09:29
 Analyzed Date: 09/16/09 09:29
 Analyst: DIH

Work Group: WG312223
 Blank Sample ID: WG312223-01
 Instrument ID: SMARTCHEM
 Method: 350.1

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG312223-02	SC090916001.010	09/16/09 09:30	01
EQUIP-BLK-3	L09090173-01	SC090916001.015	09/16/09 09:34	01
MW19D-127.0	L09090173-02	SC090916001.016	09/16/09 09:36	01
MW19D-112.0	L09090173-03	SC090916001.017	09/16/09 09:36	01
MW19D-104.0	L09090173-04	SC090916001.020	09/16/09 09:39	01
MW19D-104.0-FD	L09090173-05	SC090916001.021	09/16/09 09:40	01
MW19D-137.0	L09090173-06	SC090916001.022	09/16/09 09:41	01
MW19D-147.0	L09090173-07	SC090916001.023	09/16/09 09:41	01
DUP	WG312223-06	SC090916001.038	09/16/09 09:55	01
LCS2	WG312223-03	SC090916001.058	09/16/09 10:13	01

Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L09090173 Prep Date: 09/16/09 09:29 Sample ID: WG312223-01
Instrument ID: SMARTCHEM Run Date: 09/16/09 09:29 Prep Method: 350.1
File ID: SC090916001.009 Analyst: DIH Method: 350.1
Workgroup (AAB#): WG312223 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: SMARTC - 16-SEP-09

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Nitrogen, Ammonia	0.0500	0.100	0.100	1	ND

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1491396

16-SEP-2009 16:17



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09090173 Analyst: DIH Prep Method: 350.1
Instrument ID: SMARTCHEM Matrix: Water Method: 350.1
Workgroup (AAB#): WG312223 Units: mg/L
QC Key: DOWBOA2006 Lot #: STD33211
Sample ID: WG312223-02 LCS File ID: SC090916001.010 Run Date: 09/16/2009 09:30
Sample ID: WG312223-03 LCS2 File ID: SC090916001.058 Run Date: 09/16/2009 10:13

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Nitrogen, Ammonia	2.00	1.86	93.1	2.00	1.82	90.9	2.41	90 - 110	25	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 1491397
Report generated: 09/16/2009 16:18



2.1.3 Total Dissolved Solids Data

2.1.3.1 Summary Data

LABORATORY REPORT

L09090173

09/17/09 09:03

Submitted By

Microbac Laboratories Inc.
158 Starlite Drive
Marietta , OH 45750
(740) 373 - 4071

For

Account Name: CH2MHILL, Inc
CH2MHILL
15010 Conference Center Drive Suite 200
Chantilly, VA 20151
Attention: Michael J. Zamboni

Project Number: 2736.006
Project: MI-Dow Ludington
Site: LUDINGTON, MI

P.O. Number: 935272

Sample Analysis Summary

Client ID	Lab ID	Method	Dilution	Date Received
EQUIP-BLK-3	L09090173-01	160.1	1	09-SEP-09
MW19D-127.0	L09090173-02	160.1	1	09-SEP-09
MW19D-112.0	L09090173-03	160.1	1	09-SEP-09
MW19D-104.0	L09090173-04	160.1	1	09-SEP-09
MW19D-104.0-FD	L09090173-05	160.1	1	09-SEP-09
MW19D-137.0	L09090173-06	160.1	1	09-SEP-09
MW19D-147.0	L09090173-07	160.1	1	09-SEP-09



Report Number: **L09090173**Report Date : **September 17, 2009**

Sample Number: **L09090173-01**
Client ID: **EQUIP-BLK-3**
Matrix: **Water**
Workgroup Number: **WG311695**
Collect Date: **09/04/2009 10:25**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/09/2009 10:25**
Cal Date:
Run Date: **09/09/2009 10:25**
File ID: **EN.0909091025-14**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids			ND	10.0	5.00

ND Not detected at or above the reporting limit (RL).

Report Number: **L09090173**Report Date : **September 17, 2009**

Sample Number: **L09090173-02**
Client ID: **MW19D-127.0**
Matrix: **Water**
Workgroup Number: **WG311695**
Collect Date: **09/04/2009 10:33**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/09/2009 10:25**
Cal Date:
Run Date: **09/09/2009 10:25**
File ID: **EN.0909091025-15**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		248		20.0	10.0

Report Number: **L09090173**Report Date : **September 17, 2009**

Sample Number: **L09090173-03**
Client ID: **MW19D-112.0**
Matrix: **Water**
Workgroup Number: **WG311695**
Collect Date: **09/04/2009 08:35**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/09/2009 10:25**
Cal Date:
Run Date: **09/09/2009 10:25**
File ID: **EN.0909091025-13**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		184		20.0	10.0

Report Number: **L09090173**Report Date : **September 17, 2009**

Sample Number: **L09090173-04**
Client ID: **MW19D-104.0**
Matrix: **Water**
Workgroup Number: **WG311695**
Collect Date: **09/03/2009 14:45**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/09/2009 10:25**
Cal Date:
Run Date: **09/09/2009 10:25**
File ID: **EN.0909091025-11**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		206		20.0	10.0

Report Number: **L09090173**Report Date : **September 17, 2009**

Sample Number: **L09090173-05**
Client ID: **MW19D-104.0-FD**
Matrix: **Water**
Workgroup Number: **WG311695**
Collect Date: **09/03/2009 14:47**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/09/2009 10:25**
Cal Date:
Run Date: **09/09/2009 10:25**
File ID: **EN.0909091025-12**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		234		20.0	10.0

Report Number: **L09090173**Report Date : **September 17, 2009**

Sample Number: **L09090173-06**
Client ID: **MW19D-137.0**
Matrix: **Water**
Workgroup Number: **WG311695**
Collect Date: **09/04/2009 12:00**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/09/2009 10:25**
Cal Date:
Run Date: **09/09/2009 10:25**
File ID: **EN.0909091025-16**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		256		20.0	10.0

Report Number: **L09090173**Report Date : **September 17, 2009**

Sample Number: **L09090173-07**
Client ID: **MW19D-147.0**
Matrix: **Water**
Workgroup Number: **WG311695**
Collect Date: **09/04/2009 12:23**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/09/2009 10:25**
Cal Date:
Run Date: **09/09/2009 10:25**
File ID: **EN.0909091025-17**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		246		20.0	10.0

2.1.3.2 QC Summary Data

METHOD BLANK SUMMARY

Login Number: L09090173
 Blank File ID: EN.0909091025-01
 Prep Date: 09/09/09 10:25
 Analyzed Date: 09/09/09 10:25
 Analyst: HJR

Work Group: WG311695
 Blank Sample ID: WG311695-01
 Instrument ID: OVEN
 Method: 160.1

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG311695-02	EN.0909091025-02	09/09/09 10:25	
LCS2	WG311695-03	EN.0909091025-03	09/09/09 10:25	
MW19D-104.0	L09090173-04	EN.0909091025-11	09/09/09 10:25	
MW19D-104.0-FD	L09090173-05	EN.0909091025-12	09/09/09 10:25	
MW19D-112.0	L09090173-03	EN.0909091025-13	09/09/09 10:25	
EQUIP-BLK-3	L09090173-01	EN.0909091025-14	09/09/09 10:25	
MW19D-127.0	L09090173-02	EN.0909091025-15	09/09/09 10:25	
MW19D-137.0	L09090173-06	EN.0909091025-16	09/09/09 10:25	
MW19D-147.0	L09090173-07	EN.0909091025-17	09/09/09 10:25	
DUP	WG311695-05	EN.0909091025-18	09/09/09 10:25	



Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L09090173 Prep Date: 09/09/09 10:25 Sample ID: WG311695-01
Instrument ID: OVEN Run Date: 09/09/09 10:25 Prep Method: 160.1
File ID: EN.0909091025-01 Analyst: HJR Method: 160.1
Workgroup (AAB#): WG311695 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: OVEN -

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Total Dissolved Solids	5.00	10.0	10.0	1	ND

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1489626

15-SEP-2009 09:04



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09090173 Analyst: HJR Prep Method: 160.1
Instrument ID: OVEN Matrix: Water Method: 160.1
Workgroup (AAB#): WG311695 Units: mg/L
QC Key: DOWB0A2006 Lot #: STD32441
Sample ID: WG311695-02 LCS File ID: EN.0909091025-02 Run Date: 09/09/2009 10:25
Sample ID: WG311695-03 LCS2 File ID: EN.0909091025-03 Run Date: 09/09/2009 10:25

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Total Dissolved Solids	500	506	101	500	506	101	0.00	80 - 120	25	



3.0 Attachments

Microbac Laboratories Inc.
Analyst Listing
September 17, 2009

ADC - ANTHONY D. CANTER	AJF - AMANDA J. FICKIESEN	AJM - ANTHONY J. MOSSBURG
ALB - ANNIE L. BROWN	AML - ANTHONY M. LONG	BLG - BRENDA L. GREENWALT
BRG - BRENDA R. GREGORY	CAA - CASSIE A. AUGENSTEIN	CAF - CHERYL A. FLOWERS
CAH - CHARLES A. HALL	CEB - CHAD E. BARNES	CLC - CHRYS L. CRAWFORD
CLW - CHARISSA L. WINTERS	CPD - CHAD P. DAVIS	CSH - CHRIS S. HILL
DDE - DEBRA D. ELLIOTT	DEL - DON E. LIGHTFRITZ	DEV - DAVID E. VANDENBERG
DGB - DOUGLAS G. BUTCHER	DIH - DEANNA I. HESSON	DLB - DAVID L. BUMGARNER
DLP - DOROTHY L. PAYNE	DLR - DIANNA L. RAUCH	DR - DEANNA ROBERTS
ECL - ERIC C. LAWSON	EDA - ERIN D. AGEE	ERP - ERIN R. PORTER
FJB - FRANCES J. BOLDEN	HAV - HEMA VILASAGAR	HJR - HOLLY J. REED
JBK - JEREMY B. KINNEY	JDH - JUSTIN D. HESSON	JKT - JANE K. THOMPSON
JWR - JOHN W. RICHARDS	JWS - JACK W. SHEAVES	JYH - JI Y. HU
KEB - KATHRYN E. BARNES	KHR - KIM H. RHODES	KRA - KATHY R. ALBERTSON
LKN - LINDA K. NEDEFF	LSB - LESLIE S. BUCINA	MDA - MIKE D. ALBERTSON
MDC - MICHAEL D. COCHRAN	MES - MARY E. SCHILLING	MMB - MAREN M. BEERY
MRT - MICHELLE R. TAYLOR	MSW - MATT S. WILSON	NPM - NATHANIEL P. MILLER
PDM - PIERCE D. MORRIS	RAH - ROY A. HALSTEAD	RB - ROBERT BUCHANAN
REK - ROBERT E. KYER	RLK - ROBIN L. KLINGER	RWC - RODNEY W. CAMPBELL
SDH - SHANA D. HINYARD	SLM - STEPHANIE L. MOSSBURG	SLP - SHERI L. PFALZGRAF
TIP - TAE I. PARRISH	TMB - TIFFANY M. BAILEY	TMM - TAMMY M. MORRIS
VC - VICKI COLLIER	WTD - WADE T. DELONG	

September 17, 2009

Qualkey: STD

Qualifier	Description
*	Surrogate or spike compound out of range
+	Correlation coefficient for the MSA is less than 0.995
<	Result is less than the associated numerical value.
>	Result is greater than the associated numerical value.
A	See the report narrative
B	Analyte present in method blank
B1	Target analyte detected in method blank at or above the method reporting limit
B3	Target analyte detected in calibration blank at or above the method reporting limit
C	Confirmed by GC/MS
CG	Confluent growth
DL	Surrogate or spike compound was diluted out
E	Estimated concentration due to sample matrix interference
EDL	Elevated sample reporting limits, presence of non-target analytes
EMPC	Estimated Maximum Possible Concentration
F, S	Estimated result below quantitation limit; method of standard additions(MSA)
FL	Free Liquid
H1	Sample analysis performed past holding time.
I	Semiquantitative result (out of instrument calibration range)
J	The analyte was positively identified, but the quantitation was below the RL
J,B	Analyte detected in both the method blank and sample above the MDL.
J,P	Estimate; columns don't agree to within 40%
J,S	Estimated concentration; analyzed by method of standard addition (MSA)
L	Sample reporting limits elevated due to matrix interference
L1	The associated blank spike (LCS) recovery was above the laboratory acceptance limits.
L2	The associated blank spike (LCS) recovery was below the laboratory acceptance limits.
M	Matrix effect; the concentration is an estimate due to matrix effect.
N	Tentatively identified compound(TIC)
NA	Not applicable
ND	Not detected at or above the reporting limit (RL).
ND, L	Not detected; sample reporting limit (RL) elevated due to interference
ND, S	Not detected; analyzed by method of standard addition (MSA)
NF	Not found by library search
NFL	No free liquid
NI	Non-ignitable
NR	Analyte is not required to be analyzed
NS	Not spiked
P	Concentrations >40% difference between the two GC columns
Q	One or more quality control criteria fail. See narrative.
QNS	Quantity of sample not sufficient to perform analysis
RA	Reanalysis confirms reported results
RE	Reanalysis confirms sample matrix interference
S	Analyzed by method of standard addition (MSA)
SMI	Sample matrix interference on surrogate
SP	Reported results are for spike compounds only
TIC	Library Search Compound
TNTC	Too numerous to count
U	Undetected; the concentration is below the reported MDL.
UJ	Undetected; the MDL and RL are estimated due to quality control discrepancies.
W	Post-digestion spike for furnace AA out of control limits
X	Exceeds regulatory limit
X, S	Exceeds regulatory limit; method of standard additions (MSA)
Z	Cannot be resolved from isomer - see below

*****Special Notes for Organic Analytes**

1. Acrolein and acrylonitrile by method 624 are semi-quantitative screens only.
2. 1,2-Diphenylhydrazine is unstable and is reported as azobenzene.
3. N-nitrosodiphenylamine cannot be separated from diphenylamine.
4. 3-Methylphenol and 4-Methylphenol are unresolvable compounds.
5. m-Xylene and p-Xylene are unresolvable compounds.
6. The reporting limits for Appendix II/IX compounds by method 8270 are based on EPA estimated PQLs referenced in 40 CFR Part 264, Appendix IX. They are not always achievable for every compound and are matrix dependent.



COC No. A 14239

158 Starlite Drive

Marietta, OH 45750

Microbac

Phone: 740-373-4071

Fax: 740-373-4835

CHAIN-OF-CUSTODY RECORD

Company Name:

CHAMHILL

Project Contact:

Mike Zamboni

Contact Phone #:

703-376-5111

Turn Around Requirements:

STANDARD

Location:

LUDINGTON, MI

Project ID:

DOW LUDINGTON

Sampler (print):

Lauren Hunt

Signature:

Lauren Hunt

Sample
I.D. No.

Comp

Grab

Date

Time

Matrix*

NUMBER OF CONTAINERS

Hold

DISSOLVED AMMONIA

TDS & CHLORIDE

Program

☐ CWA☐ RCRA☐ DOD☐ AFCEE☐ OtherADDITIONAL
REQUIREMENTS

TOTAL # (LAB USE)

Relinquished by:
(Signature)

Date

Time

Relinquished by:
(Signature)

Date

Time

Microbac OVD

Received: 09/09/2009 09:45

By: ROBIN KLINGER

221000001592

Remarks:

Received by:
(Signature)

Time

Date

*Water (W), Soil (S), Solid Waste (SD), Unknown (X)



1000001592

COOLER INSPECTION



Received: 09/09/2009 09:45
Delivery Method: UPS
Opened By: Robin Klinger
Comments:

Login(s): L09090173

Cooler(s)

Cooler #	Temp Gun	Temp	Tracking #	COC #	Comments
0010156	H	3.0	J2142821005	COC14239	

1	Yes	Were shipping coolers sealed?
2	Yes	Were custody seals intact?
3	Yes	Were cooler temperatures in range of 0-6?
4	Yes	Was ice present?
5	Yes	Were COC's received/information complete/signed and dated?
6	Yes	Were sample containers and labels intact and match COC?
7	Yes	Were the correct containers and volumes received?
8	Yes	Were correct preservatives used? (water only)
9	Yes	Were pH ranges acceptable? (voa's excluded)
10	NA	Were VOA samples free of headspace (<6mm)?
11	Yes	Were samples received within EPA hold times?

Look closer. Go further. Do more.

Microbac - Ohio Valley Division
158 Starlite Drive
Marietta, OH 45750
Tel: (740)373-4071 Fax: (740)373-4835

Internal Chain of Custody Report

Login: L09090173

Account: 2736

Project: 2736.006

Samples: 7

Due Date: 23-SEP-2009

Samplenum **Container ID** **Products**
L09090173-01 613648 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	WET	09-SEP-2009 11:13	ERE	
2	STORE	WET	A2	15-SEP-2009 08:19	RLK	DIH

Samplenum **Container ID** **Products**
L09090173-01 613649 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	09-SEP-2009 11:13	ERE	
2	ANALYZ	W1	WET	10-SEP-2009 08:19	TMM	RLK
3	STORE	WET	A2	17-SEP-2009 08:26	RLK	TMM

Samplenum **Container ID** **Products**
L09090173-02 613650 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	WET	09-SEP-2009 11:13	ERE	
2	STORE	WET	A2	15-SEP-2009 08:19	RLK	DIH

Samplenum **Container ID** **Products**
L09090173-02 613651 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	09-SEP-2009 11:13	ERE	
2	ANALYZ	W1	WET	10-SEP-2009 08:19	TMM	RLK
3	STORE	WET	A2	17-SEP-2009 08:26	RLK	TMM

Samplenum **Container ID** **Products**
L09090173-03 613652 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	WET	09-SEP-2009 11:13	ERE	
2	STORE	WET	A2	15-SEP-2009 08:19	RLK	DIH

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login

Internal Chain of Custody Report

Login: L09090173

Account: 2736

Project: 2736.006

Samples: 7

Due Date: 23-SEP-2009

Samplenum **Container ID** **Products**
L09090173-03 613653 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	09-SEP-2009 11:13	ERE	
2	ANALYZ	W1	WET	10-SEP-2009 08:19	TMM	RLK
3	STORE	WET	A2	17-SEP-2009 08:26	RLK	TMM

Samplenum **Container ID** **Products**
L09090173-04 613654 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	09-SEP-2009 11:13	ERE	
2	ANALYZ	W1	WET	09-SEP-2009 12:44	TMM	RLK
3	STORE	WET	A2	15-SEP-2009 08:19	RLK	DIH

Samplenum **Container ID** **Products**
L09090173-04 613655 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	09-SEP-2009 11:13	ERE	
2	ANALYZ	W1	WET	10-SEP-2009 08:19	TMM	RLK
3	STORE	WET	A2	17-SEP-2009 08:26	RLK	TMM

Samplenum **Container ID** **Products**
L09090173-05 613656 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	09-SEP-2009 11:13	ERE	
2	ANALYZ	W1	WET	09-SEP-2009 12:44	TMM	RLK
3	STORE	WET	A2	15-SEP-2009 08:19	RLK	DIH

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09090173

Account: 2736

Project: 2736.006

Samples: 7

Due Date: 23-SEP-2009

Samplenum **Container ID** **Products**
L09090173-05 613657 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	09-SEP-2009 11:13	ERE	
2	ANALYZ	W1	WET	10-SEP-2009 08:19	TMM	RLK
3	STORE	WET	A2	17-SEP-2009 08:26	RLK	TMM

Samplenum **Container ID** **Products**
L09090173-06 613658 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	WET	09-SEP-2009 11:13	ERE	
2	STORE	WET	A2	15-SEP-2009 08:19	RLK	DIH

Samplenum **Container ID** **Products**
L09090173-06 613659 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	09-SEP-2009 11:13	ERE	
2	ANALYZ	W1	WET	10-SEP-2009 08:19	TMM	RLK
3	STORE	WET	A2	17-SEP-2009 08:26	RLK	TMM

Samplenum **Container ID** **Products**
L09090173-07 613660 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	WET	09-SEP-2009 11:13	ERE	
2	STORE	WET	A2	15-SEP-2009 08:19	RLK	DIH

Samplenum **Container ID** **Products**
L09090173-07 613661 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	09-SEP-2009 11:13	ERE	
2	ANALYZ	W1	WET	10-SEP-2009 08:19	TMM	RLK
3	STORE	WET	A2	17-SEP-2009 08:26	RLK	TMM

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login





158 Starlite Drive, Marietta, OH 45750 • T:740-373-4071 • F:740-373-4835 • <http://www.microbac.com>

Laboratory Report Number: L09090260

Please find enclosed the analytical results for the samples you submitted to Microbac Laboratories.

Review and compilation of your report was completed by Microbac's Sales and Service Team. If you have questions, comments or require further assistance regarding this report, please contact your team member noted in the reviewed box below at 800-373-4071. Team member e-mail addresses also appear here for your convenience.

Kathy Albertson	<i>Team Chemist/Data Specialist</i>	kalbertson@microbac.com
Stephanie Mossburg	<i>Team Chemist/Data Specialist</i>	smossburg@microbac.com
Tony Long	<i>Team Chemist/Data Specialist</i>	tlong@microbac.com
Amanda Fickiesen	<i>Client Services Specialist</i>	afickiesen@microbac.com
Annie Brown	<i>Client Services Specialist</i>	abrown@microbac.com

This report was reviewed on September 17, 2009.

Kathy Albertson - Team Chemist/Data Specialist

I certify that all test results meet all of the requirements of the accrediting authority listed below. All results for soil samples are reported on a 'dry-weight' basis unless specified otherwise. Analytical results for water and wastes are reported on a 'as received' basis unless specified otherwise. A statement of uncertainty for each analysis is available upon request. This laboratory report shall not be reproduced, except in full, without the written approval of Microbac Laboratories.

The reported results are related only to the samples analyzed as received.

Client: Michael J. Zamboni, CH2MHILL, Chantilly, VA, 20151

This report was certified on September 17, 2009.

David Vandenberg - Managing Director

State of origin: Michigan

Accrediting authority: N/A ID:N/A

QAPP: Microbac OVD

This report contains a total of 96 pages.

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The Microbac logo consists of the word "Microbac" in a white serif font, centered within a dark teal rectangular box.

Microbac Laboratories, Inc.
Ohio Valley Division
158 Starlite Drive
Marietta, OH 45750

Phone: 800.373.4071
Fax: 740.373.4835

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Microbac REPORT L09090260
PREPARED FOR CH2MHILL, Inc
WORK ID:

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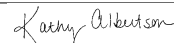
1.0 Introduction

Microbac Laboratories Inc.
REPORT NARRATIVE**Microbac Login No:** L09090260**CHAIN OF CUSTODY:** The chain of custody number was 06145**SHIPMENT CONDITIONS:** The chain of custody forms were received sealed in a cooler. The cooler temperature was 3 degrees C.**SAMPLE MANAGEMENT:** All samples received were intact.

L09090260-01	MW38D-117.0
L09090260-02	EQUIP-BLK-4
L09090260-03	MW38D-77.0
L09090260-04	MW38D-137.0
L09090260-05	MW38D-147.0
L09090260-06	MW38D-47.0
L09090260-07	MW38D-87.0
L09090260-08	MW38D-57.0
L09090260-09	MW38D-67.0
L09090260-10	MW38D-107.0
L09090260-11	MW38D-127.0
L09090260-12	MW38D-127.0-MS
L09090260-13	MW38D-127.0-MSD
L09090260-14	MW38D-97.0
L09090260-15	MW38D-97.0-FD

I certify that this data package is in compliance with the terms and conditions agreed to by the client and Microbac Laboratories Inc., both technically and for completeness, except for the conditions noted above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or designated person, as verified by the following signature.

Approved: 15-SEP-09



2.0 Data Package

2.1 General Chemistry Data

METHOD

HOLDING TIMES

Sample Analysis: All holding times were met.

PREPARATION

BATCH QA/QC

Method Blank: All acceptance criteria were met.

Laboratory Control Sample: All acceptance criteria were met.

Duplicates: All acceptance criteria were met.

Matrix Spikes: The MS/MSD recoveries for Chloride, TDS and Ammonia exceeded the advisory limits.

SAMPLES

There were no technical difficulties with the sample group.

I certify that this data package is in compliance with the terms and conditions agreed to by the client and Microbac Laboratories Inc., both technically and for completeness, except for the conditions noted above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or designated person, as verified by the following signature.

Analyst: DIH

Approved: 17-SEP-09

Lennartsson

2.1.1 Chloride Data

2.1.1.1 Summary Data

LABORATORY REPORT

L09090260

09/17/09 15:24

Submitted By

Microbac Laboratories Inc.
158 Starlite Drive
Marietta, OH 45750
(740) 373-4071

For

Account Name: CH2MHILL, Inc
CH2MHILL
15010 Conference Center Drive Suite 200
Chantilly, VA 20151
Attention: Michael J. Zamboni

Project Number: 2736.006
Project: MI-Dow Ludington
Site: LUDINGTON, MI

P.O. Number: 935272

Sample Analysis Summary

Client ID	Lab ID	Method	Dilution	Date Received
MW38D-117.0	L09090260-01	325.2	25	12-SEP-09
EQUIP-BLK-4	L09090260-02	325.2	1	12-SEP-09
MW38D-77.0	L09090260-03	325.2	20	12-SEP-09
MW38D-137.0	L09090260-04	325.2	2	12-SEP-09
MW38D-147.0	L09090260-05	325.2	1	12-SEP-09
MW38D-47.0	L09090260-06	325.2	10	12-SEP-09
MW38D-87.0	L09090260-07	325.2	20	12-SEP-09
MW38D-57.0	L09090260-08	325.2	25	12-SEP-09
MW38D-67.0	L09090260-09	325.2	25	12-SEP-09
MW38D-107.0	L09090260-10	325.2	25	12-SEP-09
MW38D-127.0	L09090260-11	325.2	25	12-SEP-09
MW38D-127.0-MS	L09090260-12	325.2	25	12-SEP-09
MW38D-127.0-MSD	L09090260-13	325.2	25	12-SEP-09
MW38D-97.0	L09090260-14	325.2	20	12-SEP-09
MW38D-97.0-FD	L09090260-15	325.2	20	12-SEP-09



Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-01**
Client ID: **MW38D-117.0**
Matrix: **Water**
Workgroup Number: **WG312210**
Collect Date: **09/10/2009 18:05**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **25**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/15/2009 16:16**
Cal Date: **09/15/2009 16:12**
Run Date: **09/15/2009 16:16**
File ID: **SC090915004.013**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	1190		50.0	25.0

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-02**
Client ID: **EQUIP-BLK-4**
Matrix: **Water**
Workgroup Number: **WG312187**
Collect Date: **09/10/2009 09:00**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/15/2009 14:57**
Cal Date: **09/15/2009 14:50**
Run Date: **09/15/2009 14:57**
File ID: **SC090915003.014**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6		ND	2.00	1.00

ND Not detected at or above the reporting limit (RL).

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-03**
Client ID: **MW38D-77.0**
Matrix: **Water**
Workgroup Number: **WG312187**
Collect Date: **09/10/2009 10:40**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **20**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/15/2009 15:16**
Cal Date: **09/15/2009 14:54**
Run Date: **09/15/2009 15:16**
File ID: **SC090915003.034**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	1720		40.0	20.0

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-04**
Client ID: **MW38D-137.0**
Matrix: **Water**
Workgroup Number: **WG312187**
Collect Date: **09/11/2009 10:40**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **2**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/15/2009 15:17**
Cal Date: **09/15/2009 14:54**
Run Date: **09/15/2009 15:17**
File ID: **SC090915003.035**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	182		4.00	2.00

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-05**
Client ID: **MW38D-147.0**
Matrix: **Water**
Workgroup Number: **WG312187**
Collect Date: **09/11/2009 11:30**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/15/2009 14:59**
Cal Date: **09/15/2009 14:54**
Run Date: **09/15/2009 14:59**
File ID: **SC090915003.017**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	60.9		2.00	1.00

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-06**
Client ID: **MW38D-47.0**
Matrix: **Water**
Workgroup Number: **WG312187**
Collect Date: **09/09/2009 14:45**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **10**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/15/2009 15:18**
Cal Date: **09/15/2009 14:54**
Run Date: **09/15/2009 15:18**
File ID: **SC090915003.036**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	959		20.0	10.0

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-07**
Client ID: **MW38D-87.0**
Matrix: **Water**
Workgroup Number: **WG312187**
Collect Date: **09/10/2009 11:45**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **20**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/15/2009 15:20**
Cal Date: **09/15/2009 14:54**
Run Date: **09/15/2009 15:20**
File ID: **SC090915003.037**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	1730		40.0	20.0

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-08**
Client ID: **MW38D-57.0**
Matrix: **Water**
Workgroup Number: **WG312210**
Collect Date: **09/09/2009 15:55**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **25**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/15/2009 16:17**
Cal Date: **09/15/2009 16:12**
Run Date: **09/15/2009 16:17**
File ID: **SC090915004.014**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	1480		50.0	25.0

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-09**
Client ID: **MW38D-67.0**
Matrix: **Water**
Workgroup Number: **WG312210**
Collect Date: **09/09/2009 16:20**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **25**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/15/2009 16:17**
Cal Date: **09/15/2009 16:13**
Run Date: **09/15/2009 16:17**
File ID: **SC090915004.015**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	1710		50.0	25.0

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-10**
Client ID: **MW38D-107.0**
Matrix: **Water**
Workgroup Number: **WG312210**
Collect Date: **09/10/2009 16:50**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **25**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/15/2009 16:18**
Cal Date: **09/15/2009 16:13**
Run Date: **09/15/2009 16:18**
File ID: **SC090915004.016**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	1750		50.0	25.0

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-11**
Client ID: **MW38D-127.0**
Matrix: **Water**
Workgroup Number: **WG312210**
Collect Date: **09/11/2009 09:15**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **25**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/15/2009 16:18**
Cal Date: **09/15/2009 16:12**
Run Date: **09/15/2009 16:18**
File ID: **SC090915004.017**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	1250		50.0	25.0

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-12**
Client ID: **MW38D-127.0-MS**
Matrix: **Water**
Workgroup Number: **WG312210**
Collect Date: **09/11/2009 09:15**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **25**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/15/2009 16:21**
Cal Date: **09/15/2009 16:13**
Run Date: **09/15/2009 16:21**
File ID: **SC090915004.021**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	1470		50.0	25.0

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-13**
Client ID: **MW38D-127.0-MSD**
Matrix: **Water**
Workgroup Number: **WG312210**
Collect Date: **09/11/2009 09:15**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **25**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/15/2009 16:22**
Cal Date: **09/15/2009 16:13**
Run Date: **09/15/2009 16:22**
File ID: **SC090915004.022**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	1500		50.0	25.0

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-14**
Client ID: **MW38D-97.0**
Matrix: **Water**
Workgroup Number: **WG312187**
Collect Date: **09/10/2009 15:40**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **20**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/15/2009 15:30**
Cal Date: **09/15/2009 14:54**
Run Date: **09/15/2009 15:30**
File ID: **SC090915003.047**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	1750		40.0	20.0

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-15**
Client ID: **MW38D-97.0-FD**
Matrix: **Water**
Workgroup Number: **WG312187**
Collect Date: **09/10/2009 15:45**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **20**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/15/2009 15:32**
Cal Date: **09/15/2009 14:54**
Run Date: **09/15/2009 15:32**
File ID: **SC090915003.048**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	1790		40.0	20.0

2.1.1.2 QC Summary Data

METHOD BLANK SUMMARY

Login Number: L09090260
 Blank File ID: SC090915003.010
 Prep Date: 09/15/09 14:55
 Analyzed Date: 09/15/09 14:55
 Analyst: JBK

Work Group: WG312187
 Blank Sample ID: WG312187-01
 Instrument ID: SMARTCHEM
 Method: 325.2

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG312187-02	SC090915003.011	09/15/09 14:55	01
LCS2	WG312187-03	SC090915003.012	09/15/09 14:56	01
EQUIP-BLK-4	L09090260-02	SC090915003.014	09/15/09 14:57	01
MW38D-147.0	L09090260-05	SC090915003.017	09/15/09 14:59	01
MW38D-77.0	L09090260-03	SC090915003.034	09/15/09 15:16	DL01
MW38D-137.0	L09090260-04	SC090915003.035	09/15/09 15:17	DL01
MW38D-47.0	L09090260-06	SC090915003.036	09/15/09 15:18	DL01
MW38D-87.0	L09090260-07	SC090915003.037	09/15/09 15:20	DL01
MW38D-97.0	L09090260-14	SC090915003.047	09/15/09 15:30	DL01
MW38D-97.0-FD	L09090260-15	SC090915003.048	09/15/09 15:32	DL01
DUP	WG312187-05	SC090915003.056	09/15/09 15:45	DL01



METHOD BLANK SUMMARY

Login Number: L09090260
 Blank File ID: SC090915004.010
 Prep Date: 09/15/09 16:14
 Analyzed Date: 09/15/09 16:14
 Analyst: JBK

Work Group: WG312210
 Blank Sample ID: WG312210-01
 Instrument ID: SMARTCHEM
 Method: 325.2

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG312210-02	SC090915004.011	09/15/09 16:15	01
LCS2	WG312210-03	SC090915004.012	09/15/09 16:16	01
MW38D-117.0	L09090260-01	SC090915004.013	09/15/09 16:16	DL01
MW38D-57.0	L09090260-08	SC090915004.014	09/15/09 16:17	DL01
MW38D-67.0	L09090260-09	SC090915004.015	09/15/09 16:17	DL01
MW38D-107.0	L09090260-10	SC090915004.016	09/15/09 16:18	DL01
MW38D-127.0	L09090260-11	SC090915004.017	09/15/09 16:18	DL01
DUP	WG312210-05	SC090915004.018	09/15/09 16:19	DL01
MW38D-127.0-MS	L09090260-12	SC090915004.021	09/15/09 16:21	DL01
MW38D-127.0-MSD	L09090260-13	SC090915004.022	09/15/09 16:22	DL01

Report Name: BLANK_SUMMARY
 PDF File ID: 1492073
 Report generated 09/17/2009 14:19



Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L09090260 Prep Date: 09/15/09 14:55 Sample ID: WG312187-01
Instrument ID: SMARTCHEM Run Date: 09/15/09 14:55 Prep Method: 325.2
File ID: SC090915003.010 Analyst: JBK Method: 325.2
Workgroup (AAB#): WG312187 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: SMARTC - 15-SEP-09

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Chloride	1.00	2.00	2.00	1	ND

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1492074

17-SEP-2009 14:19



Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L09090260 Prep Date: 09/15/09 16:14 Sample ID: WG312210-01
Instrument ID: SMARTCHEM Run Date: 09/15/09 16:14 Prep Method: 325.2
File ID: SC090915004.010 Analyst: JBK Method: 325.2
Workgroup (AAB#): WG312210 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: SMARTC - 15-SEP-09

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Chloride	1.00	2.00	-2.83	1	*

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1492074

17-SEP-2009 14:19



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09090260 Analyst: JBK Prep Method: 325.2
Instrument ID: SMARTCHEM Matrix: Water Method: 325.2
Workgroup (AAB#): WG312187 Units: mg/L
QC Key: DOWBOA2006 Lot #: STD35142
Sample ID: WG312187-02 LCS File ID: SC090915003.011 Run Date: 09/15/2009 14:55
Sample ID: WG312187-03 LCS2 File ID: SC090915003.012 Run Date: 09/15/2009 14:56

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Chloride	50.0	50.6	101	50.0	50.1	100	1.08	90 - 110	10	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 1492075
Report generated: 09/17/2009 14:20



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09090260 Analyst: JBK Prep Method: 325.2
 Instrument ID: SMARTCHEM Matrix: Water Method: 325.2
 Workgroup (AAB#): WG312210 Units: mg/L
 QC Key: DOWBOA2006 Lot #: STD35142
 Sample ID: WG312210-02 LCS File ID: SC090915004.011 Run Date: 09/15/2009 16:15
 Sample ID: WG312210-03 LCS2 File ID: SC090915004.012 Run Date: 09/15/2009 16:16

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Chloride	50.0	48.5	97.0	50.0	49.9	99.7	2.74	90 - 110	10	



MS/MSD REPORT

Loginnum: L09090260 Cal ID: SMARTCHEM- 15-SEP-09
 Instrument ID: SMARTCHEM Contract #: _____
 Parent ID: L09090260-11 File ID: SC090915004.017 Dil: 25
 Sample ID: L09090260-12 MS File ID: SC090915004.021 Dil: 25
 Sample ID: L09090260-13 MSD File ID: SC090915004.022 Dil: 25

Worknum: WG312210
 Prep Method: 325.2
 Method: 325.2
 Matrix: Water
 Units: mg/L

Analyte	Parent	MS Spiked	MS Found	MS %Rec	MSD Spiked	MSD Found	MSD %Rec	%RPD	%Rec Limits	RPD Limit	Q
Chloride	1250	20.0	1470	1070	20.0	1500	1230	2.19	90 - 110	10	*

* FAILS %REC LIMIT

FAILS RPD LIMIT

2.1.2 Ammonia Data

2.1.2.1 Summary Data

LABORATORY REPORT

L09090260

09/17/09 15:24

Submitted By

Microbac Laboratories Inc.
158 Starlite Drive
Marietta, OH 45750
(740) 373-4071

For

Account Name: CH2MHILL, Inc
CH2MHILL
15010 Conference Center Drive Suite 200
Chantilly, VA 20151
Attention: Michael J. Zamboni

Project Number: 2736.006
Project: MI-Dow Ludington
Site: LUDINGTON, MI

P.O. Number: 935272

Sample Analysis Summary

Client ID	Lab ID	Method	Dilution	Date Received
MW38D-117.0	L09090260-01	350.1	4	12-SEP-09
EQUIP-BLK-4	L09090260-02	350.1	1	12-SEP-09
MW38D-77.0	L09090260-03	350.1	2	12-SEP-09
MW38D-137.0	L09090260-04	350.1	1	12-SEP-09
MW38D-147.0	L09090260-05	350.1	1	12-SEP-09
MW38D-47.0	L09090260-06	350.1	2	12-SEP-09
MW38D-87.0	L09090260-07	350.1	4	12-SEP-09
MW38D-57.0	L09090260-08	350.1	4	12-SEP-09
MW38D-67.0	L09090260-09	350.1	2	12-SEP-09
MW38D-107.0	L09090260-10	350.1	8	12-SEP-09
MW38D-127.0	L09090260-11	350.1	4	12-SEP-09
MW38D-127.0-MS	L09090260-12	350.1	4	12-SEP-09
MW38D-127.0-MSD	L09090260-13	350.1	4	12-SEP-09
MW38D-97.0	L09090260-14	350.1	8	12-SEP-09
MW38D-97.0-FD	L09090260-15	350.1	8	12-SEP-09



Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-01**
Client ID: **MW38D-117.0**
Matrix: **Water**
Workgroup Number: **WG312223**
Collect Date: **09/10/2009 18:05**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **4**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/16/2009 10:29**
Cal Date: **09/16/2009 09:27**
Run Date: **09/16/2009 10:29**
File ID: **SC090916001.063**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	6.32		0.400	0.200

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-02**
Client ID: **EQUIP-BLK-4**
Matrix: **Water**
Workgroup Number: **WG312223**
Collect Date: **09/10/2009 09:00**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/16/2009 09:43**
Cal Date: **09/16/2009 09:27**
Run Date: **09/16/2009 09:43**
File ID: **SC090916001.025**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7		ND	0.100	0.0500

ND Not detected at or above the reporting limit (RL).

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-03**
Client ID: **MW38D-77.0**
Matrix: **Water**
Workgroup Number: **WG312223**
Collect Date: **09/10/2009 10:40**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **2**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/16/2009 10:31**
Cal Date: **09/16/2009 09:27**
Run Date: **09/16/2009 10:31**
File ID: **SC090916001.064**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	5.66		0.200	0.100

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-04**
Client ID: **MW38D-137.0**
Matrix: **Water**
Workgroup Number: **WG312223**
Collect Date: **09/11/2009 10:40**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/16/2009 09:45**
Cal Date: **09/16/2009 09:27**
Run Date: **09/16/2009 09:45**
File ID: **SC090916001.027**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	0.396		0.100	0.0500

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-05**
Client ID: **MW38D-147.0**
Matrix: **Water**
Workgroup Number: **WG312223**
Collect Date: **09/11/2009 11:30**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/16/2009 09:46**
Cal Date: **09/16/2009 09:27**
Run Date: **09/16/2009 09:46**
File ID: **SC090916001.028**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	0.263		0.100	0.0500

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-06**
Client ID: **MW38D-47.0**
Matrix: **Water**
Workgroup Number: **WG312223**
Collect Date: **09/09/2009 14:45**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **2**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/16/2009 10:33**
Cal Date: **09/16/2009 09:27**
Run Date: **09/16/2009 10:33**
File ID: **SC090916001.065**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	5.95		0.200	0.100

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-07**
Client ID: **MW38D-87.0**
Matrix: **Water**
Workgroup Number: **WG312223**
Collect Date: **09/10/2009 11:45**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **4**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/16/2009 10:35**
Cal Date: **09/16/2009 09:27**
Run Date: **09/16/2009 10:35**
File ID: **SC090916001.066**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	10.6		0.400	0.200

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-08**
Client ID: **MW38D-57.0**
Matrix: **Water**
Workgroup Number: **WG312223**
Collect Date: **09/09/2009 15:55**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **4**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/16/2009 10:36**
Cal Date: **09/16/2009 09:27**
Run Date: **09/16/2009 10:36**
File ID: **SC090916001.067**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	6.12		0.400	0.200

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-09**
Client ID: **MW38D-67.0**
Matrix: **Water**
Workgroup Number: **WG312223**
Collect Date: **09/09/2009 16:20**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **2**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/16/2009 10:40**
Cal Date: **09/16/2009 09:27**
Run Date: **09/16/2009 10:40**
File ID: **SC090916001.070**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	5.79		0.200	0.100

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-10**
Client ID: **MW38D-107.0**
Matrix: **Water**
Workgroup Number: **WG312225**
Collect Date: **09/10/2009 16:50**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **8**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/16/2009 10:47**
Cal Date: **09/16/2009 09:27**
Run Date: **09/16/2009 10:47**
File ID: **SC090916001.074**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	10.6		0.800	0.400

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-11**
Client ID: **MW38D-127.0**
Matrix: **Water**
Workgroup Number: **WG312223**
Collect Date: **09/11/2009 09:15**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **4**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/16/2009 10:42**
Cal Date: **09/16/2009 09:27**
Run Date: **09/16/2009 10:42**
File ID: **SC090916001.071**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	6.58		0.400	0.200

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-12**
Client ID: **MW38D-127.0-MS**
Matrix: **Water**
Workgroup Number: **WG312223**
Collect Date: **09/11/2009 09:15**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **4**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/16/2009 10:44**
Cal Date: **09/16/2009 09:27**
Run Date: **09/16/2009 10:44**
File ID: **SC090916001.072**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	8.06		0.400	0.200

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-13**
Client ID: **MW38D-127.0-MSD**
Matrix: **Water**
Workgroup Number: **WG312223**
Collect Date: **09/11/2009 09:15**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **4**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/16/2009 10:45**
Cal Date: **09/16/2009 09:27**
Run Date: **09/16/2009 10:45**
File ID: **SC090916001.073**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	7.86		0.400	0.200

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-14**
Client ID: **MW38D-97.0**
Matrix: **Water**
Workgroup Number: **WG312225**
Collect Date: **09/10/2009 15:40**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **8**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/16/2009 10:49**
Cal Date: **09/16/2009 09:27**
Run Date: **09/16/2009 10:49**
File ID: **SC090916001.075**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	11.1		0.800	0.400

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-15**
Client ID: **MW38D-97.0-FD**
Matrix: **Water**
Workgroup Number: **WG312225**
Collect Date: **09/10/2009 15:45**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **8**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/16/2009 10:51**
Cal Date: **09/16/2009 09:27**
Run Date: **09/16/2009 10:51**
File ID: **SC090916001.076**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	11.1		0.800	0.400

2.1.2.2 QC Summary Data

METHOD BLANK SUMMARY

Login Number: L09090260
 Blank File ID: SC090916001.009
 Prep Date: 09/16/09 09:29
 Analyzed Date: 09/16/09 09:29
 Analyst: DIH

Work Group: WG312223
 Blank Sample ID: WG312223-01
 Instrument ID: SMARTCHEM
 Method: 350.1

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG312223-02	SC090916001.010	09/16/09 09:30	01
EQUIP-BLK-4	L09090260-02	SC090916001.025	09/16/09 09:43	01
MW38D-137.0	L09090260-04	SC090916001.027	09/16/09 09:45	01
MW38D-147.0	L09090260-05	SC090916001.028	09/16/09 09:46	01
DUP	WG312223-06	SC090916001.038	09/16/09 09:55	01
LCS2	WG312223-03	SC090916001.058	09/16/09 10:13	01
MW38D-117.0	L09090260-01	SC090916001.063	09/16/09 10:29	DL01
MW38D-77.0	L09090260-03	SC090916001.064	09/16/09 10:31	DL01
MW38D-47.0	L09090260-06	SC090916001.065	09/16/09 10:33	DL01
MW38D-87.0	L09090260-07	SC090916001.066	09/16/09 10:35	DL01
MW38D-57.0	L09090260-08	SC090916001.067	09/16/09 10:36	DL01
MW38D-67.0	L09090260-09	SC090916001.070	09/16/09 10:40	DL01
MW38D-127.0	L09090260-11	SC090916001.071	09/16/09 10:42	DL01
MW38D-127.0-MS	L09090260-12	SC090916001.072	09/16/09 10:44	DL01
MW38D-127.0-MSD	L09090260-13	SC090916001.073	09/16/09 10:45	DL01

METHOD BLANK SUMMARY

Login Number: L09090260
 Blank File ID: SC090916001.039
 Prep Date: 09/16/09 09:56
 Analyzed Date: 09/16/09 09:56
 Analyst: DIH

Work Group: WG312225
 Blank Sample ID: WG312225-01
 Instrument ID: SMARTCHEM
 Method: 350.1

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG312225-02	SC090916001.040	09/16/09 09:57	01
LCS2	WG312225-03	SC090916001.041	09/16/09 09:58	01
MW38D-107.0	L09090260-10	SC090916001.074	09/16/09 10:47	DL01
MW38D-97.0	L09090260-14	SC090916001.075	09/16/09 10:49	DL01
MW38D-97.0-FD	L09090260-15	SC090916001.076	09/16/09 10:51	DL01
DUP	WG312225-05	SC090916001.077	09/16/09 10:53	DL01



METHOD BLANK REPORT

Login Number: L09090260 Prep Date: 09/16/09 09:29 Sample ID: WG312223-01
Instrument ID: SMARTCHEM Run Date: 09/16/09 09:29 Prep Method: 350.1
File ID: SC090916001.009 Analyst: DIH Method: 350.1
Workgroup (AAB#): WG312223 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: SMARTC - 16-SEP-09

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Nitrogen, Ammonia	0.0500	0.100	0.100	1	ND

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1491408

16-SEP-2009 16:18



Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L09090260 Prep Date: 09/16/09 09:56 Sample ID: WG312225-01
Instrument ID: SMARTCHEM Run Date: 09/16/09 09:56 Prep Method: 350.1
File ID: SC090916001.039 Analyst: DIH Method: 350.1
Workgroup (AAB#): WG312225 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: SMARTC - 16-SEP-09

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Nitrogen, Ammonia	0.0500	0.100	0.100	1	ND

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1491408

16-SEP-2009 16:18



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09090260 Analyst: DIH Prep Method: 350.1
Instrument ID: SMARTCHEM Matrix: Water Method: 350.1
Workgroup (AAB#): WG312223 Units: mg/L
QC Key: DOWBOA2006 Lot #: STD33211
Sample ID: WG312223-02 LCS File ID: SC090916001.010 Run Date: 09/16/2009 09:30
Sample ID: WG312223-03 LCS2 File ID: SC090916001.058 Run Date: 09/16/2009 10:13

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Nitrogen, Ammonia	2.00	1.86	93.1	2.00	1.82	90.9	2.41	90 - 110	25	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 1491409
Report generated: 09/16/2009 16:18



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09090260 Analyst: DIH Prep Method: 350.1
Instrument ID: SMARTCHEM Matrix: Water Method: 350.1
Workgroup (AAB#): WG312225 Units: mg/L
QC Key: DOWBOA2006 Lot #: STD33211
Sample ID: WG312225-02 LCS File ID: SC090916001.040 Run Date: 09/16/2009 09:57
Sample ID: WG312225-03 LCS2 File ID: SC090916001.041 Run Date: 09/16/2009 09:58

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Nitrogen, Ammonia	2.00	1.89	94.7	2.00	1.81	90.7	4.37	90 - 110	25	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 1491409
Report generated: 09/16/2009 16:18



MS/MSD REPORT

Loginnum: L09090260 Cal ID: SMARTCHEM- 16-SEP-09
 Instrument ID: SMARTCHEM Contract #: _____
 Parent ID: L09090260-11 File ID: SC090916001.071 Dil: 4
 Sample ID: L09090260-12 MS File ID: SC090916001.072 Dil: 4
 Sample ID: L09090260-13 MSD File ID: SC090916001.073 Dil: 4

Worknum: WG312223
 Prep Method: 350.1
 Method: 350.1
 Matrix: Water
 Units: mg/L

Analyte	Parent	MS Spiked	MS Found	MS %Rec	MSD Spiked	MSD Found	MSD %Rec	%RPD	%Rec Limits	RPD Limit	Q
Nitrogen, Ammonia	6.58	1.00	8.06	148	1.00	7.86	129	2.43	70 - 125	25	*

* FAILS %REC LIMIT

FAILS RPD LIMIT

2.1.3 Total Dissolved Solids Data

2.1.3.1 Summary Data

LABORATORY REPORT

L09090260

09/17/09 15:24

Submitted By

Microbac Laboratories Inc.
158 Starlite Drive
Marietta, OH 45750
(740) 373-4071

For

Account Name: CH2MHILL, Inc
CH2MHILL
15010 Conference Center Drive Suite 200
Chantilly, VA 20151
Attention: Michael J. Zamboni

Project Number: 2736.006
Project: MI-Dow Ludington
Site: LUDINGTON, MI

P.O. Number: 935272

Sample Analysis Summary

Client ID	Lab ID	Method	Dilution	Date Received
MW38D-117.0	L09090260-01	160.1	1	12-SEP-09
EQUIP-BLK-4	L09090260-02	160.1	1	12-SEP-09
MW38D-77.0	L09090260-03	160.1	1	12-SEP-09
MW38D-137.0	L09090260-04	160.1	1	12-SEP-09
MW38D-147.0	L09090260-05	160.1	1	12-SEP-09
MW38D-47.0	L09090260-06	160.1	1	12-SEP-09
MW38D-87.0	L09090260-07	160.1	1	12-SEP-09
MW38D-57.0	L09090260-08	160.1	1	12-SEP-09
MW38D-67.0	L09090260-09	160.1	1	12-SEP-09
MW38D-107.0	L09090260-10	160.1	1	12-SEP-09
MW38D-127.0	L09090260-11	160.1	1	12-SEP-09
MW38D-127.0-MS	L09090260-12	160.1	1	12-SEP-09
MW38D-127.0-MSD	L09090260-13	160.1	1	12-SEP-09
MW38D-97.0	L09090260-14	160.1	1	12-SEP-09
MW38D-97.0-FD	L09090260-15	160.1	1	12-SEP-09



Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-01**
Client ID: **MW38D-117.0**
Matrix: **Water**
Workgroup Number: **WG312008**
Collect Date: **09/10/2009 18:05**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/15/2009 13:45**
Cal Date:
Run Date: **09/15/2009 13:45**
File ID: **EN.0909151345-15**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		2700		20.0	10.0

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-02**
Client ID: **EQUIP-BLK-4**
Matrix: **Water**
Workgroup Number: **WG312008**
Collect Date: **09/10/2009 09:00**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/15/2009 13:45**
Cal Date:
Run Date: **09/15/2009 13:45**
File ID: **EN.0909151345-20**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids			ND	10.0	5.00

ND Not detected at or above the reporting limit (RL).

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-03**
Client ID: **MW38D-77.0**
Matrix: **Water**
Workgroup Number: **WG312008**
Collect Date: **09/10/2009 10:40**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/15/2009 13:45**
Cal Date:
Run Date: **09/15/2009 13:45**
File ID: **EN.0909151345-10**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		3400		20.0	10.0

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-04**
Client ID: **MW38D-137.0**
Matrix: **Water**
Workgroup Number: **WG312008**
Collect Date: **09/11/2009 10:40**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/15/2009 13:45**
Cal Date:
Run Date: **09/15/2009 13:45**
File ID: **EN.0909151345-19**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		738		20.0	10.0

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-05**
Client ID: **MW38D-147.0**
Matrix: **Water**
Workgroup Number: **WG312008**
Collect Date: **09/11/2009 11:30**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/15/2009 13:45**
Cal Date:
Run Date: **09/15/2009 13:45**
File ID: **EN.0909151345-09**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		448		20.0	10.0

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-06**
Client ID: **MW38D-47.0**
Matrix: **Water**
Workgroup Number: **WG312008**
Collect Date: **09/09/2009 14:45**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/15/2009 13:45**
Cal Date:
Run Date: **09/15/2009 13:45**
File ID: **EN.0909151345-06**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		2240		20.0	10.0

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-07**
Client ID: **MW38D-87.0**
Matrix: **Water**
Workgroup Number: **WG312008**
Collect Date: **09/10/2009 11:45**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/15/2009 13:45**
Cal Date:
Run Date: **09/15/2009 13:45**
File ID: **EN.0909151345-11**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		3700		20.0	10.0

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-08**
Client ID: **MW38D-57.0**
Matrix: **Water**
Workgroup Number: **WG312008**
Collect Date: **09/09/2009 15:55**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/15/2009 13:45**
Cal Date:
Run Date: **09/15/2009 13:45**
File ID: **EN.0909151345-07**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		3070		20.0	10.0

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-09**
Client ID: **MW38D-67.0**
Matrix: **Water**
Workgroup Number: **WG312008**
Collect Date: **09/09/2009 16:20**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/15/2009 13:45**
Cal Date:
Run Date: **09/15/2009 13:45**
File ID: **EN.0909151345-08**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		3010		20.0	10.0

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-10**
Client ID: **MW38D-107.0**
Matrix: **Water**
Workgroup Number: **WG312008**
Collect Date: **09/10/2009 16:50**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/15/2009 13:45**
Cal Date:
Run Date: **09/15/2009 13:45**
File ID: **EN.0909151345-14**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		3730		20.0	10.0

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-11**
Client ID: **MW38D-127.0**
Matrix: **Water**
Workgroup Number: **WG312008**
Collect Date: **09/11/2009 09:15**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/15/2009 13:45**
Cal Date:
Run Date: **09/15/2009 13:45**
File ID: **EN.0909151345-16**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		3280		20.0	10.0

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-12**
Client ID: **MW38D-127.0-MS**
Matrix: **Water**
Workgroup Number: **WG312008**
Collect Date: **09/11/2009 09:15**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/15/2009 13:45**
Cal Date:
Run Date: **09/15/2009 13:45**
File ID: **EN.0909151345-17**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		3460		20.0	10.0

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-13**
Client ID: **MW38D-127.0-MSD**
Matrix: **Water**
Workgroup Number: **WG312008**
Collect Date: **09/11/2009 09:15**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/15/2009 13:45**
Cal Date:
Run Date: **09/15/2009 13:45**
File ID: **EN.0909151345-18**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		3920		20.0	10.0

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-14**
Client ID: **MW38D-97.0**
Matrix: **Water**
Workgroup Number: **WG312008**
Collect Date: **09/10/2009 15:40**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/15/2009 13:45**
Cal Date:
Run Date: **09/15/2009 13:45**
File ID: **EN.0909151345-12**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		3970		20.0	10.0

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-15**
Client ID: **MW38D-97.0-FD**
Matrix: **Water**
Workgroup Number: **WG312008**
Collect Date: **09/10/2009 15:45**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/15/2009 13:45**
Cal Date:
Run Date: **09/15/2009 13:45**
File ID: **EN.0909151345-13**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		3940		20.0	10.0

2.1.3.2 QC Summary Data

METHOD BLANK SUMMARY

Login Number: L09090260
 Blank File ID: EN.0909151345-01
 Prep Date: 09/15/09 13:45
 Analyzed Date: 09/15/09 13:45
 Analyst: HJR

Work Group: WG312008
 Blank Sample ID: WG312008-01
 Instrument ID: OVEN
 Method: 160.1

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG312008-02	EN.0909151345-02	09/15/09 13:45	
LCS2	WG312008-03	EN.0909151345-03	09/15/09 13:45	
MW38D-47.0	L09090260-06	EN.0909151345-06	09/15/09 13:45	
MW38D-57.0	L09090260-08	EN.0909151345-07	09/15/09 13:45	
MW38D-67.0	L09090260-09	EN.0909151345-08	09/15/09 13:45	
MW38D-147.0	L09090260-05	EN.0909151345-09	09/15/09 13:45	
MW38D-77.0	L09090260-03	EN.0909151345-10	09/15/09 13:45	
MW38D-87.0	L09090260-07	EN.0909151345-11	09/15/09 13:45	
MW38D-97.0	L09090260-14	EN.0909151345-12	09/15/09 13:45	
MW38D-97.0-FD	L09090260-15	EN.0909151345-13	09/15/09 13:45	
MW38D-107.0	L09090260-10	EN.0909151345-14	09/15/09 13:45	
MW38D-117.0	L09090260-01	EN.0909151345-15	09/15/09 13:45	
MW38D-127.0	L09090260-11	EN.0909151345-16	09/15/09 13:45	
MW38D-127.0-MS	L09090260-12	EN.0909151345-17	09/15/09 13:45	
MW38D-127.0-MSD	L09090260-13	EN.0909151345-18	09/15/09 13:45	
MW38D-137.0	L09090260-04	EN.0909151345-19	09/15/09 13:45	
EQUIP-BLK-4	L09090260-02	EN.0909151345-20	09/15/09 13:45	
DUP	WG312008-05	EN.0909151345-22	09/15/09 13:45	



Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L09090260 Prep Date: 09/15/09 13:45 Sample ID: WG312008-01
Instrument ID: OVEN Run Date: 09/15/09 13:45 Prep Method: 160.1
File ID: EN.0909151345-01 Analyst: HJR Method: 160.1
Workgroup (AAB#): WG312008 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: OVEN -

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Total Dissolved Solids	5.00	10.0	10.0	1	ND

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1492004

17-SEP-2009 13:58



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09090260 Analyst: HJR Prep Method: 160.1
Instrument ID: OVEN Matrix: Water Method: 160.1
Workgroup (AAB#): WG312008 Units: mg/L
QC Key: DOWBOA2006 Lot #: STD32441
Sample ID: WG312008-02 LCS File ID: EN.0909151345-02 Run Date: 09/15/2009 13:45
Sample ID: WG312008-03 LCS2 File ID: EN.0909151345-03 Run Date: 09/15/2009 13:45

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Total Dissolved Solids	500	488	97.6	500	490	98.0	0.409	80 - 120	25	



MS/MSD REPORT

Loginnum: L09090260Cal ID: OVEN-Worknum: WG312008Instrument ID: OVEN

Contract #: _____

Prep Method: 160.1Parent ID: L09090260-11File ID: EN.0909151345-16Dil: 1Method: 160.1Sample ID: L09090260-12 MSFile ID: EN.0909151345-17Dil: 1Matrix: WaterSample ID: L09090260-13 MSDFile ID: EN.0909151345-18Dil: 1Units: mg/L

Analyte	Parent	MS Spiked	MS Found	MS %Rec	MSD Spiked	MSD Found	MSD %Rec	%RPD	%Rec Limits	RPD Limit	Q
Total Dissolved Solids	3280	500	3460	34.8	500	3920	127	12.5	80 - 120	25	*

* FAILS %REC LIMIT

FAILS RPD LIMIT

MS_MSD - Modified 09/13/2009

PDF File ID: 1492006

Report generated 09/17/2009 13:58



3.0 Attachments

Microbac Laboratories Inc.
Analyst Listing
September 17, 2009

ADC - ANTHONY D. CANTER	AJF - AMANDA J. FICKIESEN	AJM - ANTHONY J. MOSSBURG
ALB - ANNIE L. BROWN	AML - ANTHONY M. LONG	BLG - BRENDA L. GREENWALT
BRG - BRENDA R. GREGORY	CAA - CASSIE A. AUGENSTEIN	CAF - CHERYL A. FLOWERS
CAH - CHARLES A. HALL	CEB - CHAD E. BARNES	CLC - CHRYS L. CRAWFORD
CLW - CHARISSA L. WINTERS	CPD - CHAD P. DAVIS	CSH - CHRIS S. HILL
DDE - DEBRA D. ELLIOTT	DEL - DON E. LIGHTFRITZ	DEV - DAVID E. VANDENBERG
DGB - DOUGLAS G. BUTCHER	DIH - DEANNA I. HESSON	DLB - DAVID L. BUMGARNER
DLP - DOROTHY L. PAYNE	DLR - DIANNA L. RAUCH	DR - DEANNA ROBERTS
ECL - ERIC C. LAWSON	EDA - ERIN D. AGEE	ERP - ERIN R. PORTER
FJB - FRANCES J. BOLDEN	HAV - HEMA VILASAGAR	HJR - HOLLY J. REED
JBK - JEREMY B. KINNEY	JDH - JUSTIN D. HESSON	JKT - JANE K. THOMPSON
JWR - JOHN W. RICHARDS	JWS - JACK W. SHEAVES	JYH - JI Y. HU
KEB - KATHRYN E. BARNES	KHR - KIM H. RHODES	KRA - KATHY R. ALBERTSON
LKN - LINDA K. NEDEFF	LSB - LESLIE S. BUCINA	MDA - MIKE D. ALBERTSON
MDC - MICHAEL D. COCHRAN	MES - MARY E. SCHILLING	MMB - MAREN M. BEERY
MRT - MICHELLE R. TAYLOR	MSW - MATT S. WILSON	NPM - NATHANIEL P. MILLER
PDM - PIERCE D. MORRIS	RAH - ROY A. HALSTEAD	RB - ROBERT BUCHANAN
REK - ROBERT E. KYER	RLK - ROBIN L. KLINGER	RWC - RODNEY W. CAMPBELL
SDH - SHANA D. HINYARD	SLM - STEPHANIE L. MOSSBURG	SLP - SHERI L. PFALZGRAF
TIP - TAE I. PARRISH	TMB - TIFFANY M. BAILEY	TMM - TAMMY M. MORRIS
VC - VICKI COLLIER	WTD - WADE T. DELONG	

September 17, 2009

Qualkey: STD

Qualifier	Description
*	Surrogate or spike compound out of range
+	Correlation coefficient for the MSA is less than 0.995
<	Result is less than the associated numerical value.
>	Result is greater than the associated numerical value.
A	See the report narrative
B	Analyte present in method blank
B1	Target analyte detected in method blank at or above the method reporting limit
B3	Target analyte detected in calibration blank at or above the method reporting limit
C	Confirmed by GC/MS
CG	Confluent growth
DL	Surrogate or spike compound was diluted out
E	Estimated concentration due to sample matrix interference
EDL	Elevated sample reporting limits, presence of non-target analytes
EMPC	Estimated Maximum Possible Concentration
F, S	Estimated result below quantitation limit; method of standard additions(MSA)
FL	Free Liquid
H1	Sample analysis performed past holding time.
I	Semiquantitative result (out of instrument calibration range)
J	The analyte was positively identified, but the quantitation was below the RL
J,B	Analyte detected in both the method blank and sample above the MDL.
J,P	Estimate; columns don't agree to within 40%
J,S	Estimated concentration; analyzed by method of standard addition (MSA)
L	Sample reporting limits elevated due to matrix interference
L1	The associated blank spike (LCS) recovery was above the laboratory acceptance limits.
L2	The associated blank spike (LCS) recovery was below the laboratory acceptance limits.
M	Matrix effect; the concentration is an estimate due to matrix effect.
N	Tentatively identified compound(TIC)
NA	Not applicable
ND	Not detected at or above the reporting limit (RL).
ND, L	Not detected; sample reporting limit (RL) elevated due to interference
ND, S	Not detected; analyzed by method of standard addition (MSA)
NF	Not found by library search
NFL	No free liquid
NI	Non-ignitable
NR	Analyte is not required to be analyzed
NS	Not spiked
P	Concentrations >40% difference between the two GC columns
Q	One or more quality control criteria fail. See narrative.
QNS	Quantity of sample not sufficient to perform analysis
RA	Reanalysis confirms reported results
RE	Reanalysis confirms sample matrix interference
S	Analyzed by method of standard addition (MSA)
SMI	Sample matrix interference on surrogate
SP	Reported results are for spike compounds only
TIC	Library Search Compound
TNTC	Too numerous to count
U	Undetected; the concentration is below the reported MDL.
UJ	Undetected; the MDL and RL are estimated due to quality control discrepancies.
W	Post-digestion spike for furnace AA out of control limits
X	Exceeds regulatory limit
X, S	Exceeds regulatory limit; method of standard additions (MSA)
Z	Cannot be resolved from isomer - see below

*****Special Notes for Organic Analytes**

1. Acrolein and acrylonitrile by method 624 are semi-quantitative screens only.
2. 1,2-Diphenylhydrazine is unstable and is reported as azobenzene.
3. N-nitrosodiphenylamine cannot be separated from diphenylamine.
4. 3-Methylphenol and 4-Methylphenol are unresolvable compounds.
5. m-Xylene and p-Xylene are unresolvable compounds.
6. The reporting limits for Appendix II/IX compounds by method 8270 are based on EPA estimated PQLs referenced in 40 CFR Part 264, Appendix IX. They are not always achievable for every compound and are matrix dependent.



COC No. A 06145

158 Starlite Drive

Marietta, OH 45750

Microbac

Phone: 740-373-4071

Fax: 740-373-4835

CHAIN-OF-CUSTODY RECORD

Company Name: CH2M Hill		Contact Phone #: 703-376-5111		Location: Ludington, MI		Project ID: Don-Ludington		Project Name: Don-Ludington		Project Address: Don-Ludington		Project City: Don-Ludington		Project State: Don-Ludington		Project Zip: Don-Ludington		Project Country: Don-Ludington		Project Other: Don-Ludington		Project Program: Don-Ludington		Project Additional Requirements: Don-Ludington	
Project Contact: Mike Zamboni		Contact Phone #: 703-376-5111		Location: Ludington, MI		Project ID: Don-Ludington		Project Name: Don-Ludington		Project Address: Don-Ludington		Project City: Don-Ludington		Project State: Don-Ludington		Project Zip: Don-Ludington		Project Country: Don-Ludington		Project Other: Don-Ludington		Project Program: Don-Ludington		Project Additional Requirements: Don-Ludington	
Turn Around Requirements: Standard		Contact Phone #: 703-376-5111		Location: Ludington, MI		Project ID: Don-Ludington		Project Name: Don-Ludington		Project Address: Don-Ludington		Project City: Don-Ludington		Project State: Don-Ludington		Project Zip: Don-Ludington		Project Country: Don-Ludington		Project Other: Don-Ludington		Project Program: Don-Ludington		Project Additional Requirements: Don-Ludington	
Project ID: Don-Ludington		Contact Phone #: 703-376-5111		Location: Ludington, MI		Project ID: Don-Ludington		Project Name: Don-Ludington		Project Address: Don-Ludington		Project City: Don-Ludington		Project State: Don-Ludington		Project Zip: Don-Ludington		Project Country: Don-Ludington		Project Other: Don-Ludington		Project Program: Don-Ludington		Project Additional Requirements: Don-Ludington	
Sampler (print): Nicole Wilbur		Signature: Nicole Wilbur		Date: 9/10/09		Time: 18:05		Matrix: GW		Hold: 1		Dissolved Ammonia: 1		TDS & Chloride: 1		TOTAL # (LAB USE): 1		Program: MS/MSD		Additional Requirements: MS/MSD		Received by: (Signature)		Time: (Signature)	
Sample I.D. No.		Grab		Date		Time		Matrix		Hold		Dissolved Ammonia		TDS & Chloride		TOTAL # (LAB USE)		Program		Additional Requirements		Received by:		Time	
MW38D-117.0	X	9/10/09	18:05	GW	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Equip - BLK-4	X	9/10/09	9:00	W	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
MW38D-77.0	X	9/10/09	10:40	GW	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
MW38D-137.0	X	9/11/09	10:40	GW	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
MW38D-147.0	X	9/11/09	11:30	GW	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
MW38D-47.0	X	9/9/09	14:45	GW	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
MW38D-87.0	X	9/10/09	11:45	GW	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
MW38D-57.0	X	9/10/09	15:55	GW	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
MW38D-67.0	X	9/9/09	16:20	GW	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
MW38D-107.0	X	9/10/09	16:50	GW	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
MW38D-127.0	X	9/11/09	9:15	GW	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
MW38D-97.0	X	9/10/09	15:40	GW	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
MW38D-97.0FD	X	9/10/09	15:45	GW	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
* Samples collected on 9/9 & 9/10 have		shortened hold times		221000001672		Microbac OVD		Received: 09/12/2009 09:01		By: ROBIN KLINGER		Signature: Robin J. Klinger		Date: 9/11/09		Time: 13:30		Date: 9/11/09		Time: 13:30		Date: 9/11/09		Time: 13:30	



1000001672

COOLER INSPECTION



Received: 09/12/2009 09:01
Delivery Method: FedEx
Opened By: Robin Klinger
Comments:

Login(s): L09090260

Cooler(s)

Cooler #	Temp Gun	Temp	Tracking #	COC #	Comments
0013571	H	3.0	34575057110000448696073552942004	06145	

1	Yes	Were shipping coolers sealed?
2	Yes	Were custody seals intact?
3	Yes	Were cooler temperatures in range of 0-6?
4	Yes	Was ice present?
5	Yes	Were COC's received/information complete/signed and dated?
6	Yes	Were sample containers and labels intact and match COC?
7	Yes	Were the correct containers and volumes received?
8	Yes	Were correct preservatives used? (water only)
9	Yes	Were pH ranges acceptable? (voa's excluded)
10	NA	Were VOA samples free of headspace (<6mm)?
11	Yes	Were samples received within EPA hold times?

Look closer. Go further. Do more.

Microbac - Ohio Valley Division
158 Starlite Drive
Marietta, OH 45750
Tel: (740)373-4071 Fax: (740)373-4835

Internal Chain of Custody Report

Login: L09090260

Account: 2736

Project: 2736.006

Samples: 15

Due Date: 28-SEP-2009

Samplenum **Container ID** **Products**
L09090260-01 614387 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	14-SEP-2009 10:26	RLK	
2	ANALYZ	W1	WET	14-SEP-2009 15:19	HJR	RLK
3	STORE	WET	A2	16-SEP-2009 08:21	RLK	JBK

Samplenum **Container ID** **Products**
L09090260-01 614388 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	14-SEP-2009 10:26	RLK	
2	ANALYZ	W1	WET	14-SEP-2009 15:51	TMM	JKT
3	STORE	WET	A2	17-SEP-2009 08:26	RLK	TMM

Samplenum **Container ID** **Products**
L09090260-02 614389 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	14-SEP-2009 10:26	RLK	
2	ANALYZ	W1	WET	14-SEP-2009 15:19	HJR	RLK
3	STORE	WET	A2	16-SEP-2009 08:21	RLK	JBK

Samplenum **Container ID** **Products**
L09090260-02 614390 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	14-SEP-2009 10:26	RLK	
2	ANALYZ	W1	WET	14-SEP-2009 15:51	TMM	JKT

Samplenum **Container ID** **Products**
L09090260-03 614391 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	14-SEP-2009 10:26	RLK	
2	ANALYZ	W1	WET	14-SEP-2009 15:19	HJR	RLK
3	STORE	WET	A2	16-SEP-2009 08:21	RLK	JBK

A1 - Sample Archive (COLD)

A2 - Sample Archive (AMBIENT)

F1 - Volatiles Freezer in Login

V1 - Volatiles Refrigerator in Login

W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09090260

Account: 2736

Project: 2736.006

Samples: 15

Due Date: 28-SEP-2009

Samplenum **Container ID** **Products**
L09090260-03 614392 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	14-SEP-2009 10:26	RLK	
2	ANALYZ	W1	WET	14-SEP-2009 15:51	TMM	JKT
3	STORE	WET	A2	17-SEP-2009 08:26	RLK	TMM

Samplenum **Container ID** **Products**
L09090260-04 614393 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	14-SEP-2009 10:26	RLK	
2	ANALYZ	W1	WET	14-SEP-2009 15:19	HJR	RLK
3	STORE	WET	A2	16-SEP-2009 08:22	RLK	JBK

Samplenum **Container ID** **Products**
L09090260-04 614394 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	14-SEP-2009 10:26	RLK	
2	ANALYZ	W1	WET	14-SEP-2009 15:51	TMM	JKT
3	STORE	WET	A2	17-SEP-2009 08:26	RLK	TMM

Samplenum **Container ID** **Products**
L09090260-05 614395 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	14-SEP-2009 10:26	RLK	
2	ANALYZ	W1	WET	14-SEP-2009 15:19	HJR	RLK
3	STORE	WET	A2	16-SEP-2009 08:22	RLK	JBK

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09090260

Account: 2736

Project: 2736.006

Samples: 15

Due Date: 28-SEP-2009

Samplenum **Container ID** **Products**
L09090260-05 614396 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	14-SEP-2009 10:26	RLK	
2	ANALYZ	W1	WET	14-SEP-2009 15:51	TMM	JKT
3	STORE	WET	A2	17-SEP-2009 08:26	RLK	TMM

Samplenum **Container ID** **Products**
L09090260-06 614397 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	14-SEP-2009 10:26	RLK	
2	ANALYZ	W1	WET	14-SEP-2009 15:19	HJR	RLK
3	STORE	WET	A2	16-SEP-2009 08:22	RLK	JBK

Samplenum **Container ID** **Products**
L09090260-06 614398 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	14-SEP-2009 10:26	RLK	
2	ANALYZ	W1	WET	14-SEP-2009 15:50	TMM	JKT
3	STORE	WET	A2	17-SEP-2009 08:26	RLK	TMM

Samplenum **Container ID** **Products**
L09090260-07 614399 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	14-SEP-2009 10:26	RLK	
2	ANALYZ	W1	WET	14-SEP-2009 15:19	HJR	RLK
3	STORE	WET	A2	16-SEP-2009 08:22	RLK	JBK

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09090260

Account: 2736

Project: 2736.006

Samples: 15

Due Date: 28-SEP-2009

Samplenum **Container ID** **Products**
L09090260-07 614400 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	14-SEP-2009 10:26	RLK	
2	ANALYZ	W1	WET	14-SEP-2009 15:51	TMM	JKT
3	STORE	WET	A2	17-SEP-2009 08:26	RLK	TMM

Samplenum **Container ID** **Products**
L09090260-08 614401 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	14-SEP-2009 10:26	RLK	
2	ANALYZ	W1	WET	14-SEP-2009 15:19	HJR	RLK
3	STORE	WET	A2	16-SEP-2009 08:21	RLK	JBK

Samplenum **Container ID** **Products**
L09090260-08 614402 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	14-SEP-2009 10:26	RLK	
2	ANALYZ	W1	WET	14-SEP-2009 15:51	TMM	JKT
3	STORE	WET	A2	17-SEP-2009 08:27	RLK	TMM

Samplenum **Container ID** **Products**
L09090260-09 614403 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	14-SEP-2009 10:26	RLK	
2	ANALYZ	W1	WET	14-SEP-2009 15:19	HJR	RLK
3	STORE	WET	A2	16-SEP-2009 08:22	RLK	JBK

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09090260

Account: 2736

Project: 2736.006

Samples: 15

Due Date: 28-SEP-2009

Samplenum **Container ID** **Products**
L09090260-09 614404 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	14-SEP-2009 10:26	RLK	
2	ANALYZ	W1	WET	14-SEP-2009 15:51	TMM	JKT
3	STORE	WET	A2	17-SEP-2009 08:27	RLK	TMM

Samplenum **Container ID** **Products**
L09090260-10 614405 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	14-SEP-2009 10:26	RLK	
2	ANALYZ	W1	WET	14-SEP-2009 15:19	HJR	RLK
3	STORE	WET	A2	16-SEP-2009 08:22	RLK	JBK

Samplenum **Container ID** **Products**
L09090260-10 614406 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	14-SEP-2009 10:26	RLK	
2	ANALYZ	W1	WET	14-SEP-2009 15:51	TMM	JKT
3	STORE	WET	A2	17-SEP-2009 08:27	RLK	TMM

Samplenum **Container ID** **Products**
L09090260-11 614407 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	14-SEP-2009 10:26	RLK	
2	ANALYZ	W1	WET	14-SEP-2009 15:19	HJR	RLK
3	STORE	WET	A2	16-SEP-2009 08:22	RLK	JBK

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09090260

Account: 2736

Project: 2736.006

Samples: 15

Due Date: 28-SEP-2009

Samplenum **Container ID** **Products**
L09090260-11 614408 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	14-SEP-2009 10:26	RLK	
2	ANALYZ	W1	WET	14-SEP-2009 15:50	TMM	JKT
3	STORE	WET	A2	17-SEP-2009 08:27	RLK	TMM

Samplenum **Container ID** **Products**
L09090260-12 614409 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	14-SEP-2009 10:26	RLK	
2	ANALYZ	W1	WET	14-SEP-2009 15:19	HJR	RLK
3	STORE	WET	A2	16-SEP-2009 08:22	RLK	JBK

Samplenum **Container ID** **Products**
L09090260-12 614410 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	14-SEP-2009 10:26	RLK	
2	ANALYZ	W1	WET	14-SEP-2009 15:50	TMM	JKT
3	STORE	WET	A2	17-SEP-2009 08:27	RLK	TMM

Samplenum **Container ID** **Products**
L09090260-13 614411 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	14-SEP-2009 10:26	RLK	
2	ANALYZ	W1	WET	14-SEP-2009 15:19	HJR	RLK
3	STORE	WET	A2	16-SEP-2009 08:22	RLK	JBK

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09090260

Account: 2736

Project: 2736.006

Samples: 15

Due Date: 28-SEP-2009

Samplenum **Container ID** **Products**
L09090260-13 614412 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	14-SEP-2009 10:26	RLK	
2	ANALYZ	W1	WET	14-SEP-2009 15:50	TMM	JKT
3	STORE	WET	A2	17-SEP-2009 08:27	RLK	TMM

Samplenum **Container ID** **Products**
L09090260-14 614413 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	14-SEP-2009 10:26	RLK	
2	ANALYZ	W1	WET	14-SEP-2009 15:19	HJR	RLK
3	STORE	WET	A2	16-SEP-2009 08:22	RLK	JBK

Samplenum **Container ID** **Products**
L09090260-14 614414 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	14-SEP-2009 10:26	RLK	
2	ANALYZ	W1	WET	14-SEP-2009 15:50	TMM	JKT
3	STORE	WET	A2	17-SEP-2009 08:27	RLK	TMM

Samplenum **Container ID** **Products**
L09090260-15 614415 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	14-SEP-2009 10:26	RLK	
2	ANALYZ	W1	WET	14-SEP-2009 15:19	HJR	RLK
3	STORE	WET	A2	16-SEP-2009 08:22	RLK	JBK

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09090260**Account:** 2736**Project:** 2736.006**Samples:** 15**Due Date:** 28-SEP-2009

<u>Samplenum</u>	<u>Container ID</u>	<u>Products</u>
L09090260-15	614416	NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	14-SEP-2009 10:26	RLK	
2	ANALYZ	W1	WET	14-SEP-2009 15:51	TMM	JKT
3	STORE	WET	A2	17-SEP-2009 08:27	RLK	TMM

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login





158 Starlite Drive, Marietta, OH 45750 • T:740-373-4071 • F:740-373-4835 • <http://www.microbac.com>

Laboratory Report Number: L09090356

Client: Michael J. Zamboni, CH2MHILL, Chantilly, VA, 20151

Please find enclosed the analytical results for the samples you submitted to Microbac Laboratories.

Review and compilation of your report was completed by Microbac's Sales and Service Team. If you have questions, comments or require further assistance regarding this report, please contact your team member noted in the reviewed box below at 800-373-4071. Team member e-mail addresses also appear here for your convenience.

Kathy Albertson	<i>Team Chemist/Data Specialist</i>	kalbertson@microbac.com
Stephanie Mossburg	<i>Team Chemist/Data Specialist</i>	smossburg@microbac.com
Tony Long	<i>Team Chemist/Data Specialist</i>	tlong@microbac.com
Amanda Fickiesen	<i>Client Services Specialist</i>	afickiesen@microbac.com
Annie Brown	<i>Client Services Specialist</i>	abrown@microbac.com

This report was reviewed on September 24, 2009.

Kathy Albertson - Team Chemist/Data Specialist

I certify that all test results meet all of the requirements of the accrediting authority listed below. All results for soil samples are reported on a 'dry-weight' basis unless specified otherwise. Analytical results for water and wastes are reported on a 'as received' basis unless specified otherwise. A statement of uncertainty for each analysis is available upon request. This laboratory report shall not be reproduced, except in full, without the written approval of Microbac Laboratories. The reported results are related only to the samples analyzed as received.

This report was certified on September 24, 2009.

David Vandenberg - Managing Director

State of origin: Michigan
Accrediting authority: N/A ID:N/A
QAPP: Microbac OVD
This report contains a total of 65 pages.

Look closer. Go further. Do more.



The Microbac logo consists of the word "Microbac" in a white serif font, centered within a dark teal rectangular box.

Microbac Laboratories, Inc.
Ohio Valley Division
158 Starlite Drive
Marietta, OH 45750

Phone: 800.373.4071
Fax: 740.373.4835

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Microbac REPORT L09090356
PREPARED FOR CH2MHILL, Inc
WORK ID:

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1.0 Introduction

Microbac Laboratories Inc.
REPORT NARRATIVE

Microbac Login No: L09090356

CHAIN OF CUSTODY: The chain of custody number was 09970

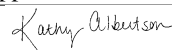
SHIPMENT CONDITIONS: The chain of custody forms were received sealed in a cooler. The cooler temperature was 0 degrees C.

SAMPLE MANAGEMENT: All samples received were intact.

L09090356-01	MW40D-127.0
L09090356-02	MW40D-127.0-FD
L09090356-03	MW40D-117.0
L09090356-04	MW40D-147.0
L09090356-05	EQUIP-BLK-5
L09090356-06	MW40D-137.0
L09090356-07	MW40D-57.0
L09090356-08	MW40D-107.0
L09090356-09	MW40D-COMP-SOIL

I certify that this data package is in compliance with the terms and conditions agreed to by the client and Microbac Laboratories Inc., both technically and for completeness, except for the conditions noted above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or designated person, as verified by the following signature.

Approved: 22-SEP-09



2.0 Data Package

LABORATORY REPORT

L09090356

09/24/09 11:16

Submitted By

Microbac Laboratories Inc.
158 Starlite Drive
Marietta , OH 45750
(740) 373 - 4071

For

Account Name: CH2MHILL, Inc
CH2MHILL
15010 Conference Center Drive Suite 200
Chantilly, VA 20151
Attention: Michael J. Zamboni

Project Number: 2736.006
Project: MI-Dow Ludington
Site: LUDINGTON, MI

P.O. Number: 935272

Sample Analysis Summary

Client ID	Lab ID	Method	Dilution	Date Received
MW40D-COMP-SOIL	L09090356-09	D2216-90	1	17-SEP-09



Report Number: **L09090356**Report Date : **September 24, 2009**

Sample Number: **L09090356-09**
Client ID: **MW40D-COMP-SOIL**
Matrix: **Soil**
Workgroup Number: **WG312591**
Collect Date: **09/15/2009 14:10**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **D2216-90**
Analytical Method: **D2216-90**
Analyst: **CPD**
Dilution: **1**
Units: **weight %**

Instrument: **BAL001**
Prep Date: **09/22/2009 08:40**
Cal Date:
Run Date: **09/22/2009 08:40**
File ID: **B1.312591-0101**

Analyte	CAS. Number	Result	Qual	RL	MDL
Percent Solids	10-02-6	84.1		1.00	1.00

2.1 General Chemistry Data

2.1.2 Chloride Data

2.1.2.1 Summary Data

LABORATORY REPORT

L09090356

09/24/09 11:16

Submitted By

Microbac Laboratories Inc.
158 Starlite Drive
Marietta, OH 45750
(740) 373-4071

For

Account Name: CH2MHILL, Inc
CH2MHILL
15010 Conference Center Drive Suite 200
Chantilly, VA 20151
Attention: Michael J. Zamboni

Project Number: 2736.006
Project: MI-Dow Ludington
Site: LUDINGTON, MI

P.O. Number: 935272

Sample Analysis Summary

Client ID	Lab ID	Method	Dilution	Date Received
MW40D-127.0	L09090356-01	325.2	1	17-SEP-09
MW40D-127.0-FD	L09090356-02	325.2	1	17-SEP-09
MW40D-117.0	L09090356-03	325.2	1	17-SEP-09
MW40D-147.0	L09090356-04	325.2	1	17-SEP-09
EQUIP-BLK-5	L09090356-05	325.2	1	17-SEP-09
MW40D-137.0	L09090356-06	325.2	1	17-SEP-09
MW40D-57.0	L09090356-07	325.2	20	17-SEP-09
MW40D-107.0	L09090356-08	325.2	1	17-SEP-09
MW40D-COMP-SOIL	L09090356-09	SM4500-C1	1	17-SEP-09



Report Number: **L09090356**Report Date : **September 24, 2009**

Sample Number: **L09090356-01**
Client ID: **MW40D-127.0**
Matrix: **Water**
Workgroup Number: **WG312455**
Collect Date: **09/15/2009 11:00**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/18/2009 13:20**
Cal Date: **09/18/2009 13:13**
Run Date: **09/18/2009 13:20**
File ID: **SC090918005.021**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	2.42		2.00	1.00

Report Number: **L09090356**Report Date : **September 24, 2009**

Sample Number: L09090356-02	PrePrep Method: NONE	Instrument: SMARTCHEM
Client ID: MW40D-127.0-FD	Prep Method: 325.2	Prep Date: 09/18/2009 13:21
Matrix: Water	Analytical Method: 325.2	Cal Date: 09/18/2009 13:13
Workgroup Number: WG312455	Analyst: JBK	Run Date: 09/18/2009 13:21
Collect Date: 09/15/2009 11:05	Dilution: 1	File ID: SC090918005.022
Sample Tag: 01	Units: mg/L	

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	2.42		2.00	1.00

Report Number: **L09090356**Report Date : **September 24, 2009**

Sample Number: **L09090356-03**
Client ID: **MW40D-117.0**
Matrix: **Water**
Workgroup Number: **WG312455**
Collect Date: **09/15/2009 10:05**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/18/2009 13:22**
Cal Date: **09/18/2009 13:13**
Run Date: **09/18/2009 13:22**
File ID: **SC090918005.023**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	2.04		2.00	1.00

Report Number: **L09090356**Report Date : **September 24, 2009**

Sample Number: **L09090356-04**
Client ID: **MW40D-147.0**
Matrix: **Water**
Workgroup Number: **WG312455**
Collect Date: **09/15/2009 14:25**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/18/2009 13:23**
Cal Date: **09/18/2009 13:13**
Run Date: **09/18/2009 13:23**
File ID: **SC090918005.024**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6		ND	2.00	1.00

ND Not detected at or above the reporting limit (RL).

Report Number: **L09090356**Report Date : **September 24, 2009**

Sample Number: **L09090356-05**
Client ID: **EQUIP-BLK-5**
Matrix: **Water**
Workgroup Number: **WG312455**
Collect Date: **09/15/2009 14:35**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/18/2009 13:23**
Cal Date: **09/18/2009 13:13**
Run Date: **09/18/2009 13:23**
File ID: **SC090918005.025**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6		ND	2.00	1.00

ND Not detected at or above the reporting limit (RL).

Report Number: **L09090356**Report Date : **September 24, 2009**

Sample Number: **L09090356-06**
Client ID: **MW40D-137.0**
Matrix: **Water**
Workgroup Number: **WG312455**
Collect Date: **09/15/2009 12:05**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/18/2009 13:24**
Cal Date: **09/18/2009 13:13**
Run Date: **09/18/2009 13:24**
File ID: **SC090918005.026**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	2.09		2.00	1.00

Report Number: **L09090356**Report Date : **September 24, 2009**

Sample Number: **L09090356-07**
Client ID: **MW40D-57.0**
Matrix: **Water**
Workgroup Number: **WG312455**
Collect Date: **09/15/2009 07:50**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **20**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/18/2009 13:42**
Cal Date: **09/18/2009 13:13**
Run Date: **09/18/2009 13:42**
File ID: **SC090918005.043**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	1860		40.0	20.0

Report Number: **L09090356**Report Date : **September 24, 2009**

Sample Number: **L09090356-08**
Client ID: **MW40D-107.0**
Matrix: **Water**
Workgroup Number: **WG312455**
Collect Date: **09/15/2009 09:20**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/18/2009 13:25**
Cal Date: **09/18/2009 13:13**
Run Date: **09/18/2009 13:25**
File ID: **SC090918005.028**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	2.37		2.00	1.00

Report Number: **L09090356**Report Date : **September 24, 2009**

Sample Number: **L09090356-09**
Client ID: **MW40D-COMP-SOIL**
Matrix: **Soil**
Workgroup Number: **WG312617**
Collect Date: **09/15/2009 14:10**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **SM4500-Cl(-)-E-2**
Analytical Method: **SM4500-Cl(-)-E-2**
Analyst: **JBK**
Dilution: **1**
Units: **mg/kg**

Instrument: **SMARTCHEM**
Prep Date: **09/21/2009 16:05**
Cal Date: **09/22/2009 09:05**
Run Date: **09/22/2009 09:09**
File ID: **SC090922001.013**
Percent Solid: **84.1**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride, Leachable	16887-00-6	142		23.6	11.8

2.1.2.2 QC Summary Data

METHOD BLANK SUMMARY

Login Number: L09090356
 Blank File ID: SC090918005.010
 Prep Date: 09/18/09 13:14
 Analyzed Date: 09/18/09 13:14
 Analyst: JBK

Work Group: WG312455
 Blank Sample ID: WG312455-01
 Instrument ID: SMARTCHEM
 Method: 325.2

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG312455-02	SC090918005.011	09/18/09 13:14	01
LCS2	WG312455-03	SC090918005.012	09/18/09 13:15	01
MW40D-127.0	L09090356-01	SC090918005.021	09/18/09 13:20	01
MW40D-127.0-FD	L09090356-02	SC090918005.022	09/18/09 13:21	01
MW40D-117.0	L09090356-03	SC090918005.023	09/18/09 13:22	01
MW40D-147.0	L09090356-04	SC090918005.024	09/18/09 13:23	01
EQUIP-BLK-5	L09090356-05	SC090918005.025	09/18/09 13:23	01
MW40D-137.0	L09090356-06	SC090918005.026	09/18/09 13:24	01
MW40D-107.0	L09090356-08	SC090918005.028	09/18/09 13:25	01
DUP	WG312455-05	SC090918005.029	09/18/09 13:25	01
MW40D-57.0	L09090356-07	SC090918005.043	09/18/09 13:42	DL01



METHOD BLANK SUMMARY

Login Number: <u>L09090356</u>	Work Group: <u>WG312617</u>
Blank File ID: <u>SC090922001.010</u>	Blank Sample ID: <u>WG312617-01</u>
Prep Date: <u>09/21/09 16:05</u>	Instrument ID: <u>SMARTCHEM</u>
Analyzed Date: <u>09/22/09 09:07</u>	Method: <u>SM4500-Cl(-)-E-2</u>
Analyst: <u>JBK</u>	

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG312617-02	SC090922001.011	09/22/09 09:08	01
LCS2	WG312617-03	SC090922001.012	09/22/09 09:09	01
MW40D-COMP-SOIL	L09090356-09	SC090922001.013	09/22/09 09:09	01
DUP	WG312617-05	SC090922001.014	09/22/09 09:10	01

Report Name: BLANK_SUMMARY
 PDF File ID: 1493323
 Report generated 09/24/2009 10:01



Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L09090356 Prep Date: 09/18/09 13:14 Sample ID: WG312455-01
Instrument ID: SMARTCHEM Run Date: 09/18/09 13:14 Prep Method: 325.2
File ID: SC090918005.010 Analyst: JBK Method: 325.2
Workgroup (AAB#): WG312455 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: SMARTC - 18-SEP-09

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Chloride	1.00	2.00	2.00	1	ND

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1493324

24-SEP-2009 10:01



METHOD BLANK REPORT

Login Number: L09090356 Prep Date: 09/21/09 16:05 Sample ID: WG312617-01
Instrument ID: SMARTCHEM Run Date: 09/22/09 09:07 Prep Method: SM4500-Cl(-)-E-
File ID: SC090922001.010 Analyst: JBK Method: SM4500-Cl(-)-E-
Workgroup (AAB#): WG312617 Matrix: Soil Units: mg/kg
Contract #: _____ Cal ID: SMARTC - 22-SEP-09

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Chloride, Leachable	10.0	20.0	-54.0	1	*

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1493324

24-SEP-2009 10:01



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09090356 Analyst: JBK Prep Method: 325.2
Instrument ID: SMARTCHEM Matrix: Water Method: 325.2
Workgroup (AAB#): WG312455 Units: mg/L
QC Key: DOWBOA2006 Lot #: STD35142
Sample ID: WG312455-02 LCS File ID: SC090918005.011 Run Date: 09/18/2009 13:14
Sample ID: WG312455-03 LCS2 File ID: SC090918005.012 Run Date: 09/18/2009 13:15

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Chloride	50.0	50.9	102	50.0	51.9	104	1.98	90 - 110	10	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 1493325
Report generated: 09/24/2009 10:01



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09090356 Analyst: JBK Prep Method: SM4500-Cl(-)-E-
Instrument ID: SMARTCHEM Matrix: Soil Method: SM4500-Cl(-)-E-
Workgroup (AAB#): WG312617 Units: mg/kg
QC Key: DOWB0A2006 Lot #: STD33071
Sample ID: WG312617-02 LCS File ID: SC090922001.011 Run Date: 09/22/2009 09:08
Sample ID: WG312617-03 LCS2 File ID: SC090922001.012 Run Date: 09/22/2009 09:09

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Chloride, Leachable	500	516	103	500	521	104	1.01	80 - 120	50	



2.1.3 Ammonia Data

2.1.3.1 Summary Data

LABORATORY REPORT

L09090356

09/24/09 11:16

Submitted By

Microbac Laboratories Inc.
158 Starlite Drive
Marietta , OH 45750
(740) 373 - 4071

For

Account Name: CH2MHILL, Inc
CH2MHILL
15010 Conference Center Drive Suite 200
Chantilly, VA 20151
Attention: Michael J. Zamboni

Project Number: 2736.006
Project: MI-Dow Ludington
Site: LUDINGTON, MI

P.O. Number: 935272

Sample Analysis Summary

Client ID	Lab ID	Method	Dilution	Date Received
MW40D-127.0	L09090356-01	350.1	2	17-SEP-09
MW40D-127.0-FD	L09090356-02	350.1	2	17-SEP-09
MW40D-117.0	L09090356-03	350.1	1	17-SEP-09
MW40D-147.0	L09090356-04	350.1	1	17-SEP-09
EQUIP-BLK-5	L09090356-05	350.1	1	17-SEP-09
MW40D-137.0	L09090356-06	350.1	1	17-SEP-09
MW40D-57.0	L09090356-07	350.1	50	17-SEP-09
MW40D-107.0	L09090356-08	350.1	2	17-SEP-09



Report Number: **L09090356**Report Date : **September 24, 2009**

Sample Number: **L09090356-01**
Client ID: **MW40D-127.0**
Matrix: **Water**
Workgroup Number: **WG312486**
Collect Date: **09/15/2009 11:00**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **2**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/21/2009 11:07**
Cal Date: **09/21/2009 11:00**
Run Date: **09/21/2009 11:07**
File ID: **SC090921002.012**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	4.55		0.200	0.100

Report Number: **L09090356**Report Date : **September 24, 2009**

Sample Number: L09090356-02	PrePrep Method: NONE	Instrument: SMARTCHEM
Client ID: MW40D-127.0-FD	Prep Method: 350.1	Prep Date: 09/21/2009 11:08
Matrix: Water	Analytical Method: 350.1	Cal Date: 09/21/2009 10:59
Workgroup Number: WG312486	Analyst: JBK	Run Date: 09/21/2009 11:08
Collect Date: 09/15/2009 11:05	Dilution: 2	File ID: SC090921002.013
Sample Tag: DL01	Units: mg/L	

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	4.96	I	0.200	0.100

I Semiquantitative result (out of instrument calibration range)

Report Number: **L09090356**Report Date : **September 24, 2009**

Sample Number: **L09090356-03**
Client ID: **MW40D-117.0**
Matrix: **Water**
Workgroup Number: **WG312486**
Collect Date: **09/15/2009 10:05**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/21/2009 11:09**
Cal Date: **09/21/2009 10:59**
Run Date: **09/21/2009 11:09**
File ID: **SC090921002.014**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	2.51	I	0.100	0.0500

I Semiquantitative result (out of instrument calibration range)

Report Number: **L09090356**Report Date : **September 24, 2009**

Sample Number: **L09090356-04**
Client ID: **MW40D-147.0**
Matrix: **Water**
Workgroup Number: **WG312486**
Collect Date: **09/15/2009 14:25**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/21/2009 11:09**
Cal Date: **09/21/2009 11:02**
Run Date: **09/21/2009 11:09**
File ID: **SC090921002.015**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	0.293		0.100	0.0500

Report Number: **L09090356**Report Date : **September 24, 2009**

Sample Number: **L09090356-05**
Client ID: **EQUIP-BLK-5**
Matrix: **Water**
Workgroup Number: **WG312486**
Collect Date: **09/15/2009 14:35**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/21/2009 11:11**
Cal Date: **09/21/2009 11:02**
Run Date: **09/21/2009 11:11**
File ID: **SC090921002.016**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	0.101		0.100	0.0500

Report Number: **L09090356**Report Date : **September 24, 2009**

Sample Number: **L09090356-06**
Client ID: **MW40D-137.0**
Matrix: **Water**
Workgroup Number: **WG312486**
Collect Date: **09/15/2009 12:05**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/21/2009 11:11**
Cal Date: **09/21/2009 11:02**
Run Date: **09/21/2009 11:11**
File ID: **SC090921002.017**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	0.343		0.100	0.0500

Report Number: **L09090356**Report Date : **September 24, 2009**

Sample Number: **L09090356-07**
Client ID: **MW40D-57.0**
Matrix: **Water**
Workgroup Number: **WG312486**
Collect Date: **09/15/2009 07:50**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **50**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/21/2009 11:34**
Cal Date: **09/21/2009 11:02**
Run Date: **09/21/2009 11:34**
File ID: **SC090921002.030**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	89.5		5.00	2.50

Report Number: **L09090356**Report Date : **September 24, 2009**

Sample Number: **L09090356-08**
Client ID: **MW40D-107.0**
Matrix: **Water**
Workgroup Number: **WG312486**
Collect Date: **09/15/2009 09:20**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **2**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/21/2009 11:15**
Cal Date: **09/21/2009 11:02**
Run Date: **09/21/2009 11:15**
File ID: **SC090921002.021**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	4.77		0.200	0.100

2.1.3.2 QC Summary Data

2.1.4 Total Dissolved Solids Data

2.1.4.1 Summary Data

LABORATORY REPORT

L09090356

09/24/09 11:16

Submitted By

Microbac Laboratories Inc.
158 Starlite Drive
Marietta , OH 45750
(740) 373 - 4071

For

Account Name: CH2MHILL, Inc
CH2MHILL
15010 Conference Center Drive Suite 200
Chantilly, VA 20151
Attention: Michael J. Zamboni

Project Number: 2736.006
Project: MI-Dow Ludington
Site: LUDINGTON, MI

P.O. Number: 935272

Sample Analysis Summary

Client ID	Lab ID	Method	Dilution	Date Received
MW40D-127.0	L09090356-01	160.1	1	17-SEP-09
MW40D-127.0-FD	L09090356-02	160.1	1	17-SEP-09
MW40D-117.0	L09090356-03	160.1	1	17-SEP-09
MW40D-147.0	L09090356-04	160.1	1	17-SEP-09
EQUIP-BLK-5	L09090356-05	160.1	1	17-SEP-09
MW40D-137.0	L09090356-06	160.1	1	17-SEP-09
MW40D-57.0	L09090356-07	160.1	1	17-SEP-09
MW40D-107.0	L09090356-08	160.1	1	17-SEP-09



Report Number: **L09090356**Report Date : **September 24, 2009**

Sample Number: **L09090356-01**
Client ID: **MW40D-127.0**
Matrix: **Water**
Workgroup Number: **WG312453**
Collect Date: **09/15/2009 11:00**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/18/2009 14:00**
Cal Date:
Run Date: **09/18/2009 14:00**
File ID: **EN.0909181400-09**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		338		20.0	10.0

Report Number: **L09090356**Report Date : **September 24, 2009**

Sample Number: **L09090356-02**
Client ID: **MW40D-127.0-FD**
Matrix: **Water**
Workgroup Number: **WG312453**
Collect Date: **09/15/2009 11:05**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/18/2009 14:00**
Cal Date:
Run Date: **09/18/2009 14:00**
File ID: **EN.0909181400-10**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		370		20.0	10.0

Report Number: **L09090356**Report Date : **September 24, 2009**

Sample Number: **L09090356-03**
Client ID: **MW40D-117.0**
Matrix: **Water**
Workgroup Number: **WG312453**
Collect Date: **09/15/2009 10:05**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/18/2009 14:00**
Cal Date:
Run Date: **09/18/2009 14:00**
File ID: **EN.0909181400-06**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		388		20.0	10.0

Report Number: **L09090356**Report Date : **September 24, 2009**

Sample Number: **L09090356-04**
Client ID: **MW40D-147.0**
Matrix: **Water**
Workgroup Number: **WG312453**
Collect Date: **09/15/2009 14:25**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/18/2009 14:00**
Cal Date:
Run Date: **09/18/2009 14:00**
File ID: **EN.0909181400-12**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		248		20.0	10.0

Report Number: **L09090356**Report Date : **September 24, 2009**

Sample Number: **L09090356-05**
Client ID: **EQUIP-BLK-5**
Matrix: **Water**
Workgroup Number: **WG312453**
Collect Date: **09/15/2009 14:35**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/18/2009 14:00**
Cal Date:
Run Date: **09/18/2009 14:00**
File ID: **EN.0909181400-16**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids			ND	10.0	5.00

ND Not detected at or above the reporting limit (RL).

Report Number: **L09090356**Report Date : **September 24, 2009**

Sample Number: **L09090356-06**
Client ID: **MW40D-137.0**
Matrix: **Water**
Workgroup Number: **WG312453**
Collect Date: **09/15/2009 12:05**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/18/2009 14:00**
Cal Date:
Run Date: **09/18/2009 14:00**
File ID: **EN.0909181400-11**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		278		20.0	10.0

Report Number: **L09090356**Report Date : **September 24, 2009**

Sample Number: **L09090356-07**
Client ID: **MW40D-57.0**
Matrix: **Water**
Workgroup Number: **WG312453**
Collect Date: **09/15/2009 07:50**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/18/2009 14:00**
Cal Date:
Run Date: **09/18/2009 14:00**
File ID: **EN.0909181400-04**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		4000		20.0	10.0

Report Number: **L09090356**Report Date : **September 24, 2009**

Sample Number: **L09090356-08**
Client ID: **MW40D-107.0**
Matrix: **Water**
Workgroup Number: **WG312453**
Collect Date: **09/15/2009 09:20**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/18/2009 14:00**
Cal Date:
Run Date: **09/18/2009 14:00**
File ID: **EN.0909181400-05**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		398		20.0	10.0

2.1.4.2 QC Summary Data

METHOD BLANK SUMMARY

Login Number: L09090356
 Blank File ID: EN.0909181400-01
 Prep Date: 09/18/09 14:00
 Analyzed Date: 09/18/09 14:00
 Analyst: HJR

Work Group: WG312453
 Blank Sample ID: WG312453-01
 Instrument ID: OVEN
 Method: 160.1

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG312453-02	EN.0909181400-02	09/18/09 14:00	
LCS2	WG312453-03	EN.0909181400-03	09/18/09 14:00	
MW40D-57.0	L09090356-07	EN.0909181400-04	09/18/09 14:00	
MW40D-107.0	L09090356-08	EN.0909181400-05	09/18/09 14:00	
MW40D-117.0	L09090356-03	EN.0909181400-06	09/18/09 14:00	
MW40D-127.0	L09090356-01	EN.0909181400-09	09/18/09 14:00	
MW40D-127.0-FD	L09090356-02	EN.0909181400-10	09/18/09 14:00	
MW40D-137.0	L09090356-06	EN.0909181400-11	09/18/09 14:00	
MW40D-147.0	L09090356-04	EN.0909181400-12	09/18/09 14:00	
EQUIP-BLK-5	L09090356-05	EN.0909181400-16	09/18/09 14:00	
DUP	WG312453-05	EN.0909181400-17	09/18/09 14:00	



Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L09090356 Prep Date: 09/18/09 14:00 Sample ID: WG312453-01
Instrument ID: OVEN Run Date: 09/18/09 14:00 Prep Method: 160.1
File ID: EN.0909181400-01 Analyst: HJR Method: 160.1
Workgroup (AAB#): WG312453 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: OVEN -

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Total Dissolved Solids	5.00	10.0	10.0	1	ND

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1494093

22-SEP-2009 11:38



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09090356 Analyst: HJR Prep Method: 160.1
Instrument ID: OVEN Matrix: Water Method: 160.1
Workgroup (AAB#): WG312453 Units: mg/L
QC Key: DOWBOA2006 Lot #: STD32441
Sample ID: WG312453-02 LCS File ID: EN.0909181400-02 Run Date: 09/18/2009 14:00
Sample ID: WG312453-03 LCS2 File ID: EN.0909181400-03 Run Date: 09/18/2009 14:00

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Total Dissolved Solids	500	502	100	500	504	101	0.398	80 - 120	25	



3.0 Attachments

Microbac Laboratories Inc.
Analyst Listing
September 24, 2009

ADC - ANTHONY D. CANTER	AJF - AMANDA J. FICKIESEN	AJM - ANTHONY J. MOSSBURG
ALB - ANNIE L. BROWN	AML - ANTHONY M. LONG	BLG - BRENDA L. GREENWALT
BRG - BRENDA R. GREGORY	CAA - CASSIE A. AUGENSTEIN	CAF - CHERYL A. FLOWERS
CAH - CHARLES A. HALL	CEB - CHAD E. BARNES	CLC - CHRYS L. CRAWFORD
CLW - CHARISSA L. WINTERS	CPD - CHAD P. DAVIS	CSH - CHRIS S. HILL
DDE - DEBRA D. ELLIOTT	DEL - DON E. LIGHTFRITZ	DEV - DAVID E. VANDENBERG
DGB - DOUGLAS G. BUTCHER	DIH - DEANNA I. HESSON	DLB - DAVID L. BUMGARNER
DLP - DOROTHY L. PAYNE	DLR - DIANNA L. RAUCH	DR - DEANNA ROBERTS
ECL - ERIC C. LAWSON	EDA - ERIN D. AGEE	ERP - ERIN R. PORTER
FJB - FRANCES J. BOLDEN	HAV - HEMA VILASAGAR	HJR - HOLLY J. REED
JBK - JEREMY B. KINNEY	JDH - JUSTIN D. HESSON	JKT - JANE K. THOMPSON
JWR - JOHN W. RICHARDS	JWS - JACK W. SHEAVES	JYH - JI Y. HU
KEB - KATHRYN E. BARNES	KHR - KIM H. RHODES	KRA - KATHY R. ALBERTSON
LKN - LINDA K. NEDEFF	LSB - LESLIE S. BUCINA	MDA - MIKE D. ALBERTSON
MDC - MICHAEL D. COCHRAN	MES - MARY E. SCHILLING	MMB - MAREN M. BEERY
MRT - MICHELLE R. TAYLOR	MSW - MATT S. WILSON	NPM - NATHANIEL P. MILLER
PDM - PIERCE D. MORRIS	RAH - ROY A. HALSTEAD	RB - ROBERT BUCHANAN
REK - ROBERT E. KYER	RLK - ROBIN L. KLINGER	RWC - RODNEY W. CAMPBELL
SDH - SHANA D. HINYARD	SLM - STEPHANIE L. MOSSBURG	SLP - SHERI L. PFALZGRAF
TIP - TAE I. PARRISH	TMB - TIFFANY M. BAILEY	TMM - TAMMY M. MORRIS
VC - VICKI COLLIER	WTD - WADE T. DELONG	

September 24, 2009

Qualkey: STD

Qualifier	Description
*	Surrogate or spike compound out of range
+	Correlation coefficient for the MSA is less than 0.995
<	Result is less than the associated numerical value.
>	Result is greater than the associated numerical value.
A	See the report narrative
B	Analyte present in method blank
B1	Target analyte detected in method blank at or above the method reporting limit
B3	Target analyte detected in calibration blank at or above the method reporting limit
C	Confirmed by GC/MS
CG	Confluent growth
DL	Surrogate or spike compound was diluted out
E	Estimated concentration due to sample matrix interference
EDL	Elevated sample reporting limits, presence of non-target analytes
EMPC	Estimated Maximum Possible Concentration
F, S	Estimated result below quantitation limit; method of standard additions(MSA)
FL	Free Liquid
H1	Sample analysis performed past holding time.
I	Semiquantitative result (out of instrument calibration range)
J	The analyte was positively identified, but the quantitation was below the RL
J,B	Analyte detected in both the method blank and sample above the MDL.
J,P	Estimate; columns don't agree to within 40%
J,S	Estimated concentration; analyzed by method of standard addition (MSA)
L	Sample reporting limits elevated due to matrix interference
L1	The associated blank spike (LCS) recovery was above the laboratory acceptance limits.
L2	The associated blank spike (LCS) recovery was below the laboratory acceptance limits.
M	Matrix effect; the concentration is an estimate due to matrix effect.
N	Tentatively identified compound(TIC)
NA	Not applicable
ND	Not detected at or above the reporting limit (RL).
ND, L	Not detected; sample reporting limit (RL) elevated due to interference
ND, S	Not detected; analyzed by method of standard addition (MSA)
NF	Not found by library search
NFL	No free liquid
NI	Non-ignitable
NR	Analyte is not required to be analyzed
NS	Not spiked
P	Concentrations >40% difference between the two GC columns
Q	One or more quality control criteria fail. See narrative.
QNS	Quantity of sample not sufficient to perform analysis
RA	Reanalysis confirms reported results
RE	Reanalysis confirms sample matrix interference
S	Analyzed by method of standard addition (MSA)
SMI	Sample matrix interference on surrogate
SP	Reported results are for spike compounds only
TIC	Library Search Compound
TNTC	Too numerous to count
U	Undetected; the concentration is below the reported MDL.
UJ	Undetected; the MDL and RL are estimated due to quality control discrepancies.
W	Post-digestion spike for furnace AA out of control limits
X	Exceeds regulatory limit
X, S	Exceeds regulatory limit; method of standard additions (MSA)
Z	Cannot be resolved from isomer - see below

*****Special Notes for Organic Analytes**

1. Acrolein and acrylonitrile by method 624 are semi-quantitative screens only.
2. 1,2-Diphenylhydrazine is unstable and is reported as azobenzene.
3. N-nitrosodiphenylamine cannot be separated from diphenylamine.
4. 3-Methylphenol and 4-Methylphenol are unresolvable compounds.
5. m-Xylene and p-Xylene are unresolvable compounds.
6. The reporting limits for Appendix II/IX compounds by method 8270 are based on EPA estimated PQLs referenced in 40 CFR Part 264, Appendix IX. They are not always achievable for every compound and are matrix dependent.

158 Starlite Drive
Marietta, OH 45750

Microbac

Phone: 740-373-4071
Fax: 740-373-4835

CHAIN-OF-CUSTODY RECORD

[illegible]

**Water (W), Soil (S), Solid Waste (SD), Unknown (X)



1000001755

COOLER INSPECTION



Received: 09/17/2009 10:15
Delivery Method: UPS
Opened By: Robin Klinger
Comments:

Login(s): L09090356

Cooler(s)

Cooler #	Temp Gun	Temp	Tracking #	COC #	Comments
0014059	G	0.0	J2142821014	09970	

1	Yes	Were shipping coolers sealed?
2	Yes	Were custody seals intact?
3	Yes	Were cooler temperatures in range of 0-6?
4	Yes	Was ice present?
5	Yes	Were COC's received/information complete/signed and dated?
6	Yes	Were sample containers and labels intact and match COC?
7	Yes	Were the correct containers and volumes received?
8	Yes	Were correct preservatives used? (water only)
9	Yes	Were pH ranges acceptable? (voa's excluded)
10	NA	Were VOA samples free of headspace (<6mm)?
11	Yes	Were samples received within EPA hold times?

Look closer. Go further. Do more.

Microbac - Ohio Valley Division
158 Starlite Drive
Marietta, OH 45750
Tel: (740)373-4071 Fax: (740)373-4835

Internal Chain of Custody Report

Login: L09090356

Account: 2736

Project: 2736.006

Samples: 9

Due Date: 01-OCT-2009

Samplenum **Container ID** **Products**
L09090356-01 615349 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	17-SEP-2009 14:42	RLK	
2	ANALYZ	W1	WET	18-SEP-2009 08:37	JBK	JKT
3	STORE	WET	A2	21-SEP-2009 10:12	HJR	JKT

Samplenum **Container ID** **Products**
L09090356-01 615350 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	17-SEP-2009 14:42	RLK	
2	ANALYZ	W1	WET	18-SEP-2009 08:34	TMM	JKT
3	STORE	WET	A2	22-SEP-2009 16:02	RLK	TMM

Samplenum **Container ID** **Products**
L09090356-02 615351 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	17-SEP-2009 14:42	RLK	
2	ANALYZ	W1	WET	18-SEP-2009 08:37	JBK	JKT
3	STORE	WET	A2	21-SEP-2009 10:12	HJR	JKT

Samplenum **Container ID** **Products**
L09090356-02 615352 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	17-SEP-2009 14:42	RLK	
2	ANALYZ	W1	WET	18-SEP-2009 08:34	TMM	JKT
3	STORE	WET	A2	22-SEP-2009 16:02	RLK	TMM

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09090356

Account: 2736

Project: 2736.006

Samples: 9

Due Date: 01-OCT-2009

Samplenum **Container ID** **Products**
L09090356-03 615353 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	17-SEP-2009 14:42	RLK	
2	ANALYZ	W1	WET	18-SEP-2009 08:37	JBK	JKT
3	STORE	WET	A2	21-SEP-2009 10:12	HJR	JKT

Samplenum **Container ID** **Products**
L09090356-03 615354 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	17-SEP-2009 14:42	RLK	
2	ANALYZ	W1	WET	18-SEP-2009 08:34	TMM	JKT
3	STORE	WET	A2	22-SEP-2009 16:02	RLK	TMM

Samplenum **Container ID** **Products**
L09090356-04 615355 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	17-SEP-2009 14:42	RLK	
2	ANALYZ	W1	WET	18-SEP-2009 08:37	JBK	JKT
3	STORE	WET	A2	21-SEP-2009 10:12	HJR	JKT

Samplenum **Container ID** **Products**
L09090356-04 615356 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	17-SEP-2009 14:42	RLK	
2	ANALYZ	W1	WET	18-SEP-2009 08:34	TMM	JKT
3	STORE	WET	A2	22-SEP-2009 16:02	RLK	TMM

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09090356

Account: 2736

Project: 2736.006

Samples: 9

Due Date: 01-OCT-2009

Samplenum **Container ID** **Products**
L09090356-05 615357 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	17-SEP-2009 14:42	RLK	
2	ANALYZ	W1	WET	18-SEP-2009 08:37	JBK	JKT
3	STORE	WET	A2	21-SEP-2009 10:12	HJR	JKT

Samplenum **Container ID** **Products**
L09090356-05 615358 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	17-SEP-2009 14:42	RLK	
2	ANALYZ	W1	WET	18-SEP-2009 08:34	TMM	JKT
3	STORE	WET	A2	22-SEP-2009 16:02	RLK	TMM

Samplenum **Container ID** **Products**
L09090356-06 615359 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	17-SEP-2009 14:42	RLK	
2	ANALYZ	W1	WET	18-SEP-2009 08:37	JBK	JKT
3	STORE	WET	A2	21-SEP-2009 10:12	HJR	JKT

Samplenum **Container ID** **Products**
L09090356-06 615360 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	17-SEP-2009 14:42	RLK	
2	ANALYZ	W1	WET	18-SEP-2009 08:34	TMM	JKT
3	STORE	WET	A2	22-SEP-2009 16:02	RLK	TMM

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09090356

Account: 2736

Project: 2736.006

Samples: 9

Due Date: 01-OCT-2009

Samplenum **Container ID** **Products**
L09090356-07 615361 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	17-SEP-2009 14:42	RLK	
2	ANALYZ	W1	WET	18-SEP-2009 08:37	JBK	JKT
3	STORE	WET	A2	21-SEP-2009 10:12	HJR	JKT

Samplenum **Container ID** **Products**
L09090356-07 615362 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	17-SEP-2009 14:42	RLK	
2	ANALYZ	W1	WET	18-SEP-2009 08:34	TMM	JKT
3	STORE	WET	A2	22-SEP-2009 16:02	RLK	TMM

Samplenum **Container ID** **Products**
L09090356-08 615363 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	17-SEP-2009 14:42	RLK	
2	ANALYZ	W1	WET	18-SEP-2009 08:37	JBK	JKT
3	STORE	WET	A2	21-SEP-2009 10:12	HJR	JKT

Samplenum **Container ID** **Products**
L09090356-08 615364 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	17-SEP-2009 14:42	RLK	
2	ANALYZ	W1	WET	18-SEP-2009 08:34	TMM	JKT
3	STORE	WET	A2	22-SEP-2009 16:02	RLK	TMM

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09090356**Account:** 2736**Project:** 2736.006**Samples:** 9**Due Date:** 01-OCT-2009

<u>Samplenum</u>	<u>Container ID</u>	<u>Products</u>
L09090356-09	615365	PCT-S

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	17-SEP-2009 14:42	RLK	
2	ANALYZ	W1	WET	21-SEP-2009 13:26	JBK	JKT
3	STORE	WET	A2	22-SEP-2009 08:26	JKT	CPD

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login





158 Starlite Drive, Marietta, OH 45750 • T:740-373-4071 • F:740-373-4835 • <http://www.microbac.com>

Laboratory Report Number: L09090508

Client: Michael J. Zamboni, CH2MHILL, Chantilly, VA, 20151

Please find enclosed the analytical results for the samples you submitted to Microbac Laboratories.

Review and compilation of your report was completed by Microbac's Sales and Service Team. If you have questions, comments or require further assistance regarding this report, please contact your team member noted in the reviewed box below at 800-373-4071. Team member e-mail addresses also appear here for your convenience.

Kathy Albertson	<i>Team Chemist/Data Specialist</i>	kalbertson@microbac.com
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Tony Long	<i>Team Chemist/Data Specialist</i>	tlong@microbac.com
Amanda Fickiesen	<i>Client Services Specialist</i>	afickiesen@microbac.com
Annie Brown	<i>Client Services Specialist</i>	abrown@microbac.com

This report was reviewed on September 30, 2009.

Kathy Albertson - Team Chemist/Data Specialist

I certify that all test results meet all of the requirements of the accrediting authority listed below. All results for soil samples are reported on a 'dry-weight' basis unless specified otherwise. Analytical results for water and wastes are reported on a 'as received' basis unless specified otherwise. A statement of uncertainty for each analysis is available upon request. This laboratory report shall not be reproduced, except in full, without the written approval of Microbac Laboratories. The reported results are related only to the samples analyzed as received.

This report was certified on September 30, 2009.

David Vandenberg - Managing Director

State of origin: Michigan

Accrediting authority: N/A ID:N/A

QAPP: Microbac OVD

This report contains a total of 132 pages.

Look closer. Go further. Do more.



The Microbac logo consists of the word "Microbac" in a white serif font, centered within a dark teal rectangular box.

Microbac Laboratories, Inc.
Ohio Valley Division
158 Starlite Drive
Marietta, OH 45750

Phone: 800.373.4071
Fax: 740.373.4835

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LOOK CLOSER, GO FURTHER, DO MORE.

Microbac REPORT L09090508
PREPARED FOR CH2MHILL, Inc
WORK ID:

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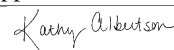
1.0 Introduction

Microbac Laboratories Inc.
REPORT NARRATIVE**Microbac Login No:** L09090508**CHAIN OF CUSTODY:** The chain of custody number was 09971 and 09972**SHIPMENT CONDITIONS:** The chain of custody forms were received sealed in a cooler. The cooler temperature was 3 and 3 degrees C.**SAMPLE MANAGEMENT:** All samples received were intact.

L09090508-01	PLT-X001
L09090508-02	PLT-X002
L09090508-03	PLT-X003
L09090508-04	PLT-X004
L09090508-05	PLT-X005
L09090508-06	PLT-X006
L09090508-07	PLT-X007
L09090508-08	PLT-X008
L09090508-09	PLT-X009
L09090508-10	PLT-X010
L09090508-11	PLT-X011
L09090508-12	PLT-X012
L09090508-13	PLT-X013
L09090508-14	PLT-X014
L09090508-15	PLT-X015
L09090508-16	PLT-X016
L09090508-17	PLT-X017
L09090508-18	PLT-X018
L09090508-19	PLT-X019
L09090508-20	PLT-X020
L09090508-21	PLT-X021
L09090508-22	PLT-X022
L09090508-23	PLT-X023
L09090508-24	PLT-X003
L09090508-25	PLT-X003

I certify that this data package is in compliance with the terms and conditions agreed to by the client and Microbac Laboratories Inc., both technically and for completeness, except for the conditions noted above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or designated person, as verified by the following signature.

Approved: 29-SEP-09



2.0 Data Package

2.1 General Chemistry Data

2.1.1 Chloride Data

2.1.1.1 Summary Data

LABORATORY REPORT

L09090508

09/30/09 13:08

Submitted By

Microbac Laboratories Inc.
158 Starlite Drive
Marietta, OH 45750
(740) 373-4071

For

Account Name: CH2MHILL, Inc
CH2MHILL
15010 Conference Center Drive Suite 200
Chantilly, VA 20151
Attention: Michael J. Zamboni

Project Number: 2736.006
Project: MI-Dow Ludington
Site: LUDINGTON, MI

P.O. Number: 935272

Sample Analysis Summary

Client ID	QC Type	Lab ID	Method	Dilution	Date Received
PLT-X001		L09090508-01	325.2	50	24-SEP-09
PLT-X002		L09090508-02	325.2	25	24-SEP-09
PLT-X003		L09090508-03	325.2	1	24-SEP-09
PLT-X004		L09090508-04	325.2	1	24-SEP-09
PLT-X005		L09090508-05	325.2	1	24-SEP-09
PLT-X006		L09090508-06	325.2	25	24-SEP-09
PLT-X007		L09090508-07	325.2	25	24-SEP-09
PLT-X008		L09090508-08	325.2	25	24-SEP-09
PLT-X009		L09090508-09	325.2	50	24-SEP-09
PLT-X010		L09090508-10	325.2	1	24-SEP-09
PLT-X011		L09090508-11	325.2	50	24-SEP-09
PLT-X012		L09090508-12	325.2	50	24-SEP-09
PLT-X013		L09090508-13	325.2	25	24-SEP-09
PLT-X014		L09090508-14	325.2	1	24-SEP-09
PLT-X015		L09090508-15	325.2	50	24-SEP-09
PLT-X016		L09090508-16	325.2	50	24-SEP-09
PLT-X017		L09090508-17	325.2	100	24-SEP-09
PLT-X018		L09090508-18	325.2	25	24-SEP-09
PLT-X019		L09090508-19	325.2	1	24-SEP-09
PLT-X020		L09090508-20	325.2	25	24-SEP-09
PLT-X021		L09090508-21	325.2	25	24-SEP-09
PLT-X022		L09090508-22	325.2	50	24-SEP-09
PLT-X023		L09090508-23	325.2	1	24-SEP-09
PLT-X003	MS	L09090508-24	325.2	1	24-SEP-09
PLT-X003	MSD	L09090508-25	325.2	1	24-SEP-09

L1_A_PROD - Modified 03/06/2008
PDF File ID: 1500371
Report generated: 09/30/2009 13:08

1 OF 1



Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-01**
Client ID: **PLT-X001**
Matrix: **Water**
Workgroup Number: **WG312914**
Collect Date: **09/22/2009 12:05**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **50**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/25/2009 11:36**
Cal Date: **09/25/2009 11:28**
Run Date: **09/25/2009 11:36**
File ID: **SC090925002.022**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	1670		100	50.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-02**
Client ID: **PLT-X002**
Matrix: **Water**
Workgroup Number: **WG312914**
Collect Date: **09/22/2009 12:35**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **25**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/25/2009 11:37**
Cal Date: **09/25/2009 11:28**
Run Date: **09/25/2009 11:37**
File ID: **SC090925002.023**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	626		50.0	25.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-03**
Client ID: **PLT-X003**
Matrix: **Water**
Workgroup Number: **WG312914**
Collect Date: **09/22/2009 14:30**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/25/2009 11:38**
Cal Date: **09/25/2009 11:28**
Run Date: **09/25/2009 11:38**
File ID: **SC090925002.024**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6		ND	2.00	1.00

ND Not detected at or above the reporting limit (RL).

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-04**
Client ID: **PLT-X004**
Matrix: **Water**
Workgroup Number: **WG312914**
Collect Date: **09/22/2009 15:25**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/25/2009 11:40**
Cal Date: **09/25/2009 11:28**
Run Date: **09/25/2009 11:40**
File ID: **SC090925002.028**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6		ND	2.00	1.00

ND Not detected at or above the reporting limit (RL).

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-05**
Client ID: **PLT-X005**
Matrix: **Water**
Workgroup Number: **WG312914**
Collect Date: **09/22/2009 16:35**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/25/2009 11:40**
Cal Date: **09/25/2009 11:28**
Run Date: **09/25/2009 11:40**
File ID: **SC090925002.029**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	2.15		2.00	1.00

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-06**
Client ID: **PLT-X006**
Matrix: **Water**
Workgroup Number: **WG312914**
Collect Date: **09/22/2009 17:15**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **25**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/25/2009 11:41**
Cal Date: **09/25/2009 11:28**
Run Date: **09/25/2009 11:41**
File ID: **SC090925002.030**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	1230		50.0	25.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-07**
Client ID: **PLT-X007**
Matrix: **Water**
Workgroup Number: **WG312914**
Collect Date: **09/22/2009 17:45**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **25**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/25/2009 11:43**
Cal Date: **09/25/2009 11:28**
Run Date: **09/25/2009 11:43**
File ID: **SC090925002.033**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	967		50.0	25.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-08**
Client ID: **PLT-X008**
Matrix: **Water**
Workgroup Number: **WG312914**
Collect Date: **09/22/2009 17:50**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **25**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/25/2009 11:44**
Cal Date: **09/25/2009 11:28**
Run Date: **09/25/2009 11:44**
File ID: **SC090925002.034**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	1040		50.0	25.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-09**
Client ID: **PLT-X009**
Matrix: **Water**
Workgroup Number: **WG312914**
Collect Date: **09/22/2009 18:20**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **50**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/25/2009 11:44**
Cal Date: **09/25/2009 11:28**
Run Date: **09/25/2009 11:44**
File ID: **SC090925002.035**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	1560		100	50.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-10**
Client ID: **PLT-X010**
Matrix: **Water**
Workgroup Number: **WG312914**
Collect Date: **09/22/2009 18:50**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/25/2009 11:45**
Cal Date: **09/25/2009 11:28**
Run Date: **09/25/2009 11:45**
File ID: **SC090925002.036**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6		ND	2.00	1.00

ND Not detected at or above the reporting limit (RL).

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-11**
Client ID: **PLT-X011**
Matrix: **Water**
Workgroup Number: **WG312914**
Collect Date: **09/23/2009 08:25**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **50**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/25/2009 11:45**
Cal Date: **09/25/2009 11:28**
Run Date: **09/25/2009 11:45**
File ID: **SC090925002.037**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	1450		100	50.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-12**
Client ID: **PLT-X012**
Matrix: **Water**
Workgroup Number: **WG312914**
Collect Date: **09/23/2009 08:30**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **50**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/25/2009 11:46**
Cal Date: **09/25/2009 11:28**
Run Date: **09/25/2009 11:46**
File ID: **SC090925002.038**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	1410		100	50.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-13**
Client ID: **PLT-X013**
Matrix: **Water**
Workgroup Number: **WG312914**
Collect Date: **09/23/2009 08:55**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **25**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/25/2009 11:46**
Cal Date: **09/25/2009 11:28**
Run Date: **09/25/2009 11:46**
File ID: **SC090925002.039**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	919		50.0	25.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-14**
Client ID: **PLT-X014**
Matrix: **Water**
Workgroup Number: **WG312915**
Collect Date: **09/23/2009 08:50**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/25/2009 11:50**
Cal Date: **09/25/2009 11:28**
Run Date: **09/25/2009 11:50**
File ID: **SC090925002.045**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6		ND	2.00	1.00

ND Not detected at or above the reporting limit (RL).

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-15**
Client ID: **PLT-X015**
Matrix: **Water**
Workgroup Number: **WG312915**
Collect Date: **09/23/2009 10:00**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **50**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/25/2009 11:51**
Cal Date: **09/25/2009 11:28**
Run Date: **09/25/2009 11:51**
File ID: **SC090925002.046**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	819		100	50.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-16**
Client ID: **PLT-X016**
Matrix: **Water**
Workgroup Number: **WG312915**
Collect Date: **09/23/2009 10:20**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **50**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/25/2009 11:51**
Cal Date: **09/25/2009 11:28**
Run Date: **09/25/2009 11:51**
File ID: **SC090925002.047**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	3490		100	50.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-17**
Client ID: **PLT-X017**
Matrix: **Water**
Workgroup Number: **WG312915**
Collect Date: **09/23/2009 10:50**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **100**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/25/2009 11:52**
Cal Date: **09/25/2009 11:28**
Run Date: **09/25/2009 11:52**
File ID: **SC090925002.048**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	4220		200	100

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-18**
Client ID: **PLT-X018**
Matrix: **Water**
Workgroup Number: **WG312915**
Collect Date: **09/23/2009 11:05**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **25**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/25/2009 11:52**
Cal Date: **09/25/2009 11:28**
Run Date: **09/25/2009 11:52**
File ID: **SC090925002.049**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	999		50.0	25.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-19**
Client ID: **PLT-X019**
Matrix: **Water**
Workgroup Number: **WG312915**
Collect Date: **09/23/2009 12:05**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/25/2009 11:53**
Cal Date: **09/25/2009 11:28**
Run Date: **09/25/2009 11:53**
File ID: **SC090925002.050**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	65.2		2.00	1.00

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-20**
Client ID: **PLT-X020**
Matrix: **Water**
Workgroup Number: **WG312915**
Collect Date: **09/23/2009 15:40**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **25**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/25/2009 11:53**
Cal Date: **09/25/2009 11:28**
Run Date: **09/25/2009 11:53**
File ID: **SC090925002.051**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	1380		50.0	25.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-21**
Client ID: **PLT-X021**
Matrix: **Water**
Workgroup Number: **WG312915**
Collect Date: **09/23/2009 16:25**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **25**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/25/2009 11:54**
Cal Date: **09/25/2009 11:28**
Run Date: **09/25/2009 11:54**
File ID: **SC090925002.052**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	903		50.0	25.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-22**
Client ID: **PLT-X022**
Matrix: **Water**
Workgroup Number: **WG312915**
Collect Date: **09/23/2009 17:15**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **50**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/25/2009 11:55**
Cal Date: **09/25/2009 11:28**
Run Date: **09/25/2009 11:55**
File ID: **SC090925002.053**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	2070		100	50.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-23**
Client ID: **PLT-X023**
Matrix: **Water**
Workgroup Number: **WG312915**
Collect Date: **09/23/2009 17:20**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/25/2009 11:56**
Cal Date: **09/25/2009 11:28**
Run Date: **09/25/2009 11:56**
File ID: **SC090925002.054**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6		ND	2.00	1.00

ND Not detected at or above the reporting limit (RL).

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-24**
Client ID: **PLT-X003**
Matrix: **Water**
Workgroup Number: **WG312914**
Collect Date: **09/22/2009 14:30**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/25/2009 11:39**
Cal Date: **09/25/2009 11:28**
Run Date: **09/25/2009 11:39**
File ID: **SC090925002.026**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	19.5		2.00	1.00

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-25**
Client ID: **PLT-X003**
Matrix: **Water**
Workgroup Number: **WG312914**
Collect Date: **09/22/2009 14:30**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/25/2009 11:39**
Cal Date: **09/25/2009 11:28**
Run Date: **09/25/2009 11:39**
File ID: **SC090925002.027**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	19.7		2.00	1.00

2.1.1.2 QC Summary Data

METHOD BLANK SUMMARY

Login Number: L09090508
 Blank File ID: SC090925002.010
 Prep Date: 09/25/09 11:29
 Analyzed Date: 09/25/09 11:29
 Analyst: JBK

Work Group: WG312914
 Blank Sample ID: WG312914-01
 Instrument ID: SMARTCHEM
 Method: 325.2

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG312914-02	SC090925002.011	09/25/09 11:29	01
LCS2	WG312914-03	SC090925002.012	09/25/09 11:30	01
PLT-X001	L09090508-01	SC090925002.022	09/25/09 11:36	DL01
PLT-X002	L09090508-02	SC090925002.023	09/25/09 11:37	DL01
PLT-X003	L09090508-03	SC090925002.024	09/25/09 11:38	01
DUP	WG312914-05	SC090925002.025	09/25/09 11:38	01
PLT-X003	L09090508-24	SC090925002.026	09/25/09 11:39	01
PLT-X003	L09090508-25	SC090925002.027	09/25/09 11:39	01
PLT-X004	L09090508-04	SC090925002.028	09/25/09 11:40	01
PLT-X005	L09090508-05	SC090925002.029	09/25/09 11:40	01
PLT-X006	L09090508-06	SC090925002.030	09/25/09 11:41	DL01
PLT-X007	L09090508-07	SC090925002.033	09/25/09 11:43	DL01
PLT-X008	L09090508-08	SC090925002.034	09/25/09 11:44	DL01
PLT-X009	L09090508-09	SC090925002.035	09/25/09 11:44	DL01
PLT-X010	L09090508-10	SC090925002.036	09/25/09 11:45	01
PLT-X011	L09090508-11	SC090925002.037	09/25/09 11:45	DL01
PLT-X012	L09090508-12	SC090925002.038	09/25/09 11:46	DL01
PLT-X013	L09090508-13	SC090925002.039	09/25/09 11:46	DL01



METHOD BLANK SUMMARY

Login Number: L09090508
 Blank File ID: SC090925002.040
 Prep Date: 09/25/09 11:47
 Analyzed Date: 09/25/09 11:47
 Analyst: JBK

Work Group: WG312915
 Blank Sample ID: WG312915-01
 Instrument ID: SMARTCHEM
 Method: 325.2

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG312915-02	SC090925002.041	09/25/09 11:47	01
LCS2	WG312915-03	SC090925002.042	09/25/09 11:48	01
PLT-X014	L09090508-14	SC090925002.045	09/25/09 11:50	01
PLT-X015	L09090508-15	SC090925002.046	09/25/09 11:51	DL01
PLT-X016	L09090508-16	SC090925002.047	09/25/09 11:51	DL01
PLT-X017	L09090508-17	SC090925002.048	09/25/09 11:52	DL01
PLT-X018	L09090508-18	SC090925002.049	09/25/09 11:52	DL01
PLT-X019	L09090508-19	SC090925002.050	09/25/09 11:53	01
PLT-X020	L09090508-20	SC090925002.051	09/25/09 11:53	DL01
PLT-X021	L09090508-21	SC090925002.052	09/25/09 11:54	DL01
PLT-X022	L09090508-22	SC090925002.053	09/25/09 11:55	DL01
PLT-X023	L09090508-23	SC090925002.054	09/25/09 11:56	01
DUP	WG312915-05	SC090925002.057	09/25/09 11:57	01



Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L09090508 Prep Date: 09/25/09 11:29 Sample ID: WG312914-01
Instrument ID: SMARTCHEM Run Date: 09/25/09 11:29 Prep Method: 325.2
File ID: SC090925002.010 Analyst: JBK Method: 325.2
Workgroup (AAB#): WG312914 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: SMARTC - 25-SEP-09

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Chloride	1.00	2.00	2.00	1	ND

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1498306

29-SEP-2009 09:33



Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L09090508 Prep Date: 09/25/09 11:47 Sample ID: WG312915-01
Instrument ID: SMARTCHEM Run Date: 09/25/09 11:47 Prep Method: 325.2
File ID: SC090925002.040 Analyst: JBK Method: 325.2
Workgroup (AAB#): WG312915 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: SMARTC - 25-SEP-09

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Chloride	1.00	2.00	-1.44	1	ND

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1498306

29-SEP-2009 09:33



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09090508 Analyst: JBK Prep Method: 325.2
Instrument ID: SMARTCHEM Matrix: Water Method: 325.2
Workgroup (AAB#): WG312914 Units: mg/L
QC Key: DOWBOA2006 Lot #: STD35142
Sample ID: WG312914-02 LCS File ID: SC090925002.011 Run Date: 09/25/2009 11:29
Sample ID: WG312914-03 LCS2 File ID: SC090925002.012 Run Date: 09/25/2009 11:30

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Chloride	50.0	47.5	95.1	50.0	46.7	93.4	1.73	90 - 110	10	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 1498307
Report generated: 09/29/2009 09:33



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09090508 Analyst: JBK Prep Method: 325.2
Instrument ID: SMARTCHEM Matrix: Water Method: 325.2
Workgroup (AAB#): WG312915 Units: mg/L
QC Key: DOWB0A2006 Lot #: STD35142
Sample ID: WG312915-02 LCS File ID: SC090925002.041 Run Date: 09/25/2009 11:47
Sample ID: WG312915-03 LCS2 File ID: SC090925002.042 Run Date: 09/25/2009 11:48

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Chloride	50.0	46.6	93.1	50.0	45.9	91.7	1.50	90 - 110	10	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 1498307
Report generated: 09/29/2009 09:33



MS/MSD REPORT

Loginnum: L09090508 Cal ID: SMARTCHEM- 25-SEP-09
 Instrument ID: SMARTCHEM Contract #: _____
 Parent ID: L09090508-03 File ID: SC090925002.024 Dil: 1
 Sample ID: L09090508-24 MS File ID: SC090925002.026 Dil: 1
 Sample ID: L09090508-25 MSD File ID: SC090925002.027 Dil: 1

Worknum: WG312914
 Prep Method: 325.2
 Method: 325.2
 Matrix: Water
 Units: mg/L

Analyte	Parent	MS Spiked	MS Found	MS %Rec	MSD Spiked	MSD Found	MSD %Rec	%RPD	%Rec Limits	RPD Limit	Q
Chloride	ND	20.0	19.5	97.3	20.0	19.7	98.6	1.38	90 - 110	10	

* FAILS %REC LIMIT

FAILS RPD LIMIT

2.1.2 Ammonia Data

2.1.2.1 Summary Data

LABORATORY REPORT

L09090508

09/30/09 13:08

Submitted By

Microbac Laboratories Inc.
158 Starlite Drive
Marietta , OH 45750
(740) 373 - 4071

For

Account Name: CH2MHILL, Inc
CH2MHILL
15010 Conference Center Drive Suite 200
Chantilly, VA 20151
Attention: Michael J. Zamboni

Project Number: 2736.006
Project: MI-Dow Ludington
Site: LUDINGTON, MI

P.O. Number: 935272

Sample Analysis Summary

Client ID	QC Type	Lab ID	Method	Dilution	Date Received
PLT-X001		L09090508-01	350.1	4	24-SEP-09
PLT-X002		L09090508-02	350.1	2	24-SEP-09
PLT-X003		L09090508-03	350.1	2	24-SEP-09
PLT-X004		L09090508-04	350.1	1	24-SEP-09
PLT-X005		L09090508-05	350.1	1	24-SEP-09
PLT-X006		L09090508-06	350.1	4	24-SEP-09
PLT-X007		L09090508-07	350.1	2	24-SEP-09
PLT-X008		L09090508-08	350.1	2	24-SEP-09
PLT-X009		L09090508-09	350.1	50	24-SEP-09
PLT-X010		L09090508-10	350.1	1	24-SEP-09
PLT-X011		L09090508-11	350.1	10	24-SEP-09
PLT-X012		L09090508-12	350.1	4	24-SEP-09
PLT-X013		L09090508-13	350.1	2	24-SEP-09
PLT-X014		L09090508-14	350.1	1	24-SEP-09
PLT-X019		L09090508-19	350.1	1	24-SEP-09
PLT-X020		L09090508-20	350.1	2	24-SEP-09
PLT-X021		L09090508-21	350.1	100	24-SEP-09
PLT-X022		L09090508-22	350.1	20	24-SEP-09
PLT-X023		L09090508-23	350.1	1	24-SEP-09
PLT-X003	MS	L09090508-24	350.1	2	24-SEP-09
PLT-X003	MSD	L09090508-25	350.1	2	24-SEP-09



Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-01**
Client ID: **PLT-X001**
Matrix: **Water**
Workgroup Number: **WG313017**
Collect Date: **09/22/2009 12:05**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **4**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/28/2009 12:01**
Cal Date: **09/28/2009 10:12**
Run Date: **09/28/2009 12:01**
File ID: **SC090928001.108**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	7.51		0.400	0.200

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-02**
Client ID: **PLT-X002**
Matrix: **Water**
Workgroup Number: **WG313017**
Collect Date: **09/22/2009 12:35**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **2**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/28/2009 12:02**
Cal Date: **09/28/2009 10:12**
Run Date: **09/28/2009 12:02**
File ID: **SC090928001.109**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	4.74		0.200	0.100

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-03**
Client ID: **PLT-X003**
Matrix: **Water**
Workgroup Number: **WG313017**
Collect Date: **09/22/2009 14:30**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **2**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/28/2009 12:04**
Cal Date: **09/28/2009 10:12**
Run Date: **09/28/2009 12:04**
File ID: **SC090928001.110**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	4.24		0.200	0.100

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-04**
Client ID: **PLT-X004**
Matrix: **Water**
Workgroup Number: **WG313017**
Collect Date: **09/22/2009 15:25**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/28/2009 10:48**
Cal Date: **09/28/2009 10:12**
Run Date: **09/28/2009 10:48**
File ID: **SC090928001.047**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	0.787		0.100	0.0500

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-05**
Client ID: **PLT-X005**
Matrix: **Water**
Workgroup Number: **WG313017**
Collect Date: **09/22/2009 16:35**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/28/2009 10:49**
Cal Date: **09/28/2009 10:12**
Run Date: **09/28/2009 10:49**
File ID: **SC090928001.048**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	0.298		0.100	0.0500

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-06**
Client ID: **PLT-X006**
Matrix: **Water**
Workgroup Number: **WG313017**
Collect Date: **09/22/2009 17:15**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **4**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/28/2009 12:10**
Cal Date: **09/28/2009 10:12**
Run Date: **09/28/2009 12:10**
File ID: **SC090928001.113**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	7.94		0.400	0.200

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-07**
Client ID: **PLT-X007**
Matrix: **Water**
Workgroup Number: **WG313017**
Collect Date: **09/22/2009 17:45**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **2**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/28/2009 12:11**
Cal Date: **09/28/2009 10:12**
Run Date: **09/28/2009 12:11**
File ID: **SC090928001.114**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	5.25		0.200	0.100

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-08**
Client ID: **PLT-X008**
Matrix: **Water**
Workgroup Number: **WG313017**
Collect Date: **09/22/2009 17:50**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **2**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/28/2009 12:15**
Cal Date: **09/28/2009 10:12**
Run Date: **09/28/2009 12:15**
File ID: **SC090928001.115**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	5.13		0.200	0.100

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-09**
Client ID: **PLT-X009**
Matrix: **Water**
Workgroup Number: **WG313017**
Collect Date: **09/22/2009 18:20**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **50**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/28/2009 12:43**
Cal Date: **09/28/2009 10:12**
Run Date: **09/28/2009 12:43**
File ID: **SC090928001.127**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	81.9		5.00	2.50

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-10**
Client ID: **PLT-X010**
Matrix: **Water**
Workgroup Number: **WG313017**
Collect Date: **09/22/2009 18:50**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/28/2009 10:53**
Cal Date: **09/28/2009 10:12**
Run Date: **09/28/2009 10:53**
File ID: **SC090928001.053**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	1.98		0.100	0.0500

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-11**
Client ID: **PLT-X011**
Matrix: **Water**
Workgroup Number: **WG313017**
Collect Date: **09/23/2009 08:25**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **10**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/28/2009 12:45**
Cal Date: **09/28/2009 10:12**
Run Date: **09/28/2009 12:45**
File ID: **SC090928001.128**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	10.8		1.00	0.500

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-12**
Client ID: **PLT-X012**
Matrix: **Water**
Workgroup Number: **WG313017**
Collect Date: **09/23/2009 08:30**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **4**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/28/2009 12:22**
Cal Date: **09/28/2009 10:12**
Run Date: **09/28/2009 12:22**
File ID: **SC090928001.120**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	10.9		0.400	0.200

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-13**
Client ID: **PLT-X013**
Matrix: **Water**
Workgroup Number: **WG313017**
Collect Date: **09/23/2009 08:55**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **2**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/28/2009 12:24**
Cal Date: **09/28/2009 10:12**
Run Date: **09/28/2009 12:24**
File ID: **SC090928001.121**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	4.57		0.200	0.100

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-14**
Client ID: **PLT-X014**
Matrix: **Water**
Workgroup Number: **WG313017**
Collect Date: **09/23/2009 08:50**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/28/2009 10:58**
Cal Date: **09/28/2009 10:12**
Run Date: **09/28/2009 10:58**
File ID: **SC090928001.059**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7		ND	0.100	0.0500

ND Not detected at or above the reporting limit (RL).

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-19**
Client ID: **PLT-X019**
Matrix: **Water**
Workgroup Number: **WG313014**
Collect Date: **09/23/2009 12:05**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/28/2009 10:30**
Cal Date: **09/28/2009 10:12**
Run Date: **09/28/2009 10:30**
File ID: **SC090928001.027**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	0.116		0.100	0.0500

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-20**
Client ID: **PLT-X020**
Matrix: **Water**
Workgroup Number: **WG313014**
Collect Date: **09/23/2009 15:40**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **2**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/28/2009 11:50**
Cal Date: **09/28/2009 10:12**
Run Date: **09/28/2009 11:50**
File ID: **SC090928001.101**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	4.60		0.200	0.100

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-21**
Client ID: **PLT-X021**
Matrix: **Water**
Workgroup Number: **WG313014**
Collect Date: **09/23/2009 16:25**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **100**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/28/2009 12:58**
Cal Date: **09/28/2009 10:12**
Run Date: **09/28/2009 12:58**
File ID: **SC090928001.131**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	169		10.0	5.00

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-22**
Client ID: **PLT-X022**
Matrix: **Water**
Workgroup Number: **WG313014**
Collect Date: **09/23/2009 17:15**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **20**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/28/2009 11:53**
Cal Date: **09/28/2009 10:12**
Run Date: **09/28/2009 11:53**
File ID: **SC090928001.103**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	37.0		2.00	1.00

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-23**
Client ID: **PLT-X023**
Matrix: **Water**
Workgroup Number: **WG313014**
Collect Date: **09/23/2009 17:20**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/28/2009 10:35**
Cal Date: **09/28/2009 10:12**
Run Date: **09/28/2009 10:35**
File ID: **SC090928001.033**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	0.217		0.100	0.0500

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-24**
Client ID: **PLT-X003**
Matrix: **Water**
Workgroup Number: **WG313017**
Collect Date: **09/22/2009 14:30**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **2**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/28/2009 12:06**
Cal Date: **09/28/2009 10:12**
Run Date: **09/28/2009 12:06**
File ID: **SC090928001.111**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	5.30		0.200	0.100

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-25**
Client ID: **PLT-X003**
Matrix: **Water**
Workgroup Number: **WG313017**
Collect Date: **09/22/2009 14:30**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **2**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/28/2009 12:08**
Cal Date: **09/28/2009 10:12**
Run Date: **09/28/2009 12:08**
File ID: **SC090928001.112**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	5.31		0.200	0.100

2.1.2.2 QC Summary Data

METHOD BLANK SUMMARY

Login Number: L09090508
 Blank File ID: SC090928001.009
 Prep Date: 09/28/09 10:13
 Analyzed Date: 09/28/09 10:13
 Analyst: JBK

Work Group: WG313014
 Blank Sample ID: WG313014-01
 Instrument ID: SMARTCHEM
 Method: 350.1

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG313014-02	SC090928001.010	09/28/09 10:15	01
PLT-X019	L09090508-19	SC090928001.027	09/28/09 10:30	01
PLT-X023	L09090508-23	SC090928001.033	09/28/09 10:35	01
DUP	WG313014-05	SC090928001.035	09/28/09 10:37	01
PLT-X020	L09090508-20	SC090928001.101	09/28/09 11:50	DL01
PLT-X022	L09090508-22	SC090928001.103	09/28/09 11:53	DL01
PLT-X021	L09090508-21	SC090928001.131	09/28/09 12:58	DL01



METHOD BLANK SUMMARY

Login Number: L09090508
 Blank File ID: SC090928001.038
 Prep Date: 09/28/09 10:40
 Analyzed Date: 09/28/09 10:40
 Analyst: JBK

Work Group: WG313017
 Blank Sample ID: WG313017-01
 Instrument ID: SMARTCHEM
 Method: 350.1

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG313017-02	SC090928001.039	09/28/09 10:40	01
PLT-X004	L09090508-04	SC090928001.047	09/28/09 10:48	01
PLT-X005	L09090508-05	SC090928001.048	09/28/09 10:49	01
PLT-X010	L09090508-10	SC090928001.053	09/28/09 10:53	01
PLT-X014	L09090508-14	SC090928001.059	09/28/09 10:58	01
PLT-X001	L09090508-01	SC090928001.108	09/28/09 12:01	DL01
PLT-X002	L09090508-02	SC090928001.109	09/28/09 12:02	DL01
PLT-X003	L09090508-03	SC090928001.110	09/28/09 12:04	DL01
PLT-X003	L09090508-24	SC090928001.111	09/28/09 12:06	DL01
PLT-X003	L09090508-25	SC090928001.112	09/28/09 12:08	DL01
PLT-X006	L09090508-06	SC090928001.113	09/28/09 12:10	DL01
PLT-X007	L09090508-07	SC090928001.114	09/28/09 12:11	DL01
PLT-X008	L09090508-08	SC090928001.115	09/28/09 12:15	DL01
PLT-X012	L09090508-12	SC090928001.120	09/28/09 12:22	DL01
PLT-X013	L09090508-13	SC090928001.121	09/28/09 12:24	DL01
DUP	WG313017-04	SC090928001.123	09/28/09 12:27	DL01
PLT-X009	L09090508-09	SC090928001.127	09/28/09 12:43	DL01
PLT-X011	L09090508-11	SC090928001.128	09/28/09 12:45	DL01



Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L09090508 Prep Date: 09/28/09 10:13 Sample ID: WG313014-01
Instrument ID: SMARTCHEM Run Date: 09/28/09 10:13 Prep Method: 350.1
File ID: SC090928001.009 Analyst: JBK Method: 350.1
Workgroup (AAB#): WG313014 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: SMARTC - 28-SEP-09

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Nitrogen, Ammonia	0.0500	0.100	0.100	1	ND

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1499241

29-SEP-2009 16:18



Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L09090508 Prep Date: 09/28/09 10:40 Sample ID: WG313017-01
Instrument ID: SMARTCHEM Run Date: 09/28/09 10:40 Prep Method: 350.1
File ID: SC090928001.038 Analyst: JBK Method: 350.1
Workgroup (AAB#): WG313017 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: SMARTC - 28-SEP-09

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Nitrogen, Ammonia	0.0500	0.100	0.100	1	ND

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1499241

29-SEP-2009 16:18



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09090508 Run Date: 09/28/2009 Sample ID: WG313014-02
Instrument ID: SMARTCHEM Run Time: 10:15 Prep Method: 350.1
File ID: SC090928001.010 Analyst: JBK Method: 350.1
Workgroup (AAB#): WG313014 Matrix: Water Units: mg/L
QC Key: DOWBOA2006 Lot#: STD33211 Cal ID: SMARTC - 28-SEP-09

Analytes	Expected	Found	% Rec	LCS Limits	Q
Nitrogen, Ammonia	2.00	1.87	93.5	90 - 110	

LCS - Modified 03/06/2008
PDF File ID: 1499242
Report generated: 09/29/2009 16:18



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09090508 Run Date: 09/28/2009 Sample ID: WG313017-02
Instrument ID: SMARTCHEM Run Time: 10:40 Prep Method: 350.1
File ID: SC090928001.039 Analyst: JBK Method: 350.1
Workgroup (AAB#): WG313017 Matrix: Water Units: mg/L
QC Key: DOWBOA2006 Lot#: STD33211 Cal ID: SMARTC - 28-SEP-09

Analytes	Expected	Found	% Rec	LCS Limits	Q
Nitrogen, Ammonia	2.00	1.80	90.2	90 - 110	

LCS - Modified 03/06/2008
PDF File ID: 1499242
Report generated: 09/29/2009 16:18



MS/MSD REPORT

Loginnum: L09090508 Cal ID: SMARTCHEM- 28-SEP-09
Instrument ID: SMARTCHEM Contract #: _____
Parent ID: L09090508-03 File ID: SC090928001.110 Dil: 2
Sample ID: L09090508-24 MS File ID: SC090928001.111 Dil: 2
Sample ID: L09090508-25 MSD File ID: SC090928001.112 Dil: 2

Worknum: WG313017
Prep Method: 350.1
Method: 350.1
Matrix: Water
Units: mg/L

Analyte	Parent	MS Spiked	MS Found	MS %Rec	MSD Spiked	MSD Found	MSD %Rec	%RPD	%Rec Limits	RPD Limit	Q
Nitrogen, Ammonia	4.24	1.00	5.30	106	1.00	5.31	107	0.145	70 - 125	25	

* FAILS %REC LIMIT

FAILS RPD LIMIT



2.1.3 Total Dissolved Solids Data

2.1.3.1 Summary Data

LABORATORY REPORT

L09090508

09/30/09 13:08

Submitted By

Microbac Laboratories Inc.
158 Starlite Drive
Marietta, OH 45750
(740) 373-4071

For

Account Name: CH2MHILL, Inc
CH2MHILL
15010 Conference Center Drive Suite 200
Chantilly, VA 20151
Attention: Michael J. Zamboni

Project Number: 2736.006
Project: MI-Dow Ludington
Site: LUDINGTON, MI

P.O. Number: 935272

Sample Analysis Summary

Client ID	QC Type	Lab ID	Method	Dilution	Date Received
PLT-X001		L09090508-01	160.1	1	24-SEP-09
PLT-X002		L09090508-02	160.1	1	24-SEP-09
PLT-X003		L09090508-03	160.1	1	24-SEP-09
PLT-X004		L09090508-04	160.1	1	24-SEP-09
PLT-X005		L09090508-05	160.1	1	24-SEP-09
PLT-X006		L09090508-06	160.1	1	24-SEP-09
PLT-X007		L09090508-07	160.1	1	24-SEP-09
PLT-X008		L09090508-08	160.1	1	24-SEP-09
PLT-X009		L09090508-09	160.1	1	24-SEP-09
PLT-X010		L09090508-10	160.1	1	24-SEP-09
PLT-X011		L09090508-11	160.1	1	24-SEP-09
PLT-X012		L09090508-12	160.1	1	24-SEP-09
PLT-X013		L09090508-13	160.1	1	24-SEP-09
PLT-X014		L09090508-14	160.1	1	24-SEP-09
PLT-X015		L09090508-15	160.1	1	24-SEP-09
PLT-X016		L09090508-16	160.1	1	24-SEP-09
PLT-X017		L09090508-17	160.1	1	24-SEP-09
PLT-X018		L09090508-18	160.1	1	24-SEP-09
PLT-X019		L09090508-19	160.1	1	24-SEP-09
PLT-X020		L09090508-20	160.1	1	24-SEP-09
PLT-X021		L09090508-21	160.1	1	24-SEP-09
PLT-X022		L09090508-22	160.1	1	24-SEP-09
PLT-X023		L09090508-23	160.1	1	24-SEP-09
PLT-X003	MS	L09090508-24	160.1	1	24-SEP-09
PLT-X003	MSD	L09090508-25	160.1	1	24-SEP-09



Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-01**
Client ID: **PLT-X001**
Matrix: **Water**
Workgroup Number: **WG312943**
Collect Date: **09/22/2009 12:05**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/25/2009 12:15**
Cal Date:
Run Date: **09/25/2009 12:15**
File ID: **EN.0909251215-11**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		3520		20.0	10.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-02**
Client ID: **PLT-X002**
Matrix: **Water**
Workgroup Number: **WG312943**
Collect Date: **09/22/2009 12:35**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/25/2009 12:15**
Cal Date:
Run Date: **09/25/2009 12:15**
File ID: **EN.0909251215-13**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		2530		20.0	10.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-03**
Client ID: **PLT-X003**
Matrix: **Water**
Workgroup Number: **WG312943**
Collect Date: **09/22/2009 14:30**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/25/2009 12:15**
Cal Date:
Run Date: **09/25/2009 12:15**
File ID: **EN.0909251215-15**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		344		20.0	10.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-04**
Client ID: **PLT-X004**
Matrix: **Water**
Workgroup Number: **WG312943**
Collect Date: **09/22/2009 15:25**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/25/2009 12:15**
Cal Date:
Run Date: **09/25/2009 12:15**
File ID: **EN.0909251215-21**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		280		20.0	10.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-05**
Client ID: **PLT-X005**
Matrix: **Water**
Workgroup Number: **WG312943**
Collect Date: **09/22/2009 16:35**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/25/2009 12:15**
Cal Date:
Run Date: **09/25/2009 12:15**
File ID: **EN.0909251215-23**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		190		20.0	10.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-06**
Client ID: **PLT-X006**
Matrix: **Water**
Workgroup Number: **WG312946**
Collect Date: **09/22/2009 17:15**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/25/2009 13:15**
Cal Date:
Run Date: **09/25/2009 13:15**
File ID: **EN.0909251315-04**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		3020		20.0	10.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-07**
Client ID: **PLT-X007**
Matrix: **Water**
Workgroup Number: **WG312946**
Collect Date: **09/22/2009 17:45**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/25/2009 13:15**
Cal Date:
Run Date: **09/25/2009 13:15**
File ID: **EN.0909251315-05**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		2540		20.0	10.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-08**
Client ID: **PLT-X008**
Matrix: **Water**
Workgroup Number: **WG312946**
Collect Date: **09/22/2009 17:50**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/25/2009 13:15**
Cal Date:
Run Date: **09/25/2009 13:15**
File ID: **EN.0909251315-06**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		2680		20.0	10.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-09**
Client ID: **PLT-X009**
Matrix: **Water**
Workgroup Number: **WG312946**
Collect Date: **09/22/2009 18:20**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/25/2009 13:15**
Cal Date:
Run Date: **09/25/2009 13:15**
File ID: **EN.0909251315-07**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		4960		40.0	20.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-10**
Client ID: **PLT-X010**
Matrix: **Water**
Workgroup Number: **WG312946**
Collect Date: **09/22/2009 18:50**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/25/2009 13:15**
Cal Date:
Run Date: **09/25/2009 13:15**
File ID: **EN.0909251315-08**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		452		20.0	10.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-11**
Client ID: **PLT-X011**
Matrix: **Water**
Workgroup Number: **WG312946**
Collect Date: **09/23/2009 08:25**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/25/2009 13:15**
Cal Date:
Run Date: **09/25/2009 13:15**
File ID: **EN.0909251315-09**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		3270		20.0	10.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-12**
Client ID: **PLT-X012**
Matrix: **Water**
Workgroup Number: **WG312946**
Collect Date: **09/23/2009 08:30**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/25/2009 13:15**
Cal Date:
Run Date: **09/25/2009 13:15**
File ID: **EN.0909251315-10**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		3570		20.0	10.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-13**
Client ID: **PLT-X013**
Matrix: **Water**
Workgroup Number: **WG312946**
Collect Date: **09/23/2009 08:55**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/25/2009 13:15**
Cal Date:
Run Date: **09/25/2009 13:15**
File ID: **EN.0909251315-12**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		2720		20.0	10.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-14**
Client ID: **PLT-X014**
Matrix: **Water**
Workgroup Number: **WG312946**
Collect Date: **09/23/2009 08:50**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/25/2009 13:15**
Cal Date:
Run Date: **09/25/2009 13:15**
File ID: **EN.0909251315-11**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids			ND	10.0	5.00

ND Not detected at or above the reporting limit (RL).

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-15**
Client ID: **PLT-X015**
Matrix: **Water**
Workgroup Number: **WG312946**
Collect Date: **09/23/2009 10:00**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/25/2009 13:15**
Cal Date:
Run Date: **09/25/2009 13:15**
File ID: **EN.0909251315-13**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		2900		20.0	10.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-16**
Client ID: **PLT-X016**
Matrix: **Water**
Workgroup Number: **WG312946**
Collect Date: **09/23/2009 10:20**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/25/2009 13:15**
Cal Date:
Run Date: **09/25/2009 13:15**
File ID: **EN.0909251315-19**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		7040		40.0	20.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-17**
Client ID: **PLT-X017**
Matrix: **Water**
Workgroup Number: **WG313036**
Collect Date: **09/23/2009 10:50**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/28/2009 15:00**
Cal Date:
Run Date: **09/28/2009 15:00**
File ID: **EN.0909281500-15**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		8950		100	50.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-18**
Client ID: **PLT-X018**
Matrix: **Water**
Workgroup Number: **WG312946**
Collect Date: **09/23/2009 11:05**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/25/2009 13:15**
Cal Date:
Run Date: **09/25/2009 13:15**
File ID: **EN.0909251315-14**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		3210		20.0	10.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-19**
Client ID: **PLT-X019**
Matrix: **Water**
Workgroup Number: **WG312946**
Collect Date: **09/23/2009 12:05**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/25/2009 13:15**
Cal Date:
Run Date: **09/25/2009 13:15**
File ID: **EN.0909251315-15**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		400		20.0	10.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-20**
Client ID: **PLT-X020**
Matrix: **Water**
Workgroup Number: **WG312946**
Collect Date: **09/23/2009 15:40**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/25/2009 13:15**
Cal Date:
Run Date: **09/25/2009 13:15**
File ID: **EN.0909251315-16**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		3470		20.0	10.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-21**
Client ID: **PLT-X021**
Matrix: **Water**
Workgroup Number: **WG312946**
Collect Date: **09/23/2009 16:25**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/25/2009 13:15**
Cal Date:
Run Date: **09/25/2009 13:15**
File ID: **EN.0909251315-17**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		2270		20.0	10.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-22**
Client ID: **PLT-X022**
Matrix: **Water**
Workgroup Number: **WG312946**
Collect Date: **09/23/2009 17:15**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/25/2009 13:15**
Cal Date:
Run Date: **09/25/2009 13:15**
File ID: **EN.0909251315-20**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		5030		40.0	20.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-23**
Client ID: **PLT-X023**
Matrix: **Water**
Workgroup Number: **WG312946**
Collect Date: **09/23/2009 17:20**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/25/2009 13:15**
Cal Date:
Run Date: **09/25/2009 13:15**
File ID: **EN.0909251315-18**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		80.0		10.0	5.00

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-24**
Client ID: **PLT-X003**
Matrix: **Water**
Workgroup Number: **WG312943**
Collect Date: **09/22/2009 14:30**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/25/2009 12:15**
Cal Date:
Run Date: **09/25/2009 12:15**
File ID: **EN.0909251215-16**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		846		20.0	10.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-25**
Client ID: **PLT-X003**
Matrix: **Water**
Workgroup Number: **WG312943**
Collect Date: **09/22/2009 14:30**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/25/2009 12:15**
Cal Date:
Run Date: **09/25/2009 12:15**
File ID: **EN.0909251215-17**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		848		20.0	10.0

2.1.3.2 QC Summary Data

METHOD BLANK SUMMARY

Login Number: L09090508
 Blank File ID: EN.0909251215-01
 Prep Date: 09/25/09 12:15
 Analyzed Date: 09/25/09 12:15
 Analyst: HJR

Work Group: WG312943
 Blank Sample ID: WG312943-01
 Instrument ID: OVEN
 Method: 160.1

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG312943-02	EN.0909251215-02	09/25/09 12:15	
LCS2	WG312943-03	EN.0909251215-03	09/25/09 12:15	
PLT-X001	L09090508-01	EN.0909251215-11	09/25/09 12:15	
PLT-X002	L09090508-02	EN.0909251215-13	09/25/09 12:15	
PLT-X003	L09090508-03	EN.0909251215-15	09/25/09 12:15	
PLT-X003	L09090508-24	EN.0909251215-16	09/25/09 12:15	
PLT-X003	L09090508-25	EN.0909251215-17	09/25/09 12:15	
PLT-X004	L09090508-04	EN.0909251215-21	09/25/09 12:15	
PLT-X005	L09090508-05	EN.0909251215-23	09/25/09 12:15	
DUP	WG312943-05	EN.0909251215-24	09/25/09 12:15	

METHOD BLANK SUMMARY

Login Number: L09090508
 Blank File ID: EN.0909251315-01
 Prep Date: 09/25/09 13:15
 Analyzed Date: 09/25/09 13:15
 Analyst: HJR

Work Group: WG312946
 Blank Sample ID: WG312946-01
 Instrument ID: OVEN
 Method: 160.1

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG312946-02	EN.0909251315-02	09/25/09 13:15	
LCS2	WG312946-03	EN.0909251315-03	09/25/09 13:15	
PLT-X006	L09090508-06	EN.0909251315-04	09/25/09 13:15	
PLT-X007	L09090508-07	EN.0909251315-05	09/25/09 13:15	
PLT-X008	L09090508-08	EN.0909251315-06	09/25/09 13:15	
PLT-X009	L09090508-09	EN.0909251315-07	09/25/09 13:15	
PLT-X010	L09090508-10	EN.0909251315-08	09/25/09 13:15	
PLT-X011	L09090508-11	EN.0909251315-09	09/25/09 13:15	
PLT-X012	L09090508-12	EN.0909251315-10	09/25/09 13:15	
PLT-X014	L09090508-14	EN.0909251315-11	09/25/09 13:15	
PLT-X013	L09090508-13	EN.0909251315-12	09/25/09 13:15	
PLT-X015	L09090508-15	EN.0909251315-13	09/25/09 13:15	
PLT-X018	L09090508-18	EN.0909251315-14	09/25/09 13:15	
PLT-X019	L09090508-19	EN.0909251315-15	09/25/09 13:15	
PLT-X020	L09090508-20	EN.0909251315-16	09/25/09 13:15	
PLT-X021	L09090508-21	EN.0909251315-17	09/25/09 13:15	
PLT-X023	L09090508-23	EN.0909251315-18	09/25/09 13:15	
PLT-X016	L09090508-16	EN.0909251315-19	09/25/09 13:15	
PLT-X022	L09090508-22	EN.0909251315-20	09/25/09 13:15	
DUP	WG312946-05	EN.0909251315-21	09/25/09 13:15	



METHOD BLANK SUMMARY

Login Number: L09090508
 Blank File ID: EN.0909281500-01
 Prep Date: 09/28/09 15:00
 Analyzed Date: 09/28/09 15:00
 Analyst: HJR

Work Group: WG313036
 Blank Sample ID: WG313036-01
 Instrument ID: OVEN
 Method: 160.1

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG313036-02	EN.0909281500-02	09/28/09 15:00	
LCS2	WG313036-03	EN.0909281500-03	09/28/09 15:00	
PLT-X017	L09090508-17	EN.0909281500-15	09/28/09 15:00	
DUP	WG313036-05	EN.0909281500-16	09/28/09 15:00	

Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L09090508 Prep Date: 09/25/09 12:15 Sample ID: WG312943-01
Instrument ID: OVEN Run Date: 09/25/09 12:15 Prep Method: 160.1
File ID: EN.0909251215-01 Analyst: HJR Method: 160.1
Workgroup (AAB#): WG312943 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: OVEN -

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Total Dissolved Solids	5.00	10.0	10.0	1	ND

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1499151

30-SEP-2009 11:59



Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L09090508 Prep Date: 09/25/09 13:15 Sample ID: WG312946-01
Instrument ID: OVEN Run Date: 09/25/09 13:15 Prep Method: 160.1
File ID: EN.0909251315-01 Analyst: HJR Method: 160.1
Workgroup (AAB#): WG312946 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: OVEN -

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Total Dissolved Solids	5.00	10.0	10.0	1	ND

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1499151

30-SEP-2009 11:59



Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L09090508 Prep Date: 09/28/09 15:00 Sample ID: WG313036-01
Instrument ID: OVEN Run Date: 09/28/09 15:00 Prep Method: 160.1
File ID: EN.0909281500-01 Analyst: HJR Method: 160.1
Workgroup (AAB#): WG313036 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: OVEN -

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Total Dissolved Solids	5.00	10.0	10.0	1	ND

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1499151

30-SEP-2009 11:59



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09090508 Analyst: HJR Prep Method: 160.1
 Instrument ID: OVEN Matrix: Water Method: 160.1
 Workgroup (AAB#): WG312943 Units: mg/L
 QC Key: DOWB0A2006 Lot #: STD32441
 Sample ID: WG312943-02 LCS File ID: EN.0909251215-02 Run Date: 09/25/2009 12:15
 Sample ID: WG312943-03 LCS2 File ID: EN.0909251215-03 Run Date: 09/25/2009 12:15

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Total Dissolved Solids	500	502	100	500	504	101	0.398	80 - 120	25	



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09090508 Analyst: HJR Prep Method: 160.1
Instrument ID: OVEN Matrix: Water Method: 160.1
Workgroup (AAB#): WG312946 Units: mg/L
QC Key: DOWB0A2006 Lot #: STD32441
Sample ID: WG312946-02 LCS File ID: EN.0909251315-02 Run Date: 09/25/2009 13:15
Sample ID: WG312946-03 LCS2 File ID: EN.0909251315-03 Run Date: 09/25/2009 13:15

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Total Dissolved Solids	500	504	101	500	502	100	0.398	80 - 120	25	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 1499152
Report generated: 09/30/2009 11:59



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09090508 Analyst: HJR Prep Method: 160.1
Instrument ID: OVEN Matrix: Water Method: 160.1
Workgroup (AAB#): WG313036 Units: mg/L
QC Key: DOWB0A2006 Lot #: STD32441
Sample ID: WG313036-02 LCS File ID: EN.0909281500-02 Run Date: 09/28/2009 15:00
Sample ID: WG313036-03 LCS2 File ID: EN.0909281500-03 Run Date: 09/28/2009 15:00

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Total Dissolved Solids	500	500	100	500	500	100	0.00	80 - 120	25	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 1499152
Report generated: 09/30/2009 11:59



MS/MSD REPORT

Loginnum: L09090508Cal ID: OVEN-Worknum: WG312943Instrument ID: OVEN

Contract #: _____

Prep Method: 160.1Parent ID: L09090508-03File ID: EN.0909251215-15Dil: 1Method: 160.1Sample ID: L09090508-24 MSFile ID: EN.0909251215-16Dil: 1Matrix: WaterSample ID: L09090508-25 MSDFile ID: EN.0909251215-17Dil: 1Units: mg/L

Analyte	Parent	MS Spiked	MS Found	MS %Rec	MSD Spiked	MSD Found	MSD %Rec	%RPD	%Rec Limits	RPD Limit	Q
Total Dissolved Solids	344	500	846	100	500	848	101	0.236	80 - 120	25	

* FAILS %REC LIMIT

FAILS RPD LIMIT

MS_MSD - Modified 09/13/2009

PDF File ID: 1499153

Report generated 09/30/2009 11:59



3.0 Attachments

Microbac Laboratories Inc.
Analyst Listing
September 30, 2009

ADC - ANTHONY D. CANTER	AJF - AMANDA J. FICKIESEN	AJM - ANTHONY J. MOSSBURG
ALB - ANNIE L. BROWN	AML - ANTHONY M. LONG	BLG - BRENDA L. GREENWALT
BRG - BRENDA R. GREGORY	CAA - CASSIE A. AUGENSTEIN	CAF - CHERYL A. FLOWERS
CAH - CHARLES A. HALL	CEB - CHAD E. BARNES	CLC - CHRYS L. CRAWFORD
CLW - CHARISSA L. WINTERS	CPD - CHAD P. DAVIS	CSH - CHRIS S. HILL
DDE - DEBRA D. ELLIOTT	DEL - DON E. LIGHTFRITZ	DEV - DAVID E. VANDENBERG
DGB - DOUGLAS G. BUTCHER	DIH - DEANNA I. HESSON	DLB - DAVID L. BUMGARNER
DLP - DOROTHY L. PAYNE	DLR - DIANNA L. RAUCH	DR - DEANNA ROBERTS
ECL - ERIC C. LAWSON	EDA - ERIN D. AGEE	ERP - ERIN R. PORTER
FJB - FRANCES J. BOLDEN	HAV - HEMA VILASAGAR	HJR - HOLLY J. REED
JBK - JEREMY B. KINNEY	JDH - JUSTIN D. HESSON	JKT - JANE K. THOMPSON
JWR - JOHN W. RICHARDS	JWS - JACK W. SHEAVES	JYH - JI Y. HU
KEB - KATHRYN E. BARNES	KHR - KIM H. RHODES	KRA - KATHY R. ALBERTSON
LKN - LINDA K. NEDEFF	LSB - LESLIE S. BUCINA	MDA - MIKE D. ALBERTSON
MDC - MICHAEL D. COCHRAN	MES - MARY E. SCHILLING	MMB - MAREN M. BEERY
MRT - MICHELLE R. TAYLOR	MSW - MATT S. WILSON	NPM - NATHANIEL P. MILLER
PDM - PIERCE D. MORRIS	RAH - ROY A. HALSTEAD	RB - ROBERT BUCHANAN
REK - ROBERT E. KYER	RLK - ROBIN L. KLINGER	RWC - RODNEY W. CAMPBELL
SDH - SHANA D. HINYARD	SLM - STEPHANIE L. MOSSBURG	SLP - SHERI L. PFALZGRAF
TIP - TAE I. PARRISH	TMB - TIFFANY M. BAILEY	TMM - TAMMY M. MORRIS
VC - VICKI COLLIER	WTD - WADE T. DELONG	

September 30, 2009

Qualkey: STD

Qualifier	Description
*	Surrogate or spike compound out of range
+	Correlation coefficient for the MSA is less than 0.995
<	Result is less than the associated numerical value.
>	Result is greater than the associated numerical value.
A	See the report narrative
B	Analyte present in method blank
B1	Target analyte detected in method blank at or above the method reporting limit
B3	Target analyte detected in calibration blank at or above the method reporting limit
C	Confirmed by GC/MS
CG	Confluent growth
DL	Surrogate or spike compound was diluted out
E	Estimated concentration due to sample matrix interference
EDL	Elevated sample reporting limits, presence of non-target analytes
EMPC	Estimated Maximum Possible Concentration
F, S	Estimated result below quantitation limit; method of standard additions(MSA)
FL	Free Liquid
H1	Sample analysis performed past holding time.
I	Semiquantitative result (out of instrument calibration range)
J	The analyte was positively identified, but the quantitation was below the RL
J,B	Analyte detected in both the method blank and sample above the MDL.
J,P	Estimate; columns don't agree to within 40%
J,S	Estimated concentration; analyzed by method of standard addition (MSA)
L	Sample reporting limits elevated due to matrix interference
L1	The associated blank spike (LCS) recovery was above the laboratory acceptance limits.
L2	The associated blank spike (LCS) recovery was below the laboratory acceptance limits.
M	Matrix effect; the concentration is an estimate due to matrix effect.
N	Tentatively identified compound(TIC)
NA	Not applicable
ND	Not detected at or above the reporting limit (RL).
ND, L	Not detected; sample reporting limit (RL) elevated due to interference
ND, S	Not detected; analyzed by method of standard addition (MSA)
NF	Not found by library search
NFL	No free liquid
NI	Non-ignitable
NR	Analyte is not required to be analyzed
NS	Not spiked
P	Concentrations >40% difference between the two GC columns
Q	One or more quality control criteria fail. See narrative.
QNS	Quantity of sample not sufficient to perform analysis
RA	Reanalysis confirms reported results
RE	Reanalysis confirms sample matrix interference
S	Analyzed by method of standard addition (MSA)
SMI	Sample matrix interference on surrogate
SP	Reported results are for spike compounds only
TIC	Library Search Compound
TNTC	Too numerous to count
U	Undetected; the concentration is below the reported MDL.
UJ	Undetected; the MDL and RL are estimated due to quality control discrepancies.
W	Post-digestion spike for furnace AA out of control limits
X	Exceeds regulatory limit
X, S	Exceeds regulatory limit; method of standard additions (MSA)
Z	Cannot be resolved from isomer - see below

*****Special Notes for Organic Analytes**

1. Acrolein and acrylonitrile by method 624 are semi-quantitative screens only.
2. 1,2-Diphenylhydrazine is unstable and is reported as azobenzene.
3. N-nitrosodiphenylamine cannot be separated from diphenylamine.
4. 3-Methylphenol and 4-Methylphenol are unresolvable compounds.
5. m-Xylene and p-Xylene are unresolvable compounds.
6. The reporting limits for Appendix II/IX compounds by method 8270 are based on EPA estimated PQLs referenced in 40 CFR Part 264, Appendix IX. They are not always achievable for every compound and are matrix dependent.



Phone: 740-373-4071

Marietta, OH 45750

CHAIN-OF-CUSTODY RECORD

Fax: 740-373-4835

[illegible]

CHAIN-OF-CUSTODY RECORD

Company Name: CH2M Hill		Contact Phone #: 414-847-0332		Program ☐ CWA ☐ RCRA ☐ DOD ☐ AFCEE ☐ Other	
Project Contact: Mike Zamboni		Location: Milwaukee, WI		ADDITIONAL REQUIREMENTS	
Turn Around Requirements: Standard		Project ID: DOW - Ludington		TOTAL # (LAB USE)	
Sampler (print): N. Wilbur / J. Tortorelli		Signature: <i>Nicole D. Wilbur</i>		MS/HSD	
Sample I.D. No.	Comp	Grab	Date	Time	Matrix*
PLT-X001		X	9/22/09	1205	W
PLT-X002		X	9/22/09	1235	W
PLT-X003		X	9/22/09	1430	W
PLT-X004		X	9/22/09	1525	W
PLT-X005		X	9/22/09	1635	W
PLT-X006		X	9/22/09	1715	W
PLT-X007		X	9/22/09	1745	W
PLT-X008		X	9/22/09	1750	W
PLT-X009		X	9/22/09	1820	W
PLT-X010		X	9/22/09	1850	W
Microbac OVD  Received: 09/24/2009 09:44 By: ERIN PORTER 221000001882					
Relinquished by: <i>Nicole D. Wilbur</i>	Date: 9/23/09	Time: 1700	Received (Signature)	Date	Time
Relinquished by: <i>Nicole D. Wilbur</i>	Date	Time	Received (Signature)	Remarks:	



1000001882

COOLER INSPECTION



Received: 09/24/2009 09:44
Delivery Method: UPS
Opened By: Erin R Porter
Comments:

Login(s): L09090508

Cooler(s)

Cooler #	Temp Gun	Temp	Tracking #	COC #	Comments
0014077	G	3.0	J2142821050	09971 09972	
0014078	G	3.0	J2142821041	09971 09972	

1	Yes	Were shipping coolers sealed?
2	Yes	Were custody seals intact?
3	Yes	Were cooler temperatures in range of 0-6?
4	Yes	Was ice present?
5	Yes	Were COC's received/information complete/signed and dated?
6	Yes	Were sample containers and labels intact and match COC?
7	Yes	Were the correct containers and volumes received?
8	Yes	Were correct preservatives used? (water only)
9	Yes	Were pH ranges acceptable? (voa's excluded)
10	NA	Were VOA samples free of headspace (<6mm)?
11	Yes	Were samples received within EPA hold times?

Look closer. Go further. Do more.

Microbac - Ohio Valley Division
158 Starlite Drive
Marietta, OH 45750
Tel: (740)373-4071 Fax: (740)373-4835

Internal Chain of Custody Report

Login: L09090508

Account: 2736

Project: 2736.006

Samples: 25

Due Date: 08-OCT-2009

Samplenum **Container ID** **Products**
L09090508-01 617421 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:13	JBK	RLK
3	STORE	WET	A2	28-SEP-2009 09:21	RLK	HJR

Samplenum **Container ID** **Products**
L09090508-01 617422 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:10	DLP	JKT
3	STORE	WET	A2	25-SEP-2009 15:55	RLK	DLP

Samplenum **Container ID** **Products**
L09090508-02 617423 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:13	JBK	RLK
3	STORE	WET	A2	28-SEP-2009 09:21	RLK	HJR

Samplenum **Container ID** **Products**
L09090508-02 617424 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:10	DLP	JKT
3	STORE	WET	A2	25-SEP-2009 15:55	RLK	DLP

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09090508

Account: 2736

Project: 2736.006

Samples: 25

Due Date: 08-OCT-2009

Samplenum **Container ID** **Products**
L09090508-03 617425 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:13	JBK	RLK
3	STORE	WET	A2	28-SEP-2009 09:20	RLK	HJR

Samplenum **Container ID** **Products**
L09090508-03 617426 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:10	DLP	JKT
3	STORE	WET	A2	25-SEP-2009 15:55	RLK	DLP

Samplenum **Container ID** **Products**
L09090508-04 617427 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:13	JBK	RLK
3	STORE	WET	A2	28-SEP-2009 09:21	RLK	HJR

Samplenum **Container ID** **Products**
L09090508-04 617428 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:10	DLP	JKT
3	STORE	WET	A2	25-SEP-2009 15:54	RLK	DLP

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09090508

Account: 2736

Project: 2736.006

Samples: 25

Due Date: 08-OCT-2009

Samplenum **Container ID** **Products**
L09090508-05 617429 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:13	JBK	RLK
3	STORE	WET	A2	28-SEP-2009 09:21	RLK	HJR

Samplenum **Container ID** **Products**
L09090508-05 617430 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:10	DLP	JKT
3	STORE	WET	A2	25-SEP-2009 15:54	RLK	DLP

Samplenum **Container ID** **Products**
L09090508-06 617431 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:13	JBK	RLK
3	STORE	WET	A2	28-SEP-2009 09:21	RLK	HJR

Samplenum **Container ID** **Products**
L09090508-06 617432 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:10	DLP	JKT
3	STORE	WET	A2	25-SEP-2009 15:55	RLK	DLP

Samplenum **Container ID** **Products**
L09090508-07 617433 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:13	JBK	RLK

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09090508

Account: 2736

Project: 2736.006

Samples: 25

Due Date: 08-OCT-2009

Samplenum **Container ID** **Products**
L09090508-07 617434 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:11	DLP	JKT
3	STORE	WET	A2	25-SEP-2009 15:55	RLK	DLP

Samplenum **Container ID** **Products**
L09090508-08 617435 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:13	JBK	RLK
3	STORE	WET	A2	28-SEP-2009 09:21	RLK	HJR

Samplenum **Container ID** **Products**
L09090508-08 617436 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:11	DLP	JKT
3	STORE	WET	A2	25-SEP-2009 15:55	RLK	DLP

Samplenum **Container ID** **Products**
L09090508-09 617437 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:13	JBK	RLK
3	STORE	WET	A2	28-SEP-2009 09:21	RLK	HJR

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09090508

Account: 2736

Project: 2736.006

Samples: 25

Due Date: 08-OCT-2009

Samplenum **Container ID** **Products**
L09090508-09 617438 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:11	DLP	JKT
3	STORE	WET	A2	25-SEP-2009 15:54	RLK	DLP

Samplenum **Container ID** **Products**
L09090508-10 617439 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:13	JBK	RLK
3	STORE	WET	A2	28-SEP-2009 09:21	RLK	HJR

Samplenum **Container ID** **Products**
L09090508-10 617440 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:11	DLP	JKT
3	STORE	WET	A2	25-SEP-2009 15:54	RLK	DLP

Samplenum **Container ID** **Products**
L09090508-11 617441 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:13	JBK	RLK
3	STORE	WET	A2	28-SEP-2009 09:21	RLK	HJR

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09090508

Account: 2736

Project: 2736.006

Samples: 25

Due Date: 08-OCT-2009

Samplenum **Container ID** **Products**
L09090508-11 617442 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:11	DLP	JKT
3	STORE	WET	A2	25-SEP-2009 15:54	RLK	DLP

Samplenum **Container ID** **Products**
L09090508-12 617443 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:13	JBK	RLK
3	STORE	WET	A2	28-SEP-2009 09:22	RLK	HJR

Samplenum **Container ID** **Products**
L09090508-12 617444 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:11	DLP	JKT
3	STORE	WET	A2	25-SEP-2009 15:55	RLK	DLP

Samplenum **Container ID** **Products**
L09090508-13 617445 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:13	JBK	RLK
3	STORE	WET	A2	28-SEP-2009 09:22	RLK	HJR

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09090508

Account: 2736

Project: 2736.006

Samples: 25

Due Date: 08-OCT-2009

Samplenum **Container ID** **Products**
L09090508-13 617446 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:10	DLP	JKT
3	STORE	WET	A2	25-SEP-2009 15:55	RLK	DLP

Samplenum **Container ID** **Products**
L09090508-14 617447 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:13	JBK	RLK
3	STORE	WET	A2	28-SEP-2009 09:21	RLK	HJR

Samplenum **Container ID** **Products**
L09090508-14 617448 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:10	DLP	JKT
3	STORE	WET	A2	25-SEP-2009 15:55	RLK	DLP

Samplenum **Container ID** **Products**
L09090508-15 617449 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:13	JBK	RLK
3	STORE	WET	A2	28-SEP-2009 09:21	RLK	HJR

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09090508

Account: 2736

Project: 2736.006

Samples: 25

Due Date: 08-OCT-2009

Samplenum **Container ID** **Products**
L09090508-16 617450 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:13	JBK	RLK
3	STORE	WET	A2	28-SEP-2009 09:21	RLK	HJR

Samplenum **Container ID** **Products**
L09090508-17 617451 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:13	JBK	RLK
3	STORE	WET	A2	28-SEP-2009 09:21	RLK	HJR

Samplenum **Container ID** **Products**
L09090508-18 617452 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:13	JBK	RLK
3	STORE	WET	A2	28-SEP-2009 09:22	RLK	HJR

Samplenum **Container ID** **Products**
L09090508-19 617453 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:13	JBK	RLK
3	STORE	WET	A2	28-SEP-2009 09:22	RLK	HJR

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09090508

Account: 2736

Project: 2736.006

Samples: 25

Due Date: 08-OCT-2009

Samplenum **Container ID** **Products**
L09090508-19 617454 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:10	DLP	JKT
3	STORE	WET	A2	25-SEP-2009 15:55	RLK	DLP

Samplenum **Container ID** **Products**
L09090508-20 617455 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:13	JBK	RLK
3	STORE	WET	A2	28-SEP-2009 09:21	RLK	HJR

Samplenum **Container ID** **Products**
L09090508-20 617456 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:10	DLP	JKT
3	STORE	WET	A2	25-SEP-2009 15:55	RLK	DLP

Samplenum **Container ID** **Products**
L09090508-21 617457 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:13	JBK	RLK
3	STORE	WET	A2	28-SEP-2009 09:22	RLK	HJR

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09090508

Account: 2736

Project: 2736.006

Samples: 25

Due Date: 08-OCT-2009

Samplenum **Container ID** **Products**
L09090508-21 617458 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:10	DLP	JKT
3	STORE	WET	A2	25-SEP-2009 15:55	RLK	DLP

Samplenum **Container ID** **Products**
L09090508-22 617459 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:13	JBK	RLK
3	STORE	WET	A2	28-SEP-2009 09:21	RLK	HJR

Samplenum **Container ID** **Products**
L09090508-22 617460 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:10	DLP	JKT
3	STORE	WET	A2	25-SEP-2009 15:55	RLK	DLP

Samplenum **Container ID** **Products**
L09090508-23 617461 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:13	JBK	RLK
3	STORE	WET	A2	28-SEP-2009 09:22	RLK	HJR

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09090508

Account: 2736

Project: 2736.006

Samples: 25

Due Date: 08-OCT-2009

Samplenum **Container ID** **Products**
L09090508-23 617462 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:10	DLP	JKT
3	STORE	WET	A2	25-SEP-2009 15:54	RLK	DLP

Samplenum **Container ID** **Products**
L09090508-24 617463 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:13	JBK	RLK
3	STORE	WET	A2	28-SEP-2009 09:21	RLK	HJR

Samplenum **Container ID** **Products**
L09090508-24 617464 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:10	DLP	JKT
3	STORE	WET	A2	25-SEP-2009 15:54	RLK	DLP

Samplenum **Container ID** **Products**
L09090508-25 617465 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:13	JBK	RLK
3	STORE	WET	A2	28-SEP-2009 09:21	RLK	HJR

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09090508**Account:** 2736**Project:** 2736.006**Samples:** 25**Due Date:** 08-OCT-2009

<u>Samplenum</u>	<u>Container ID</u>	<u>Products</u>
L09090508-25	617466	NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:10	DLP	JKT
3	STORE	WET	A2	25-SEP-2009 15:55	RLK	DLP

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Field Investigation Report

**Dow Ludington Plant Site
Exfiltration Study Deep Groundwater
Field Investigation Report**

Prepared for
The Dow Chemical Company

March 2010

CH2MHILL

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Abbreviations and Acronyms

bgs	below ground surface
CPT	cone penetrometer test
Dow	The Dow Chemical Company
DW	drinking water
EC	electrical conductivity
FAC	final acute value
facility	Dow Ludington Plant Site Facility, Ludington, Michigan
gpm	gallons per minute
GSI	groundwater-surface water interface
MDNRE	Michigan Department of Natural Resources and Environment
mg/L	milligrams per liter
Microbac	Microbac Laboratories
MS	matrix spike
MSD	matrix spike duplicate
NPDES	National Pollutant Discharge Elimination System
PVC	polyvinyl chloride
QC	quality control
R&C	residential and commercial
TDS	total dissolved solids
TKN	total kjeldahl nitrogen
USEPA	United States Environmental Protection Agency
VAP	vertical aquifer profiling

SECTION 1

Introduction

The Dow Chemical Company (Dow) Ludington Plant Site Facility (facility) was located on 183 acres within an industrialized area of Ludington, Michigan, along the northeastern and eastern shore of Pere Marquette Lake (Figure 1). In July 2009, Dow's Calcium Chloride Business was sold to the Occidental Chemical Corporation. This sale included the production facilities located on the facility, as well as 100 acres of the facility located on the eastern end of Pere Marquette Lake occupied by a series of retention ponds known as the South Pond Area.

An exfiltration study is being performed at the South Pond Area as part of a requirement of the facility National Pollutant Discharge Elimination System (NPDES) permit MI0003026 (Part I, Section A.2) that became effective on January 1, 2008. The results of the initial phase of the study completed in 2008 indicated the ponds were losing more than 500 gallons per minute (gpm) to exfiltration, and the majority of water lost through exfiltration appeared to discharge (vent) to surface water in the Pere Marquette River and Pere Marquette Lake adjacent to the South Pond Area through shallow groundwater. Deep groundwater also appeared to be impacted in some areas; however, the initial phase of the study was not able to determine whether impacted deep groundwater also discharged to surface water or if deep groundwater impacts extend beyond the facility boundaries (CH2M HILL 2009a).

This report represents an extension of the exfiltration study to address data gaps in the understanding of the fate of groundwater affected by exfiltration. The work was conducted on behalf of Dow during August and September 2009 at the South Pond Area in accordance with the requirements of the Michigan Department of Natural Resources and Environment Quality (MDNRE, formerly known as the Michigan Department of Environmental Quality) -approved work plan (CH2M HILL 2008a).

SECTION 2

Objectives and Investigation Approach

The overall purpose of this investigation was to collect sufficient data to determine how much water exfiltrating from the South Pond Area is entering deep groundwater and the fate of impacted deep groundwater. The specific objectives of this investigation were as follows:

- Assess whether concentrations of ammonia, chloride, and total dissolved solids (TDS) are exceeding generic MDNRE criteria in deep groundwater (greater than 50 feet below ground surface [bgs]) beneath the South Pond Area
- Determine the hydraulics of the upper and lower sand aquifers beneath the South Pond Area
- Evaluate aquifer hydraulics to determine if any deep groundwater impacted by exfiltration water could potentially migrate offsite

The field investigation approach was to install seven deep groundwater monitoring wells and four shallow groundwater monitoring wells, in combination with 3 existing shallow monitoring wells, to form seven nested shallow/deep well pairs at various locations across the South Pond Area. These wells were intended to further define the horizontal and vertical extent of chlorides, TDS, and ammonia in deep groundwater; provide an understanding of the lower sand aquifer hydraulics; and supplement the current understanding of the geology beneath the South Pond Area.

SECTION 3

Background

During 2006, a field investigation was conducted at the facility and South Pond Area to assess whether chlorides and TDS beneath the facility exceeding the MDNRE Part 201, Public Act 451 drinking water criteria (for chloride, at 250 milligrams per liter [mg/L]) and groundwater-surface water interface (GSI) cleanup criteria (for TDS, at 500 mg/L) were ultimately discharging into Pere Marquette Lake. This investigation concluded that shallow groundwater impacted with chloride and TDS appeared to be venting to Pere Marquette Lake in areas where the facility's primary aquitard unit (the 'lake clay') was not present (CH2M HILL 2007).

In August and September 2008, an exfiltration study was performed at the South Pond Area to assess whether the ponds were losing water via exfiltration to the shallow groundwater and if so, estimate the amount of water loss. Groundwater samples and electrical conductivity (EC) logs from cone penetrometer testing (CPT) soundings, and pond influent and effluent samples were used to determine the mass loading of ammonia, chlorides, TDS, and total kjeldahl nitrogen (TKN) that was exfiltrating from the South Pond Area into groundwater. This study concluded that the South Pond Area was losing between 520 and 580 gpm to exfiltration, and that the majority of water lost through exfiltration appears to discharge to shallow groundwater and then to the Pere Marquette River and Pere Marquette Lake adjacent to the South Pond Area. Some of the deeper CPT soundings and groundwater grab samples indicated that deep groundwater was impacted in some areas; however, the study was not able to determine the fate of impacted deep groundwater and whether impacts extend beyond the facility boundaries (CH2M HILL 2009).

Additional history and facility background are included in previously published reports: *Dow Ludington Plant Site 2006 Groundwater/Surface Water Interface Field Investigation Report* (CH2M HILL 2007) and *Dow Ludington Plant Site Trident Probe Pore Water Investigation* (CH2M HILL 2008b).

3.1 Site Setting

The South Pond Area is a series of retention ponds that hold process water delivered from the plant for the primary purpose of solids settling (Figure 2). The ponds are located at the western end of Pere Marquette Lake and are bordered by Pere Marquette River to the north and east, and wetlands to the south. The ponds are located on top of a low-lying area that has been filled with calcium/magnesium carbonates and hydroxides, gravel, and other non-native fill. The ponds provide four components of treating post-process water:

- Solids settling
- pH reduction
- Heat loss
- Ammonia volatilization and reduction

Currently, post-process water enters the Center Pond through a pipeline that discharges at the northern end of the pond (influent) and then flows to the southern end of the pond. Water delivered to the Center Pond flows to the Secondary Settling and Tertiary Ponds, and then continues through to the Polishing Pond. Water in the Polishing Pond (effluent) then is pumped back to the facility where it is combined with other process wastewater before being discharged to Pere Marquette Lake through Outfall 001 (regulated under the facility's current NPDES permit).

3.2 Site Geology and Hydrogeology

The geologic and hydrogeologic conditions summarized herein are based on previous studies, primarily the *Site Assessment for Ludington Plant Volume I* (Radian 1999), *Dow Ludington Plant Site 2006 Groundwater/Surface Water Interface Field Investigation Report* (CH2M HILL 2007), and the *Plant Site 2008 Exfiltration Study Report* (CH2M HILL 2009). These studies investigated the facility and South Pond Area. Results of the 2006 GSI field investigation indicated there are some significant differences in subsurface geology between the onshore and offshore areas of Pere Marquette Lake (CH2M HILL 2007). There also are notable differences in geology between the facility and the South Pond Area. This section focuses on the geology and hydrogeology beneath and adjacent to the South Pond Area.

3.2.1 Geology

The unconsolidated materials below the facility consist of three primary stratigraphic units, as follows:

- Non-native fill material
- Post-glacial sediments
- Glacial till

Non-Native Fill Material

Non-native fill material is found nearly everywhere across the South Pond Area and varies from 5 to 30 feet thick, with the thickest areas being along the dikes/roads between and around the ponds as indicated in previous investigations. Typically, the fill material is 10 to 20 feet thick and is comprised of calcium/magnesium carbonates and hydroxides, sand, silt, clay, and gravel.

Post-Glacial Sediments

Below the non-native fill layer is a thick sequence of post-glacial sediments. These sediments are predominantly loose to extremely dense silty sands, with frequent lenses of silt, clay, and peat (organics). These post-glacial sediments generally extend to depths greater than 100 feet bgs and likely were deposited by a sequence of aeolian, lacustrine, and fluvial depositional events (Radian 1999).

Immediately below the non-native fill, clay to silty clay was observed in borings and CPT soundings located near Pere Marquette River along the eastern side of the South Pond Area and near the wetlands along the southern side of the South Pond Area. These post-glacial clays are the youngest native soils beneath the pond system, and range between 4 and 25 feet thick.

The predominant post-glacial sands beneath the pond system can be split into two subunits: a silty sand with frequent lenses of silt, clay and/or peat, and a dense to very dense silty sand. Where no major fine-grained soil units are present, the less dense silty sand unit sits directly above the denser silty sand and is approximately 40 to 100 feet thick. The denser silty sand is characterized by a noted increase in density (as determined by the significant increase in pushing force required to advance the CPT probe and the increased stiffness of the sand in borings) and a reduced frequency of silt and/or clay seams. Based on some of the deeper CPT soundings and boring logs across the facility (including the South Pond Area), this dense sand unit ranges from approximately 10 to over 100 feet thick.

A deeper clay layer ranging between 2 and 30 feet thick was found within the upper sand unit and was observed in a number of onshore and offshore CPT soundings, and a few of the deep borings within the South Pond Area. This clay unit appears to have been deposited under lacustrine or deep-water fluvial conditions, as it contains virtually no coarse-grained component and is absent of sand, silt, or gravel seams. There are no varves observed in this clay at any of the CPT sounding logs, indicating no significant seasonal changes in sediment loading. This lake clay appears to pinch out toward Pere Marquette Lake's northern shoreline and is present under much of the southern and western half of the South Pond Area.

Glacial Till

Beneath the post-glacial sediments is a discontinuous glacial till deposit comprised of dense silty clay with trace amounts of gravel and sand. The lateral extent of the glacial clay is not well known or mapped, as the upper boundary typically is found well below 100 feet bgs. The upper surface of this till was not observed in any of the deep borings during this investigation. Across the facility, this deep glacial clay appears to have a high amount of relief, likely because of differential post-glacial weathering.

3.2.2 Hydrogeology

In general, there are four primary hydrostratigraphic units beneath the South Pond Area:

- Upper aquifer comprised of shallow non-native fill material and post-glacial loose silty sand
- Post-glacial "lake clay" aquitard comprised of clay to silty clay
- Lower aquifer comprised of the deeper, dense post-glacial silty sand
- Glacial till aquitard comprised of dense clayey silt or silty clay

The subsurface hydrogeology beneath the South Pond Area is strongly influenced by the presence or absence of the lake clay. This clay unit is the primary aquitard unit beneath much of Pere Marquette Lake and extends beneath much of the southern portion of the South Pond Area.

The upper aquifer is unconfined with saturated conditions occurring from 5 to 17 feet bgs. Previous groundwater elevation data collected in the upper sand aquifer from existing wells around the South Pond Area indicated that groundwater flow was radially away from the approximate center of the pond (CH2M HILL 2009b). The lower sand aquifer is presumed

to be under semiconfined conditions, with hydraulic conditions partially controlled by the presence or absence of overlying lake clay or other intermittent clay and silt seams. Groundwater flow direction within the lower sand aquifer beneath the South Pond Area was unknown prior to this field investigation, as no wells penetrated this hydrostratigraphic unit.

SECTION 4

Field Investigation Results

The field investigation presented in this report was performed in accordance with the *Plant Site Exfiltration Study - Deep Groundwater Field Investigation Work Plan* (CH2M HILL 2008a).

4.1 Field Activities

The fieldwork consisted of the following:

- Rotosonic drilling/installation of seven deep wells (MW-15D, MW-16D, MW-19D, MW-37D, MW-38D, MW-39D, and MW-40D) and four shallow wells (MW-37S, MW-38S, MW-39S, and MW-40S) in the South Pond Area
- Vertical aquifer profiling (VAP) groundwater grab sampling (performed during drilling activities)
- Groundwater sampling (monitoring wells sampled)
- Groundwater elevation data collection from the well nests in the South Pond Area

4.1.1 Rotosonic Drilling, VAP Sampling, and Monitoring Well Installation

Between August 18 and September 17, 2009, 11 monitoring wells (seven deep and four shallow) were drilled and installed in the South Pond Area using rotosonic drilling techniques (Figure 2). Continuous soil logging was performed using 10-foot-long, 6-inch-diameter cores collected by this method.

Groundwater grab samples were collected every 10 feet (beginning at approximately 50 to 60 feet bgs) using a VAP “push ahead” sampling device that was advanced into soil ahead of the rotosonic drill head and allowed to fill with formation groundwater. Groundwater grab samples were unable to be collected by the VAP equipment in some of the low permeability fine-grained soils (clay and silt seams/aquitards) encountered during drilling. In these instances, VAP groundwater grab sampling resumed at the next 10-foot interval that encountered soil that yielded sufficient water. Groundwater collected using the VAP sampling technique was screened in the field for ammonia, chloride, and conductance. Ammonia was screened using a Hach DR890 colorimeter. Chloride was screened using Hach titrator strips. Conductance was screened using a YSI-SCT-30 conductivity meter. Groundwater grab samples were submitted to Microbac Laboratories (Microbac) of Marietta, Ohio, for chloride, TDS, and ammonia analyses. Table 1 provides a summary of the VAP sampling depths, field screening results, and laboratory analytical results.

Field screening results combined with soil logging data aided in selecting the final well screen position at each deep boring location based on the project data quality objectives. Each deep monitoring well was constructed using 2.5-inch Schedule 80 polyvinyl chloride (PVC) casing and a 5-foot, 0.01-slotted PVC screen (Appendix A). Controlled collapse of the native soils was used to fill in the deep borings to the desired depth for setting the deep

monitoring wells, as each of the deep borings was advanced deeper than the final depth of the monitoring well. Global Filter Pack #5 sand was used to fill the annular space around the deep well screens from the bottom of the well to 5 to 10 feet above the well screen. Portland cement grout then was used to fill the remaining annular space, and the well was completed at the surface with an expandable locking cap and a protective steel outer casing.

Each shallow monitoring well was constructed using 2-inch-diameter Schedule 80 PVC casing and a 5-foot, 0.01-slotted PVC screen (Appendix A). Final shallow well screen positions were determined in the *Plant Site Exfiltration Study - Deep Groundwater Field Investigation Work Plan* (CH2M HILL 2008a), so the shallow well screens were placed in the same elevation range (550 to 560 feet above mean sea level). Filter Pack #5 was used to fill the annular space around the well screen from the bottom of the well to 2 feet above the well screen. Approximately 2 feet of 3/8-inch coated bentonite pellets were installed above the filter pack. The remaining annular space was sealed with a bentonite grout and completed at the surface with an expandable locking cap and a protective steel outer casing.

The deep monitoring wells were developed using the air lift technique by lowering tubing to the bottom of the well and pumping air into the well to lift sediment and water through purge tubing. Development of the deep monitoring wells took between 30 and 40 minutes and removed approximately 225 gallons of purge water from each well. The shallow monitoring wells were developed using the surge and purge development technique by surging each well with the pump during development. Development of the shallow monitoring wells ranged from 35 minutes to 1 hour, 25 minutes. The amount of water purged from the shallow monitoring wells ranged from 18 to 70 gallons. Specific details including well development times, volumes, and other details, are provided on the well construction forms included in Appendix B.

On September 22 and 23, 2009, Wade Trim Incorporated surveyed the South Pond Area monitoring wells for horizontal and vertical coordinates. The ground surface and top of casing elevations were surveyed at each well location. Table 5 provides a summary of the well survey details.

4.1.2 Groundwater Well Sampling

Groundwater samples were collected from the South Pond Area monitoring wells on September 22 and 23, 2009. The samples were collected from the monitoring wells via submersible pump or low-flow sampling methods, depending on the depth of the well and the amount of hydraulic head above the well screen. The samples were shipped to Microbac to be analyzed for TDS, using U.S. Environmental Protection Agency (USEPA) Method 160.1, chlorides using USEPA Method 325.2, and ammonia using USEPA Method 350.1. The complete groundwater well sampling analytical results are summarized Table 2.

4.1.3 Groundwater Elevation Measurements

Groundwater elevations were measured from the top of the inner PVC casing at all 15 monitoring wells located within the South Pond Area. Elevation measurements were collected weekly for the first 4 weeks (September 22 through October 12, 2009), and then on November 18, 2009 and January 7, 2010. Monthly water level measurements will continue

in 2010 until April, when the facility annual groundwater monitoring event is scheduled to take place.

4.2 Field Investigation Results

This section presents the results of this field investigation including groundwater analytical results and groundwater elevation data.

4.2.1 Groundwater Analytical Results

All VAP groundwater grab samples and monitoring well groundwater samples were analyzed for TDS using USEPA Method 160.1, chlorides using USEPA Method 325.2, and ammonia using USEPA Method 350.1. Un-ionized ammonia concentrations were calculated using the default method in the MDNRE Operational Memorandum #1 criteria tables under footnote CC for cold water streams.

VAP Sampling

A total of 65 groundwater samples were collected using the VAP sampling technique during installation of deep monitoring wells MW-15D, MW-16D, MW-19D, MW-37D, MW-38D, MW-39D, and MW-40D. Table 1 provides a complete summary of the VAP sample analytical results.

Eleven VAP groundwater grab samples were collected during installation of MW-15D at 47, 57, 72, 77, 87, 97, 107, 117, 127, 137, and 147 feet bgs. Chloride exceeded Residential and Commercial (R&C) I Drinking Water (DW) standards (250 mg/L) in groundwater samples collected at 47 feet bgs and at and below 107 feet bgs. TDS exceeded R&C I DW and generic GSI criteria (500 mg/L) at all sample depths except 72 feet bgs. Un-ionized ammonia exceeded generic GSI criteria (0.029 mg/L) and the final acute value (FAV [0.320 mg/L]) at a sample depth of 47 feet bgs. All un-ionized ammonia samples collected at and below 107 feet bgs exceeded the generic GSI criteria.

Nine VAP groundwater grab samples were collected during installation of MW-16D at 47, 52, 87, 97, 104, 117, 125.5, 134, and 147 feet bgs. No VAP samples were collected between 52 and 87 feet bgs because of the presence of a fine-grained stratigraphic unit (lake clay). Chloride and TDS concentrations exceeded R&C I DW and generic GSI criteria, respectively, for groundwater samples collected at 47 and 52 feet bgs. Un-ionized ammonia concentrations exceeded the generic GSI criteria and FAV at samples collected from 47 to 97 feet bgs. The generic GSI criteria for un-ionized ammonia was exceeded at samples collected from 117 to 134 feet bgs.

Eleven VAP groundwater grab samples were collected during installation of MW-19D at depths of 47, 52, 67, 77, 87, 94, 104, 112, 127, 137, and 147 feet bgs. Chloride and TDS concentrations did not exceed R&C I DW or generic GSI criteria, respectively, for any sample depths at this location. Un-ionized ammonia concentrations ranged from 0.007 to 0.350 mg/L, exceeding the generic GSI criteria and FAV at 47 feet bgs, and the generic GSI criteria only at 52 feet bgs.

Seven VAP groundwater grab samples were collected during installation of MW-37D at 77, 87, 97, 117, 127, 137, and 147 feet bgs. Samples were not collected above 77 feet bgs because

of the presence of the lake clay aquitard unit. TDS concentrations exceeded the generic GSI criteria at 77 feet bgs. There were no chloride exceedances. Un-ionized ammonia concentrations exceeded the generic GSI criteria and FAV at samples collected from 77 to 87 feet bgs, and the generic GSI criteria only, at the sample collected from 97 feet bgs.

Eleven VAP grab groundwater samples were collected during installation of MW-38D at depths of 47, 57, 67, 77, 87, 97, 107, 117, 127, 137, and 147 feet bgs. Chloride exceeded R&C I DW criteria at all sample depths except 137 and 147 feet bgs. TDS concentrations exceeded generic GSI criteria at all sample depths except 147 feet bgs. Un-ionized ammonia concentrations exceeded the generic GSI criteria and FAV at samples collected from 87 to 107 feet bgs, and the generic GSI criteria at samples collected from 47 to 77 and from 117 to 127 feet bgs.

Nine VAP grab groundwater samples were collected from MW-39D at 67, 77, 87, 97, 103, 117, 127, 132, and 147 feet bgs. Chloride and TDS values exceeded R&C I DW and generic GSI criteria at all sample depths. Un-ionized ammonia concentrations exceeded the generic GSI criteria and FAV at samples collected from 67 and 103 feet bgs. The generic GSI criteria for un-ionized ammonia was exceeded at samples collected from 77 to 97 and 127 to 147 feet bgs.

Six VAP groundwater grab samples were collected from MW-40D at 57, 107, 117, 127, 137, and 147 feet bgs. No samples were collected from below 57 and above 106 feet bgs because of the presence of the lake clay unit. Chloride and TDS exceeded R&C I DW and generic GSI criteria, respectively, for the sample collected at 57 feet bgs (above the lake clay unit). Un-ionized ammonia concentrations exceeded the generic GSI criteria and FAV at the sample collected from 57 feet bgs. The generic GSI criteria for un-ionized ammonia was exceeded at samples collected from 107 to 127 feet bgs.

Seven field duplicates, three matrix spike (MS)/matrix spike duplicates (MSDs), one field blank, and five equipment blanks were collected for quality control (QC) purposes during the VAP sampling activities.

Monitoring Well Sampling

On September 22 and 23, 2009, one round of groundwater samples was collected from the South Pond Area monitoring wells. Chloride concentrations in the shallow monitoring wells (screened in the upper sand aquifer) ranged from 65.2 to 2,070 mg/L, while TDS concentrations in the shallow monitoring wells ranged from 400 to 5,670 mg/L. Chloride concentration isopleths are shown for the upper sand aquifer on Figure 3. Ammonia concentrations for the shallow monitoring wells ranged from not detected to 169 mg/L, while un-ionized ammonia concentrations ranged from not detected to 6.42 mg/L. Ammonia concentration isopleths are shown for the upper sand aquifer on Figure 5. Shallow groundwater concentrations exceeded the R&C I DW and generic GSI criteria for chloride and TDS and the FAV and generic GSI criteria for ammonia and un-ionized ammonia in wells MW-15S, MW-16S, MW-19S, MW-37S, MW-38S, MW-39S, and MW-40S.

Chloride groundwater concentrations in the deep monitoring wells ranged from not detected to 1,450 mg/L while TDS concentrations ranged from not detected to 3,270 mg/L. Chloride concentration isopleths are shown for the lower sand aquifer on Figure 4. Deep groundwater concentrations exceeded the R&C I DW and generic GSI criteria for chloride

and TDS, respectively, in wells MW-15D, MW-38D, and MW-39D. Ammonia concentration isopleths are shown for the deep sand aquifer on Figure 6. Ammonia groundwater concentrations in the deep monitoring wells ranged from not detected to 10.8 mg/L while un-ionized ammonia concentrations ranged from not detected to 0.410 mg/L, exceeding the FAV and generic GSI criteria in wells MW-15D, MW-16D, MW-38D, MW-39D, and MW-40D.

Two field duplicates, one MS/MSD, one equipment blank, and one field blank were collected and analyzed during monitoring well sampling activities. A summary of the monitoring well sampling results is included in Table 2.

4.2.2 Groundwater Elevation Summary

Groundwater elevations were collected weekly for 4 weeks (beginning in September 2009) and at two additional times (November 18, 2009 and January 7, 2010) since the monitoring wells were installed. Horizontal flow patterns and vertical gradients within the upper and lower sand aquifers were determined for each of the seven nested well pairs in the South Pond Area. All groundwater elevations collected are summarized in Table 3.

Shallow groundwater (0 to 50 feet bgs) levels were measured for monitoring wells MW-15S, MW-16S, MW-17S, MW-19S, MW-37S, MW-38S, MW-39S, and MW-40S. However, water levels measurements collected from MW-17S were not incorporated into the analyses of the horizontal or vertical gradients because of significant heaving damage to the well casing resulting in an offset of the screen and/or top of casing elevation. This well is scheduled for replacement in the first quarter of 2010. Shallow groundwater flow was found to be generally to the north and radially away from the center of the ponds toward Pere Marquette Lake and Pere Marquette River. A shallow groundwater elevation contour map was generated for the measurements collected on October 9, 2009, and included as Figure 7. Flow patterns were consistent over the time period evaluated (September to January), and these data are representative of the general flow conditions.

Deep groundwater levels were measured for monitoring wells MW-15D, MW-16D, MW-19D, MW-37D, MW-38D, MW-39D, and MW-40D. Deep groundwater flow is to the north-northeast toward the Pere Marquette River. Groundwater elevations remained consistent throughout the weekly and monthly water level measurements. A deep groundwater elevation contour map is included as Figure 8 and is representative of general flow conditions over the time period evaluated.

Groundwater elevations remained relatively consistent throughout the weekly and monthly water level measurements, varying slightly with minor elevation changes in lake/river levels, as shown in the hydrograph presented on Figure 9.

Vertical gradients were calculated for each of the seven nested well pairs for each round of groundwater elevation collected. Vertical gradients were found to be consistently upward in well nests along the lake and river (MW-15, MW16, MW-19, and MW-38). In the interior of the ponds, the vertical gradient is minimally upward at well nest MW-39 with two measurements indicating a slightly upward gradient while the remaining measurements indicated no measurable gradient (essentially zero). The vertical gradient at well nest MW-40 near the center of the ponds is consistently downward. A vertical gradient summary table is included as Table 4.

Data Evaluation

This section provides the following:

- Discussion of geology based upon new soil logging data collected from deep borings
- Discussion of the hydraulics within and between the upper and lower sand aquifers
- Presentation of the horizontal and vertical extent of chloride, TDS, and ammonia and its impacts beneath the South Pond Area

5.1 Geology

The soil borings performed during this field investigation confirmed that the present understanding of the geology beneath the South Pond Area is correct. Because soils beneath the South Pond Area were physically logged during this field investigation, rather than determined through geotechnical methods (CPT sounding soil friction and resistance measurements), some of the geologic details at boring locations could be refined. Overall, the geology encountered matched well with the CPT sounding interpretations, and the primary stratigraphic and hydrostratigraphic units encountered fit within the conceptual site model developed in the first phase of the exfiltration study.

The deep borings performed within the South Pond Area have allowed for improved delineation of the extent of the lake clay aquitard. The lake clay unit was observed in South Pond Area perimeter deep borings MW-16D, MW-19D, MW-37D, and South Pond Area interior deep boring MW-40D. An updated version of the lake clay isopach map, which originally was included in the *Plant Site 2008 Exfiltration Study Report* (CH2M HILL 2009a), is included as Figure 10.

5.2 Hydrogeologic Conditions

Over 3 months, the groundwater flow pattern in the upper sand aquifer was observed to be generally to the north and radially toward Pere Marquette Lake and Pere Marquette River (Figure 7). The groundwater flow pattern in the lower sand aquifer was similar, and observed to be to the north-northeast and toward the Pere Marquette River (Figure 8).

Vertical gradients between the shallow and the deep aquifers indicate that deep groundwater is upwelling into the upper sand aquifer at locations along the Pere Marquette River and Pere Marquette Lake, and groundwater within the upper sand aquifer is venting to surface water directly. In the interior and upgradient (horizontal) zones of the South Pond Area, vertical gradients indicate the potential for downward flow from the upper sand to the lower sand aquifer, but the presence of the lake clay retards this flow, leaving the lower sand aquifer beneath the aquitard free of impacts from chloride and TDS.

Across the South Pond Area, there appears to be a transition from downward to upward vertical gradient from southwest to northeast, with deep groundwater ultimately coming up

from the lower sand aquifer and discharging into Pere Marquette Lake and Pere Marquette River. As there is no lake clay aquitard present in this area, the lake and river surrounding the South Pond Area appear to act as a hydraulic boundary, controlling flow from both the upper and lower sand aquifers. Figure 11 provides the revised conceptual site model of the South Pond Area, reflecting the realization that deep groundwater is migrating upward toward Pere Marquette River.

5.3 Chloride, TDS, and Ammonia Extent

Chloride and TDS concentrations in shallow groundwater of the upper sand aquifer exceed R&C I DW and generic GSI criteria, respectively, across the majority of the South Pond Area, with the highest concentrations occurring near the center of the South Pond Area between the West Pond and Center Pond (CPT-37; Figure 3). The overall horizontal extent of elevated chlorides and TDS in the upper sand aquifer covers the entire South Pond Area. Elevated chlorides and TDS are found throughout the thickness of the upper sand aquifer (Figures 10, 11, 12, and 13). Previous investigation CPT EC logging also indicates that elevated chlorides and TDS likely are found within the lake clay, as EC levels are above background in locations where this aquitard unit is penetrated. However, elevated chloride and TDS do not appear to have completely permeated this aquitard unit.

The Center, Secondary, Tertiary, and Polishing ponds are actively exfiltrating water into the shallow groundwater system directly below the ponds. Although the East and West ponds are currently inactive, their basins are filled with evaporites and calcium/magnesium carbonates and hydroxides, and these areas can contribute to elevated chlorides and TDS to groundwater, through the infiltration of precipitation and the dissolution of the remaining solids in the pond basin.

Chloride and TDS concentrations in deep groundwater of the lower sand aquifer exceed R&C I DW and generic GSI criteria, respectively, along the center and northeastern portion of the South Pond Area (Figure 4). These areas of elevated chloride and TDS concentration within deep groundwater appear to be controlled by the presence of the lake clay aquitard (Figure 8). In areas where the lake clay is present, elevated chlorides and TDS are absent in deep groundwater. Where the upper and lower sand aquifers appear to be directly connected (center and northeast South Pond Area), elevated chlorides and TDS are found at depth. The deep groundwater elevated chlorides and TDS beneath the South Pond Area also appear to come in line with the known plume on the north side of the Pere Marquette River. Groundwater grab sample and CPT EC logging indicate the distribution of elevated chlorides and TDS within lower sand aquifer (Figures 10, 11, 12, and 13). At several locations (CPT-14, CPT-36, and MW-15D), the migration of elevated chlorides and TDS appears to be impeded by other fine-grained units that may be separate from the lake clay aquitard.

The horizontal and vertical extent of ammonia exceeding FAV and generic GSI criteria in the shallow groundwater of the upper sand aquifer appears to be similar to that observed for chloride and TDS (Figure 5). However, it should be noted that CPT groundwater grab samples collected around the perimeter of the pond in the previous 2006 GSI investigation (CH2M HILL 2007) were not analyzed for ammonia, so the extent of ammonia beneath the South Pond Area is not as well defined. Ammonia groundwater concentrations above

generic GSI criteria are present across the South Pond Area, while the FAV criteria are exceeded at MW-19S, MW-37S, and MW-40S (un-ionized ammonia concentrations of 1.41, 6.42, and 3.11 mg/L, respectively).

However, ammonia concentrations in the deep groundwater of the lower sand aquifer do not appear to have good correlation with chloride and TDS extent. In general, ammonia concentrations in deep groundwater are an order of magnitude lower than in the shallow groundwater, although ammonia exceeds the generic GSI criteria at all monitoring wells screened in the lower sand aquifer, with the exception of MW-19D (a nondetect). The FAV criteria were exceeded at only one location (MW-38D). Unlike chloride and TDS, elevated concentrations of ammonia are present below the lake clay aquitard (Figure 6). For example, MW-16D, MW-37D, and MW-40D have elevated groundwater concentrations of ammonia beneath the lake clay as high as 1.49 mg/L (un-ionized), while chloride and TDS concentrations are well below R&C I DW and generic GSI criteria. Ammonia, while reduced in overall concentration, is present at concentrations perceived to be above background in the lower sand aquifer where confined by the lake clay aquitard (Figures 16, 17, 18, and 19).

SECTION 6

Conclusions

As presented in the *Plant Site Exfiltration Study Deep Groundwater Field Investigation Work Plan* (CH2M HILL 2008a), there were three primary objectives of this study, as follows:

- Assess whether concentrations of ammonia, chloride, and TDS are exceeding generic MDNRE criteria in deep groundwater (greater than 50 feet bgs) beneath the South Pond Area
- Determine the hydraulics of the upper and lower sand aquifers beneath the South Pond Area
- Evaluate aquifer hydraulics to determine if deep groundwater impacted by exfiltration water could potentially migrate offsite

The groundwater grab and monitoring well sample quantitative data collected during this field investigation were adequate to meet the objective of assessing the concentrations of ammonia, chloride, and TDS in deep groundwater, relative to MDNRE criteria. Existing shallow monitoring wells and newly added shallow and deep monitoring wells installed within the South Pond Area provided adequate hydraulic data to assess the horizontal and vertical flow directions of both the upper and lower sand aquifers, as well as determine if impacted deep groundwater has the potential to migrate offsite.

The following conclusions are based the data collected during this field investigation:

- Deep groundwater is impacted above MDNRE screening criteria by ammonia, chloride, and TDS beneath the ponds in areas where the lake clay is not present.
- Un-ionized ammonia concentrations exceed the GSI criterion beneath the entire pond area, even in locations where the lake clay is present.
- Shallow groundwater is discharging to Pere Marquette Lake and Pere Marquette River.
- Shallow groundwater is migrating downward within the interior of the ponds and radially toward Pere Marquette River and Pere Marquette Lake.
- Deep groundwater is upwelling to the shallow aquifer along the Pere Marquette River.
- Deep groundwater does not appear to migrate offsite other than to Pere Marquette River and Pere Marquette Lake.

SECTION 7

References

CH2M HILL. 2007. *Dow Ludington Plant Site 2006 Groundwater/Surface Water Interface Field Investigation Report*. May.

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TABLE 1
VAP Groundwater Grab Sample Results
Plant Site Exfiltration Study Deep Groundwater Field Investigation Report
The Dow Chemical Company
Ludington, Michigan

MW15D								MW16D								MW19D							
Sample Depth	Analytical Results			Un-ionized Ammonia (mg/L)	Field Screening Parameters			Sample Depth	Analytical Results			Un-ionized Ammonia (mg/L)	Field Screening Parameters			Sample Depth	Analytical Results			Un-ionized Ammonia (mg/L)	Field Screening Parameters		
	Chloride (mg/L)	TDS (mg/L)	Ammonia (mg/L)		Chloride (ppm)	Sp Cond (µS/cm ^o)	Dissolved Ammonia (mg/L)		Chloride (mg/L)	TDS (mg/L)	Ammonia (mg/L)		Chloride (ppm)	Sp Cond (µS/cm ^o)	Dissolved Ammonia (mg/L)		Chloride (mg/L)	TDS (mg/L)	Ammonia (mg/L)		Chloride (ppm)	Sp Cond (µS/cm ^o)	Dissolved Ammonia (mg/L)
47	1,830	4,000	8.59	0.326	>638	3,190	>0.60	47	1,520	3,540	22.3	0.847	>638	4,604	>0.60	47	2 U	280	9.2	0.350	<31	456.1	>0.60
57	71.4	656	0.292 U	-	54	393	0.54	52	1,300	2,640	119	4.52	>638	4,367	>0.60	52	2 U	248	5.52	0.210	<31	427.3	>0.60
72	137	448	0.331 U	-	96	766	>0.60	87	2.76	372	39.1	1.49	<31	849	>0.60	67	2 U	254	0.664	0.0252	<31	346.3	>0.60
77	161	544	0.318 U	-	135	802	>0.60	97	2 U	252	11.1	0.422	<31	501	>0.60	77	2 U	254	0.337	0.0128	<31	343	0.53
87	183	804	0.215 U	-	180	914	0.35	104	2.34	256	0.246	0.00935	<31	483.4	>0.60	87	2 U	228	0.413	0.0157	<31	360.4	>0.60
97	238	754	0.732 U	-	232	NR	>0.60	117	6.65 J	274	1.55	0.0589	<31	388.4	>0.60	94	2 U	250	0.338	0.0128	<31	413.6	>0.60
107	696	2,370	4.94	0.188	>638	2,116	>0.60	125.5	2 U	326	3.25	0.124	<31	442.1	>0.60	104	2 U	234	0.393	0.0149	<31	366.2	>0.60
117	869	3,060	4.03	0.153	>638	2,846	>0.60	134	2 U	288	1.42	0.0540	<31	401.2	>0.60	112	2 U	184	0.355	0.0135	<31	357.8	>0.60
127	1,180	2,650	2.26	0.0859	>638	3,160	>0.60	147	2 U	264	0.1 U	-	<31	373.3	0.15	127	4.67	248	0.222	0.00844	<31	386.7	>0.60
137	954	3,300	1.59	0.0604	>638	3,055	>0.60									137	12.5	256	0.213	0.00809	<31	413.1	0.23
147	1,090	2,910	2.99	0.114	>638	3,323	NR									147	4.37	246	0.186	0.00707	<31	378.3	0.36

MW37D								MW38D								MW39D							
Sample Depth	Analytical Results			Un-ionized Ammonia (mg/L)	Field Screening Parameters			Sample Depth	Analytical Results			Un-ionized Ammonia (mg/L)	Field Screening Parameters			Sample Depth	Analytical Results			Un-ionized Ammonia (mg/L)	Field Screening Parameters		
	Chloride (mg/L)	TDS (mg/L)	Ammonia (mg/L)		Chloride (ppm)	Sp Cond (µS/cm ^o)	Dissolved Ammonia (mg/L)		Chloride (mg/L)	TDS (mg/L)	Ammonia (mg/L)		Chloride (ppm)	Sp Cond (µS/cm ^o)	Dissolved Ammonia (mg/L)		Chloride (mg/L)	TDS (mg/L)	Ammonia (mg/L)		Chloride (ppm)	Sp Cond (µS/cm ^o)	Dissolved Ammonia (mg/L)
77	4.73	504	34.6	1.31	<31	920	>0.60	47	959	2,240	5.95	0.226	>638	2,942	>0.60	67	1,440	3070 J	12.6 J	0.479 J	>638	3,976	>0.60
87	2 U	332	9.39	0.357	<31	510	>0.60	57	1,480	3,070	6.12	0.233	>638	4,371	>0.60	77	1430 J	3640 J	8.19 J	0.311 J	>638	3,703	>0.60
97	2 U	328	6.99	0.266	<31	513	>0.60	67	1,710	3,010	5.79	0.220	>638	4,383	>0.60	87	1440 J	3780 J	8.39 J	0.319 J	>638	3,983	>0.60
117	2 U	252	0.297	0.0113	<31	348.1	0.3	77	1,720	3,400	5.66	0.215	>638	4,663	>0.60	97	1490 J	3400 J	7.92 J	0.301 J	>638	4,194	>0.60
127	2 U	264	0.217	0.00825	<31	359.3	0.4	87	1,730	3,700	10.6	0.403	>638	4,880	>0.60	103	1370 J	3700 J	8.76 J	0.333 J	>638	4,138	>0.60
137	2 U	268	0.231	0.00878	<31	361.7	0.44	97	1,790	3,970	11.1	0.422	>638	5,090	>0.60	117	996	2,250	0.221 U	-	>638	2,809	>0.60
147	2 U	338	0.154	0.00585	<31	375.9	>0.60	107	1,750	3,730	10.6	0.403	>638	4,934	>0.60	127	1,470	2,950	5.47	0.208	>638	3,988	>0.60
								117	1,190	2,700	6.32	0.240	>638	3,651	>0.60	132	1,330	3,070	5.26	0.200	>638	4,236	>0.60
								127	1,530	3,280	6.58	0.250	>638	4,095	>0.60	147	1,670	3,010	7.37	0.280	>638	4,358	>0.60
								137	182	738	0.396	0.0150	180	920	>0.60								
								147	60.9	448	0.263	0.0100	54	554	0.24								

MW40D							
Sample Depth	Analytical Results			Un-ionized Ammonia (mg/L)	Field Screening Parameters		
	Chloride (mg/L)	TDS (mg/L)	Ammonia (mg/L)		Chloride (ppm)	Sp Cond (µS/cm ^o)	Dissolved Ammonia (mg/L)
57	1,860	4,000	89.5	3.40	>638	5,650	>0.60
107	2.37	398	4.77	0.181	<31	490.6	>0.60
117	2.04	388	2.51	0.0954	<31	585	>0.60
127	2.42	370	4.96	0.188	<31	617	>0.60
137	2.09	278	0.343 U	-	<31	412.4	0.41
147	2 U	248	0.293 U	-	<31	419.2	0.12

NR - Not recorded
J - Estimated
U - Not detected or not detected at significantly greater than that in an associated blank.
UJ - Nondetect, estimated quantitation limit.
All concentrations compared to PA 451 Part 201 Residential and Commercial (R&C) I Drinking Water (DW) and Groundwater-Surface Water Interface (GSI) Criteria.
- Shading indicates a concentration that exceeds the R&C I DW Criteria (250 mg/L Chloride).
- Bold indicates a concentration that exceeds the R&C GSI Criteria (0.029 mg/L ammonia [un-ionized] & 500 mg/L TDS).
- Italics indicates a concentration that exceeds the Final Acute Value form MDNRE Water Quality Rule 57 (0.320 mg/L un-ionized ammonia) from MDNRE Op Memo 1, Footnote CC (0.029 mg/L un-ionized Ammonia)

TABLE 2

Groundwater Monitoring Well Sampling Results

*Plant Site Exfiltration Study Deep Groundwater Field Investigation Report**The Dow Chemical Company**Ludington, Michigan*

Well ID	Date Collected	Chloride (mg/L)	TDS (mg/L)	Ammonia (mg/L)	Un-ionized Ammonia (mg/L)
MW-15D	9/22/09 12:35	626	2530	4.74	0.180
MW-15S	9/22/09 12:05	1670	3520	7.51	0.285
MW-16D	9/22/09 14:30	2.01	344 U	4.26	0.162
MW-16S	9/23/09 15:40	1380	3470	4.6	0.175
MW-17S	9/23/09 12:05	65.2	400	0.116 U	-
MW-19D	9/22/09 16:35	2.15	190 U	0.298 U	-
MW-19S	9/23/09 17:15	2070	5670	37	1.41
MW-37D	9/22/09 15:25	2 U	280 U	0.787 U	-
MW-37S	9/23/09 16:25	903	2270	169	6.42
MW-38D	9/23/09 8:25	1450	3270	10.8	0.410
MW-38S	9/23/09 8:55	919	2720	4.57	0.174
MW-39D	9/22/09 17:45	967	2540	5.25	0.200
MW-39S	9/22/09 17:15	1230	3020	7.94	0.302
MW-40D	9/22/09 18:50	2 U	452	1.98	0.0752
MW-40S	9/22/09 18:20	1560	4960	81.9	3.11

FD - Field Duplicate

J - Estimated

U - Not detected or not detected at significantly greater than that in an associated blank.

UJ - Nondetect, estimated quantitation limit.

All concentrations compared to PA 451 Part 201 Residential and Commercial (R&C) I Drinking Water (DW) and Groundwater-Surface Water Interface (GSI) Criteria.

- Shading indicates a concentration that exceeds the R&C I DW Criteria (250 mg/L Chloride).

- Bold indicates a concentration that exceeds the R&C I GSI Criteria (0.029 mg/L ammonia [un-ionized] & 500 mg/L TDS).

- Italics indicates a concentration that exceeds the Final Acute Value from MDNRE Water Quality Rule 57

(0.320 mg/L Ammonia) from MDNRE Op Memo 1, Footnote CC

TABLE 3

Groundwater Elevation Data

Plant Site Exfiltration Study Deep Groundwater Field Investigation Report

The Dow Chemical Company

Ludington, Michigan

Monitoring Well ID	Surveyed Elevation at TOC	Depth to Water 9/22/09	Groundwater Elevation 9/22/09	Depth to Water 9/30/09	Groundwater Elevation 9/30/09	Depth to Water 10/7/09	Groundwater Elevation 10/7/09	Depth to Water 10/12/09	Groundwater Elevation 10/12/09	Depth to Water 11/18/09	Groundwater Elevation 11/18/09	Depth to Water 1/7/2010	Groundwater Elevation 1/7/2010
MW-15S	593.42	13.07	580.35	13.18	580.24	13.10	580.32	13.19	580.23	13.08	580.34	12.95	580.47
MW-15D	591.68	11.23	580.45	11.34	580.34	11.27	580.41	11.34	580.34	11.22	580.46	11.08	580.60
MW-16S	588.96	9.08	579.88	9.18	579.78	9.23	579.73	9.23	579.73	9.33	579.63	9.43	579.53
MW-16D	588.73	7.51	581.22	7.62	581.11	7.62	581.11	7.65	581.08	7.54	581.19	7.43	581.30
MW-17S	594.01	7.35	586.66	7.28	586.73	7.23	586.78	7.32	586.69	7.38	586.63	7.18	586.83
MW-19S ¹	589.97	10.64	579.33	10.77	579.20	10.68	579.29	7.99	581.98	10.67	579.30	10.30	579.67
MW-19D	588.38	8.05	580.33	8.01	580.37	7.85	580.53	8.06	580.32	7.88	580.50	NM	N/A
MW-37S	587.94	5.67	582.27	5.43	582.51	5.72	582.22	5.94	582.00	5.78	582.16	NM	N/A
MW-37D	587.83	6.08	581.75	6.06	581.77	5.94	581.89	6.92	580.91	5.86	581.97	NM	N/A
MW-38S	590.67	10.91	579.76	11.04	579.63	10.92	579.75	11.07	579.60	10.43	580.24	10.57	580.10
MW-38D	590.75	10.78	579.97	10.92	579.83	10.80	579.95	10.96	579.79	10.81	579.94	10.62	580.13
MW-39S	601.76	21.09	580.67	21.19	580.57	21.03	580.73	21.22	580.54	21.06	580.70	20.95	580.81
MW-39D	601.70	20.97	580.73	21.12	580.58	20.94	580.76	21.14	580.56	20.96	580.74	20.84	580.86
MW-40S	598.62	16.43	582.19	16.31	582.31	16.45	582.17	16.66	581.96	16.52	582.10	16.37	582.25
MW-40D	598.57	17.06	581.51	17.12	581.45	16.98	581.59	17.16	581.41	17.00	581.57	16.92	581.65

TOC = Top of Casing

NM = Well not measured due to difficulty locating in deep snow.

N/A = Not applicable (groundwater elevation cannot be calculated)

¹Depth to water measurement collected on 10/12/2009 believed to be erroneous.

TABLE 4
South Ponds Monitoring Wells - Vertical Gradient Summary
Plant Site Exfiltration Study Deep Groundwater Field Investigation Report
The Dow Chemical Company
Ludington, Michigan

Well Nest	Screen Midpoint Shallow	Screen Midpoint Deep	GW Elev. Shallow - 9/22/09	GW Elev. Deep - 9/22/09	Unconsolidated (Shallow to Deep) Vertical Gradient (ft/ft) 9/22/09	GW Elev. Shallow - 9/30/09	GW Elev. Deep - 9/30/09	Unconsolidated (Shallow to Deep) Vertical Gradient (ft/ft) 9/30/09	GW Elev. Shallow - 10/7/09	GW Elev. Deep - 10/7/09	Unconsolidated (Shallow to Deep) Vertical Gradient (ft/ft) 10/7/09	GW Elev. Shallow - 10/12/09	GW Elev. Deep - 10/12/09	Unconsolidated (Shallow to Deep) Vertical Gradient (ft/ft) 10/12/09	GW Elev. Shallow - 11/18/09	GW Elev. Deep - 11/18/09	Unconsolidated (Shallow to Deep) Vertical Gradient (ft/ft) 11/18/09	GW Elev. Shallow - 1/7/10	GW Elev. Deep - 1/7/10	Unconsolidated (Shallow to Deep) Vertical Gradient (ft/ft) 1/7/10
15	551.10	484.53	580.35	580.45	-0.002	580.24	580.34	-0.002	580.32	580.41	-0.001	580.23	580.34	-0.002	580.34	580.46	-0.002	580.47	580.60	-0.002
16	555.50	481.62	579.88	581.22	-0.018	579.78	581.11	-0.018	579.73	581.11	-0.019	579.73	581.08	-0.018	579.63	581.19	-0.021	579.53	581.30	-0.024
19	564.60	481.30	579.33	580.33	-0.012	579.20	580.37	-0.014	579.29	580.53	-0.015	581.98	580.32	0.020	579.30	580.50	-0.014	579.30	NA	NA
37	545.79	480.78	582.27	581.75	0.008	582.51	581.77	0.011	582.22	581.89	0.005	582.00	580.91	0.017	582.16	581.97	0.003	NA	NA	NA
38	549.81	483.87	579.76	579.97	-0.003	579.63	579.83	-0.003	579.75	579.95	-0.003	579.60	579.79	-0.003	580.24	579.94	0.005	580.10	580.13	0.000
39	551.70	481.63	580.67	580.73	-0.001	580.57	580.58	0.000	580.73	580.76	0.000	580.54	580.56	0.000	580.70	580.74	-0.001	580.81	580.86	-0.001
40	541.57	481.58	582.19	581.51	0.011	582.31	581.45	0.014	582.17	581.59	0.010	581.96	581.41	0.009	582.10	581.57	0.009	582.25	581.65	0.010

Note: Negative values for vertical gradients indicate upward movement. Positive values indicate downward movement.
NA = Not Available
All elevations in feet above mean sea level

TABLE 5

Monitoring Well Construction Summary and Survey Data

*Plant Site Exfiltration Study Deep Groundwater Field Investigation Report**The Dow Chemical Company**Ludington, Michigan*

Monitoring Well	Northing	Easting	Elevation at TOC	Elevation at Grade	Top of Screen (from Grade)	Bottom of Screen (from Grade)	Top of Screen Elevation	Bottom of Screen Elevation	Total Boring Depth (from Grade)
MW-15S ¹	232095.95	19142570.64	593.42	591.72	39.17	42.17	552.55	549.55	42.17
MW-15D	232096.93	19142609.14	591.68	592.03	105.00	110.00	487.03	482.03	147.00
MW-16S ¹	231318.77	19141629.05	588.96	588.96	31.93	34.93	557.03	554.03	34.93
MW-16D	231306.84	19141604.92	588.73	589.12	105.00	110.00	484.12	479.12	147.00
MW-17S ^{1,2}	229467.65	19143552.99	594.01	588.53	29.77	32.77	558.76	555.76	32.77
MW-19S ¹	231158.16	19143678.54	589.97	589.15	23.05	26.05	566.09	563.09	26.05
MW-19D	231171.61	19143663.25	588.38	588.80	105.00	110.00	483.80	478.80	147.00
MW-37S	230418.96	19141617.33	587.94	588.29	40.00	45.00	548.29	543.29	45.00
MW-37D	230414.64	19141622.31	587.83	588.28	105.00	110.00	483.28	478.28	147.00
MW-38S	231756.99	19143348.28	590.67	591.31	39.00	44.00	552.31	547.31	44.00
MW-38D	231753.21	19143348.29	590.75	591.37	105.00	110.00	486.37	481.37	147.00
MW-39S	231348.00	19142974.64	601.76	602.20	48.00	53.00	554.20	549.20	53.00
MW-39D	231342.51	19142975.12	601.70	602.14	118.00	123.00	484.14	479.14	147.00
MW-40S	230678.18	19142343.36	598.62	599.07	55.00	60.00	544.07	539.07	60.00
MW-40D	230678.43	19142337.47	598.57	599.08	115.00	120.00	484.08	479.08	147.00

Elevations are measured in feet above mean sea level

¹Monitoring well installed previous to 2009 Field Investigation.²Elevations listed may not be accurate due to well casing heaving. Well is scheduled to be replaced in early 2010.

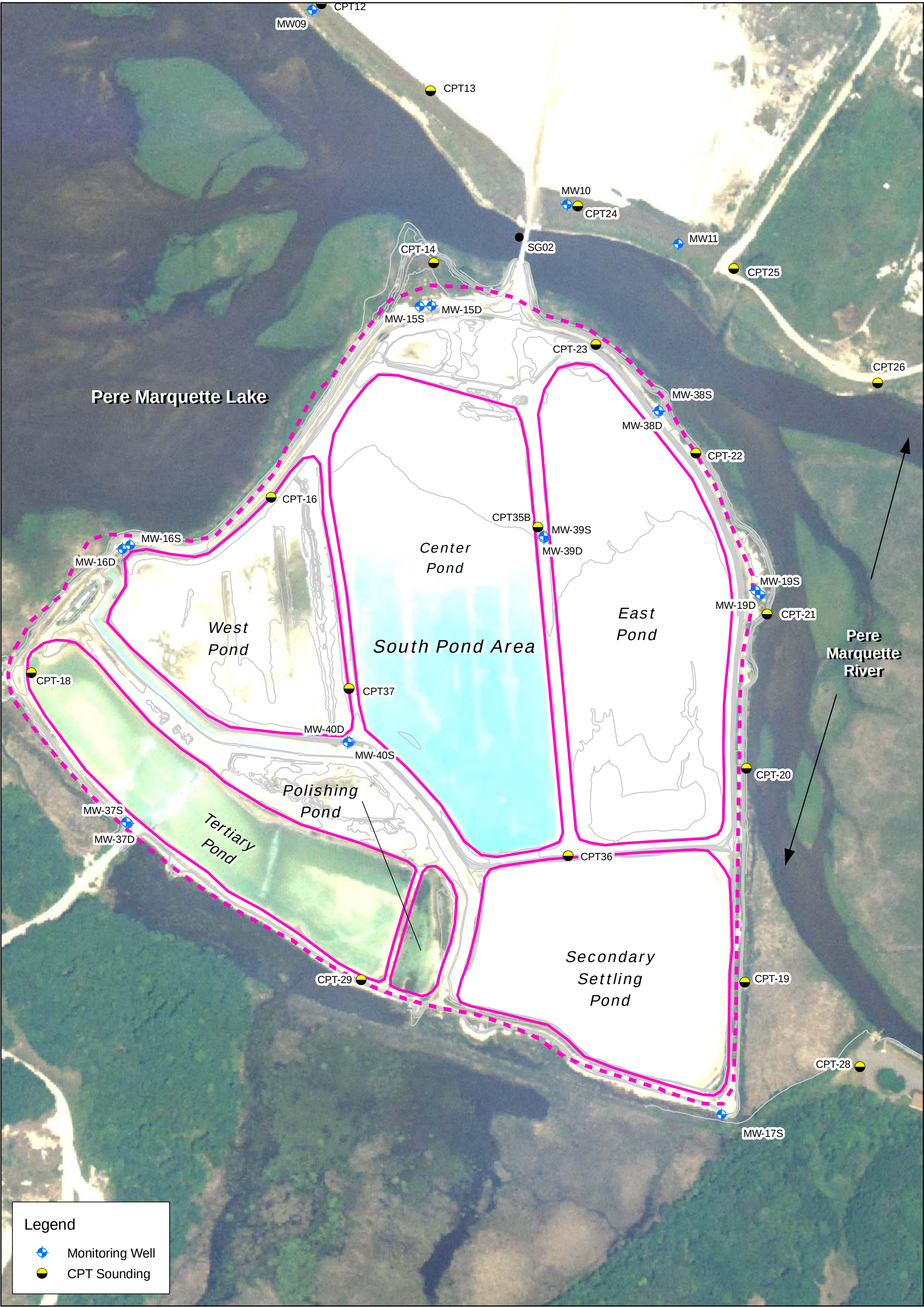
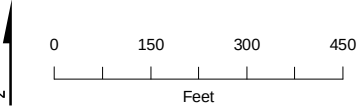


Figure 1
South Pond Area Site Map
Plant Site Exfiltration Study Deep Groundwater FI Report
The Dow Chemical Company
Ludington Plant Site



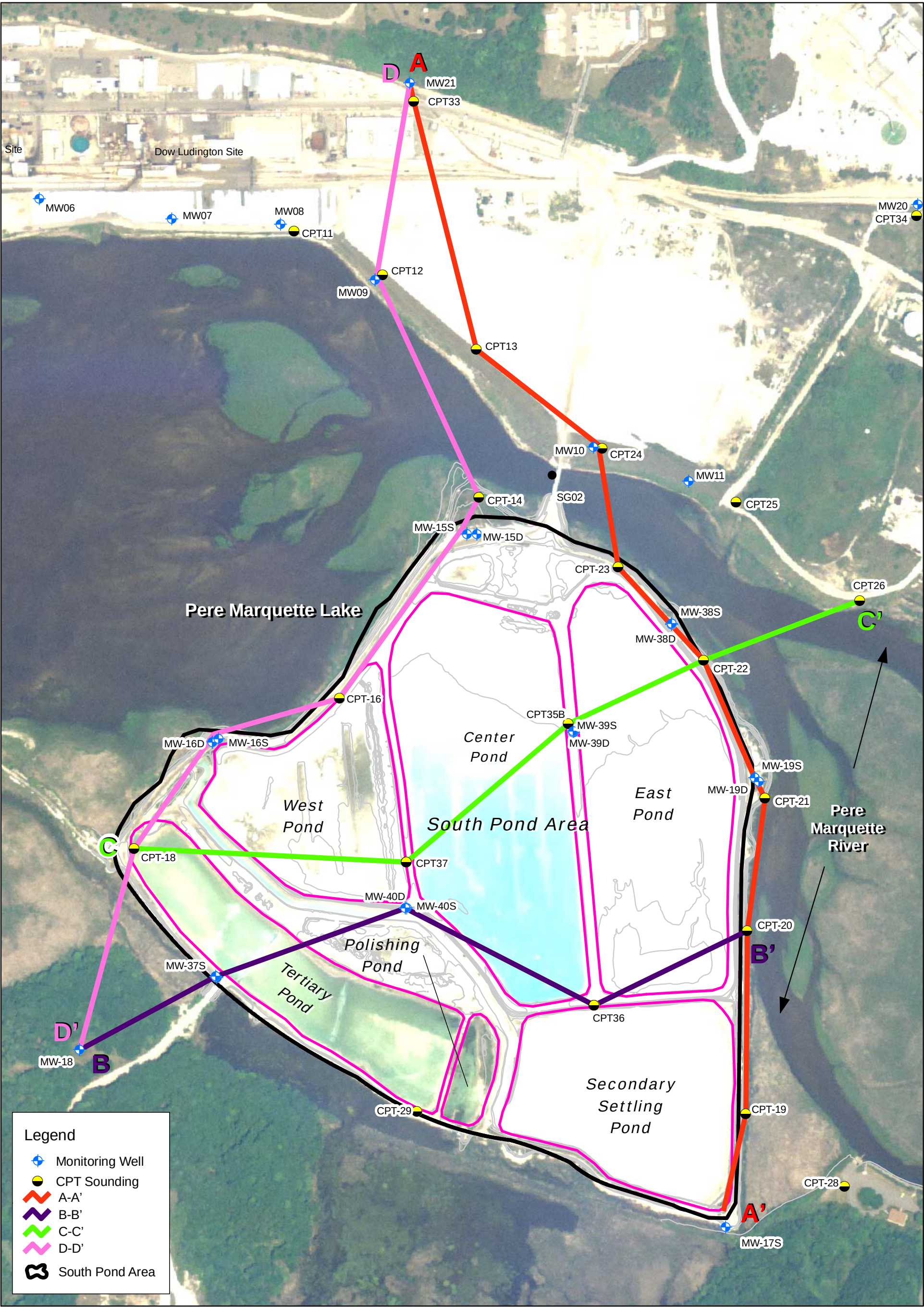
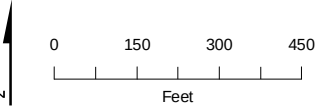


Figure 2
Cross-Section Transect Map
Plant Site Exfiltration Study Deep Groundwater FI Report
The Dow Chemical Company
Ludington Plant Site



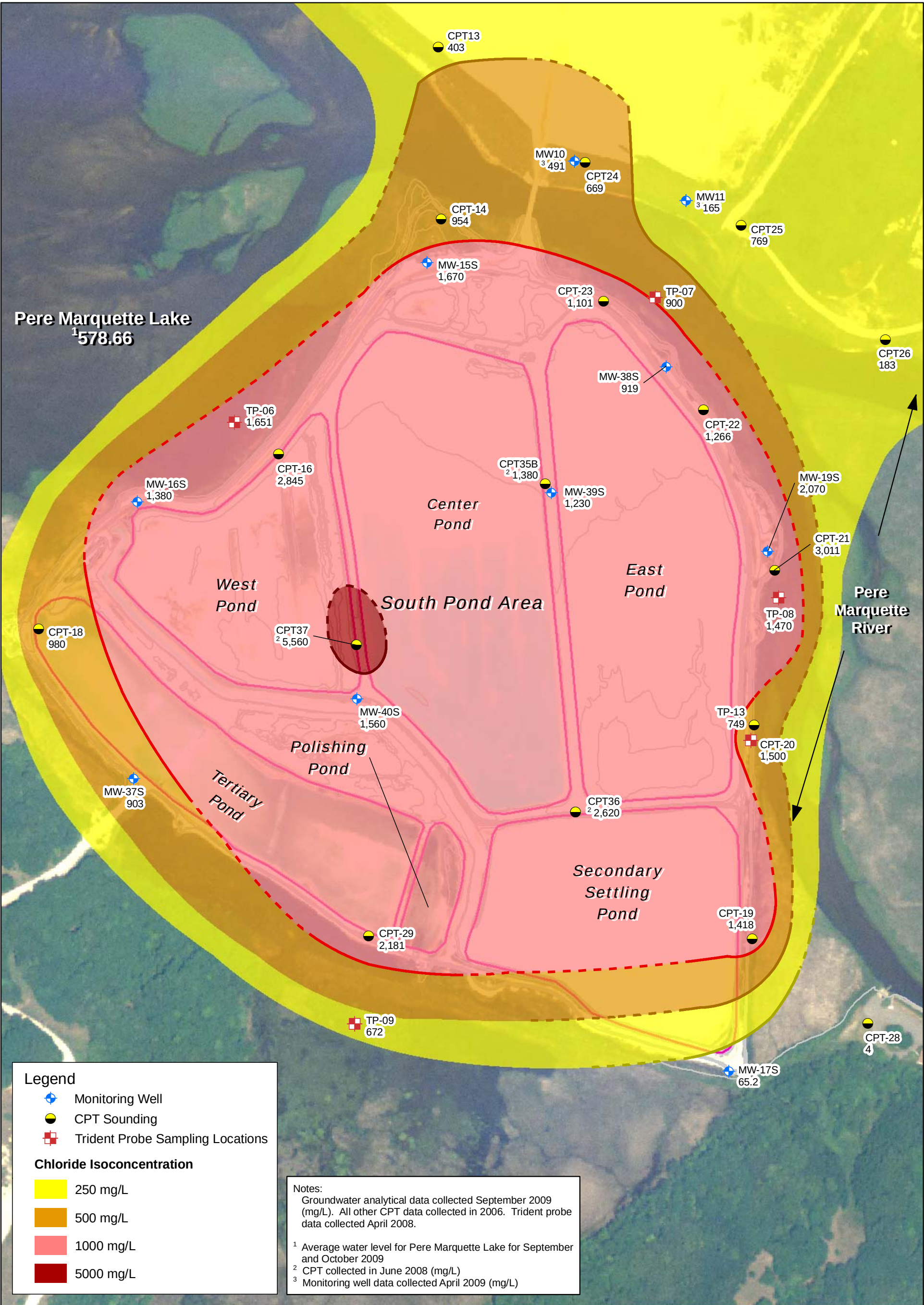
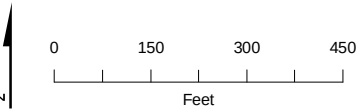


Figure 3
Shallow Monitoring Well Chloride Concentration Contour Map
September 2009
Plant Site Exfiltration Study Deep Groundwater FI Report
The Dow Chemical Company
Ludington Plant Site



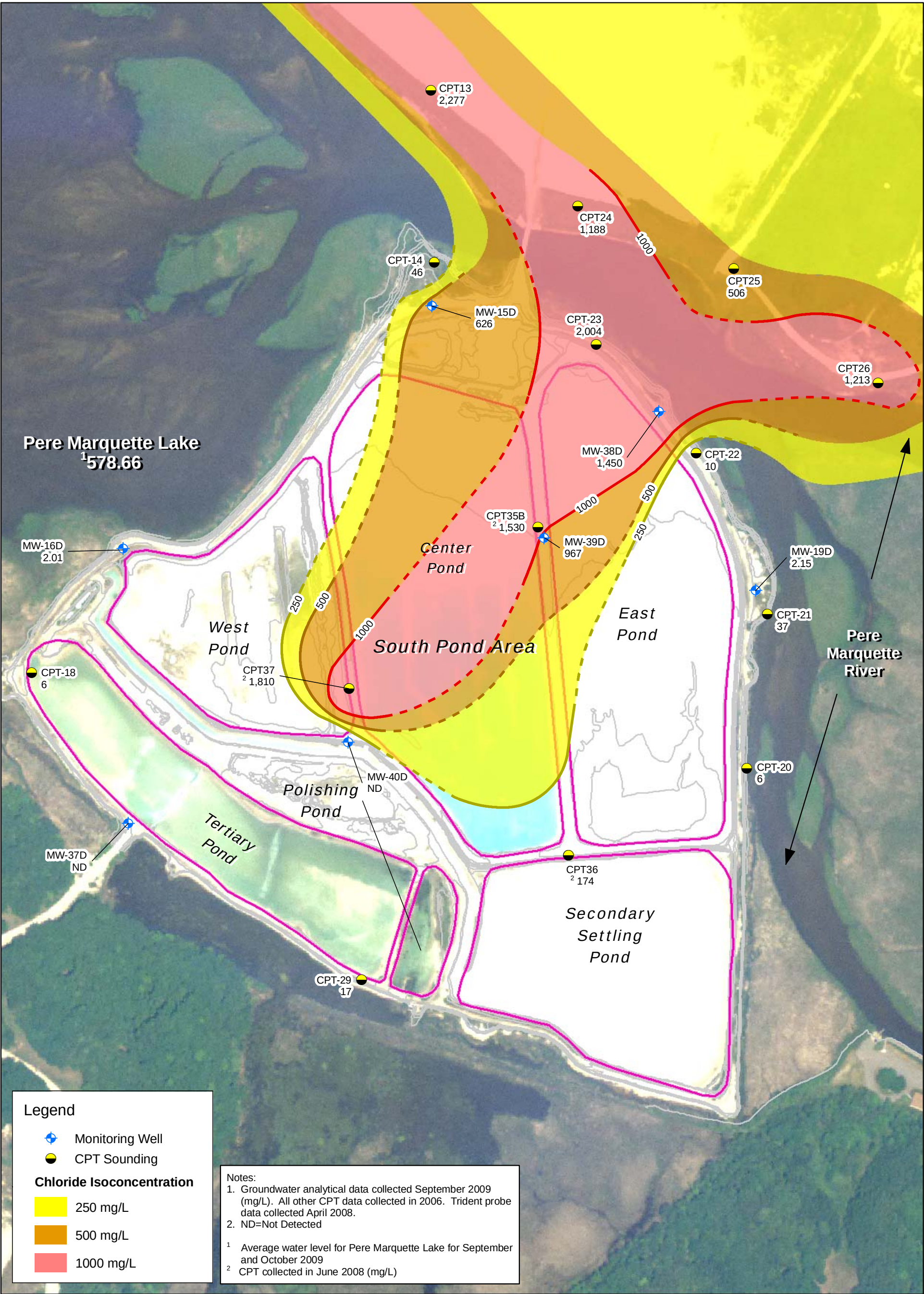
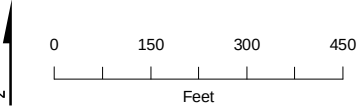


Figure 4
Deep Monitoring Well Chloride Concentration Contour Map
September 2009
Plant Site Exfiltration Study Deep Groundwater FI Report
The Dow Chemical Company
Ludington Plant Site



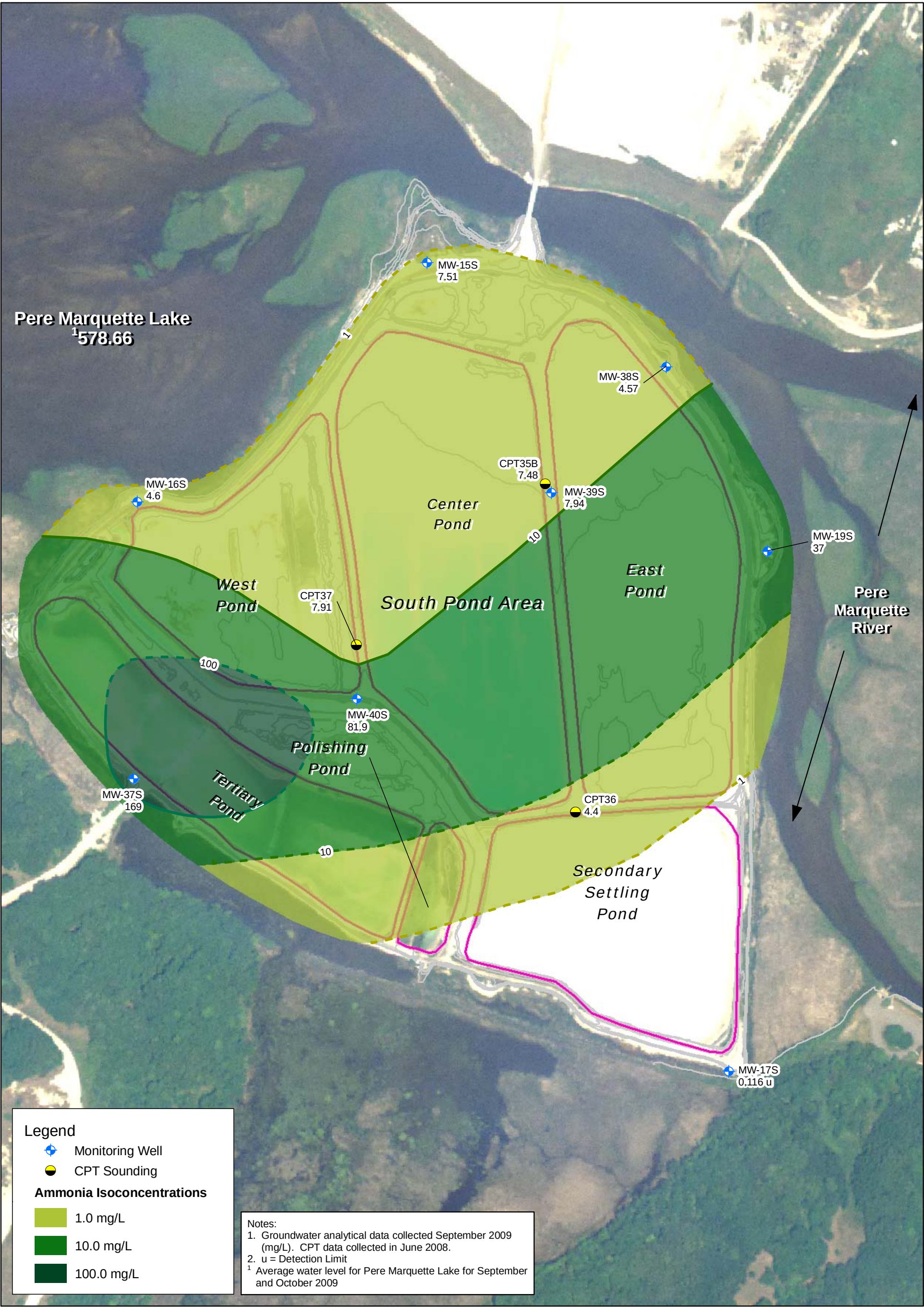


Figure 5
Shallow Monitoring Well Ammonia Concentration Contour Map
September 2009
Plant Site Exfiltration Study Deep Groundwater FI Report
The Dow Chemical Company
Ludington Plant Site

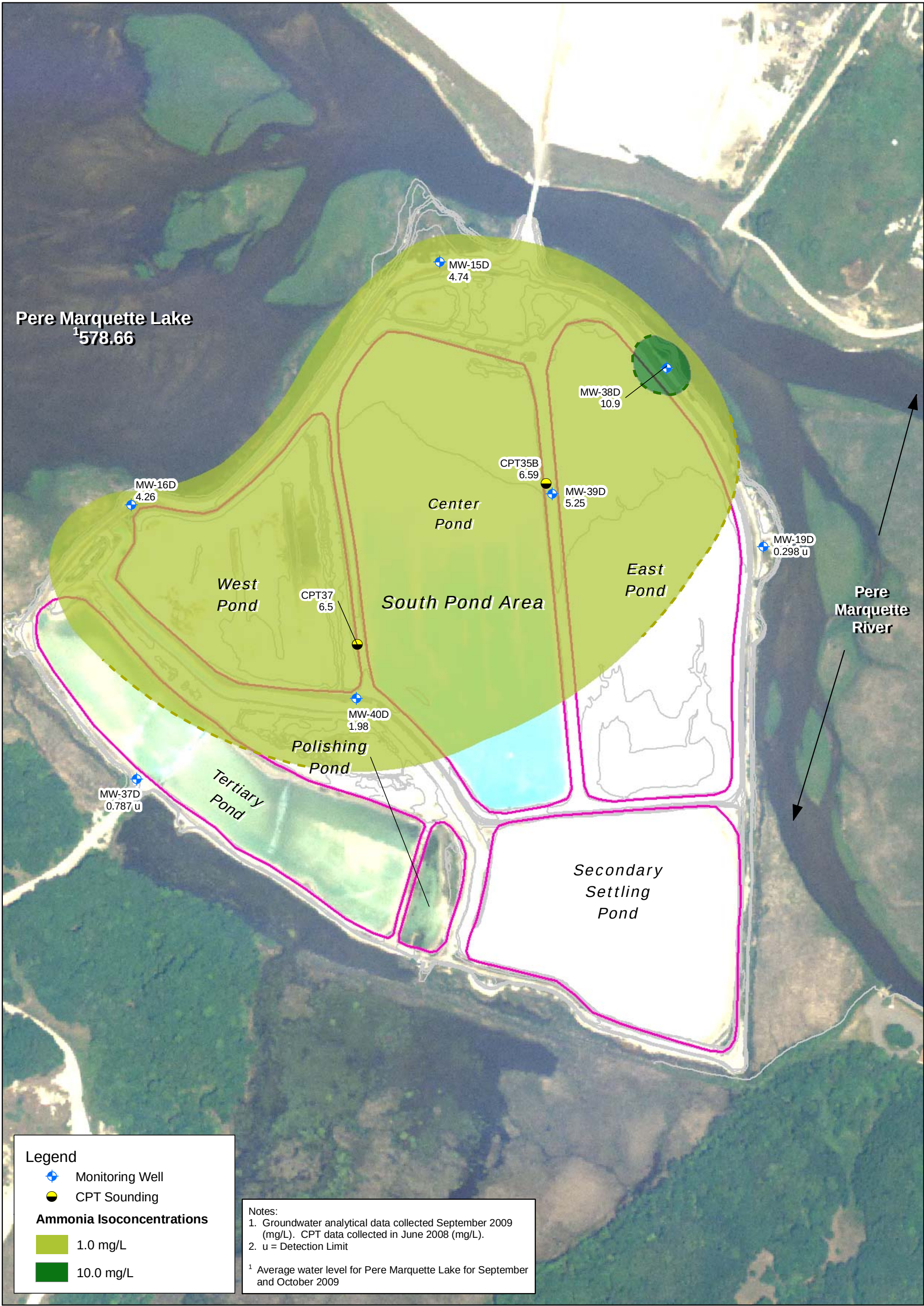
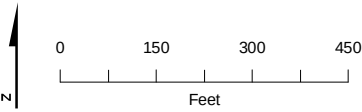


Figure 6
Deep Monitoring Well Ammonia Concentration Contour Map
September 2009
Plant Site Exfiltration Study Deep Groundwater FI Report
The Dow Chemical Company
Ludington Plant Site



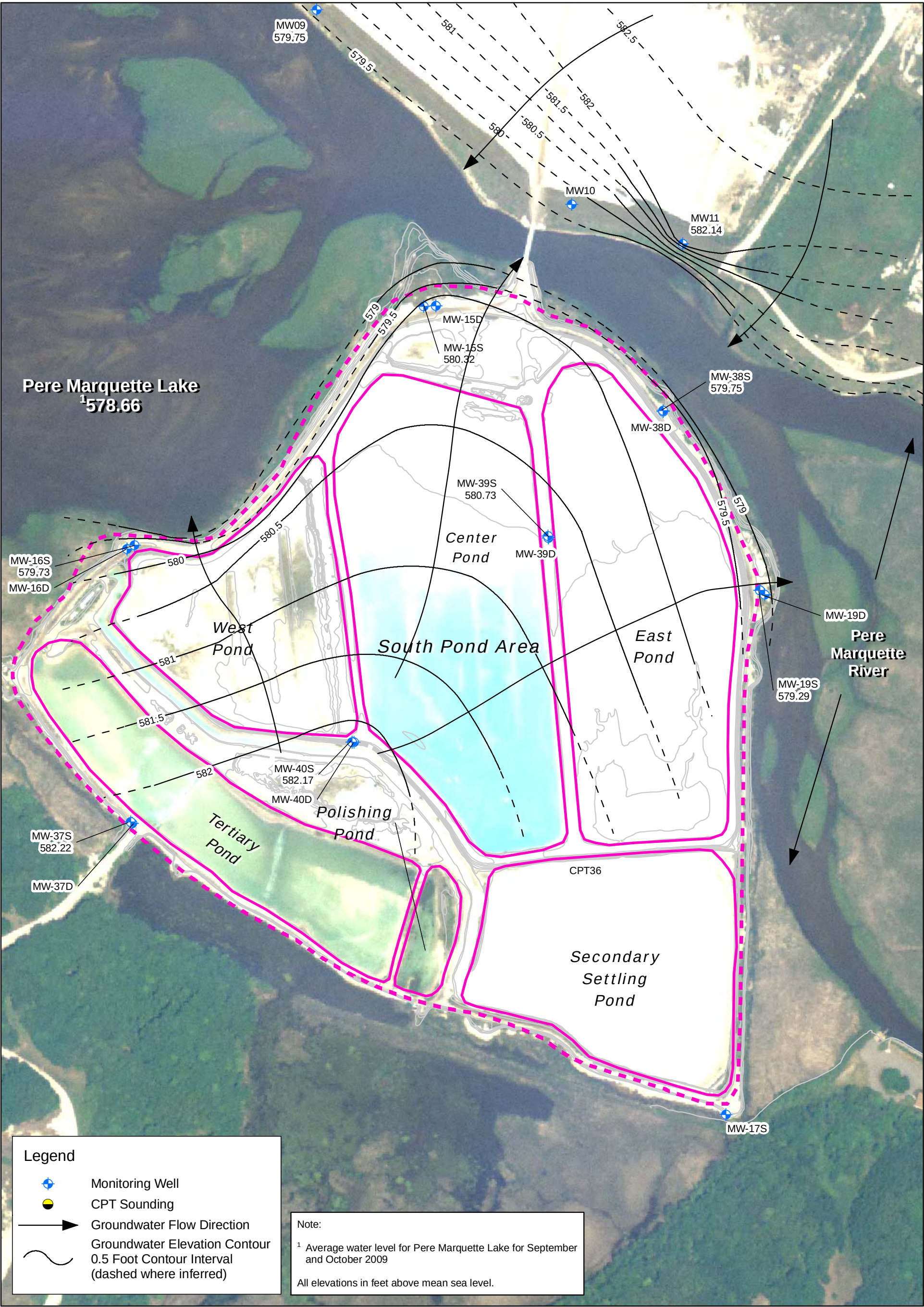


Figure 7
Shallow Groundwater Elevation Map
October 7, 2009
Plant Site Exfiltration Study Deep Groundwater FI Report
The Dow Chemical Company
Ludington Plant Site

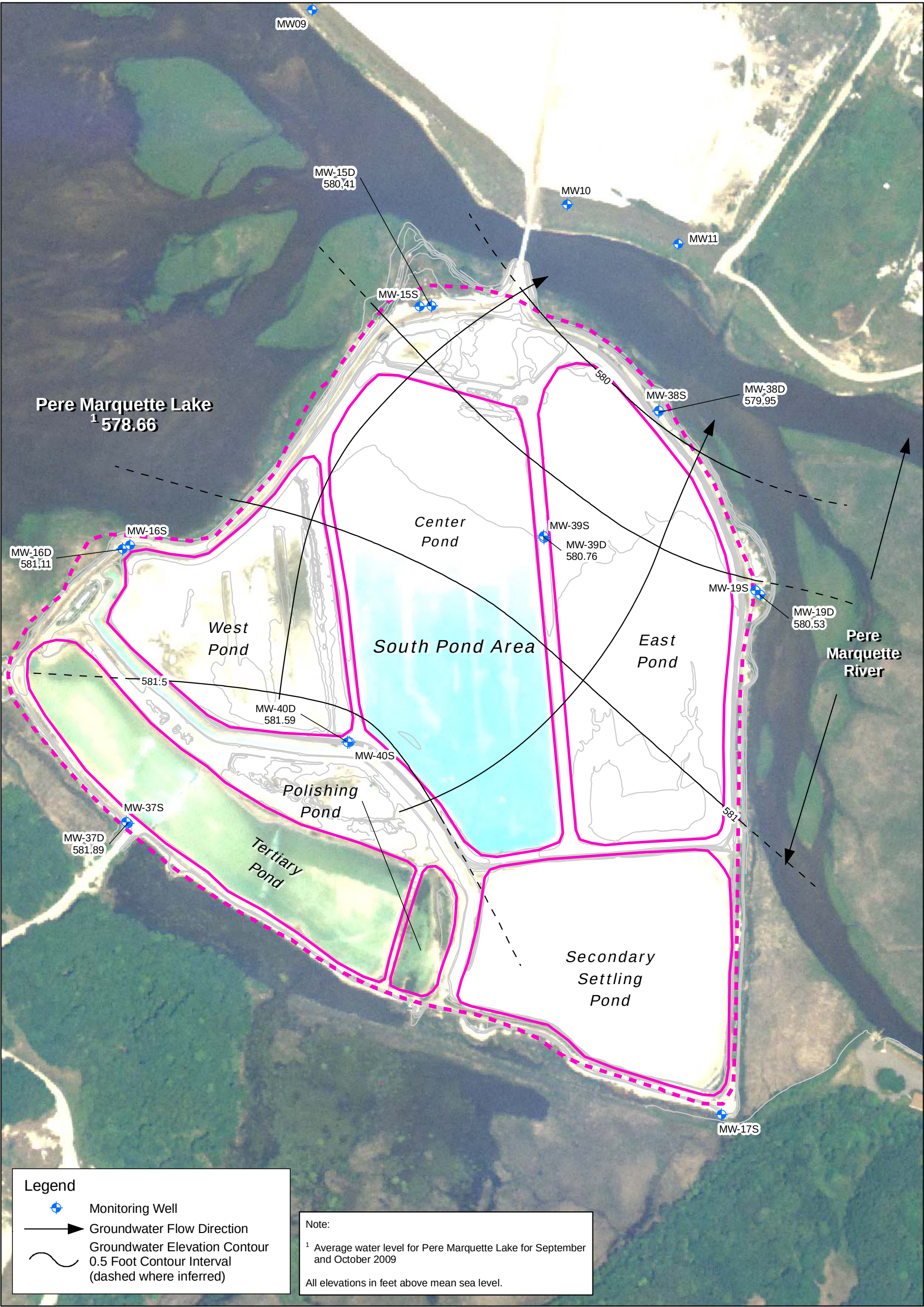


Figure 8
Deep Groundwater Elevation Map
October 7, 2009
Plant Site Exfiltration Study - Deep Groundwater FI Report
The Dow Chemical Company
Ludington Plant Site

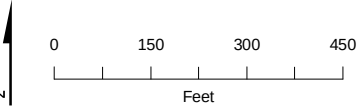
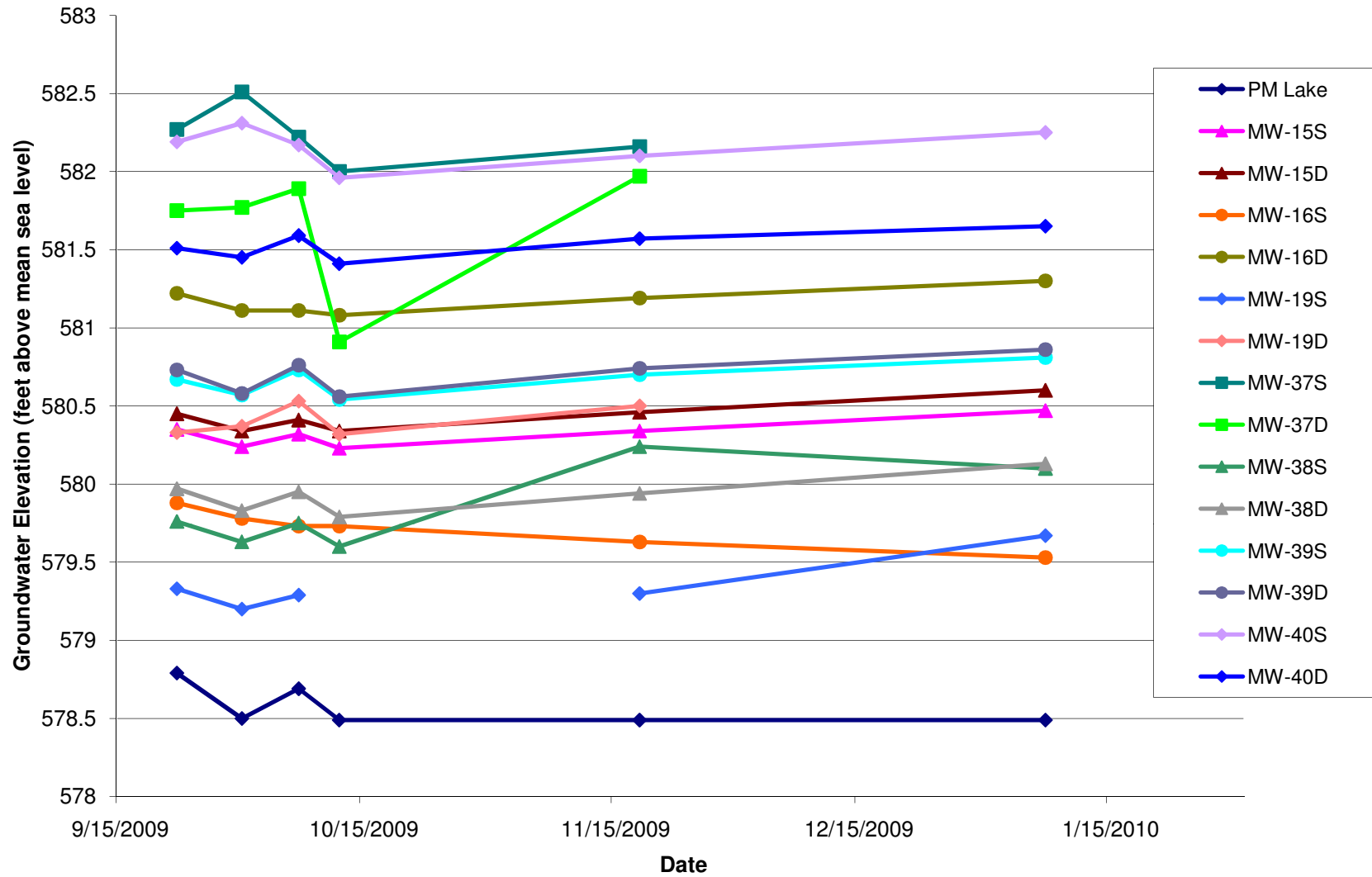


Figure 9 - Groundwater/Surface Water Hydrograph



$$\text{Mass Balance: Mass of Cl}^-/\text{TDS} \sim \left(\text{Influent Mass of Cl}^-/\text{TDS} + \text{Precipitation Mass of Cl}^-/\text{TDS} - \text{Effluent Mass of Cl}^-/\text{TDS} \right)$$

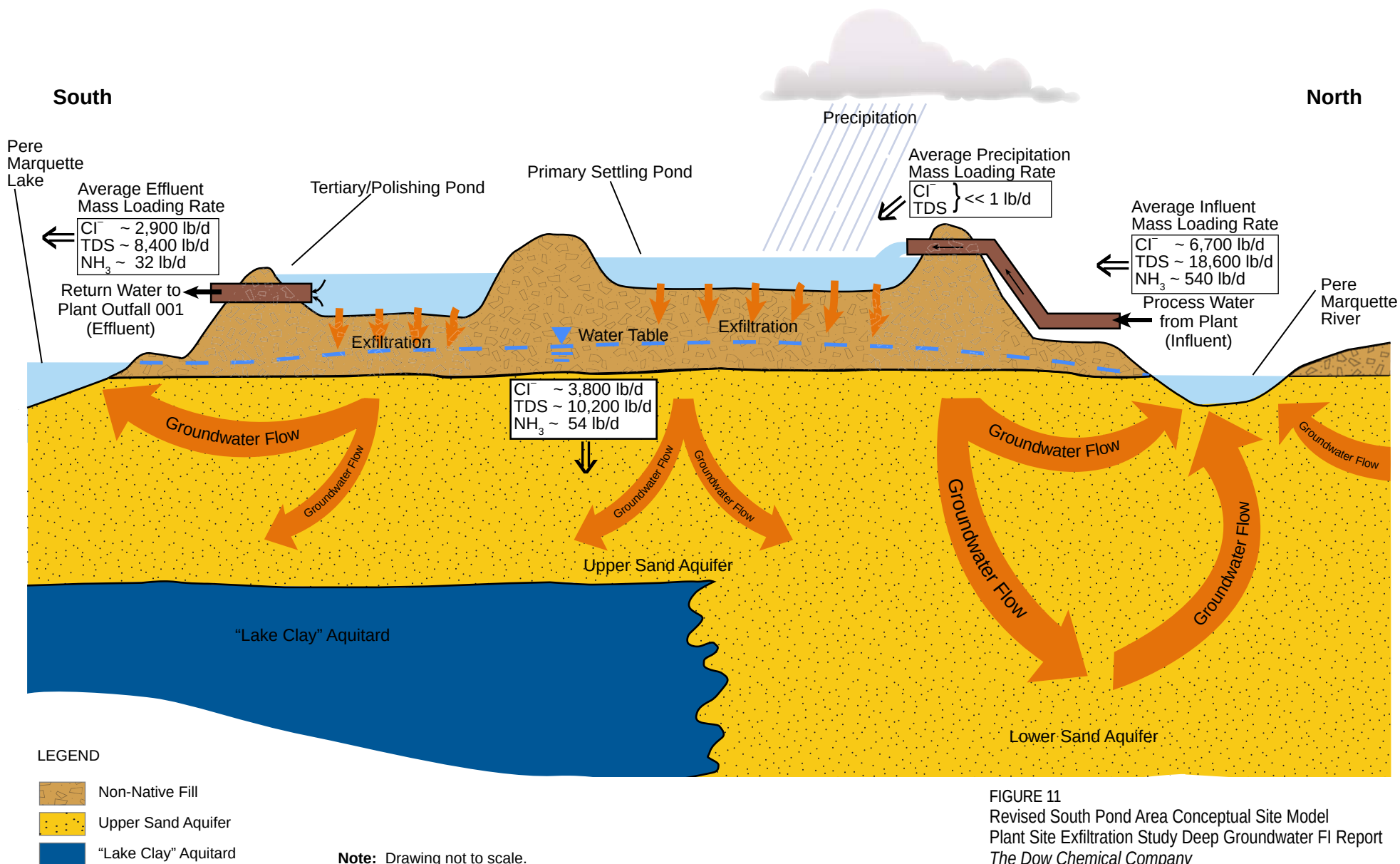


FIGURE 11
 Revised South Pond Area Conceptual Site Model
 Plant Site Exfiltration Study Deep Groundwater FI Report
 The Dow Chemical Company
 Ludington Plant Site

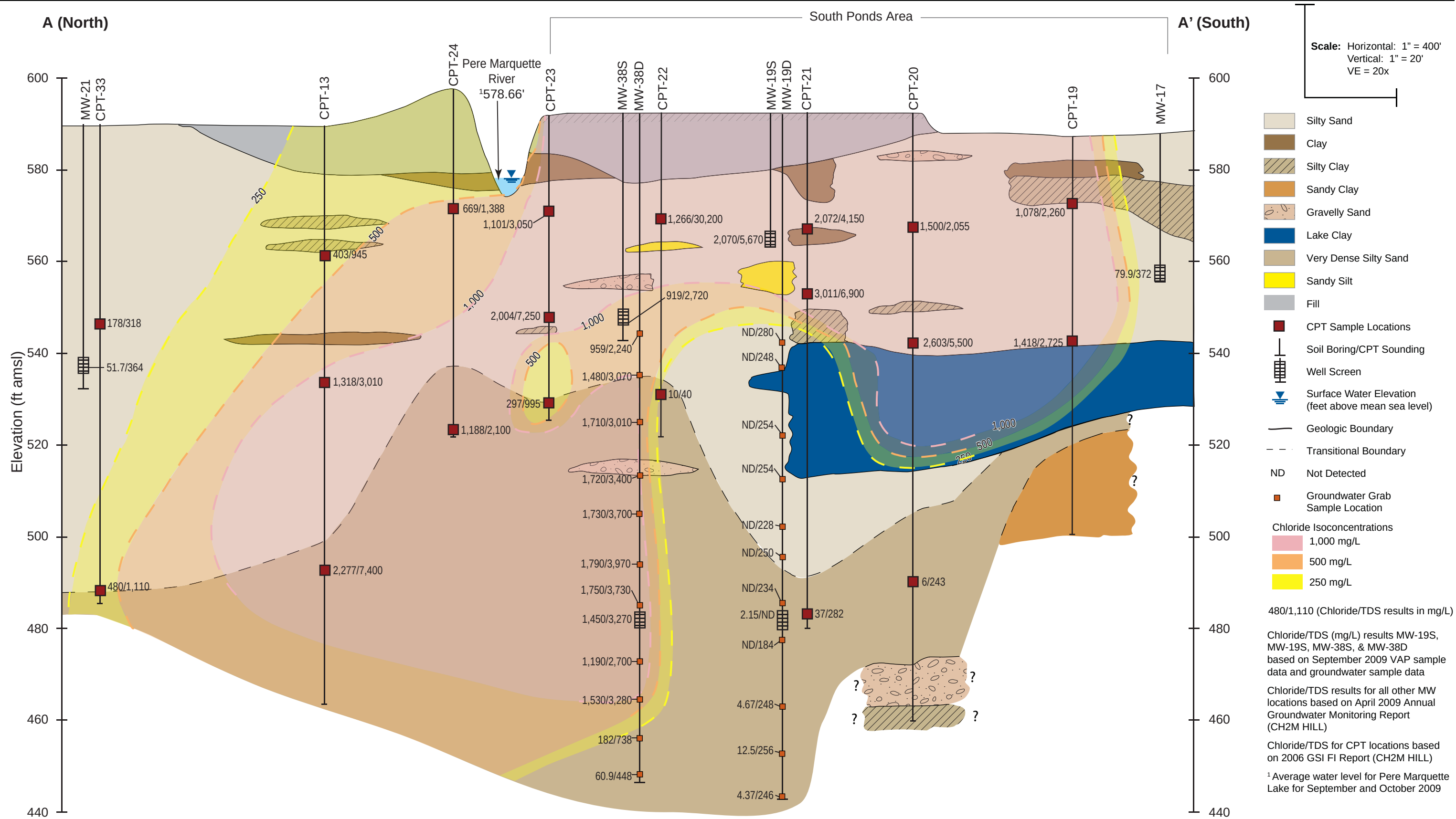
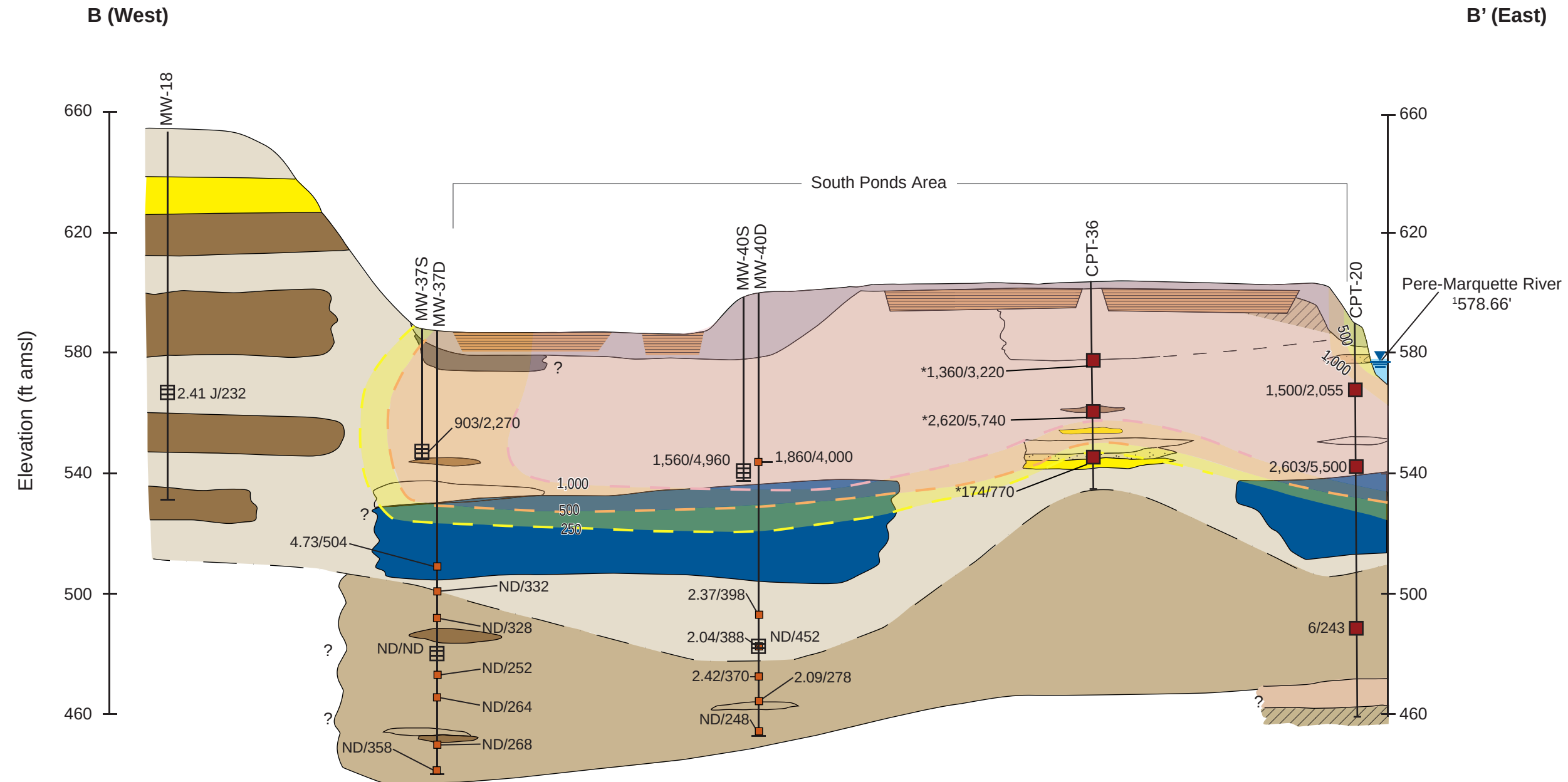


FIGURE 12
Geologic Cross Section A-A' (with Chloride Isopleths)
Plant Site Exfiltration Study Deep Groundwater FI Report
The Dow Chemical Company
Ludington Plant Site



LEGEND

	Fill		Silty Sand with Gravel		Soil Boring/CPT Sounding
	Clay		Very Dense Silty Sand		Well Screen
	Silty Sand		Dense Gravelly Sand		Geologic Boundary
	Silt		Lime Solids		Transitional Boundary
	Lake Clay		Organics		Not Detected
	Silty Clay		CPT Sample Locations		Surface Water Elevation (feet above mean sea level)

Chloride Isoconcentrations (dashed where inferred)

	1,000 mg/L
	500 mg/L
	250 mg/L
	Groundwater Grab Sample Location

480/1,110 (Chloride/TDS results in mg/L)

Chloride/TDS (mg/L) results for MW-37S, MW-37D, MW-40S, & MW-40D based on September 2009 VAP sample data and groundwater sample data

Chloride/TDS (mg/L) results for all other MW locations based on April 2009 Annual Groundwater Monitoring Report (CH2M HILL)

* Chloride and TDS (mg/L) samples collected in June 2008

Chloride/TDS for all other CPT locations based on 2006 GSI FI Report (CH2M HILL)

¹ Average water level for Pere Marquette Lake for September and October 2009

Scale: Horizontal: 1" = 300'
Vertical: 1" = 40'
VE = 7.5x

FIGURE 13
Geologic Cross Section B-B' (with Chloride Isoleths)
Plant Site Exfiltration Study Deep Groundwater FI Report
The Dow Chemical Company
Ludington Plant Site

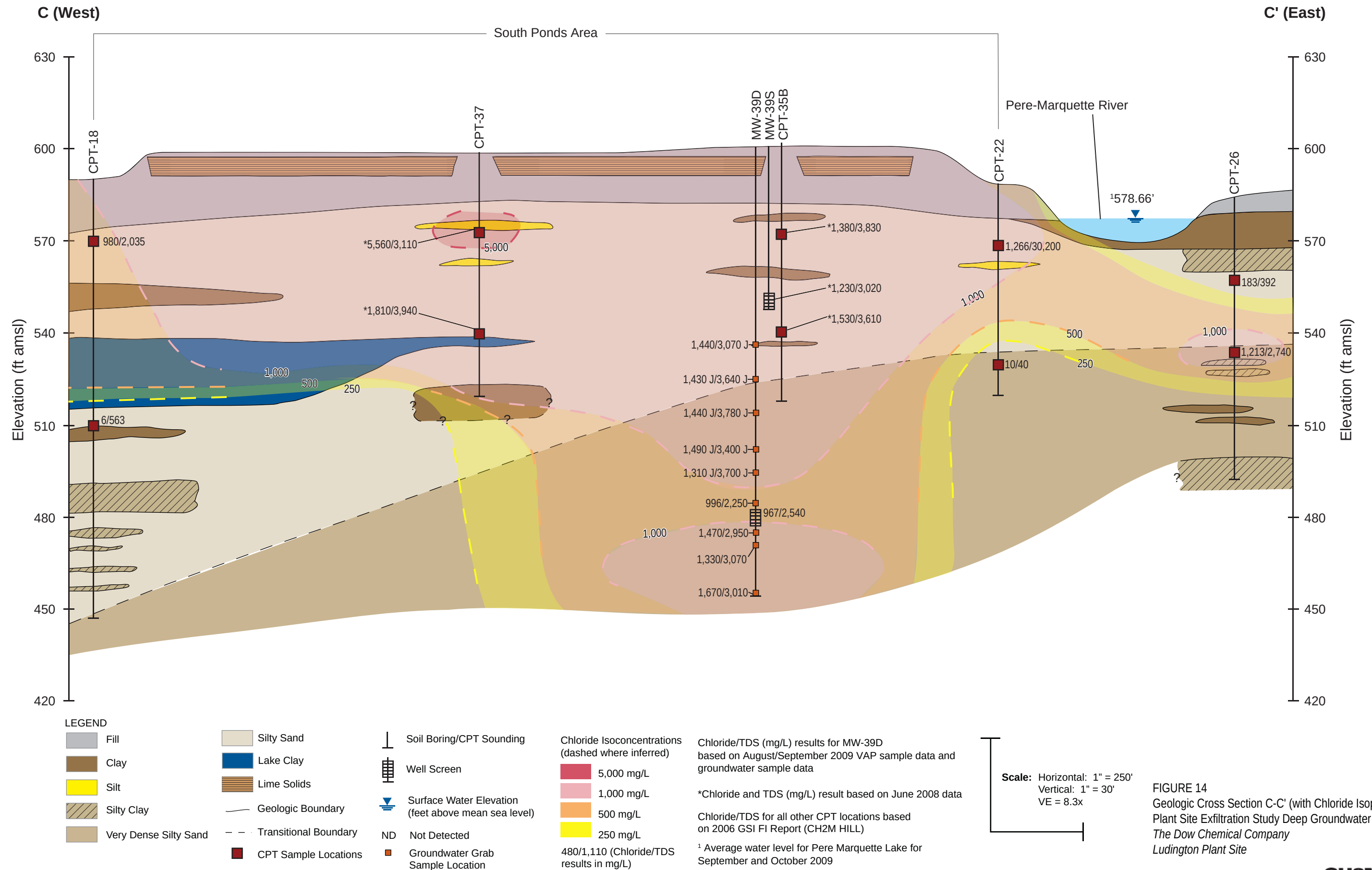
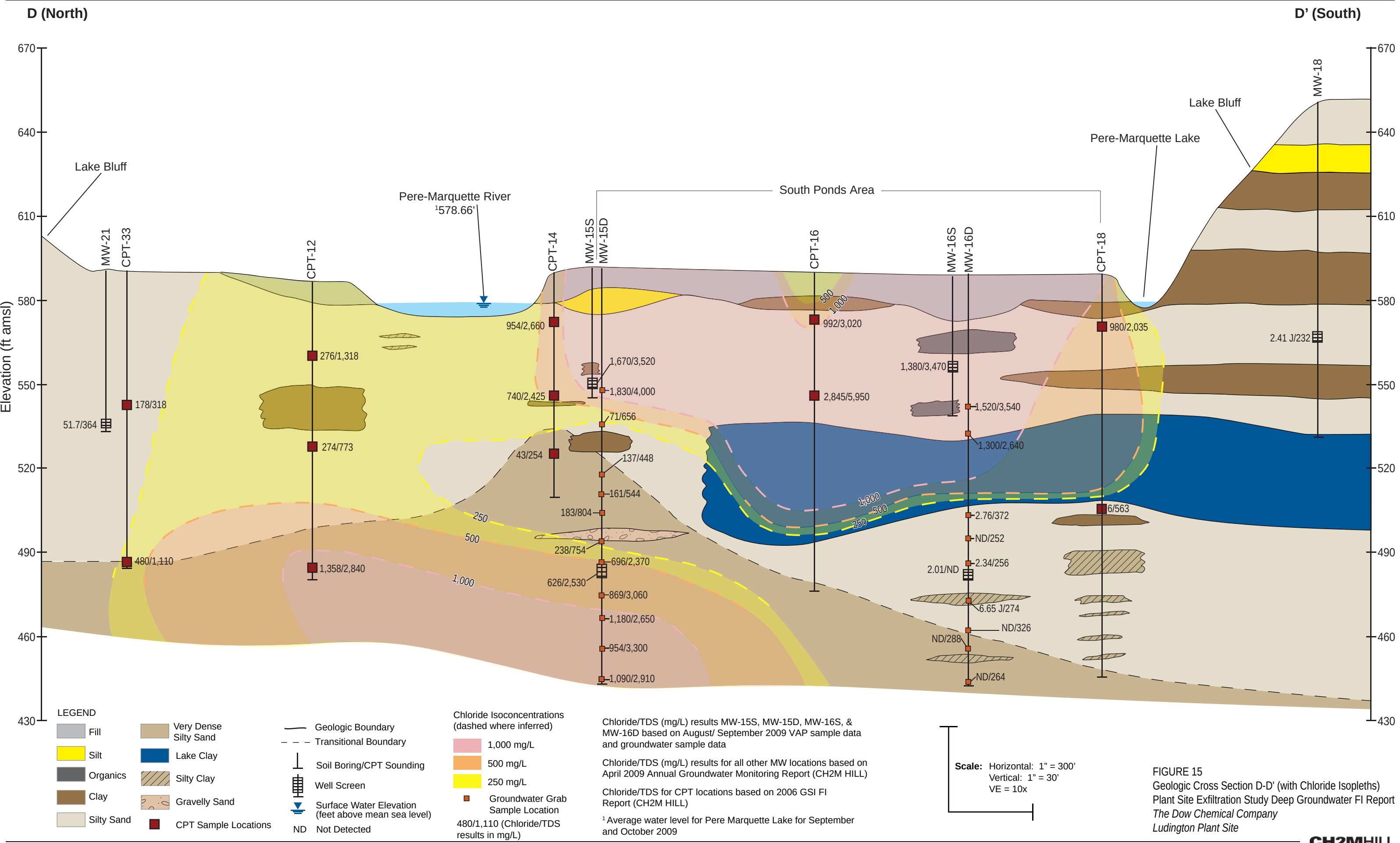


FIGURE 14
Geologic Cross Section C-C' (with Chloride Isopleths)
Plant Site Exfiltration Study Deep Groundwater FI Report
The Dow Chemical Company
Ludington Plant Site



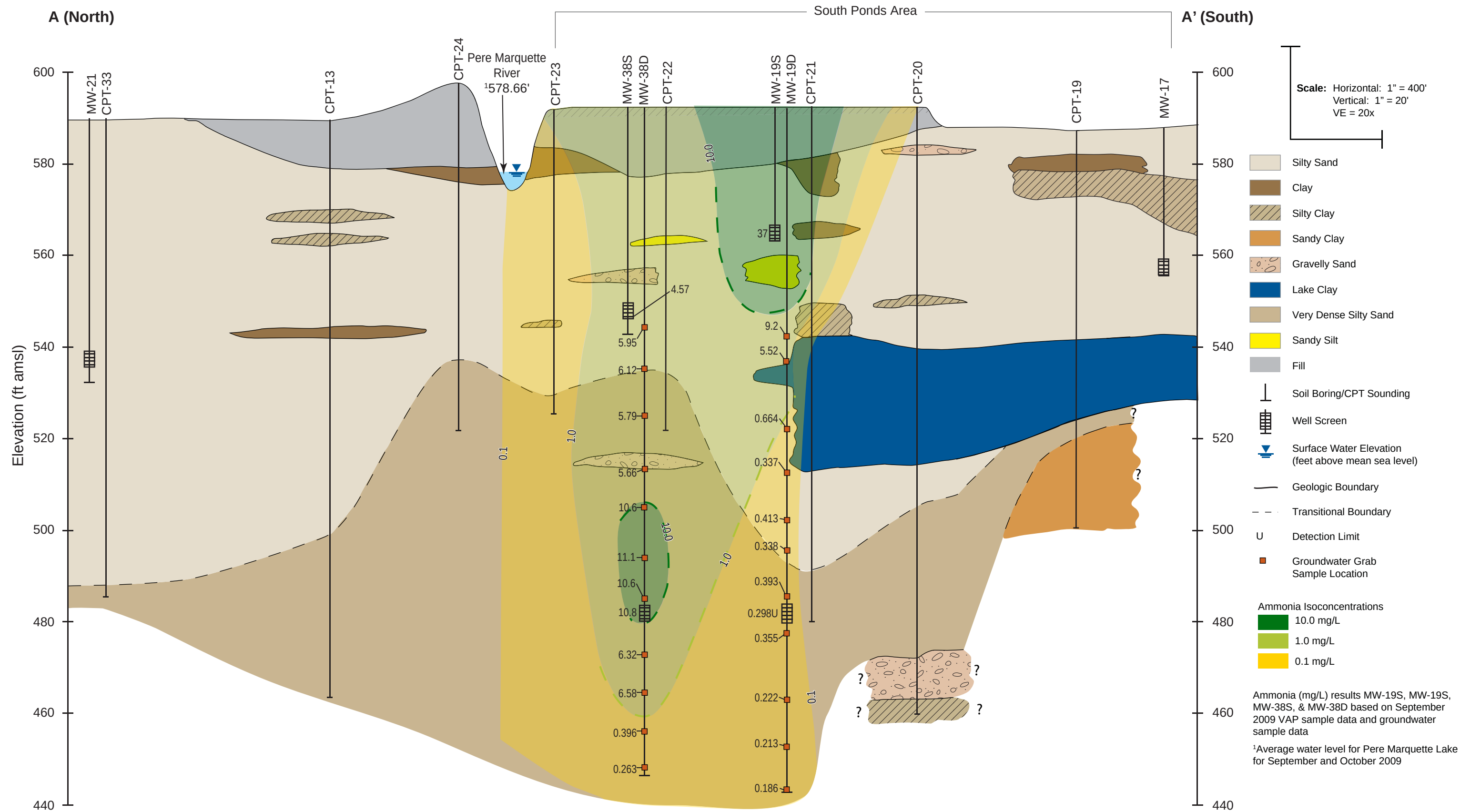
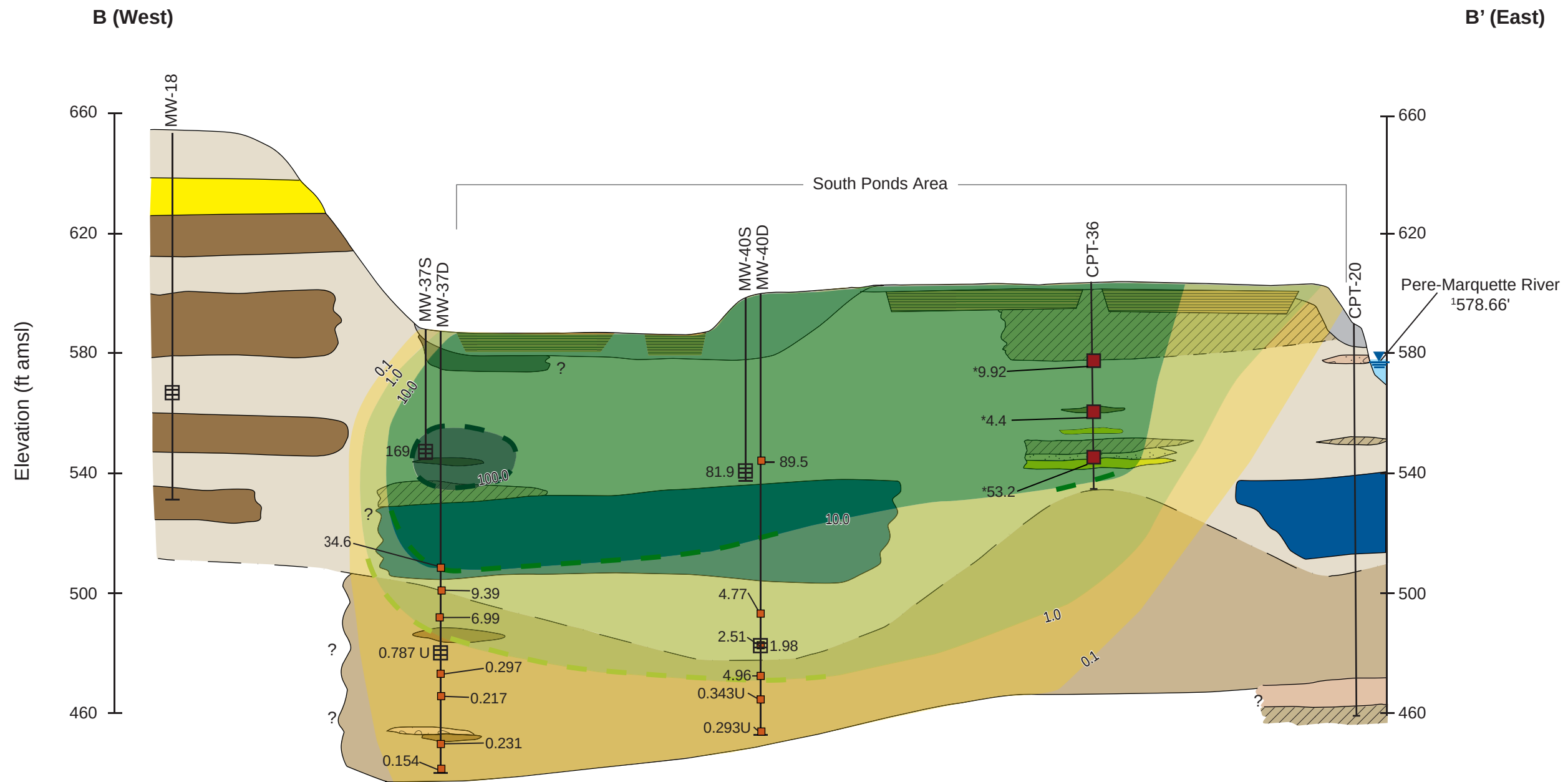


FIGURE 16
Geologic Cross Section A-A' (with Ammonia Isopleths)
Plant Site Exfiltration Study Deep Groundwater FI Report
The Dow Chemical Company
Ludington Plant Site



LEGEND

	Fill		Silty Sand with Gravel		Soil Boring/CPT Sounding
	Clay		Very Dense Silty Sand		Well Screen
	Silty Sand		Dense Gravelly Sand		Geologic Boundary
	Silt		Lime Solids		Transitional Boundary
	Lake Clay		Organics		Detection Limit
	Silty Clay		CPT Sample Locations		Surface Water Elevation (feet above mean sea level)

Chloride Isoconcentrations

	100.0 mg/L
	10.0 mg/L
	1.0 mg/L
	0.1 mg/L
	Groundwater Grab Sample Location

Ammonia (mg/L) results for MW-37S, MW-37D, MW-40S, & MW-40D based on September 2009 VAP sample data and groundwater sample data

* Ammonia (mg/L) samples collected in June 2008

¹ Average water level for Pere Marquette Lake for September and October 2009

Scale: Horizontal: 1" = 300'
Vertical: 1" = 40'
VE = 7.5x

FIGURE 17
Geologic Cross Section B-B' (with Ammonia Isoleths)
Plant Site Exfiltration Study Deep Groundwater FI Report
The Dow Chemical Company
Ludington Plant Site

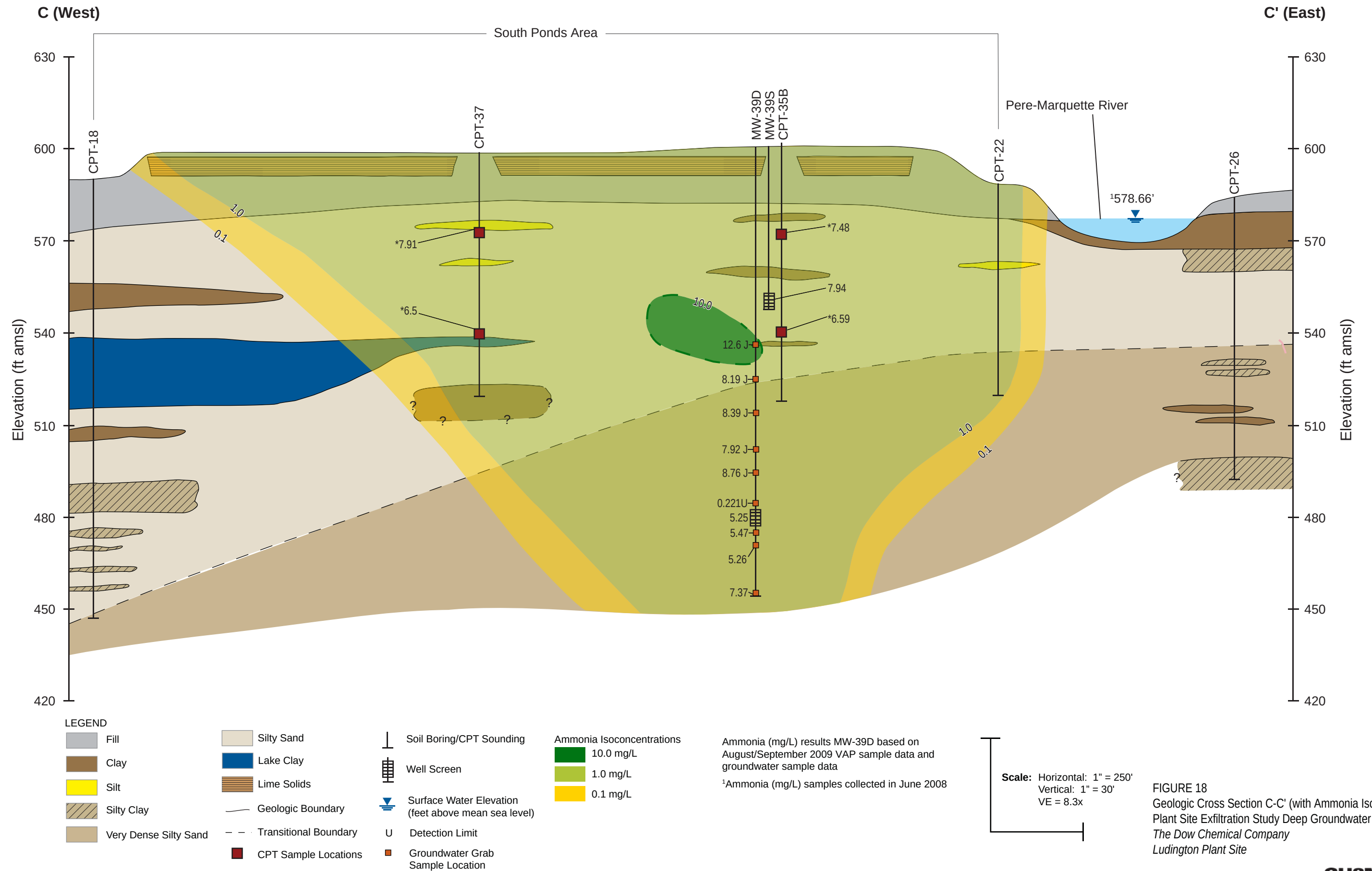
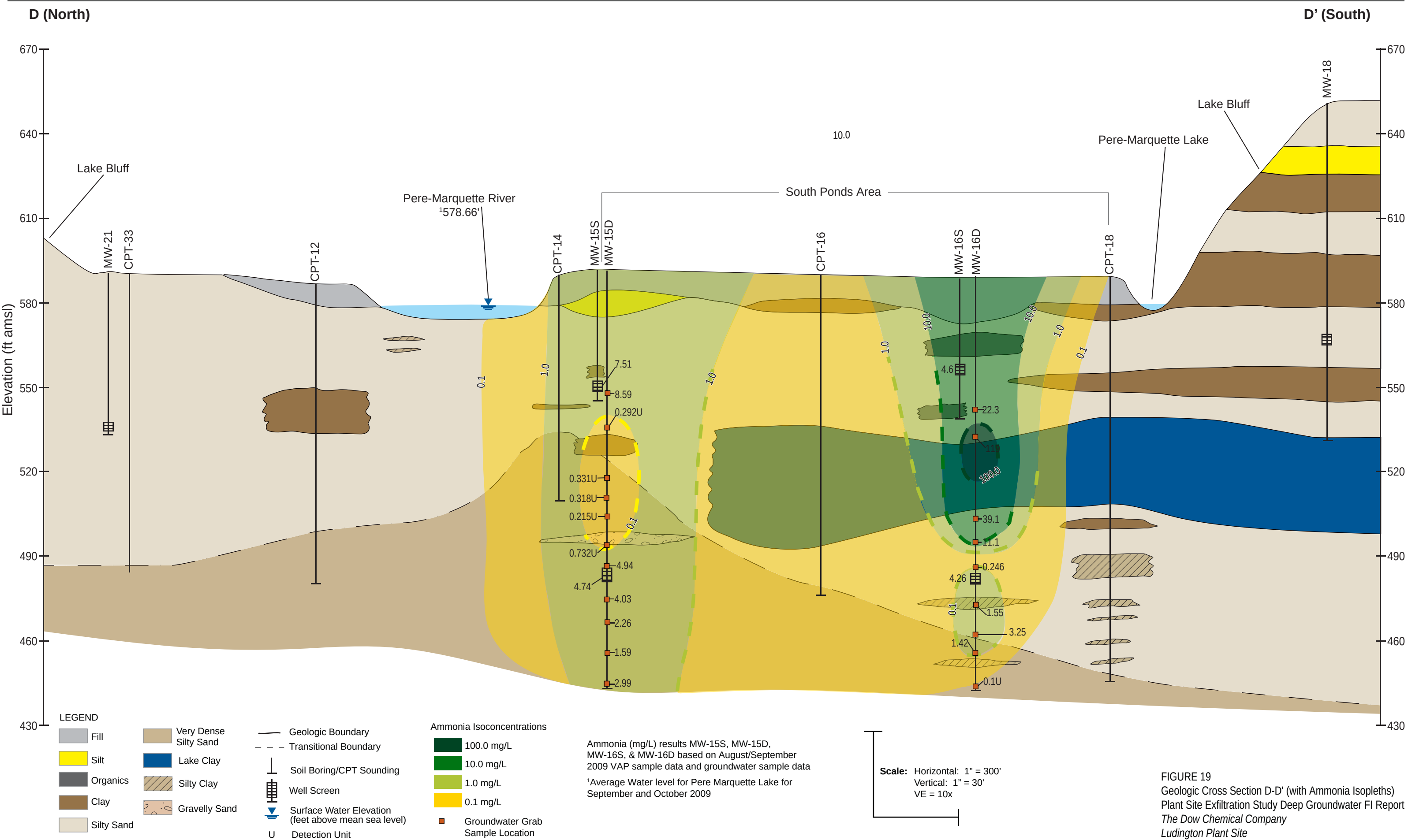


FIGURE 18
Geologic Cross Section C-C' (with Ammonia Isoleths)
Plant Site Exfiltration Study Deep Groundwater FI Report
The Dow Chemical Company
Ludington Plant Site



Appendix A
Boring Logs and Well Construction Forms



PROJECT NUMBER 363838.03.ES	BORING NUMBER MW-15D	SHEET 1 OF
SOIL BORING LOG		

PROJECT : S. Ponds Exfiltration Deep Groundwater Field Investigation				LOCATION : Dow-Ludington		
ELEVATION : 591.68 (toc)				DRILLING CONTRACTOR : Boart-Longyear		
DRILLING METHOD AND EQUIPMENT USED Rotosonic						
WATER LEVELS : 11.09' btoc		START : 8/18/09 12:55		END: 8/19/09 15:20	LOGGER : N. Wilbur	
DEPTH BELOW SURFACE (FT)	INTERVAL (FT)		STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION	COMMENTS	
	RECOVERY (IN)	#/TYPE				
					FID (ppm):	
0						
7	1	7.0/7.0	RS	N/A	0-7': Fill - Lime solids with asphalt and gravel.	
17	2	10.0/10.0	RS	N/A	7-15': (SM-ML) Medium-grained sand with some clay, gray	
27	3	10.0/10.0	RS	N/A	15-26': (SP) Fine-grained sand with trace coarse sand and organics, wet, brown	
37	4	10.0/10.0	RS	N/A	26-26.5': (ML-CL) Silty clay seam, green-gray, non-low plasticity	
					26.5-30.2': (SP) Fine-medium grained sand with trace small gravel, brown	
					30.2-31.2': (CH) Gray-green clay, high placticity, wet	
					31.2-37': (SP) Fine-grained sand, brown, wet. 1" gray-green silty seam at 32'	
47	5	7.5/10.0	RS	N/A	37-47': (SP-SW) Fine-medium grained san grading to courser sand, with trace subangular gravel, brown, wet	GW VAP sample collected Sample ID: MW15D-47.0 8/18/2009 13:55 Cl ⁻ : >638 ppm So Cond: 3190 uS/cm ^o NH ₃ : >0.60 mg/L
57	6	6.5/10.0	RS	N/A	47-58.8': (SP) Fine-medium grained sand with trace gravel, brown, wet. 1.5" clay seam (CH), reddish-brown, wet, high placticity	GW VAP sample collected Sample ID: MW15D-57.0 8/18/2009 14:25 Cl ⁻ : 54 ppm So Cond: 393 uS/cm ^o NH ₃ : 0.54 mg/L
67	7	10.0/10.0	RS	N/A	58.8-65.5': (CH) Clay with trace gravel, brown, wet, dense, plastic	GW VAP sample collected Sample ID: MW15D-72.0 8/18/2009 15:10 Cl ⁻ : 96 ppm So Cond: 766 uS/cm ^o NH ₃ : >0.60 mg/L
77	8	7.0/10.0	RS	N/A		GW VAP sample collected Sample ID: MW15D-77.0 8/18/2009 15:37 Cl ⁻ : 135 ppm So Cond: 802 uS/cm ^o NH ₃ : >0.60 mg/L
87	9	4.0/10.0	RS	N/A	65.5-93': (SP) Fine-medium grained sand with trace coarse sand, brown, wet	GW VAP sample collected Sample ID: MW15D-87.0 & MW15D-87.0FD 8/18/2009 16:50 & 16:55 Cl ⁻ : 180 ppm So Cond: 914 uS/cm ^o NH ₃ : 0.35 mg/L
97	10	5.5/10.0	HS	N/A		GW VAP sample collected Sample ID: MW15D-97.0 8/18/2009 17:26 Cl ⁻ : 232 ppm Sp Cond: NR NH ₃ : >0.60 mg/L
					93-97': (SW) Well graded sand with subangular gravel up to 1" in diameter	
107	11	12.5/20.0	RS	N/A	97-115.8': (SP-SW) Fine-medium grained snad with trace coarse sand and gravel, gravel increasing with depth, brown, wet	GW VAP sample collected Sample ID: MW15D-107.0 8/19/2009 8:50 Cl ⁻ : >638 ppm So Cond: 2116 uS/cm ^o NH ₃ : >0.60 mg/L
						NOTE: A 20 foot-long sample core used due to the loss of the 10-foot core sample down hole
117					GW VAP sample collected Sample ID: MW15D-117.0 8/19/2009 10:10 Cl ⁻ : >638 ppm So Cond: 2846 uS/cm ^o NH ₃ : >0.60 mg/L	
					115.8-117': (GW) Gravel with sand, gravel ranging in size up to 1.5"	
127	12	8.5/10.0	RS	N/A	117-121.5': (SP-SW) Fine-medium grained sand with gravel (up to 0.5" in diameter), brown, wet	GW VAP sample collected Sample ID: MW15D-127.0 (collected MS/MSD) 8/19/2009 10:59 Cl ⁻ : >638 ppm So Cond: 3160 uS/cm ^o NH ₃ : >0.60 mg/L
						121.5-127': (SP) Medium grained sand, brown, wet
137	13	7.0/10.0	RS	N/A	127-131': (SP-SW) Fine-medium grained sand with coarse sand and gravel (up to 2" in diameter), brown, wet	GW VAP sample collected Sample ID: MW15D-137.0 8/19/2009 13:00 Cl ⁻ : >638 ppm So Cond: 3055 uS/cm ^o NH ₃ : >0.60 mg/L
147	14	7.5/10.0	RS	N/A	131-144': (SP) Medium grained sand with trace gravel (< 0.5" in diameter), brown, wet	GW VAP sample collected Sample ID: MW15D-147.0 8/19/2009 15:20 Cl ⁻ : >638 ppm So Cond: 3323 uS/cm ^o NH ₃ : NR
						144-147': (SP-SM) Fine-medium grained snad with silt, brown-gray, wet
EOB at 147'						

EOB at 147'

LEGEND
FID Flame Ionization Detector
T Time
SPT Split Spoon Sample



PROJECT NUMBER 363838.03.ES	BORING NUMBER MW-16D	SHEET 1 OF
SOIL BORING LOG		

PROJECT : S. Ponds Exfiltration Deep Groundwater Field Investigation				LOCATION : Dow-Ludington					
ELEVATION : 588.73 (toc)				DRILLING CONTRACTOR : Boart-Longyear					
DRILLING METHOD AND EQUIPMENT USED Rotosonic									
WATER LEVELS : 7.5' btoc		START : 8/26/09 9:30		END: 8/27/09 12:10	LOGGER : L. Hunt				
DEPTH BELOW SURFACE (FT)	INTERVAL (FT)		STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION	COMMENTS				
	RECOVERY (IN)	#/TYPE							
0	1	4.1/7.0	RS	N/A	0-12.6': Fill - Sand, siltm and clay with gravel, black, gray, and white, wet to moist, loose, soft				
7	2	8.9/10.0	RS	N/A					
17	3	10.0/10.0	HS	N/A	12.6-14.1': (CH) Clay with a little sand, silt and gravel, black, wet to moist, soft				
14.1-22': (SP) Fine to medium grained sand with trace coarse sand, gray-brown, wet, loose to dense									
22-22.5': (CL) Sandy clay, dark gray, wet, very soft									
27	4	10.0/10.0	RS	N/A	22.5-27': (SP) Fine to medium grained sand with trace coarse sand, gray-brown, wet, loose to dense				
27-47': (SP) Fine sand with trace coarse sand, gray, wet, loose to dense									
47					5	8.0/10.0	RS	N/A	GW VAP sample collected Sample ID: MW16D-47.0 8/26/2009 10:25 Cl ⁻ : >638 nmm So Cond: 4604 uS/cm ^o NH ₃ : >0.60 mg/L
57	6	6.0/10.0	RS	N/A					GW VAP sample collected Sample ID: MW16D-52.0 8/26/2009 11:40 Cl ⁻ : >638 nmm So Cond: 4367 uS/cm ^o NH ₃ : >0.60 mg/L
67									7
77					8	10.0/10.0	RS	N/A	
87	9	10.0/10.0	HS	N/A					
97									10
107					11	10.0/10.0	RS	N/A	
117	12	10.0/10.0	RS	N/A					
127									13
137					14	10.0/10.0	RS	N/A	
147	15	6.0/10.0	RS	N/A					
									15

EOB at 147'

LEGEND
FID Flame Ionization Detector
T Time
SPT Split Spoon Sample



PROJECT NUMBER 363838.03.ES	BORING NUMBER MW-19D	SHEET 1 OF
SOIL BORING LOG		

PROJECT : S. Ponds Exfiltration Deep Groundwater Field Investigation				LOCATION : Dow-Ludington		
ELEVATION : 588.38 (toc)				DRILLING CONTRACTOR : Boart-Longyear		
DRILLING METHOD AND EQUIPMENT USED Rotosonic						
WATER LEVELS : 7.83' btoc		START : 9/1/09 13:00		END: 9/4/09 12:23	LOGGER : L. Hunt	
DEPTH BELOW SURFACE (FT)			STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION	COMMENTS	
INTERVAL (FT)	RECOVERY (IN)			SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.	
	#/TYPE					
0	1	5.1/7.0	RS	N/A	0-5.1': Fill, gravel, snad, silt, & clay, black, white, & light gray, moist, loose	
7	2	10.0/10.0	RS	N/A	11-12': (CL) Clay with organics and wood, dark gray to black, moist, firm to stiff	
17					12-21.5': (SP) Medium grained sand, dark gray, wet, very loose	
	3	10.0/10.0	RS	N/A	21.5-22.5': (SC) Clayey sand, dark gray-brown, wet, loose to dense	
27					22.5-29': (SP) Medium grained sand, dark gray, wet, very loose	
	4	10.0/10.0	RS	N/A	29-36.5': (ML) Sandy silt with trace to little organics, dark brown, wet to moist, firm. Fine sand layers (0.03' to 0.3' thick) from 29-34'	
37						
	5	10.0/10.0	RS	N/A	36.5-47': (SP) Fine-medium grained sand with trace shell fragments, course sand, and organics (wood and roots), dark gray, wet, very loose to loose	GW VAP sample collected Sample ID: MW19D-47.0 (Collected a MS/MSD) 9/1/2009 14:10 Cl ⁻ : <31 ppm So Cond: 456.1 uS/cm ^o NH ₃ : >0.60 mg/L
47						
	6	10.0/10.0	RS	N/A	47-53': (SP-SW) Fine-medium grained sand with trace to little course sand and trace organics, gray, wet, very loose 53-54': (SP) Medium grained sand with trace course sand, dark gray, wet, very dense 54-57': (CL) Clay with trace gravel and organics, reddish-brown, moist, hard, sandy in spots with sand pockets every 1-2'	GW VAP sample collected Sample ID: MW19D-52.0 9/1/2009 14:52 Cl ⁻ : <31 ppm So Cond: 427.3 uS/cm ^o NH ₃ : >0.60 mg/L
57						
	7	7.5/10.0	RS	N/A	57-67': (SP) Fine sand with trace medium and course grained sand (trace gravel found from 57-58'), light brown, wet, very loose	GW VAP sample collected Sample ID: MW19D-67.0 & MW19D-67.0FD 9/1/2009 15:25 & 15:27 Cl ⁻ : <31 ppm So Cond: 346.3 uS/cm ^o NH ₃ : >0.60 mg/L
67						
	8	8.5/10.0	RS	N/A		GW VAP sample collected Sample ID: MW19D-77.0 9/1/2009 16:20 Cl ⁻ : <31 ppm So Cond: 343 uS/cm ^o NH ₃ : 0.53 mg/L
77					67-87': (SP) Medium grained sand with trace fine to course gravel, gray-brown, wet, loose, no gravel from 82-87'	
	9	10.0/10.0	RS	N/A		GW VAP sample collected Sample ID: MW19D-87.0 9/1/2009 17:37 Cl ⁻ : <31 ppm So Cond: 360.4 uS/cm ^o NH ₃ : >0.60 mg/L
87						
	10	10.0/10.0	RS	N/A	87-94': (SP-SM) Fine-medium grained sand with trace gravel, light brown, wet, loose, fining downward 94-97': (MI-SP) Silty sand	GW VAP sample collected Sample ID: MW19D-94.0 9/2/2009 11:08 Cl ⁻ : <31 ppm So Cond: 413.6 uS/cm ^o NH ₃ : >0.60 mg/L
97						
	11	10.0/10.0	RS	N/A		GW VAP sample collected Sample ID: MW19D-104.0 & MW19D-104.0FD 9/3/2009 14:45 & 14:47 Cl ⁻ : <31 ppm So Cond: 366.2 uS/cm ^o NH ₃ : >0.60 mg/L
107						
	12	4.3/10.0	RS	N/A	97-126.5': (SP) Fine sand with trace medium-course sand and small gravel, light brown, wet, loose	GW VAP sample collected Sample ID: MW19D-112.0 9/4/2009 8:35 Cl ⁻ : <31 ppm So Cond: 357.8 uS/cm ^o NH ₃ : >0.60 mg/L
117						
	13	10.0/10.0	RS	N/A		GW VAP sample collected Sample ID: MW19D-127.0 9/4/2009 10:33 Cl ⁻ : <31 ppm So Cond: 386.7 uS/cm ^o NH ₃ : >0.60 mg/L
127					126.5-127': (SM) Silty sand, light brown, wet, dense to very dense	
137	14	16.0/20.0	RS	N/A	127-147': (SP) Fine sand with trace medium grained sand, light brown, wet, loose, silt pocket at 139'	GW VAP sample collected Sample ID: MW19D-137.0 9/4/2009 12:00 Cl ⁻ : <31 ppm So Cond: 413.1 uS/cm ^o NH ₃ : 0.23 mg/L NOTE: Used 20 foot core barrel for last soil boring length
147						GW VAP sample collected Sample ID: MW19D-147.0 9/4/2009 12:23 Cl ⁻ : <31 ppm So Cond: 378.3 uS/cm ^o NH ₃ : 0.36 mg/L

EOB at 147'

LEGEND
FID Flame Ionization Detector
T Time
SPT Split Spoon Sample



PROJECT NUMBER 363838.03.ES	BORING NUMBER MW-37D	SHEET 1 OF
SOIL BORING LOG		

PROJECT : S. Ponds Exfiltration Deep Groundwater Field Investigation				LOCATION : Dow-Ludington		
ELEVATION : 587.83 (toc)				DRILLING CONTRACTOR : Boart-Longyear		
DRILLING METHOD AND EQUIPMENT USED Rotosonic						
WATER LEVELS : 5.99' btoc		START : 8/27/09 16:50		END: 8/28/09 13:45	LOGGER : L. Hunt	
DEPTH BELOW SURFACE (FT)	INTERVAL (FT)		STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION	COMMENTS	
	RECOVERY (IN)	#/TYPE				
0	1	4.0/7.0	RS	N/A	0-7': Fill - gravel, sand, silt, and clay, black, white, and gray, moist, loose	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. FID (ppm):
7	2	10.0/10.0	RS	N/A	7-13': (OL) Organic clay (peat) with roots, black and dark brown, moist, firm	
					13-17': (SC) Clayey fine sand, black to dark gray, moist, loose	
17	3	9.0/10.0	RS	N/A	17-34': (SM) Silty fine sand, balck to dark gray, clayey in spots, light gray and black horizontal laminations at 24' (6" thick), wet, loose	
27	4	10.0/10.0	RS	N/A	34-37': (ML) Sandy silt, dark gray to gray, moist to wet, firm	
37	5	10.0/10.0	RS	N/A	37-47': (SM & OL) Alternating silty sand and organic clay/silt with organics throughout, layers ranging from 0.5-1.5" thick, light gray and dark gray, moist, dense/firm	
47	6	7.0/10.0	RS	N/A	47-51.5': (SM-SC) Silty/Clayey Sand with organics, gray, wet, very loose	
					51.5-57': (CL-ML) Silty clay with organics, dark gray to dark brown, moist, firm	
57	7	10.0/10.0	RS	N/A	57-65.5': (OL) Organic clay, black and mottled dark brown, moist to wet, firm	
					65.5-67': (SC) Clayey sand with organics, light gray to gray with black streaks, moist to wet, loose	
67	8	9.6/10.0	RS	N/A	67-72.5': (SM-SC) Silty to clayey sand with organics (roots and wood), light gray to gray, wet, loose to dense	GW VAP sample collected Sample ID: MW37D-77.0 8/28/2009 8:45 Cl ⁻ : <31 ppm So Cond: 920 uS/cm° NH ₃ : >0.60 mg/L
					72.5-75.6': (CH) Clay with organics, black to dark gray and mottled dark brown, wet, firm	
					75.6-77': (SP) Fine sand, gray-brown, wet, loose	
77	9	8.5/10.0	HS	N/A	77-82.7': (CH) Clay with organics, gray, wet, high plasticity, soft to firm, sand seam at 81.3' (0.3' thick)	GW VAP sample collected Sample ID: MW37D-87.0 8/28/2009 9:21 Cl ⁻ : <31 ppm So Cond: 510 uS/cm° NH ₃ : >0.60 mg/L
					82.7-87': (SP) Fine to medium grained sand, gray brown, wet, loose to dense, silty sand (SM) in pockets	
87	10	10.0/10.0	RS	N/A	87-102': (SP) Fine to medium grained sand with trace coarse sand, gray, wet, dense, organics in 2-3" layers	GW VAP sample collected Sample ID: MW37D-97.0 8/28/2009 10:03 Cl ⁻ : <31 ppm So Cond: 513 uS/cm° NH ₃ : >0.60 mg/L
97	11	10.0/10.0	RS	N/A	102-104.3': (CL) Clay with trace organics and shell fragments, gray, moist, firm to stiff, low plasticity, black peat layers at bottom (2" thick)	GW VAP sample attempted, no water yielded
					104.3-107': (SM) Silty sand with trace medium and coarse sand and organics, gray-brown, moist to wet, dense	
107	12	4.0/10.0	RS	N/A		GW VAP sample collected Sample ID: MW37D-117.0 8/28/2009 11:42 Cl ⁻ : <31 ppm So Cond: 348.1 uS/cm° NH ₃ : 0.30 mg/L
117	13	8.0/10.0	RS	N/A	107-132': (SP) Medium sand with trace coarse sand and clay pockets, light gray-brown, wet, loose	GW VAP sample collected Sample ID: MW37D-127.0 8/28/2009 12:25 Cl ⁻ : <31 ppm So Cond: 359.3 uS/cm° NH ₃ : 0.40 mg/L
127	14	8.0/10.0	HS	N/A	132-133.6': (GP-GW) Medium gravel, rounded, trace sand and silt, gray, wet, loose	GW VAP sample collected Sample ID: MW37D-137.0 8/28/2009 13:11 Cl ⁻ : <31 ppm So Cond: 361.7 uS/cm° NH ₃ : 0.44 mg/L
					133.6-134.6': (CH) Clay, reddish-brown, moist, very stiff, med-high plasticity	
					134.6-137': (SP) Fine to medium sand, gray-brown, wet, loose	
137	15	9.0/10.0	RS	N/A	137-147': (SP-SM) Fine sand, becomes finer with depth, gray-brwon, wet to moist, very dense to dense	GW VAP sample collected Sample ID: MW37D-147.0 8/28/2009 13:58 Cl ⁻ : <31 ppm So Cond: 375.9 uS/cm° NH ₃ : >0.60 mg/L
147						

EOB at 147'

LEGEND
FID Flame Ionization Detector
T Time
SPT Split Spoon Sample



PROJECT NUMBER 363838.03.ES	BORING NUMBER MW-38D	SHEET 1 OF
SOIL BORING LOG		

PROJECT : S. Ponds Exfiltration Deep Groundwater Field Investigation				LOCATION : Dow-Ludington		
ELEVATION : 590.75 (toc)				DRILLING CONTRACTOR : Boart-Longyear		
DRILLING METHOD AND EQUIPMENT USED : Rotasonic						
WATER LEVELS : 10.52' btoc		START : 9/9/09 13:55		END: 9/11/09 11:30	LOGGER : N. Wilbur	
DEPTH BELOW SURFACE (FT)	STANDARD			SOIL DESCRIPTION	COMMENTS	
	PENETRATION					
	TEST					
	RESULTS					
	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	6"-6"-6"-6" (N)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
						FID (ppm):
0						
1	1	6.3/7.0	RS	N/A	0-13.8': Fill - topsoil in first 1.7' with organics, lime solids & gravel below, white, moist	
7						
2	2	9.0/10.0	RS	N/A	13.9-14.9': (ML) Silt with trace coarse sand, organics, black, moist, firm	
17						
3	3	10.0/10.0	RS	N/A	14.9-24': (SP) Medium grained sand with trace gravel, moist to wet, silt seam at 16'	
27						
4	4	10.0/10.0	RS	N/A	24-33': (SP) Fine grained sand, light brown, moist to wet	
37					33-33.2': (ML-CL) Silty clay seam, gray-green, moist, stiff	
5	5	9.0/10.0	RS	N/A	33.2-37': (SW) Fine-coarse grained sand with small gravel (<0.5") brown, wet	GW VAP sample collected Sample ID: MW38D-47.0 9/9/2009 14:45 Cl ⁻ : >638 ppm So Cond: 2942 uS/cm ² NH ₃ : >0.60 mg/L
47					37-56.5': (SP) Fine to medium grained sand with trace coarse sand and gravel, brown, moist to wet, loose	GW VAP sample collected Sample ID: MW38D-57.0 9/9/2009 15:50 Cl ⁻ : >638 ppm So Cond: 4371 uS/cm ² NH ₃ : >0.60 mg/L
57					56.5-57': (SW) Fine-coarse sand with sub-angular gravel	GW VAP sample collected Sample ID: MW38D-67.0 9/9/2009 16:20 Cl ⁻ : >638 ppm So Cond: 4383 uS/cm ² NH ₃ : >0.60 mg/L
67	7	7.2/10.0	RS	N/A	57-74': (SP) Fine to medium grained sand with trace coarse sand and sub-angular gravel (up to 1.5" in diameter), brown, moist, loose	GW VAP sample collected Sample ID: MW38D-77.0 9/10/2009 10:40 Cl ⁻ : >638 ppm So Cond: 4663 uS/cm ² NH ₃ : >0.60 mg/L
77					74-77': (SP-GW) Medium grained sand and gravel with trace coarse sand, gravel up to 1.5" in diameter, subangular, brown, moist	GW VAP sample collected Sample ID: MW38D-87.0 9/10/2009 11:45 Cl ⁻ : >638 ppm So Cond: 4880 uS/cm ² NH ₃ : >0.60 mg/L
87	9	10.0/10.0	RS	N/A		GW VAP sample collected Sample ID: MW38D-97.0 & MW38D-97.0FD 9/10/2009 15:40 & 15:45 Cl ⁻ : >638 ppm So Cond: 5090 uS/cm ² NH ₃ : >0.60 mg/L
97					77-115.2': (SP) Fine-medium grained sand with trace coarse sand, brown, moist, loose	GW VAP sample collected Sample ID: MW38D-107.0 9/10/2009 16:50 Cl ⁻ : >638 ppm So Cond: 4934 uS/cm ² NH ₃ : >0.60 mg/L
107	11	8.8/10.0	RS	N/A		GW VAP sample collected Sample ID: MW38D-117.0 9/10/2009 18:05 Cl ⁻ : >638 ppm So Cond: 3651 uS/cm ² NH ₃ : >0.60 mg/L
117					115.2-117': (SP) Fine to very fine grained sand, brown, moist	GW VAP sample collected Sample ID: MW38D-127.0 (MS/MSD collected) 9/11/2009 9:15 Cl ⁻ : >638 ppm So Cond: 4095 uS/cm ² NH ₃ : >0.60 mg/L
127	13	9.0/10.0	RS	N/A		GW VAP sample collected Sample ID: MW38D-137.0 9/11/2009 10:40 Cl ⁻ : 180 ppm So Cond: 920 uS/cm ² NH ₃ : >0.60 mg/L
137					117-143.7': (SP) Fine-medium grained sand with trace coarse sand, brown, moist, loose, silty clay seam at 134.8	GW VAP sample collected Sample ID: MW38D-147.0 9/11/2009 11:30 Cl ⁻ : 54 ppm So Cond: 554 uS/cm ² NH ₃ : 0.24 mg/L
147	15	10.0/10.0	RS	N/A	143.7-145.7': (ML) Silt, brown, moist, firm	
					145.7-147': (SP) Fine-medium grained sand with trace coarse sand, brown, moist, loose	

EOB at 147'

LEGEND
FID Flame Ionization Detector
T Time
SPT Split Spoon Sample



PROJECT NUMBER 363838.03.ES	BORING NUMBER MW-39D	SHEET 1 OF
SOIL BORING LOG		

PROJECT : S. Ponds Exfiltration Deep Groundwater Field Investigation				LOCATION : Dow-Ludington		
ELEVATION : 601.7 (toc)				DRILLING CONTRACTOR : Boart-Longyear		
DRILLING METHOD AND EQUIPMENT USED Rotosonic						
WATER LEVELS : 20.90' btoc		START : 8/20/09 9:10		END: 8/25/09 9:40	LOGGER : L. Hunt	
DEPTH BELOW SURFACE (FT)	INTERVAL (FT)		STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION	COMMENTS	
	RECOVERY (IN)	#/TYPE				
0	1	7.0/7.0	RS	N/A	0-14': Fill - silt, sand, and gravel, white, brown, and light gray, dry to moist, loose to dense	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. FID (ppm):
7	2	10.0/10.0	RS	N/A	14-16': (GW) Gravel with some silt and sand and trace organics, dark brown, moist, loose 16-18': Fill - silt, sand, and gravel, white, brown, and light gray, dry to moist, loose to dense	
17	3	10.0/10.0	RS	N/A	18-23': (SM) Silty sand, gray to dark brown, moist, loose, organic layer (peat) at 22' 23-27': (SM-ML) Silty sand to silt, light to dark gray and white, laminae bedding to blocky, moist, dense to firm	
27	4	6.5/10.0	RS	N/A	27-33.9': (SP) Medium grained sand with trace gravel, dark gray-brown, moist to wet, loose 33.9-35.4': (CL) Clay, dark gray, dry to moist, hard	
37	5	9.0/10.0	RS	N/A	35.4-47': (SP) Medium sand with trace coarse sand, light brown to gray, wet, loose. Sandy silt seam with trace organics (ML) from 43.3 to 44.5 feet, greenish gray, wet, dense	
47	6	9.0/10.0	RS	N/A	47-62.5': (SP-SW) Medium grained sand with trace gravel and trace to little coarse sand, light brown to gray, wet, very loose	
57	7	8.0/10.0	RS	N/A	62.5-64.1': (CH) Clay, reddish-brown, moist, hard 64.1-67': (SP-SW) Medium grained sand with trace gravel and trace to little coarse sand, light brown to gray, wet, very loose	GW VAP sample collected Sample ID: MW39D-67.0 8/20/2009 10:40 Cl ⁻ : >638 ppm So Cond: 3976 uS/cm ^o NH ₃ : >0.60 mg/L NOTE: Water smells like rotten eggs
67	8	5.8/10.0	RS	N/A	67-87': (SP-SW) Medium grained sand with trace coarse sand and gravel, gray to gray-brown, wet, loose. Gravel seams at 69.1' and 78'	GW VAP sample collected Sample ID: MW39D-77.0 8/20/2009 11:28 Cl ⁻ : >638 ppm So Cond: 3703 uS/cm ^o NH ₃ : >0.60 mg/L
77	9	7.0/10.0	RS	N/A		GW VAP sample collected Sample ID: MW39D-87.0 8/20/2009 12:17 Cl ⁻ : >638 ppm So Cond: 3983 uS/cm ^o NH ₃ : >0.60 mg/L
87	10	7.4/10.0	RS	N/A	87-97': (SP) Fine sand with trace medium-coarse grained sand, gray-brown, wet, very loose, trace gravel in the top 6"	GW VAP sample collected Sample ID: MW39D-97.0 8/20/2009 15:05 Cl ⁻ : >638 ppm So Cond: 4194 uS/cm ^o NH ₃ : >0.60 mg/L
97	11	5.5/10.0	RS	N/A	97-100.6': (SP) Fine to medium grained sand with trace gravel and coarse sand, gray-brown, wet, very loose 100.6-107': (SM) Silty sand, light brown, wet, loose to dense	GW VAP sample collected Sample ID: MW39D-103.0 & MW39D-103.0FD 8/21/2009 11:03 & 11:05 Cl ⁻ : >638 ppm So Cond: 4138 uS/cm ^o NH ₃ : >0.60 mg/L
107	12	7.5/10.0	RS	N/A	107-109': (SP) Fine to medium grained sand with trace gravel and coarse sand, gray-brown, wet, very loose 109-114.3': (SM) Silty sand, light brown, wet, loose to dense	GW VAP sample collected Sample ID: MW39D-117.0 8/24/2009 14:05 Cl ⁻ : >638 ppm So Cond: 2809 uS/cm ^o NH ₃ : >0.60 mg/L
117	13	5.0/10.0	RS	N/A	114.3-127': (SP) Fine to medium grained sand with trace gravel and coarse sand, gray-brown, wet, very loose	GW VAP sample collected Sample ID: MW39D-127.0 8/24/2009 15:13 Cl ⁻ : >638 ppm So Cond: 3988 uS/cm ^o NH ₃ : >0.60 mg/L
127	14	7.7/10.0	RS	N/A	127-144.8': (SM) Silty sand with trace gravel and coarse sand, light brown, wet, loose to very dense	GW VAP sample collected Sample ID: MW39D-132.0 8/25/2009 8:25 Cl ⁻ : >638 ppm So Cond: 4236 uS/cm ^o NH ₃ : >0.60 mg/L
137	15	6.6/10.0	RS	N/A		GW VAP sample collected Sample ID: MW39D-147.0 8/25/2009 10:45 Cl ⁻ : >638 ppm So Cond: 4358 uS/cm ^o NH ₃ : >0.60 mg/L
147					144.8-147': (SP) Medium grained sand, wet, loose to very loose	

EOB at 147'

LEGEND
FID Flame Ionization Detector
T Time
SPT Split Spoon Sample



PROJECT NUMBER	BORING NUMBER	SHEET 1	OF
363838.03.ES	MW-40D		
SOIL BORING LOG			

PROJECT : S. Ponds Exfiltration Deep Groundwater Field Investigation				LOCATION : Dow-Ludington		
ELEVATION : 598.57 (toc)				DRILLING CONTRACTOR : Boart-Longyear		
DRILLING METHOD AND EQUIPMENT USED Rotosonic						
WATER LEVELS : 16.95' btoc		START : 9/14/09 16:25		END: 9/15/09 14:25	LOGGER : N. Wilbur	
DEPTH BELOW SURFACE (FT)	INTERVAL (FT)		STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION	COMMENTS	
	RECOVERY (IN)	#/TYPE				
0	1	7.0/7.0	RS	N/A	0-8': Fill - gravel and lime solids, gray	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. FID (ppm):
7	2	4.8/10.0	RS	N/A	8-11.2': (SM-CL) Sandy clay mix, brown	
					11.2-14.8': (ML-CL) Silty clay, brown, firm, high plasticity	
17	3	8.3/10.0	RS	N/A	14.8-22.4': Fill - gravel and lime solids with some sand, gray and white	
					22.4-23.4': (SW-SM) Sandy silt with organics (grass and roots), black	
					23.4-25.2': Transistion between sandy silt and sand, black to brown	
27	4	2.6/10.0	RS	N/A	25.2-45': (SP) Fine to medium grained sand, very thin layers of silt throughout, dark brown	
37	5	9.6/10.0	RS	N/A	45-45.4': (OL) Organics (bark, sticks, and leaves), dark brown, thin sand layer at 45.4'	GW VAP sample collected Sample ID: MW40D-57.0 9/15/2009 7:50 Cl ⁻ : >638 ppm So Cond: 5650 uS/cm ^o NH ₃ : >0.60 mg/L
					45.4-50.1': (SM) Silty sand (fine-medium grained), dark brown, wet, semi-plastic	
					50.1-54.1': (ML) Sandy silt, brown, wet to moist, low plasticity, become more stiff with depth	
47	6	9.1/10.0	RS	N/A	54.1-60.3': (SP) Fine to medium grained sand, light brown, moist, 2" layer of organics (leaves, bark, sticks) at 55'	No GW VAP sample collected due to fine grained unit
					60.3-63.4': (ML-SP) Sandy silt with thin layers of fine-medium grained sand, gray-brown, semi-stiff, organic layer (sticks and leaves) at 60.3'	
57	7	9.9/10.0	RS	N/A		No GW VAP sample collected due to fine grained unit
67	8	10.0/10.0	RS	N/A		No GW VAP sample collected due to fine grained unit
77	9	10.0/10.0	RS	N/A	63.4-95': (ML-CL) Silty clay, dark brown, dry to moist, low plasticity, semi-stiff, stiffness increasing slightly with depth, trace shell fragments	No GW VAP sample collected due to fine grained unit
87	10	6.9/10.0	RS	N/A		No GW VAP sample collected due to fine grained unit
97	11	8.9/10.0	RS	N/A		GW VAP sample collected Sample ID: MW40D-107.0 9/15/2009 9:20 Cl ⁻ : <31 ppm So Cond: 490.6 uS/cm ^o NH ₃ : >0.60 mg/L
107	12	6.3/10.0	RS	N/A	95-122.5': (SP) Fine to medium grained sand, light brown, moist, trace coarse sand and shell fragments, silty clay seam at 98.3'	GW VAP sample collected Sample ID: MW40D-117.0 9/15/2009 10:05 Cl ⁻ : <31 ppm So Cond: 585 uS/cm ^o NH ₃ : >0.60 mg/L
117	13	10.0/10.0	RS	N/A		GW VAP sample collected Sample ID: MW40D-127.0 & MW40D-127.0FD 9/15/2009 11:00 & 11:05 Cl ⁻ : <31 ppm So Cond: 617 uS/cm ^o NH ₃ : >0.60 mg/L
					122.5-126.2': (ML-SP) Silty fine grained sand with thin layers of organics throughout, brown, moist, semi-firm	
127	14	9.5/10.0	RS	N/A	126.2-135.1': (SP) Fine to medium grained sand, light brown, moist, trace coarse sand and shell fragments, 0.2' thick clay seam at 126.8', brown, very plastic, moist, firm	GW VAP sample collected Sample ID: MW40D-137.0 9/15/2009 12:05 Cl ⁻ : <31 ppm So Cond: 412.4 uS/cm ^o NH ₃ : 0.41 mg/L
					135.1-135.6': (ML-CL) silty clay, brown, moist, very firm, plastic	
					135.6-137': (ML-SP) Fine silty sand, brown, dry, layers of organics	
137	15	5.8/10.0	HS	N/A	137-138.5': Fine to medium grained sand with thin (<0.5") clay layers	GW VAP sample collected Sample ID: MW40D-147.0 9/15/2009 14:10 Cl ⁻ : <31 ppm So Cond: 419.2 uS/cm ^o NH ₃ : 0.12 mg/L
					138.5-143': (SP) Fine to medium grained sand, light brown, moist, trace coarse sand and shell fragments	
					143-147': (SP-GW) Fine to medium grained sand and gravel (up to 4" in diameter), angular to sub-angular, light brown, moist	
147					Composite soil smaple collected: MW40D-COMP-SOIL 9/15/2009 14:10	

EOB at 147'

LEGEND
FID Flame Ionization Detector
T Time
SPT Split Spoon Sample



PROJECT NUMBER
363838.03.ES

WELL NUMBER
MW-15D

SHEET 1 OF 1

WELL COMPLETION DIAGRAM

PROJECT : S. Ponds Exfiltration Deep Groundwater Field Investigation LOCATION : Dow-Ludington

DRILLING CONTRACTOR : Boart-Longyear

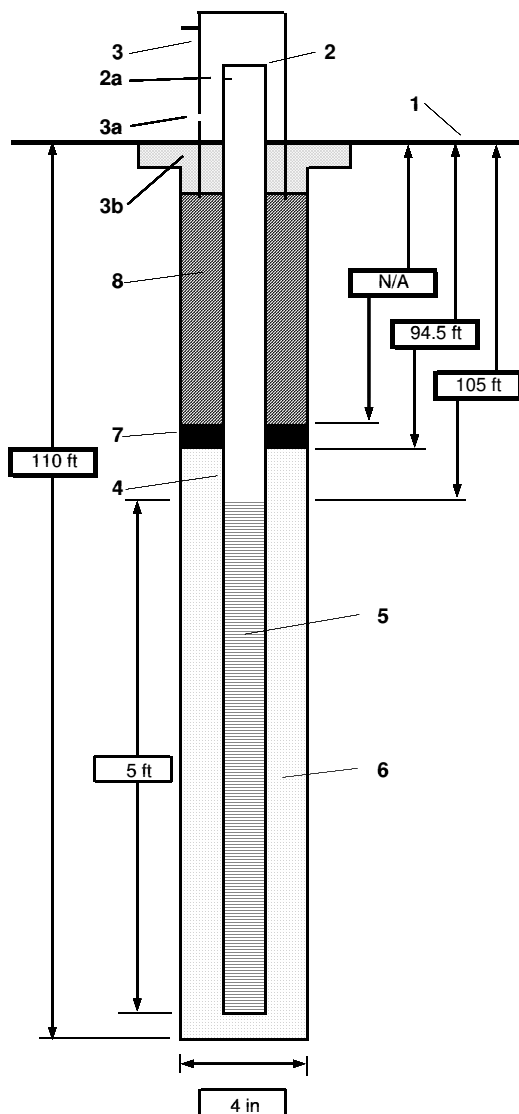
DRILLING METHOD AND EQUIPMENT USED : Rotosonic

WATER LEVELS : 11.09' btoc

START : 8/19/09 15:50

END : 8/19/09 18:00

LOGGER : L. Hunt

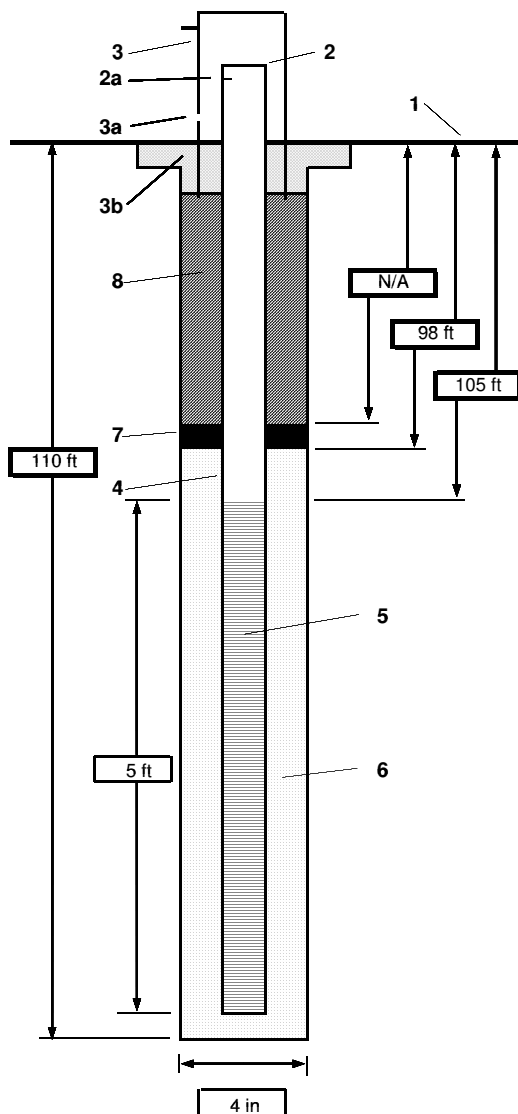


1- Ground elevation at well	592.034
2- Top of casing elevation	591.68
a) vent hole?	
3- Wellhead protection cover type	Flushmount
a) weep hole?	
b) concrete pad dimensions	2' x 2'
4- Dia./type of well casing	2.5" Scheule 80 PVC
5- Type/slot size of screen	0.01"
6- Type screen filter	Filter sand
a) Quantity used	
7- Type of seal	Bentonite Grout
a) Quantity used	
8- Grout	
a) Grout mix used	Bentonite Grout
b) Method of placement	Tremie Pipe
c) Vol. of well casing grout	
Development method	Air lift
Development time	40 minutes
Estimated purge volume	225 gallons
Comments	



PROJECT NUMBER 363838.03.ES	WELL NUMBER MW-16D
SHEET 1 OF 1	
WELL COMPLETION DIAGRAM	

PROJECT : S. Ponds Exfiltration Deep Groundwater Field Investigati LOCATION : Dow-Ludington
 DRILLING CONTRACTOR : Boart-Longyear
 DRILLING METHOD AND EQUIPMENT USED : Rotosonic
 WATER LEVELS : 7.5' btoc START : 8/27/09 13:30 END : 8/27/09 15:20 LOGGER : L. Hunt



1- Ground elevation at well	589.124
2- Top of casing elevation	588.73
a) vent hole?	
3- Wellhead protection cover type	Flushmount
a) weep hole?	
b) concrete pad dimensions	2' x 2'
4- Dia./type of well casing	2.5" Schedule 80 PVC
5- Type/slot size of screen	0.010"
6- Type screen filter	Filter Sand
a) Quantity used	
7- Type of seal	Bentonite grout
a) Quantity used	
8- Grout	
a) Grout mix used	Bentonite grout
b) Method of placement	Tremie pipe
c) Vol. of well casing grout	
Development method	Air lift
Development time	40 minutes
Estimated purge volume	225 gal
Comments	



PROJECT NUMBER
363838.03.ES

WELL NUMBER
MW-19D

SHEET 1 OF 1

WELL COMPLETION DIAGRAM

PROJECT : S. Ponds Exfiltration Deep Groundwater Field Investigati LOCATION : Dow-Ludington

DRILLING CONTRACTOR : Boart-Longyear

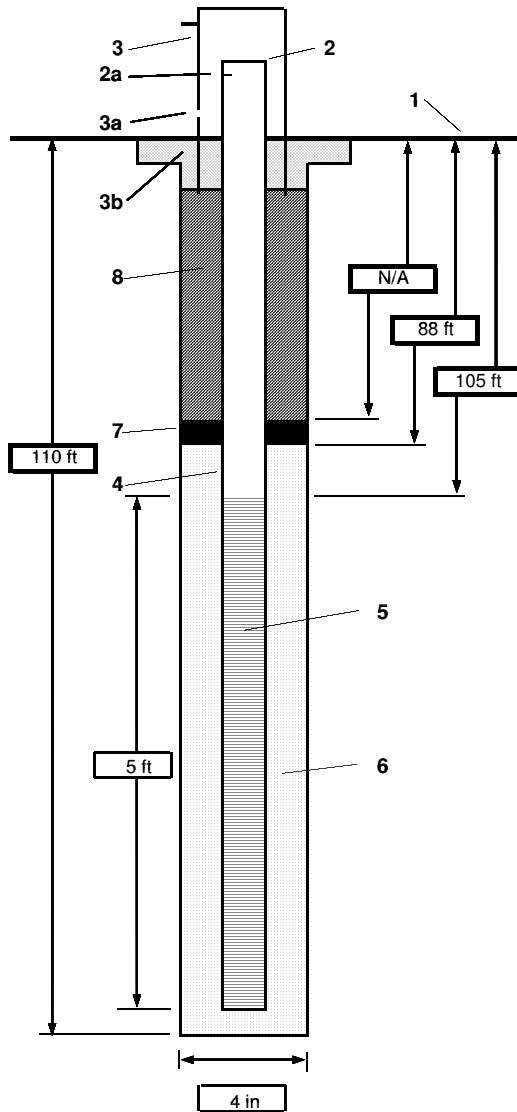
DRILLING METHOD AND EQUIPMENT USED : Rotosonic

WATER LEVELS : 7.83' btoc

START : 9/9/09 9:15

END : 9/9/09 12:25

LOGGER : N. Wilbur

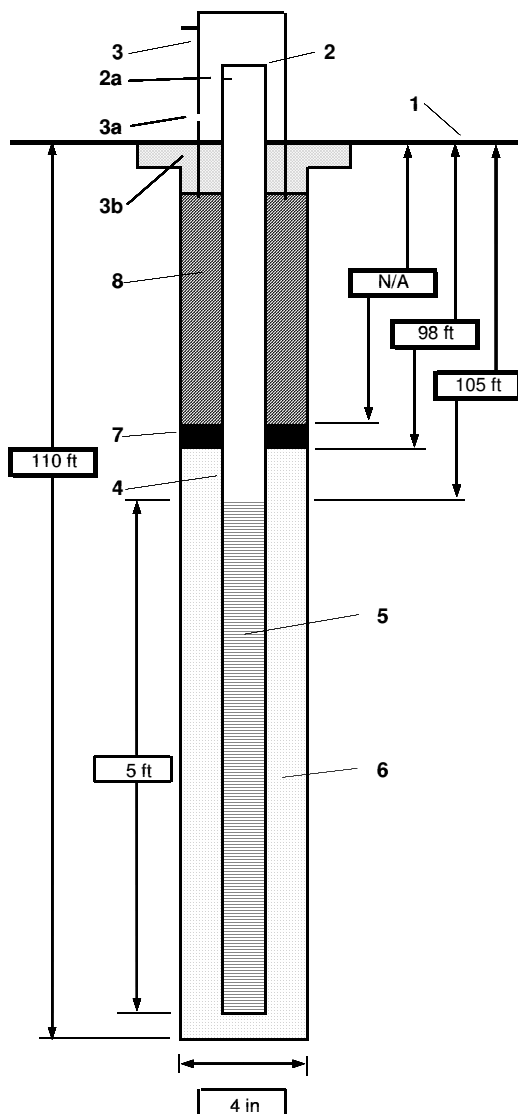


1- Ground elevation at well	588.801
2- Top of casing elevation	588.38
a) vent hole?	
3- Wellhead protection cover type	Flushmount
a) weep hole?	
b) concrete pad dimensions	2' x 2'
4- Dia./type of well casing	2.5" Schedule 80 PVC
5- Type/slot size of screen	0.010"
6- Type screen filter	Filter Sand
a) Quantity used	
7- Type of seal	Bentonite grout
a) Quantity used	
8- Grout	
a) Grout mix used	Bentonite grout
b) Method of placement	Tremie pipe
c) Vol. of well casing grout	
Development method	Air lift
Development time	30 minutes
Estimated purge volume	225 gal
Comments	



PROJECT NUMBER 363838.03.ES	WELL NUMBER MW-37D
SHEET 1 OF 1	
WELL COMPLETION DIAGRAM	

PROJECT : S. Ponds Exfiltration Deep Groundwater Field Investigati LOCATION : Dow-Ludington
 DRILLING CONTRACTOR : Boart-Longyear
 DRILLING METHOD AND EQUIPMENT USED : Rotosonic
 WATER LEVELS : 5.99' btoc START : 8/31/09 11:30 END : 8/27/09 16:30 LOGGER : L. Hunt



1- Ground elevation at well	588.28
2- Top of casing elevation	587.83
a) vent hole?	
3- Wellhead protection cover type	Flushmount
a) weep hole?	
b) concrete pad dimensions	2' x 2'
4- Dia./type of well casing	2.5" Schedule 80 PVC
5- Type/slot size of screen	0.010"
6- Type screen filter	Filter Sand
a) Quantity used	
7- Type of seal	Bentonite grout
a) Quantity used	
8- Grout	
a) Grout mix used	Bentonite grout
b) Method of placement	Tremie pipe
c) Vol. of well casing grout	
Development method	Air lift
Development time	30 minutes
Estimated purge volume	225 gal
Comments	



PROJECT NUMBER
363838.03.ES

WELL NUMBER
MW-37S

SHEET 1 OF 1

WELL COMPLETION DIAGRAM

PROJECT : S. Ponds Exfiltration Deep Groundwater Field Investigati LOCATION : Dow-Ludington

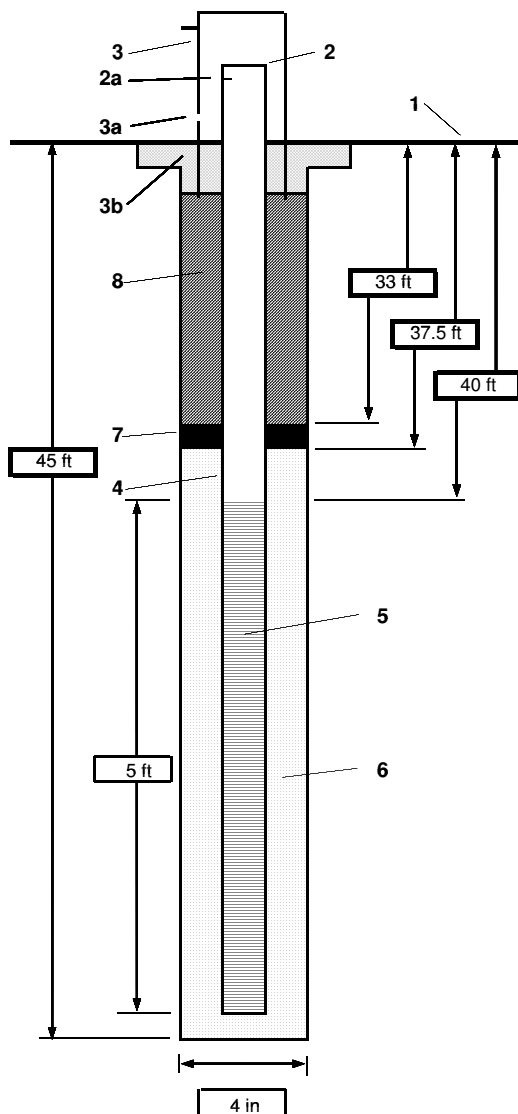
DRILLING CONTRACTOR : Boart-Longyear

DRILLING METHOD AND EQUIPMENT USED : Rotosonic

WATER LEVELS : 8.9' btoc

START : 8/31/09 11:30

END : 8/27/09 16:30 LOGGER : L. Hunt



1- Ground elevation at well	588.288
2- Top of casing elevation	587.94
a) vent hole?	
3- Wellhead protection cover type	Flushmount
a) weep hole?	
b) concrete pad dimensions	2' x 2'
4- Dia./type of well casing	2" Schedule 80 PVC
5- Type/slot size of screen	0.010"
6- Type screen filter	Filter Sand
a) Quantity used	
7- Type of seal	Bentonite chips
a) Quantity used	
8- Grout	
a) Grout mix used	Bentonite grout
b) Method of placement	Tremie pipe
c) Vol. of well casing grout	
Development method	Pump and surge
Development time	1 hour 20 minutes
Estimated purge volume	18 gal
Comments	Well went dry during purging.



PROJECT NUMBER
363838.03.ES

WELL NUMBER
MW-38D

SHEET 1 OF 1

WELL COMPLETION DIAGRAM

PROJECT : S. Ponds Exfiltration Deep Groundwater Field Investigati LOCATION : Dow-Ludington

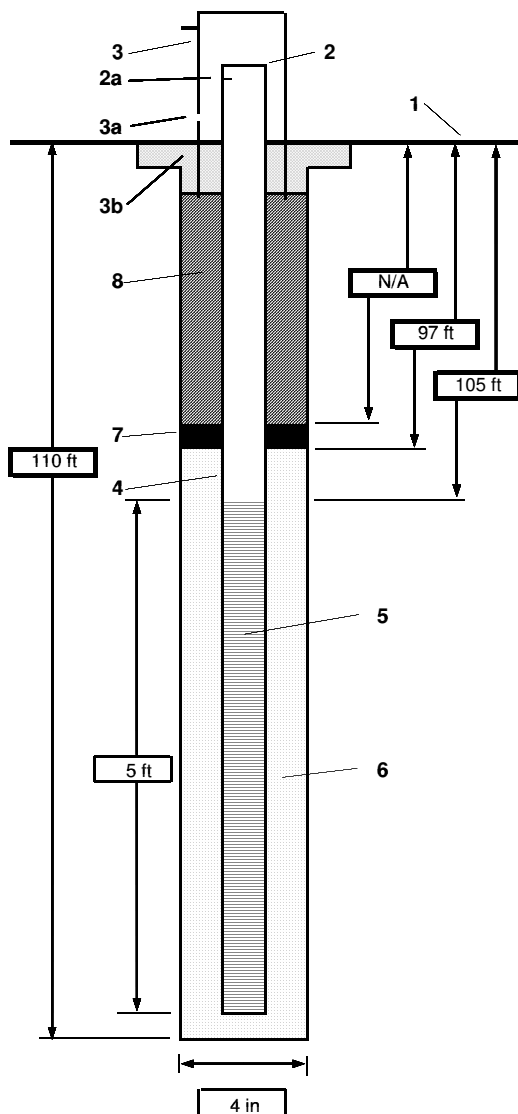
DRILLING CONTRACTOR : Boart-Longyear

DRILLING METHOD AND EQUIPMENT USED : Rotosonic

WATER LEVELS : 10.52' btoc

START : 9/14/09 10:30

END : 9/14/09 12:10 LOGGER : N. Wilbur

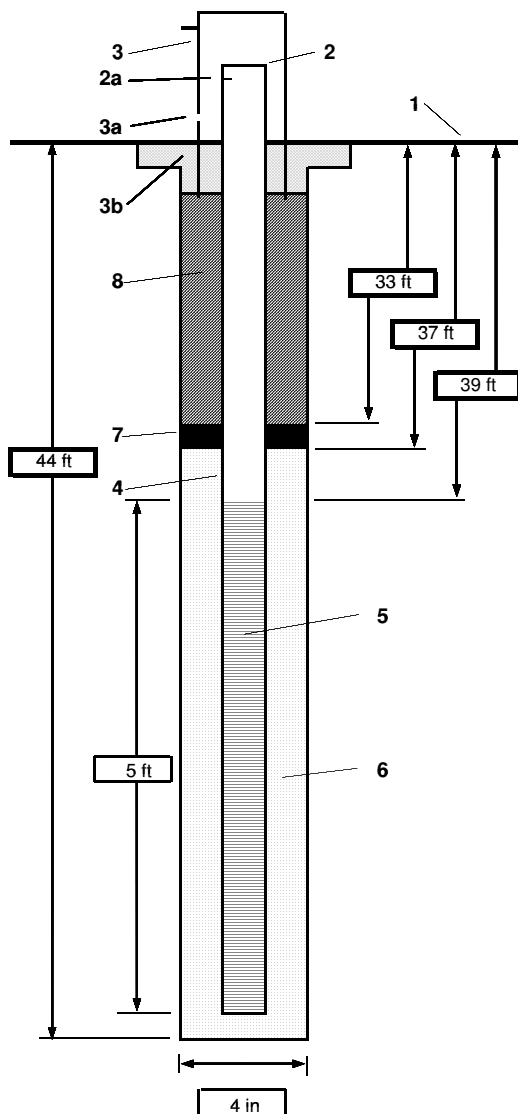


1- Ground elevation at well	591.369
2- Top of casing elevation	590.75
a) vent hole?	
3- Wellhead protection cover type	Flushmount
a) weep hole?	
b) concrete pad dimensions	2' x 2'
4- Dia./type of well casing	2.5" Schedule 80 PVC
5- Type/slot size of screen	0.010"
6- Type screen filter	Filter Sand
a) Quantity used	
7- Type of seal	Bentonite grout
a) Quantity used	
8- Grout	
a) Grout mix used	Bentonite grout
b) Method of placement	Tremie pipe
c) Vol. of well casing grout	
Development method	Air lift
Development time	30 minutes
Estimated purge volume	225 gal
Comments	



PROJECT NUMBER 363838.03.ES	WELL NUMBER MW-38S	SHEET 1 OF 1
WELL COMPLETION DIAGRAM		

PROJECT : S. Ponds Exfiltration Deep Groundwater Field Investigati LOCATION : Dow-Ludington
 DRILLING CONTRACTOR : Boart-Longyear
 DRILLING METHOD AND EQUIPMENT USED : Rotosonic
 WATER LEVELS : 10.84' btoc START : 9/14/09 14:15 END : 9/14/09 15:20 LOGGER : N. Wilbur

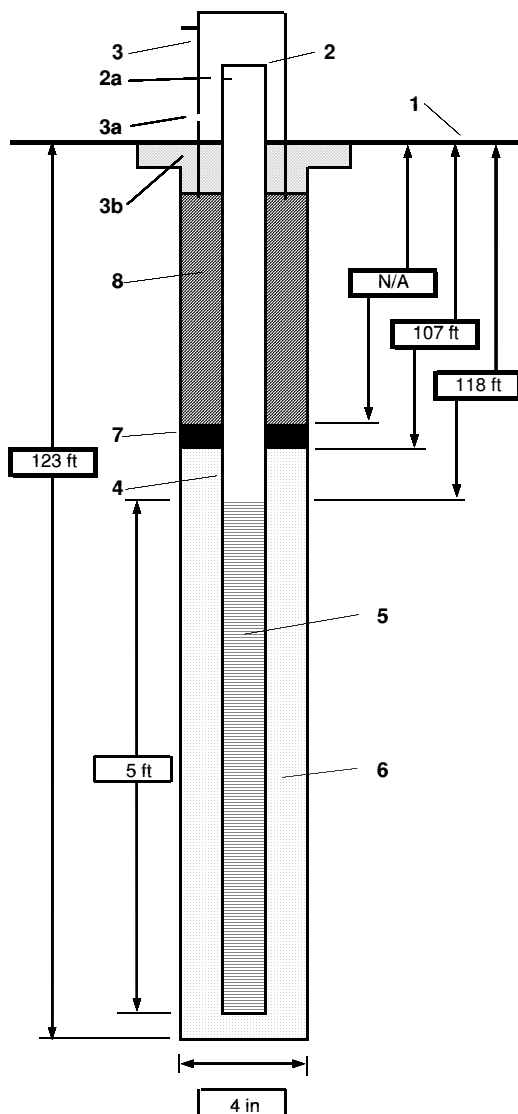


1- Ground elevation at well	591.31
2- Top of casing elevation	590.67
a) vent hole?	
3- Wellhead protection cover type	Flushmount
a) weep hole?	
b) concrete pad dimensions	2' x 2'
4- Dia./type of well casing	2" Schedule 80 PVC
5- Type/slot size of screen	0.010"
6- Type screen filter	Filter Sand
a) Quantity used	
7- Type of seal	Bentonite Chips
a) Quantity used	
8- Grout	
a) Grout mix used	Bentonite grout
b) Method of placement	Tremie pipe
c) Vol. of well casing grout	
Development method	Pump and surge
Development time	45 minutes
Estimated purge volume	50 gallons
Comments	



PROJECT NUMBER 363838.03.ES	WELL NUMBER MW-39D
SHEET 1 OF 1	
WELL COMPLETION DIAGRAM	

PROJECT : S. Ponds Exfiltration Deep Groundwater Field Investigati LOCATION : Dow-Ludington
 DRILLING CONTRACTOR : Boart-Longyear
 DRILLING METHOD AND EQUIPMENT USED : Rotosonic
 WATER LEVELS : 20.90' btoc START : 8/25/09 11:55 END : 8/25/09 14:30 LOGGER : L. Hunt

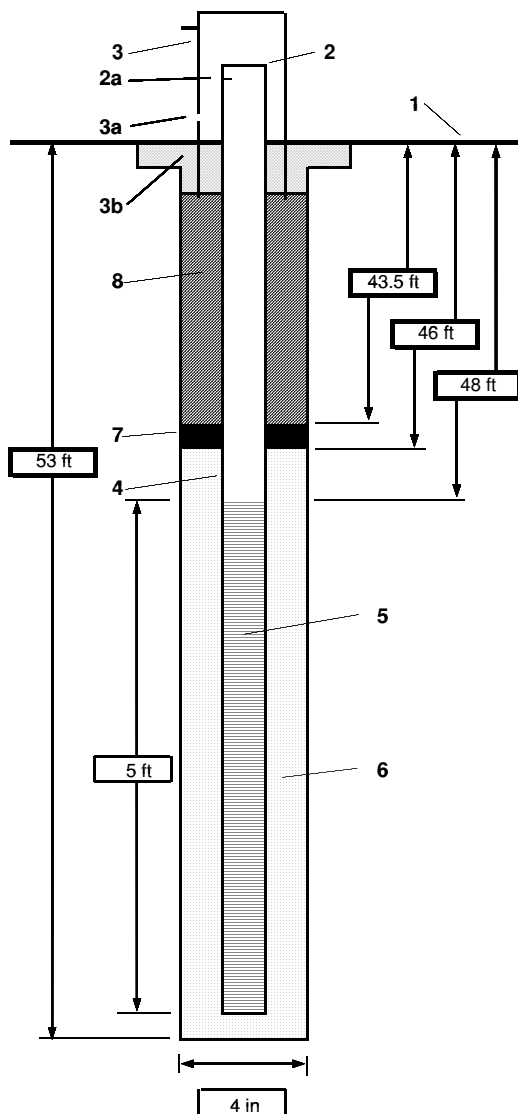


1- Ground elevation at well	602.135
2- Top of casing elevation	601.7
a) vent hole?	
3- Wellhead protection cover type	Flushmount
a) weep hole?	
b) concrete pad dimensions	2' x 2'
4- Dia./type of well casing	2.5" Schedule 80 PVC
5- Type/slot size of screen	0.010"
6- Type screen filter	Filter Sand
a) Quantity used	
7- Type of seal	Bentonite grout
a) Quantity used	
8- Grout	
a) Grout mix used	Bentonite grout
b) Method of placement	Tremie pipe
c) Vol. of well casing grout	
Development method	Air lift
Development time	40 minutes
Estimated purge volume	225 gal
Comments	



PROJECT NUMBER 363838.03.ES	WELL NUMBER MW-39S
SHEET 1 OF 1	
WELL COMPLETION DIAGRAM	

PROJECT : S. Ponds Exfiltration Deep Groundwater Field Investigati LOCATION : Dow-Ludington
 DRILLING CONTRACTOR : Boart-Longyear
 DRILLING METHOD AND EQUIPMENT USED : Rotosonic
 WATER LEVELS : 21.07' btoc START : 8/25/09 15:10 END : 8/25/09 16:30 LOGGER : L. Hunt

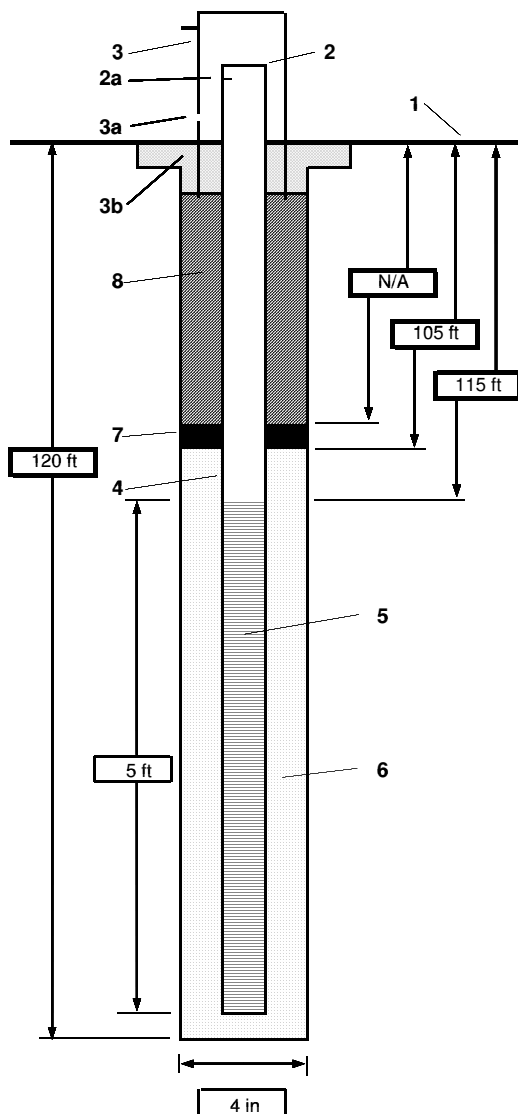


1- Ground elevation at well	602.2
2- Top of casing elevation	601.76
a) vent hole?	
3- Wellhead protection cover type	Flushmount
a) weep hole?	
b) concrete pad dimensions	2' x 2'
4- Dia./type of well casing	2" Schedule 80 PVC
5- Type/slot size of screen	0.010"
6- Type screen filter	Filter Sand
a) Quantity used	
7- Type of seal	Bentonite chips
a) Quantity used	
8- Grout	
a) Grout mix used	Bentonite grout
b) Method of placement	Tremie pipe
c) Vol. of well casing grout	
Development method	Pump and surge
Development time	1 hour 25 minutes
Estimated purge volume	53 gal
Comments	



PROJECT NUMBER 363838.03.ES	WELL NUMBER MW-40D
SHEET 1 OF 1	
WELL COMPLETION DIAGRAM	

PROJECT : S. Ponds Exfiltration Deep Groundwater Field Investigati LOCATION : Dow-Ludington
 DRILLING CONTRACTOR : Boart-Longyear
 DRILLING METHOD AND EQUIPMENT USED : Rotosonic
 WATER LEVELS : 16.95' btoc START : 9/15/09 15:00 9/15/2009 16:50 LOGGER : N. Wilbur



1- Ground elevation at well	599.079
2- Top of casing elevation	598.57
a) vent hole?	
3- Wellhead protection cover type	Flushmount
a) weep hole?	
b) concrete pad dimensions	2' x 2'
4- Dia./type of well casing	2.5" Schedule 80 PVC
5- Type/slot size of screen	0.010"
6- Type screen filter	Filter Sand
a) Quantity used	
7- Type of seal	Bentonite grout
a) Quantity used	
8- Grout	
a) Grout mix used	Bentonite grout
b) Method of placement	Tremie pipe
c) Vol. of well casing grout	
Development method	Air lift
Development time	40 minutes
Estimated purge volume	225 gal
Comments	



PROJECT NUMBER
363838.03.ES

WELL NUMBER
MW-40S

SHEET 1 OF 1

WELL COMPLETION DIAGRAM

PROJECT : S. Ponds Exfiltration Deep Groundwater Field Investigati LOCATION : Dow-Ludington

DRILLING CONTRACTOR : Boart-Longyear

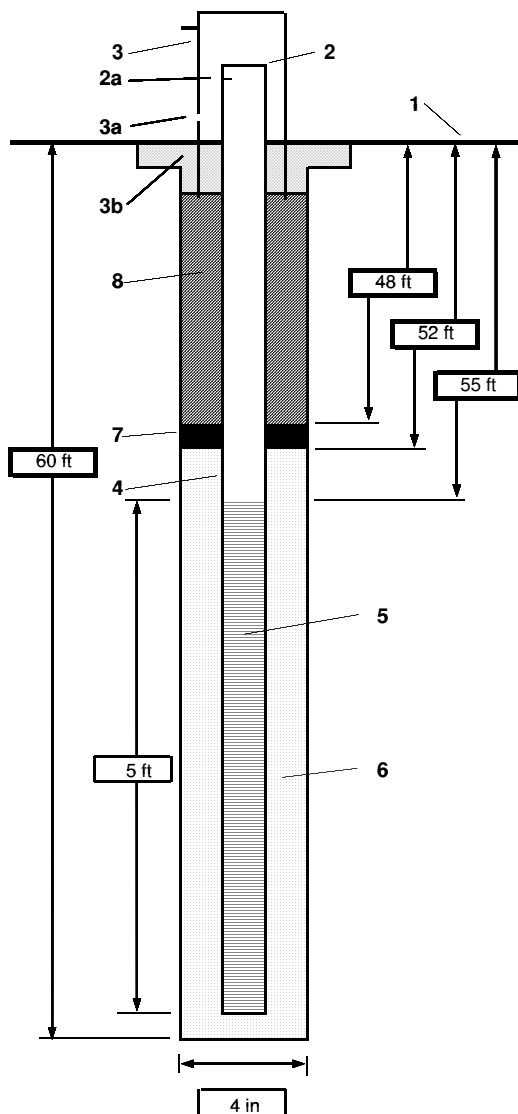
DRILLING METHOD AND EQUIPMENT USED : Rotosonic

WATER LEVELS : 16.44' btoc

START : 9/16/09 8:25

END : 9/14/09 9:40

LOGGER : N. Wilbur



1- Ground elevation at well	599.071
2- Top of casing elevation	598.62
a) vent hole?	
3- Wellhead protection cover type	Flushmount
a) weep hole?	
b) concrete pad dimensions	2' x 2'
4- Dia./type of well casing	2" Schedule 80 PVC
5- Type/slot size of screen	0.010"
6- Type screen filter	Filter Sand
a) Quantity used	
7- Type of seal	Bentonite Chips
a) Quantity used	
8- Grout	
a) Grout mix used	Bentonite grout
b) Method of placement	Tremie pipe
c) Vol. of well casing grout	
Development method	Pump and surge
Development time	35 minutes
Estimated purge volume	70 gallons
Comments	

Appendix B
Data Quality Review Memorandum and
Lab Analytical Reports

Dow Ludington Plant Site August-September 2009 Exfiltration Study Sampling Data Quality Review Vertical Aquifer Profiling Study SDGs - L09080461, L09080542, L09080640, L09080720, L09080726, L09090092, L09090173, L09090260, and L09090356 Monitoring Well Sampling SDG - L09090508

PREPARED FOR: Jon Tortomasi/CH2M HILL
Nicole Wilbur/CH2M HILL

PREPARED BY: Michael Zamboni/CH2M HILL

DATE: November 23, 2009

Introduction

This memorandum presents the results of the data review for the exfiltration study conducted during August-September 2009 at The Dow Chemical Company (Dow) Ludington Plant Site in Ludington, Michigan. The vertical aquifer profiling (VAP) screening consisted of 64 groundwater grab samples collected from seven boring locations. The monitoring well (MW) sampling consisted of groundwater samples collected from 14 monitoring wells. The samples were analyzed for chloride by U.S. Environmental Protection Agency (USEPA) Method 325.2, total dissolved solids (TDS) by USEPA Method 160.1, and ammonia by USEPA Method 350.1. A composite soil sample also was collected to aid in soil cuttings characterization. The VAP study included five equipment blanks, three matrix spike (MS)/matrix spike duplicate (MSD) pairs, and seven field duplicates. The MW sampling included two field duplicates, one MS/MSD pair, one equipment blank, and one field blank. There were 38 method blanks, 38 laboratory control samples (LCS; blank spikes), 34 laboratory control sample duplicates (LCSD; blank spike duplicates), and 17 laboratory replicates associated with this data set. Microbac Laboratories of Marietta, Ohio, analyzed the samples.

The data were reviewed to assess the sample accuracy, precision, and completeness. The review was completed in a manner consistent with the USEPA Contract Laboratory Program (CLP) National Functional Guidelines for Organic Data Review. Quality control (QC) summary forms and data reports were reviewed against the established QC limits. Data qualifiers were added when the QC data indicated a bias. Recommendations on how the results are to be used, and associated comments, are discussed below.

The field samples and related quality assurance (QA)/QC samples were reviewed for the following QC requirements:

- Completeness (that all samples were analyzed for the requested analytical parameters)
- Holding times prior to extraction and analysis
- Field duplicate precision
- Field and equipment blank contamination
- Laboratory replicate precision
- Laboratory method blank contamination
- LCS/LCSD accuracy and precision
- MS/MSD accuracy and precision
- Overall assessment of data

SDG L09080461

Chloride was detected at 20 milligrams per kilogram (mg/kg) in the soil method blank. The sample concentration was greater than five times that in the related blank; therefore, no qualifiers were applied. The MS/MSD was characterized by percent recovery outside control limits for chloride in groundwater. The parent concentration was much greater than (more than five times) the spike amount; therefore, no qualifiers were applied.

Ammonia was characterized by 28 percent relative percent difference (RPD) between MW15D-87.0 and MW15D-87.0FD. These two results were J-qualified as “estimated” because of field duplicate RPD exceeding 20 percent. The data user should use the greater of results between field duplicates. The MSD was characterized by percent recovery less than control limits for ammonia in groundwater (51.1 percent recovery versus 70 percent lower control limit). Qualifiers are not applied based on MS/MSD exceedances alone, and the MS and LCS were characterized by acceptable recovery; therefore, no qualifiers were applied. EQUIP-BLK-1, the equipment blank, contained 0.234 milligram per liter (mg/L) of ammonia. Related results were U-qualified as “not detected at significantly greater than that in an associated blank” if the sample concentration was less than five times that in the blank, considering the dilution factor. If necessary, the result was raised to the quantitation limit. Ammonia in MW15D-97.0, MW15D-87.0, MW15D-87.0FD, MW15D-77.0, MW15D-72.0, and MW15D-75.0 was U-qualified because of equipment blank contamination.

SDG L09080542

A cooler was received at 8 degrees Celsius (°C), which is greater than the upper control limit of 4°C. The samples were received overnight and analyzed within the appropriate holding times. A slight temperature exceedance is not expected to have a significant effect on these particular inorganic analyses. All chloride, total dissolved solids (TDS), and ammonia results in this sample delivery group (SDG) were J-qualified as “estimated” because of temperature preservation in order to document that a QA/QC exceedance has occurred. EQUIP-BLK-1, the equipment blank, contained 0.234 mg/L of ammonia. All related sample concentrations were greater than five times that in the related blank; therefore, no qualifiers were applied.

SDG L09080640

EQUIP-BLK-1, the equipment blank, contained 0.234 mg/L of ammonia. Related results were U-qualified as “not detected at significantly greater than that in an associated blank” if the sample concentration was less than five times that in the blank, considering the dilution factor. If necessary, the result was raised to the quantitation limit. Ammonia in MW16D-104.0 and MW39D-117.0 was U-qualified because of equipment blank contamination.

SDG L09080720

There were no QA/QC exceedances affecting the data quality or usability in this SDG.

SDG L09080726

Chloride was detected in MW16D-117.0FD but not in MW16D-117.0. Therefore, chloride was J-qualified as “estimated” in MW16D-117.0FD and UJ-qualified as “nondetect, estimated quantitation limit” in MW16D-117.0. The data user should use the greater of results between field duplicates.

SDG L09090092

The MS and MSD were characterized by percent recovery slightly less than control limits for chloride in groundwater (85 percent and 76.8 percent, respectively, versus 90 percent lower control limit). The parent sample was nondetect. Qualifiers are not applied based on MS/MSD exceedances alone, and the MS and LCS were characterized by acceptable recovery; therefore, no qualifiers were applied.

SDG L09080173

There were no QA/QC exceedances affecting the data quality or usability in this SDG.

SDG L09090260

The MS/MSD was characterized by percent recovery outside control limits for chloride, TDS, and ammonia in groundwater. The parent concentration was much greater than (more than five times) the spike amount; therefore, no qualifiers were applied. The LCS was characterized by acceptable recovery.

SDG L09090356

EQUIP-BLK-5, the equipment blank, contained 0.101 mg/L of ammonia. Related results were U-qualified as “not detected at significantly greater than that in an associated blank” if the sample concentration was less than five times that in the blank, considering the dilution factor. If necessary, the result was raised to the quantitation limit. Ammonia in MW40D-147.0 and MW40D-137.0 was U-qualified because of equipment blank contamination.

SDG L09090508

PLT-X023, the equipment blank, contained 0.217 mg/L of ammonia and 80 mg/L of TDS. Related results were U-qualified as “not detected at significantly greater than that in an associated blank” if the sample concentration was less than five times that in the blank,

considering the dilution factor. If necessary, the result was raised to the quantitation limit. Ammonia in PLT-X004, PLT-X005, and PLT-X019 and TDS in PLT-X003, PLT-X004, and PLT-X005 were U-qualified because of equipment blank contamination.

Conclusion

The data package was complete as received, and the data are of good overall quality.

Detected results were J-qualified as “estimated” because of various QA/QC exceedances. These results are usable as detects at the reported concentration as long as the data user acknowledges that they may be somewhat inaccurate or imprecise. Often, results are J-qualified simply because they are low (less than the quantitation limit).

Detected results were U-qualified as “not detected at significantly greater than that in an associated blank” if they were less than five times that in an associated blank. Results in this data set were only U-qualified because of equipment blank contamination. If the sample result was less than the quantitation limit, then it was raised to the quantitation limit when U-qualifying. U-qualified results are usable as nondetects at the reported numerical result or quantitation limit as long as the data user acknowledges that the analyte was detected but was not detected at significantly greater than that in an associated blank.

Nondetected results were UJ-qualified as “nondetect, estimated quantitation limit” because of field duplicate RPD. These results are usable as nondetects at the reported quantitation limit as long as the data user acknowledges that the quantitation limit is estimated and may be higher.

The analytical results are acceptable as qualified. No results were rejected; therefore, all results are available for use to the project team for making decisions. There were no holes identified in this data set.

	StationID	PLT-MW15D	PLT-MW15D	PLT-MW15D	PLT-MW15D	PLT-MW15D	PLT-MW15D	PLT-MW15D	PLT-MW15D	PLT-MW15D	PLT-MW15D
	SampleID	MW15D-107.0	MW15D-117.0	MW15D-127.0	MW15D-127.0D	MW15D-137.0	MW15D-147.0	MW15D-47.0	MW15D-57.0	MW15D-72.0	MW15D-77.0
	SiteID	PLT	PLT	PLT	PLT	PLT	PLT	PLT	PLT	PLT	PLT
	Date Collected	8/19/09 8:50	8/19/09 10:10	8/19/09 10:59	8/19/09 10:59	8/19/09 13:00	8/19/09 15:20	8/18/09 13:55	8/18/09 14:25	8/18/09 15:10	8/18/09 15:37
Parameter	Units										
NITROGEN, AMMONIA (AS N)	mg/L	4.94 =	4.03 =	2.26 =		1.59 =	2.99 =	8.59 =	0.292 U	0.331 U	0.318 U
TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE)	mg/L	2370 =	3060 =	2650 =		3300 =	2910 =	4000 =	656 =	448 =	544 =
CHLORIDE (AS CL)	mg/L	696 =	869 =	1180 =	940 =	954 =	1090 =	1830 =	71.4 =	137 =	161 =

		PLT-MW15D	PLT-MW15D	PLT-MW15D	PLT-MW16D	PLT-MW16D	PLT-MW16D	PLT-MW16D	PLT-MW16D	PLT-MW16D	PLT-MW16D
		MW15D-87.0	MW15D-87.0FD	MW15D-97.0	MW16D-104.0	MW16D-117.0	MW16D-117.0FD	MW16D-117.0FDD	MW16D-125.5	MW16D-134.0	MW16D-147.0
		PLT	PLT	PLT	PLT	PLT	PLT	PLT	PLT	PLT	PLT
		8/18/09 16:50	8/18/09 16:55	8/18/09 17:26	8/26/09 16:20	8/27/09 8:50	8/27/09 8:58	8/27/09 8:58	8/27/09 10:50	8/27/09 11:34	8/27/09 13:22
Parameter	Units										
NITROGEN, AMMONIA (AS N)	mg/L	0.215 U	0.285 U	0.732 U	0.246 U	1.55 =	1.38 =		3.25 =	1.42 =	0.1 U
TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE)	mg/L	666 =	804 =	754 =	256 =	268 =	274 =	260 =	326 =	288 =	264 =
CHLORIDE (AS CL)	mg/L	183 =	181 =	238 =	2.34 =	2 UJ	6.65 J		2 U	2 U	2 U

		PLT-MW16D	PLT-MW16D	PLT-MW16D	PLT-MW16D	PLT-MW19D	PLT-MW19D	PLT-MW19D	PLT-MW19D	PLT-MW19D	PLT-MW19D
		MW16D-47.0	MW16D-52.0	MW16D-87.0	MW16D-97.0	MW19D-104.0	MW19D-104.0D	MW19D-104.0FD	MW19D-112.0	MW19D-127.0	MW19D-137.0
		PLT	PLT	PLT	PLT	PLT	PLT	PLT	PLT	PLT	PLT
		8/26/09 10:25	8/26/09 11:40	8/26/09 14:45	8/26/09 15:32	9/3/09 14:45	9/3/09 14:45	9/3/09 14:47	9/4/09 8:35	9/4/09 10:33	9/4/09 12:00
Parameter	Units										
NITROGEN, AMMONIA (AS N)	mg/L	22.3 =	119 =	39.1 =	11.1 =	0.342 =		0.393 =	0.355 =	0.222 =	0.213 =
TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE)	mg/L	3540 =	2640 =	372 =	252 =	206 =		234 =	184 =	248 =	256 =
CHLORIDE (AS CL)	mg/L	1520 =	1300 =	2.76 =	2 U	2 U	2 U	2 U	2 U	4.67 =	12.5 =

		PLT-MW19D	PLT-MW19D	PLT-MW19D	PLT-MW19D	PLT-MW19D	PLT-MW19D	PLT-MW19D	PLT-MW19D	PLT-MW19D	PLT-MW37D
		MW19D-147.0	MW19D-47.0	MW19D-47.0D	MW19D-52.0	MW19D-67.0	MW19D-67.0FD	MW19D-77.0	MW19D-87.0	MW19D-94.0	MW37D-117.0
		PLT	PLT	PLT	PLT	PLT	PLT	PLT	PLT	PLT	PLT
		9/4/09 12:23	9/1/09 14:10	9/1/09 14:10	9/1/09 14:52	9/1/09 15:25	9/1/09 15:27	9/1/09 16:20	9/1/09 17:37	9/2/09 11:08	8/28/09 11:42
Parameter	Units										
NITROGEN, AMMONIA (AS N)	mg/L	0.186 =	9.2 =		5.52 =	0.63 =	0.664 =	0.337 =	0.413 =	0.338 =	0.297 =
TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE)	mg/L	246 =	280 =		248 =	234 =	254 =	254 =	228 =	250 =	252 =
CHLORIDE (AS CL)	mg/L	4.37 =	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U

		PLT-MW37D	PLT-MW37D	PLT-MW37D	PLT-MW37D	PLT-MW37D	PLT-MW37D	PLT-MW37D	PLT-MW38D	PLT-MW38D	PLT-MW38D
		MW37D-127.0	MW37D-137.0	MW37D-137.0D	MW37D-147.0	MW37D-77.0	MW37D-87.0	MW37D-97.0	MW38D-107.0	MW38D-117.0	MW38D-127.0
		PLT	PLT	PLT	PLT	PLT	PLT	PLT	PLT	PLT	PLT
		8/28/09 12:25	8/28/09 13:11	8/28/09 12:25	8/28/09 13:58	8/28/09 8:45	8/28/09 9:21	8/28/09 10:03	9/10/09 16:50	9/10/09 18:05	9/11/09 9:15
Parameter	Units										
NITROGEN, AMMONIA (AS N)	mg/L	0.217 =	0.231 =		0.154 =	34.6 =	9.39 =	6.99 =	10.6 =	6.32 =	6.58 =
TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE)	mg/L	264 =	268 =		338 =	504 =	332 =	328 =	3730 =	2700 =	3280 =
CHLORIDE (AS CL)	mg/L	2 U	2 U	2 U	2 U	4.73 =	2 U	2 U	1750 =	1190 =	1250 =

		PLT-MW38D	PLT-MW38D	PLT-MW38D	PLT-MW38D	PLT-MW38D	PLT-MW38D	PLT-MW38D	PLT-MW38D	PLT-MW38D	PLT-MW38D
		MW38D-127.0D	MW38D-137.0	MW38D-147.0	MW38D-47.0	MW38D-57.0	MW38D-67.0	MW38D-77.0	MW38D-87.0	MW38D-97.0	MW38D-97.0D
		PLT	PLT	PLT	PLT	PLT	PLT	PLT	PLT	PLT	PLT
		9/11/09 9:15	9/11/09 10:40	9/11/09 11:30	9/9/09 14:45	9/9/09 15:55	9/9/09 16:20	9/10/09 10:40	9/10/09 11:45	9/10/09 15:40	9/10/09 15:40
Parameter	Units										
NITROGEN, AMMONIA (AS N)	mg/L		0.396 =	0.263 =	5.95 =	6.12 =	5.79 =	5.66 =	10.6 =	11.1 =	11 =
TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE)	mg/L		738 =	448 =	2240 =	3070 =	3010 =	3400 =	3700 =	3970 =	
CHLORIDE (AS CL)	mg/L	1530 =	182 =	60.9 =	959 =	1480 =	1710 =	1720 =	1730 =	1750 =	

Parameter	StationID	PLT-MW15D	PLT-MW15D	PLT-MW15D	PLT-MW15D	PLT-MW15D	PLT-MW15D	PLT-MW15D	PLT-MW15D	PLT-MW15D	PLT-MW15D
	SampleID	MW15D-107.0	MW15D-117.0	MW15D-127.0	MW15D-127.0D	MW15D-137.0	MW15D-147.0	MW15D-47.0	MW15D-57.0	MW15D-72.0	MW15D-77.0
	SiteID	PLT	PLT	PLT	PLT	PLT	PLT	PLT	PLT	PLT	PLT
	Date Collected	8/19/09 8:50	8/19/09 10:10	8/19/09 10:59	8/19/09 10:59	8/19/09 13:00	8/19/09 15:20	8/18/09 13:55	8/18/09 14:25	8/18/09 15:10	8/18/09 15:37
Parameter	Units										
		PLT-MW38D	PLT-MW39D	PLT-MW39D	PLT-MW39D	PLT-MW39D	PLT-MW39D	PLT-MW39D	PLT-MW39D	PLT-MW39D	PLT-MW39D
		MW38D-97.0FD	MW39D-103.0	MW39D-103.0FD	MW39D-117.0	MW39D-127.0	MW39D-132.0	MW39D-147.0	MW39D-67.0	MW39D-67.0D	MW39D-77.0
		PLT	PLT	PLT	PLT	PLT	PLT	PLT	PLT	PLT	PLT
Parameter	Units										
		9/10/09 15:45	8/21/09 11:03	8/21/09 11:05	8/24/09 14:05	8/24/09 15:13	8/25/09 8:25	8/25/09 10:45	8/20/09 10:40	8/20/09 10:40	8/20/09 11:28
Parameter	Units										
		11.1 =	8.6 J	8.76 J	0.221 U	5.47 =	5.26 =	7.37 =	12.6 J	11.7 J	8.19 J
		3940 =	3700 J	3620 J	2250 =	2950 =	3070 =	3010 =	3070 J		3640 J
		1790 =	1310 J	1370 J	996 =	1470 =	1330 =	1670 =	1440 J		1430 J

Parameter	Units	PLT-MW39D	PLT-MW39D	PLT-MW40D	PLT-MW40D	PLT-MW40D	PLT-MW40D	PLT-MW40D	PLT-MW40D	PLT-MW40D	PLT-MW40D
		MW39D-87.0	MW39D-97.0	MW40D-107.0	MW40D-107.0D	MW40D-117.0	MW40D-117.0D	MW40D-127.0	MW40D-127.0FD	MW40D-137.0	MW40D-147.0
		PLT	PLT	PLT	PLT	PLT	PLT	PLT	PLT	PLT	PLT
		8/20/09 12:17	8/20/09 15:05	9/15/09 9:20	9/15/09 9:20	9/15/09 10:05	9/15/09 10:05	9/15/09 11:00	9/15/09 11:05	9/15/09 12:05	9/15/09 14:25
Parameter	Units										
		8.39 J	7.92 J	4.77 =		2.51 =	2.48 =	4.55 =	4.96 =	0.343 U	0.293 U
		3780 J	3400 J	398 =		388 =		338 =	370 =	278 =	248 =
		1440 J	1490 J	2.37 =	2.09 =	2.04 =		2.42 =	2.42 =	2.09 =	2 U

Parameter	Units	PLT-MW40D
		MW40D-57.0
		PLT
		9/15/09 7:50
Parameter	Units	
		89.5 =
		4000 =
		1860 =

	StationID	PLT-MW15D	PLT-MW15S	PLT-MW16D	PLT-MW16D	PLT-MW16S	PLT-MW17	PLT-MW19D	PLT-MW19D
	SampleID	PLT-X002	PLT-X001	PLT-X003	PLT-X003D	PLT-X020	PLT-X019	PLT-X005	PLT-X005D
	SiteID	PLT	PLT	PLT	PLT	PLT	PLT	PLT	PLT
	Date Collected	9/22/09 12:35	9/22/09 12:05	9/22/09 14:30	9/22/09 14:30	9/23/09 15:40	9/23/09 12:05	9/22/09 16:35	9/22/09 16:35
Parameter	Units								
NITROGEN, AMMONIA (AS N)	mg/L	4.74 =	7.51 =	4.24 =	4.26 =	4.6 =	0.116 U	0.298 U	
TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE)	mg/L	2530 =	3520 =	344 U		3470 =	400 =	190 U	188 =
CHLORIDE (AS CL)	mg/L	626 =	1670 =	2 U	2.01 =	1380 =	65.2 =	2.15 =	

		PLT-MW19S	PLT-MW19S	PLT-MW37D	PLT-MW37S	PLT-MW38D	PLT-MW38D	PLT-MW38S	PLT-MW39D
		PLT-X022	PLT-X022D	PLT-X004	PLT-X021	PLT-X011	PLT-X012	PLT-X013	PLT-X007
		PLT	PLT	PLT	PLT	PLT	PLT	PLT	PLT
		9/23/09 17:15	9/23/09 17:15	9/22/09 15:25	9/23/09 16:25	9/23/09 8:25	9/23/09 8:30	9/23/09 8:55	9/22/09 17:45
Parameter	Units								
NITROGEN, AMMONIA (AS N)	mg/L	37 =		0.787 U	169 =	10.8 =	10.9 =	4.57 =	5.25 =
TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE)	mg/L	5030 =	5670 =	280 U	2270 =	3270 =	3570 =	2720 =	2540 =
CHLORIDE (AS CL)	mg/L	2070 =		2 U	903 =	1450 =	1410 =	919 =	967 =

		PLT-MW39D	PLT-MW39S	PLT-MW40D	PLT-MW40S
		PLT-X008	PLT-X006	PLT-X010	PLT-X009
		PLT	PLT	PLT	PLT
		9/22/09 17:50	9/22/09 17:15	9/22/09 18:50	9/22/09 18:20
Parameter	Units				
NITROGEN, AMMONIA (AS N)	mg/L	5.13 =	7.94 =	1.98 =	81.9 =
TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE)	mg/L	2680 =	3020 =	452 =	4960 =
CHLORIDE (AS CL)	mg/L	1040 =	1230 =	2 U	1560 =



158 Starlite Drive, Marietta, OH 45750 • T:740-373-4071 • F:740-373-4835 • <http://www.microbac.com>

Laboratory Report Number: L09080461

Please find enclosed the analytical results for the samples you submitted to Microbac Laboratories.

Review and compilation of your report was completed by Microbac's Sales and Service Team. If you have questions, comments or require further assistance regarding this report, please contact your team member noted in the reviewed box below at 800-373-4071. Team member e-mail addresses also appear here for your convenience.

Kathy Albertson	<i>Team Chemist/Data Specialist</i>	kalbertson@microbac.com
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Annie Brown	<i>Client Services Specialist</i>	abrown@microbac.com

This report was reviewed on August 28, 2009.

A handwritten signature in black ink that reads "Kathy Albertson".

Kathy Albertson - Team Chemist/Data Specialist

I certify that all test results meet all of the requirements of the accrediting authority listed below. All results for soil samples are reported on a 'dry-weight' basis unless specified otherwise. Analytical results for water and wastes are reported on a 'as received' basis unless specified otherwise. A statement of uncertainty for each analysis is available upon request. This laboratory report shall not be reproduced, except in full, without the written approval of Microbac Laboratories.

This report was certified on August 28, 2009.

A handwritten signature in black ink that reads "David E. Vandenberg".

David Vandenberg - Managing Director

State of origin: Michigan

Accrediting authority: N/A ID:N/A

QAPP: Microbac OVD

This report contains a total of 93 pages.

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Ohio Valley Division
158 Starlite Drive
Marietta, OH 45750

Phone: 800.373.4071
Fax: 740.373.4835

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Microbac REPORT L09080461
PREPARED FOR CH2MHILL, Inc
WORK ID:

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1.0 Introduction

Microbac Laboratories Inc.
REPORT NARRATIVE

Microbac Login No: L09080461

CHAIN OF CUSTODY: The chain of custody number was 14240

SHIPMENT CONDITIONS: The chain of custody forms were received sealed in a cooler. The cooler temperature was 5 degrees C.

SAMPLE MANAGEMENT: All samples received were intact.

I certify that this data package is in compliance with the terms and conditions agreed to by the client and Microbac Laboratories Inc., both technically and for completeness, except for the conditions noted above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or designated person, as verified by the following signature.

Approved: 21-AUG-09


2.0 Data Package

LABORATORY REPORT

L09080461

08/28/09 09:26

Submitted By

Microbac Laboratories Inc.
158 Starlite Drive
Marietta , OH 45750
(740) 373 - 4071

For

Account Name: CH2MHILL, Inc
CH2MHILL
15010 Conference Center Drive Suite 200
Chantilly, VA 20151
Attention: Michael J. Zamboni

Project Number: 2736.006
Project: MI-Dow Ludington
Site: LUDINGTON, MI

P.O. Number: 933464

Sample Analysis Summary

Client ID	Lab ID	Method	Dilution	Date Received
MW15D-CUTTINGS	L09080461-15	D2216-90	1	20-AUG-09



Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-15**
Client ID: **MW15D-CUTTINGS**
Matrix: **Soil**
Workgroup Number: **WG310270**
Collect Date: **08/19/2009 00:01**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **D2216-90**
Analytical Method: **D2216-90**
Analyst: **CPD**
Dilution: **1**
Units: **weight %**

Instrument: **BAL001**
Prep Date: **08/24/2009 08:58**
Cal Date:
Run Date: **08/24/2009 08:58**
File ID: **B1.310270-0110**

Analyte	CAS. Number	Result	Qual	RL	MDL
Percent Solids	10-02-6	92.0		1.00	1.00

2.1 General Chemistry Data

Microbac Laboratories Inc.
GENERAL CHEMISTRY

Microbac Login No: L09080461

METHOD

Analysis: See report for method reference.

HOLDING TIMES

Sample Preparation: All holding times were met.

Sample Analysis: All holding times were met.

PREPARATION

Sample preparation proceeded normally.

BATCH QA/QC

Method Blank: The associated Chloride soil blank had a result at the reporting limit.

Laboratory Control Sample: All acceptance criteria were met.

Duplicates: All acceptance criteria were met.

Matrix Spikes: The MS/MSD recoveries for Chloride and Ammonia exceeded the advisory limits.

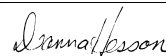
SAMPLES

There were no technical difficulties with the sample group.

I certify that this data package is in compliance with the terms and conditions agreed to by the client and Microbac Laboratories Inc., both technically and for completeness, except for the conditions noted above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or designated person, as verified by the following signature.

Analyst: DIH

Approved: 24-AUG-09



2.1.2 Chloride Data

2.1.2.1 Summary Data

LABORATORY REPORT

L09080461

08/28/09 09:26

Submitted By

Microbac Laboratories Inc.
158 Starlite Drive
Marietta, OH 45750
(740) 373-4071

For

Account Name: CH2MHILL, Inc
CH2MHILL
15010 Conference Center Drive Suite 200
Chantilly, VA 20151
Attention: Michael J. Zamboni

Project Number: 2736.006
Project: MI-Dow Ludington
Site: LUDINGTON, MI

P.O. Number: 933464

Sample Analysis Summary

Client ID	Lab ID	Method	Dilution	Date Received
MW15D-147.0	L09080461-01	325.2	20	20-AUG-09
MW15D-137.0	L09080461-02	325.2	20	20-AUG-09
MW15D-127.0	L09080461-03	325.2	20	20-AUG-09
MW15D-127.0-MS	L09080461-04	325.2	20	20-AUG-09
MW15D-127.0-MSD	L09080461-05	325.2	20	20-AUG-09
MW15D-117.0	L09080461-06	325.2	20	20-AUG-09
MW15D-107.0	L09080461-07	325.2	10	20-AUG-09
MW15D-97.0	L09080461-08	325.2	4	20-AUG-09
MW15D-87.0	L09080461-09	325.2	2	20-AUG-09
MW15D-87.0-FD	L09080461-10	325.2	2	20-AUG-09
MW15D-77.0	L09080461-11	325.2	2	20-AUG-09
MW15D-72.0	L09080461-12	325.2	2	20-AUG-09
MW15D-57.0	L09080461-13	325.2	2	20-AUG-09
MW15D-47.0	L09080461-14	325.2	40	20-AUG-09
MW15D-CUTTINGS	L09080461-15	SM4500-C1	1	20-AUG-09



Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-01**
Client ID: **MW15D-147.0**
Matrix: **Water**
Workgroup Number: **WG310251**
Collect Date: **08/19/2009 15:20**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **DIH**
Dilution: **20**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/21/2009 13:49**
Cal Date: **08/21/2009 13:43**
Run Date: **08/21/2009 13:49**
File ID: **SC090821004.018**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	1090		40.0	20.0

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-02**
Client ID: **MW15D-137.0**
Matrix: **Water**
Workgroup Number: **WG310251**
Collect Date: **08/19/2009 13:00**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **DIH**
Dilution: **20**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/21/2009 13:51**
Cal Date: **08/21/2009 13:42**
Run Date: **08/21/2009 13:51**
File ID: **SC090821004.021**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	954		40.0	20.0

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-03**
Client ID: **MW15D-127.0**
Matrix: **Water**
Workgroup Number: **WG310251**
Collect Date: **08/19/2009 10:59**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **DIH**
Dilution: **20**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/21/2009 13:52**
Cal Date: **08/21/2009 13:43**
Run Date: **08/21/2009 13:52**
File ID: **SC090821004.022**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	1180		40.0	20.0

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-04**
Client ID: **MW15D-127.0-MS**
Matrix: **Water**
Workgroup Number: **WG310251**
Collect Date: **08/19/2009 10:59**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **DIH**
Dilution: **20**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/21/2009 13:53**
Cal Date: **08/21/2009 13:43**
Run Date: **08/21/2009 13:53**
File ID: **SC090821004.024**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	958		40.0	20.0

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-05**
Client ID: **MW15D-127.0-MSD**
Matrix: **Water**
Workgroup Number: **WG310251**
Collect Date: **08/19/2009 10:59**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **DIH**
Dilution: **20**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/21/2009 13:53**
Cal Date: **08/21/2009 13:43**
Run Date: **08/21/2009 13:53**
File ID: **SC090821004.025**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	950		40.0	20.0

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-06**
Client ID: **MW15D-117.0**
Matrix: **Water**
Workgroup Number: **WG310251**
Collect Date: **08/19/2009 10:10**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **DIH**
Dilution: **20**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/21/2009 13:54**
Cal Date: **08/21/2009 13:43**
Run Date: **08/21/2009 13:54**
File ID: **SC090821004.026**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	869		40.0	20.0

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-07**
Client ID: **MW15D-107.0**
Matrix: **Water**
Workgroup Number: **WG310251**
Collect Date: **08/19/2009 08:50**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **DIH**
Dilution: **10**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/21/2009 13:54**
Cal Date: **08/21/2009 13:43**
Run Date: **08/21/2009 13:54**
File ID: **SC090821004.027**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	696		20.0	10.0

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-08**
Client ID: **MW15D-97.0**
Matrix: **Water**
Workgroup Number: **WG310251**
Collect Date: **08/18/2009 17:26**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **DIH**
Dilution: **4**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/21/2009 13:55**
Cal Date: **08/21/2009 13:43**
Run Date: **08/21/2009 13:55**
File ID: **SC090821004.028**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	238		8.00	4.00

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-09**
Client ID: **MW15D-87.0**
Matrix: **Water**
Workgroup Number: **WG310251**
Collect Date: **08/18/2009 16:50**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **DIH**
Dilution: **2**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/21/2009 13:55**
Cal Date: **08/21/2009 13:43**
Run Date: **08/21/2009 13:55**
File ID: **SC090821004.029**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	183		4.00	2.00

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-10**
Client ID: **MW15D-87.0-FD**
Matrix: **Water**
Workgroup Number: **WG310251**
Collect Date: **08/18/2009 16:55**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **DIH**
Dilution: **2**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/21/2009 13:56**
Cal Date: **08/21/2009 13:43**
Run Date: **08/21/2009 13:56**
File ID: **SC090821004.030**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	181		4.00	2.00

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-11**
Client ID: **MW15D-77.0**
Matrix: **Water**
Workgroup Number: **WG310251**
Collect Date: **08/18/2009 15:37**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **DIH**
Dilution: **2**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/21/2009 13:58**
Cal Date: **08/21/2009 13:43**
Run Date: **08/21/2009 13:58**
File ID: **SC090821004.033**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	161		4.00	2.00

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-12**
Client ID: **MW15D-72.0**
Matrix: **Water**
Workgroup Number: **WG310251**
Collect Date: **08/18/2009 15:10**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **DIH**
Dilution: **2**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/21/2009 13:59**
Cal Date: **08/21/2009 13:43**
Run Date: **08/21/2009 13:59**
File ID: **SC090821004.034**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	137		4.00	2.00

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-13**
Client ID: **MW15D-57.0**
Matrix: **Water**
Workgroup Number: **WG310251**
Collect Date: **08/18/2009 14:25**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **DIH**
Dilution: **2**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/21/2009 13:59**
Cal Date: **08/21/2009 13:43**
Run Date: **08/21/2009 13:59**
File ID: **SC090821004.035**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	71.4		4.00	2.00

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-14**
Client ID: **MW15D-47.0**
Matrix: **Water**
Workgroup Number: **WG310251**
Collect Date: **08/18/2009 13:55**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **DIH**
Dilution: **40**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/21/2009 14:00**
Cal Date: **08/21/2009 13:43**
Run Date: **08/21/2009 14:00**
File ID: **SC090821004.036**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	1830		80.0	40.0

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-15**
Client ID: **MW15D-CUTTINGS**
Matrix: **Soil**
Workgroup Number: **WG310261**
Collect Date: **08/19/2009 00:01**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **SM4500-Cl(-)-E-2**
Analytical Method: **SM4500-Cl(-)-E-2**
Analyst: **DIH**
Dilution: **1**
Units: **mg/kg**

Instrument: **SMARTCHEM**
Prep Date: **08/21/2009 09:10**
Cal Date: **08/21/2009 13:43**
Run Date: **08/21/2009 14:02**
File ID: **SC090821004.040**
Percent Solid: **92.0**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride, Leachable	16887-00-6	114		22.0	11.0

15 of 15



2.1.2.2 QC Summary Data

METHOD BLANK SUMMARY

Login Number: L09080461
 Blank File ID: SC090821004.010
 Prep Date: 08/21/09 13:44
 Analyzed Date: 08/21/09 13:44
 Analyst: DIH

Work Group: WG310251
 Blank Sample ID: WG310251-01
 Instrument ID: SMARTCHEM
 Method: 325.2

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG310251-02	SC090821004.011	08/21/09 13:45	01
LCS2	WG310251-03	SC090821004.012	08/21/09 13:46	01
MW15D-147.0	L09080461-01	SC090821004.018	08/21/09 13:49	DL01
MW15D-137.0	L09080461-02	SC090821004.021	08/21/09 13:51	DL01
MW15D-127.0	L09080461-03	SC090821004.022	08/21/09 13:52	DL01
DUP	WG310251-05	SC090821004.023	08/21/09 13:52	DL01
MW15D-127.0-MS	L09080461-04	SC090821004.024	08/21/09 13:53	DL01
MW15D-127.0-MSD	L09080461-05	SC090821004.025	08/21/09 13:53	DL01
MW15D-117.0	L09080461-06	SC090821004.026	08/21/09 13:54	DL01
MW15D-107.0	L09080461-07	SC090821004.027	08/21/09 13:54	DL01
MW15D-97.0	L09080461-08	SC090821004.028	08/21/09 13:55	DL01
MW15D-87.0	L09080461-09	SC090821004.029	08/21/09 13:55	DL01
MW15D-87.0-FD	L09080461-10	SC090821004.030	08/21/09 13:56	DL01
MW15D-77.0	L09080461-11	SC090821004.033	08/21/09 13:58	DL01
MW15D-72.0	L09080461-12	SC090821004.034	08/21/09 13:59	DL01
MW15D-57.0	L09080461-13	SC090821004.035	08/21/09 13:59	DL01
MW15D-47.0	L09080461-14	SC090821004.036	08/21/09 14:00	DL01



METHOD BLANK SUMMARY

Login Number: L09080461
Blank File ID: SC090821004.037
Prep Date: 08/21/09 09:10
Analyzed Date: 08/21/09 14:00
Analyst: DIH

Work Group: WG310261
Blank Sample ID: WG310261-01
Instrument ID: SMARTCHEM
Method: SM4500-Cl(-)-E-2

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG310261-02	SC090821004.038	08/21/09 14:01	01
LCS2	WG310261-03	SC090821004.039	08/21/09 14:01	01
MW15D-CUTTINGS	L09080461-15	SC090821004.040	08/21/09 14:02	01
DUP	WG310261-05	SC090821004.041	08/21/09 14:03	01



Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L09080461 Prep Date: 08/21/09 13:44 Sample ID: WG310251-01
Instrument ID: SMARTCHEM Run Date: 08/21/09 13:44 Prep Method: 325.2
File ID: SC090821004.010 Analyst: DIH Method: 325.2
Workgroup (AAB#): WG310251 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: SMARTC - 21-AUG-09

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Chloride	1.00	2.00	2.00	1	ND

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1472037

24-AUG-2009 10:46



Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L09080461 Prep Date: 08/21/09 09:10 Sample ID: WG310261-01
Instrument ID: SMARTCHEM Run Date: 08/21/09 14:00 Prep Method: SM4500-Cl(-)-E-
File ID: SC090821004.037 Analyst: DIH Method: SM4500-Cl(-)-E-
Workgroup (AAB#): WG310261 Matrix: Soil Units: mg/kg
Contract #: _____ Cal ID: SMARTC - 21-AUG-09

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Chloride, Leachable	10.0	20.0	20.0	1	*

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1472037

24-AUG-2009 10:46



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09080461 Analyst: DIH Prep Method: 325.2
Instrument ID: SMARTCHEM Matrix: Water Method: 325.2
Workgroup (AAB#): WG310251 Units: mg/L
QC Key: DOWBOA2006 Lot #: STD34512
Sample ID: WG310251-02 LCS File ID: SC090821004.011 Run Date: 08/21/2009 13:45
Sample ID: WG310251-03 LCS2 File ID: SC090821004.012 Run Date: 08/21/2009 13:46

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Chloride	50.0	49.4	98.8	50.0	51.4	103	3.92	90 - 110	10	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 1472038
Report generated: 08/24/2009 10:45



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09080461 Analyst: DIH Prep Method: SM4500-Cl(-)-E-
 Instrument ID: SMARTCHEM Matrix: Soil Method: SM4500-Cl(-)-E-
 Workgroup (AAB#): WG310261 Units: mg/kg
 QC Key: DOWBOA2006 Lot #: STD33071
 Sample ID: WG310261-02 LCS File ID: SC090821004.038 Run Date: 08/21/2009 14:01
 Sample ID: WG310261-03 LCS2 File ID: SC090821004.039 Run Date: 08/21/2009 14:01

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Chloride, Leachable	500	537	107	500	521	104	3.06	80 - 120	50	

LCS_LCS2 - Modified 03/06/2008
 PDF File ID: 1472038
 Report generated: 08/24/2009 10:45



MS/MSD REPORT

Loginnum: L09080461 Cal ID: SMARTCHEM- 21-AUG-09
 Instrument ID: SMARTCHEM Contract #: _____
 Parent ID: L09080461-03 File ID: SC090821004.022 Dil: 20
 Sample ID: L09080461-04 MS File ID: SC090821004.024 Dil: 20
 Sample ID: L09080461-05 MSD File ID: SC090821004.025 Dil: 20

Worknum: WG310251
 Prep Method: 325.2
 Method: 325.2
 Matrix: Water
 Units: mg/L

Analyte	Parent	MS Spiked	MS Found	MS %Rec	MSD Spiked	MSD Found	MSD %Rec	%RPD	%Rec Limits	RPD Limit	Q
Chloride	1180	20.0	958	-1090	20.0	950	-1130	0.834	90 - 110	10	*

* FAILS %REC LIMIT

FAILS RPD LIMIT

2.1.3 Ammonia Data

2.1.3.1 Summary Data

LABORATORY REPORT

L09080461

08/28/09 09:26

Submitted By

Microbac Laboratories Inc.
158 Starlite Drive
Marietta, OH 45750
(740) 373-4071

For

Account Name: CH2MHILL, Inc
CH2MHILL
15010 Conference Center Drive Suite 200
Chantilly, VA 20151
Attention: Michael J. Zamboni

Project Number: 2736.006
Project: MI-Dow Ludington
Site: LUDINGTON, MI

P.O. Number: 933464

Sample Analysis Summary

Client ID	Lab ID	Method	Dilution	Date Received
MW15D-147.0	L09080461-01	350.1	1	20-AUG-09
MW15D-137.0	L09080461-02	350.1	1	20-AUG-09
MW15D-127.0	L09080461-03	350.1	1	20-AUG-09
MW15D-127.0-MS	L09080461-04	350.1	1	20-AUG-09
MW15D-127.0-MSD	L09080461-05	350.1	1	20-AUG-09
MW15D-117.0	L09080461-06	350.1	2	20-AUG-09
MW15D-107.0	L09080461-07	350.1	2	20-AUG-09
MW15D-97.0	L09080461-08	350.1	1	20-AUG-09
MW15D-87.0	L09080461-09	350.1	1	20-AUG-09
MW15D-87.0-FD	L09080461-10	350.1	1	20-AUG-09
MW15D-77.0	L09080461-11	350.1	1	20-AUG-09
MW15D-72.0	L09080461-12	350.1	1	20-AUG-09
MW15D-57.0	L09080461-13	350.1	1	20-AUG-09
MW15D-47.0	L09080461-14	350.1	5	20-AUG-09



Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-01**
Client ID: **MW15D-147.0**
Matrix: **Water**
Workgroup Number: **WG310558**
Collect Date: **08/19/2009 15:20**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/26/2009 09:47**
Cal Date: **08/26/2009 09:34**
Run Date: **08/26/2009 09:47**
File ID: **SC090826001.020**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	2.99		0.100	0.0500

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-02**
Client ID: **MW15D-137.0**
Matrix: **Water**
Workgroup Number: **WG310558**
Collect Date: **08/19/2009 13:00**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/26/2009 09:47**
Cal Date: **08/26/2009 09:34**
Run Date: **08/26/2009 09:47**
File ID: **SC090826001.021**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	1.59		0.100	0.0500

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-03**
Client ID: **MW15D-127.0**
Matrix: **Water**
Workgroup Number: **WG310558**
Collect Date: **08/19/2009 10:59**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/26/2009 09:48**
Cal Date: **08/26/2009 09:34**
Run Date: **08/26/2009 09:48**
File ID: **SC090826001.022**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	2.26		0.100	0.0500

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-04**
Client ID: **MW15D-127.0-MS**
Matrix: **Water**
Workgroup Number: **WG310558**
Collect Date: **08/19/2009 10:59**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/26/2009 09:49**
Cal Date: **08/26/2009 09:34**
Run Date: **08/26/2009 09:49**
File ID: **SC090826001.023**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	3.00		0.100	0.0500

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-05**
Client ID: **MW15D-127.0-MSD**
Matrix: **Water**
Workgroup Number: **WG310558**
Collect Date: **08/19/2009 10:59**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/26/2009 09:50**
Cal Date: **08/26/2009 09:34**
Run Date: **08/26/2009 09:50**
File ID: **SC090826001.024**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	2.77		0.100	0.0500

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-06**
Client ID: **MW15D-117.0**
Matrix: **Water**
Workgroup Number: **WG310558**
Collect Date: **08/19/2009 10:10**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **2**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/26/2009 10:39**
Cal Date: **08/26/2009 09:34**
Run Date: **08/26/2009 10:39**
File ID: **SC090826001.066**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	4.03		0.200	0.100

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-07**
Client ID: **MW15D-107.0**
Matrix: **Water**
Workgroup Number: **WG310558**
Collect Date: **08/19/2009 08:50**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **2**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/26/2009 10:41**
Cal Date: **08/26/2009 09:34**
Run Date: **08/26/2009 10:41**
File ID: **SC090826001.067**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	4.94		0.200	0.100

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-08**
Client ID: **MW15D-97.0**
Matrix: **Water**
Workgroup Number: **WG310558**
Collect Date: **08/18/2009 17:26**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/26/2009 09:52**
Cal Date: **08/26/2009 09:34**
Run Date: **08/26/2009 09:52**
File ID: **SC090826001.027**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	0.732		0.100	0.0500

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-09**
Client ID: **MW15D-87.0**
Matrix: **Water**
Workgroup Number: **WG310558**
Collect Date: **08/18/2009 16:50**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/26/2009 09:54**
Cal Date: **08/26/2009 09:34**
Run Date: **08/26/2009 09:54**
File ID: **SC090826001.028**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	0.215		0.100	0.0500

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-10**
Client ID: **MW15D-87.0-FD**
Matrix: **Water**
Workgroup Number: **WG310558**
Collect Date: **08/18/2009 16:55**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/26/2009 09:54**
Cal Date: **08/26/2009 09:34**
Run Date: **08/26/2009 09:54**
File ID: **SC090826001.029**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	0.285		0.100	0.0500

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-11**
Client ID: **MW15D-77.0**
Matrix: **Water**
Workgroup Number: **WG310558**
Collect Date: **08/18/2009 15:37**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/26/2009 09:57**
Cal Date: **08/26/2009 09:34**
Run Date: **08/26/2009 09:57**
File ID: **SC090826001.032**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	0.318		0.100	0.0500

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-12**
Client ID: **MW15D-72.0**
Matrix: **Water**
Workgroup Number: **WG310558**
Collect Date: **08/18/2009 15:10**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/26/2009 09:58**
Cal Date: **08/26/2009 09:34**
Run Date: **08/26/2009 09:58**
File ID: **SC090826001.033**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	0.331		0.100	0.0500

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-13**
Client ID: **MW15D-57.0**
Matrix: **Water**
Workgroup Number: **WG310558**
Collect Date: **08/18/2009 14:25**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/26/2009 09:59**
Cal Date: **08/26/2009 09:34**
Run Date: **08/26/2009 09:59**
File ID: **SC090826001.034**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	0.292		0.100	0.0500

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-14**
Client ID: **MW15D-47.0**
Matrix: **Water**
Workgroup Number: **WG310558**
Collect Date: **08/18/2009 13:55**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **5**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/26/2009 11:12**
Cal Date: **08/26/2009 09:34**
Run Date: **08/26/2009 11:12**
File ID: **SC090826001.081**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	8.59		0.500	0.250

2.1.3.2 QC Summary Data

METHOD BLANK SUMMARY

Login Number: L09080461
 Blank File ID: SC090826001.009
 Prep Date: 08/26/09 09:36
 Analyzed Date: 08/26/09 09:36
 Analyst: JBK

Work Group: WG310558
 Blank Sample ID: WG310558-01
 Instrument ID: SMARTCHEM
 Method: 350.1

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG310558-02	SC090826001.010	08/26/09 09:38	01
MW15D-147.0	L09080461-01	SC090826001.020	08/26/09 09:47	01
MW15D-137.0	L09080461-02	SC090826001.021	08/26/09 09:47	01
MW15D-127.0	L09080461-03	SC090826001.022	08/26/09 09:48	01
MW15D-127.0-MS	L09080461-04	SC090826001.023	08/26/09 09:49	01
MW15D-127.0-MSD	L09080461-05	SC090826001.024	08/26/09 09:50	01
MW15D-97.0	L09080461-08	SC090826001.027	08/26/09 09:52	01
MW15D-87.0	L09080461-09	SC090826001.028	08/26/09 09:54	01
MW15D-87.0-FD	L09080461-10	SC090826001.029	08/26/09 09:54	01
MW15D-77.0	L09080461-11	SC090826001.032	08/26/09 09:57	01
MW15D-72.0	L09080461-12	SC090826001.033	08/26/09 09:58	01
MW15D-57.0	L09080461-13	SC090826001.034	08/26/09 09:59	01
DUP	WG310558-05	SC090826001.036	08/26/09 10:01	01
MW15D-117.0	L09080461-06	SC090826001.066	08/26/09 10:39	DL01
MW15D-107.0	L09080461-07	SC090826001.067	08/26/09 10:41	DL01
MW15D-47.0	L09080461-14	SC090826001.081	08/26/09 11:12	DL01



Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L09080461 Prep Date: 08/26/09 09:36 Sample ID: WG310558-01
Instrument ID: SMARTCHEM Run Date: 08/26/09 09:36 Prep Method: 350.1
File ID: SC090826001.009 Analyst: JBK Method: 350.1
Workgroup (AAB#): WG310558 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: SMARTC - 26-AUG-09

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Nitrogen, Ammonia	0.0500	0.100	-0.0647	1	ND

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1475243

27-AUG-2009 11:48



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09080461 Run Date: 08/26/2009 Sample ID: WG310558-02
Instrument ID: SMARTCHEM Run Time: 09:38 Prep Method: 350.1
File ID: SC090826001.010 Analyst: JBK Method: 350.1
Workgroup (AAB#): WG310558 Matrix: Water Units: mg/L
QC Key: DOWBOA2006 Lot#: STD33211 Cal ID: SMARTC - 26-AUG-09

Analytes	Expected	Found	% Rec	LCS Limits	Q
Nitrogen, Ammonia	2.00	1.88	94.2	90 - 110	

LCS - Modified 03/06/2008
PDF File ID: 1475244
Report generated: 08/27/2009 11:48



MS/MSD REPORT

Loginnum: L09080461 Cal ID: SMARTCHEM- 26-AUG-09
 Instrument ID: SMARTCHEM Contract #: _____
 Parent ID: L09080461-03 File ID: SC090826001.022 Dil: 1
 Sample ID: L09080461-04 MS File ID: SC090826001.023 Dil: 1
 Sample ID: L09080461-05 MSD File ID: SC090826001.024 Dil: 1

Worknum: WG310558
 Prep Method: 350.1
 Method: 350.1
 Matrix: Water
 Units: mg/L

Analyte	Parent	MS Spiked	MS Found	MS %Rec	MSD Spiked	MSD Found	MSD %Rec	%RPD	%Rec Limits	RPD Limit	Q
Nitrogen, Ammonia	2.26	1.00	3.00	74.1	1.00	2.77	51.1	7.98	70 - 125	25	*

* FAILS %REC LIMIT

FAILS RPD LIMIT

2.1.4 Total Dissolved Solids Data

2.1.4.1 Summary Data

LABORATORY REPORT

L09080461

08/28/09 09:26

Submitted By

Microbac Laboratories Inc.
158 Starlite Drive
Marietta, OH 45750
(740) 373-4071

For

Account Name: CH2MHILL, Inc
CH2MHILL
15010 Conference Center Drive Suite 200
Chantilly, VA 20151
Attention: Michael J. Zamboni

Project Number: 2736.006
Project: MI-Dow Ludington
Site: LUDINGTON, MI

P.O. Number: 933464

Sample Analysis Summary

Client ID	Lab ID	Method	Dilution	Date Received
MW15D-147.0	L09080461-01	160.1	1	20-AUG-09
MW15D-137.0	L09080461-02	160.1	1	20-AUG-09
MW15D-127.0	L09080461-03	160.1	1	20-AUG-09
MW15D-127.0-MS	L09080461-04	160.1	1	20-AUG-09
MW15D-127.0-MSD	L09080461-05	160.1	1	20-AUG-09
MW15D-117.0	L09080461-06	160.1	1	20-AUG-09
MW15D-107.0	L09080461-07	160.1	1	20-AUG-09
MW15D-97.0	L09080461-08	160.1	1	20-AUG-09
MW15D-87.0	L09080461-09	160.1	1	20-AUG-09
MW15D-87.0-FD	L09080461-10	160.1	1	20-AUG-09
MW15D-77.0	L09080461-11	160.1	1	20-AUG-09
MW15D-72.0	L09080461-12	160.1	1	20-AUG-09
MW15D-57.0	L09080461-13	160.1	1	20-AUG-09
MW15D-47.0	L09080461-14	160.1	1	20-AUG-09



Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-01**
Client ID: **MW15D-147.0**
Matrix: **Water**
Workgroup Number: **WG310207**
Collect Date: **08/19/2009 15:20**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/20/2009 14:15**
Cal Date:
Run Date: **08/20/2009 14:15**
File ID: **EN.0908201415-18**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		2910		20.0	10.0

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-02**
Client ID: **MW15D-137.0**
Matrix: **Water**
Workgroup Number: **WG310207**
Collect Date: **08/19/2009 13:00**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/20/2009 14:15**
Cal Date:
Run Date: **08/20/2009 14:15**
File ID: **EN.0908201415-17**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		3300		20.0	10.0

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-03**
Client ID: **MW15D-127.0**
Matrix: **Water**
Workgroup Number: **WG310207**
Collect Date: **08/19/2009 10:59**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/20/2009 14:15**
Cal Date:
Run Date: **08/20/2009 14:15**
File ID: **EN.0908201415-14**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		2650		20.0	10.0

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-04**
Client ID: **MW15D-127.0-MS**
Matrix: **Water**
Workgroup Number: **WG310207**
Collect Date: **08/19/2009 10:59**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/20/2009 14:15**
Cal Date:
Run Date: **08/20/2009 14:15**
File ID: **EN.0908201415-15**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		3150		20.0	10.0

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-05**
Client ID: **MW15D-127.0-MSD**
Matrix: **Water**
Workgroup Number: **WG310207**
Collect Date: **08/19/2009 10:59**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/20/2009 14:15**
Cal Date:
Run Date: **08/20/2009 14:15**
File ID: **EN.0908201415-16**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		3150		20.0	10.0

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-06**
Client ID: **MW15D-117.0**
Matrix: **Water**
Workgroup Number: **WG310207**
Collect Date: **08/19/2009 10:10**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/20/2009 14:15**
Cal Date:
Run Date: **08/20/2009 14:15**
File ID: **EN.0908201415-13**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		3060		20.0	10.0

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-07**
Client ID: **MW15D-107.0**
Matrix: **Water**
Workgroup Number: **WG310207**
Collect Date: **08/19/2009 08:50**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/20/2009 14:15**
Cal Date:
Run Date: **08/20/2009 14:15**
File ID: **EN.0908201415-12**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		2370		20.0	10.0

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-08**
Client ID: **MW15D-97.0**
Matrix: **Water**
Workgroup Number: **WG310207**
Collect Date: **08/18/2009 17:26**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/20/2009 14:15**
Cal Date:
Run Date: **08/20/2009 14:15**
File ID: **EN.0908201415-11**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		754		20.0	10.0

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-09**
Client ID: **MW15D-87.0**
Matrix: **Water**
Workgroup Number: **WG310207**
Collect Date: **08/18/2009 16:50**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/20/2009 14:15**
Cal Date:
Run Date: **08/20/2009 14:15**
File ID: **EN.0908201415-09**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		666		20.0	10.0

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-10**
Client ID: **MW15D-87.0-FD**
Matrix: **Water**
Workgroup Number: **WG310207**
Collect Date: **08/18/2009 16:55**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/20/2009 14:15**
Cal Date:
Run Date: **08/20/2009 14:15**
File ID: **EN.0908201415-10**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		804		20.0	10.0

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-11**
Client ID: **MW15D-77.0**
Matrix: **Water**
Workgroup Number: **WG310207**
Collect Date: **08/18/2009 15:37**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/20/2009 14:15**
Cal Date:
Run Date: **08/20/2009 14:15**
File ID: **EN.0908201415-08**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		544		20.0	10.0

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-12**
Client ID: **MW15D-72.0**
Matrix: **Water**
Workgroup Number: **WG310207**
Collect Date: **08/18/2009 15:10**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/20/2009 14:15**
Cal Date:
Run Date: **08/20/2009 14:15**
File ID: **EN.0908201415-07**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		448		20.0	10.0

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-13**
Client ID: **MW15D-57.0**
Matrix: **Water**
Workgroup Number: **WG310207**
Collect Date: **08/18/2009 14:25**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/20/2009 14:15**
Cal Date:
Run Date: **08/20/2009 14:15**
File ID: **EN.0908201415-06**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		656		20.0	10.0

Report Number: **L09080461**Report Date : **August 28, 2009**

Sample Number: **L09080461-14**
Client ID: **MW15D-47.0**
Matrix: **Water**
Workgroup Number: **WG310207**
Collect Date: **08/18/2009 13:55**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/20/2009 14:15**
Cal Date:
Run Date: **08/20/2009 14:15**
File ID: **EN.0908201415-05**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		4000		20.0	10.0

2.1.4.2 QC Summary Data

METHOD BLANK SUMMARY

Login Number: L09080461
 Blank File ID: EN.0908201415-01
 Prep Date: 08/20/09 14:15
 Analyzed Date: 08/20/09 14:15
 Analyst: HJR

Work Group: WG310207
 Blank Sample ID: WG310207-01
 Instrument ID: OVEN
 Method: 160.1

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG310207-02	EN.0908201415-02	08/20/09 14:15	
LCS2	WG310207-03	EN.0908201415-03	08/20/09 14:15	
MW15D-47.0	L09080461-14	EN.0908201415-05	08/20/09 14:15	
MW15D-57.0	L09080461-13	EN.0908201415-06	08/20/09 14:15	
MW15D-72.0	L09080461-12	EN.0908201415-07	08/20/09 14:15	
MW15D-77.0	L09080461-11	EN.0908201415-08	08/20/09 14:15	
MW15D-87.0	L09080461-09	EN.0908201415-09	08/20/09 14:15	
MW15D-87.0-FD	L09080461-10	EN.0908201415-10	08/20/09 14:15	
MW15D-97.0	L09080461-08	EN.0908201415-11	08/20/09 14:15	
MW15D-107.0	L09080461-07	EN.0908201415-12	08/20/09 14:15	
MW15D-117.0	L09080461-06	EN.0908201415-13	08/20/09 14:15	
MW15D-127.0	L09080461-03	EN.0908201415-14	08/20/09 14:15	
MW15D-127.0-MS	L09080461-04	EN.0908201415-15	08/20/09 14:15	
MW15D-127.0-MSD	L09080461-05	EN.0908201415-16	08/20/09 14:15	
MW15D-137.0	L09080461-02	EN.0908201415-17	08/20/09 14:15	
MW15D-147.0	L09080461-01	EN.0908201415-18	08/20/09 14:15	
DUP	WG310207-05	EN.0908201415-19	08/20/09 14:15	



Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L09080461 Prep Date: 08/20/09 14:15 Sample ID: WG310207-01
Instrument ID: OVEN Run Date: 08/20/09 14:15 Prep Method: 160.1
File ID: EN.0908201415-01 Analyst: HJR Method: 160.1
Workgroup (AAB#): WG310207 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: OVEN -

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Total Dissolved Solids	5.00	10.0	10.0	1	ND

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1472640

24-AUG-2009 15:13



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09080461 Analyst: HJR Prep Method: 160.1
Instrument ID: OVEN Matrix: Water Method: 160.1
Workgroup (AAB#): WG310207 Units: mg/L
QC Key: DOWB0A2006 Lot #: STD32441
Sample ID: WG310207-02 LCS File ID: EN.0908201415-02 Run Date: 08/20/2009 14:15
Sample ID: WG310207-03 LCS2 File ID: EN.0908201415-03 Run Date: 08/20/2009 14:15

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Total Dissolved Solids	500	492	98.4	500	486	97.2	1.23	80 - 120	25	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 1472641
Report generated: 08/24/2009 15:13



MS/MSD REPORT

Loginnum: L09080461 Cal ID: OVEN-
 Instrument ID: OVEN Contract #: _____
 Parent ID: L09080461-03 File ID: EN.0908201415-14 Dil: 1
 Sample ID: L09080461-04 MS File ID: EN.0908201415-15 Dil: 1
 Sample ID: L09080461-05 MSD File ID: EN.0908201415-16 Dil: 1

Worknum: WG310207
 Prep Method: 160.1
 Method: 160.1
 Matrix: Water
 Units: mg/L

Analyte	Parent	MS Spiked	MS Found	MS %Rec	MSD Spiked	MSD Found	MSD %Rec	%RPD	%Rec Limits	RPD Limit	Q
Total Dissolved Solids	2650	500	3150	99.2	500	3150	99.2	0	80 - 120	25	

* FAILS %REC LIMIT

FAILS RPD LIMIT

3.0 Attachments

Microbac Laboratories Inc.
Analyst Listing
August 28, 2009

ADC - ANTHONY D. CANTER	AJF - AMANDA J. FICKIESEN	AJM - ANTHONY J. MOSSBURG
ALB - ANNIE L. BROWN	AML - ANTHONY M. LONG	BLG - BRENDA L. GREENWALT
BRG - BRENDA R. GREGORY	CAA - CASSIE A. AUGENSTEIN	CAF - CHERYL A. FLOWERS
CAH - CHARLES A. HALL	CEB - CHAD E. BARNES	CLC - CHRYS L. CRAWFORD
CLW - CHARISSA L. WINTERS	CPD - CHAD P. DAVIS	CSH - CHRIS S. HILL
DDE - DEBRA D. ELLIOTT	DEL - DON E. LIGHTFRITZ	DEV - DAVID E. VANDENBERG
DGB - DOUGLAS G. BUTCHER	DIH - DEANNA I. HESSON	DLB - DAVID L. BUMGARNER
DLP - DOROTHY L. PAYNE	DLR - DIANNA L. RAUCH	DR - DEANNA ROBERTS
ECL - ERIC C. LAWSON	EDA - ERIN D. AGEE	ERP - ERIN R. PORTER
FJB - FRANCES J. BOLDEN	HAV - HEMA VILASAGAR	HJR - HOLLY J. REED
JBK - JEREMY B. KINNEY	JDH - JUSTIN D. HESSON	JKT - JANE K. THOMPSON
JWR - JOHN W. RICHARDS	JWS - JACK W. SHEAVES	JYH - JI Y. HU
KEB - KATHRYN E. BARNES	KHR - KIM H. RHODES	KRA - KATHY R. ALBERTSON
LKN - LINDA K. NEDEFF	LSB - LESLIE S. BUCINA	MDA - MIKE D. ALBERTSON
MDC - MICHAEL D. COCHRAN	MES - MARY E. SCHILLING	MMB - MAREN M. BEERY
MRT - MICHELLE R. TAYLOR	MSW - MATT S. WILSON	NPM - NATHANIEL P. MILLER
PDM - PIERCE D. MORRIS	RAH - ROY A. HALSTEAD	RB - ROBERT BUCHANAN
REK - ROBERT E. KYER	RLK - ROBIN L. KLINGER	RWC - RODNEY W. CAMPBELL
SDH - SHANA D. HINYARD	SLM - STEPHANIE L. MOSSBURG	SLP - SHERI L. PFALZGRAF
TIP - TAE I. PARRISH	TMB - TIFFANY M. BAILEY	TMM - TAMMY M. MORRIS
VC - VICKI COLLIER	WTD - WADE T. DELONG	

August 28, 2009

Qualkey: STD

Qualifier	Description
*	Surrogate or spike compound out of range
+	Correlation coefficient for the MSA is less than 0.995
<	Result is less than the associated numerical value.
>	Result is greater than the associated numerical value.
A	See the report narrative
B	Analyte present in method blank
B1	Target analyte detected in method blank at or above the method reporting limit
B3	Target analyte detected in calibration blank at or above the method reporting limit
C	Confirmed by GC/MS
CG	Confluent growth
DL	Surrogate or spike compound was diluted out
E	Estimated concentration due to sample matrix interference
EDL	Elevated sample reporting limits, presence of non-target analytes
EMPC	Estimated Maximum Possible Concentration
F, S	Estimated result below quantitation limit; method of standard additions(MSA)
FL	Free Liquid
H1	Sample analysis performed past holding time.
I	Semiquantitative result (out of instrument calibration range)
J	The analyte was positively identified, but the quantitation was below the RL
J,B	Analyte detected in both the method blank and sample above the MDL.
J,P	Estimate; columns don't agree to within 40%
J,S	Estimated concentration; analyzed by method of standard addition (MSA)
L	Sample reporting limits elevated due to matrix interference
L1	The associated blank spike (LCS) recovery was above the laboratory acceptance limits.
L2	The associated blank spike (LCS) recovery was below the laboratory acceptance limits.
M	Matrix effect; the concentration is an estimate due to matrix effect.
N	Tentatively identified compound(TIC)
NA	Not applicable
ND	Not detected at or above the reporting limit (RL).
ND, L	Not detected; sample reporting limit (RL) elevated due to interference
ND, S	Not detected; analyzed by method of standard addition (MSA)
NF	Not found by library search
NFL	No free liquid
NI	Non-ignitable
NR	Analyte is not required to be analyzed
NS	Not spiked
P	Concentrations >40% difference between the two GC columns
Q	One or more quality control criteria fail. See narrative.
QNS	Quantity of sample not sufficient to perform analysis
RA	Reanalysis confirms reported results
RE	Reanalysis confirms sample matrix interference
S	Analyzed by method of standard addition (MSA)
SMI	Sample matrix interference on surrogate
SP	Reported results are for spike compounds only
TIC	Library Search Compound
TNTC	Too numerous to count
U	Undetected; the concentration is below the reported MDL.
UJ	Undetected; the MDL and RL are estimated due to quality control discrepancies.
W	Post-digestion spike for furnace AA out of control limits
X	Exceeds regulatory limit
X, S	Exceeds regulatory limit; method of standard additions (MSA)
Z	Cannot be resolved from isomer - see below

*****Special Notes for Organic Analytes**

1. Acrolein and acrylonitrile by method 624 are semi-quantitative screens only.
2. 1,2-Diphenylhydrazine is unstable and is reported as azobenzene.
3. N-nitrosodiphenylamine cannot be separated from diphenylamine.
4. 3-Methylphenol and 4-Methylphenol are unresolvable compounds.
5. m-Xylene and p-Xylene are unresolvable compounds.
6. The reporting limits for Appendix II/IX compounds by method 8270 are based on EPA estimated PQLs referenced in 40 CFR Part 264, Appendix IX. They are not always achievable for every compound and are matrix dependent.



1000001197

COOLER INSPECTION



Received: 08/20/2009 09:38
Delivery Method: UPS
Opened By: Erin R Porter
Comments:

Login(s): L09080461

Cooler(s)

Cooler #	Temp Gun	Temp	Tracking #	COC #	Comments
0013687	G	5.0	J2029837829	COC14240	

1	Yes	Were shipping coolers sealed?
2	Yes	Were custody seals intact?
3	Yes	Were cooler temperatures in range of 0-6?
4	Yes	Was ice present?
5	Yes	Were COC's received/information complete/signed and dated?
6	Yes	Were sample containers and labels intact and match COC?
7	Yes	Were the correct containers and volumes received?
8	Yes	Were correct preservatives used? (water only)
9	Yes	Were pH ranges acceptable? (voa's excluded)
10	NA	Were VOA samples free of headspace (<6mm)?
11	Yes	Were samples received within EPA hold times?

Look closer. Go further. Do more.

Microbac - Ohio Valley Division
158 Starlite Drive
Marietta, OH 45750
Tel: (740)373-4071 Fax: (740)373-4835

Internal Chain of Custody Report

Login: L09080461

Account: 2736

Project: 2736.006

Samples: 15

Due Date: 03-SEP-2009

Samplenum **Container ID** **Products**
L09080461-01 608119 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	20-AUG-2009 15:48	RLK	
2	ANALYZ	W1	WET	21-AUG-2009 09:46	HJR	JKT
3	STORE	WET	A2	24-AUG-2009 12:59	JKT	DIH

Samplenum **Container ID** **Products**
L09080461-01 608120 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	20-AUG-2009 15:48	RLK	
2	ANALYZ	W1	WET	25-AUG-2009 08:26	DLP	JKT
3	STORE	WET	A2	26-AUG-2009 08:07	JKT	DLP

Samplenum **Container ID** **Products**
L09080461-02 608121 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	20-AUG-2009 15:48	RLK	
2	ANALYZ	W1	WET	21-AUG-2009 09:46	HJR	JKT
3	STORE	WET	A2	24-AUG-2009 12:59	JKT	DIH

Samplenum **Container ID** **Products**
L09080461-02 608122 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	20-AUG-2009 15:48	RLK	
2	ANALYZ	W1	WET	25-AUG-2009 08:26	DLP	JKT
3	STORE	WET	A2	26-AUG-2009 08:07	JKT	DLP

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09080461

Account: 2736

Project: 2736.006

Samples: 15

Due Date: 03-SEP-2009

Samplenum **Container ID** **Products**
L09080461-03 608123 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	20-AUG-2009 15:48	RLK	
2	ANALYZ	W1	WET	21-AUG-2009 09:46	HJR	JKT
3	STORE	WET	A2	24-AUG-2009 12:59	JKT	DIH

Samplenum **Container ID** **Products**
L09080461-03 608124 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	20-AUG-2009 15:48	RLK	
2	ANALYZ	W1	WET	25-AUG-2009 08:26	DLP	JKT
3	STORE	WET	A2	26-AUG-2009 08:07	JKT	DLP

Samplenum **Container ID** **Products**
L09080461-04 608125 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	20-AUG-2009 15:48	RLK	
2	ANALYZ	W1	WET	21-AUG-2009 09:46	HJR	JKT
3	STORE	WET	A2	24-AUG-2009 12:59	JKT	DIH

Samplenum **Container ID** **Products**
L09080461-04 608126 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	20-AUG-2009 15:48	RLK	
2	ANALYZ	W1	WET	25-AUG-2009 08:26	DLP	JKT
3	STORE	WET	A2	26-AUG-2009 08:07	JKT	DLP

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09080461

Account: 2736

Project: 2736.006

Samples: 15

Due Date: 03-SEP-2009

Samplenum **Container ID** **Products**
L09080461-05 608127 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	20-AUG-2009 15:48	RLK	
2	ANALYZ	W1	WET	21-AUG-2009 09:46	HJR	JKT
3	STORE	WET	A2	24-AUG-2009 12:59	JKT	DIH

Samplenum **Container ID** **Products**
L09080461-05 608128 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	20-AUG-2009 15:48	RLK	
2	ANALYZ	W1	WET	25-AUG-2009 08:26	DLP	JKT
3	STORE	WET	A2	26-AUG-2009 08:07	JKT	DLP

Samplenum **Container ID** **Products**
L09080461-06 608129 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	20-AUG-2009 15:48	RLK	
2	ANALYZ	W1	WET	21-AUG-2009 09:46	HJR	JKT
3	STORE	WET	A2	24-AUG-2009 12:58	JKT	DIH

Samplenum **Container ID** **Products**
L09080461-06 608130 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	20-AUG-2009 15:48	RLK	
2	ANALYZ	W1	WET	25-AUG-2009 08:26	DLP	JKT
3	STORE	WET	A2	26-AUG-2009 08:07	JKT	DLP

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09080461

Account: 2736

Project: 2736.006

Samples: 15

Due Date: 03-SEP-2009

Samplenum **Container ID** **Products**
L09080461-07 608131 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	20-AUG-2009 15:48	RLK	
2	ANALYZ	W1	WET	20-AUG-2009 16:12	HJR	JKT
3	ANALYZ	W1	WET	21-AUG-2009 09:46	HJR	JKT
4	STORE	WET	A2	24-AUG-2009 12:58	JKT	DIH

Samplenum **Container ID** **Products**
L09080461-07 608132 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	20-AUG-2009 15:48	RLK	
2	ANALYZ	W1	WET	25-AUG-2009 08:26	DLP	JKT
3	STORE	WET	A2	26-AUG-2009 08:07	JKT	DLP

Samplenum **Container ID** **Products**
L09080461-08 608133 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	20-AUG-2009 15:48	RLK	
2	ANALYZ	W1	WET	21-AUG-2009 09:46	HJR	JKT
3	STORE	WET	A2	24-AUG-2009 12:58	JKT	DIH

Samplenum **Container ID** **Products**
L09080461-08 608134 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	20-AUG-2009 15:48	RLK	
2	ANALYZ	W1	WET	25-AUG-2009 08:26	DLP	JKT
3	STORE	WET	A2	26-AUG-2009 08:07	JKT	DLP

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09080461

Account: 2736

Project: 2736.006

Samples: 15

Due Date: 03-SEP-2009

Samplenum **Container ID** **Products**
L09080461-09 608135 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	20-AUG-2009 15:48	RLK	
2	ANALYZ	W1	WET	21-AUG-2009 09:46	HJR	JKT
3	STORE	WET	A2	24-AUG-2009 12:58	JKT	DIH

Samplenum **Container ID** **Products**
L09080461-09 608136 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	20-AUG-2009 15:48	RLK	
2	ANALYZ	W1	WET	25-AUG-2009 08:26	DLP	JKT
3	STORE	WET	A2	26-AUG-2009 08:07	JKT	DLP

Samplenum **Container ID** **Products**
L09080461-10 608137 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	20-AUG-2009 15:48	RLK	
2	ANALYZ	W1	WET	21-AUG-2009 09:46	HJR	JKT
3	STORE	WET	A2	24-AUG-2009 12:58	JKT	DIH

Samplenum **Container ID** **Products**
L09080461-10 608138 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	20-AUG-2009 15:48	RLK	
2	ANALYZ	W1	WET	25-AUG-2009 08:26	DLP	JKT
3	STORE	WET	A2	26-AUG-2009 08:07	JKT	DLP

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09080461

Account: 2736

Project: 2736.006

Samples: 15

Due Date: 03-SEP-2009

Samplenum **Container ID** **Products**
L09080461-11 608139 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	20-AUG-2009 15:48	RLK	
2	ANALYZ	W1	WET	21-AUG-2009 09:46	HJR	JKT
3	STORE	WET	A2	24-AUG-2009 12:58	JKT	DIH

Samplenum **Container ID** **Products**
L09080461-11 608140 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	20-AUG-2009 15:48	RLK	
2	ANALYZ	W1	WET	25-AUG-2009 08:26	DLP	JKT
3	STORE	WET	A2	26-AUG-2009 08:07	JKT	DLP

Samplenum **Container ID** **Products**
L09080461-12 608141 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	20-AUG-2009 15:48	RLK	
2	ANALYZ	W1	WET	21-AUG-2009 09:46	HJR	JKT
3	STORE	WET	A2	24-AUG-2009 12:58	JKT	DIH

Samplenum **Container ID** **Products**
L09080461-12 608142 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	20-AUG-2009 15:48	RLK	
2	ANALYZ	W1	WET	25-AUG-2009 08:26	DLP	JKT
3	STORE	WET	A2	26-AUG-2009 08:06	JKT	DLP

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09080461**Account:** 2736**Project:** 2736.006**Samples:** 15**Due Date:** 03-SEP-2009

Samplenum **Container ID** **Products**
L09080461-13 608143 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	20-AUG-2009 15:48	RLK	
2	ANALYZ	W1	WET	21-AUG-2009 09:46	HJR	JKT
3	STORE	WET	A2	24-AUG-2009 12:58	JKT	DIH

Samplenum **Container ID** **Products**
L09080461-13 608144 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	20-AUG-2009 15:48	RLK	
2	ANALYZ	W1	WET	25-AUG-2009 08:26	DLP	JKT
3	STORE	WET	A2	26-AUG-2009 08:06	JKT	DLP

Samplenum **Container ID** **Products**
L09080461-14 608145 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	20-AUG-2009 15:48	RLK	
2	ANALYZ	W1	WET	21-AUG-2009 09:46	HJR	JKT
3	STORE	WET	A2	24-AUG-2009 12:58	JKT	DIH

Samplenum **Container ID** **Products**
L09080461-14 608146 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	20-AUG-2009 15:48	RLK	
2	ANALYZ	W1	WET	25-AUG-2009 08:26	DLP	JKT
3	STORE	WET	A2	26-AUG-2009 08:07	JKT	DLP

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09080461**Account:** 2736**Project:** 2736.006**Samples:** 15**Due Date:** 03-SEP-2009

<u>Samplenum</u>	<u>Container ID</u>	<u>Products</u>
L09080461-15	608147	PCT-S

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	20-AUG-2009 15:48	RLK	
2	ANALYZ	W1	WET	21-AUG-2009 09:06	DIH	JKT
3	STORE	WET	A2	24-AUG-2009 12:58	JKT	DIH

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login





158 Starlite Drive, Marietta, OH 45750 • T:740-373-4071 • F:740-373-4835 • <http://www.microbac.com>

Laboratory Report Number: L09080542

Please find enclosed the analytical results for the samples you submitted to Microbac Laboratories.

Review and compilation of your report was completed by Microbac's Sales and Service Team. If you have questions, comments or require further assistance regarding this report, please contact your team member noted in the reviewed box below at 800-373-4071. Team member e-mail addresses also appear here for your convenience.

Kathy Albertson	<i>Team Chemist/Data Specialist</i>	kalbertson@microbac.com
Stephanie Mossburg	<i>Team Chemist/Data Specialist</i>	smossburg@microbac.com
Tony Long	<i>Team Chemist/Data Specialist</i>	tlong@microbac.com
Amanda Fickiesen	<i>Client Services Specialist</i>	afickiesen@microbac.com
Annie Brown	<i>Client Services Specialist</i>	abrown@microbac.com

This report was reviewed on September 02, 2009.

A handwritten signature in cursive script that reads "Kathy Albertson".

Kathy Albertson - Team Chemist/Data Specialist

I certify that all test results meet all of the requirements of the accrediting authority listed below. All results for soil samples are reported on a 'dry-weight' basis unless specified otherwise. Analytical results for water and wastes are reported on a 'as received' basis unless specified otherwise. A statement of uncertainty for each analysis is available upon request. This laboratory report shall not be reproduced, except in full, without the written approval of Microbac Laboratories.

This report was certified on September 02, 2009.

A handwritten signature in cursive script that reads "David E. Vandenberg".

David Vandenberg - Managing Director

State of origin: Michigan

Accrediting authority: N/A ID:N/A

QAPP: Microbac OVD

This report contains a total of 54 pages.

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The Microbac logo consists of the word "Microbac" in a white serif font, centered within a dark teal rectangular box.

Microbac Laboratories, Inc.
Ohio Valley Division
158 Starlite Drive
Marietta, OH 45750

Phone: 800.373.4071
Fax: 740.373.4835

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Microbac REPORT L09080542
PREPARED FOR CH2MHILL, Inc
WORK ID:

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1.0 Introduction

Microbac Laboratories Inc.
REPORT NARRATIVE

Microbac Login No: L09080542

CHAIN OF CUSTODY: The chain of custody number was 14233.

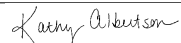
SHIPMENT CONDITIONS: The chain of custody forms were received sealed in a cooler. The cooler temperature was 8 degrees C.

SAMPLE MANAGEMENT: All samples received were intact.

Per client, samples were logged for analyses with temperature anomaly.

I certify that this data package is in compliance with the terms and conditions agreed to by the client and Microbac Laboratories Inc., both technically and for completeness, except for the conditions noted above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or designated person, as verified by the following signature.

Analyst: KRA

Approved: 26-AUG-09


2.0 Data Package

2.1 General Chemistry Data

2.1.1 Chloride Data

2.1.1.1 Summary Data

LABORATORY REPORT

L09080542

09/02/09 12:58

Submitted By

Microbac Laboratories Inc.
158 Starlite Drive
Marietta, OH 45750
(740) 373-4071

For

Account Name: CH2MHILL, Inc
CH2MHILL
15010 Conference Center Drive Suite 200
Chantilly, VA 20151
Attention: Michael J. Zamboni

Project Number: 2736.006
Project: MI-Dow Ludington
Site: LUDINGTON, MI

P.O. Number: 935272

Sample Analysis Summary

Client ID	Lab ID	Method	Dilution	Date Received
MW39D-67.0	L09080542-01	325.2	25	24-AUG-09
MW39D-77.0	L09080542-02	325.2	25	24-AUG-09
MW39D-87.0	L09080542-03	325.2	25	24-AUG-09
MW39D-97.0	L09080542-04	325.2	25	24-AUG-09
MW39D-103.0	L09080542-05	325.2	25	24-AUG-09
MW39D-103.0-FD	L09080542-06	325.2	25	24-AUG-09



Report Number: **L09080542**Report Date : **September 2, 2009**

Sample Number: **L09080542-01**
Client ID: **MW39D-67.0**
Matrix: **Water**
Workgroup Number: **WG310604**
Collect Date: **08/20/2009 10:40**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **25**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/26/2009 15:27**
Cal Date: **08/26/2009 15:22**
Run Date: **08/26/2009 15:27**
File ID: **SC090826005.017**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	1440		50.0	25.0

Report Number: **L09080542**Report Date : **September 2, 2009**

Sample Number: **L09080542-02**
Client ID: **MW39D-77.0**
Matrix: **Water**
Workgroup Number: **WG310604**
Collect Date: **08/20/2009 11:28**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **25**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/26/2009 15:28**
Cal Date: **08/26/2009 15:22**
Run Date: **08/26/2009 15:28**
File ID: **SC090826005.018**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	1430		50.0	25.0

Report Number: **L09080542**Report Date : **September 2, 2009**

Sample Number: **L09080542-03**
Client ID: **MW39D-87.0**
Matrix: **Water**
Workgroup Number: **WG310604**
Collect Date: **08/20/2009 12:17**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **25**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/26/2009 15:29**
Cal Date: **08/26/2009 15:22**
Run Date: **08/26/2009 15:29**
File ID: **SC090826005.021**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	1440		50.0	25.0

Report Number: **L09080542**Report Date : **September 2, 2009**

Sample Number: **L09080542-04**
Client ID: **MW39D-97.0**
Matrix: **Water**
Workgroup Number: **WG310604**
Collect Date: **08/20/2009 15:05**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **25**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/26/2009 15:30**
Cal Date: **08/26/2009 15:22**
Run Date: **08/26/2009 15:30**
File ID: **SC090826005.022**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	1490		50.0	25.0

Report Number: **L09080542**Report Date : **September 2, 2009**

Sample Number: **L09080542-05**
Client ID: **MW39D-103.0**
Matrix: **Water**
Workgroup Number: **WG310604**
Collect Date: **08/21/2009 11:03**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **25**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/26/2009 15:31**
Cal Date: **08/26/2009 15:22**
Run Date: **08/26/2009 15:31**
File ID: **SC090826005.023**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	1310		50.0	25.0

Report Number: **L09080542**Report Date : **September 2, 2009**

Sample Number: **L09080542-06**
Client ID: **MW39D-103.0-FD**
Matrix: **Water**
Workgroup Number: **WG310604**
Collect Date: **08/21/2009 11:05**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **25**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/26/2009 15:32**
Cal Date: **08/26/2009 15:22**
Run Date: **08/26/2009 15:32**
File ID: **SC090826005.024**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	1370		50.0	25.0

2.1.1.2 QC Summary Data

METHOD BLANK SUMMARY

Login Number: L09080542
 Blank File ID: SC090826005.027
 Prep Date: 08/26/09 15:33
 Analyzed Date: 08/26/09 15:33
 Analyst: JBK

Work Group: WG310604
 Blank Sample ID: WG310604-01
 Instrument ID: SMARTCHEM
 Method: 325.2

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG310604-02	SC090826005.011	08/26/09 15:23	01
LCS2	WG310604-03	SC090826005.012	08/26/09 15:24	01
MW39D-67.0	L09080542-01	SC090826005.017	08/26/09 15:27	DL01
MW39D-77.0	L09080542-02	SC090826005.018	08/26/09 15:28	DL01
MW39D-87.0	L09080542-03	SC090826005.021	08/26/09 15:29	DL01
MW39D-97.0	L09080542-04	SC090826005.022	08/26/09 15:30	DL01
MW39D-103.0	L09080542-05	SC090826005.023	08/26/09 15:31	DL01
MW39D-103.0-FD	L09080542-06	SC090826005.024	08/26/09 15:32	DL01
DUP	WG310604-05	SC090826005.025	08/26/09 15:32	01

Report Name: BLANK_SUMMARY
 PDF File ID: 1476796
 Report generated 08/28/2009 15:22



Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L09080542 Prep Date: 08/26/09 15:33 Sample ID: WG310604-01
Instrument ID: SMARTCHEM Run Date: 08/26/09 15:33 Prep Method: 325.2
File ID: SC090826005.027 Analyst: JBK Method: 325.2
Workgroup (AAB#): WG310604 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: SMARTC - 26-AUG-09

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Chloride	1.00	2.00	2.00	1	ND

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1476797

28-AUG-2009 15:22



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09080542 Analyst: JBK Prep Method: 325.2
Instrument ID: SMARTCHEM Matrix: Water Method: 325.2
Workgroup (AAB#): WG310604 Units: mg/L
QC Key: DOWBOA2006 Lot #: STD34512
Sample ID: WG310604-02 LCS File ID: SC090826005.011 Run Date: 08/26/2009 15:23
Sample ID: WG310604-03 LCS2 File ID: SC090826005.012 Run Date: 08/26/2009 15:24

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Chloride	50.0	47.8	95.6	50.0	49.2	98.3	2.84	90 - 110	10	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 1476798
Report generated: 08/28/2009 15:22



2.1.2 Ammonia Data

2.1.2.1 Summary Data

LABORATORY REPORT

L09080542

09/02/09 12:58

Submitted By

Microbac Laboratories Inc.
158 Starlite Drive
Marietta , OH 45750
(740) 373 - 4071

For

Account Name: CH2MHILL, Inc
CH2MHILL
15010 Conference Center Drive Suite 200
Chantilly, VA 20151
Attention: Michael J. Zamboni

Project Number: 2736.006
Project: MI-Dow Ludington
Site: LUDINGTON, MI

P.O. Number: 935272

Sample Analysis Summary

Client ID	Lab ID	Method	Dilution	Date Received
MW39D-67.0	L09080542-01	350.1	5	24-AUG-09
MW39D-77.0	L09080542-02	350.1	5	24-AUG-09
MW39D-87.0	L09080542-03	350.1	5	24-AUG-09
MW39D-97.0	L09080542-04	350.1	5	24-AUG-09
MW39D-103.0	L09080542-05	350.1	5	24-AUG-09
MW39D-103.0-FD	L09080542-06	350.1	5	24-AUG-09



Report Number: **L09080542**Report Date : **September 2, 2009**

Sample Number: **L09080542-01**
Client ID: **MW39D-67.0**
Matrix: **Water**
Workgroup Number: **WG310560**
Collect Date: **08/20/2009 10:40**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **5**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/26/2009 11:14**
Cal Date: **08/26/2009 09:34**
Run Date: **08/26/2009 11:14**
File ID: **SC090826001.082**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	12.6		0.500	0.250

Report Number: **L09080542**Report Date : **September 2, 2009**

Sample Number: **L09080542-02**
Client ID: **MW39D-77.0**
Matrix: **Water**
Workgroup Number: **WG310560**
Collect Date: **08/20/2009 11:28**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **5**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/26/2009 11:18**
Cal Date: **08/26/2009 09:34**
Run Date: **08/26/2009 11:18**
File ID: **SC090826001.085**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	8.19		0.500	0.250

Report Number: **L09080542**Report Date : **September 2, 2009**

Sample Number: **L09080542-03**
Client ID: **MW39D-87.0**
Matrix: **Water**
Workgroup Number: **WG310560**
Collect Date: **08/20/2009 12:17**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **5**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/26/2009 11:19**
Cal Date: **08/26/2009 09:34**
Run Date: **08/26/2009 11:19**
File ID: **SC090826001.086**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	8.39		0.500	0.250

Report Number: **L09080542**Report Date : **September 2, 2009**

Sample Number: **L09080542-04**
Client ID: **MW39D-97.0**
Matrix: **Water**
Workgroup Number: **WG310560**
Collect Date: **08/20/2009 15:05**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **5**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/26/2009 11:21**
Cal Date: **08/26/2009 09:34**
Run Date: **08/26/2009 11:21**
File ID: **SC090826001.087**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	7.92		0.500	0.250

Report Number: **L09080542**Report Date : **September 2, 2009**

Sample Number: **L09080542-05**
Client ID: **MW39D-103.0**
Matrix: **Water**
Workgroup Number: **WG310560**
Collect Date: **08/21/2009 11:03**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **5**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/26/2009 11:23**
Cal Date: **08/26/2009 09:34**
Run Date: **08/26/2009 11:23**
File ID: **SC090826001.088**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	8.60		0.500	0.250

Report Number: **L09080542**Report Date : **September 2, 2009**

Sample Number: **L09080542-06**
Client ID: **MW39D-103.0-FD**
Matrix: **Water**
Workgroup Number: **WG310560**
Collect Date: **08/21/2009 11:05**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **5**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/26/2009 11:25**
Cal Date: **08/26/2009 09:34**
Run Date: **08/26/2009 11:25**
File ID: **SC090826001.089**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	8.76		0.500	0.250

2.1.2.2 QC Summary Data

METHOD BLANK SUMMARY

Login Number: L09080542
 Blank File ID: SC090826001.037
 Prep Date: 08/26/09 10:01
 Analyzed Date: 08/26/09 10:01
 Analyst: JBK

Work Group: WG310560
 Blank Sample ID: WG310560-01
 Instrument ID: SMARTCHEM
 Method: 350.1

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG310560-02	SC090826001.038	08/26/09 10:03	01
LCS2	WG310560-03	SC090826001.039	08/26/09 10:03	01
MW39D-67.0	L09080542-01	SC090826001.082	08/26/09 11:14	DL01
MW39D-77.0	L09080542-02	SC090826001.085	08/26/09 11:18	DL01
MW39D-87.0	L09080542-03	SC090826001.086	08/26/09 11:19	DL01
MW39D-97.0	L09080542-04	SC090826001.087	08/26/09 11:21	DL01
MW39D-103.0	L09080542-05	SC090826001.088	08/26/09 11:23	DL01
MW39D-103.0-FD	L09080542-06	SC090826001.089	08/26/09 11:25	DL01
DUP	WG310560-06	SC090826001.090	08/26/09 11:27	DL01

Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L09080542 Prep Date: 08/26/09 10:01 Sample ID: WG310560-01
Instrument ID: SMARTCHEM Run Date: 08/26/09 10:01 Prep Method: 350.1
File ID: SC090826001.037 Analyst: JBK Method: 350.1
Workgroup (AAB#): WG310560 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: SMARTC - 26-AUG-09

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Nitrogen, Ammonia	0.0500	0.100	-0.121	1	*

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1475261

27-AUG-2009 11:54



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09080542 Analyst: JBK Prep Method: 350.1
Instrument ID: SMARTCHEM Matrix: Water Method: 350.1
Workgroup (AAB#): WG310560 Units: mg/L
QC Key: DOWBOA2006 Lot #: STD33211
Sample ID: WG310560-02 LCS File ID: SC090826001.038 Run Date: 08/26/2009 10:03
Sample ID: WG310560-03 LCS2 File ID: SC090826001.039 Run Date: 08/26/2009 10:03

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Nitrogen, Ammonia	2.00	1.95	97.5	2.00	1.88	94.0	3.62	90 - 110	25	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 1475262
Report generated: 08/27/2009 11:54



2.1.3 Total Dissolved Solids Data

2.1.3.1 Summary Data

LABORATORY REPORT

L09080542

09/02/09 12:58

Submitted By

Microbac Laboratories Inc.
158 Starlite Drive
Marietta , OH 45750
(740) 373 - 4071

For

Account Name: CH2MHILL, Inc
CH2MHILL
15010 Conference Center Drive Suite 200
Chantilly, VA 20151
Attention: Michael J. Zamboni

Project Number: 2736.006
Project: MI-Dow Ludington
Site: LUDINGTON, MI

P.O. Number: 935272

Sample Analysis Summary

Client ID	Lab ID	Method	Dilution	Date Received
MW39D-67.0	L09080542-01	160.1	1	24-AUG-09
MW39D-77.0	L09080542-02	160.1	1	24-AUG-09
MW39D-87.0	L09080542-03	160.1	1	24-AUG-09
MW39D-97.0	L09080542-04	160.1	1	24-AUG-09
MW39D-103.0	L09080542-05	160.1	1	24-AUG-09
MW39D-103.0-FD	L09080542-06	160.1	1	24-AUG-09



Report Number: **L09080542**Report Date : **September 2, 2009**

Sample Number: **L09080542-01**
Client ID: **MW39D-67.0**
Matrix: **Water**
Workgroup Number: **WG310589**
Collect Date: **08/20/2009 10:40**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/26/2009 14:05**
Cal Date:
Run Date: **08/26/2009 14:05**
File ID: **EN.0908261405-04**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		3070		20.0	10.0

Report Number: **L09080542**Report Date : **September 2, 2009**

Sample Number: **L09080542-02**
Client ID: **MW39D-77.0**
Matrix: **Water**
Workgroup Number: **WG310589**
Collect Date: **08/20/2009 11:28**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/26/2009 14:05**
Cal Date:
Run Date: **08/26/2009 14:05**
File ID: **EN.0908261405-05**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		3640		20.0	10.0

Report Number: **L09080542**Report Date : **September 2, 2009**

Sample Number: **L09080542-03**
Client ID: **MW39D-87.0**
Matrix: **Water**
Workgroup Number: **WG310589**
Collect Date: **08/20/2009 12:17**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/26/2009 14:05**
Cal Date:
Run Date: **08/26/2009 14:05**
File ID: **EN.0908261405-06**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		3780		20.0	10.0

Report Number: **L09080542**Report Date : **September 2, 2009**

Sample Number: **L09080542-04**
Client ID: **MW39D-97.0**
Matrix: **Water**
Workgroup Number: **WG310589**
Collect Date: **08/20/2009 15:05**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/26/2009 14:05**
Cal Date:
Run Date: **08/26/2009 14:05**
File ID: **EN.0908261405-07**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		3400		20.0	10.0

Report Number: **L09080542**Report Date : **September 2, 2009**

Sample Number: **L09080542-05**
Client ID: **MW39D-103.0**
Matrix: **Water**
Workgroup Number: **WG310589**
Collect Date: **08/21/2009 11:03**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/26/2009 14:05**
Cal Date:
Run Date: **08/26/2009 14:05**
File ID: **EN.0908261405-08**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		3700		20.0	10.0

Report Number: **L09080542**Report Date : **September 2, 2009**

Sample Number: **L09080542-06**
Client ID: **MW39D-103.0-FD**
Matrix: **Water**
Workgroup Number: **WG310589**
Collect Date: **08/21/2009 11:05**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/26/2009 14:05**
Cal Date:
Run Date: **08/26/2009 14:05**
File ID: **EN.0908261405-09**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		3620		20.0	10.0

2.1.3.2 QC Summary Data

METHOD BLANK SUMMARY

Login Number: L09080542
 Blank File ID: EN.0908261405-01
 Prep Date: 08/26/09 14:05
 Analyzed Date: 08/26/09 14:05
 Analyst: HJR

Work Group: WG310589
 Blank Sample ID: WG310589-01
 Instrument ID: OVEN
 Method: 160.1

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG310589-02	EN.0908261405-02	08/26/09 14:05	
LCS2	WG310589-03	EN.0908261405-03	08/26/09 14:05	
MW39D-67.0	L09080542-01	EN.0908261405-04	08/26/09 14:05	
MW39D-77.0	L09080542-02	EN.0908261405-05	08/26/09 14:05	
MW39D-87.0	L09080542-03	EN.0908261405-06	08/26/09 14:05	
MW39D-97.0	L09080542-04	EN.0908261405-07	08/26/09 14:05	
MW39D-103.0	L09080542-05	EN.0908261405-08	08/26/09 14:05	
MW39D-103.0-FD	L09080542-06	EN.0908261405-09	08/26/09 14:05	
DUP	WG310589-05	EN.0908261405-13	08/26/09 14:05	

Report Name: BLANK_SUMMARY
 PDF File ID: 1480001
 Report generated 09/02/2009 09:25



Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L09080542 Prep Date: 08/26/09 14:05 Sample ID: WG310589-01
Instrument ID: OVEN Run Date: 08/26/09 14:05 Prep Method: 160.1
File ID: EN.0908261405-01 Analyst: HJR Method: 160.1
Workgroup (AAB#): WG310589 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: OVEN -

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Total Dissolved Solids	5.00	10.0	10.0	1	ND

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1480002

02-SEP-2009 09:25



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09080542 Analyst: HJR Prep Method: 160.1
Instrument ID: OVEN Matrix: Water Method: 160.1
Workgroup (AAB#): WG310589 Units: mg/L
QC Key: DOWBOA2006 Lot #: STD32441
Sample ID: WG310589-02 LCS File ID: EN.0908261405-02 Run Date: 08/26/2009 14:05
Sample ID: WG310589-03 LCS2 File ID: EN.0908261405-03 Run Date: 08/26/2009 14:05

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Total Dissolved Solids	500	502	100	500	504	101	0.398	80 - 120	25	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 1480003
Report generated: 09/02/2009 09:25



3.0 Attachments

Microbac Laboratories Inc.
Analyst Listing
September 2, 2009

ADC - ANTHONY D. CANTER	AJF - AMANDA J. FICKIESEN	AJM - ANTHONY J. MOSSBURG
ALB - ANNIE L. BROWN	AML - ANTHONY M. LONG	BLG - BRENDA L. GREENWALT
BRG - BRENDA R. GREGORY	CAA - CASSIE A. AUGENSTEIN	CAF - CHERYL A. FLOWERS
CAH - CHARLES A. HALL	CEB - CHAD E. BARNES	CLC - CHRYS L. CRAWFORD
CLW - CHARISSA L. WINTERS	CPD - CHAD P. DAVIS	CSH - CHRIS S. HILL
DDE - DEBRA D. ELLIOTT	DEL - DON E. LIGHTFRITZ	DEV - DAVID E. VANDENBERG
DGB - DOUGLAS G. BUTCHER	DIH - DEANNA I. HESSON	DLB - DAVID L. BUMGARNER
DLP - DOROTHY L. PAYNE	DLR - DIANNA L. RAUCH	DR - DEANNA ROBERTS
ECL - ERIC C. LAWSON	EDA - ERIN D. AGEE	ERP - ERIN R. PORTER
FJB - FRANCES J. BOLDEN	HAV - HEMA VILASAGAR	HJR - HOLLY J. REED
JBK - JEREMY B. KINNEY	JDH - JUSTIN D. HESSON	JKT - JANE K. THOMPSON
JWR - JOHN W. RICHARDS	JWS - JACK W. SHEAVES	JYH - JI Y. HU
KEB - KATHRYN E. BARNES	KHR - KIM H. RHODES	KRA - KATHY R. ALBERTSON
LKN - LINDA K. NEDEFF	LSB - LESLIE S. BUCINA	MDA - MIKE D. ALBERTSON
MDC - MICHAEL D. COCHRAN	MES - MARY E. SCHILLING	MMB - MAREN M. BEERY
MRT - MICHELLE R. TAYLOR	MSW - MATT S. WILSON	NPM - NATHANIEL P. MILLER
PDM - PIERCE D. MORRIS	RAH - ROY A. HALSTEAD	RB - ROBERT BUCHANAN
REK - ROBERT E. KYER	RLK - ROBIN L. KLINGER	RWC - RODNEY W. CAMPBELL
SDH - SHANA D. HINYARD	SLM - STEPHANIE L. MOSSBURG	SLP - SHERI L. PFALZGRAF
TIP - TAE I. PARRISH	TMB - TIFFANY M. BAILEY	TMM - TAMMY M. MORRIS
VC - VICKI COLLIER	WTD - WADE T. DELONG	

September 02, 2009

Qualkey: STD

Qualifier	Description
*	Surrogate or spike compound out of range
+	Correlation coefficient for the MSA is less than 0.995
<	Result is less than the associated numerical value.
>	Result is greater than the associated numerical value.
A	See the report narrative
B	Analyte present in method blank
B1	Target analyte detected in method blank at or above the method reporting limit
B3	Target analyte detected in calibration blank at or above the method reporting limit
C	Confirmed by GC/MS
CG	Confluent growth
DL	Surrogate or spike compound was diluted out
E	Estimated concentration due to sample matrix interference
EDL	Elevated sample reporting limits, presence of non-target analytes
EMPC	Estimated Maximum Possible Concentration
F, S	Estimated result below quantitation limit; method of standard additions(MSA)
FL	Free Liquid
H1	Sample analysis performed past holding time.
I	Semiquantitative result (out of instrument calibration range)
J	The analyte was positively identified, but the quantitation was below the RL
J,B	Analyte detected in both the method blank and sample above the MDL.
J,P	Estimate; columns don't agree to within 40%
J,S	Estimated concentration; analyzed by method of standard addition (MSA)
L	Sample reporting limits elevated due to matrix interference
L1	The associated blank spike (LCS) recovery was above the laboratory acceptance limits.
L2	The associated blank spike (LCS) recovery was below the laboratory acceptance limits.
M	Matrix effect; the concentration is an estimate due to matrix effect.
N	Tentatively identified compound(TIC)
NA	Not applicable
ND	Not detected at or above the reporting limit (RL).
ND, L	Not detected; sample reporting limit (RL) elevated due to interference
ND, S	Not detected; analyzed by method of standard addition (MSA)
NF	Not found by library search
NFL	No free liquid
NI	Non-ignitable
NR	Analyte is not required to be analyzed
NS	Not spiked
P	Concentrations >40% difference between the two GC columns
Q	One or more quality control criteria fail. See narrative.
QNS	Quantity of sample not sufficient to perform analysis
RA	Reanalysis confirms reported results
RE	Reanalysis confirms sample matrix interference
S	Analyzed by method of standard addition (MSA)
SMI	Sample matrix interference on surrogate
SP	Reported results are for spike compounds only
TIC	Library Search Compound
TNTC	Too numerous to count
U	Undetected; the concentration is below the reported MDL.
UJ	Undetected; the MDL and RL are estimated due to quality control discrepancies.
W	Post-digestion spike for furnace AA out of control limits
X	Exceeds regulatory limit
X, S	Exceeds regulatory limit; method of standard additions (MSA)
Z	Cannot be resolved from isomer - see below

*****Special Notes for Organic Analytes**

1. Acrolein and acrylonitrile by method 624 are semi-quantitative screens only.
2. 1,2-Diphenylhydrazine is unstable and is reported as azobenzene.
3. N-nitrosodiphenylamine cannot be separated from diphenylamine.
4. 3-Methylphenol and 4-Methylphenol are unresolvable compounds.
5. m-Xylene and p-Xylene are unresolvable compounds.
6. The reporting limits for Appendix II/IX compounds by method 8270 are based on EPA estimated PQLs referenced in 40 CFR Part 264, Appendix IX. They are not always achievable for every compound and are matrix dependent.



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 4. **Results**
 5. **Discussion**
 6. **Conclusion**
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Microbac

Phone: 740-373-4071
Fax: 740-373-4835

CHAIN-OF-CUSTODY RECORD

Company Name:		Project Contact:		Contact Phone #:	
Project Contact:		Turn Around Requirements:		Location:	
Project ID:		Sampler (print):		Signature:	
Sample I.D. No.	Comp	Grab	Date	Time	Matrix*
MW39D-67.0		X	8-20-09	1040	W
MW39D-77.0		X		1128	W
MW39D-87.0		X		1217	W
MW39D-97.0		X		1505	W
MW39D-103.0		X	8-21-09	1103	W
MW39D-103.0FD		X		1105	W
*SAMPLES COLLECTED ON 8-20-08-21; STORED HALI					
TIME					
Relinquished by: (Signature)					
Relinquished by: (Signature)					
Date					
Time					
F (					
F (					
Microbac OVD					
Received: 08/24/2009 10:02					
By: ROBIN KLINGER					
221000001263					
TOTAL # (LAB USE)					
Program					
CWA					
RCRA					
DOD					
AFCEE					
Other					
ADDITIONAL REQUIREMENTS					
Received by: (Signature)					
Date					
Time					
Remarks:					

*Water (W), Soil (S), Solid Waste (SD), Unknown (X)



1000001263

COOLER INSPECTION



Received: 08/24/2009 10:02
Delivery Method: UPS
Opened By: Robin Klinger
Comments:

Login(s): L09080542

Cooler(s)

Cooler #	Temp Gun	Temp	Tracking #	COC #	Comments
0013954	H	8.0	1Z1R19E04425868773	14233	

1	Yes	Were shipping coolers sealed?
2	Yes	Were custody seals intact?
3	No	Were cooler temperatures in range of 0-6?
4	No	Was ice present?
5	No	Were COC's received/information complete/signed and dated?
6	Yes	Were sample containers and labels intact and match COC?
7	Yes	Were the correct containers and volumes received?
8	Yes	Were correct preservatives used? (water only)
9	Yes	Were pH ranges acceptable? (voa's excluded)
10	NA	Were VOA samples free of headspace (<6mm)?
11	Yes	Were samples received within EPA hold times?

Discrepancies:

3	Cooler temp is out.	
4	Ice is melted.	

Look closer. Go further. Do more.

Microbac - Ohio Valley Division
158 Starlite Drive
Marietta, OH 45750
Tel: (740)373-4071 Fax: (740)373-4835

Internal Chain of Custody Report

Login: L09080542

Account: 2736

Project: 2736.006

Samples: 6

Due Date: 07-SEP-2009

Samplenum **Container ID** **Products**
L09080542-01 608871 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	25-AUG-2009 12:38	JKT	
2	ANALYZ	W1	WET	26-AUG-2009 12:47	HJR	JKT
3	STORE	WET	A2	27-AUG-2009 09:37	JKT	JBK

Samplenum **Container ID** **Products**
L09080542-01 608872 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	25-AUG-2009 12:38	JKT	
2	ANALYZ	W1	WET	25-AUG-2009 13:06	DLP	JKT
3	STORE	WET	A2	26-AUG-2009 08:06	JKT	DLP

Samplenum **Container ID** **Products**
L09080542-02 608873 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	25-AUG-2009 12:38	JKT	
2	ANALYZ	W1	WET	26-AUG-2009 12:47	HJR	JKT
3	STORE	WET	A2	27-AUG-2009 09:37	JKT	JBK

Samplenum **Container ID** **Products**
L09080542-02 608874 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	25-AUG-2009 12:38	JKT	
2	ANALYZ	W1	WET	25-AUG-2009 13:06	DLP	JKT
3	STORE	WET	A2	26-AUG-2009 08:06	JKT	DLP

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09080542

Account: 2736

Project: 2736.006

Samples: 6

Due Date: 07-SEP-2009

Samplenum **Container ID** **Products**
L09080542-03 608875 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	25-AUG-2009 12:38	JKT	
2	ANALYZ	W1	WET	26-AUG-2009 12:47	HJR	JKT
3	STORE	WET	A2	27-AUG-2009 09:37	JKT	JBK

Samplenum **Container ID** **Products**
L09080542-03 608876 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	25-AUG-2009 12:38	JKT	
2	ANALYZ	W1	WET	25-AUG-2009 13:06	DLP	JKT
3	STORE	WET	A2	26-AUG-2009 08:06	JKT	DLP

Samplenum **Container ID** **Products**
L09080542-04 608877 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	25-AUG-2009 12:38	JKT	
2	ANALYZ	W1	WET	26-AUG-2009 12:47	HJR	JKT
3	STORE	WET	A2	27-AUG-2009 09:37	JKT	JBK

Samplenum **Container ID** **Products**
L09080542-04 608878 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	25-AUG-2009 12:38	JKT	
2	ANALYZ	W1	WET	25-AUG-2009 13:06	DLP	JKT
3	STORE	WET	A2	26-AUG-2009 08:06	JKT	DLP

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09080542

Account: 2736

Project: 2736.006

Samples: 6

Due Date: 07-SEP-2009

Samplenum **Container ID** **Products**
L09080542-05 608879 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	25-AUG-2009 12:38	JKT	
2	ANALYZ	W1	WET	26-AUG-2009 12:47	HJR	JKT
3	STORE	WET	A2	27-AUG-2009 09:37	JKT	JBK

Samplenum **Container ID** **Products**
L09080542-05 608880 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	25-AUG-2009 12:38	JKT	
2	ANALYZ	W1	WET	25-AUG-2009 13:06	DLP	JKT
3	STORE	WET	A2	26-AUG-2009 08:06	JKT	DLP

Samplenum **Container ID** **Products**
L09080542-06 608881 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	25-AUG-2009 12:38	JKT	
2	ANALYZ	W1	WET	26-AUG-2009 12:47	HJR	JKT
3	STORE	WET	A2	27-AUG-2009 09:38	JKT	JBK

Samplenum **Container ID** **Products**
L09080542-06 608882 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	25-AUG-2009 12:38	JKT	
2	ANALYZ	W1	WET	25-AUG-2009 13:07	DLP	JKT
3	STORE	WET	A2	26-AUG-2009 08:06	JKT	DLP

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login





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Laboratory Report Number: L09080640

Please find enclosed the analytical results for the samples you submitted to Microbac Laboratories.

Review and compilation of your report was completed by Microbac's Sales and Service Team. If you have questions, comments or require further assistance regarding this report, please contact your team member noted in the reviewed box below at 800-373-4071. Team member e-mail addresses also appear here for your convenience.

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Tony Long	<i>Team Chemist/Data Specialist</i>	tlong@microbac.com
Amanda Fickiesen	<i>Client Services Specialist</i>	afickiesen@microbac.com
Annie Brown	<i>Client Services Specialist</i>	abrown@microbac.com

This report was reviewed on September 04, 2009.

A handwritten signature in cursive script that reads "Kathy Albertson".

Kathy Albertson - Team Chemist/Data Specialist

I certify that all test results meet all of the requirements of the accrediting authority listed below. All results for soil samples are reported on a 'dry-weight' basis unless specified otherwise. Analytical results for water and wastes are reported on a 'as received' basis unless specified otherwise. A statement of uncertainty for each analysis is available upon request. This laboratory report shall not be reproduced, except in full, without the written approval of Microbac Laboratories.

This report was certified on September 04, 2009.

A handwritten signature in cursive script that reads "David E. Vandenberg".

David Vandenberg - Managing Director

State of origin: Michigan

Accrediting authority: N/A ID:N/A

QAPP: Microbac OVD

This report contains a total of 71 pages.

Look closer. Go further. Do more.



The Microbac logo consists of the word "Microbac" in a white serif font, centered within a dark teal rectangular box.

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Ohio Valley Division
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Marietta, OH 45750

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Fax: 740.373.4835

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LOOK CLOSER, GO FURTHER, DO MORE.

Microbac REPORT L09080640
PREPARED FOR CH2MHILL, Inc
WORK ID:

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1.0 Introduction

Microbac Laboratories Inc.
REPORT NARRATIVE**Microbac Login No:** L09080640**CHAIN OF CUSTODY:** The chain of custody number was 14234**SHIPMENT CONDITIONS:** The chain of custody forms were received sealed in a cooler. The cooler temperature was 4 degrees C.**SAMPLE MANAGEMENT:** All samples received were intact.

L09080640-01	MW39D-127.0
L09080640-02	MW39D-132.0
L09080640-03	MW39D-147.0
L09080640-04	EQUIP-BLK-1
L09080640-05	MW16D-47.0
L09080640-06	MW16D-52.0
L09080640-07	MW16D-87.0
L09080640-08	MW16D-97.0
L09080640-09	MW16D-104.0
L09080640-10	MW39D-117.0

I certify that this data package is in compliance with the terms and conditions agreed to by the client and Microbac Laboratories Inc., both technically and for completeness, except for the conditions noted above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or designated person, as verified by the following signature.

Approved: 28-AUG-09



2.0 Data Package

2.1 General Chemistry Data

2.1.1 Chloride Data

2.1.1.1 Summary Data

LABORATORY REPORT

L09080640

09/04/09 16:54

Submitted By

Microbac Laboratories Inc.
158 Starlite Drive
Marietta , OH 45750
(740) 373 - 4071

For

Account Name: CH2MHILL, Inc
CH2MHILL
15010 Conference Center Drive Suite 200
Chantilly, VA 20151
Attention: Michael J. Zamboni

Project Number: 2736.006
Project: MI-Dow Ludington
Site: LUDINGTON, MI

P.O. Number: 935272

Sample Analysis Summary

Client ID	Lab ID	Method	Dilution	Date Received
MW39D-127.0	L09080640-01	325.2	20	27-AUG-09
MW39D-132.0	L09080640-02	325.2	20	27-AUG-09
MW39D-147.0	L09080640-03	325.2	20	27-AUG-09
EQUIP-BLK-1	L09080640-04	325.2	1	27-AUG-09
MW16D-47.0	L09080640-05	325.2	20	27-AUG-09
MW16D-52.0	L09080640-06	325.2	20	27-AUG-09
MW16D-87.0	L09080640-07	325.2	1	27-AUG-09
MW16D-97.0	L09080640-08	325.2	1	27-AUG-09
MW16D-104.0	L09080640-09	325.2	1	27-AUG-09
MW39D-117.0	L09080640-10	325.2	20	27-AUG-09



Report Number: **L09080640**Report Date : **September 4, 2009**

Sample Number: **L09080640-01**
Client ID: **MW39D-127.0**
Matrix: **Water**
Workgroup Number: **WG311101**
Collect Date: **08/24/2009 15:13**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **20**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/01/2009 14:50**
Cal Date: **09/01/2009 13:58**
Run Date: **09/01/2009 14:50**
File ID: **SC090901008.084**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	1470		40.0	20.0

Report Number: **L09080640**Report Date : **September 4, 2009**

Sample Number: **L09080640-02**
Client ID: **MW39D-132.0**
Matrix: **Water**
Workgroup Number: **WG311101**
Collect Date: **08/25/2009 08:25**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **20**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/01/2009 14:51**
Cal Date: **09/01/2009 13:58**
Run Date: **09/01/2009 14:51**
File ID: **SC090901008.085**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	1330		40.0	20.0

Report Number: **L09080640**Report Date : **September 4, 2009**

Sample Number: **L09080640-03**
Client ID: **MW39D-147.0**
Matrix: **Water**
Workgroup Number: **WG311101**
Collect Date: **08/25/2009 10:45**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **20**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/01/2009 14:53**
Cal Date: **09/01/2009 13:58**
Run Date: **09/01/2009 14:53**
File ID: **SC090901008.086**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	1670		40.0	20.0

Report Number: **L09080640**Report Date : **September 4, 2009**

Sample Number: **L09080640-04**
Client ID: **EQUIP-BLK-1**
Matrix: **Water**
Workgroup Number: **WG311101**
Collect Date: **08/24/2009 15:08**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/01/2009 14:07**
Cal Date: **09/01/2009 13:58**
Run Date: **09/01/2009 14:07**
File ID: **SC090901008.024**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6		ND	2.00	1.00

ND Not detected at or above the reporting limit (RL).

Report Number: **L09080640**Report Date : **September 4, 2009**

Sample Number: **L09080640-05**
Client ID: **MW16D-47.0**
Matrix: **Water**
Workgroup Number: **WG311101**
Collect Date: **08/26/2009 10:25**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **20**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/01/2009 14:54**
Cal Date: **09/01/2009 13:58**
Run Date: **09/01/2009 14:54**
File ID: **SC090901008.087**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	1520		40.0	20.0

Report Number: **L09080640**Report Date : **September 4, 2009**

Sample Number: **L09080640-06**
Client ID: **MW16D-52.0**
Matrix: **Water**
Workgroup Number: **WG311101**
Collect Date: **08/26/2009 11:40**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **20**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/01/2009 14:55**
Cal Date: **09/01/2009 13:58**
Run Date: **09/01/2009 14:55**
File ID: **SC090901008.088**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	1300		40.0	20.0

Report Number: **L09080640**Report Date : **September 4, 2009**

Sample Number: **L09080640-07**
Client ID: **MW16D-87.0**
Matrix: **Water**
Workgroup Number: **WG311101**
Collect Date: **08/26/2009 14:45**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/01/2009 14:31**
Cal Date: **09/01/2009 13:58**
Run Date: **09/01/2009 14:31**
File ID: **SC090901008.064**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	2.76		2.00	1.00

Report Number: **L09080640**Report Date : **September 4, 2009**

Sample Number: **L09080640-08**
Client ID: **MW16D-97.0**
Matrix: **Water**
Workgroup Number: **WG311101**
Collect Date: **08/26/2009 15:32**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/01/2009 14:32**
Cal Date: **09/01/2009 13:58**
Run Date: **09/01/2009 14:32**
File ID: **SC090901008.065**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6		ND	2.00	1.00

ND Not detected at or above the reporting limit (RL).

Report Number: **L09080640**Report Date : **September 4, 2009**

Sample Number: **L09080640-09**
Client ID: **MW16D-104.0**
Matrix: **Water**
Workgroup Number: **WG311101**
Collect Date: **08/26/2009 16:20**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/01/2009 14:33**
Cal Date: **09/01/2009 13:58**
Run Date: **09/01/2009 14:33**
File ID: **SC090901008.066**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	2.34		2.00	1.00

Report Number: **L09080640**Report Date : **September 4, 2009**

Sample Number: **L09080640-10**
Client ID: **MW39D-117.0**
Matrix: **Water**
Workgroup Number: **WG311101**
Collect Date: **08/24/2009 14:05**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **20**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/01/2009 14:56**
Cal Date: **09/01/2009 13:58**
Run Date: **09/01/2009 14:56**
File ID: **SC090901008.089**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	996		40.0	20.0

10 of 10



2.1.1.2 QC Summary Data

METHOD BLANK SUMMARY

Login Number: L09080640
 Blank File ID: SC090901008.010
 Prep Date: 09/01/09 13:59
 Analyzed Date: 09/01/09 13:59
 Analyst: JBK

Work Group: WG311101
 Blank Sample ID: WG311101-01
 Instrument ID: SMARTCHEM
 Method: 325.2

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG311101-02	SC090901008.011	09/01/09 13:59	01
LCS2	WG311101-03	SC090901008.012	09/01/09 14:00	01
EQUIP-BLK-1	L09080640-04	SC090901008.024	09/01/09 14:07	01
DUP	WG311101-05	SC090901008.034	09/01/09 14:13	DL01
MW16D-87.0	L09080640-07	SC090901008.064	09/01/09 14:31	01
MW16D-97.0	L09080640-08	SC090901008.065	09/01/09 14:32	01
MW16D-104.0	L09080640-09	SC090901008.066	09/01/09 14:33	01
MW39D-127.0	L09080640-01	SC090901008.084	09/01/09 14:50	DL01
MW39D-132.0	L09080640-02	SC090901008.085	09/01/09 14:51	DL01
MW39D-147.0	L09080640-03	SC090901008.086	09/01/09 14:53	DL01
MW16D-47.0	L09080640-05	SC090901008.087	09/01/09 14:54	DL01
MW16D-52.0	L09080640-06	SC090901008.088	09/01/09 14:55	DL01
MW39D-117.0	L09080640-10	SC090901008.089	09/01/09 14:56	DL01

Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L09080640 Prep Date: 09/01/09 13:59 Sample ID: WG311101-01
Instrument ID: SMARTCHEM Run Date: 09/01/09 13:59 Prep Method: 325.2
File ID: SC090901008.010 Analyst: JBK Method: 325.2
Workgroup (AAB#): WG311101 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: SMARTC - 01-SEP-09

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Chloride	1.00	2.00	2.00	1	ND

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1479929

02-SEP-2009 09:17



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09080640 Analyst: JBK Prep Method: 325.2
Instrument ID: SMARTCHEM Matrix: Water Method: 325.2
Workgroup (AAB#): WG311101 Units: mg/L
QC Key: DOWBOA2006 Lot #: STD34512
Sample ID: WG311101-02 LCS File ID: SC090901008.011 Run Date: 09/01/2009 13:59
Sample ID: WG311101-03 LCS2 File ID: SC090901008.012 Run Date: 09/01/2009 14:00

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Chloride	50.0	49.2	98.5	50.0	51.5	103	4.53	90 - 110	10	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 1479930
Report generated: 09/02/2009 09:17



2.1.2 Ammonia Data

2.1.2.1 Summary Data

LABORATORY REPORT

L09080640

09/04/09 16:54

Submitted By

Microbac Laboratories Inc.
158 Starlite Drive
Marietta, OH 45750
(740) 373-4071

For

Account Name: CH2MHILL, Inc
CH2MHILL
15010 Conference Center Drive Suite 200
Chantilly, VA 20151
Attention: Michael J. Zamboni

Project Number: 2736.006
Project: MI-Dow Ludington
Site: LUDINGTON, MI

P.O. Number: 935272

Sample Analysis Summary

Client ID	Lab ID	Method	Dilution	Date Received
MW39D-127.0	L09080640-01	350.1	2	27-AUG-09
MW39D-132.0	L09080640-02	350.1	2	27-AUG-09
MW39D-147.0	L09080640-03	350.1	4	27-AUG-09
EQUIP-BLK-1	L09080640-04	350.1	1	27-AUG-09
MW16D-47.0	L09080640-05	350.1	10	27-AUG-09
MW16D-52.0	L09080640-06	350.1	50	27-AUG-09
MW16D-87.0	L09080640-07	350.1	25	27-AUG-09
MW16D-97.0	L09080640-08	350.1	4	27-AUG-09
MW16D-104.0	L09080640-09	350.1	1	27-AUG-09
MW39D-117.0	L09080640-10	350.1	1	27-AUG-09



Report Number: **L09080640**Report Date : **September 4, 2009**

Sample Number: **L09080640-01**
Client ID: **MW39D-127.0**
Matrix: **Water**
Workgroup Number: **WG310918**
Collect Date: **08/24/2009 15:13**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **2**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/31/2009 09:28**
Cal Date: **08/31/2009 09:10**
Run Date: **08/31/2009 09:28**
File ID: **SC090831001.026**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	5.47		0.200	0.100

Report Number: **L09080640**Report Date : **September 4, 2009**

Sample Number: **L09080640-02**
Client ID: **MW39D-132.0**
Matrix: **Water**
Workgroup Number: **WG310918**
Collect Date: **08/25/2009 08:25**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **2**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/31/2009 09:28**
Cal Date: **08/31/2009 09:10**
Run Date: **08/31/2009 09:28**
File ID: **SC090831001.027**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	5.26		0.200	0.100

Report Number: **L09080640**Report Date : **September 4, 2009**

Sample Number: **L09080640-03**
Client ID: **MW39D-147.0**
Matrix: **Water**
Workgroup Number: **WG310918**
Collect Date: **08/25/2009 10:45**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **4**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/31/2009 09:58**
Cal Date: **08/31/2009 09:10**
Run Date: **08/31/2009 09:58**
File ID: **SC090831001.045**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	7.37		0.400	0.200

Report Number: **L09080640**Report Date : **September 4, 2009**

Sample Number: **L09080640-04**
Client ID: **EQUIP-BLK-1**
Matrix: **Water**
Workgroup Number: **WG310918**
Collect Date: **08/24/2009 15:08**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/31/2009 09:30**
Cal Date: **08/31/2009 09:10**
Run Date: **08/31/2009 09:30**
File ID: **SC090831001.029**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	0.234		0.100	0.0500

Report Number: **L09080640**Report Date : **September 4, 2009**

Sample Number: **L09080640-05**
Client ID: **MW16D-47.0**
Matrix: **Water**
Workgroup Number: **WG310918**
Collect Date: **08/26/2009 10:25**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **10**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/31/2009 10:00**
Cal Date: **08/31/2009 09:10**
Run Date: **08/31/2009 10:00**
File ID: **SC090831001.046**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	22.3		1.00	0.500

Report Number: **L09080640**Report Date : **September 4, 2009**

Sample Number: **L09080640-06**
Client ID: **MW16D-52.0**
Matrix: **Water**
Workgroup Number: **WG310918**
Collect Date: **08/26/2009 11:40**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **50**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/31/2009 10:38**
Cal Date: **08/31/2009 09:10**
Run Date: **08/31/2009 10:38**
File ID: **SC090831001.058**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	119		5.00	2.50

Report Number: **L09080640**Report Date : **September 4, 2009**

Sample Number: **L09080640-07**
Client ID: **MW16D-87.0**
Matrix: **Water**
Workgroup Number: **WG310918**
Collect Date: **08/26/2009 14:45**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **25**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/31/2009 10:25**
Cal Date: **08/31/2009 09:10**
Run Date: **08/31/2009 10:25**
File ID: **SC090831001.055**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	39.1		2.50	1.25

Report Number: **L09080640**Report Date : **September 4, 2009**

Sample Number: **L09080640-08**
Client ID: **MW16D-97.0**
Matrix: **Water**
Workgroup Number: **WG310918**
Collect Date: **08/26/2009 15:32**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **4**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **08/31/2009 10:05**
Cal Date: **08/31/2009 09:10**
Run Date: **08/31/2009 10:05**
File ID: **SC090831001.049**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	11.1		0.400	0.200

Report Number: **L09080640**Report Date : **September 4, 2009**

Sample Number: **L09080640-09**
Client ID: **MW16D-104.0**
Matrix: **Water**
Workgroup Number: **WG311429**
Collect Date: **08/26/2009 16:20**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/04/2009 11:20**
Cal Date: **09/04/2009 11:07**
Run Date: **09/04/2009 11:20**
File ID: **SC090904002.020**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	0.246		0.100	0.0500

Report Number: **L09080640**Report Date : **September 4, 2009**

Sample Number: **L09080640-10**
Client ID: **MW39D-117.0**
Matrix: **Water**
Workgroup Number: **WG311429**
Collect Date: **08/24/2009 14:05**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/04/2009 11:20**
Cal Date: **09/04/2009 11:07**
Run Date: **09/04/2009 11:20**
File ID: **SC090904002.021**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	0.221		0.100	0.0500

2.1.2.2 QC Summary Data

METHOD BLANK SUMMARY

Login Number: L09080640
 Blank File ID: SC090831001.039
 Prep Date: 08/31/09 09:39
 Analyzed Date: 08/31/09 09:39
 Analyst: JBK

Work Group: WG310918
 Blank Sample ID: WG310918-01
 Instrument ID: SMARTCHEM
 Method: 350.1

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS2	WG310918-03	SC090831001.011	08/31/09 09:14	01
MW39D-127.0	L09080640-01	SC090831001.026	08/31/09 09:28	DL01
MW39D-132.0	L09080640-02	SC090831001.027	08/31/09 09:28	DL01
EQUIP-BLK-1	L09080640-04	SC090831001.029	08/31/09 09:30	01
DUP	WG310918-06	SC090831001.036	08/31/09 09:37	01
LCS	WG310918-02	SC090831001.040	08/31/09 09:41	01
MW39D-147.0	L09080640-03	SC090831001.045	08/31/09 09:58	DL01
MW16D-47.0	L09080640-05	SC090831001.046	08/31/09 10:00	DL01
MW16D-97.0	L09080640-08	SC090831001.049	08/31/09 10:05	DL01
MW16D-87.0	L09080640-07	SC090831001.055	08/31/09 10:25	DL01
MW16D-52.0	L09080640-06	SC090831001.058	08/31/09 10:38	DL01



METHOD BLANK SUMMARY

Login Number: L09080640
 Blank File ID: SC090904002.009
 Prep Date: 09/04/09 11:09
 Analyzed Date: 09/04/09 11:09
 Analyst: DIH

Work Group: WG311429
 Blank Sample ID: WG311429-01
 Instrument ID: SMARTCHEM
 Method: 350.1

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
MW16D-104.0	L09080640-09	SC090904002.020	09/04/09 11:20	01
MW39D-117.0	L09080640-10	SC090904002.021	09/04/09 11:20	01
DUP	WG311429-05	SC090904002.037	09/04/09 11:34	DL01
LCS	WG311429-02	SC090904002.064	09/04/09 11:59	01



METHOD BLANK REPORT

Login Number: L09080640 Prep Date: 08/31/09 09:39 Sample ID: WG310918-01
Instrument ID: SMARTCHEM Run Date: 08/31/09 09:39 Prep Method: 350.1
File ID: SC090831001.039 Analyst: JBK Method: 350.1
Workgroup (AAB#): WG310918 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: SMARTC - 31-AUG-09

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Nitrogen, Ammonia	0.0500	0.100	0.100	1	ND

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1480202

04-SEP-2009 14:50



Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L09080640 Prep Date: 09/04/09 11:09 Sample ID: WG311429-01
Instrument ID: SMARTCHEM Run Date: 09/04/09 11:09 Prep Method: 350.1
File ID: SC090904002.009 Analyst: DIH Method: 350.1
Workgroup (AAB#): WG311429 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: SMARTC - 04-SEP-09

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Nitrogen, Ammonia	0.0500	0.100	0.100	1	ND

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1480202

04-SEP-2009 14:50



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09080640 Run Date: 09/04/2009 Sample ID: WG311429-02
Instrument ID: SMARTCHEM Run Time: 11:59 Prep Method: 350.1
File ID: SC090904002.064 Analyst: DIH Method: 350.1
Workgroup (AAB#): WG311429 Matrix: Water Units: mg/L
QC Key: DOWBOA2006 Lot#: STD33211 Cal ID: SMARTC - 04-SEP-09

Analytes	Expected	Found	% Rec	LCS Limits	Q
Nitrogen, Ammonia	2.00	1.97	98.5	90 - 110	

LCS - Modified 03/06/2008
PDF File ID: 1483038
Report generated: 09/04/2009 14:50



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09080640 Analyst: JBK Prep Method: 350.1
 Instrument ID: SMARTCHEM Matrix: Water Method: 350.1
 Workgroup (AAB#): WG310918 Units: mg/L
 QC Key: DOWB0A2006 Lot #: STD33211
 Sample ID: WG310918-02 LCS File ID: SC090831001.040 Run Date: 08/31/2009 09:41
 Sample ID: WG310918-03 LCS2 File ID: SC090831001.011 Run Date: 08/31/2009 09:14

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Nitrogen, Ammonia	2.00	1.91	95.6	2.00	1.87	93.5	2.23	90 - 110	25	



2.1.3 Total Dissolved Solids Data

2.1.3.1 Summary Data

LABORATORY REPORT

L09080640

09/04/09 16:54

Submitted By

Microbac Laboratories Inc.
158 Starlite Drive
Marietta , OH 45750
(740) 373 - 4071

For

Account Name: CH2MHILL, Inc
CH2MHILL
15010 Conference Center Drive Suite 200
Chantilly, VA 20151
Attention: Michael J. Zamboni

Project Number: 2736.006
Project: MI-Dow Ludington
Site: LUDINGTON, MI

P.O. Number: 935272

Sample Analysis Summary

Client ID	Lab ID	Method	Dilution	Date Received
MW39D-127.0	L09080640-01	160.1	1	27-AUG-09
MW39D-132.0	L09080640-02	160.1	1	27-AUG-09
MW39D-147.0	L09080640-03	160.1	1	27-AUG-09
EQUIP-BLK-1	L09080640-04	160.1	1	27-AUG-09
MW16D-47.0	L09080640-05	160.1	1	27-AUG-09
MW16D-52.0	L09080640-06	160.1	1	27-AUG-09
MW16D-87.0	L09080640-07	160.1	1	27-AUG-09
MW16D-97.0	L09080640-08	160.1	1	27-AUG-09
MW16D-104.0	L09080640-09	160.1	1	27-AUG-09
MW39D-117.0	L09080640-10	160.1	1	27-AUG-09



Report Number: **L09080640**Report Date : **September 4, 2009**

Sample Number: **L09080640-01**
Client ID: **MW39D-127.0**
Matrix: **Water**
Workgroup Number: **WG310807**
Collect Date: **08/24/2009 15:13**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/28/2009 10:50**
Cal Date:
Run Date: **08/28/2009 10:50**
File ID: **EN.0908281050-06**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		2950		20.0	10.0

Report Number: **L09080640**Report Date : **September 4, 2009**

Sample Number: **L09080640-02**
Client ID: **MW39D-132.0**
Matrix: **Water**
Workgroup Number: **WG310807**
Collect Date: **08/25/2009 08:25**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/28/2009 10:50**
Cal Date:
Run Date: **08/28/2009 10:50**
File ID: **EN.0908281050-07**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		3070		20.0	10.0

Report Number: **L09080640**Report Date : **September 4, 2009**

Sample Number: **L09080640-03**
Client ID: **MW39D-147.0**
Matrix: **Water**
Workgroup Number: **WG310807**
Collect Date: **08/25/2009 10:45**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/28/2009 10:50**
Cal Date:
Run Date: **08/28/2009 10:50**
File ID: **EN.0908281050-08**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		3010		20.0	10.0

Report Number: **L09080640**Report Date : **September 4, 2009**

Sample Number: **L09080640-04**
Client ID: **EQUIP-BLK-1**
Matrix: **Water**
Workgroup Number: **WG310807**
Collect Date: **08/24/2009 15:08**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/28/2009 10:50**
Cal Date:
Run Date: **08/28/2009 10:50**
File ID: **EN.0908281050-05**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids			ND	10.0	5.00

ND Not detected at or above the reporting limit (RL).

Report Number: **L09080640**Report Date : **September 4, 2009**

Sample Number: **L09080640-05**
Client ID: **MW16D-47.0**
Matrix: **Water**
Workgroup Number: **WG310807**
Collect Date: **08/26/2009 10:25**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/28/2009 10:50**
Cal Date:
Run Date: **08/28/2009 10:50**
File ID: **EN.0908281050-09**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		3540		20.0	10.0

Report Number: **L09080640**Report Date : **September 4, 2009**

Sample Number: **L09080640-06**
Client ID: **MW16D-52.0**
Matrix: **Water**
Workgroup Number: **WG310807**
Collect Date: **08/26/2009 11:40**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/28/2009 10:50**
Cal Date:
Run Date: **08/28/2009 10:50**
File ID: **EN.0908281050-10**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		2640		20.0	10.0

Report Number: **L09080640**Report Date : **September 4, 2009**

Sample Number: **L09080640-07**
Client ID: **MW16D-87.0**
Matrix: **Water**
Workgroup Number: **WG310807**
Collect Date: **08/26/2009 14:45**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/28/2009 10:50**
Cal Date:
Run Date: **08/28/2009 10:50**
File ID: **EN.0908281050-11**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		372		20.0	10.0

Report Number: **L09080640**Report Date : **September 4, 2009**

Sample Number: **L09080640-08**
Client ID: **MW16D-97.0**
Matrix: **Water**
Workgroup Number: **WG310807**
Collect Date: **08/26/2009 15:32**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/28/2009 10:50**
Cal Date:
Run Date: **08/28/2009 10:50**
File ID: **EN.0908281050-12**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		252		20.0	10.0

Report Number: **L09080640**Report Date : **September 4, 2009**

Sample Number: **L09080640-09**
Client ID: **MW16D-104.0**
Matrix: **Water**
Workgroup Number: **WG310807**
Collect Date: **08/26/2009 16:20**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/28/2009 10:50**
Cal Date:
Run Date: **08/28/2009 10:50**
File ID: **EN.0908281050-13**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		256		20.0	10.0

Report Number: **L09080640**Report Date : **September 4, 2009**

Sample Number: **L09080640-10**
Client ID: **MW39D-117.0**
Matrix: **Water**
Workgroup Number: **WG310807**
Collect Date: **08/24/2009 14:05**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/28/2009 10:50**
Cal Date:
Run Date: **08/28/2009 10:50**
File ID: **EN.0908281050-04**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		2250		20.0	10.0

2.1.3.2 QC Summary Data

METHOD BLANK SUMMARY

Login Number: L09080640
 Blank File ID: EN.0908281050-01
 Prep Date: 08/28/09 10:50
 Analyzed Date: 08/28/09 10:50
 Analyst: HJR

Work Group: WG310807
 Blank Sample ID: WG310807-01
 Instrument ID: OVEN
 Method: 160.1

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG310807-02	EN.0908281050-02	08/28/09 10:50	
LCS2	WG310807-03	EN.0908281050-03	08/28/09 10:50	
MW39D-117.0	L09080640-10	EN.0908281050-04	08/28/09 10:50	
EQUIP-BLK-1	L09080640-04	EN.0908281050-05	08/28/09 10:50	
MW39D-127.0	L09080640-01	EN.0908281050-06	08/28/09 10:50	
MW39D-132.0	L09080640-02	EN.0908281050-07	08/28/09 10:50	
MW39D-147.0	L09080640-03	EN.0908281050-08	08/28/09 10:50	
MW16D-47.0	L09080640-05	EN.0908281050-09	08/28/09 10:50	
MW16D-52.0	L09080640-06	EN.0908281050-10	08/28/09 10:50	
MW16D-87.0	L09080640-07	EN.0908281050-11	08/28/09 10:50	
MW16D-97.0	L09080640-08	EN.0908281050-12	08/28/09 10:50	
MW16D-104.0	L09080640-09	EN.0908281050-13	08/28/09 10:50	
DUP	WG310807-05	EN.0908281050-17	08/28/09 10:50	

Report Name: BLANK_SUMMARY
 PDF File ID: 1480017
 Report generated 09/02/2009 09:28



Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L09080640 Prep Date: 08/28/09 10:50 Sample ID: WG310807-01
Instrument ID: OVEN Run Date: 08/28/09 10:50 Prep Method: 160.1
File ID: EN.0908281050-01 Analyst: HJR Method: 160.1
Workgroup (AAB#): WG310807 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: OVEN -

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Total Dissolved Solids	5.00	10.0	10.0	1	ND

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1480018

02-SEP-2009 09:28



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09080640 Analyst: HJR Prep Method: 160.1
Instrument ID: OVEN Matrix: Water Method: 160.1
Workgroup (AAB#): WG310807 Units: mg/L
QC Key: DOWBOA2006 Lot #: STD32441
Sample ID: WG310807-02 LCS File ID: EN.0908281050-02 Run Date: 08/28/2009 10:50
Sample ID: WG310807-03 LCS2 File ID: EN.0908281050-03 Run Date: 08/28/2009 10:50

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Total Dissolved Solids	500	492	98.4	500	500	100	1.61	80 - 120	25	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 1480019
Report generated: 09/02/2009 09:28



3.0 Attachments

Microbac Laboratories Inc.
Analyst Listing
September 4, 2009

ADC - ANTHONY D. CANTER	AJF - AMANDA J. FICKIESEN	AJM - ANTHONY J. MOSSBURG
ALB - ANNIE L. BROWN	AML - ANTHONY M. LONG	BLG - BRENDA L. GREENWALT
BRG - BRENDA R. GREGORY	CAA - CASSIE A. AUGENSTEIN	CAF - CHERYL A. FLOWERS
CAH - CHARLES A. HALL	CEB - CHAD E. BARNES	CLC - CHRYS L. CRAWFORD
CLW - CHARISSA L. WINTERS	CPD - CHAD P. DAVIS	CSH - CHRIS S. HILL
DDE - DEBRA D. ELLIOTT	DEL - DON E. LIGHTFRITZ	DEV - DAVID E. VANDENBERG
DGB - DOUGLAS G. BUTCHER	DIH - DEANNA I. HESSON	DLB - DAVID L. BUMGARNER
DLP - DOROTHY L. PAYNE	DLR - DIANNA L. RAUCH	DR - DEANNA ROBERTS
ECL - ERIC C. LAWSON	EDA - ERIN D. AGEE	ERP - ERIN R. PORTER
FJB - FRANCES J. BOLDEN	HAV - HEMA VILASAGAR	HJR - HOLLY J. REED
JBK - JEREMY B. KINNEY	JDH - JUSTIN D. HESSON	JKT - JANE K. THOMPSON
JWR - JOHN W. RICHARDS	JWS - JACK W. SHEAVES	JYH - JI Y. HU
KEB - KATHRYN E. BARNES	KHR - KIM H. RHODES	KRA - KATHY R. ALBERTSON
LKN - LINDA K. NEDEFF	LSB - LESLIE S. BUCINA	MDA - MIKE D. ALBERTSON
MDC - MICHAEL D. COCHRAN	MES - MARY E. SCHILLING	MMB - MAREN M. BEERY
MRT - MICHELLE R. TAYLOR	MSW - MATT S. WILSON	NPM - NATHANIEL P. MILLER
PDM - PIERCE D. MORRIS	RAH - ROY A. HALSTEAD	RB - ROBERT BUCHANAN
REK - ROBERT E. KYER	RLK - ROBIN L. KLINGER	RWC - RODNEY W. CAMPBELL
SDH - SHANA D. HINYARD	SLM - STEPHANIE L. MOSSBURG	SLP - SHERI L. PFALZGRAF
TIP - TAE I. PARRISH	TMB - TIFFANY M. BAILEY	TMM - TAMMY M. MORRIS
VC - VICKI COLLIER	WTD - WADE T. DELONG	

September 04, 2009

Qualkey: STD

Qualifier	Description
*	Surrogate or spike compound out of range
+	Correlation coefficient for the MSA is less than 0.995
<	Result is less than the associated numerical value.
>	Result is greater than the associated numerical value.
A	See the report narrative
B	Analyte present in method blank
B1	Target analyte detected in method blank at or above the method reporting limit
B3	Target analyte detected in calibration blank at or above the method reporting limit
C	Confirmed by GC/MS
CG	Confluent growth
DL	Surrogate or spike compound was diluted out
E	Estimated concentration due to sample matrix interference
EDL	Elevated sample reporting limits, presence of non-target analytes
EMPC	Estimated Maximum Possible Concentration
F, S	Estimated result below quantitation limit; method of standard additions(MSA)
FL	Free Liquid
H1	Sample analysis performed past holding time.
I	Semiquantitative result (out of instrument calibration range)
J	The analyte was positively identified, but the quantitation was below the RL
J,B	Analyte detected in both the method blank and sample above the MDL.
J,P	Estimate; columns don't agree to within 40%
J,S	Estimated concentration; analyzed by method of standard addition (MSA)
L	Sample reporting limits elevated due to matrix interference
L1	The associated blank spike (LCS) recovery was above the laboratory acceptance limits.
L2	The associated blank spike (LCS) recovery was below the laboratory acceptance limits.
M	Matrix effect; the concentration is an estimate due to matrix effect.
N	Tentatively identified compound(TIC)
NA	Not applicable
ND	Not detected at or above the reporting limit (RL).
ND, L	Not detected; sample reporting limit (RL) elevated due to interference
ND, S	Not detected; analyzed by method of standard addition (MSA)
NF	Not found by library search
NFL	No free liquid
NI	Non-ignitable
NR	Analyte is not required to be analyzed
NS	Not spiked
P	Concentrations >40% difference between the two GC columns
Q	One or more quality control criteria fail. See narrative.
QNS	Quantity of sample not sufficient to perform analysis
RA	Reanalysis confirms reported results
RE	Reanalysis confirms sample matrix interference
S	Analyzed by method of standard addition (MSA)
SMI	Sample matrix interference on surrogate
SP	Reported results are for spike compounds only
TIC	Library Search Compound
TNTC	Too numerous to count
U	Undetected; the concentration is below the reported MDL.
UJ	Undetected; the MDL and RL are estimated due to quality control discrepancies.
W	Post-digestion spike for furnace AA out of control limits
X	Exceeds regulatory limit
X, S	Exceeds regulatory limit; method of standard additions (MSA)
Z	Cannot be resolved from isomer - see below

*****Special Notes for Organic Analytes**

1. Acrolein and acrylonitrile by method 624 are semi-quantitative screens only.
2. 1,2-Diphenylhydrazine is unstable and is reported as azobenzene.
3. N-nitrosodiphenylamine cannot be separated from diphenylamine.
4. 3-Methylphenol and 4-Methylphenol are unresolvable compounds.
5. m-Xylene and p-Xylene are unresolvable compounds.
6. The reporting limits for Appendix II/IX compounds by method 8270 are based on EPA estimated PQLs referenced in 40 CFR Part 264, Appendix IX. They are not always achievable for every compound and are matrix dependent.



COC No. A 14234

158 Starlite Drive

Marietta, OH 45750



Microbac

Phone: 740-373-4071

Fax: 740-373-4835

CHAIN-OF-CUSTODY RECORD

Company Name: CH2MHILL		Project Contact: Mike Zumboni		Contact Phone #: 703-376-5111		Program ☐ CWA ☐ RCRA ☐ DOD ☐ AFCEE ☐ Other			
Turn Around Requirements: Standard		Location: LUCINGTON, MI		Project ID: How LUCINGTON		TOTAL # (LAB USE)			
Sampler (print): Lauren Hunt		Signature: Lauren Hunt		Hold		ADDITIONAL REQUIREMENTS			
Sample I.D. No.	Comp	Grab	Date	Time	Matrix*	NUMBER OF CONTAINERS	Hold		
MW39D-127.0	X	X	8-24-09	1513	W	2	1		
MW39D-132.0	X	X	8-25-09	0825	W	2	1		
MW39D-147.0	X	X	↓	1045	W	2	1		
EQUIP-BX-1	X	X	8-24-09	1508	W	2	1		
MW16D-47.0	X	X	8-26-09	1025	W	2	1		
MW16D-52.0	X	X	8-26-09	1140	W	2	1		
MW16D-87.0	X	X	↓	1445	W	2	1		
MW16D-97.0	X	X	↓	1532	W	2	1		
MW16D-104.0	X	X	8-26-09	1620	W	2	1		
*SAMPLES COLLECTED ON 8-24 & 8-25, SHORTENED HOLD TIMES.							Dissolved Ammonia TDS & CHLORIDE		
Relinquished by: (Signature)							Date	Time	Received by: (Signature)
Relinquished by: (Signature)							Date	Time	Remarks:

221000001334

Microbac OVD

Received: 08/27/2009 09:43

By: ERIN PORTER

*Water (W), Soil (S), Solid Waste (SD), Unknown (X)



1000001334

COOLER INSPECTION



Received: 08/27/2009 09:43
Delivery Method: UPS
Opened By: Erin R Porter
Comments:

Login(s): L09080640

Cooler(s)

Cooler #	Temp Gun	Temp	Tracking #	COC #	Comments
0012112	G	4.0	J2029837614	COC14234	

1	Yes	Were shipping coolers sealed?
2	Yes	Were custody seals intact?
3	Yes	Were cooler temperatures in range of 0-6?
4	Yes	Was ice present?
5	No	Were COC's received/information complete/signed and dated?
6	Yes	Were sample containers and labels intact and match COC?
7	Yes	Were the correct containers and volumes received?
8	Yes	Were correct perservatives used? (water only)
9	No	Were pH ranges acceptable? (voa's excluded)
10	NA	Were VOA samples free of headspace (<6mm)?
11	Yes	Were samples received within EPA hold times?

Discrepancies:

5	MW39D-117.0 not on coc 8/24/09@1405 per bottle	Per J. Tortomasi, sample MW39D-117.0 is to be logged for NH3, Cl and TDS.
9	MW16D-52.0 didn't PH due to matrix	

Look closer. Go further. Do more.

Microbac - Ohio Valley Division
158 Starlite Drive
Marietta, OH 45750
Tel: (740)373-4071 Fax: (740)373-4835

Internal Chain of Custody Report

Login: L09080640

Account: 2736

Project: 2736.006

Samples: 10

Due Date: 10-SEP-2009

Samplenum **Container ID** **Products**
L09080640-01 609786 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	28-AUG-2009 08:28	JKT	
2	ANALYZ	W1	WET	28-AUG-2009 10:34	HJR	JKT
3	STORE	WET	A2	01-SEP-2009 14:40	RLK	JBK

Samplenum **Container ID** **Products**
L09080640-01 609787 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	28-AUG-2009 08:28	JKT	
2	ANALYZ	W1	WET	28-AUG-2009 10:33	TMM	JKT
3	STORE	WET	A2	31-AUG-2009 08:54	JKT	TMM

Samplenum **Container ID** **Products**
L09080640-02 609788 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	28-AUG-2009 08:28	JKT	
2	ANALYZ	W1	WET	28-AUG-2009 10:34	HJR	JKT
3	STORE	WET	A2	01-SEP-2009 14:40	RLK	JBK

Samplenum **Container ID** **Products**
L09080640-02 609789 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	28-AUG-2009 08:28	JKT	
2	ANALYZ	W1	WET	28-AUG-2009 10:33	TMM	JKT
3	STORE	WET	A2	31-AUG-2009 08:54	JKT	TMM

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09080640

Account: 2736

Project: 2736.006

Samples: 10

Due Date: 10-SEP-2009

Samplenum **Container ID** **Products**
L09080640-03 609790 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	28-AUG-2009 08:28	JKT	
2	ANALYZ	W1	WET	28-AUG-2009 10:34	HJR	JKT
3	STORE	WET	A2	01-SEP-2009 14:40	RLK	JBK

Samplenum **Container ID** **Products**
L09080640-03 609791 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	28-AUG-2009 08:28	JKT	
2	ANALYZ	W1	WET	28-AUG-2009 10:33	TMM	JKT
3	STORE	WET	A2	31-AUG-2009 08:54	JKT	TMM

Samplenum **Container ID** **Products**
L09080640-04 609792 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	WET	28-AUG-2009 08:28	JKT	
2	STORE	WET	A2	01-SEP-2009 14:40	RLK	JBK

Samplenum **Container ID** **Products**
L09080640-04 609793 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	28-AUG-2009 08:28	JKT	
2	ANALYZ	W1	WET	28-AUG-2009 10:33	TMM	JKT
3	STORE	WET	A2	31-AUG-2009 08:54	JKT	TMM

Samplenum **Container ID** **Products**
L09080640-05 609794 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	WET	28-AUG-2009 08:28	JKT	
2	STORE	WET	A2	01-SEP-2009 14:40	RLK	JBK

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09080640

Account: 2736

Project: 2736.006

Samples: 10

Due Date: 10-SEP-2009

Samplenum **Container ID** **Products**
L09080640-05 609795 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	WET	28-AUG-2009 08:28	JKT	
2	STORE	WET	A2	31-AUG-2009 08:54	JKT	TMM

Samplenum **Container ID** **Products**
L09080640-06 609796 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	28-AUG-2009 08:28	JKT	
2	ANALYZ	W1	WET	28-AUG-2009 10:35	HJR	JKT
3	STORE	WET	A2	01-SEP-2009 14:40	RLK	JBK

Samplenum **Container ID** **Products**
L09080640-06 609797 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	28-AUG-2009 08:28	JKT	
2	ANALYZ	W1	WET	28-AUG-2009 10:33	TMM	JKT
3	STORE	WET	A2	31-AUG-2009 08:54	JKT	TMM

Samplenum **Container ID** **Products**
L09080640-07 609798 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	28-AUG-2009 08:28	JKT	
2	ANALYZ	W1	WET	28-AUG-2009 10:35	HJR	JKT
3	STORE	WET	A2	01-SEP-2009 14:40	RLK	JBK

Samplenum **Container ID** **Products**
L09080640-07 609799 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	28-AUG-2009 08:28	JKT	
2	ANALYZ	W1	WET	28-AUG-2009 10:33	TMM	JKT
3	STORE	WET	A2	31-AUG-2009 08:54	JKT	TMM

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09080640

Account: 2736

Project: 2736.006

Samples: 10

Due Date: 10-SEP-2009

Samplenum **Container ID** **Products**
L09080640-08 609800 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	28-AUG-2009 08:28	JKT	
2	ANALYZ	W1	WET	28-AUG-2009 10:34	HJR	JKT
3	STORE	WET	A2	01-SEP-2009 14:40	RLK	JBK

Samplenum **Container ID** **Products**
L09080640-08 609801 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	28-AUG-2009 08:28	JKT	
2	ANALYZ	W1	WET	28-AUG-2009 10:33	TMM	JKT
3	STORE	WET	A2	31-AUG-2009 08:54	JKT	TMM

Samplenum **Container ID** **Products**
L09080640-09 609802 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	28-AUG-2009 08:28	JKT	
2	ANALYZ	W1	WET	28-AUG-2009 10:35	HJR	JKT
3	STORE	WET	A2	01-SEP-2009 14:40	RLK	JBK

Samplenum **Container ID** **Products**
L09080640-09 609803 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	28-AUG-2009 08:28	JKT	
2	ANALYZ	W1	WET	28-AUG-2009 10:33	TMM	JKT
3	STORE	WET	A2	03-SEP-2009 16:18	RLK	DLP

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09080640**Account:** 2736**Project:** 2736.006**Samples:** 10**Due Date:** 10-SEP-2009

Samplenum **Container ID** **Products**
L09080640-10 609804 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	28-AUG-2009 08:28	JKT	
2	ANALYZ	W1	WET	28-AUG-2009 10:35	HJR	JKT
3	STORE	WET	A2	01-SEP-2009 14:40	RLK	JBK

Samplenum **Container ID** **Products**
L09080640-10 609805 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	28-AUG-2009 08:28	JKT	
2	ANALYZ	W1	WET	28-AUG-2009 10:33	TMM	JKT
3	STORE	WET	A2	03-SEP-2009 16:18	RLK	DLP

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login





158 Starlite Drive, Marietta, OH 45750 • T:740-373-4071 • F:740-373-4835 • <http://www.microbac.com>

Laboratory Report Number: L09080720

Please find enclosed the analytical results for the samples you submitted to Microbac Laboratories.

Review and compilation of your report was completed by Microbac's Sales and Service Team. If you have questions, comments or require further assistance regarding this report, please contact your team member noted in the reviewed box below at 800-373-4071. Team member e-mail addresses also appear here for your convenience.

Kathy Albertson	<i>Team Chemist/Data Specialist</i>	kalbertson@microbac.com
Stephanie Mossburg	<i>Team Chemist/Data Specialist</i>	smossburg@microbac.com
Tony Long	<i>Team Chemist/Data Specialist</i>	tlong@microbac.com
Amanda Fickiesen	<i>Client Services Specialist</i>	afickiesen@microbac.com
Annie Brown	<i>Client Services Specialist</i>	abrown@microbac.com

This report was reviewed on September 04, 2009.

A handwritten signature in cursive script that reads "Kathy Albertson".

Kathy Albertson - Team Chemist/Data Specialist

I certify that all test results meet all of the requirements of the accrediting authority listed below. All results for soil samples are reported on a 'dry-weight' basis unless specified otherwise. Analytical results for water and wastes are reported on a 'as received' basis unless specified otherwise. A statement of uncertainty for each analysis is available upon request. This laboratory report shall not be reproduced, except in full, without the written approval of Microbac Laboratories.

This report was certified on September 04, 2009.

A handwritten signature in cursive script that reads "David E. Vandenberg".

David Vandenberg - Managing Director

State of origin: Michigan

Accrediting authority: N/A ID:N/A

QAPP: Microbac OVD

This report contains a total of 54 pages.

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Ohio Valley Division
158 Starlite Drive
Marietta, OH 45750

Phone: 800.373.4071
Fax: 740.373.4835

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Microbac REPORT L09080720
PREPARED FOR CH2MHILL, Inc
WORK ID:

1.0 Introduction	4
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1.0 Introduction

Microbac Laboratories Inc.
REPORT NARRATIVE

Microbac Login No: L09080720

CHAIN OF CUSTODY: The chain of custody number was 14236

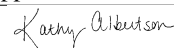
SHIPMENT CONDITIONS: The chain of custody forms were received sealed in a cooler. The cooler temperature was 3 degrees C.

SAMPLE MANAGEMENT: All samples received were intact.

L09080720-01	MW37D-147.0
L09080720-02	MW37D-137.0
L09080720-03	MW37D-117.0
L09080720-04	MW37D-77.0
L09080720-05	MW37D-87.0
L09080720-06	MW37D-97.0

I certify that this data package is in compliance with the terms and conditions agreed to by the client and Microbac Laboratories Inc., both technically and for completeness, except for the conditions noted above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or designated person, as verified by the following signature.

Approved: 01-SEP-09



2.0 Data Package

2.1 General Chemistry Data

2.1.1 Chloride Data

2.1.1.1 Summary Data

LABORATORY REPORT

L09080720

09/04/09 16:53

Submitted By

Microbac Laboratories Inc.
158 Starlite Drive
Marietta , OH 45750
(740) 373 - 4071

For

Account Name: CH2MHILL, Inc
CH2MHILL
15010 Conference Center Drive Suite 200
Chantilly, VA 20151
Attention: Michael J. Zamboni

Project Number: 2736.006
Project: MI-Dow Ludington
Site: LUDINGTON, MI

P.O. Number: 935272

Sample Analysis Summary

Client ID	Lab ID	Method	Dilution	Date Received
MW37D-147.0	L09080720-01	325.2	1	31-AUG-09
MW37D-137.0	L09080720-02	325.2	1	31-AUG-09
MW37D-117.0	L09080720-03	325.2	1	31-AUG-09
MW37D-77.0	L09080720-04	325.2	1	31-AUG-09
MW37D-87.0	L09080720-05	325.2	1	31-AUG-09
MW37D-97.0	L09080720-06	325.2	1	31-AUG-09



Report Number: **L09080720**Report Date : **September 4, 2009**

Sample Number: **L09080720-01**
Client ID: **MW37D-147.0**
Matrix: **Water**
Workgroup Number: **WG311103**
Collect Date: **08/28/2009 13:58**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/01/2009 14:33**
Cal Date: **09/01/2009 13:58**
Run Date: **09/01/2009 14:33**
File ID: **SC090901008.067**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6		ND	2.00	1.00

ND Not detected at or above the reporting limit (RL).

Report Number: **L09080720**Report Date : **September 4, 2009**

Sample Number: **L09080720-02**
Client ID: **MW37D-137.0**
Matrix: **Water**
Workgroup Number: **WG311103**
Collect Date: **08/28/2009 13:11**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/01/2009 14:34**
Cal Date: **09/01/2009 13:58**
Run Date: **09/01/2009 14:34**
File ID: **SC090901008.068**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6		ND	2.00	1.00

ND Not detected at or above the reporting limit (RL).

Report Number: **L09080720**Report Date : **September 4, 2009**

Sample Number: **L09080720-03**
Client ID: **MW37D-117.0**
Matrix: **Water**
Workgroup Number: **WG311103**
Collect Date: **08/28/2009 11:42**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/01/2009 14:35**
Cal Date: **09/01/2009 13:58**
Run Date: **09/01/2009 14:35**
File ID: **SC090901008.071**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6		ND	2.00	1.00

ND Not detected at or above the reporting limit (RL).

Report Number: **L09080720**Report Date : **September 4, 2009**

Sample Number: **L09080720-04**
Client ID: **MW37D-77.0**
Matrix: **Water**
Workgroup Number: **WG311103**
Collect Date: **08/28/2009 08:45**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/01/2009 14:36**
Cal Date: **09/01/2009 13:58**
Run Date: **09/01/2009 14:36**
File ID: **SC090901008.072**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	4.73		2.00	1.00

Report Number: **L09080720**Report Date : **September 4, 2009**

Sample Number: **L09080720-05**
Client ID: **MW37D-87.0**
Matrix: **Water**
Workgroup Number: **WG311103**
Collect Date: **08/28/2009 09:21**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/01/2009 14:36**
Cal Date: **09/01/2009 13:58**
Run Date: **09/01/2009 14:36**
File ID: **SC090901008.073**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6		ND	2.00	1.00

ND Not detected at or above the reporting limit (RL).

Report Number: **L09080720**Report Date : **September 4, 2009**

Sample Number: **L09080720-06**
Client ID: **MW37D-97.0**
Matrix: **Water**
Workgroup Number: **WG311103**
Collect Date: **08/28/2009 10:03**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/01/2009 14:37**
Cal Date: **09/01/2009 13:58**
Run Date: **09/01/2009 14:37**
File ID: **SC090901008.074**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6		ND	2.00	1.00

ND Not detected at or above the reporting limit (RL).

2.1.1.2 QC Summary Data

METHOD BLANK SUMMARY

Login Number: L09080720
 Blank File ID: SC090901008.038
 Prep Date: 09/01/09 14:16
 Analyzed Date: 09/01/09 14:16
 Analyst: JBK

Work Group: WG311103
 Blank Sample ID: WG311103-01
 Instrument ID: SMARTCHEM
 Method: 325.2

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG311103-02	SC090901008.039	09/01/09 14:16	01
LCS2	WG311103-03	SC090901008.040	09/01/09 14:17	01
DUP	WG311103-05	SC090901008.057	09/01/09 14:27	01
MW37D-147.0	L09080720-01	SC090901008.067	09/01/09 14:33	01
MW37D-137.0	L09080720-02	SC090901008.068	09/01/09 14:34	01
MW37D-117.0	L09080720-03	SC090901008.071	09/01/09 14:35	01
MW37D-77.0	L09080720-04	SC090901008.072	09/01/09 14:36	01
MW37D-87.0	L09080720-05	SC090901008.073	09/01/09 14:36	01
MW37D-97.0	L09080720-06	SC090901008.074	09/01/09 14:37	01

Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L09080720 Prep Date: 09/01/09 14:16 Sample ID: WG311103-01
Instrument ID: SMARTCHEM Run Date: 09/01/09 14:16 Prep Method: 325.2
File ID: SC090901008.038 Analyst: JBK Method: 325.2
Workgroup (AAB#): WG311103 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: SMARTC - 01-SEP-09

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Chloride	1.00	2.00	2.00	1	ND

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1479950

02-SEP-2009 09:18



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09080720 Analyst: JBK Prep Method: 325.2
Instrument ID: SMARTCHEM Matrix: Water Method: 325.2
Workgroup (AAB#): WG311103 Units: mg/L
QC Key: DOWBOA2006 Lot #: STD34512
Sample ID: WG311103-02 LCS File ID: SC090901008.039 Run Date: 09/01/2009 14:16
Sample ID: WG311103-03 LCS2 File ID: SC090901008.040 Run Date: 09/01/2009 14:17

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Chloride	50.0	52.0	104	50.0	50.6	101	2.75	90 - 110	10	



2.1.2 Ammonia Data

2.1.2.1 Summary Data

LABORATORY REPORT

L09080720

09/04/09 16:53

Submitted By

Microbac Laboratories Inc.
158 Starlite Drive
Marietta, OH 45750
(740) 373-4071

For

Account Name: CH2MHILL, Inc
CH2MHILL
15010 Conference Center Drive Suite 200
Chantilly, VA 20151
Attention: Michael J. Zamboni

Project Number: 2736.006
Project: MI-Dow Ludington
Site: LUDINGTON, MI

P.O. Number: 935272

Sample Analysis Summary

Client ID	Lab ID	Method	Dilution	Date Received
MW37D-147.0	L09080720-01	350.1	1	31-AUG-09
MW37D-137.0	L09080720-02	350.1	1	31-AUG-09
MW37D-117.0	L09080720-03	350.1	1	31-AUG-09
MW37D-77.0	L09080720-04	350.1	20	31-AUG-09
MW37D-87.0	L09080720-05	350.1	5	31-AUG-09
MW37D-97.0	L09080720-06	350.1	4	31-AUG-09



Report Number: **L09080720**Report Date : **September 4, 2009**

Sample Number: **L09080720-01**
Client ID: **MW37D-147.0**
Matrix: **Water**
Workgroup Number: **WG311429**
Collect Date: **08/28/2009 13:58**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/04/2009 11:27**
Cal Date: **09/04/2009 11:07**
Run Date: **09/04/2009 11:27**
File ID: **SC090904002.029**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	0.154		0.100	0.0500

Report Number: **L09080720**Report Date : **September 4, 2009**

Sample Number: **L09080720-02**
Client ID: **MW37D-137.0**
Matrix: **Water**
Workgroup Number: **WG311429**
Collect Date: **08/28/2009 13:11**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/04/2009 11:30**
Cal Date: **09/04/2009 11:07**
Run Date: **09/04/2009 11:30**
File ID: **SC090904002.032**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	0.231		0.100	0.0500

Report Number: **L09080720**Report Date : **September 4, 2009**

Sample Number: **L09080720-03**
Client ID: **MW37D-117.0**
Matrix: **Water**
Workgroup Number: **WG311429**
Collect Date: **08/28/2009 11:42**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/04/2009 11:31**
Cal Date: **09/04/2009 11:07**
Run Date: **09/04/2009 11:31**
File ID: **SC090904002.033**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	0.297		0.100	0.0500

Report Number: **L09080720**Report Date : **September 4, 2009**

Sample Number: **L09080720-04**
Client ID: **MW37D-77.0**
Matrix: **Water**
Workgroup Number: **WG311429**
Collect Date: **08/28/2009 08:45**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **20**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/04/2009 11:32**
Cal Date: **09/04/2009 11:07**
Run Date: **09/04/2009 11:32**
File ID: **SC090904002.034**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	34.6		2.00	1.00

Report Number: **L09080720**Report Date : **September 4, 2009**

Sample Number: **L09080720-05**
Client ID: **MW37D-87.0**
Matrix: **Water**
Workgroup Number: **WG311429**
Collect Date: **08/28/2009 09:21**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **5**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/04/2009 11:33**
Cal Date: **09/04/2009 11:07**
Run Date: **09/04/2009 11:33**
File ID: **SC090904002.035**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	9.39		0.500	0.250

Report Number: **L09080720**Report Date : **September 4, 2009**

Sample Number: **L09080720-06**
Client ID: **MW37D-97.0**
Matrix: **Water**
Workgroup Number: **WG311429**
Collect Date: **08/28/2009 10:03**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **4**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/04/2009 11:34**
Cal Date: **09/04/2009 11:07**
Run Date: **09/04/2009 11:34**
File ID: **SC090904002.036**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	6.99		0.400	0.200

2.1.2.2 QC Summary Data

METHOD BLANK SUMMARY

Login Number: L09080720
 Blank File ID: SC090904002.009
 Prep Date: 09/04/09 11:09
 Analyzed Date: 09/04/09 11:09
 Analyst: DIH

Work Group: WG311429
 Blank Sample ID: WG311429-01
 Instrument ID: SMARTCHEM
 Method: 350.1

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
MW37D-147.0	L09080720-01	SC090904002.029	09/04/09 11:27	01
MW37D-137.0	L09080720-02	SC090904002.032	09/04/09 11:30	01
MW37D-117.0	L09080720-03	SC090904002.033	09/04/09 11:31	01
MW37D-77.0	L09080720-04	SC090904002.034	09/04/09 11:32	DL01
MW37D-87.0	L09080720-05	SC090904002.035	09/04/09 11:33	DL01
MW37D-97.0	L09080720-06	SC090904002.036	09/04/09 11:34	DL01
DUP	WG311429-05	SC090904002.037	09/04/09 11:34	DL01
LCS	WG311429-02	SC090904002.064	09/04/09 11:59	01

METHOD BLANK REPORT

Login Number: L09080720 Prep Date: 09/04/09 11:09 Sample ID: WG311429-01
Instrument ID: SMARTCHEM Run Date: 09/04/09 11:09 Prep Method: 350.1
File ID: SC090904002.009 Analyst: DIH Method: 350.1
Workgroup (AAB#): WG311429 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: SMARTC - 04-SEP-09

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Nitrogen, Ammonia	0.0500	0.100	0.100	1	ND

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1483049

04-SEP-2009 14:56



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09080720 Run Date: 09/04/2009 Sample ID: WG311429-02
Instrument ID: SMARTCHEM Run Time: 11:59 Prep Method: 350.1
File ID: SC090904002.064 Analyst: DIH Method: 350.1
Workgroup (AAB#): WG311429 Matrix: Water Units: mg/L
QC Key: DOWBOA2006 Lot#: STD33211 Cal ID: SMARTC - 04-SEP-09

Analytes	Expected	Found	% Rec	LCS Limits	Q
Nitrogen, Ammonia	2.00	1.97	98.5	90 - 110	

LCS - Modified 03/06/2008
PDF File ID: 1483050
Report generated: 09/04/2009 14:56



2.1.3 Total Dissolved Solids Data

2.1.3.1 Summary Data

LABORATORY REPORT

L09080720

09/04/09 16:53

Submitted By

Microbac Laboratories Inc.
158 Starlite Drive
Marietta , OH 45750
(740) 373 - 4071

For

Account Name: CH2MHILL, Inc
CH2MHILL
15010 Conference Center Drive Suite 200
Chantilly, VA 20151
Attention: Michael J. Zamboni

Project Number: 2736.006
Project: MI-Dow Ludington
Site: LUDINGTON, MI

P.O. Number: 935272

Sample Analysis Summary

Client ID	Lab ID	Method	Dilution	Date Received
MW37D-147.0	L09080720-01	160.1	1	31-AUG-09
MW37D-137.0	L09080720-02	160.1	1	31-AUG-09
MW37D-117.0	L09080720-03	160.1	1	31-AUG-09
MW37D-77.0	L09080720-04	160.1	1	31-AUG-09
MW37D-87.0	L09080720-05	160.1	1	31-AUG-09
MW37D-97.0	L09080720-06	160.1	1	31-AUG-09



Report Number: **L09080720**Report Date : **September 4, 2009**

Sample Number: **L09080720-01**
Client ID: **MW37D-147.0**
Matrix: **Water**
Workgroup Number: **WG310949**
Collect Date: **08/28/2009 13:58**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/31/2009 14:00**
Cal Date:
Run Date: **08/31/2009 14:00**
File ID: **EN.0908311400-11**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		338		20.0	10.0

Report Number: **L09080720**Report Date : **September 4, 2009**

Sample Number: **L09080720-02**
Client ID: **MW37D-137.0**
Matrix: **Water**
Workgroup Number: **WG310949**
Collect Date: **08/28/2009 13:11**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/31/2009 14:00**
Cal Date:
Run Date: **08/31/2009 14:00**
File ID: **EN.0908311400-16**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		268		20.0	10.0

Report Number: **L09080720**Report Date : **September 4, 2009**

Sample Number: **L09080720-03**
Client ID: **MW37D-117.0**
Matrix: **Water**
Workgroup Number: **WG310949**
Collect Date: **08/28/2009 11:42**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/31/2009 14:00**
Cal Date:
Run Date: **08/31/2009 14:00**
File ID: **EN.0908311400-19**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		252		20.0	10.0

Report Number: **L09080720**Report Date : **September 4, 2009**

Sample Number: **L09080720-04**
Client ID: **MW37D-77.0**
Matrix: **Water**
Workgroup Number: **WG310949**
Collect Date: **08/28/2009 08:45**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/31/2009 14:00**
Cal Date:
Run Date: **08/31/2009 14:00**
File ID: **EN.0908311400-14**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		504		20.0	10.0

Report Number: **L09080720**Report Date : **September 4, 2009**

Sample Number: **L09080720-05**
Client ID: **MW37D-87.0**
Matrix: **Water**
Workgroup Number: **WG310949**
Collect Date: **08/28/2009 09:21**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/31/2009 14:00**
Cal Date:
Run Date: **08/31/2009 14:00**
File ID: **EN.0908311400-10**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		332		20.0	10.0

Report Number: **L09080720**Report Date : **September 4, 2009**

Sample Number: **L09080720-06**
Client ID: **MW37D-97.0**
Matrix: **Water**
Workgroup Number: **WG310949**
Collect Date: **08/28/2009 10:03**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/31/2009 14:00**
Cal Date:
Run Date: **08/31/2009 14:00**
File ID: **EN.0908311400-15**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		328		20.0	10.0

2.1.3.2 QC Summary Data

METHOD BLANK SUMMARY

Login Number: L09080720
 Blank File ID: EN.0908311400-01
 Prep Date: 08/31/09 14:00
 Analyzed Date: 08/31/09 14:00
 Analyst: HJR

Work Group: WG310949
 Blank Sample ID: WG310949-01
 Instrument ID: OVEN
 Method: 160.1

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG310949-02	EN.0908311400-02	08/31/09 14:00	
LCS2	WG310949-03	EN.0908311400-03	08/31/09 14:00	
MW37D-87.0	L09080720-05	EN.0908311400-10	08/31/09 14:00	
MW37D-147.0	L09080720-01	EN.0908311400-11	08/31/09 14:00	
MW37D-77.0	L09080720-04	EN.0908311400-14	08/31/09 14:00	
MW37D-97.0	L09080720-06	EN.0908311400-15	08/31/09 14:00	
MW37D-137.0	L09080720-02	EN.0908311400-16	08/31/09 14:00	
MW37D-117.0	L09080720-03	EN.0908311400-19	08/31/09 14:00	
DUP	WG310949-05	EN.0908311400-24	08/31/09 14:00	

Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L09080720 Prep Date: 08/31/09 14:00 Sample ID: WG310949-01
Instrument ID: OVEN Run Date: 08/31/09 14:00 Prep Method: 160.1
File ID: EN.0908311400-01 Analyst: HJR Method: 160.1
Workgroup (AAB#): WG310949 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: OVEN -

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Total Dissolved Solids	5.00	10.0	10.0	1	ND

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1482622

04-SEP-2009 11:27



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09080720 Analyst: HJR Prep Method: 160.1
 Instrument ID: OVEN Matrix: Water Method: 160.1
 Workgroup (AAB#): WG310949 Units: mg/L
 QC Key: DOWBOA2006 Lot #: STD32441
 Sample ID: WG310949-02 LCS File ID: EN.0908311400-02 Run Date: 08/31/2009 14:00
 Sample ID: WG310949-03 LCS2 File ID: EN.0908311400-03 Run Date: 08/31/2009 14:00

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Total Dissolved Solids	500	494	98.8	500	506	101	2.40	80 - 120	25	

LCS_LCS2 - Modified 03/06/2008
 PDF File ID: 1482623
 Report generated: 09/04/2009 11:27



3.0 Attachments

Microbac Laboratories Inc.
Analyst Listing
September 4, 2009

ADC - ANTHONY D. CANTER	AJF - AMANDA J. FICKIESEN	AJM - ANTHONY J. MOSSBURG
ALB - ANNIE L. BROWN	AML - ANTHONY M. LONG	BLG - BRENDA L. GREENWALT
BRG - BRENDA R. GREGORY	CAA - CASSIE A. AUGENSTEIN	CAF - CHERYL A. FLOWERS
CAH - CHARLES A. HALL	CEB - CHAD E. BARNES	CLC - CHRYS L. CRAWFORD
CLW - CHARISSA L. WINTERS	CPD - CHAD P. DAVIS	CSH - CHRIS S. HILL
DDE - DEBRA D. ELLIOTT	DEL - DON E. LIGHTFRITZ	DEV - DAVID E. VANDENBERG
DGB - DOUGLAS G. BUTCHER	DIH - DEANNA I. HESSON	DLB - DAVID L. BUMGARNER
DLP - DOROTHY L. PAYNE	DLR - DIANNA L. RAUCH	DR - DEANNA ROBERTS
ECL - ERIC C. LAWSON	EDA - ERIN D. AGEE	ERP - ERIN R. PORTER
FJB - FRANCES J. BOLDEN	HAV - HEMA VILASAGAR	HJR - HOLLY J. REED
JBK - JEREMY B. KINNEY	JDH - JUSTIN D. HESSON	JKT - JANE K. THOMPSON
JWR - JOHN W. RICHARDS	JWS - JACK W. SHEAVES	JYH - JI Y. HU
KEB - KATHRYN E. BARNES	KHR - KIM H. RHODES	KRA - KATHY R. ALBERTSON
LKN - LINDA K. NEDEFF	LSB - LESLIE S. BUCINA	MDA - MIKE D. ALBERTSON
MDC - MICHAEL D. COCHRAN	MES - MARY E. SCHILLING	MMB - MAREN M. BEERY
MRT - MICHELLE R. TAYLOR	MSW - MATT S. WILSON	NPM - NATHANIEL P. MILLER
PDM - PIERCE D. MORRIS	RAH - ROY A. HALSTEAD	RB - ROBERT BUCHANAN
REK - ROBERT E. KYER	RLK - ROBIN L. KLINGER	RWC - RODNEY W. CAMPBELL
SDH - SHANA D. HINYARD	SLM - STEPHANIE L. MOSSBURG	SLP - SHERI L. PFALZGRAF
TIP - TAE I. PARRISH	TMB - TIFFANY M. BAILEY	TMM - TAMMY M. MORRIS
VC - VICKI COLLIER	WTD - WADE T. DELONG	

September 04, 2009

Qualkey: STD

Qualifier	Description
*	Surrogate or spike compound out of range
+	Correlation coefficient for the MSA is less than 0.995
<	Result is less than the associated numerical value.
>	Result is greater than the associated numerical value.
A	See the report narrative
B	Analyte present in method blank
B1	Target analyte detected in method blank at or above the method reporting limit
B3	Target analyte detected in calibration blank at or above the method reporting limit
C	Confirmed by GC/MS
CG	Confluent growth
DL	Surrogate or spike compound was diluted out
E	Estimated concentration due to sample matrix interference
EDL	Elevated sample reporting limits, presence of non-target analytes
EMPC	Estimated Maximum Possible Concentration
F, S	Estimated result below quantitation limit; method of standard additions(MSA)
FL	Free Liquid
H1	Sample analysis performed past holding time.
I	Semiquantitative result (out of instrument calibration range)
J	The analyte was positively identified, but the quantitation was below the RL
J,B	Analyte detected in both the method blank and sample above the MDL.
J,P	Estimate; columns don't agree to within 40%
J,S	Estimated concentration; analyzed by method of standard addition (MSA)
L	Sample reporting limits elevated due to matrix interference
L1	The associated blank spike (LCS) recovery was above the laboratory acceptance limits.
L2	The associated blank spike (LCS) recovery was below the laboratory acceptance limits.
M	Matrix effect; the concentration is an estimate due to matrix effect.
N	Tentatively identified compound(TIC)
NA	Not applicable
ND	Not detected at or above the reporting limit (RL).
ND, L	Not detected; sample reporting limit (RL) elevated due to interference
ND, S	Not detected; analyzed by method of standard addition (MSA)
NF	Not found by library search
NFL	No free liquid
NI	Non-ignitable
NR	Analyte is not required to be analyzed
NS	Not spiked
P	Concentrations >40% difference between the two GC columns
Q	One or more quality control criteria fail. See narrative.
QNS	Quantity of sample not sufficient to perform analysis
RA	Reanalysis confirms reported results
RE	Reanalysis confirms sample matrix interference
S	Analyzed by method of standard addition (MSA)
SMI	Sample matrix interference on surrogate
SP	Reported results are for spike compounds only
TIC	Library Search Compound
TNTC	Too numerous to count
U	Undetected; the concentration is below the reported MDL.
UJ	Undetected; the MDL and RL are estimated due to quality control discrepancies.
W	Post-digestion spike for furnace AA out of control limits
X	Exceeds regulatory limit
X, S	Exceeds regulatory limit; method of standard additions (MSA)
Z	Cannot be resolved from isomer - see below

*****Special Notes for Organic Analytes**

1. Acrolein and acrylonitrile by method 624 are semi-quantitative screens only.
2. 1,2-Diphenylhydrazine is unstable and is reported as azobenzene.
3. N-nitrosodiphenylamine cannot be separated from diphenylamine.
4. 3-Methylphenol and 4-Methylphenol are unresolvable compounds.
5. m-Xylene and p-Xylene are unresolvable compounds.
6. The reporting limits for Appendix II/IX compounds by method 8270 are based on EPA estimated PQLs referenced in 40 CFR Part 264, Appendix IX. They are not always achievable for every compound and are matrix dependent.





1000001416

COOLER INSPECTION



Received: 08/29/2009 10:31
Delivery Method: UPS
Opened By: Don Lightfritz
Comments:

Login(s): L09080720

Cooler(s)

Cooler #	Temp Gun	Temp	Tracking #	COC #	Comments
0010299	H	3.0	J2029837669	COC14236	

1	Yes	Were shipping coolers sealed?
2	Yes	Were custody seals intact?
3	Yes	Were cooler temperatures in range of 0-6?
4	Yes	Was ice present?
5	Yes	Were COC's received/information complete/signed and dated?
6	Yes	Were sample containers and labels intact and match COC?
7	Yes	Were the correct containers and volumes received?
8	Yes	Were correct preservatives used? (water only)
9	Yes	Were pH ranges acceptable? (voa's excluded)
10	NA	Were VOA samples free of headspace (<6mm)?
11	Yes	Were samples received within EPA hold times?

Look closer. Go further. Do more.

Microbac - Ohio Valley Division
158 Starlite Drive
Marietta, OH 45750
Tel: (740)373-4071 Fax: (740)373-4835

Internal Chain of Custody Report

Login: L09080720

Account: 2736

Project: 2736.006

Samples: 6

Due Date: 14-SEP-2009

Samplenum **Container ID** **Products**
L09080720-01 610724 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	31-AUG-2009 14:44	JKT	
2	ANALYZ	W1	WET	31-AUG-2009 15:16	HJR	JKT
3	STORE	WET	A2	01-SEP-2009 14:40	RLK	JBK

Samplenum **Container ID** **Products**
L09080720-01 610725 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	31-AUG-2009 14:44	JKT	
2	ANALYZ	W1	WET	03-SEP-2009 08:08	DLP	JKT
3	STORE	WET	A2	03-SEP-2009 16:18	RLK	DLP

Samplenum **Container ID** **Products**
L09080720-02 610726 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	31-AUG-2009 14:44	JKT	
2	ANALYZ	W1	WET	31-AUG-2009 15:16	HJR	JKT
3	STORE	WET	A2	01-SEP-2009 14:40	RLK	JBK

Samplenum **Container ID** **Products**
L09080720-02 610727 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	31-AUG-2009 14:44	JKT	
2	ANALYZ	W1	WET	03-SEP-2009 08:08	DLP	JKT
3	STORE	WET	A2	03-SEP-2009 16:18	RLK	DLP

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09080720

Account: 2736

Project: 2736.006

Samples: 6

Due Date: 14-SEP-2009

Samplenum **Container ID** **Products**
L09080720-03 610728 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	31-AUG-2009 14:44	JKT	
2	ANALYZ	W1	WET	31-AUG-2009 15:16	HJR	JKT
3	STORE	WET	A2	01-SEP-2009 14:40	RLK	JBK

Samplenum **Container ID** **Products**
L09080720-03 610729 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	31-AUG-2009 14:44	JKT	
2	ANALYZ	W1	WET	03-SEP-2009 08:08	DLP	JKT
3	STORE	WET	A2	03-SEP-2009 16:18	RLK	DLP

Samplenum **Container ID** **Products**
L09080720-04 610730 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	31-AUG-2009 14:44	JKT	
2	ANALYZ	W1	WET	31-AUG-2009 15:16	HJR	JKT
3	STORE	WET	A2	01-SEP-2009 14:40	RLK	JBK

Samplenum **Container ID** **Products**
L09080720-04 610731 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	31-AUG-2009 14:44	JKT	
2	ANALYZ	W1	WET	03-SEP-2009 08:08	DLP	JKT
3	STORE	WET	A2	03-SEP-2009 16:18	RLK	DLP

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09080720

Account: 2736

Project: 2736.006

Samples: 6

Due Date: 14-SEP-2009

Samplenum **Container ID** **Products**
L09080720-05 610732 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	31-AUG-2009 14:44	JKT	
2	ANALYZ	W1	WET	31-AUG-2009 15:15	HJR	JKT
3	STORE	WET	A2	01-SEP-2009 14:40	RLK	JBK

Samplenum **Container ID** **Products**
L09080720-05 610733 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	31-AUG-2009 14:44	JKT	
2	ANALYZ	W1	WET	03-SEP-2009 08:08	DLP	JKT
3	STORE	WET	A2	03-SEP-2009 16:18	RLK	DLP

Samplenum **Container ID** **Products**
L09080720-06 610734 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	31-AUG-2009 14:44	JKT	
2	ANALYZ	W1	WET	31-AUG-2009 15:15	HJR	JKT
3	STORE	WET	A2	01-SEP-2009 14:40	RLK	JBK

Samplenum **Container ID** **Products**
L09080720-06 610735 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	31-AUG-2009 14:44	JKT	
2	ANALYZ	W1	WET	03-SEP-2009 08:08	DLP	JKT
3	STORE	WET	A2	03-SEP-2009 16:18	RLK	DLP

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login





158 Starlite Drive, Marietta, OH 45750 • T:740-373-4071 • F:740-373-4835 • <http://www.microbac.com>

Laboratory Report Number: L09080726

Please find enclosed the analytical results for the samples you submitted to Microbac Laboratories.

Review and compilation of your report was completed by Microbac's Sales and Service Team. If you have questions, comments or require further assistance regarding this report, please contact your team member noted in the reviewed box below at 800-373-4071. Team member e-mail addresses also appear here for your convenience.

Kathy Albertson	<i>Team Chemist/Data Specialist</i>	kalbertson@microbac.com
Stephanie Mossburg	<i>Team Chemist/Data Specialist</i>	smossburg@microbac.com
Tony Long	<i>Team Chemist/Data Specialist</i>	tlong@microbac.com
Amanda Fickiesen	<i>Client Services Specialist</i>	afickiesen@microbac.com
Annie Brown	<i>Client Services Specialist</i>	abrown@microbac.com

This report was reviewed on September 10, 2009.

A handwritten signature in cursive script that reads "Kathy Albertson".

Kathy Albertson - Team Chemist/Data Specialist

I certify that all test results meet all of the requirements of the accrediting authority listed below. All results for soil samples are reported on a 'dry-weight' basis unless specified otherwise. Analytical results for water and wastes are reported on a 'as received' basis unless specified otherwise. A statement of uncertainty for each analysis is available upon request. This laboratory report shall not be reproduced, except in full, without the written approval of Microbac Laboratories.

The reported results are related only to the samples analyzed as received.

Client: Michael J. Zamboni, CH2MHILL, Chantilly, VA, 20151

This report was certified on September 10, 2009.

A handwritten signature in cursive script that reads "David E. Vandenberg".

David Vandenberg - Managing Director

State of origin: Michigan

Accrediting authority: N/A ID:N/A

QAPP: Microbac OVD

This report contains a total of 54 pages.

Look closer. Go further. Do more.



The Microbac logo consists of the word "Microbac" in a white serif font, centered within a dark teal rectangular box.

Microbac Laboratories, Inc.
Ohio Valley Division
158 Starlite Drive
Marietta, OH 45750

Phone: 800.373.4071
Fax: 740.373.4835

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LOOK CLOSER, GO FURTHER, DO MORE.

Microbac REPORT L09080726
PREPARED FOR CH2MHILL, Inc
WORK ID:

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1.0 Introduction

Microbac Laboratories Inc.
REPORT NARRATIVE

Microbac Login No: L09080726

CHAIN OF CUSTODY: The chain of custody number was 14237

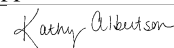
SHIPMENT CONDITIONS: The chain of custody forms were received sealed in a cooler. The cooler temperature was 2 degrees C.

SAMPLE MANAGEMENT: All samples received were intact.

L09080726-01	MW16D-117.0
L09080726-02	MW16D-147.0
L09080726-03	MW16D-134.0
L09080726-04	MW16D-117.0FD
L09080726-05	MW16D-125.5
L09080726-06	MW37D-137.0

I certify that this data package is in compliance with the terms and conditions agreed to by the client and Microbac Laboratories Inc., both technically and for completeness, except for the conditions noted above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or designated person, as verified by the following signature.

Approved: 01-SEP-09



2.0 Data Package

2.1 General Chemistry Data

2.1.1 Chloride Data

2.1.1.1 Summary Data

LABORATORY REPORT

L09080726

09/10/09 15:02

Submitted By

Microbac Laboratories Inc.
158 Starlite Drive
Marietta, OH 45750
(740) 373-4071

For

Account Name: CH2MHILL, Inc
CH2MHILL
15010 Conference Center Drive Suite 200
Chantilly, VA 20151
Attention: Michael J. Zamboni

Project Number: 2736.006
Project: MI-Dow Ludington
Site: LUDINGTON, MI

P.O. Number: 935272

Sample Analysis Summary

Client ID	Lab ID	Method	Dilution	Date Received
MW16D-117.0	L09080726-01	325.2	1	29-AUG-09
MW16D-147.0	L09080726-02	325.2	1	29-AUG-09
MW16D-134.0	L09080726-03	325.2	1	29-AUG-09
MW16D-117.0FD	L09080726-04	325.2	1	29-AUG-09
MW16D-125.5	L09080726-05	325.2	1	29-AUG-09
MW37D-137.0	L09080726-06	325.2	1	29-AUG-09



Report Number: **L09080726**Report Date : **September 10, 2009**

Sample Number: **L09080726-01**
Client ID: **MW16D-117.0**
Matrix: **Water**
Workgroup Number: **WG311103**
Collect Date: **08/27/2009 08:50**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/01/2009 14:38**
Cal Date: **09/01/2009 13:58**
Run Date: **09/01/2009 14:38**
File ID: **SC090901008.075**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6		ND	2.00	1.00

ND Not detected at or above the reporting limit (RL).

Report Number: **L09080726**Report Date : **September 10, 2009**

Sample Number: **L09080726-02**
Client ID: **MW16D-147.0**
Matrix: **Water**
Workgroup Number: **WG311103**
Collect Date: **08/27/2009 13:22**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/01/2009 14:39**
Cal Date: **09/01/2009 13:58**
Run Date: **09/01/2009 14:39**
File ID: **SC090901008.076**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6		ND	2.00	1.00

ND Not detected at or above the reporting limit (RL).

Report Number: **L09080726**Report Date : **September 10, 2009**

Sample Number: **L09080726-03**
Client ID: **MW16D-134.0**
Matrix: **Water**
Workgroup Number: **WG311103**
Collect Date: **08/27/2009 11:34**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/01/2009 14:39**
Cal Date: **09/01/2009 13:58**
Run Date: **09/01/2009 14:39**
File ID: **SC090901008.077**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6		ND	2.00	1.00

ND Not detected at or above the reporting limit (RL).

Report Number: **L09080726**Report Date : **September 10, 2009**

Sample Number: **L09080726-04**
Client ID: **MW16D-117.0FD**
Matrix: **Water**
Workgroup Number: **WG311103**
Collect Date: **08/27/2009 08:58**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/01/2009 14:40**
Cal Date: **09/01/2009 13:58**
Run Date: **09/01/2009 14:40**
File ID: **SC090901008.078**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	6.65		2.00	1.00

Report Number: **L09080726**Report Date : **September 10, 2009**

Sample Number: **L09080726-05**
Client ID: **MW16D-125.5**
Matrix: **Water**
Workgroup Number: **WG311103**
Collect Date: **08/27/2009 10:50**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/01/2009 14:40**
Cal Date: **09/01/2009 13:58**
Run Date: **09/01/2009 14:40**
File ID: **SC090901008.079**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6		ND	2.00	1.00

ND Not detected at or above the reporting limit (RL).

Report Number: **L09080726**Report Date : **September 10, 2009**

Sample Number: **L09080726-06**
Client ID: **MW37D-137.0**
Matrix: **Water**
Workgroup Number: **WG311103**
Collect Date: **08/28/2009 12:25**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/01/2009 14:41**
Cal Date: **09/01/2009 13:58**
Run Date: **09/01/2009 14:41**
File ID: **SC090901008.080**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6		ND	2.00	1.00

ND Not detected at or above the reporting limit (RL).

2.1.1.2 QC Summary Data

METHOD BLANK SUMMARY

Login Number: L09080726
 Blank File ID: SC090901008.038
 Prep Date: 09/01/09 14:16
 Analyzed Date: 09/01/09 14:16
 Analyst: JBK

Work Group: WG311103
 Blank Sample ID: WG311103-01
 Instrument ID: SMARTCHEM
 Method: 325.2

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG311103-02	SC090901008.039	09/01/09 14:16	01
LCS2	WG311103-03	SC090901008.040	09/01/09 14:17	01
DUP	WG311103-05	SC090901008.057	09/01/09 14:27	01
MW16D-117.0	L09080726-01	SC090901008.075	09/01/09 14:38	01
MW16D-147.0	L09080726-02	SC090901008.076	09/01/09 14:39	01
MW16D-134.0	L09080726-03	SC090901008.077	09/01/09 14:39	01
MW16D-117.0FD	L09080726-04	SC090901008.078	09/01/09 14:40	01
MW16D-125.5	L09080726-05	SC090901008.079	09/01/09 14:40	01
MW37D-137.0	L09080726-06	SC090901008.080	09/01/09 14:41	01

Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L09080726 Prep Date: 09/01/09 14:16 Sample ID: WG311103-01
Instrument ID: SMARTCHEM Run Date: 09/01/09 14:16 Prep Method: 325.2
File ID: SC090901008.038 Analyst: JBK Method: 325.2
Workgroup (AAB#): WG311103 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: SMARTC - 01-SEP-09

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Chloride	1.00	2.00	2.00	1	ND

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1479954

02-SEP-2009 09:19



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09080726 Analyst: JBK Prep Method: 325.2
Instrument ID: SMARTCHEM Matrix: Water Method: 325.2
Workgroup (AAB#): WG311103 Units: mg/L
QC Key: DOWBOA2006 Lot #: STD34512
Sample ID: WG311103-02 LCS File ID: SC090901008.039 Run Date: 09/01/2009 14:16
Sample ID: WG311103-03 LCS2 File ID: SC090901008.040 Run Date: 09/01/2009 14:17

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Chloride	50.0	52.0	104	50.0	50.6	101	2.75	90 - 110	10	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 1479955
Report generated: 09/02/2009 09:19



2.1.2 Ammonia Data

2.1.2.1 Summary Data

LABORATORY REPORT

L09080726

09/10/09 15:02

Submitted By

Microbac Laboratories Inc.
158 Starlite Drive
Marietta, OH 45750
(740) 373-4071

For

Account Name: CH2MHILL, Inc
CH2MHILL
15010 Conference Center Drive Suite 200
Chantilly, VA 20151
Attention: Michael J. Zamboni

Project Number: 2736.006
Project: MI-Dow Ludington
Site: LUDINGTON, MI

P.O. Number: 935272

Sample Analysis Summary

Client ID	Lab ID	Method	Dilution	Date Received
MW16D-117.0	L09080726-01	350.1	1	29-AUG-09
MW16D-147.0	L09080726-02	350.1	1	29-AUG-09
MW16D-134.0	L09080726-03	350.1	1	29-AUG-09
MW16D-117.0FD	L09080726-04	350.1	1	29-AUG-09
MW16D-125.5	L09080726-05	350.1	2	29-AUG-09
MW37D-137.0	L09080726-06	350.1	1	29-AUG-09



Report Number: **L09080726**Report Date : **September 10, 2009**

Sample Number: **L09080726-01**
Client ID: **MW16D-117.0**
Matrix: **Water**
Workgroup Number: **WG311726**
Collect Date: **08/27/2009 08:50**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/09/2009 16:50**
Cal Date: **09/09/2009 16:38**
Run Date: **09/09/2009 16:50**
File ID: **SC090909007.020**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	1.55		0.100	0.0500

Report Number: **L09080726**Report Date : **September 10, 2009**

Sample Number: **L09080726-02**
Client ID: **MW16D-147.0**
Matrix: **Water**
Workgroup Number: **WG311726**
Collect Date: **08/27/2009 13:22**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/09/2009 16:50**
Cal Date: **09/09/2009 16:38**
Run Date: **09/09/2009 16:50**
File ID: **SC090909007.021**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7		ND	0.100	0.0500

ND Not detected at or above the reporting limit (RL).

Report Number: **L09080726**Report Date : **September 10, 2009**

Sample Number: **L09080726-03**
Client ID: **MW16D-134.0**
Matrix: **Water**
Workgroup Number: **WG311726**
Collect Date: **08/27/2009 11:34**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/09/2009 16:52**
Cal Date: **09/09/2009 16:38**
Run Date: **09/09/2009 16:52**
File ID: **SC090909007.022**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	1.42		0.100	0.0500

Report Number: **L09080726**Report Date : **September 10, 2009**

Sample Number: **L09080726-04**
Client ID: **MW16D-117.0FD**
Matrix: **Water**
Workgroup Number: **WG311726**
Collect Date: **08/27/2009 08:58**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/09/2009 16:52**
Cal Date: **09/09/2009 16:38**
Run Date: **09/09/2009 16:52**
File ID: **SC090909007.023**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	1.38		0.100	0.0500

Report Number: **L09080726**Report Date : **September 10, 2009**

Sample Number: **L09080726-05**
Client ID: **MW16D-125.5**
Matrix: **Water**
Workgroup Number: **WG311726**
Collect Date: **08/27/2009 10:50**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **2**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/09/2009 16:54**
Cal Date: **09/09/2009 16:38**
Run Date: **09/09/2009 16:54**
File ID: **SC090909007.024**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	3.25		0.200	0.100

Report Number: **L09080726**Report Date : **September 10, 2009**

Sample Number: **L09080726-06**
Client ID: **MW37D-137.0**
Matrix: **Water**
Workgroup Number: **WG311726**
Collect Date: **08/28/2009 12:25**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/09/2009 16:54**
Cal Date: **09/09/2009 16:38**
Run Date: **09/09/2009 16:54**
File ID: **SC090909007.025**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	0.217		0.100	0.0500

2.1.2.2 QC Summary Data

METHOD BLANK SUMMARY

Login Number: L09080726
 Blank File ID: SC090909007.009
 Prep Date: 09/09/09 16:39
 Analyzed Date: 09/09/09 16:39
 Analyst: JBK

Work Group: WG311726
 Blank Sample ID: WG311726-01
 Instrument ID: SMARTCHEM
 Method: 350.1

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG311726-02	SC090909007.010	09/09/09 16:41	01
LCS2	WG311726-03	SC090909007.011	09/09/09 16:41	01
MW16D-117.0	L09080726-01	SC090909007.020	09/09/09 16:50	01
MW16D-147.0	L09080726-02	SC090909007.021	09/09/09 16:50	01
MW16D-134.0	L09080726-03	SC090909007.022	09/09/09 16:52	01
MW16D-117.0FD	L09080726-04	SC090909007.023	09/09/09 16:52	01
MW16D-125.5	L09080726-05	SC090909007.024	09/09/09 16:54	DL01
MW37D-137.0	L09080726-06	SC090909007.025	09/09/09 16:54	01
DUP	WG311726-05	SC090909007.035	09/09/09 17:03	DL01

Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L09080726 Prep Date: 09/09/09 16:39 Sample ID: WG311726-01
Instrument ID: SMARTCHEM Run Date: 09/09/09 16:39 Prep Method: 350.1
File ID: SC090909007.009 Analyst: JBK Method: 350.1
Workgroup (AAB#): WG311726 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: SMARTC - 09-SEP-09

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Nitrogen, Ammonia	0.0500	0.100	0.100	1	ND

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1486511

10-SEP-2009 13:26



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09080726 Analyst: JBK Prep Method: 350.1
 Instrument ID: SMARTCHEM Matrix: Water Method: 350.1
 Workgroup (AAB#): WG311726 Units: mg/L
 QC Key: DOWB0A2006 Lot #: STD33211
 Sample ID: WG311726-02 LCS File ID: SC090909007.010 Run Date: 09/09/2009 16:41
 Sample ID: WG311726-03 LCS2 File ID: SC090909007.011 Run Date: 09/09/2009 16:41

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Nitrogen, Ammonia	2.00	1.85	92.6	2.00	1.82	90.8	1.97	90 - 110	25	

LCS_LCS2 - Modified 03/06/2008
 PDF File ID: 1486512
 Report generated: 09/10/2009 13:26



2.1.3 Total Dissolved Solids Data

2.1.3.1 Summary Data

LABORATORY REPORT

L09080726

09/10/09 15:02

Submitted By

Microbac Laboratories Inc.
158 Starlite Drive
Marietta, OH 45750
(740) 373-4071

For

Account Name: CH2MHILL, Inc
CH2MHILL
15010 Conference Center Drive Suite 200
Chantilly, VA 20151
Attention: Michael J. Zamboni

Project Number: 2736.006
Project: MI-Dow Ludington
Site: LUDINGTON, MI

P.O. Number: 935272

Sample Analysis Summary

Client ID	Lab ID	Method	Dilution	Date Received
MW16D-117.0	L09080726-01	160.1	1	29-AUG-09
MW16D-147.0	L09080726-02	160.1	1	29-AUG-09
MW16D-134.0	L09080726-03	160.1	1	29-AUG-09
MW16D-117.0FD	L09080726-04	160.1	1	29-AUG-09
MW16D-125.5	L09080726-05	160.1	1	29-AUG-09
MW37D-137.0	L09080726-06	160.1	1	29-AUG-09



Report Number: **L09080726**Report Date : **September 10, 2009**

Sample Number: **L09080726-01**
Client ID: **MW16D-117.0**
Matrix: **Water**
Workgroup Number: **WG310949**
Collect Date: **08/27/2009 08:50**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/31/2009 14:00**
Cal Date:
Run Date: **08/31/2009 14:00**
File ID: **EN.0908311400-13**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		268		20.0	10.0

Report Number: **L09080726**Report Date : **September 10, 2009**

Sample Number: **L09080726-02**
Client ID: **MW16D-147.0**
Matrix: **Water**
Workgroup Number: **WG310949**
Collect Date: **08/27/2009 13:22**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/31/2009 14:00**
Cal Date:
Run Date: **08/31/2009 14:00**
File ID: **EN.0908311400-17**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		264		20.0	10.0

Report Number: **L09080726**Report Date : **September 10, 2009**

Sample Number: **L09080726-03**
Client ID: **MW16D-134.0**
Matrix: **Water**
Workgroup Number: **WG310949**
Collect Date: **08/27/2009 11:34**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/31/2009 14:00**
Cal Date:
Run Date: **08/31/2009 14:00**
File ID: **EN.0908311400-20**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		288		20.0	10.0

Report Number: **L09080726**Report Date : **September 10, 2009**

Sample Number: **L09080726-04**
Client ID: **MW16D-117.0FD**
Matrix: **Water**
Workgroup Number: **WG310949**
Collect Date: **08/27/2009 08:58**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/31/2009 14:00**
Cal Date:
Run Date: **08/31/2009 14:00**
File ID: **EN.0908311400-21**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		274		20.0	10.0

Report Number: **L09080726**Report Date : **September 10, 2009**

Sample Number: **L09080726-05**
Client ID: **MW16D-125.5**
Matrix: **Water**
Workgroup Number: **WG310949**
Collect Date: **08/27/2009 10:50**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/31/2009 14:00**
Cal Date:
Run Date: **08/31/2009 14:00**
File ID: **EN.0908311400-12**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		326		20.0	10.0

Report Number: **L09080726**Report Date : **September 10, 2009**

Sample Number: **L09080726-06**
Client ID: **MW37D-137.0**
Matrix: **Water**
Workgroup Number: **WG310949**
Collect Date: **08/28/2009 12:25**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **08/31/2009 14:00**
Cal Date:
Run Date: **08/31/2009 14:00**
File ID: **EN.0908311400-18**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		264		20.0	10.0

2.1.3.2 QC Summary Data

METHOD BLANK SUMMARY

Login Number: <u>L09080726</u>	Work Group: <u>WG310949</u>
Blank File ID: <u>EN.0908311400-01</u>	Blank Sample ID: <u>WG310949-01</u>
Prep Date: <u>08/31/09 14:00</u>	Instrument ID: <u>OVEN</u>
Analyzed Date: <u>08/31/09 14:00</u>	Method: <u>160.1</u>
Analyst: <u>HJR</u>	

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG310949-02	EN.0908311400-02	08/31/09 14:00	
LCS2	WG310949-03	EN.0908311400-03	08/31/09 14:00	
MW16D-125.5	L09080726-05	EN.0908311400-12	08/31/09 14:00	
MW16D-117.0	L09080726-01	EN.0908311400-13	08/31/09 14:00	
MW16D-147.0	L09080726-02	EN.0908311400-17	08/31/09 14:00	
MW37D-137.0	L09080726-06	EN.0908311400-18	08/31/09 14:00	
MW16D-134.0	L09080726-03	EN.0908311400-20	08/31/09 14:00	
MW16D-117.0FD	L09080726-04	EN.0908311400-21	08/31/09 14:00	
DUP	WG310949-05	EN.0908311400-24	08/31/09 14:00	

Report Name: BLANK_SUMMARY
 PDF File ID: 1482625
 Report generated 09/04/2009 11:27



Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L09080726 Prep Date: 08/31/09 14:00 Sample ID: WG310949-01
Instrument ID: OVEN Run Date: 08/31/09 14:00 Prep Method: 160.1
File ID: EN.0908311400-01 Analyst: HJR Method: 160.1
Workgroup (AAB#): WG310949 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: OVEN -

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Total Dissolved Solids	5.00	10.0	10.0	1	ND

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1482626

04-SEP-2009 11:27



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09080726 Analyst: HJR Prep Method: 160.1
Instrument ID: OVEN Matrix: Water Method: 160.1
Workgroup (AAB#): WG310949 Units: mg/L
QC Key: DOWB0A2006 Lot #: STD32441
Sample ID: WG310949-02 LCS File ID: EN.0908311400-02 Run Date: 08/31/2009 14:00
Sample ID: WG310949-03 LCS2 File ID: EN.0908311400-03 Run Date: 08/31/2009 14:00

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Total Dissolved Solids	500	494	98.8	500	506	101	2.40	80 - 120	25	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 1482627
Report generated: 09/04/2009 11:27



3.0 Attachments

Microbac Laboratories Inc.
Analyst Listing
September 10, 2009

ADC - ANTHONY D. CANTER	AJF - AMANDA J. FICKIESEN	AJM - ANTHONY J. MOSSBURG
ALB - ANNIE L. BROWN	AML - ANTHONY M. LONG	BLG - BRENDA L. GREENWALT
BRG - BRENDA R. GREGORY	CAA - CASSIE A. AUGENSTEIN	CAF - CHERYL A. FLOWERS
CAH - CHARLES A. HALL	CEB - CHAD E. BARNES	CLC - CHRYS L. CRAWFORD
CLW - CHARISSA L. WINTERS	CPD - CHAD P. DAVIS	CSH - CHRIS S. HILL
DDE - DEBRA D. ELLIOTT	DEL - DON E. LIGHTFRITZ	DEV - DAVID E. VANDENBERG
DGB - DOUGLAS G. BUTCHER	DIH - DEANNA I. HESSON	DLB - DAVID L. BUMGARNER
DLP - DOROTHY L. PAYNE	DLR - DIANNA L. RAUCH	DR - DEANNA ROBERTS
ECL - ERIC C. LAWSON	EDA - ERIN D. AGEE	ERP - ERIN R. PORTER
FJB - FRANCES J. BOLDEN	HAV - HEMA VILASAGAR	HJR - HOLLY J. REED
JBK - JEREMY B. KINNEY	JDH - JUSTIN D. HESSON	JKT - JANE K. THOMPSON
JWR - JOHN W. RICHARDS	JWS - JACK W. SHEAVES	JYH - JI Y. HU
KEB - KATHRYN E. BARNES	KHR - KIM H. RHODES	KRA - KATHY R. ALBERTSON
LKN - LINDA K. NEDEFF	LSB - LESLIE S. BUCINA	MDA - MIKE D. ALBERTSON
MDC - MICHAEL D. COCHRAN	MES - MARY E. SCHILLING	MMB - MAREN M. BEERY
MRT - MICHELLE R. TAYLOR	MSW - MATT S. WILSON	NPM - NATHANIEL P. MILLER
PDM - PIERCE D. MORRIS	RAH - ROY A. HALSTEAD	RB - ROBERT BUCHANAN
REK - ROBERT E. KYER	RLK - ROBIN L. KLINGER	RWC - RODNEY W. CAMPBELL
SDH - SHANA D. HINYARD	SLM - STEPHANIE L. MOSSBURG	SLP - SHERI L. PFALZGRAF
TIP - TAE I. PARRISH	TMB - TIFFANY M. BAILEY	TMM - TAMMY M. MORRIS
VC - VICKI COLLIER	WTD - WADE T. DELONG	

September 10, 2009

Qualkey: STD

Qualifier	Description
*	Surrogate or spike compound out of range
+	Correlation coefficient for the MSA is less than 0.995
<	Result is less than the associated numerical value.
>	Result is greater than the associated numerical value.
A	See the report narrative
B	Analyte present in method blank
B1	Target analyte detected in method blank at or above the method reporting limit
B3	Target analyte detected in calibration blank at or above the method reporting limit
C	Confirmed by GC/MS
CG	Confluent growth
DL	Surrogate or spike compound was diluted out
E	Estimated concentration due to sample matrix interference
EDL	Elevated sample reporting limits, presence of non-target analytes
EMPC	Estimated Maximum Possible Concentration
F, S	Estimated result below quantitation limit; method of standard additions(MSA)
FL	Free Liquid
H1	Sample analysis performed past holding time.
I	Semiquantitative result (out of instrument calibration range)
J	The analyte was positively identified, but the quantitation was below the RL
J,B	Analyte detected in both the method blank and sample above the MDL.
J,P	Estimate; columns don't agree to within 40%
J,S	Estimated concentration; analyzed by method of standard addition (MSA)
L	Sample reporting limits elevated due to matrix interference
L1	The associated blank spike (LCS) recovery was above the laboratory acceptance limits.
L2	The associated blank spike (LCS) recovery was below the laboratory acceptance limits.
M	Matrix effect; the concentration is an estimate due to matrix effect.
N	Tentatively identified compound(TIC)
NA	Not applicable
ND	Not detected at or above the reporting limit (RL).
ND, L	Not detected; sample reporting limit (RL) elevated due to interference
ND, S	Not detected; analyzed by method of standard addition (MSA)
NF	Not found by library search
NFL	No free liquid
NI	Non-ignitable
NR	Analyte is not required to be analyzed
NS	Not spiked
P	Concentrations >40% difference between the two GC columns
Q	One or more quality control criteria fail. See narrative.
QNS	Quantity of sample not sufficient to perform analysis
RA	Reanalysis confirms reported results
RE	Reanalysis confirms sample matrix interference
S	Analyzed by method of standard addition (MSA)
SMI	Sample matrix interference on surrogate
SP	Reported results are for spike compounds only
TIC	Library Search Compound
TNTC	Too numerous to count
U	Undetected; the concentration is below the reported MDL.
UJ	Undetected; the MDL and RL are estimated due to quality control discrepancies.
W	Post-digestion spike for furnace AA out of control limits
X	Exceeds regulatory limit
X, S	Exceeds regulatory limit; method of standard additions (MSA)
Z	Cannot be resolved from isomer - see below

*****Special Notes for Organic Analytes**

1. Acrolein and acrylonitrile by method 624 are semi-quantitative screens only.
2. 1,2-Diphenylhydrazine is unstable and is reported as azobenzene.
3. N-nitrosodiphenylamine cannot be separated from diphenylamine.
4. 3-Methylphenol and 4-Methylphenol are unresolvable compounds.
5. m-Xylene and p-Xylene are unresolvable compounds.
6. The reporting limits for Appendix II/IX compounds by method 8270 are based on EPA estimated PQLs referenced in 40 CFR Part 264, Appendix IX. They are not always achievable for every compound and are matrix dependent.

COC No. A 14237

158 Starlite Drive

Marietta, OH 45750

Microbac

Phone: 740-373-4071

Fax: 740-373-4835

CHAIN-OF-CUSTODY RECORD

Company Name: CHAM HILL		Project Contact: Mike Zamboni		Contact Phone #: 703-376-5111	
Turn Around Requirements: STANDARD		Location: LUONINGTON MI			
Project ID: Don LUONINGTON					
Sampler (print): Lauren Hunt		Signature: <i>Lauren Hunt</i>			
Sample I.D. No.	Comp	Grab	Date	Time	Matrix*
MW16D-1170	X	X	8-27-09	0850	W
MW16D-1470	X	X		1322	W
MW16D-1340	X	X		1134	W
MW16D-1170AD	X	X		0858	W
MW16D-1355	X	X		1050	W
MW36D-1370	X	X	8-28-09	1225	W
NUMBER OF CONTAINERS 2 2 2 2 2 2 Hold 1 1 1 1 1 1 Disinfectant Ammonia 1 1 1 1 1 1 TDS & CHLORIDE 1 1 1 1 1 1					
Program ☐ CWA ☐ RCRA ☐ DOD ☐ AFCEE ☐ Other ADDITIONAL REQUIREMENTS					
TOTAL # (LAB USE)					
Relinquished by: (Signature) Date Time Received by: (Signature)					
Relinquished by: (Signature) Date Time Received by: (Signature)					
Remarks:					

Microbac OVD

Received: 08/29/2009 10:36

By: DON LIGHTFRITZ

Receive
(Signature)

Time

Date

Receive
(Signature)

Time

Date

*Water (W), Soil (S), Solid Waste (SD), Unknown (X)



1000001417

COOLER INSPECTION



Received: 08/29/2009 10:36
Delivery Method: UPS
Opened By: Don Lightfritz
Comments:

Login(s): L09080726

Cooler(s)

Cooler #	Temp Gun	Temp	Tracking #	COC #	Comments
0013125	H	2.0	J2142820999	COC14237	

1	Yes	Were shipping coolers sealed?
2	Yes	Were custody seals intact?
3	Yes	Were cooler temperatures in range of 0-6?
4	Yes	Was ice present?
5	Yes	Were COC's received/information complete/signed and dated?
6	Yes	Were sample containers and labels intact and match COC?
7	Yes	Were the correct containers and volumes received?
8	Yes	Were correct preservatives used? (water only)
9	Yes	Were pH ranges acceptable? (voa's excluded)
10	NA	Were VOA samples free of headspace (<6mm)?
11	Yes	Were samples received within EPA hold times?

Look closer. Go further. Do more.

Microbac - Ohio Valley Division
158 Starlite Drive
Marietta, OH 45750
Tel: (740)373-4071 Fax: (740)373-4835

Internal Chain of Custody Report

Login: L09080726

Account: 2736

Project: 2736.006

Samples: 6

Due Date: 14-SEP-2009

Samplenum **Container ID** **Products**
L09080726-01 610767 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	31-AUG-2009 15:22	JKT	
2	ANALYZ	W1	WET	31-AUG-2009 15:36	DLP	RLK
3	STORE	WET	A2	01-SEP-2009 14:40	RLK	JBK

Samplenum **Container ID** **Products**
L09080726-01 610768 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	31-AUG-2009 15:22	JKT	
2	ANALYZ	W1	WET	03-SEP-2009 08:08	DLP	JKT
3	STORE	WET	A2	03-SEP-2009 16:18	RLK	DLP
4	STORE	W1	WET	04-SEP-2009 08:49	DIH	RLK
5	ANALYZ	W1	WET	08-SEP-2009 08:36	TMM	JKT
6	STORE	WET	A2	08-SEP-2009 16:07	JKT	TMM

Samplenum **Container ID** **Products**
L09080726-02 610769 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	31-AUG-2009 15:22	JKT	
2	ANALYZ	W1	WET	31-AUG-2009 15:36	DLP	RLK
3	STORE	WET	A2	01-SEP-2009 14:40	RLK	JBK

Samplenum **Container ID** **Products**
L09080726-02 610770 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	31-AUG-2009 15:22	JKT	
2	ANALYZ	W1	WET	03-SEP-2009 08:08	DLP	JKT
3	STORE	WET	A2	08-SEP-2009 16:07	JKT	TMM

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09080726

Account: 2736

Project: 2736.006

Samples: 6

Due Date: 14-SEP-2009

Samplenum **Container ID** **Products**
L09080726-03 610771 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	31-AUG-2009 15:22	JKT	
2	ANALYZ	W1	WET	31-AUG-2009 15:36	DLP	RLK
3	STORE	WET	A2	01-SEP-2009 14:40	RLK	JBK

Samplenum **Container ID** **Products**
L09080726-03 610772 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	31-AUG-2009 15:22	JKT	
2	ANALYZ	W1	WET	03-SEP-2009 08:08	DLP	JKT
3	STORE	WET	A2	08-SEP-2009 16:07	JKT	TMM

Samplenum **Container ID** **Products**
L09080726-04 610773 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	31-AUG-2009 15:22	JKT	
2	ANALYZ	W1	WET	31-AUG-2009 15:36	DLP	RLK
3	STORE	WET	A2	01-SEP-2009 14:40	RLK	JBK

Samplenum **Container ID** **Products**
L09080726-04 610774 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	31-AUG-2009 15:22	JKT	
2	ANALYZ	W1	WET	03-SEP-2009 08:08	DLP	JKT
3	STORE	WET	A2	08-SEP-2009 16:07	JKT	TMM

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09080726

Account: 2736

Project: 2736.006

Samples: 6

Due Date: 14-SEP-2009

Samplenum **Container ID** **Products**
L09080726-05 610775 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	31-AUG-2009 15:22	JKT	
2	ANALYZ	W1	WET	31-AUG-2009 15:36	DLP	RLK
3	STORE	WET	A2	01-SEP-2009 14:40	RLK	JBK

Samplenum **Container ID** **Products**
L09080726-05 610776 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	31-AUG-2009 15:22	JKT	
2	ANALYZ	W1	WET	03-SEP-2009 08:08	DLP	JKT
3	STORE	WET	A2	08-SEP-2009 16:07	JKT	TMM

Samplenum **Container ID** **Products**
L09080726-06 610777 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	31-AUG-2009 15:22	JKT	
2	ANALYZ	W1	WET	31-AUG-2009 15:36	DLP	RLK
3	STORE	WET	A2	01-SEP-2009 14:40	RLK	JBK

Samplenum **Container ID** **Products**
L09080726-06 610778 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	31-AUG-2009 15:22	JKT	
2	ANALYZ	W1	WET	03-SEP-2009 08:08	DLP	JKT
3	STORE	WET	A2	08-SEP-2009 16:07	JKT	TMM

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login





158 Starlite Drive, Marietta, OH 45750 • T:740-373-4071 • F:740-373-4835 • <http://www.microbac.com>

Laboratory Report Number: L09090092

Please find enclosed the analytical results for the samples you submitted to Microbac Laboratories.

Review and compilation of your report was completed by Microbac's Sales and Service Team. If you have questions, comments or require further assistance regarding this report, please contact your team member noted in the reviewed box below at 800-373-4071. Team member e-mail addresses also appear here for your convenience.

Kathy Albertson	<i>Team Chemist/Data Specialist</i>	kalbertson@microbac.com
Stephanie Mossburg	<i>Team Chemist/Data Specialist</i>	smossburg@microbac.com
Tony Long	<i>Team Chemist/Data Specialist</i>	tlong@microbac.com
Amanda Fickiesen	<i>Client Services Specialist</i>	afickiesen@microbac.com
Annie Brown	<i>Client Services Specialist</i>	abrown@microbac.com

This report was reviewed on September 15, 2009.

Kathy Albertson - Team Chemist/Data Specialist

I certify that all test results meet all of the requirements of the accrediting authority listed below. All results for soil samples are reported on a 'dry-weight' basis unless specified otherwise. Analytical results for water and wastes are reported on a 'as received' basis unless specified otherwise. A statement of uncertainty for each analysis is available upon request. This laboratory report shall not be reproduced, except in full, without the written approval of Microbac Laboratories.

The reported results are related only to the samples analyzed as received.

Client: Michael J. Zamboni, CH2MHILL, Chantilly, VA, 20151

This report was certified on September 15, 2009.

David Vandenberg - Managing Director

State of origin: Michigan

Accrediting authority: N/A ID:N/A

QAPP: Microbac OVD

This report contains a total of 68 pages.

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The Microbac logo consists of the word "Microbac" in a white serif font, centered within a dark teal rectangular box.

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Ohio Valley Division
158 Starlite Drive
Marietta, OH 45750

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Microbac REPORT L09090092
PREPARED FOR CH2MHILL, Inc
WORK ID:

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1.0 Introduction

Microbac Laboratories Inc.
REPORT NARRATIVE

Microbac Login No: L09090092

CHAIN OF CUSTODY: The chain of custody number was 14238

SHIPMENT CONDITIONS: The chain of custody forms were received sealed in a cooler. The cooler temperature was 3 degrees C.

SAMPLE MANAGEMENT: All samples received were intact.

L09090092-01	MW19D-47.0
L09090092-02	MW19D-47.0
L09090092-03	MW19D-47.0
L09090092-04	MW19D-52.0
L09090092-05	MW19D-67.0
L09090092-06	MW19D-67.0-FD
L09090092-07	MW19D-77.0
L09090092-08	MW19D-87.0
L09090092-09	MW19D-94.0
L09090092-10	EQUIP BLK-2

I certify that this data package is in compliance with the terms and conditions agreed to by the client and Microbac Laboratories Inc., both technically and for completeness, except for the conditions noted above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or designated person, as verified by the following signature.

Approved: 08-SEP-09



2.0 Data Package

2.1 General Chemistry Data

METHOD

HOLDING TIMES

Sample Analysis: All holding times were met.

PREPARATION

BATCH QA/QC

Method Blank: All acceptance criteria were met.

Laboratory Control Sample: All acceptance criteria were met.

Duplicates: All acceptance criteria were met.

Matrix Spikes: The MS/MSD recoveries exceeded the advisory limits for Chloride.

SAMPLES

There were no technical difficulties with the sample group.

I certify that this data package is in compliance with the terms and conditions agreed to by the client and Microbac Laboratories Inc., both technically and for completeness, except for the conditions noted above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or designated person, as verified by the following signature.

Analyst: DIH

Approved: 09-SEP-09

Linnafors

2.1.1 Chloride Data

2.1.1.1 Summary Data

LABORATORY REPORT

L09090092

09/15/09 16:31

Submitted By

Microbac Laboratories Inc.
158 Starlite Drive
Marietta, OH 45750
(740) 373-4071

For

Account Name: CH2MHILL, Inc
CH2MHILL
15010 Conference Center Drive Suite 200
Chantilly, VA 20151
Attention: Michael J. Zamboni

Project Number: 2736.006
Project: MI-Dow Ludington
Site: LUDINGTON, MI

P.O. Number: 935272

Sample Analysis Summary

Client ID	QC Type	Lab ID	Method	Dilution	Date Received
MW19D-47.0		L09090092-01	325.2	1	03-SEP-09
MW19D-47.0	MS	L09090092-02	325.2	1	03-SEP-09
MW19D-47.0	MSD	L09090092-03	325.2	1	03-SEP-09
MW19D-52.0		L09090092-04	325.2	1	03-SEP-09
MW19D-67.0		L09090092-05	325.2	1	03-SEP-09
MW19D-67.0-FD		L09090092-06	325.2	1	03-SEP-09
MW19D-77.0		L09090092-07	325.2	1	03-SEP-09
MW19D-87.0		L09090092-08	325.2	1	03-SEP-09
MW19D-94.0		L09090092-09	325.2	1	03-SEP-09
EQUIP BLK-2		L09090092-10	325.2	1	03-SEP-09

Report Number: **L09090092**Report Date : **September 15, 2009**

Sample Number: **L09090092-01**
Client ID: **MW19D-47.0**
Matrix: **Water**
Workgroup Number: **WG311599**
Collect Date: **09/01/2009 14:10**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **DIH**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/08/2009 12:04**
Cal Date: **09/08/2009 11:59**
Run Date: **09/08/2009 12:04**
File ID: **SC090908002.016**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6		ND	2.00	1.00

ND Not detected at or above the reporting limit (RL).

Report Number: **L09090092**Report Date : **September 15, 2009**

Sample Number: **L09090092-02**
Client ID: **MW19D-47.0**
Matrix: **Water**
Workgroup Number: **WG311599**
Collect Date: **09/01/2009 14:10**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **DIH**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/08/2009 12:06**
Cal Date: **09/08/2009 12:00**
Run Date: **09/08/2009 12:06**
File ID: **SC090908002.018**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	17.0		2.00	1.00

Report Number: **L09090092**Report Date : **September 15, 2009**

Sample Number: **L09090092-03**
Client ID: **MW19D-47.0**
Matrix: **Water**
Workgroup Number: **WG311599**
Collect Date: **09/01/2009 14:10**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **DIH**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/08/2009 12:07**
Cal Date: **09/08/2009 11:59**
Run Date: **09/08/2009 12:07**
File ID: **SC090908002.021**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	15.4		2.00	1.00

Report Number: **L09090092**Report Date : **September 15, 2009**

Sample Number: L09090092-04	PrePrep Method: NONE	Instrument: SMARTCHEM
Client ID: MW19D-52.0	Prep Method: 325.2	Prep Date: 09/08/2009 12:08
Matrix: Water	Analytical Method: 325.2	Cal Date: 09/08/2009 12:00
Workgroup Number: WG311599	Analyst: DIH	Run Date: 09/08/2009 12:08
Collect Date: 09/01/2009 14:52	Dilution: 1	File ID: SC090908002.022
Sample Tag: 01	Units: mg/L	

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6		ND	2.00	1.00

ND Not detected at or above the reporting limit (RL).

Report Number: **L09090092**Report Date : **September 15, 2009**

Sample Number: **L09090092-05**
Client ID: **MW19D-67.0**
Matrix: **Water**
Workgroup Number: **WG311599**
Collect Date: **09/01/2009 15:25**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **DIH**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/08/2009 12:08**
Cal Date: **09/08/2009 12:00**
Run Date: **09/08/2009 12:08**
File ID: **SC090908002.023**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6		ND	2.00	1.00

ND Not detected at or above the reporting limit (RL).

Report Number: **L09090092**Report Date : **September 15, 2009**

Sample Number: **L09090092-06**
Client ID: **MW19D-67.0-FD**
Matrix: **Water**
Workgroup Number: **WG311599**
Collect Date: **09/01/2009 15:27**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **DIH**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/08/2009 12:09**
Cal Date: **09/08/2009 12:00**
Run Date: **09/08/2009 12:09**
File ID: **SC090908002.024**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6		ND	2.00	1.00

ND Not detected at or above the reporting limit (RL).

Report Number: **L09090092**Report Date : **September 15, 2009**

Sample Number: **L09090092-07**
Client ID: **MW19D-77.0**
Matrix: **Water**
Workgroup Number: **WG311599**
Collect Date: **09/01/2009 16:20**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **DIH**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/08/2009 12:10**
Cal Date: **09/08/2009 12:00**
Run Date: **09/08/2009 12:10**
File ID: **SC090908002.025**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6		ND	2.00	1.00

ND Not detected at or above the reporting limit (RL).

Report Number: **L09090092**Report Date : **September 15, 2009**

Sample Number: **L09090092-08**
Client ID: **MW19D-87.0**
Matrix: **Water**
Workgroup Number: **WG311599**
Collect Date: **09/01/2009 17:37**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **DIH**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/08/2009 12:10**
Cal Date: **09/08/2009 12:00**
Run Date: **09/08/2009 12:10**
File ID: **SC090908002.026**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6		ND	2.00	1.00

ND Not detected at or above the reporting limit (RL).

Report Number: **L09090092**Report Date : **September 15, 2009**

Sample Number: **L09090092-09**
Client ID: **MW19D-94.0**
Matrix: **Water**
Workgroup Number: **WG311599**
Collect Date: **09/02/2009 11:08**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **DIH**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/08/2009 12:11**
Cal Date: **09/08/2009 12:00**
Run Date: **09/08/2009 12:11**
File ID: **SC090908002.027**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6		ND	2.00	1.00

ND Not detected at or above the reporting limit (RL).

Report Number: **L09090092**Report Date : **September 15, 2009**

Sample Number: **L09090092-10**
Client ID: **EQUIP BLK-2**
Matrix: **Water**
Workgroup Number: **WG311599**
Collect Date: **09/01/2009 14:08**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **DIH**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/08/2009 12:12**
Cal Date: **09/08/2009 12:00**
Run Date: **09/08/2009 12:12**
File ID: **SC090908002.028**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6		ND	2.00	1.00

ND Not detected at or above the reporting limit (RL).

2.1.1.2 QC Summary Data

METHOD BLANK SUMMARY

Login Number: L09090092
 Blank File ID: SC090908002.010
 Prep Date: 09/08/09 12:01
 Analyzed Date: 09/08/09 12:01
 Analyst: DIH

Work Group: WG311599
 Blank Sample ID: WG311599-01
 Instrument ID: SMARTCHEM
 Method: 325.2

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG311599-02	SC090908002.011	09/08/09 12:01	01
LCS2	WG311599-03	SC090908002.012	09/08/09 12:02	01
MW19D-47.0	L09090092-01	SC090908002.016	09/08/09 12:04	01
DUP	WG311599-05	SC090908002.017	09/08/09 12:05	01
MW19D-47.0	L09090092-02	SC090908002.018	09/08/09 12:06	01
MW19D-47.0	L09090092-03	SC090908002.021	09/08/09 12:07	01
MW19D-52.0	L09090092-04	SC090908002.022	09/08/09 12:08	01
MW19D-67.0	L09090092-05	SC090908002.023	09/08/09 12:08	01
MW19D-67.0-FD	L09090092-06	SC090908002.024	09/08/09 12:09	01
MW19D-77.0	L09090092-07	SC090908002.025	09/08/09 12:10	01
MW19D-87.0	L09090092-08	SC090908002.026	09/08/09 12:10	01
MW19D-94.0	L09090092-09	SC090908002.027	09/08/09 12:11	01
EQUIP BLK-2	L09090092-10	SC090908002.028	09/08/09 12:12	01

Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L09090092 Prep Date: 09/08/09 12:01 Sample ID: WG311599-01
Instrument ID: SMARTCHEM Run Date: 09/08/09 12:01 Prep Method: 325.2
File ID: SC090908002.010 Analyst: DIH Method: 325.2
Workgroup (AAB#): WG311599 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: SMARTC - 08-SEP-09

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Chloride	1.00	2.00	-3.87	1	*

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1485171

09-SEP-2009 10:48



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09090092 Analyst: DIH Prep Method: 325.2
 Instrument ID: SMARTCHEM Matrix: Water Method: 325.2
 Workgroup (AAB#): WG311599 Units: mg/L
 QC Key: DOWBOA2006 Lot #: STD34512
 Sample ID: WG311599-02 LCS File ID: SC090908002.011 Run Date: 09/08/2009 12:01
 Sample ID: WG311599-03 LCS2 File ID: SC090908002.012 Run Date: 09/08/2009 12:02

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Chloride	50.0	49.4	98.9	50.0	48.1	96.2	2.78	90 - 110	10	



MS/MSD REPORT

Loginnum: L09090092 Cal ID: SMARTCHEM- 08-SEP-09
 Instrument ID: SMARTCHEM Contract #: _____
 Parent ID: L09090092-01 File ID: SC090908002.016 Dil: 1
 Sample ID: L09090092-02 MS File ID: SC090908002.018 Dil: 1
 Sample ID: L09090092-03 MSD File ID: SC090908002.021 Dil: 1

Worknum: WG311599
 Prep Method: 325.2
 Method: 325.2
 Matrix: Water
 Units: mg/L

Analyte	Parent	MS Spiked	MS Found	MS %Rec	MSD Spiked	MSD Found	MSD %Rec	%RPD	%Rec Limits	RPD Limit	Q
Chloride	ND	20.0	17.0	85	20.0	15.4	76.8	10.1	90 - 110	10	*#

* FAILS %REC LIMIT

FAILS RPD LIMIT

2.1.2 Ammonia Data

2.1.2.1 Summary Data

LABORATORY REPORT

L09090092

09/15/09 16:31

Submitted By

Microbac Laboratories Inc.
158 Starlite Drive
Marietta, OH 45750
(740) 373-4071

For

Account Name: CH2MHILL, Inc
CH2MHILL
15010 Conference Center Drive Suite 200
Chantilly, VA 20151
Attention: Michael J. Zamboni

Project Number: 2736.006
Project: MI-Dow Ludington
Site: LUDINGTON, MI

P.O. Number: 935272

Sample Analysis Summary

Client ID	QC Type	Lab ID	Method	Dilution	Date Received
MW19D-47.0		L09090092-01	350.1	5	03-SEP-09
MW19D-47.0	MS	L09090092-02	350.1	5	03-SEP-09
MW19D-47.0	MSD	L09090092-03	350.1	5	03-SEP-09
MW19D-52.0		L09090092-04	350.1	4	03-SEP-09
MW19D-67.0		L09090092-05	350.1	1	03-SEP-09
MW19D-67.0-FD		L09090092-06	350.1	1	03-SEP-09
MW19D-77.0		L09090092-07	350.1	1	03-SEP-09
MW19D-87.0		L09090092-08	350.1	1	03-SEP-09
MW19D-94.0		L09090092-09	350.1	1	03-SEP-09
EQUIP BLK-2		L09090092-10	350.1	1	03-SEP-09



Report Number: **L09090092**Report Date : **September 15, 2009**

Sample Number: **L09090092-01**
Client ID: **MW19D-47.0**
Matrix: **Water**
Workgroup Number: **WG311889**
Collect Date: **09/01/2009 14:10**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **5**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/11/2009 11:15**
Cal Date: **09/11/2009 11:01**
Run Date: **09/11/2009 11:15**
File ID: **SC090911001.023**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	9.20		0.500	0.250

Report Number: **L09090092**Report Date : **September 15, 2009**

Sample Number: **L09090092-02**
Client ID: **MW19D-47.0**
Matrix: **Water**
Workgroup Number: **WG311889**
Collect Date: **09/01/2009 14:10**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **5**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/11/2009 11:17**
Cal Date: **09/11/2009 11:01**
Run Date: **09/11/2009 11:17**
File ID: **SC090911001.024**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	10.3		0.500	0.250

Report Number: **L09090092**Report Date : **September 15, 2009**

Sample Number: **L09090092-03**
Client ID: **MW19D-47.0**
Matrix: **Water**
Workgroup Number: **WG311889**
Collect Date: **09/01/2009 14:10**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **5**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/11/2009 11:17**
Cal Date: **09/11/2009 11:01**
Run Date: **09/11/2009 11:17**
File ID: **SC090911001.025**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	10.1		0.500	0.250

Report Number: **L09090092**Report Date : **September 15, 2009**

Sample Number: **L09090092-04**
Client ID: **MW19D-52.0**
Matrix: **Water**
Workgroup Number: **WG311889**
Collect Date: **09/01/2009 14:52**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **4**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/11/2009 11:19**
Cal Date: **09/11/2009 11:01**
Run Date: **09/11/2009 11:19**
File ID: **SC090911001.026**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	5.52		0.400	0.200

Report Number: **L09090092**Report Date : **September 15, 2009**

Sample Number: **L09090092-05**
Client ID: **MW19D-67.0**
Matrix: **Water**
Workgroup Number: **WG311889**
Collect Date: **09/01/2009 15:25**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/11/2009 11:19**
Cal Date: **09/11/2009 11:01**
Run Date: **09/11/2009 11:19**
File ID: **SC090911001.027**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	0.630		0.100	0.0500

Report Number: **L09090092**Report Date : **September 15, 2009**

Sample Number: **L09090092-06**
Client ID: **MW19D-67.0-FD**
Matrix: **Water**
Workgroup Number: **WG311889**
Collect Date: **09/01/2009 15:27**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/11/2009 11:20**
Cal Date: **09/11/2009 11:01**
Run Date: **09/11/2009 11:20**
File ID: **SC090911001.028**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	0.664		0.100	0.0500

Report Number: **L09090092**Report Date : **September 15, 2009**

Sample Number: L09090092-07	PrePrep Method: NONE	Instrument: SMARTCHEM
Client ID: MW19D-77.0	Prep Method: 350.1	Prep Date: 09/11/2009 11:21
Matrix: Water	Analytical Method: 350.1	Cal Date: 09/11/2009 11:01
Workgroup Number: WG311889	Analyst: DIH	Run Date: 09/11/2009 11:21
Collect Date: 09/01/2009 16:20	Dilution: 1	File ID: SC090911001.029
Sample Tag: 01	Units: mg/L	

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	0.337		0.100	0.0500

Report Number: **L09090092**Report Date : **September 15, 2009**

Sample Number: **L09090092-08**
Client ID: **MW19D-87.0**
Matrix: **Water**
Workgroup Number: **WG311889**
Collect Date: **09/01/2009 17:37**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/11/2009 11:24**
Cal Date: **09/11/2009 11:01**
Run Date: **09/11/2009 11:24**
File ID: **SC090911001.032**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	0.413		0.100	0.0500

Report Number: **L09090092**Report Date : **September 15, 2009**

Sample Number: **L09090092-09**
Client ID: **MW19D-94.0**
Matrix: **Water**
Workgroup Number: **WG311889**
Collect Date: **09/02/2009 11:08**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/11/2009 11:24**
Cal Date: **09/11/2009 11:01**
Run Date: **09/11/2009 11:24**
File ID: **SC090911001.033**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	0.338		0.100	0.0500

Report Number: **L09090092**Report Date : **September 15, 2009**

Sample Number: **L09090092-10**
Client ID: **EQUIP BLK-2**
Matrix: **Water**
Workgroup Number: **WG311889**
Collect Date: **09/01/2009 14:08**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/11/2009 11:26**
Cal Date: **09/11/2009 11:01**
Run Date: **09/11/2009 11:26**
File ID: **SC090911001.034**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7		ND	0.100	0.0500

ND Not detected at or above the reporting limit (RL).

2.1.2.2 QC Summary Data

METHOD BLANK SUMMARY

Login Number: L09090092
 Blank File ID: SC090911001.009
 Prep Date: 09/11/09 11:03
 Analyzed Date: 09/11/09 11:03
 Analyst: DIH

Work Group: WG311889
 Blank Sample ID: WG311889-01
 Instrument ID: SMARTCHEM
 Method: 350.1

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS2	WG311889-03	SC090911001.011	09/11/09 11:05	01
MW19D-47.0	L09090092-01	SC090911001.023	09/11/09 11:15	DL01
MW19D-47.0	L09090092-02	SC090911001.024	09/11/09 11:17	DL01
MW19D-47.0	L09090092-03	SC090911001.025	09/11/09 11:17	DL01
MW19D-52.0	L09090092-04	SC090911001.026	09/11/09 11:19	DL01
MW19D-67.0	L09090092-05	SC090911001.027	09/11/09 11:19	01
MW19D-67.0-FD	L09090092-06	SC090911001.028	09/11/09 11:20	01
MW19D-77.0	L09090092-07	SC090911001.029	09/11/09 11:21	01
MW19D-87.0	L09090092-08	SC090911001.032	09/11/09 11:24	01
MW19D-94.0	L09090092-09	SC090911001.033	09/11/09 11:24	01
EQUIP BLK-2	L09090092-10	SC090911001.034	09/11/09 11:26	01
DUP	WG311889-06	SC090911001.038	09/11/09 11:29	01
LCS	WG311889-02	SC090911001.056	09/11/09 11:46	01

METHOD BLANK REPORT

Login Number: L09090092 Prep Date: 09/11/09 11:03 Sample ID: WG311889-01
Instrument ID: SMARTCHEM Run Date: 09/11/09 11:03 Prep Method: 350.1
File ID: SC090911001.009 Analyst: DIH Method: 350.1
Workgroup (AAB#): WG311889 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: SMARTC - 11-SEP-09

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Nitrogen, Ammonia	0.0500	0.100	0.100	1	ND

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1489913

15-SEP-2009 11:46



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09090092 Analyst: DIH Prep Method: 350.1
Instrument ID: SMARTCHEM Matrix: Water Method: 350.1
Workgroup (AAB#): WG311889 Units: mg/L
QC Key: DOWBOA2006 Lot #: STD33211
Sample ID: WG311889-02 LCS File ID: SC090911001.056 Run Date: 09/11/2009 11:46
Sample ID: WG311889-03 LCS2 File ID: SC090911001.011 Run Date: 09/11/2009 11:05

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Nitrogen, Ammonia	2.00	1.96	98.2	2.00	1.96	97.8	0.413	90 - 110	25	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 1489914
Report generated: 09/15/2009 11:46



MS/MSD REPORT

Loginnum: L09090092 Cal ID: SMARTCHEM- 11-SEP-09
 Instrument ID: SMARTCHEM Contract #: _____
 Parent ID: L09090092-01 File ID: SC090911001.023 Dil: 5
 Sample ID: L09090092-02 MS File ID: SC090911001.024 Dil: 5
 Sample ID: L09090092-03 MSD File ID: SC090911001.025 Dil: 5

Worknum: WG311889
 Prep Method: 350.1
 Method: 350.1
 Matrix: Water
 Units: mg/L

Analyte	Parent	MS Spiked	MS Found	MS %Rec	MSD Spiked	MSD Found	MSD %Rec	%RPD	%Rec Limits	RPD Limit	Q
Nitrogen, Ammonia	9.20	1.00	10.3	111	1.00	10.1	94.5	1.64	70 - 125	25	

* FAILS %REC LIMIT

FAILS RPD LIMIT

2.1.3 Total Dissolved Solids Data

2.1.3.1 Summary Data

LABORATORY REPORT

L09090092

09/15/09 16:31

Submitted By

Microbac Laboratories Inc.
158 Starlite Drive
Marietta, OH 45750
(740) 373-4071

For

Account Name: CH2MHILL, Inc
CH2MHILL
15010 Conference Center Drive Suite 200
Chantilly, VA 20151
Attention: Michael J. Zamboni

Project Number: 2736.006
Project: MI-Dow Ludington
Site: LUDINGTON, MI

P.O. Number: 935272

Sample Analysis Summary

Client ID	QC Type	Lab ID	Method	Dilution	Date Received
MW19D-47.0		L09090092-01	160.1	1	03-SEP-09
MW19D-47.0	MS	L09090092-02	160.1	1	03-SEP-09
MW19D-47.0	MSD	L09090092-03	160.1	1	03-SEP-09
MW19D-52.0		L09090092-04	160.1	1	03-SEP-09
MW19D-67.0		L09090092-05	160.1	1	03-SEP-09
MW19D-67.0-FD		L09090092-06	160.1	1	03-SEP-09
MW19D-77.0		L09090092-07	160.1	1	03-SEP-09
MW19D-87.0		L09090092-08	160.1	1	03-SEP-09
MW19D-94.0		L09090092-09	160.1	1	03-SEP-09
EQUIP BLK-2		L09090092-10	160.1	1	03-SEP-09

Report Number: **L09090092**Report Date : **September 15, 2009**

Sample Number: **L09090092-01**
Client ID: **MW19D-47.0**
Matrix: **Water**
Workgroup Number: **WG311399**
Collect Date: **09/01/2009 14:10**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/03/2009 14:45**
Cal Date:
Run Date: **09/03/2009 14:45**
File ID: **EN.0909031445-14**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		280		20.0	10.0

Report Number: **L09090092**Report Date : **September 15, 2009**

Sample Number: **L09090092-02**
Client ID: **MW19D-47.0**
Matrix: **Water**
Workgroup Number: **WG311399**
Collect Date: **09/01/2009 14:10**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/03/2009 14:45**
Cal Date:
Run Date: **09/03/2009 14:45**
File ID: **EN.0909031445-11**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		788		20.0	10.0

Report Number: **L09090092**Report Date : **September 15, 2009**

Sample Number: **L09090092-03**
Client ID: **MW19D-47.0**
Matrix: **Water**
Workgroup Number: **WG311399**
Collect Date: **09/01/2009 14:10**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/03/2009 14:45**
Cal Date:
Run Date: **09/03/2009 14:45**
File ID: **EN.0909031445-17**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		784		20.0	10.0

Report Number: **L09090092**Report Date : **September 15, 2009**

Sample Number: **L09090092-04**
Client ID: **MW19D-52.0**
Matrix: **Water**
Workgroup Number: **WG311399**
Collect Date: **09/01/2009 14:52**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/03/2009 14:45**
Cal Date:
Run Date: **09/03/2009 14:45**
File ID: **EN.0909031445-18**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		248		20.0	10.0

Report Number: **L09090092**Report Date : **September 15, 2009**

Sample Number: **L09090092-05**
Client ID: **MW19D-67.0**
Matrix: **Water**
Workgroup Number: **WG311399**
Collect Date: **09/01/2009 15:25**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/03/2009 14:45**
Cal Date:
Run Date: **09/03/2009 14:45**
File ID: **EN.0909031445-15**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		234		20.0	10.0

Report Number: **L09090092**Report Date : **September 15, 2009**

Sample Number: **L09090092-06**
Client ID: **MW19D-67.0-FD**
Matrix: **Water**
Workgroup Number: **WG311399**
Collect Date: **09/01/2009 15:27**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/03/2009 14:45**
Cal Date:
Run Date: **09/03/2009 14:45**
File ID: **EN.0909031445-12**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		254		20.0	10.0

Report Number: **L09090092**Report Date : **September 15, 2009**

Sample Number: **L09090092-07**
Client ID: **MW19D-77.0**
Matrix: **Water**
Workgroup Number: **WG311399**
Collect Date: **09/01/2009 16:20**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/03/2009 14:45**
Cal Date:
Run Date: **09/03/2009 14:45**
File ID: **EN.0909031445-19**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		254		20.0	10.0

Report Number: **L09090092**Report Date : **September 15, 2009**

Sample Number: **L09090092-08**
Client ID: **MW19D-87.0**
Matrix: **Water**
Workgroup Number: **WG311399**
Collect Date: **09/01/2009 17:37**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/03/2009 14:45**
Cal Date:
Run Date: **09/03/2009 14:45**
File ID: **EN.0909031445-16**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		228		20.0	10.0

Report Number: **L09090092**Report Date : **September 15, 2009**

Sample Number: **L09090092-09**
Client ID: **MW19D-94.0**
Matrix: **Water**
Workgroup Number: **WG311399**
Collect Date: **09/02/2009 11:08**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/03/2009 14:45**
Cal Date:
Run Date: **09/03/2009 14:45**
File ID: **EN.0909031445-13**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		250		20.0	10.0

Report Number: **L09090092**Report Date : **September 15, 2009**

Sample Number: **L09090092-10**
Client ID: **EQUIP BLK-2**
Matrix: **Water**
Workgroup Number: **WG311399**
Collect Date: **09/01/2009 14:08**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/03/2009 14:45**
Cal Date:
Run Date: **09/03/2009 14:45**
File ID: **EN.0909031445-20**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids			ND	10.0	5.00

ND Not detected at or above the reporting limit (RL).

2.1.3.2 QC Summary Data

3.0 Attachments

Microbac Laboratories Inc.
Analyst Listing
September 15, 2009

ADC - ANTHONY D. CANTER	AJF - AMANDA J. FICKIESEN	AJM - ANTHONY J. MOSSBURG
ALB - ANNIE L. BROWN	AML - ANTHONY M. LONG	BLG - BRENDA L. GREENWALT
BRG - BRENDA R. GREGORY	CAA - CASSIE A. AUGENSTEIN	CAF - CHERYL A. FLOWERS
CAH - CHARLES A. HALL	CEB - CHAD E. BARNES	CLC - CHRYS L. CRAWFORD
CLW - CHARISSA L. WINTERS	CPD - CHAD P. DAVIS	CSH - CHRIS S. HILL
DDE - DEBRA D. ELLIOTT	DEL - DON E. LIGHTFRITZ	DEV - DAVID E. VANDENBERG
DGB - DOUGLAS G. BUTCHER	DIH - DEANNA I. HESSON	DLB - DAVID L. BUMGARNER
DLP - DOROTHY L. PAYNE	DLR - DIANNA L. RAUCH	DR - DEANNA ROBERTS
ECL - ERIC C. LAWSON	EDA - ERIN D. AGEE	ERP - ERIN R. PORTER
FJB - FRANCES J. BOLDEN	HAV - HEMA VILASAGAR	HJR - HOLLY J. REED
JBK - JEREMY B. KINNEY	JDH - JUSTIN D. HESSON	JKT - JANE K. THOMPSON
JWR - JOHN W. RICHARDS	JWS - JACK W. SHEAVES	JYH - JI Y. HU
KEB - KATHRYN E. BARNES	KHR - KIM H. RHODES	KRA - KATHY R. ALBERTSON
LKN - LINDA K. NEDEFF	LSB - LESLIE S. BUCINA	MDA - MIKE D. ALBERTSON
MDC - MICHAEL D. COCHRAN	MES - MARY E. SCHILLING	MMB - MAREN M. BEERY
MRT - MICHELLE R. TAYLOR	MSW - MATT S. WILSON	NPM - NATHANIEL P. MILLER
PDM - PIERCE D. MORRIS	RAH - ROY A. HALSTEAD	RB - ROBERT BUCHANAN
REK - ROBERT E. KYER	RLK - ROBIN L. KLINGER	RWC - RODNEY W. CAMPBELL
SDH - SHANA D. HINYARD	SLM - STEPHANIE L. MOSSBURG	SLP - SHERI L. PFALZGRAF
TIP - TAE I. PARRISH	TMB - TIFFANY M. BAILEY	TMM - TAMMY M. MORRIS
VC - VICKI COLLIER	WTD - WADE T. DELONG	

September 15, 2009

Qualkey: STD

Qualifier	Description
*	Surrogate or spike compound out of range
+	Correlation coefficient for the MSA is less than 0.995
<	Result is less than the associated numerical value.
>	Result is greater than the associated numerical value.
A	See the report narrative
B	Analyte present in method blank
B1	Target analyte detected in method blank at or above the method reporting limit
B3	Target analyte detected in calibration blank at or above the method reporting limit
C	Confirmed by GC/MS
CG	Confluent growth
DL	Surrogate or spike compound was diluted out
E	Estimated concentration due to sample matrix interference
EDL	Elevated sample reporting limits, presence of non-target analytes
EMPC	Estimated Maximum Possible Concentration
F, S	Estimated result below quantitation limit; method of standard additions(MSA)
FL	Free Liquid
H1	Sample analysis performed past holding time.
I	Semiquantitative result (out of instrument calibration range)
J	The analyte was positively identified, but the quantitation was below the RL
J,B	Analyte detected in both the method blank and sample above the MDL.
J,P	Estimate; columns don't agree to within 40%
J,S	Estimated concentration; analyzed by method of standard addition (MSA)
L	Sample reporting limits elevated due to matrix interference
L1	The associated blank spike (LCS) recovery was above the laboratory acceptance limits.
L2	The associated blank spike (LCS) recovery was below the laboratory acceptance limits.
M	Matrix effect; the concentration is an estimate due to matrix effect.
N	Tentatively identified compound(TIC)
NA	Not applicable
ND	Not detected at or above the reporting limit (RL).
ND, L	Not detected; sample reporting limit (RL) elevated due to interference
ND, S	Not detected; analyzed by method of standard addition (MSA)
NF	Not found by library search
NFL	No free liquid
NI	Non-ignitable
NR	Analyte is not required to be analyzed
NS	Not spiked
P	Concentrations >40% difference between the two GC columns
Q	One or more quality control criteria fail. See narrative.
QNS	Quantity of sample not sufficient to perform analysis
RA	Reanalysis confirms reported results
RE	Reanalysis confirms sample matrix interference
S	Analyzed by method of standard addition (MSA)
SMI	Sample matrix interference on surrogate
SP	Reported results are for spike compounds only
TIC	Library Search Compound
TNTC	Too numerous to count
U	Undetected; the concentration is below the reported MDL.
UJ	Undetected; the MDL and RL are estimated due to quality control discrepancies.
W	Post-digestion spike for furnace AA out of control limits
X	Exceeds regulatory limit
X, S	Exceeds regulatory limit; method of standard additions (MSA)
Z	Cannot be resolved from isomer - see below

*****Special Notes for Organic Analytes**

1. Acrolein and acrylonitrile by method 624 are semi-quantitative screens only.
2. 1,2-Diphenylhydrazine is unstable and is reported as azobenzene.
3. N-nitrosodiphenylamine cannot be separated from diphenylamine.
4. 3-Methylphenol and 4-Methylphenol are unresolvable compounds.
5. m-Xylene and p-Xylene are unresolvable compounds.
6. The reporting limits for Appendix II/IX compounds by method 8270 are based on EPA estimated PQLs referenced in 40 CFR Part 264, Appendix IX. They are not always achievable for every compound and are matrix dependent.

COC No. A 14238

158 Starlite Drive
Marietta, OH 45750

Microbac

Phone: 740-373-4071

Fax: 740-373-4835

CHAIN-OF-CUSTODY RECORD

Company Name: CHAM HILL		Contact Phone #: 703-376-5111		Project ID: Dow Ludington		Signature: <i>Lauren Hunt</i>						
Project Contact: Mike Zamboni		Location: LUDINGTON, MI		Turn Around Requirements: Standard		Sampler (print): Lauren Hunt						
Sample I.D. No.	Comp	Grab	Date	Time	Matrix*	NUMBER OF CONTAINERS	Hold	Disinfectant	TSI/Chloride	TOTAL # (LAB USE)	Program	ADDITIONAL REQUIREMENTS
MW19D-47.0	X	X	9-1-09	1410	W	2	1	33	MS/MSD			
MW19D-52.0	X	X		1452	W	2	1	33				
MW19D-67.0	X	X		1525	W	2	1	33				
MW19D-67.0FD	X	X		1527	W	2	1	33				
MW19D-77.0	X	X		1620	W	2	1	33				
MW19D-87.0	X	X	9-2-09	1737	W	2	1	33				
MW19D-94.0	X	X	9-2-09	1108	W	2	1	33				
MW19D-104.0	X	X	9-1-09	1408	W	2	1	33				
*Most of the samples were taken on 9-1-09; Started cold times.												
Relinquished by: (Signature) Date Time												
Relinquished by: (Signature) Date Time												
Received by: (Signature) Date Time												
Remarks:												

Microbac OVD
Received: 09/03/2009 09:44
By: ROBIN KLINGER

*Water (W), Soil (S), Solid Waste (SD), Unknown (X)



1000001510

COOLER INSPECTION



Received: 09/03/2009 09:44
Delivery Method: UPS
Opened By: Robin Klinger
Comments:

Login(s): L09090092

Cooler(s)

Cooler #	Temp Gun	Temp	Tracking #	COC #	Comments
0014012	H	3.0	J2142823585	COC14238	

1	Yes	Were shipping coolers sealed?
2	Yes	Were custody seals intact?
3	Yes	Were cooler temperatures in range of 0-6?
4	Yes	Was ice present?
5	Yes	Were COC's received/information complete/signed and dated?
6	Yes	Were sample containers and labels intact and match COC?
7	Yes	Were the correct containers and volumes received?
8	Yes	Were correct preservatives used? (water only)
9	Yes	Were pH ranges acceptable? (voa's excluded)
10	NA	Were VOA samples free of headspace (<6mm)?
11	Yes	Were samples received within EPA hold times?

Look closer. Go further. Do more.

Microbac - Ohio Valley Division
158 Starlite Drive
Marietta, OH 45750
Tel: (740)373-4071 Fax: (740)373-4835

Internal Chain of Custody Report

Login: L09090092

Account: 2736

Project: 2736.006

Samples: 10

Due Date: 17-SEP-2009

Samplenum **Container ID** **Products**
L09090092-01 612715 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	03-SEP-2009 16:13	RLK	
2	ANALYZ	W1	WET	03-SEP-2009 16:19	DLP	RLK
3	STORE	WET	A2	10-SEP-2009 11:15	RLK	DIH

Samplenum **Container ID** **Products**
L09090092-01 612716 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	03-SEP-2009 16:13	RLK	
2	ANALYZ	W1	WET	08-SEP-2009 08:36	TMM	JKT
3	STORE	WET	A2	11-SEP-2009 08:01	RLK	TMM

Samplenum **Container ID** **Products**
L09090092-02 612717 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	03-SEP-2009 16:13	RLK	
2	ANALYZ	W1	WET	03-SEP-2009 16:19	DLP	RLK
3	STORE	WET	A2	10-SEP-2009 11:15	RLK	DIH

Samplenum **Container ID** **Products**
L09090092-02 612718 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	03-SEP-2009 16:13	RLK	
2	ANALYZ	W1	WET	08-SEP-2009 08:36	TMM	JKT
3	STORE	WET	A2	11-SEP-2009 08:01	RLK	TMM

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09090092

Account: 2736

Project: 2736.006

Samples: 10

Due Date: 17-SEP-2009

Samplenum **Container ID** **Products**
L09090092-03 612719 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	03-SEP-2009 16:13	RLK	
2	ANALYZ	W1	WET	03-SEP-2009 16:19	DLP	RLK
3	STORE	WET	A2	10-SEP-2009 11:16	RLK	DIH

Samplenum **Container ID** **Products**
L09090092-03 612720 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	WET	03-SEP-2009 16:13	RLK	
2	STORE	WET	A2	11-SEP-2009 08:01	RLK	TMM

Samplenum **Container ID** **Products**
L09090092-04 612721 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	03-SEP-2009 16:13	RLK	
2	ANALYZ	W1	WET	03-SEP-2009 16:19	DLP	RLK
3	STORE	WET	A2	10-SEP-2009 11:15	RLK	DIH

Samplenum **Container ID** **Products**
L09090092-04 612722 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	03-SEP-2009 16:13	RLK	
2	ANALYZ	W1	WET	08-SEP-2009 08:36	TMM	JKT
3	STORE	WET	A2	11-SEP-2009 08:01	RLK	TMM

Samplenum **Container ID** **Products**
L09090092-05 612723 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	03-SEP-2009 16:13	RLK	
2	ANALYZ	W1	WET	03-SEP-2009 16:19	DLP	RLK
3	STORE	WET	A2	10-SEP-2009 11:16	RLK	DIH

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09090092

Account: 2736

Project: 2736.006

Samples: 10

Due Date: 17-SEP-2009

Samplenum **Container ID** **Products**
L09090092-05 612724 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	03-SEP-2009 16:13	RLK	
2	ANALYZ	W1	WET	08-SEP-2009 08:36	TMM	JKT
3	STORE	WET	A2	11-SEP-2009 08:01	RLK	TMM

Samplenum **Container ID** **Products**
L09090092-06 612725 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	03-SEP-2009 16:13	RLK	
2	ANALYZ	W1	WET	03-SEP-2009 16:19	DLP	RLK
3	STORE	WET	A2	10-SEP-2009 11:16	RLK	DIH

Samplenum **Container ID** **Products**
L09090092-06 612726 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	03-SEP-2009 16:13	RLK	
2	ANALYZ	W1	WET	08-SEP-2009 08:36	TMM	JKT
3	STORE	WET	A2	11-SEP-2009 08:01	RLK	TMM

Samplenum **Container ID** **Products**
L09090092-07 612727 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	03-SEP-2009 16:13	RLK	
2	ANALYZ	W1	WET	03-SEP-2009 16:19	DLP	RLK
3	STORE	WET	A2	10-SEP-2009 11:15	RLK	DIH

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09090092

Account: 2736

Project: 2736.006

Samples: 10

Due Date: 17-SEP-2009

Samplenum **Container ID** **Products**
L09090092-07 612728 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	03-SEP-2009 16:13	RLK	
2	ANALYZ	W1	WET	08-SEP-2009 08:36	TMM	JKT
3	STORE	WET	A2	11-SEP-2009 08:01	RLK	TMM

Samplenum **Container ID** **Products**
L09090092-08 612729 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	03-SEP-2009 16:13	RLK	
2	ANALYZ	W1	WET	03-SEP-2009 16:19	DLP	RLK
3	STORE	WET	A2	10-SEP-2009 11:16	RLK	DIH

Samplenum **Container ID** **Products**
L09090092-08 612730 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	03-SEP-2009 16:13	RLK	
2	ANALYZ	W1	WET	08-SEP-2009 08:36	TMM	JKT
3	STORE	WET	A2	08-SEP-2009 16:07	JKT	TMM
4	STORE	WET	A2	11-SEP-2009 08:01	RLK	TMM

Samplenum **Container ID** **Products**
L09090092-09 612731 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	03-SEP-2009 16:13	RLK	
2	ANALYZ	W1	WET	03-SEP-2009 16:19	DLP	RLK
3	STORE	WET	A2	10-SEP-2009 11:16	RLK	DIH

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09090092

Account: 2736

Project: 2736.006

Samples: 10

Due Date: 17-SEP-2009

Samplenum **Container ID** **Products**
L09090092-09 612732 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	03-SEP-2009 16:13	RLK	
2	ANALYZ	W1	WET	08-SEP-2009 08:35	TMM	JKT
3	STORE	WET	A2	11-SEP-2009 08:01	RLK	TMM

Samplenum **Container ID** **Products**
L09090092-10 612733 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	03-SEP-2009 16:13	RLK	
2	ANALYZ	W1	WET	03-SEP-2009 16:19	DLP	RLK
3	STORE	WET	A2	10-SEP-2009 11:15	RLK	DIH

Samplenum **Container ID** **Products**
L09090092-10 612734 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	03-SEP-2009 16:13	RLK	
2	ANALYZ	W1	WET	08-SEP-2009 08:35	TMM	JKT
3	STORE	WET	A2	11-SEP-2009 08:01	RLK	TMM

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login





158 Starlite Drive, Marietta, OH 45750 • T:740-373-4071 • F:740-373-4835 • <http://www.microbac.com>

Laboratory Report Number: L09090173

Please find enclosed the analytical results for the samples you submitted to Microbac Laboratories.

Review and compilation of your report was completed by Microbac's Sales and Service Team. If you have questions, comments or require further assistance regarding this report, please contact your team member noted in the reviewed box below at 800-373-4071. Team member e-mail addresses also appear here for your convenience.

Kathy Albertson	<i>Team Chemist/Data Specialist</i>	kalbertson@microbac.com
Stephanie Mossburg	<i>Team Chemist/Data Specialist</i>	smossburg@microbac.com
Tony Long	<i>Team Chemist/Data Specialist</i>	tlong@microbac.com
Amanda Fickiesen	<i>Client Services Specialist</i>	afickiesen@microbac.com
Annie Brown	<i>Client Services Specialist</i>	abrown@microbac.com

This report was reviewed on September 17, 2009.

Kathy Albertson - Team Chemist/Data Specialist

I certify that all test results meet all of the requirements of the accrediting authority listed below. All results for soil samples are reported on a 'dry-weight' basis unless specified otherwise. Analytical results for water and wastes are reported on a 'as received' basis unless specified otherwise. A statement of uncertainty for each analysis is available upon request. This laboratory report shall not be reproduced, except in full, without the written approval of Microbac Laboratories.

The reported results are related only to the samples analyzed as received.

Client: Michael J. Zamboni, CH2MHILL, Chantilly, VA, 20151

This report was certified on September 17, 2009.

David Vandenberg - Managing Director

State of origin: Michigan

Accrediting authority: N/A ID:N/A

QAPP: Microbac OVD

This report contains a total of 60 pages.

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Marietta, OH 45750

Phone: 800.373.4071
Fax: 740.373.4835

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Microbac REPORT L09090173
PREPARED FOR CH2MHILL, Inc
WORK ID:

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1.0 Introduction

Microbac Laboratories Inc.
REPORT NARRATIVE

Microbac Login No: L09090173

CHAIN OF CUSTODY: The chain of custody number was 14239

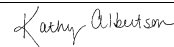
SHIPMENT CONDITIONS: The chain of custody forms were received sealed in a cooler. The cooler temperature was 3 degrees C.

SAMPLE MANAGEMENT: All samples received were intact.

L09090173-01	EQUIP-BLK-3
L09090173-02	MW19D-127.0
L09090173-03	MW19D-112.0
L09090173-04	MW19D-104.0
L09090173-05	MW19D-104.0-FD
L09090173-06	MW19D-137.0
L09090173-07	MW19D-147.0

I certify that this data package is in compliance with the terms and conditions agreed to by the client and Microbac Laboratories Inc., both technically and for completeness, except for the conditions noted above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or designated person, as verified by the following signature.

Approved: 10-SEP-09



2.0 Data Package

2.1 General Chemistry Data

2.1.1 Chloride Data

2.1.1.1 Summary Data

LABORATORY REPORT

L09090173

09/17/09 09:03

Submitted By

Microbac Laboratories Inc.
158 Starlite Drive
Marietta, OH 45750
(740) 373-4071

For

Account Name: CH2MHILL, Inc
CH2MHILL
15010 Conference Center Drive Suite 200
Chantilly, VA 20151
Attention: Michael J. Zamboni

Project Number: 2736.006
Project: MI-Dow Ludington
Site: LUDINGTON, MI

P.O. Number: 935272

Sample Analysis Summary

Client ID	Lab ID	Method	Dilution	Date Received
EQUIP-BLK-3	L09090173-01	325.2	1	09-SEP-09
MW19D-127.0	L09090173-02	325.2	1	09-SEP-09
MW19D-112.0	L09090173-03	325.2	1	09-SEP-09
MW19D-104.0	L09090173-04	325.2	1	09-SEP-09
MW19D-104.0-FD	L09090173-05	325.2	1	09-SEP-09
MW19D-137.0	L09090173-06	325.2	1	09-SEP-09
MW19D-147.0	L09090173-07	325.2	1	09-SEP-09



Report Number: **L09090173**Report Date : **September 17, 2009**

Sample Number: **L09090173-01**
Client ID: **EQUIP-BLK-3**
Matrix: **Water**
Workgroup Number: **WG312003**
Collect Date: **09/04/2009 10:25**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **DIH**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/14/2009 09:50**
Cal Date: **09/14/2009 09:20**
Run Date: **09/14/2009 09:50**
File ID: **SC090914001.059**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6		ND	2.00	1.00

ND Not detected at or above the reporting limit (RL).

Report Number: **L09090173**Report Date : **September 17, 2009**

Sample Number: **L09090173-02**
Client ID: **MW19D-127.0**
Matrix: **Water**
Workgroup Number: **WG312003**
Collect Date: **09/04/2009 10:33**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **DIH**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/14/2009 09:51**
Cal Date: **09/14/2009 09:20**
Run Date: **09/14/2009 09:51**
File ID: **SC090914001.060**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	4.67		2.00	1.00

Report Number: **L09090173**Report Date : **September 17, 2009**

Sample Number: **L09090173-03**
Client ID: **MW19D-112.0**
Matrix: **Water**
Workgroup Number: **WG312003**
Collect Date: **09/04/2009 08:35**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **DIH**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/14/2009 09:51**
Cal Date: **09/14/2009 09:20**
Run Date: **09/14/2009 09:51**
File ID: **SC090914001.061**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6		ND	2.00	1.00

ND Not detected at or above the reporting limit (RL).

Report Number: **L09090173**Report Date : **September 17, 2009**

Sample Number: **L09090173-04**
Client ID: **MW19D-104.0**
Matrix: **Water**
Workgroup Number: **WG312003**
Collect Date: **09/03/2009 14:45**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **DIH**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/14/2009 09:52**
Cal Date: **09/14/2009 09:20**
Run Date: **09/14/2009 09:52**
File ID: **SC090914001.062**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6		ND	2.00	1.00

ND Not detected at or above the reporting limit (RL).

Report Number: **L09090173**Report Date : **September 17, 2009**

Sample Number: **L09090173-05**
Client ID: **MW19D-104.0-FD**
Matrix: **Water**
Workgroup Number: **WG312002**
Collect Date: **09/03/2009 14:47**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **DIH**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/14/2009 09:54**
Cal Date: **09/14/2009 09:20**
Run Date: **09/14/2009 09:54**
File ID: **SC090914001.065**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6		ND	2.00	1.00

ND Not detected at or above the reporting limit (RL).

Report Number: **L09090173**Report Date : **September 17, 2009**

Sample Number: **L09090173-06**
Client ID: **MW19D-137.0**
Matrix: **Water**
Workgroup Number: **WG312002**
Collect Date: **09/04/2009 12:00**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **DIH**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/14/2009 09:55**
Cal Date: **09/14/2009 09:20**
Run Date: **09/14/2009 09:55**
File ID: **SC090914001.066**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	12.5		2.00	1.00

Report Number: **L09090173**Report Date : **September 17, 2009**

Sample Number: **L09090173-07**
Client ID: **MW19D-147.0**
Matrix: **Water**
Workgroup Number: **WG312002**
Collect Date: **09/04/2009 12:23**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **DIH**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/14/2009 09:56**
Cal Date: **09/14/2009 09:20**
Run Date: **09/14/2009 09:56**
File ID: **SC090914001.069**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	4.37		2.00	1.00

2.1.1.2 QC Summary Data

METHOD BLANK SUMMARY

Login Number: L09090173
 Blank File ID: SC090914001.010
 Prep Date: 09/14/09 09:21
 Analyzed Date: 09/14/09 09:21
 Analyst: DIH

Work Group: WG312002
 Blank Sample ID: WG312002-01
 Instrument ID: SMARTCHEM
 Method: 325.2

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG312002-02	SC090914001.011	09/14/09 09:21	01
LCS2	WG312002-03	SC090914001.012	09/14/09 09:22	01
DUP	WG312002-05	SC090914001.018	09/14/09 09:26	DL01
MW19D-104.0-FD	L09090173-05	SC090914001.065	09/14/09 09:54	01
MW19D-137.0	L09090173-06	SC090914001.066	09/14/09 09:55	01
MW19D-147.0	L09090173-07	SC090914001.069	09/14/09 09:56	01



METHOD BLANK SUMMARY

Login Number: L09090173
 Blank File ID: SC090914001.036
 Prep Date: 09/14/09 09:37
 Analyzed Date: 09/14/09 09:37
 Analyst: DIH

Work Group: WG312003
 Blank Sample ID: WG312003-01
 Instrument ID: SMARTCHEM
 Method: 325.2

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG312003-02	SC090914001.037	09/14/09 09:37	01
LCS2	WG312003-03	SC090914001.038	09/14/09 09:38	01
EQUIP-BLK-3	L09090173-01	SC090914001.059	09/14/09 09:50	01
MW19D-127.0	L09090173-02	SC090914001.060	09/14/09 09:51	01
MW19D-112.0	L09090173-03	SC090914001.061	09/14/09 09:51	01
MW19D-104.0	L09090173-04	SC090914001.062	09/14/09 09:52	01
DUP	WG312003-05	SC090914001.063	09/14/09 09:53	01



Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L09090173 Prep Date: 09/14/09 09:21 Sample ID: WG312002-01
Instrument ID: SMARTCHEM Run Date: 09/14/09 09:21 Prep Method: 325.2
File ID: SC090914001.010 Analyst: DIH Method: 325.2
Workgroup (AAB#): WG312002 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: SMARTC - 14-SEP-09

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Chloride	1.00	2.00	2.00	1	ND

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1490066

15-SEP-2009 12:18



Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L09090173 Prep Date: 09/14/09 09:37 Sample ID: WG312003-01
Instrument ID: SMARTCHEM Run Date: 09/14/09 09:37 Prep Method: 325.2
File ID: SC090914001.036 Analyst: DIH Method: 325.2
Workgroup (AAB#): WG312003 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: SMARTC - 14-SEP-09

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Chloride	1.00	2.00	-1.73	1	ND

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1490066

15-SEP-2009 12:18



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09090173 Analyst: DIH Prep Method: 325.2
Instrument ID: SMARTCHEM Matrix: Water Method: 325.2
Workgroup (AAB#): WG312002 Units: mg/L
QC Key: DOWBOA2006 Lot #: STD35142
Sample ID: WG312002-02 LCS File ID: SC090914001.011 Run Date: 09/14/2009 09:21
Sample ID: WG312002-03 LCS2 File ID: SC090914001.012 Run Date: 09/14/2009 09:22

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Chloride	50.0	50.6	101	50.0	49.6	99.3	1.83	90 - 110	10	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 1490067
Report generated: 09/15/2009 12:18



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09090173 Analyst: DIH Prep Method: 325.2
Instrument ID: SMARTCHEM Matrix: Water Method: 325.2
Workgroup (AAB#): WG312003 Units: mg/L
QC Key: DOWBOA2006 Lot #: STD35142
Sample ID: WG312003-02 LCS File ID: SC090914001.037 Run Date: 09/14/2009 09:37
Sample ID: WG312003-03 LCS2 File ID: SC090914001.038 Run Date: 09/14/2009 09:38

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Chloride	50.0	47.9	95.8	50.0	48.4	96.9	1.13	90 - 110	10	



2.1.2 Ammonia Data

2.1.2.1 Summary Data

LABORATORY REPORT

L09090173

09/17/09 09:03

Submitted By

Microbac Laboratories Inc.
158 Starlite Drive
Marietta , OH 45750
(740) 373 - 4071

For

Account Name: CH2MHILL, Inc
CH2MHILL
15010 Conference Center Drive Suite 200
Chantilly, VA 20151
Attention: Michael J. Zamboni

Project Number: 2736.006
Project: MI-Dow Ludington
Site: LUDINGTON, MI

P.O. Number: 935272

Sample Analysis Summary

Client ID	Lab ID	Method	Dilution	Date Received
EQUIP-BLK-3	L09090173-01	350.1	1	09-SEP-09
MW19D-127.0	L09090173-02	350.1	1	09-SEP-09
MW19D-112.0	L09090173-03	350.1	1	09-SEP-09
MW19D-104.0	L09090173-04	350.1	1	09-SEP-09
MW19D-104.0-FD	L09090173-05	350.1	1	09-SEP-09
MW19D-137.0	L09090173-06	350.1	1	09-SEP-09
MW19D-147.0	L09090173-07	350.1	1	09-SEP-09



Report Number: **L09090173**Report Date : **September 17, 2009**

Sample Number: **L09090173-01**
Client ID: **EQUIP-BLK-3**
Matrix: **Water**
Workgroup Number: **WG312223**
Collect Date: **09/04/2009 10:25**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/16/2009 09:34**
Cal Date: **09/16/2009 09:27**
Run Date: **09/16/2009 09:34**
File ID: **SC090916001.015**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7		ND	0.100	0.0500

ND Not detected at or above the reporting limit (RL).

Report Number: **L09090173**Report Date : **September 17, 2009**

Sample Number: **L09090173-02**
Client ID: **MW19D-127.0**
Matrix: **Water**
Workgroup Number: **WG312223**
Collect Date: **09/04/2009 10:33**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/16/2009 09:36**
Cal Date: **09/16/2009 09:27**
Run Date: **09/16/2009 09:36**
File ID: **SC090916001.016**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	0.222		0.100	0.0500

Report Number: **L09090173**Report Date : **September 17, 2009**

Sample Number: **L09090173-03**
Client ID: **MW19D-112.0**
Matrix: **Water**
Workgroup Number: **WG312223**
Collect Date: **09/04/2009 08:35**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/16/2009 09:36**
Cal Date: **09/16/2009 09:27**
Run Date: **09/16/2009 09:36**
File ID: **SC090916001.017**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	0.355		0.100	0.0500

Report Number: **L09090173**Report Date : **September 17, 2009**

Sample Number: **L09090173-04**
Client ID: **MW19D-104.0**
Matrix: **Water**
Workgroup Number: **WG312223**
Collect Date: **09/03/2009 14:45**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/16/2009 09:39**
Cal Date: **09/16/2009 09:27**
Run Date: **09/16/2009 09:39**
File ID: **SC090916001.020**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	0.342		0.100	0.0500

Report Number: **L09090173**Report Date : **September 17, 2009**

Sample Number: **L09090173-05**
Client ID: **MW19D-104.0-FD**
Matrix: **Water**
Workgroup Number: **WG312223**
Collect Date: **09/03/2009 14:47**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/16/2009 09:40**
Cal Date: **09/16/2009 09:27**
Run Date: **09/16/2009 09:40**
File ID: **SC090916001.021**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	0.393		0.100	0.0500

Report Number: **L09090173**Report Date : **September 17, 2009**

Sample Number: **L09090173-06**
Client ID: **MW19D-137.0**
Matrix: **Water**
Workgroup Number: **WG312223**
Collect Date: **09/04/2009 12:00**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/16/2009 09:41**
Cal Date: **09/16/2009 09:27**
Run Date: **09/16/2009 09:41**
File ID: **SC090916001.022**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	0.213		0.100	0.0500

Report Number: **L09090173**Report Date : **September 17, 2009**

Sample Number: **L09090173-07**
Client ID: **MW19D-147.0**
Matrix: **Water**
Workgroup Number: **WG312223**
Collect Date: **09/04/2009 12:23**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/16/2009 09:41**
Cal Date: **09/16/2009 09:27**
Run Date: **09/16/2009 09:41**
File ID: **SC090916001.023**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	0.186		0.100	0.0500

2.1.2.2 QC Summary Data

METHOD BLANK SUMMARY

Login Number: L09090173
 Blank File ID: SC090916001.009
 Prep Date: 09/16/09 09:29
 Analyzed Date: 09/16/09 09:29
 Analyst: DIH

Work Group: WG312223
 Blank Sample ID: WG312223-01
 Instrument ID: SMARTCHEM
 Method: 350.1

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG312223-02	SC090916001.010	09/16/09 09:30	01
EQUIP-BLK-3	L09090173-01	SC090916001.015	09/16/09 09:34	01
MW19D-127.0	L09090173-02	SC090916001.016	09/16/09 09:36	01
MW19D-112.0	L09090173-03	SC090916001.017	09/16/09 09:36	01
MW19D-104.0	L09090173-04	SC090916001.020	09/16/09 09:39	01
MW19D-104.0-FD	L09090173-05	SC090916001.021	09/16/09 09:40	01
MW19D-137.0	L09090173-06	SC090916001.022	09/16/09 09:41	01
MW19D-147.0	L09090173-07	SC090916001.023	09/16/09 09:41	01
DUP	WG312223-06	SC090916001.038	09/16/09 09:55	01
LCS2	WG312223-03	SC090916001.058	09/16/09 10:13	01

METHOD BLANK REPORT

Login Number: L09090173 Prep Date: 09/16/09 09:29 Sample ID: WG312223-01
Instrument ID: SMARTCHEM Run Date: 09/16/09 09:29 Prep Method: 350.1
File ID: SC090916001.009 Analyst: DIH Method: 350.1
Workgroup (AAB#): WG312223 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: SMARTC - 16-SEP-09

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Nitrogen, Ammonia	0.0500	0.100	0.100	1	ND

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1491396

16-SEP-2009 16:17



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09090173 Analyst: DIH Prep Method: 350.1
 Instrument ID: SMARTCHEM Matrix: Water Method: 350.1
 Workgroup (AAB#): WG312223 Units: mg/L
 QC Key: DOWBOA2006 Lot #: STD33211
 Sample ID: WG312223-02 LCS File ID: SC090916001.010 Run Date: 09/16/2009 09:30
 Sample ID: WG312223-03 LCS2 File ID: SC090916001.058 Run Date: 09/16/2009 10:13

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Nitrogen, Ammonia	2.00	1.86	93.1	2.00	1.82	90.9	2.41	90 - 110	25	



2.1.3 Total Dissolved Solids Data

2.1.3.1 Summary Data

LABORATORY REPORT

L09090173

09/17/09 09:03

Submitted By

Microbac Laboratories Inc.
158 Starlite Drive
Marietta , OH 45750
(740) 373 - 4071

For

Account Name: CH2MHILL, Inc
CH2MHILL
15010 Conference Center Drive Suite 200
Chantilly, VA 20151
Attention: Michael J. Zamboni

Project Number: 2736.006
Project: MI-Dow Ludington
Site: LUDINGTON, MI

P.O. Number: 935272

Sample Analysis Summary

Client ID	Lab ID	Method	Dilution	Date Received
EQUIP-BLK-3	L09090173-01	160.1	1	09-SEP-09
MW19D-127.0	L09090173-02	160.1	1	09-SEP-09
MW19D-112.0	L09090173-03	160.1	1	09-SEP-09
MW19D-104.0	L09090173-04	160.1	1	09-SEP-09
MW19D-104.0-FD	L09090173-05	160.1	1	09-SEP-09
MW19D-137.0	L09090173-06	160.1	1	09-SEP-09
MW19D-147.0	L09090173-07	160.1	1	09-SEP-09



Report Number: **L09090173**Report Date : **September 17, 2009**

Sample Number: **L09090173-01**
Client ID: **EQUIP-BLK-3**
Matrix: **Water**
Workgroup Number: **WG311695**
Collect Date: **09/04/2009 10:25**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/09/2009 10:25**
Cal Date:
Run Date: **09/09/2009 10:25**
File ID: **EN.0909091025-14**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids			ND	10.0	5.00

ND Not detected at or above the reporting limit (RL).

Report Number: **L09090173**Report Date : **September 17, 2009**

Sample Number: **L09090173-02**
Client ID: **MW19D-127.0**
Matrix: **Water**
Workgroup Number: **WG311695**
Collect Date: **09/04/2009 10:33**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/09/2009 10:25**
Cal Date:
Run Date: **09/09/2009 10:25**
File ID: **EN.0909091025-15**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		248		20.0	10.0

Report Number: **L09090173**Report Date : **September 17, 2009**

Sample Number: **L09090173-03**
Client ID: **MW19D-112.0**
Matrix: **Water**
Workgroup Number: **WG311695**
Collect Date: **09/04/2009 08:35**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/09/2009 10:25**
Cal Date:
Run Date: **09/09/2009 10:25**
File ID: **EN.0909091025-13**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		184		20.0	10.0

Report Number: **L09090173**Report Date : **September 17, 2009**

Sample Number: **L09090173-04**
Client ID: **MW19D-104.0**
Matrix: **Water**
Workgroup Number: **WG311695**
Collect Date: **09/03/2009 14:45**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/09/2009 10:25**
Cal Date:
Run Date: **09/09/2009 10:25**
File ID: **EN.0909091025-11**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		206		20.0	10.0

Report Number: **L09090173**Report Date : **September 17, 2009**

Sample Number: **L09090173-05**
Client ID: **MW19D-104.0-FD**
Matrix: **Water**
Workgroup Number: **WG311695**
Collect Date: **09/03/2009 14:47**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/09/2009 10:25**
Cal Date:
Run Date: **09/09/2009 10:25**
File ID: **EN.0909091025-12**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		234		20.0	10.0

Report Number: **L09090173**Report Date : **September 17, 2009**

Sample Number: **L09090173-06**
Client ID: **MW19D-137.0**
Matrix: **Water**
Workgroup Number: **WG311695**
Collect Date: **09/04/2009 12:00**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/09/2009 10:25**
Cal Date:
Run Date: **09/09/2009 10:25**
File ID: **EN.0909091025-16**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		256		20.0	10.0

Report Number: **L09090173**Report Date : **September 17, 2009**

Sample Number: **L09090173-07**
Client ID: **MW19D-147.0**
Matrix: **Water**
Workgroup Number: **WG311695**
Collect Date: **09/04/2009 12:23**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/09/2009 10:25**
Cal Date:
Run Date: **09/09/2009 10:25**
File ID: **EN.0909091025-17**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		246		20.0	10.0

2.1.3.2 QC Summary Data

METHOD BLANK SUMMARY

Login Number: <u>L09090173</u>	Work Group: <u>WG311695</u>
Blank File ID: <u>EN.0909091025-01</u>	Blank Sample ID: <u>WG311695-01</u>
Prep Date: <u>09/09/09 10:25</u>	Instrument ID: <u>OVEN</u>
Analyzed Date: <u>09/09/09 10:25</u>	Method: <u>160.1</u>
Analyst: <u>HJR</u>	

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG311695-02	EN.0909091025-02	09/09/09 10:25	
LCS2	WG311695-03	EN.0909091025-03	09/09/09 10:25	
MW19D-104.0	L09090173-04	EN.0909091025-11	09/09/09 10:25	
MW19D-104.0-FD	L09090173-05	EN.0909091025-12	09/09/09 10:25	
MW19D-112.0	L09090173-03	EN.0909091025-13	09/09/09 10:25	
EQUIP-BLK-3	L09090173-01	EN.0909091025-14	09/09/09 10:25	
MW19D-127.0	L09090173-02	EN.0909091025-15	09/09/09 10:25	
MW19D-137.0	L09090173-06	EN.0909091025-16	09/09/09 10:25	
MW19D-147.0	L09090173-07	EN.0909091025-17	09/09/09 10:25	
DUP	WG311695-05	EN.0909091025-18	09/09/09 10:25	

Report Name: BLANK_SUMMARY
 PDF File ID: 1489625
 Report generated 09/15/2009 09:04



Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L09090173 Prep Date: 09/09/09 10:25 Sample ID: WG311695-01
Instrument ID: OVEN Run Date: 09/09/09 10:25 Prep Method: 160.1
File ID: EN.0909091025-01 Analyst: HJR Method: 160.1
Workgroup (AAB#): WG311695 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: OVEN -

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Total Dissolved Solids	5.00	10.0	10.0	1	ND

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1489626

15-SEP-2009 09:04



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09090173 Analyst: HJR Prep Method: 160.1
Instrument ID: OVEN Matrix: Water Method: 160.1
Workgroup (AAB#): WG311695 Units: mg/L
QC Key: DOWB0A2006 Lot #: STD32441
Sample ID: WG311695-02 LCS File ID: EN.0909091025-02 Run Date: 09/09/2009 10:25
Sample ID: WG311695-03 LCS2 File ID: EN.0909091025-03 Run Date: 09/09/2009 10:25

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Total Dissolved Solids	500	506	101	500	506	101	0.00	80 - 120	25	



3.0 Attachments

Microbac Laboratories Inc.
Analyst Listing
September 17, 2009

ADC - ANTHONY D. CANTER	AJF - AMANDA J. FICKIESEN	AJM - ANTHONY J. MOSSBURG
ALB - ANNIE L. BROWN	AML - ANTHONY M. LONG	BLG - BRENDA L. GREENWALT
BRG - BRENDA R. GREGORY	CAA - CASSIE A. AUGENSTEIN	CAF - CHERYL A. FLOWERS
CAH - CHARLES A. HALL	CEB - CHAD E. BARNES	CLC - CHRYS L. CRAWFORD
CLW - CHARISSA L. WINTERS	CPD - CHAD P. DAVIS	CSH - CHRIS S. HILL
DDE - DEBRA D. ELLIOTT	DEL - DON E. LIGHTFRITZ	DEV - DAVID E. VANDENBERG
DGB - DOUGLAS G. BUTCHER	DIH - DEANNA I. HESSON	DLB - DAVID L. BUMGARNER
DLP - DOROTHY L. PAYNE	DLR - DIANNA L. RAUCH	DR - DEANNA ROBERTS
ECL - ERIC C. LAWSON	EDA - ERIN D. AGEE	ERP - ERIN R. PORTER
FJB - FRANCES J. BOLDEN	HAV - HEMA VILASAGAR	HJR - HOLLY J. REED
JBK - JEREMY B. KINNEY	JDH - JUSTIN D. HESSON	JKT - JANE K. THOMPSON
JWR - JOHN W. RICHARDS	JWS - JACK W. SHEAVES	JYH - JI Y. HU
KEB - KATHRYN E. BARNES	KHR - KIM H. RHODES	KRA - KATHY R. ALBERTSON
LKN - LINDA K. NEDEFF	LSB - LESLIE S. BUCINA	MDA - MIKE D. ALBERTSON
MDC - MICHAEL D. COCHRAN	MES - MARY E. SCHILLING	MMB - MAREN M. BEERY
MRT - MICHELLE R. TAYLOR	MSW - MATT S. WILSON	NPM - NATHANIEL P. MILLER
PDM - PIERCE D. MORRIS	RAH - ROY A. HALSTEAD	RB - ROBERT BUCHANAN
REK - ROBERT E. KYER	RLK - ROBIN L. KLINGER	RWC - RODNEY W. CAMPBELL
SDH - SHANA D. HINYARD	SLM - STEPHANIE L. MOSSBURG	SLP - SHERI L. PFALZGRAF
TIP - TAE I. PARRISH	TMB - TIFFANY M. BAILEY	TMM - TAMMY M. MORRIS
VC - VICKI COLLIER	WTD - WADE T. DELONG	

September 17, 2009

Qualkey: STD

Qualifier	Description
*	Surrogate or spike compound out of range
+	Correlation coefficient for the MSA is less than 0.995
<	Result is less than the associated numerical value.
>	Result is greater than the associated numerical value.
A	See the report narrative
B	Analyte present in method blank
B1	Target analyte detected in method blank at or above the method reporting limit
B3	Target analyte detected in calibration blank at or above the method reporting limit
C	Confirmed by GC/MS
CG	Confluent growth
DL	Surrogate or spike compound was diluted out
E	Estimated concentration due to sample matrix interference
EDL	Elevated sample reporting limits, presence of non-target analytes
EMPC	Estimated Maximum Possible Concentration
F, S	Estimated result below quantitation limit; method of standard additions(MSA)
FL	Free Liquid
H1	Sample analysis performed past holding time.
I	Semiquantitative result (out of instrument calibration range)
J	The analyte was positively identified, but the quantitation was below the RL
J,B	Analyte detected in both the method blank and sample above the MDL.
J,P	Estimate; columns don't agree to within 40%
J,S	Estimated concentration; analyzed by method of standard addition (MSA)
L	Sample reporting limits elevated due to matrix interference
L1	The associated blank spike (LCS) recovery was above the laboratory acceptance limits.
L2	The associated blank spike (LCS) recovery was below the laboratory acceptance limits.
M	Matrix effect; the concentration is an estimate due to matrix effect.
N	Tentatively identified compound(TIC)
NA	Not applicable
ND	Not detected at or above the reporting limit (RL).
ND, L	Not detected; sample reporting limit (RL) elevated due to interference
ND, S	Not detected; analyzed by method of standard addition (MSA)
NF	Not found by library search
NFL	No free liquid
NI	Non-ignitable
NR	Analyte is not required to be analyzed
NS	Not spiked
P	Concentrations >40% difference between the two GC columns
Q	One or more quality control criteria fail. See narrative.
QNS	Quantity of sample not sufficient to perform analysis
RA	Reanalysis confirms reported results
RE	Reanalysis confirms sample matrix interference
S	Analyzed by method of standard addition (MSA)
SMI	Sample matrix interference on surrogate
SP	Reported results are for spike compounds only
TIC	Library Search Compound
TNTC	Too numerous to count
U	Undetected; the concentration is below the reported MDL.
UJ	Undetected; the MDL and RL are estimated due to quality control discrepancies.
W	Post-digestion spike for furnace AA out of control limits
X	Exceeds regulatory limit
X, S	Exceeds regulatory limit; method of standard additions (MSA)
Z	Cannot be resolved from isomer - see below

*****Special Notes for Organic Analytes**

1. Acrolein and acrylonitrile by method 624 are semi-quantitative screens only.
2. 1,2-Diphenylhydrazine is unstable and is reported as azobenzene.
3. N-nitrosodiphenylamine cannot be separated from diphenylamine.
4. 3-Methylphenol and 4-Methylphenol are unresolvable compounds.
5. m-Xylene and p-Xylene are unresolvable compounds.
6. The reporting limits for Appendix II/IX compounds by method 8270 are based on EPA estimated PQLs referenced in 40 CFR Part 264, Appendix IX. They are not always achievable for every compound and are matrix dependent.





1000001592

COOLER INSPECTION



Received: 09/09/2009 09:45
Delivery Method: UPS
Opened By: Robin Klinger
Comments:

Login(s): L09090173

Cooler(s)

Cooler #	Temp Gun	Temp	Tracking #	COC #	Comments
0010156	H	3.0	J2142821005	COC14239	

1	Yes	Were shipping coolers sealed?
2	Yes	Were custody seals intact?
3	Yes	Were cooler temperatures in range of 0-6?
4	Yes	Was ice present?
5	Yes	Were COC's received/information complete/signed and dated?
6	Yes	Were sample containers and labels intact and match COC?
7	Yes	Were the correct containers and volumes received?
8	Yes	Were correct preservatives used? (water only)
9	Yes	Were pH ranges acceptable? (voa's excluded)
10	NA	Were VOA samples free of headspace (<6mm)?
11	Yes	Were samples received within EPA hold times?

Look closer. Go further. Do more.

Microbac - Ohio Valley Division
158 Starlite Drive
Marietta, OH 45750
Tel: (740)373-4071 Fax: (740)373-4835

Internal Chain of Custody Report

Login: L09090173

Account: 2736

Project: 2736.006

Samples: 7

Due Date: 23-SEP-2009

Samplenum **Container ID** **Products**
L09090173-01 613648 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	WET	09-SEP-2009 11:13	ERE	
2	STORE	WET	A2	15-SEP-2009 08:19	RLK	DIH

Samplenum **Container ID** **Products**
L09090173-01 613649 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	09-SEP-2009 11:13	ERE	
2	ANALYZ	W1	WET	10-SEP-2009 08:19	TMM	RLK
3	STORE	WET	A2	17-SEP-2009 08:26	RLK	TMM

Samplenum **Container ID** **Products**
L09090173-02 613650 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	WET	09-SEP-2009 11:13	ERE	
2	STORE	WET	A2	15-SEP-2009 08:19	RLK	DIH

Samplenum **Container ID** **Products**
L09090173-02 613651 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	09-SEP-2009 11:13	ERE	
2	ANALYZ	W1	WET	10-SEP-2009 08:19	TMM	RLK
3	STORE	WET	A2	17-SEP-2009 08:26	RLK	TMM

Samplenum **Container ID** **Products**
L09090173-03 613652 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	WET	09-SEP-2009 11:13	ERE	
2	STORE	WET	A2	15-SEP-2009 08:19	RLK	DIH

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09090173

Account: 2736

Project: 2736.006

Samples: 7

Due Date: 23-SEP-2009

Samplenum **Container ID** **Products**
L09090173-03 613653 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	09-SEP-2009 11:13	ERE	
2	ANALYZ	W1	WET	10-SEP-2009 08:19	TMM	RLK
3	STORE	WET	A2	17-SEP-2009 08:26	RLK	TMM

Samplenum **Container ID** **Products**
L09090173-04 613654 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	09-SEP-2009 11:13	ERE	
2	ANALYZ	W1	WET	09-SEP-2009 12:44	TMM	RLK
3	STORE	WET	A2	15-SEP-2009 08:19	RLK	DIH

Samplenum **Container ID** **Products**
L09090173-04 613655 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	09-SEP-2009 11:13	ERE	
2	ANALYZ	W1	WET	10-SEP-2009 08:19	TMM	RLK
3	STORE	WET	A2	17-SEP-2009 08:26	RLK	TMM

Samplenum **Container ID** **Products**
L09090173-05 613656 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	09-SEP-2009 11:13	ERE	
2	ANALYZ	W1	WET	09-SEP-2009 12:44	TMM	RLK
3	STORE	WET	A2	15-SEP-2009 08:19	RLK	DIH

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09090173

Account: 2736

Project: 2736.006

Samples: 7

Due Date: 23-SEP-2009

Samplenum **Container ID** **Products**
L09090173-05 613657 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	09-SEP-2009 11:13	ERE	
2	ANALYZ	W1	WET	10-SEP-2009 08:19	TMM	RLK
3	STORE	WET	A2	17-SEP-2009 08:26	RLK	TMM

Samplenum **Container ID** **Products**
L09090173-06 613658 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	WET	09-SEP-2009 11:13	ERE	
2	STORE	WET	A2	15-SEP-2009 08:19	RLK	DIH

Samplenum **Container ID** **Products**
L09090173-06 613659 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	09-SEP-2009 11:13	ERE	
2	ANALYZ	W1	WET	10-SEP-2009 08:19	TMM	RLK
3	STORE	WET	A2	17-SEP-2009 08:26	RLK	TMM

Samplenum **Container ID** **Products**
L09090173-07 613660 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	WET	09-SEP-2009 11:13	ERE	
2	STORE	WET	A2	15-SEP-2009 08:19	RLK	DIH

Samplenum **Container ID** **Products**
L09090173-07 613661 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	09-SEP-2009 11:13	ERE	
2	ANALYZ	W1	WET	10-SEP-2009 08:19	TMM	RLK
3	STORE	WET	A2	17-SEP-2009 08:26	RLK	TMM

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login





158 Starlite Drive, Marietta, OH 45750 • T:740-373-4071 • F:740-373-4835 • <http://www.microbac.com>

Laboratory Report Number: L09090260

Please find enclosed the analytical results for the samples you submitted to Microbac Laboratories.

Review and compilation of your report was completed by Microbac's Sales and Service Team. If you have questions, comments or require further assistance regarding this report, please contact your team member noted in the reviewed box below at 800-373-4071. Team member e-mail addresses also appear here for your convenience.

Kathy Albertson	<i>Team Chemist/Data Specialist</i>	kalbertson@microbac.com
Stephanie Mossburg	<i>Team Chemist/Data Specialist</i>	smossburg@microbac.com
Tony Long	<i>Team Chemist/Data Specialist</i>	tlong@microbac.com
Amanda Fickiesen	<i>Client Services Specialist</i>	afickiesen@microbac.com
Annie Brown	<i>Client Services Specialist</i>	abrown@microbac.com

This report was reviewed on September 17, 2009.

A handwritten signature in cursive script that reads "Kathy Albertson".

Kathy Albertson - Team Chemist/Data Specialist

I certify that all test results meet all of the requirements of the accrediting authority listed below. All results for soil samples are reported on a 'dry-weight' basis unless specified otherwise. Analytical results for water and wastes are reported on a 'as received' basis unless specified otherwise. A statement of uncertainty for each analysis is available upon request. This laboratory report shall not be reproduced, except in full, without the written approval of Microbac Laboratories.

The reported results are related only to the samples analyzed as received.

Client: Michael J. Zamboni, CH2MHILL, Chantilly, VA, 20151

This report was certified on September 17, 2009.

A handwritten signature in cursive script that reads "David E. Vandenberg".

David Vandenberg - Managing Director

State of origin: Michigan

Accrediting authority: N/A ID:N/A

QAPP: Microbac OVD

This report contains a total of 96 pages.

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Ohio Valley Division
158 Starlite Drive
Marietta, OH 45750

Phone: 800.373.4071
Fax: 740.373.4835

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Microbac REPORT L09090260
PREPARED FOR CH2MHILL, Inc
WORK ID:

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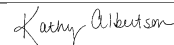
1.0 Introduction

Microbac Laboratories Inc.
REPORT NARRATIVE**Microbac Login No:** L09090260**CHAIN OF CUSTODY:** The chain of custody number was 06145**SHIPMENT CONDITIONS:** The chain of custody forms were received sealed in a cooler. The cooler temperature was 3 degrees C.**SAMPLE MANAGEMENT:** All samples received were intact.

L09090260-01	MW38D-117.0
L09090260-02	EQUIP-BLK-4
L09090260-03	MW38D-77.0
L09090260-04	MW38D-137.0
L09090260-05	MW38D-147.0
L09090260-06	MW38D-47.0
L09090260-07	MW38D-87.0
L09090260-08	MW38D-57.0
L09090260-09	MW38D-67.0
L09090260-10	MW38D-107.0
L09090260-11	MW38D-127.0
L09090260-12	MW38D-127.0-MS
L09090260-13	MW38D-127.0-MSD
L09090260-14	MW38D-97.0
L09090260-15	MW38D-97.0-FD

I certify that this data package is in compliance with the terms and conditions agreed to by the client and Microbac Laboratories Inc., both technically and for completeness, except for the conditions noted above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or designated person, as verified by the following signature.

Approved: 15-SEP-09



2.0 Data Package

2.1 General Chemistry Data

METHOD

HOLDING TIMES

Sample Analysis: All holding times were met.

PREPARATION

BATCH QA/QC

Method Blank: All acceptance criteria were met.

Laboratory Control Sample: All acceptance criteria were met.

Duplicates: All acceptance criteria were met.

Matrix Spikes: The MS/MSD recoveries for Chloride, TDS and Ammonia exceeded the advisory limits.

SAMPLES

There were no technical difficulties with the sample group.

I certify that this data package is in compliance with the terms and conditions agreed to by the client and Microbac Laboratories Inc., both technically and for completeness, except for the conditions noted above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or designated person, as verified by the following signature.

Analyst: DIH

Approved: 17-SEP-09

Lennartsson

2.1.1 Chloride Data

2.1.1.1 Summary Data

LABORATORY REPORT

L09090260

09/17/09 15:24

Submitted By

Microbac Laboratories Inc.
158 Starlite Drive
Marietta, OH 45750
(740) 373-4071

For

Account Name: CH2MHILL, Inc
CH2MHILL
15010 Conference Center Drive Suite 200
Chantilly, VA 20151
Attention: Michael J. Zamboni

Project Number: 2736.006
Project: MI-Dow Ludington
Site: LUDINGTON, MI

P.O. Number: 935272

Sample Analysis Summary

Client ID	Lab ID	Method	Dilution	Date Received
MW38D-117.0	L09090260-01	325.2	25	12-SEP-09
EQUIP-BLK-4	L09090260-02	325.2	1	12-SEP-09
MW38D-77.0	L09090260-03	325.2	20	12-SEP-09
MW38D-137.0	L09090260-04	325.2	2	12-SEP-09
MW38D-147.0	L09090260-05	325.2	1	12-SEP-09
MW38D-47.0	L09090260-06	325.2	10	12-SEP-09
MW38D-87.0	L09090260-07	325.2	20	12-SEP-09
MW38D-57.0	L09090260-08	325.2	25	12-SEP-09
MW38D-67.0	L09090260-09	325.2	25	12-SEP-09
MW38D-107.0	L09090260-10	325.2	25	12-SEP-09
MW38D-127.0	L09090260-11	325.2	25	12-SEP-09
MW38D-127.0-MS	L09090260-12	325.2	25	12-SEP-09
MW38D-127.0-MSD	L09090260-13	325.2	25	12-SEP-09
MW38D-97.0	L09090260-14	325.2	20	12-SEP-09
MW38D-97.0-FD	L09090260-15	325.2	20	12-SEP-09



Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-01**
Client ID: **MW38D-117.0**
Matrix: **Water**
Workgroup Number: **WG312210**
Collect Date: **09/10/2009 18:05**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **25**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/15/2009 16:16**
Cal Date: **09/15/2009 16:12**
Run Date: **09/15/2009 16:16**
File ID: **SC090915004.013**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	1190		50.0	25.0

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-02**
Client ID: **EQUIP-BLK-4**
Matrix: **Water**
Workgroup Number: **WG312187**
Collect Date: **09/10/2009 09:00**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/15/2009 14:57**
Cal Date: **09/15/2009 14:50**
Run Date: **09/15/2009 14:57**
File ID: **SC090915003.014**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6		ND	2.00	1.00

ND Not detected at or above the reporting limit (RL).

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-03**
Client ID: **MW38D-77.0**
Matrix: **Water**
Workgroup Number: **WG312187**
Collect Date: **09/10/2009 10:40**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **20**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/15/2009 15:16**
Cal Date: **09/15/2009 14:54**
Run Date: **09/15/2009 15:16**
File ID: **SC090915003.034**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	1720		40.0	20.0

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-04**
Client ID: **MW38D-137.0**
Matrix: **Water**
Workgroup Number: **WG312187**
Collect Date: **09/11/2009 10:40**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **2**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/15/2009 15:17**
Cal Date: **09/15/2009 14:54**
Run Date: **09/15/2009 15:17**
File ID: **SC090915003.035**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	182		4.00	2.00

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-05**
Client ID: **MW38D-147.0**
Matrix: **Water**
Workgroup Number: **WG312187**
Collect Date: **09/11/2009 11:30**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/15/2009 14:59**
Cal Date: **09/15/2009 14:54**
Run Date: **09/15/2009 14:59**
File ID: **SC090915003.017**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	60.9		2.00	1.00

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-06**
Client ID: **MW38D-47.0**
Matrix: **Water**
Workgroup Number: **WG312187**
Collect Date: **09/09/2009 14:45**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **10**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/15/2009 15:18**
Cal Date: **09/15/2009 14:54**
Run Date: **09/15/2009 15:18**
File ID: **SC090915003.036**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	959		20.0	10.0

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-07**
Client ID: **MW38D-87.0**
Matrix: **Water**
Workgroup Number: **WG312187**
Collect Date: **09/10/2009 11:45**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **20**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/15/2009 15:20**
Cal Date: **09/15/2009 14:54**
Run Date: **09/15/2009 15:20**
File ID: **SC090915003.037**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	1730		40.0	20.0

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-08**
Client ID: **MW38D-57.0**
Matrix: **Water**
Workgroup Number: **WG312210**
Collect Date: **09/09/2009 15:55**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **25**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/15/2009 16:17**
Cal Date: **09/15/2009 16:12**
Run Date: **09/15/2009 16:17**
File ID: **SC090915004.014**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	1480		50.0	25.0

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-09**
Client ID: **MW38D-67.0**
Matrix: **Water**
Workgroup Number: **WG312210**
Collect Date: **09/09/2009 16:20**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **25**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/15/2009 16:17**
Cal Date: **09/15/2009 16:13**
Run Date: **09/15/2009 16:17**
File ID: **SC090915004.015**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	1710		50.0	25.0

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-10**
Client ID: **MW38D-107.0**
Matrix: **Water**
Workgroup Number: **WG312210**
Collect Date: **09/10/2009 16:50**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **25**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/15/2009 16:18**
Cal Date: **09/15/2009 16:13**
Run Date: **09/15/2009 16:18**
File ID: **SC090915004.016**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	1750		50.0	25.0

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-11**
Client ID: **MW38D-127.0**
Matrix: **Water**
Workgroup Number: **WG312210**
Collect Date: **09/11/2009 09:15**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **25**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/15/2009 16:18**
Cal Date: **09/15/2009 16:12**
Run Date: **09/15/2009 16:18**
File ID: **SC090915004.017**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	1250		50.0	25.0

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-12**
Client ID: **MW38D-127.0-MS**
Matrix: **Water**
Workgroup Number: **WG312210**
Collect Date: **09/11/2009 09:15**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **25**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/15/2009 16:21**
Cal Date: **09/15/2009 16:13**
Run Date: **09/15/2009 16:21**
File ID: **SC090915004.021**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	1470		50.0	25.0

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-13**
Client ID: **MW38D-127.0-MSD**
Matrix: **Water**
Workgroup Number: **WG312210**
Collect Date: **09/11/2009 09:15**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **25**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/15/2009 16:22**
Cal Date: **09/15/2009 16:13**
Run Date: **09/15/2009 16:22**
File ID: **SC090915004.022**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	1500		50.0	25.0

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-14**
Client ID: **MW38D-97.0**
Matrix: **Water**
Workgroup Number: **WG312187**
Collect Date: **09/10/2009 15:40**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **20**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/15/2009 15:30**
Cal Date: **09/15/2009 14:54**
Run Date: **09/15/2009 15:30**
File ID: **SC090915003.047**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	1750		40.0	20.0

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-15**
Client ID: **MW38D-97.0-FD**
Matrix: **Water**
Workgroup Number: **WG312187**
Collect Date: **09/10/2009 15:45**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **20**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/15/2009 15:32**
Cal Date: **09/15/2009 14:54**
Run Date: **09/15/2009 15:32**
File ID: **SC090915003.048**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	1790		40.0	20.0

15 of 15



2.1.1.2 QC Summary Data

METHOD BLANK SUMMARY

Login Number: L09090260
 Blank File ID: SC090915003.010
 Prep Date: 09/15/09 14:55
 Analyzed Date: 09/15/09 14:55
 Analyst: JBK

Work Group: WG312187
 Blank Sample ID: WG312187-01
 Instrument ID: SMARTCHEM
 Method: 325.2

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG312187-02	SC090915003.011	09/15/09 14:55	01
LCS2	WG312187-03	SC090915003.012	09/15/09 14:56	01
EQUIP-BLK-4	L09090260-02	SC090915003.014	09/15/09 14:57	01
MW38D-147.0	L09090260-05	SC090915003.017	09/15/09 14:59	01
MW38D-77.0	L09090260-03	SC090915003.034	09/15/09 15:16	DL01
MW38D-137.0	L09090260-04	SC090915003.035	09/15/09 15:17	DL01
MW38D-47.0	L09090260-06	SC090915003.036	09/15/09 15:18	DL01
MW38D-87.0	L09090260-07	SC090915003.037	09/15/09 15:20	DL01
MW38D-97.0	L09090260-14	SC090915003.047	09/15/09 15:30	DL01
MW38D-97.0-FD	L09090260-15	SC090915003.048	09/15/09 15:32	DL01
DUP	WG312187-05	SC090915003.056	09/15/09 15:45	DL01



METHOD BLANK SUMMARY

Login Number: L09090260
 Blank File ID: SC090915004.010
 Prep Date: 09/15/09 16:14
 Analyzed Date: 09/15/09 16:14
 Analyst: JBK

Work Group: WG312210
 Blank Sample ID: WG312210-01
 Instrument ID: SMARTCHEM
 Method: 325.2

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG312210-02	SC090915004.011	09/15/09 16:15	01
LCS2	WG312210-03	SC090915004.012	09/15/09 16:16	01
MW38D-117.0	L09090260-01	SC090915004.013	09/15/09 16:16	DL01
MW38D-57.0	L09090260-08	SC090915004.014	09/15/09 16:17	DL01
MW38D-67.0	L09090260-09	SC090915004.015	09/15/09 16:17	DL01
MW38D-107.0	L09090260-10	SC090915004.016	09/15/09 16:18	DL01
MW38D-127.0	L09090260-11	SC090915004.017	09/15/09 16:18	DL01
DUP	WG312210-05	SC090915004.018	09/15/09 16:19	DL01
MW38D-127.0-MS	L09090260-12	SC090915004.021	09/15/09 16:21	DL01
MW38D-127.0-MSD	L09090260-13	SC090915004.022	09/15/09 16:22	DL01

Report Name: BLANK_SUMMARY
 PDF File ID: 1492073
 Report generated 09/17/2009 14:19



Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L09090260 Prep Date: 09/15/09 14:55 Sample ID: WG312187-01
Instrument ID: SMARTCHEM Run Date: 09/15/09 14:55 Prep Method: 325.2
File ID: SC090915003.010 Analyst: JBK Method: 325.2
Workgroup (AAB#): WG312187 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: SMARTC - 15-SEP-09

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Chloride	1.00	2.00	2.00	1	ND

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1492074

17-SEP-2009 14:19



Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L09090260 Prep Date: 09/15/09 16:14 Sample ID: WG312210-01
Instrument ID: SMARTCHEM Run Date: 09/15/09 16:14 Prep Method: 325.2
File ID: SC090915004.010 Analyst: JBK Method: 325.2
Workgroup (AAB#): WG312210 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: SMARTC - 15-SEP-09

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Chloride	1.00	2.00	-2.83	1	*

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1492074

17-SEP-2009 14:19



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09090260 Analyst: JBK Prep Method: 325.2
Instrument ID: SMARTCHEM Matrix: Water Method: 325.2
Workgroup (AAB#): WG312187 Units: mg/L
QC Key: DOWBOA2006 Lot #: STD35142
Sample ID: WG312187-02 LCS File ID: SC090915003.011 Run Date: 09/15/2009 14:55
Sample ID: WG312187-03 LCS2 File ID: SC090915003.012 Run Date: 09/15/2009 14:56

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Chloride	50.0	50.6	101	50.0	50.1	100	1.08	90 - 110	10	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 1492075
Report generated: 09/17/2009 14:20



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09090260 Analyst: JBK Prep Method: 325.2
Instrument ID: SMARTCHEM Matrix: Water Method: 325.2
Workgroup (AAB#): WG312210 Units: mg/L
QC Key: DOWBOA2006 Lot #: STD35142
Sample ID: WG312210-02 LCS File ID: SC090915004.011 Run Date: 09/15/2009 16:15
Sample ID: WG312210-03 LCS2 File ID: SC090915004.012 Run Date: 09/15/2009 16:16

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Chloride	50.0	48.5	97.0	50.0	49.9	99.7	2.74	90 - 110	10	



MS/MSD REPORT

Loginnum: L09090260 Cal ID: SMARTCHEM- 15-SEP-09
 Instrument ID: SMARTCHEM Contract #: _____
 Parent ID: L09090260-11 File ID: SC090915004.017 Dil: 25
 Sample ID: L09090260-12 MS File ID: SC090915004.021 Dil: 25
 Sample ID: L09090260-13 MSD File ID: SC090915004.022 Dil: 25

Worknum: WG312210
 Prep Method: 325.2
 Method: 325.2
 Matrix: Water
 Units: mg/L

Analyte	Parent	MS Spiked	MS Found	MS %Rec	MSD Spiked	MSD Found	MSD %Rec	%RPD	%Rec Limits	RPD Limit	Q
Chloride	1250	20.0	1470	1070	20.0	1500	1230	2.19	90 - 110	10	*

* FAILS %REC LIMIT

FAILS RPD LIMIT

2.1.2 Ammonia Data

2.1.2.1 Summary Data

LABORATORY REPORT

L09090260

09/17/09 15:24

Submitted By

Microbac Laboratories Inc.
158 Starlite Drive
Marietta, OH 45750
(740) 373-4071

For

Account Name: CH2MHILL, Inc
CH2MHILL
15010 Conference Center Drive Suite 200
Chantilly, VA 20151
Attention: Michael J. Zamboni

Project Number: 2736.006
Project: MI-Dow Ludington
Site: LUDINGTON, MI

P.O. Number: 935272

Sample Analysis Summary

Client ID	Lab ID	Method	Dilution	Date Received
MW38D-117.0	L09090260-01	350.1	4	12-SEP-09
EQUIP-BLK-4	L09090260-02	350.1	1	12-SEP-09
MW38D-77.0	L09090260-03	350.1	2	12-SEP-09
MW38D-137.0	L09090260-04	350.1	1	12-SEP-09
MW38D-147.0	L09090260-05	350.1	1	12-SEP-09
MW38D-47.0	L09090260-06	350.1	2	12-SEP-09
MW38D-87.0	L09090260-07	350.1	4	12-SEP-09
MW38D-57.0	L09090260-08	350.1	4	12-SEP-09
MW38D-67.0	L09090260-09	350.1	2	12-SEP-09
MW38D-107.0	L09090260-10	350.1	8	12-SEP-09
MW38D-127.0	L09090260-11	350.1	4	12-SEP-09
MW38D-127.0-MS	L09090260-12	350.1	4	12-SEP-09
MW38D-127.0-MSD	L09090260-13	350.1	4	12-SEP-09
MW38D-97.0	L09090260-14	350.1	8	12-SEP-09
MW38D-97.0-FD	L09090260-15	350.1	8	12-SEP-09



Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-01**
Client ID: **MW38D-117.0**
Matrix: **Water**
Workgroup Number: **WG312223**
Collect Date: **09/10/2009 18:05**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **4**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/16/2009 10:29**
Cal Date: **09/16/2009 09:27**
Run Date: **09/16/2009 10:29**
File ID: **SC090916001.063**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	6.32		0.400	0.200

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-02**
Client ID: **EQUIP-BLK-4**
Matrix: **Water**
Workgroup Number: **WG312223**
Collect Date: **09/10/2009 09:00**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/16/2009 09:43**
Cal Date: **09/16/2009 09:27**
Run Date: **09/16/2009 09:43**
File ID: **SC090916001.025**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7		ND	0.100	0.0500

ND Not detected at or above the reporting limit (RL).

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-03**
Client ID: **MW38D-77.0**
Matrix: **Water**
Workgroup Number: **WG312223**
Collect Date: **09/10/2009 10:40**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **2**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/16/2009 10:31**
Cal Date: **09/16/2009 09:27**
Run Date: **09/16/2009 10:31**
File ID: **SC090916001.064**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	5.66		0.200	0.100

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-04**
Client ID: **MW38D-137.0**
Matrix: **Water**
Workgroup Number: **WG312223**
Collect Date: **09/11/2009 10:40**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/16/2009 09:45**
Cal Date: **09/16/2009 09:27**
Run Date: **09/16/2009 09:45**
File ID: **SC090916001.027**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	0.396		0.100	0.0500

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-05**
Client ID: **MW38D-147.0**
Matrix: **Water**
Workgroup Number: **WG312223**
Collect Date: **09/11/2009 11:30**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/16/2009 09:46**
Cal Date: **09/16/2009 09:27**
Run Date: **09/16/2009 09:46**
File ID: **SC090916001.028**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	0.263		0.100	0.0500

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-06**
Client ID: **MW38D-47.0**
Matrix: **Water**
Workgroup Number: **WG312223**
Collect Date: **09/09/2009 14:45**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **2**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/16/2009 10:33**
Cal Date: **09/16/2009 09:27**
Run Date: **09/16/2009 10:33**
File ID: **SC090916001.065**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	5.95		0.200	0.100

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-07**
Client ID: **MW38D-87.0**
Matrix: **Water**
Workgroup Number: **WG312223**
Collect Date: **09/10/2009 11:45**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **4**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/16/2009 10:35**
Cal Date: **09/16/2009 09:27**
Run Date: **09/16/2009 10:35**
File ID: **SC090916001.066**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	10.6		0.400	0.200

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-08**
Client ID: **MW38D-57.0**
Matrix: **Water**
Workgroup Number: **WG312223**
Collect Date: **09/09/2009 15:55**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **4**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/16/2009 10:36**
Cal Date: **09/16/2009 09:27**
Run Date: **09/16/2009 10:36**
File ID: **SC090916001.067**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	6.12		0.400	0.200

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-09**
Client ID: **MW38D-67.0**
Matrix: **Water**
Workgroup Number: **WG312223**
Collect Date: **09/09/2009 16:20**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **2**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/16/2009 10:40**
Cal Date: **09/16/2009 09:27**
Run Date: **09/16/2009 10:40**
File ID: **SC090916001.070**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	5.79		0.200	0.100

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-10**
Client ID: **MW38D-107.0**
Matrix: **Water**
Workgroup Number: **WG312225**
Collect Date: **09/10/2009 16:50**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **8**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/16/2009 10:47**
Cal Date: **09/16/2009 09:27**
Run Date: **09/16/2009 10:47**
File ID: **SC090916001.074**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	10.6		0.800	0.400

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-11**
Client ID: **MW38D-127.0**
Matrix: **Water**
Workgroup Number: **WG312223**
Collect Date: **09/11/2009 09:15**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **4**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/16/2009 10:42**
Cal Date: **09/16/2009 09:27**
Run Date: **09/16/2009 10:42**
File ID: **SC090916001.071**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	6.58		0.400	0.200

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-12**
Client ID: **MW38D-127.0-MS**
Matrix: **Water**
Workgroup Number: **WG312223**
Collect Date: **09/11/2009 09:15**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **4**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/16/2009 10:44**
Cal Date: **09/16/2009 09:27**
Run Date: **09/16/2009 10:44**
File ID: **SC090916001.072**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	8.06		0.400	0.200

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-13**
Client ID: **MW38D-127.0-MSD**
Matrix: **Water**
Workgroup Number: **WG312223**
Collect Date: **09/11/2009 09:15**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **4**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/16/2009 10:45**
Cal Date: **09/16/2009 09:27**
Run Date: **09/16/2009 10:45**
File ID: **SC090916001.073**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	7.86		0.400	0.200

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-14**
Client ID: **MW38D-97.0**
Matrix: **Water**
Workgroup Number: **WG312225**
Collect Date: **09/10/2009 15:40**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **8**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/16/2009 10:49**
Cal Date: **09/16/2009 09:27**
Run Date: **09/16/2009 10:49**
File ID: **SC090916001.075**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	11.1		0.800	0.400

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-15**
Client ID: **MW38D-97.0-FD**
Matrix: **Water**
Workgroup Number: **WG312225**
Collect Date: **09/10/2009 15:45**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **DIH**
Dilution: **8**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/16/2009 10:51**
Cal Date: **09/16/2009 09:27**
Run Date: **09/16/2009 10:51**
File ID: **SC090916001.076**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	11.1		0.800	0.400

2.1.2.2 QC Summary Data

METHOD BLANK SUMMARY

Login Number: L09090260
 Blank File ID: SC090916001.009
 Prep Date: 09/16/09 09:29
 Analyzed Date: 09/16/09 09:29
 Analyst: DIH

Work Group: WG312223
 Blank Sample ID: WG312223-01
 Instrument ID: SMARTCHEM
 Method: 350.1

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG312223-02	SC090916001.010	09/16/09 09:30	01
EQUIP-BLK-4	L09090260-02	SC090916001.025	09/16/09 09:43	01
MW38D-137.0	L09090260-04	SC090916001.027	09/16/09 09:45	01
MW38D-147.0	L09090260-05	SC090916001.028	09/16/09 09:46	01
DUP	WG312223-06	SC090916001.038	09/16/09 09:55	01
LCS2	WG312223-03	SC090916001.058	09/16/09 10:13	01
MW38D-117.0	L09090260-01	SC090916001.063	09/16/09 10:29	DL01
MW38D-77.0	L09090260-03	SC090916001.064	09/16/09 10:31	DL01
MW38D-47.0	L09090260-06	SC090916001.065	09/16/09 10:33	DL01
MW38D-87.0	L09090260-07	SC090916001.066	09/16/09 10:35	DL01
MW38D-57.0	L09090260-08	SC090916001.067	09/16/09 10:36	DL01
MW38D-67.0	L09090260-09	SC090916001.070	09/16/09 10:40	DL01
MW38D-127.0	L09090260-11	SC090916001.071	09/16/09 10:42	DL01
MW38D-127.0-MS	L09090260-12	SC090916001.072	09/16/09 10:44	DL01
MW38D-127.0-MSD	L09090260-13	SC090916001.073	09/16/09 10:45	DL01



METHOD BLANK SUMMARY

Login Number: L09090260
 Blank File ID: SC090916001.039
 Prep Date: 09/16/09 09:56
 Analyzed Date: 09/16/09 09:56
 Analyst: DIH

Work Group: WG312225
 Blank Sample ID: WG312225-01
 Instrument ID: SMARTCHEM
 Method: 350.1

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG312225-02	SC090916001.040	09/16/09 09:57	01
LCS2	WG312225-03	SC090916001.041	09/16/09 09:58	01
MW38D-107.0	L09090260-10	SC090916001.074	09/16/09 10:47	DL01
MW38D-97.0	L09090260-14	SC090916001.075	09/16/09 10:49	DL01
MW38D-97.0-FD	L09090260-15	SC090916001.076	09/16/09 10:51	DL01
DUP	WG312225-05	SC090916001.077	09/16/09 10:53	DL01



Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L09090260 Prep Date: 09/16/09 09:29 Sample ID: WG312223-01
Instrument ID: SMARTCHEM Run Date: 09/16/09 09:29 Prep Method: 350.1
File ID: SC090916001.009 Analyst: DIH Method: 350.1
Workgroup (AAB#): WG312223 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: SMARTC - 16-SEP-09

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Nitrogen, Ammonia	0.0500	0.100	0.100	1	ND

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1491408

16-SEP-2009 16:18



Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L09090260 Prep Date: 09/16/09 09:56 Sample ID: WG312225-01
Instrument ID: SMARTCHEM Run Date: 09/16/09 09:56 Prep Method: 350.1
File ID: SC090916001.039 Analyst: DIH Method: 350.1
Workgroup (AAB#): WG312225 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: SMARTC - 16-SEP-09

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Nitrogen, Ammonia	0.0500	0.100	0.100	1	ND

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1491408

16-SEP-2009 16:18



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09090260 Analyst: DIH Prep Method: 350.1
Instrument ID: SMARTCHEM Matrix: Water Method: 350.1
Workgroup (AAB#): WG312223 Units: mg/L
QC Key: DOWBOA2006 Lot #: STD33211
Sample ID: WG312223-02 LCS File ID: SC090916001.010 Run Date: 09/16/2009 09:30
Sample ID: WG312223-03 LCS2 File ID: SC090916001.058 Run Date: 09/16/2009 10:13

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Nitrogen, Ammonia	2.00	1.86	93.1	2.00	1.82	90.9	2.41	90 - 110	25	



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09090260 Analyst: DIH Prep Method: 350.1
 Instrument ID: SMARTCHEM Matrix: Water Method: 350.1
 Workgroup (AAB#): WG312225 Units: mg/L
 QC Key: DOWBOA2006 Lot #: STD33211
 Sample ID: WG312225-02 LCS File ID: SC090916001.040 Run Date: 09/16/2009 09:57
 Sample ID: WG312225-03 LCS2 File ID: SC090916001.041 Run Date: 09/16/2009 09:58

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Nitrogen, Ammonia	2.00	1.89	94.7	2.00	1.81	90.7	4.37	90 - 110	25	

LCS_LCS2 - Modified 03/06/2008
 PDF File ID: 1491409
 Report generated: 09/16/2009 16:18



MS/MSD REPORT

Loginnum: L09090260 Cal ID: SMARTCHEM- 16-SEP-09
 Instrument ID: SMARTCHEM Contract #: _____
 Parent ID: L09090260-11 File ID: SC090916001.071 Dil: 4
 Sample ID: L09090260-12 MS File ID: SC090916001.072 Dil: 4
 Sample ID: L09090260-13 MSD File ID: SC090916001.073 Dil: 4

Worknum: WG312223
 Prep Method: 350.1
 Method: 350.1
 Matrix: Water
 Units: mg/L

Analyte	Parent	MS Spiked	MS Found	MS %Rec	MSD Spiked	MSD Found	MSD %Rec	%RPD	%Rec Limits	RPD Limit	Q
Nitrogen, Ammonia	6.58	1.00	8.06	148	1.00	7.86	129	2.43	70 - 125	25	*

* FAILS %REC LIMIT

FAILS RPD LIMIT

2.1.3 Total Dissolved Solids Data

2.1.3.1 Summary Data

LABORATORY REPORT

L09090260

09/17/09 15:24

Submitted By

Microbac Laboratories Inc.
158 Starlite Drive
Marietta , OH 45750
(740) 373 - 4071

For

Account Name: CH2MHILL, Inc
CH2MHILL
15010 Conference Center Drive Suite 200
Chantilly, VA 20151
Attention: Michael J. Zamboni

Project Number: 2736.006
Project: MI-Dow Ludington
Site: LUDINGTON, MI

P.O. Number: 935272

Sample Analysis Summary

Client ID	Lab ID	Method	Dilution	Date Received
MW38D-117.0	L09090260-01	160.1	1	12-SEP-09
EQUIP-BLK-4	L09090260-02	160.1	1	12-SEP-09
MW38D-77.0	L09090260-03	160.1	1	12-SEP-09
MW38D-137.0	L09090260-04	160.1	1	12-SEP-09
MW38D-147.0	L09090260-05	160.1	1	12-SEP-09
MW38D-47.0	L09090260-06	160.1	1	12-SEP-09
MW38D-87.0	L09090260-07	160.1	1	12-SEP-09
MW38D-57.0	L09090260-08	160.1	1	12-SEP-09
MW38D-67.0	L09090260-09	160.1	1	12-SEP-09
MW38D-107.0	L09090260-10	160.1	1	12-SEP-09
MW38D-127.0	L09090260-11	160.1	1	12-SEP-09
MW38D-127.0-MS	L09090260-12	160.1	1	12-SEP-09
MW38D-127.0-MSD	L09090260-13	160.1	1	12-SEP-09
MW38D-97.0	L09090260-14	160.1	1	12-SEP-09
MW38D-97.0-FD	L09090260-15	160.1	1	12-SEP-09



Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-01**
Client ID: **MW38D-117.0**
Matrix: **Water**
Workgroup Number: **WG312008**
Collect Date: **09/10/2009 18:05**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/15/2009 13:45**
Cal Date:
Run Date: **09/15/2009 13:45**
File ID: **EN.0909151345-15**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		2700		20.0	10.0

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-02**
Client ID: **EQUIP-BLK-4**
Matrix: **Water**
Workgroup Number: **WG312008**
Collect Date: **09/10/2009 09:00**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/15/2009 13:45**
Cal Date:
Run Date: **09/15/2009 13:45**
File ID: **EN.0909151345-20**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids			ND	10.0	5.00

ND Not detected at or above the reporting limit (RL).

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-03**
Client ID: **MW38D-77.0**
Matrix: **Water**
Workgroup Number: **WG312008**
Collect Date: **09/10/2009 10:40**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/15/2009 13:45**
Cal Date:
Run Date: **09/15/2009 13:45**
File ID: **EN.0909151345-10**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		3400		20.0	10.0

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-04**
Client ID: **MW38D-137.0**
Matrix: **Water**
Workgroup Number: **WG312008**
Collect Date: **09/11/2009 10:40**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/15/2009 13:45**
Cal Date:
Run Date: **09/15/2009 13:45**
File ID: **EN.0909151345-19**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		738		20.0	10.0

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-05**
Client ID: **MW38D-147.0**
Matrix: **Water**
Workgroup Number: **WG312008**
Collect Date: **09/11/2009 11:30**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/15/2009 13:45**
Cal Date:
Run Date: **09/15/2009 13:45**
File ID: **EN.0909151345-09**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		448		20.0	10.0

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-06**
Client ID: **MW38D-47.0**
Matrix: **Water**
Workgroup Number: **WG312008**
Collect Date: **09/09/2009 14:45**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/15/2009 13:45**
Cal Date:
Run Date: **09/15/2009 13:45**
File ID: **EN.0909151345-06**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		2240		20.0	10.0

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-07**
Client ID: **MW38D-87.0**
Matrix: **Water**
Workgroup Number: **WG312008**
Collect Date: **09/10/2009 11:45**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/15/2009 13:45**
Cal Date:
Run Date: **09/15/2009 13:45**
File ID: **EN.0909151345-11**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		3700		20.0	10.0

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-08**
Client ID: **MW38D-57.0**
Matrix: **Water**
Workgroup Number: **WG312008**
Collect Date: **09/09/2009 15:55**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/15/2009 13:45**
Cal Date:
Run Date: **09/15/2009 13:45**
File ID: **EN.0909151345-07**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		3070		20.0	10.0

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-09**
Client ID: **MW38D-67.0**
Matrix: **Water**
Workgroup Number: **WG312008**
Collect Date: **09/09/2009 16:20**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/15/2009 13:45**
Cal Date:
Run Date: **09/15/2009 13:45**
File ID: **EN.0909151345-08**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		3010		20.0	10.0

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-10**
Client ID: **MW38D-107.0**
Matrix: **Water**
Workgroup Number: **WG312008**
Collect Date: **09/10/2009 16:50**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/15/2009 13:45**
Cal Date:
Run Date: **09/15/2009 13:45**
File ID: **EN.0909151345-14**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		3730		20.0	10.0

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-11**
Client ID: **MW38D-127.0**
Matrix: **Water**
Workgroup Number: **WG312008**
Collect Date: **09/11/2009 09:15**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/15/2009 13:45**
Cal Date:
Run Date: **09/15/2009 13:45**
File ID: **EN.0909151345-16**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		3280		20.0	10.0

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-12**
Client ID: **MW38D-127.0-MS**
Matrix: **Water**
Workgroup Number: **WG312008**
Collect Date: **09/11/2009 09:15**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/15/2009 13:45**
Cal Date:
Run Date: **09/15/2009 13:45**
File ID: **EN.0909151345-17**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		3460		20.0	10.0

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-13**
Client ID: **MW38D-127.0-MSD**
Matrix: **Water**
Workgroup Number: **WG312008**
Collect Date: **09/11/2009 09:15**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/15/2009 13:45**
Cal Date:
Run Date: **09/15/2009 13:45**
File ID: **EN.0909151345-18**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		3920		20.0	10.0

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-14**
Client ID: **MW38D-97.0**
Matrix: **Water**
Workgroup Number: **WG312008**
Collect Date: **09/10/2009 15:40**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/15/2009 13:45**
Cal Date:
Run Date: **09/15/2009 13:45**
File ID: **EN.0909151345-12**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		3970		20.0	10.0

Report Number: **L09090260**Report Date : **September 17, 2009**

Sample Number: **L09090260-15**
Client ID: **MW38D-97.0-FD**
Matrix: **Water**
Workgroup Number: **WG312008**
Collect Date: **09/10/2009 15:45**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/15/2009 13:45**
Cal Date:
Run Date: **09/15/2009 13:45**
File ID: **EN.0909151345-13**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		3940		20.0	10.0

2.1.3.2 QC Summary Data

METHOD BLANK SUMMARY

Login Number: L09090260
 Blank File ID: EN.0909151345-01
 Prep Date: 09/15/09 13:45
 Analyzed Date: 09/15/09 13:45
 Analyst: HJR

Work Group: WG312008
 Blank Sample ID: WG312008-01
 Instrument ID: OVEN
 Method: 160.1

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG312008-02	EN.0909151345-02	09/15/09 13:45	
LCS2	WG312008-03	EN.0909151345-03	09/15/09 13:45	
MW38D-47.0	L09090260-06	EN.0909151345-06	09/15/09 13:45	
MW38D-57.0	L09090260-08	EN.0909151345-07	09/15/09 13:45	
MW38D-67.0	L09090260-09	EN.0909151345-08	09/15/09 13:45	
MW38D-147.0	L09090260-05	EN.0909151345-09	09/15/09 13:45	
MW38D-77.0	L09090260-03	EN.0909151345-10	09/15/09 13:45	
MW38D-87.0	L09090260-07	EN.0909151345-11	09/15/09 13:45	
MW38D-97.0	L09090260-14	EN.0909151345-12	09/15/09 13:45	
MW38D-97.0-FD	L09090260-15	EN.0909151345-13	09/15/09 13:45	
MW38D-107.0	L09090260-10	EN.0909151345-14	09/15/09 13:45	
MW38D-117.0	L09090260-01	EN.0909151345-15	09/15/09 13:45	
MW38D-127.0	L09090260-11	EN.0909151345-16	09/15/09 13:45	
MW38D-127.0-MS	L09090260-12	EN.0909151345-17	09/15/09 13:45	
MW38D-127.0-MSD	L09090260-13	EN.0909151345-18	09/15/09 13:45	
MW38D-137.0	L09090260-04	EN.0909151345-19	09/15/09 13:45	
EQUIP-BLK-4	L09090260-02	EN.0909151345-20	09/15/09 13:45	
DUP	WG312008-05	EN.0909151345-22	09/15/09 13:45	



Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L09090260 Prep Date: 09/15/09 13:45 Sample ID: WG312008-01
Instrument ID: OVEN Run Date: 09/15/09 13:45 Prep Method: 160.1
File ID: EN.0909151345-01 Analyst: HJR Method: 160.1
Workgroup (AAB#): WG312008 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: OVEN -

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Total Dissolved Solids	5.00	10.0	10.0	1	ND

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1492004

17-SEP-2009 13:58



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09090260 Analyst: HJR Prep Method: 160.1
Instrument ID: OVEN Matrix: Water Method: 160.1
Workgroup (AAB#): WG312008 Units: mg/L
QC Key: DOWBOA2006 Lot #: STD32441
Sample ID: WG312008-02 LCS File ID: EN.0909151345-02 Run Date: 09/15/2009 13:45
Sample ID: WG312008-03 LCS2 File ID: EN.0909151345-03 Run Date: 09/15/2009 13:45

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Total Dissolved Solids	500	488	97.6	500	490	98.0	0.409	80 - 120	25	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 1492005
Report generated: 09/17/2009 13:58



MS/MSD REPORT

Loginnum: L09090260Cal ID: OVEN-Worknum: WG312008Instrument ID: OVEN

Contract #: _____

Prep Method: 160.1Parent ID: L09090260-11File ID: EN.0909151345-16Dil: 1Method: 160.1Sample ID: L09090260-12 MSFile ID: EN.0909151345-17Dil: 1Matrix: WaterSample ID: L09090260-13 MSDFile ID: EN.0909151345-18Dil: 1Units: mg/L

Analyte	Parent	MS Spiked	MS Found	MS %Rec	MSD Spiked	MSD Found	MSD %Rec	%RPD	%Rec Limits	RPD Limit	Q
Total Dissolved Solids	3280	500	3460	34.8	500	3920	127	12.5	80 - 120	25	*

* FAILS %REC LIMIT

FAILS RPD LIMIT

MS_MSD - Modified 09/13/2009

PDF File ID: 1492006

Report generated 09/17/2009 13:58



3.0 Attachments

Microbac Laboratories Inc.
Analyst Listing
September 17, 2009

ADC - ANTHONY D. CANTER	AJF - AMANDA J. FICKIESEN	AJM - ANTHONY J. MOSSBURG
ALB - ANNIE L. BROWN	AML - ANTHONY M. LONG	BLG - BRENDA L. GREENWALT
BRG - BRENDA R. GREGORY	CAA - CASSIE A. AUGENSTEIN	CAF - CHERYL A. FLOWERS
CAH - CHARLES A. HALL	CEB - CHAD E. BARNES	CLC - CHRYS L. CRAWFORD
CLW - CHARISSA L. WINTERS	CPD - CHAD P. DAVIS	CSH - CHRIS S. HILL
DDE - DEBRA D. ELLIOTT	DEL - DON E. LIGHTFRITZ	DEV - DAVID E. VANDENBERG
DGB - DOUGLAS G. BUTCHER	DIH - DEANNA I. HESSON	DLB - DAVID L. BUMGARNER
DLP - DOROTHY L. PAYNE	DLR - DIANNA L. RAUCH	DR - DEANNA ROBERTS
ECL - ERIC C. LAWSON	EDA - ERIN D. AGEE	ERP - ERIN R. PORTER
FJB - FRANCES J. BOLDEN	HAV - HEMA VILASAGAR	HJR - HOLLY J. REED
JBK - JEREMY B. KINNEY	JDH - JUSTIN D. HESSON	JKT - JANE K. THOMPSON
JWR - JOHN W. RICHARDS	JWS - JACK W. SHEAVES	JYH - JI Y. HU
KEB - KATHRYN E. BARNES	KHR - KIM H. RHODES	KRA - KATHY R. ALBERTSON
LKN - LINDA K. NEDEFF	LSB - LESLIE S. BUCINA	MDA - MIKE D. ALBERTSON
MDC - MICHAEL D. COCHRAN	MES - MARY E. SCHILLING	MMB - MAREN M. BEERY
MRT - MICHELLE R. TAYLOR	MSW - MATT S. WILSON	NPM - NATHANIEL P. MILLER
PDM - PIERCE D. MORRIS	RAH - ROY A. HALSTEAD	RB - ROBERT BUCHANAN
REK - ROBERT E. KYER	RLK - ROBIN L. KLINGER	RWC - RODNEY W. CAMPBELL
SDH - SHANA D. HINYARD	SLM - STEPHANIE L. MOSSBURG	SLP - SHERI L. PFALZGRAF
TIP - TAE I. PARRISH	TMB - TIFFANY M. BAILEY	TMM - TAMMY M. MORRIS
VC - VICKI COLLIER	WTD - WADE T. DELONG	

September 17, 2009

Qualkey: STD

Qualifier	Description
*	Surrogate or spike compound out of range
+	Correlation coefficient for the MSA is less than 0.995
<	Result is less than the associated numerical value.
>	Result is greater than the associated numerical value.
A	See the report narrative
B	Analyte present in method blank
B1	Target analyte detected in method blank at or above the method reporting limit
B3	Target analyte detected in calibration blank at or above the method reporting limit
C	Confirmed by GC/MS
CG	Confluent growth
DL	Surrogate or spike compound was diluted out
E	Estimated concentration due to sample matrix interference
EDL	Elevated sample reporting limits, presence of non-target analytes
EMPC	Estimated Maximum Possible Concentration
F, S	Estimated result below quantitation limit; method of standard additions(MSA)
FL	Free Liquid
H1	Sample analysis performed past holding time.
I	Semiquantitative result (out of instrument calibration range)
J	The analyte was positively identified, but the quantitation was below the RL
J,B	Analyte detected in both the method blank and sample above the MDL.
J,P	Estimate; columns don't agree to within 40%
J,S	Estimated concentration; analyzed by method of standard addition (MSA)
L	Sample reporting limits elevated due to matrix interference
L1	The associated blank spike (LCS) recovery was above the laboratory acceptance limits.
L2	The associated blank spike (LCS) recovery was below the laboratory acceptance limits.
M	Matrix effect; the concentration is an estimate due to matrix effect.
N	Tentatively identified compound(TIC)
NA	Not applicable
ND	Not detected at or above the reporting limit (RL).
ND, L	Not detected; sample reporting limit (RL) elevated due to interference
ND, S	Not detected; analyzed by method of standard addition (MSA)
NF	Not found by library search
NFL	No free liquid
NI	Non-ignitable
NR	Analyte is not required to be analyzed
NS	Not spiked
P	Concentrations >40% difference between the two GC columns
Q	One or more quality control criteria fail. See narrative.
QNS	Quantity of sample not sufficient to perform analysis
RA	Reanalysis confirms reported results
RE	Reanalysis confirms sample matrix interference
S	Analyzed by method of standard addition (MSA)
SMI	Sample matrix interference on surrogate
SP	Reported results are for spike compounds only
TIC	Library Search Compound
TNTC	Too numerous to count
U	Undetected; the concentration is below the reported MDL.
UJ	Undetected; the MDL and RL are estimated due to quality control discrepancies.
W	Post-digestion spike for furnace AA out of control limits
X	Exceeds regulatory limit
X, S	Exceeds regulatory limit; method of standard additions (MSA)
Z	Cannot be resolved from isomer - see below

*****Special Notes for Organic Analytes**

1. Acrolein and acrylonitrile by method 624 are semi-quantitative screens only.
2. 1,2-Diphenylhydrazine is unstable and is reported as azobenzene.
3. N-nitrosodiphenylamine cannot be separated from diphenylamine.
4. 3-Methylphenol and 4-Methylphenol are unresolvable compounds.
5. m-Xylene and p-Xylene are unresolvable compounds.
6. The reporting limits for Appendix II/IX compounds by method 8270 are based on EPA estimated PQLs referenced in 40 CFR Part 264, Appendix IX. They are not always achievable for every compound and are matrix dependent.



COC No. A 06145

158 Starlite Drive

Marietta, OH 45750

Microbac

Phone: 740-373-4071

Fax: 740-373-4835

CHAIN-OF-CUSTODY RECORD

Company Name: CH2M Hill		Contact Phone #: 703-376-5111		Location: Ludington, MI		Project ID: Don-Ludington		Project Name: Don-Ludington		Project Address: Don-Ludington		Project City: Don-Ludington		Project State: Don-Ludington		Project Zip: Don-Ludington		Project Country: Don-Ludington		Project Other: Don-Ludington		Project Program: Don-Ludington		Project Additional Requirements: Don-Ludington	
Project Contact: Mike Zamboni		Contact Phone #: 703-376-5111		Location: Ludington, MI		Project ID: Don-Ludington		Project Name: Don-Ludington		Project Address: Don-Ludington		Project City: Don-Ludington		Project State: Don-Ludington		Project Zip: Don-Ludington		Project Country: Don-Ludington		Project Other: Don-Ludington		Project Program: Don-Ludington		Project Additional Requirements: Don-Ludington	
Turn Around Requirements: Standard		Contact Phone #: 703-376-5111		Location: Ludington, MI		Project ID: Don-Ludington		Project Name: Don-Ludington		Project Address: Don-Ludington		Project City: Don-Ludington		Project State: Don-Ludington		Project Zip: Don-Ludington		Project Country: Don-Ludington		Project Other: Don-Ludington		Project Program: Don-Ludington		Project Additional Requirements: Don-Ludington	
Project ID: Don-Ludington		Contact Phone #: 703-376-5111		Location: Ludington, MI		Project ID: Don-Ludington		Project Name: Don-Ludington		Project Address: Don-Ludington		Project City: Don-Ludington		Project State: Don-Ludington		Project Zip: Don-Ludington		Project Country: Don-Ludington		Project Other: Don-Ludington		Project Program: Don-Ludington		Project Additional Requirements: Don-Ludington	
Sampler (print): Nicole Wilbur		Signature: Nicole Wilbur		Date: 9/10/09		Time: 18:05		Matrix: GW		Hold: 1		Dissolved Ammonia: 1		TDS & Chloride: 1		TOTAL # (LAB USE): 1		Program: MS/MSD		Additional Requirements: MS/MSD		Received by: MS/MSD		Time: MS/MSD	
Sample I.D. No.		Grab		Date		Time		Matrix		Hold		Dissolved Ammonia		TDS & Chloride		TOTAL # (LAB USE)		Program		Additional Requirements		Received by:		Time	
MW38D-117.0	X	9/10/09	18:05	GW	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Equip - BLK-4	X	9/10/09	9:00	W	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
MW38D-77.0	X	9/10/09	10:40	GW	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
MW38D-137.0	X	9/11/09	10:40	GW	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
MW38D-147.0	X	9/11/09	11:30	GW	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
MW38D-47.0	X	9/9/09	14:45	GW	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
MW38D-87.0	X	9/10/09	11:45	GW	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
MW38D-57.0	X	9/10/09	15:55	GW	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
MW38D-67.0	X	9/9/09	16:20	GW	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
MW38D-107.0	X	9/10/09	16:50	GW	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
MW38D-127.0	X	9/11/09	9:15	GW	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
MW38D-97.0	X	9/10/09	15:40	GW	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
MW38D-97.0FD	X	9/10/09	15:45	GW	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
* Samples collected on 9/9 & 9/10 have		shortened hold times		221000001672		Microbac OVD		Received: 09/12/2009 09:01		By: ROBIN KLINGER		Signature: Robin J. Klinger		Date: 9/11/09		Time: 13:30		Date: 9/11/09		Time: 13:30		Date: 9/11/09		Time: 13:30	



1000001672

COOLER INSPECTION



Received: 09/12/2009 09:01
Delivery Method: FedEx
Opened By: Robin Klinger
Comments:

Login(s): L09090260

Cooler(s)

Cooler #	Temp Gun	Temp	Tracking #	COC #	Comments
0013571	H	3.0	34575057110000448696073552942004	06145	

1	Yes	Were shipping coolers sealed?
2	Yes	Were custody seals intact?
3	Yes	Were cooler temperatures in range of 0-6?
4	Yes	Was ice present?
5	Yes	Were COC's received/information complete/signed and dated?
6	Yes	Were sample containers and labels intact and match COC?
7	Yes	Were the correct containers and volumes received?
8	Yes	Were correct preservatives used? (water only)
9	Yes	Were pH ranges acceptable? (voa's excluded)
10	NA	Were VOA samples free of headspace (<6mm)?
11	Yes	Were samples received within EPA hold times?

Look closer. Go further. Do more.

Microbac - Ohio Valley Division
158 Starlite Drive
Marietta, OH 45750
Tel: (740)373-4071 Fax: (740)373-4835

Internal Chain of Custody Report

Login: L09090260

Account: 2736

Project: 2736.006

Samples: 15

Due Date: 28-SEP-2009

Samplenum **Container ID** **Products**
L09090260-01 614387 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	14-SEP-2009 10:26	RLK	
2	ANALYZ	W1	WET	14-SEP-2009 15:19	HJR	RLK
3	STORE	WET	A2	16-SEP-2009 08:21	RLK	JBK

Samplenum **Container ID** **Products**
L09090260-01 614388 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	14-SEP-2009 10:26	RLK	
2	ANALYZ	W1	WET	14-SEP-2009 15:51	TMM	JKT
3	STORE	WET	A2	17-SEP-2009 08:26	RLK	TMM

Samplenum **Container ID** **Products**
L09090260-02 614389 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	14-SEP-2009 10:26	RLK	
2	ANALYZ	W1	WET	14-SEP-2009 15:19	HJR	RLK
3	STORE	WET	A2	16-SEP-2009 08:21	RLK	JBK

Samplenum **Container ID** **Products**
L09090260-02 614390 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	14-SEP-2009 10:26	RLK	
2	ANALYZ	W1	WET	14-SEP-2009 15:51	TMM	JKT

Samplenum **Container ID** **Products**
L09090260-03 614391 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	14-SEP-2009 10:26	RLK	
2	ANALYZ	W1	WET	14-SEP-2009 15:19	HJR	RLK
3	STORE	WET	A2	16-SEP-2009 08:21	RLK	JBK

A1 - Sample Archive (COLD)

A2 - Sample Archive (AMBIENT)

F1 - Volatiles Freezer in Login

V1 - Volatiles Refrigerator in Login

W1 - Walkin Cooler in Login

Internal Chain of Custody Report

Login: L09090260

Account: 2736

Project: 2736.006

Samples: 15

Due Date: 28-SEP-2009

Samplenum **Container ID** **Products**
L09090260-03 614392 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	14-SEP-2009 10:26	RLK	
2	ANALYZ	W1	WET	14-SEP-2009 15:51	TMM	JKT
3	STORE	WET	A2	17-SEP-2009 08:26	RLK	TMM

Samplenum **Container ID** **Products**
L09090260-04 614393 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	14-SEP-2009 10:26	RLK	
2	ANALYZ	W1	WET	14-SEP-2009 15:19	HJR	RLK
3	STORE	WET	A2	16-SEP-2009 08:22	RLK	JBK

Samplenum **Container ID** **Products**
L09090260-04 614394 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	14-SEP-2009 10:26	RLK	
2	ANALYZ	W1	WET	14-SEP-2009 15:51	TMM	JKT
3	STORE	WET	A2	17-SEP-2009 08:26	RLK	TMM

Samplenum **Container ID** **Products**
L09090260-05 614395 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	14-SEP-2009 10:26	RLK	
2	ANALYZ	W1	WET	14-SEP-2009 15:19	HJR	RLK
3	STORE	WET	A2	16-SEP-2009 08:22	RLK	JBK

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09090260

Account: 2736

Project: 2736.006

Samples: 15

Due Date: 28-SEP-2009

Samplenum **Container ID** **Products**
L09090260-05 614396 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	14-SEP-2009 10:26	RLK	
2	ANALYZ	W1	WET	14-SEP-2009 15:51	TMM	JKT
3	STORE	WET	A2	17-SEP-2009 08:26	RLK	TMM

Samplenum **Container ID** **Products**
L09090260-06 614397 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	14-SEP-2009 10:26	RLK	
2	ANALYZ	W1	WET	14-SEP-2009 15:19	HJR	RLK
3	STORE	WET	A2	16-SEP-2009 08:22	RLK	JBK

Samplenum **Container ID** **Products**
L09090260-06 614398 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	14-SEP-2009 10:26	RLK	
2	ANALYZ	W1	WET	14-SEP-2009 15:50	TMM	JKT
3	STORE	WET	A2	17-SEP-2009 08:26	RLK	TMM

Samplenum **Container ID** **Products**
L09090260-07 614399 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	14-SEP-2009 10:26	RLK	
2	ANALYZ	W1	WET	14-SEP-2009 15:19	HJR	RLK
3	STORE	WET	A2	16-SEP-2009 08:22	RLK	JBK

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09090260

Account: 2736

Project: 2736.006

Samples: 15

Due Date: 28-SEP-2009

Samplenum **Container ID** **Products**
L09090260-07 614400 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	14-SEP-2009 10:26	RLK	
2	ANALYZ	W1	WET	14-SEP-2009 15:51	TMM	JKT
3	STORE	WET	A2	17-SEP-2009 08:26	RLK	TMM

Samplenum **Container ID** **Products**
L09090260-08 614401 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	14-SEP-2009 10:26	RLK	
2	ANALYZ	W1	WET	14-SEP-2009 15:19	HJR	RLK
3	STORE	WET	A2	16-SEP-2009 08:21	RLK	JBK

Samplenum **Container ID** **Products**
L09090260-08 614402 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	14-SEP-2009 10:26	RLK	
2	ANALYZ	W1	WET	14-SEP-2009 15:51	TMM	JKT
3	STORE	WET	A2	17-SEP-2009 08:27	RLK	TMM

Samplenum **Container ID** **Products**
L09090260-09 614403 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	14-SEP-2009 10:26	RLK	
2	ANALYZ	W1	WET	14-SEP-2009 15:19	HJR	RLK
3	STORE	WET	A2	16-SEP-2009 08:22	RLK	JBK

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09090260

Account: 2736

Project: 2736.006

Samples: 15

Due Date: 28-SEP-2009

Samplenum **Container ID** **Products**
L09090260-09 614404 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	14-SEP-2009 10:26	RLK	
2	ANALYZ	W1	WET	14-SEP-2009 15:51	TMM	JKT
3	STORE	WET	A2	17-SEP-2009 08:27	RLK	TMM

Samplenum **Container ID** **Products**
L09090260-10 614405 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	14-SEP-2009 10:26	RLK	
2	ANALYZ	W1	WET	14-SEP-2009 15:19	HJR	RLK
3	STORE	WET	A2	16-SEP-2009 08:22	RLK	JBK

Samplenum **Container ID** **Products**
L09090260-10 614406 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	14-SEP-2009 10:26	RLK	
2	ANALYZ	W1	WET	14-SEP-2009 15:51	TMM	JKT
3	STORE	WET	A2	17-SEP-2009 08:27	RLK	TMM

Samplenum **Container ID** **Products**
L09090260-11 614407 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	14-SEP-2009 10:26	RLK	
2	ANALYZ	W1	WET	14-SEP-2009 15:19	HJR	RLK
3	STORE	WET	A2	16-SEP-2009 08:22	RLK	JBK

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09090260

Account: 2736

Project: 2736.006

Samples: 15

Due Date: 28-SEP-2009

Samplenum **Container ID** **Products**
L09090260-11 614408 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	14-SEP-2009 10:26	RLK	
2	ANALYZ	W1	WET	14-SEP-2009 15:50	TMM	JKT
3	STORE	WET	A2	17-SEP-2009 08:27	RLK	TMM

Samplenum **Container ID** **Products**
L09090260-12 614409 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	14-SEP-2009 10:26	RLK	
2	ANALYZ	W1	WET	14-SEP-2009 15:19	HJR	RLK
3	STORE	WET	A2	16-SEP-2009 08:22	RLK	JBK

Samplenum **Container ID** **Products**
L09090260-12 614410 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	14-SEP-2009 10:26	RLK	
2	ANALYZ	W1	WET	14-SEP-2009 15:50	TMM	JKT
3	STORE	WET	A2	17-SEP-2009 08:27	RLK	TMM

Samplenum **Container ID** **Products**
L09090260-13 614411 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	14-SEP-2009 10:26	RLK	
2	ANALYZ	W1	WET	14-SEP-2009 15:19	HJR	RLK
3	STORE	WET	A2	16-SEP-2009 08:22	RLK	JBK

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09090260

Account: 2736

Project: 2736.006

Samples: 15

Due Date: 28-SEP-2009

Samplenum **Container ID** **Products**
L09090260-13 614412 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	14-SEP-2009 10:26	RLK	
2	ANALYZ	W1	WET	14-SEP-2009 15:50	TMM	JKT
3	STORE	WET	A2	17-SEP-2009 08:27	RLK	TMM

Samplenum **Container ID** **Products**
L09090260-14 614413 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	14-SEP-2009 10:26	RLK	
2	ANALYZ	W1	WET	14-SEP-2009 15:19	HJR	RLK
3	STORE	WET	A2	16-SEP-2009 08:22	RLK	JBK

Samplenum **Container ID** **Products**
L09090260-14 614414 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	14-SEP-2009 10:26	RLK	
2	ANALYZ	W1	WET	14-SEP-2009 15:50	TMM	JKT
3	STORE	WET	A2	17-SEP-2009 08:27	RLK	TMM

Samplenum **Container ID** **Products**
L09090260-15 614415 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	14-SEP-2009 10:26	RLK	
2	ANALYZ	W1	WET	14-SEP-2009 15:19	HJR	RLK
3	STORE	WET	A2	16-SEP-2009 08:22	RLK	JBK

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09090260**Account:** 2736**Project:** 2736.006**Samples:** 15**Due Date:** 28-SEP-2009

<u>Samplenum</u>	<u>Container ID</u>	<u>Products</u>
L09090260-15	614416	NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	14-SEP-2009 10:26	RLK	
2	ANALYZ	W1	WET	14-SEP-2009 15:51	TMM	JKT
3	STORE	WET	A2	17-SEP-2009 08:27	RLK	TMM

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login





158 Starlite Drive, Marietta, OH 45750 • T:740-373-4071 • F:740-373-4835 • <http://www.microbac.com>

Laboratory Report Number: L09090356

Client: Michael J. Zamboni, CH2MHILL, Chantilly, VA, 20151

Please find enclosed the analytical results for the samples you submitted to Microbac Laboratories.

Review and compilation of your report was completed by Microbac's Sales and Service Team. If you have questions, comments or require further assistance regarding this report, please contact your team member noted in the reviewed box below at 800-373-4071. Team member e-mail addresses also appear here for your convenience.

Kathy Albertson	<i>Team Chemist/Data Specialist</i>	kalbertson@microbac.com
Stephanie Mossburg	<i>Team Chemist/Data Specialist</i>	smossburg@microbac.com
Tony Long	<i>Team Chemist/Data Specialist</i>	tlong@microbac.com
Amanda Fickiesen	<i>Client Services Specialist</i>	afickiesen@microbac.com
Annie Brown	<i>Client Services Specialist</i>	abrown@microbac.com

This report was reviewed on September 24, 2009.

Kathy Albertson - Team Chemist/Data Specialist

I certify that all test results meet all of the requirements of the accrediting authority listed below. All results for soil samples are reported on a 'dry-weight' basis unless specified otherwise. Analytical results for water and wastes are reported on a 'as received' basis unless specified otherwise. A statement of uncertainty for each analysis is available upon request. This laboratory report shall not be reproduced, except in full, without the written approval of Microbac Laboratories. The reported results are related only to the samples analyzed as received.

This report was certified on September 24, 2009.

David Vandenberg - Managing Director

State of origin: Michigan

Accrediting authority: N/A ID:N/A

QAPP: Microbac OVD

This report contains a total of 65 pages.

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The Microbac logo consists of the word "Microbac" in a white serif font, centered within a dark teal rectangular box.

Microbac Laboratories, Inc.
Ohio Valley Division
158 Starlite Drive
Marietta, OH 45750

Phone: 800.373.4071
Fax: 740.373.4835

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LOOK CLOSER, GO FURTHER, DO MORE.

Microbac REPORT L09090356
PREPARED FOR CH2MHILL, Inc
WORK ID:

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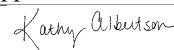
1.0 Introduction

Microbac Laboratories Inc.
REPORT NARRATIVE**Microbac Login No:** L09090356**CHAIN OF CUSTODY:** The chain of custody number was 09970**SHIPMENT CONDITIONS:** The chain of custody forms were received sealed in a cooler. The cooler temperature was 0 degrees C.**SAMPLE MANAGEMENT:** All samples received were intact.

L09090356-01	MW40D-127.0
L09090356-02	MW40D-127.0-FD
L09090356-03	MW40D-117.0
L09090356-04	MW40D-147.0
L09090356-05	EQUIP-BLK-5
L09090356-06	MW40D-137.0
L09090356-07	MW40D-57.0
L09090356-08	MW40D-107.0
L09090356-09	MW40D-COMP-SOIL

I certify that this data package is in compliance with the terms and conditions agreed to by the client and Microbac Laboratories Inc., both technically and for completeness, except for the conditions noted above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or designated person, as verified by the following signature.

Approved: 22-SEP-09



2.0 Data Package

LABORATORY REPORT

L09090356

09/24/09 11:16

Submitted By

Microbac Laboratories Inc.
158 Starlite Drive
Marietta , OH 45750
(740) 373 - 4071

For

Account Name: CH2MHILL, Inc
CH2MHILL
15010 Conference Center Drive Suite 200
Chantilly, VA 20151
Attention: Michael J. Zamboni

Project Number: 2736.006
Project: MI-Dow Ludington
Site: LUDINGTON, MI

P.O. Number: 935272

Sample Analysis Summary

Client ID	Lab ID	Method	Dilution	Date Received
MW40D-COMP-SOIL	L09090356-09	D2216-90	1	17-SEP-09



Report Number: **L09090356**Report Date : **September 24, 2009**

Sample Number: **L09090356-09**
Client ID: **MW40D-COMP-SOIL**
Matrix: **Soil**
Workgroup Number: **WG312591**
Collect Date: **09/15/2009 14:10**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **D2216-90**
Analytical Method: **D2216-90**
Analyst: **CPD**
Dilution: **1**
Units: **weight %**

Instrument: **BAL001**
Prep Date: **09/22/2009 08:40**
Cal Date:
Run Date: **09/22/2009 08:40**
File ID: **B1.312591-0101**

Analyte	CAS. Number	Result	Qual	RL	MDL
Percent Solids	10-02-6	84.1		1.00	1.00

2.1 General Chemistry Data

2.1.2 Chloride Data

2.1.2.1 Summary Data

LABORATORY REPORT

L09090356

09/24/09 11:16

Submitted By

Microbac Laboratories Inc.
158 Starlite Drive
Marietta , OH 45750
(740) 373 - 4071

For

Account Name: CH2MHILL, Inc
CH2MHILL
15010 Conference Center Drive Suite 200
Chantilly, VA 20151
Attention: Michael J. Zamboni

Project Number: 2736.006
Project: MI-Dow Ludington
Site: LUDINGTON, MI

P.O. Number: 935272

Sample Analysis Summary

Client ID	Lab ID	Method	Dilution	Date Received
MW40D-127.0	L09090356-01	325.2	1	17-SEP-09
MW40D-127.0-FD	L09090356-02	325.2	1	17-SEP-09
MW40D-117.0	L09090356-03	325.2	1	17-SEP-09
MW40D-147.0	L09090356-04	325.2	1	17-SEP-09
EQUIP-BLK-5	L09090356-05	325.2	1	17-SEP-09
MW40D-137.0	L09090356-06	325.2	1	17-SEP-09
MW40D-57.0	L09090356-07	325.2	20	17-SEP-09
MW40D-107.0	L09090356-08	325.2	1	17-SEP-09
MW40D-COMP-SOIL	L09090356-09	SM4500-C1	1	17-SEP-09



Report Number: **L09090356**Report Date : **September 24, 2009**

Sample Number: **L09090356-01**
Client ID: **MW40D-127.0**
Matrix: **Water**
Workgroup Number: **WG312455**
Collect Date: **09/15/2009 11:00**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/18/2009 13:20**
Cal Date: **09/18/2009 13:13**
Run Date: **09/18/2009 13:20**
File ID: **SC090918005.021**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	2.42		2.00	1.00

Report Number: **L09090356**Report Date : **September 24, 2009**

Sample Number: L09090356-02	PrePrep Method: NONE	Instrument: SMARTCHEM
Client ID: MW40D-127.0-FD	Prep Method: 325.2	Prep Date: 09/18/2009 13:21
Matrix: Water	Analytical Method: 325.2	Cal Date: 09/18/2009 13:13
Workgroup Number: WG312455	Analyst: JBK	Run Date: 09/18/2009 13:21
Collect Date: 09/15/2009 11:05	Dilution: 1	File ID: SC090918005.022
Sample Tag: 01	Units: mg/L	

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	2.42		2.00	1.00

Report Number: **L09090356**Report Date : **September 24, 2009**

Sample Number: **L09090356-03**
Client ID: **MW40D-117.0**
Matrix: **Water**
Workgroup Number: **WG312455**
Collect Date: **09/15/2009 10:05**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/18/2009 13:22**
Cal Date: **09/18/2009 13:13**
Run Date: **09/18/2009 13:22**
File ID: **SC090918005.023**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	2.04		2.00	1.00

Report Number: **L09090356**Report Date : **September 24, 2009**

Sample Number: **L09090356-04**
Client ID: **MW40D-147.0**
Matrix: **Water**
Workgroup Number: **WG312455**
Collect Date: **09/15/2009 14:25**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/18/2009 13:23**
Cal Date: **09/18/2009 13:13**
Run Date: **09/18/2009 13:23**
File ID: **SC090918005.024**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6		ND	2.00	1.00

ND Not detected at or above the reporting limit (RL).

Report Number: **L09090356**Report Date : **September 24, 2009**

Sample Number: **L09090356-05**
Client ID: **EQUIP-BLK-5**
Matrix: **Water**
Workgroup Number: **WG312455**
Collect Date: **09/15/2009 14:35**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/18/2009 13:23**
Cal Date: **09/18/2009 13:13**
Run Date: **09/18/2009 13:23**
File ID: **SC090918005.025**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6		ND	2.00	1.00

ND Not detected at or above the reporting limit (RL).

Report Number: **L09090356**Report Date : **September 24, 2009**

Sample Number: **L09090356-06**
Client ID: **MW40D-137.0**
Matrix: **Water**
Workgroup Number: **WG312455**
Collect Date: **09/15/2009 12:05**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/18/2009 13:24**
Cal Date: **09/18/2009 13:13**
Run Date: **09/18/2009 13:24**
File ID: **SC090918005.026**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	2.09		2.00	1.00

Report Number: **L09090356**Report Date : **September 24, 2009**

Sample Number: **L09090356-07**
Client ID: **MW40D-57.0**
Matrix: **Water**
Workgroup Number: **WG312455**
Collect Date: **09/15/2009 07:50**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **20**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/18/2009 13:42**
Cal Date: **09/18/2009 13:13**
Run Date: **09/18/2009 13:42**
File ID: **SC090918005.043**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	1860		40.0	20.0

Report Number: **L09090356**Report Date : **September 24, 2009**

Sample Number: **L09090356-08**
Client ID: **MW40D-107.0**
Matrix: **Water**
Workgroup Number: **WG312455**
Collect Date: **09/15/2009 09:20**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/18/2009 13:25**
Cal Date: **09/18/2009 13:13**
Run Date: **09/18/2009 13:25**
File ID: **SC090918005.028**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	2.37		2.00	1.00

Report Number: **L09090356**Report Date : **September 24, 2009**

Sample Number: **L09090356-09**
Client ID: **MW40D-COMP-SOIL**
Matrix: **Soil**
Workgroup Number: **WG312617**
Collect Date: **09/15/2009 14:10**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **SM4500-Cl(-)-E-2**
Analytical Method: **SM4500-Cl(-)-E-2**
Analyst: **JBK**
Dilution: **1**
Units: **mg/kg**

Instrument: **SMARTCHEM**
Prep Date: **09/21/2009 16:05**
Cal Date: **09/22/2009 09:05**
Run Date: **09/22/2009 09:09**
File ID: **SC090922001.013**
Percent Solid: **84.1**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride, Leachable	16887-00-6	142		23.6	11.8

2.1.2.2 QC Summary Data

METHOD BLANK SUMMARY

Login Number: L09090356
 Blank File ID: SC090918005.010
 Prep Date: 09/18/09 13:14
 Analyzed Date: 09/18/09 13:14
 Analyst: JBK

Work Group: WG312455
 Blank Sample ID: WG312455-01
 Instrument ID: SMARTCHEM
 Method: 325.2

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG312455-02	SC090918005.011	09/18/09 13:14	01
LCS2	WG312455-03	SC090918005.012	09/18/09 13:15	01
MW40D-127.0	L09090356-01	SC090918005.021	09/18/09 13:20	01
MW40D-127.0-FD	L09090356-02	SC090918005.022	09/18/09 13:21	01
MW40D-117.0	L09090356-03	SC090918005.023	09/18/09 13:22	01
MW40D-147.0	L09090356-04	SC090918005.024	09/18/09 13:23	01
EQUIP-BLK-5	L09090356-05	SC090918005.025	09/18/09 13:23	01
MW40D-137.0	L09090356-06	SC090918005.026	09/18/09 13:24	01
MW40D-107.0	L09090356-08	SC090918005.028	09/18/09 13:25	01
DUP	WG312455-05	SC090918005.029	09/18/09 13:25	01
MW40D-57.0	L09090356-07	SC090918005.043	09/18/09 13:42	DL01



METHOD BLANK SUMMARY

Login Number: <u>L09090356</u>	Work Group: <u>WG312617</u>
Blank File ID: <u>SC090922001.010</u>	Blank Sample ID: <u>WG312617-01</u>
Prep Date: <u>09/21/09 16:05</u>	Instrument ID: <u>SMARTCHEM</u>
Analyzed Date: <u>09/22/09 09:07</u>	Method: <u>SM4500-Cl(-)-E-2</u>
Analyst: <u>JBK</u>	

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG312617-02	SC090922001.011	09/22/09 09:08	01
LCS2	WG312617-03	SC090922001.012	09/22/09 09:09	01
MW40D-COMP-SOIL	L09090356-09	SC090922001.013	09/22/09 09:09	01
DUP	WG312617-05	SC090922001.014	09/22/09 09:10	01

Report Name: BLANK_SUMMARY
 PDF File ID: 1493323
 Report generated 09/24/2009 10:01



Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L09090356 Prep Date: 09/18/09 13:14 Sample ID: WG312455-01
Instrument ID: SMARTCHEM Run Date: 09/18/09 13:14 Prep Method: 325.2
File ID: SC090918005.010 Analyst: JBK Method: 325.2
Workgroup (AAB#): WG312455 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: SMARTC - 18-SEP-09

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Chloride	1.00	2.00	2.00	1	ND

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1493324

24-SEP-2009 10:01



METHOD BLANK REPORT

Login Number: L09090356 Prep Date: 09/21/09 16:05 Sample ID: WG312617-01
Instrument ID: SMARTCHEM Run Date: 09/22/09 09:07 Prep Method: SM4500-Cl(-)-E-
File ID: SC090922001.010 Analyst: JBK Method: SM4500-Cl(-)-E-
Workgroup (AAB#): WG312617 Matrix: Soil Units: mg/kg
Contract #: _____ Cal ID: SMARTC - 22-SEP-09

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Chloride, Leachable	10.0	20.0	-54.0	1	*

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1493324

24-SEP-2009 10:01



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09090356 Analyst: JBK Prep Method: 325.2
Instrument ID: SMARTCHEM Matrix: Water Method: 325.2
Workgroup (AAB#): WG312455 Units: mg/L
QC Key: DOWBOA2006 Lot #: STD35142
Sample ID: WG312455-02 LCS File ID: SC090918005.011 Run Date: 09/18/2009 13:14
Sample ID: WG312455-03 LCS2 File ID: SC090918005.012 Run Date: 09/18/2009 13:15

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Chloride	50.0	50.9	102	50.0	51.9	104	1.98	90 - 110	10	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 1493325
Report generated: 09/24/2009 10:01



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09090356 Analyst: JBK Prep Method: SM4500-Cl(-)-E-
Instrument ID: SMARTCHEM Matrix: Soil Method: SM4500-Cl(-)-E-
Workgroup (AAB#): WG312617 Units: mg/kg
QC Key: DOWB0A2006 Lot #: STD33071
Sample ID: WG312617-02 LCS File ID: SC090922001.011 Run Date: 09/22/2009 09:08
Sample ID: WG312617-03 LCS2 File ID: SC090922001.012 Run Date: 09/22/2009 09:09

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Chloride, Leachable	500	516	103	500	521	104	1.01	80 - 120	50	



2.1.3 Ammonia Data

2.1.3.1 Summary Data

LABORATORY REPORT

L09090356

09/24/09 11:16

Submitted By

Microbac Laboratories Inc.
158 Starlite Drive
Marietta , OH 45750
(740) 373 - 4071

For

Account Name: CH2MHILL, Inc
CH2MHILL
15010 Conference Center Drive Suite 200
Chantilly, VA 20151
Attention: Michael J. Zamboni

Project Number: 2736.006
Project: MI-Dow Ludington
Site: LUDINGTON, MI

P.O. Number: 935272

Sample Analysis Summary

Client ID	Lab ID	Method	Dilution	Date Received
MW40D-127.0	L09090356-01	350.1	2	17-SEP-09
MW40D-127.0-FD	L09090356-02	350.1	2	17-SEP-09
MW40D-117.0	L09090356-03	350.1	1	17-SEP-09
MW40D-147.0	L09090356-04	350.1	1	17-SEP-09
EQUIP-BLK-5	L09090356-05	350.1	1	17-SEP-09
MW40D-137.0	L09090356-06	350.1	1	17-SEP-09
MW40D-57.0	L09090356-07	350.1	50	17-SEP-09
MW40D-107.0	L09090356-08	350.1	2	17-SEP-09



Report Number: **L09090356**Report Date : **September 24, 2009**

Sample Number: **L09090356-01**
Client ID: **MW40D-127.0**
Matrix: **Water**
Workgroup Number: **WG312486**
Collect Date: **09/15/2009 11:00**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **2**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/21/2009 11:07**
Cal Date: **09/21/2009 11:00**
Run Date: **09/21/2009 11:07**
File ID: **SC090921002.012**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	4.55		0.200	0.100

Report Number: **L09090356**Report Date : **September 24, 2009**

Sample Number: **L09090356-02**
Client ID: **MW40D-127.0-FD**
Matrix: **Water**
Workgroup Number: **WG312486**
Collect Date: **09/15/2009 11:05**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **2**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/21/2009 11:08**
Cal Date: **09/21/2009 10:59**
Run Date: **09/21/2009 11:08**
File ID: **SC090921002.013**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	4.96	I	0.200	0.100

I Semiquantitative result (out of instrument calibration range)

Report Number: **L09090356**Report Date : **September 24, 2009**

Sample Number: **L09090356-03**
Client ID: **MW40D-117.0**
Matrix: **Water**
Workgroup Number: **WG312486**
Collect Date: **09/15/2009 10:05**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/21/2009 11:09**
Cal Date: **09/21/2009 10:59**
Run Date: **09/21/2009 11:09**
File ID: **SC090921002.014**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	2.51	I	0.100	0.0500

I Semiquantitative result (out of instrument calibration range)

Report Number: **L09090356**Report Date : **September 24, 2009**

Sample Number: **L09090356-04**
Client ID: **MW40D-147.0**
Matrix: **Water**
Workgroup Number: **WG312486**
Collect Date: **09/15/2009 14:25**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/21/2009 11:09**
Cal Date: **09/21/2009 11:02**
Run Date: **09/21/2009 11:09**
File ID: **SC090921002.015**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	0.293		0.100	0.0500

Report Number: **L09090356**Report Date : **September 24, 2009**

Sample Number: **L09090356-05**
Client ID: **EQUIP-BLK-5**
Matrix: **Water**
Workgroup Number: **WG312486**
Collect Date: **09/15/2009 14:35**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/21/2009 11:11**
Cal Date: **09/21/2009 11:02**
Run Date: **09/21/2009 11:11**
File ID: **SC090921002.016**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	0.101		0.100	0.0500

Report Number: **L09090356**Report Date : **September 24, 2009**

Sample Number: **L09090356-06**
Client ID: **MW40D-137.0**
Matrix: **Water**
Workgroup Number: **WG312486**
Collect Date: **09/15/2009 12:05**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/21/2009 11:11**
Cal Date: **09/21/2009 11:02**
Run Date: **09/21/2009 11:11**
File ID: **SC090921002.017**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	0.343		0.100	0.0500

Report Number: **L09090356**Report Date : **September 24, 2009**

Sample Number: **L09090356-07**
Client ID: **MW40D-57.0**
Matrix: **Water**
Workgroup Number: **WG312486**
Collect Date: **09/15/2009 07:50**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **50**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/21/2009 11:34**
Cal Date: **09/21/2009 11:02**
Run Date: **09/21/2009 11:34**
File ID: **SC090921002.030**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	89.5		5.00	2.50

Report Number: **L09090356**Report Date : **September 24, 2009**

Sample Number: **L09090356-08**
Client ID: **MW40D-107.0**
Matrix: **Water**
Workgroup Number: **WG312486**
Collect Date: **09/15/2009 09:20**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **2**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/21/2009 11:15**
Cal Date: **09/21/2009 11:02**
Run Date: **09/21/2009 11:15**
File ID: **SC090921002.021**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	4.77		0.200	0.100

2.1.3.2 QC Summary Data

2.1.4 Total Dissolved Solids Data

2.1.4.1 Summary Data

LABORATORY REPORT

L09090356

09/24/09 11:16

Submitted By

Microbac Laboratories Inc.
158 Starlite Drive
Marietta , OH 45750
(740) 373 - 4071

For

Account Name: CH2MHILL, Inc
CH2MHILL
15010 Conference Center Drive Suite 200
Chantilly, VA 20151
Attention: Michael J. Zamboni

Project Number: 2736.006
Project: MI-Dow Ludington
Site: LUDINGTON, MI

P.O. Number: 935272

Sample Analysis Summary

Client ID	Lab ID	Method	Dilution	Date Received
MW40D-127.0	L09090356-01	160.1	1	17-SEP-09
MW40D-127.0-FD	L09090356-02	160.1	1	17-SEP-09
MW40D-117.0	L09090356-03	160.1	1	17-SEP-09
MW40D-147.0	L09090356-04	160.1	1	17-SEP-09
EQUIP-BLK-5	L09090356-05	160.1	1	17-SEP-09
MW40D-137.0	L09090356-06	160.1	1	17-SEP-09
MW40D-57.0	L09090356-07	160.1	1	17-SEP-09
MW40D-107.0	L09090356-08	160.1	1	17-SEP-09



Report Number: **L09090356**Report Date : **September 24, 2009**

Sample Number: **L09090356-01**
Client ID: **MW40D-127.0**
Matrix: **Water**
Workgroup Number: **WG312453**
Collect Date: **09/15/2009 11:00**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/18/2009 14:00**
Cal Date:
Run Date: **09/18/2009 14:00**
File ID: **EN.0909181400-09**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		338		20.0	10.0

Report Number: **L09090356**Report Date : **September 24, 2009**

Sample Number: **L09090356-02**
Client ID: **MW40D-127.0-FD**
Matrix: **Water**
Workgroup Number: **WG312453**
Collect Date: **09/15/2009 11:05**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/18/2009 14:00**
Cal Date:
Run Date: **09/18/2009 14:00**
File ID: **EN.0909181400-10**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		370		20.0	10.0

Report Number: **L09090356**Report Date : **September 24, 2009**

Sample Number: **L09090356-03**
Client ID: **MW40D-117.0**
Matrix: **Water**
Workgroup Number: **WG312453**
Collect Date: **09/15/2009 10:05**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/18/2009 14:00**
Cal Date:
Run Date: **09/18/2009 14:00**
File ID: **EN.0909181400-06**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		388		20.0	10.0

Report Number: **L09090356**Report Date : **September 24, 2009**

Sample Number: **L09090356-04**
Client ID: **MW40D-147.0**
Matrix: **Water**
Workgroup Number: **WG312453**
Collect Date: **09/15/2009 14:25**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/18/2009 14:00**
Cal Date:
Run Date: **09/18/2009 14:00**
File ID: **EN.0909181400-12**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		248		20.0	10.0

Report Number: **L09090356**Report Date : **September 24, 2009**

Sample Number: **L09090356-05**
Client ID: **EQUIP-BLK-5**
Matrix: **Water**
Workgroup Number: **WG312453**
Collect Date: **09/15/2009 14:35**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/18/2009 14:00**
Cal Date:
Run Date: **09/18/2009 14:00**
File ID: **EN.0909181400-16**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids			ND	10.0	5.00

ND Not detected at or above the reporting limit (RL).

Report Number: **L09090356**Report Date : **September 24, 2009**

Sample Number: **L09090356-06**
Client ID: **MW40D-137.0**
Matrix: **Water**
Workgroup Number: **WG312453**
Collect Date: **09/15/2009 12:05**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/18/2009 14:00**
Cal Date:
Run Date: **09/18/2009 14:00**
File ID: **EN.0909181400-11**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		278		20.0	10.0

Report Number: **L09090356**Report Date : **September 24, 2009**

Sample Number: **L09090356-07**
Client ID: **MW40D-57.0**
Matrix: **Water**
Workgroup Number: **WG312453**
Collect Date: **09/15/2009 07:50**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/18/2009 14:00**
Cal Date:
Run Date: **09/18/2009 14:00**
File ID: **EN.0909181400-04**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		4000		20.0	10.0

Report Number: **L09090356**Report Date : **September 24, 2009**

Sample Number: **L09090356-08**
Client ID: **MW40D-107.0**
Matrix: **Water**
Workgroup Number: **WG312453**
Collect Date: **09/15/2009 09:20**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/18/2009 14:00**
Cal Date:
Run Date: **09/18/2009 14:00**
File ID: **EN.0909181400-05**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		398		20.0	10.0

2.1.4.2 QC Summary Data

METHOD BLANK SUMMARY

Login Number: L09090356
 Blank File ID: EN.0909181400-01
 Prep Date: 09/18/09 14:00
 Analyzed Date: 09/18/09 14:00
 Analyst: HJR

Work Group: WG312453
 Blank Sample ID: WG312453-01
 Instrument ID: OVEN
 Method: 160.1

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG312453-02	EN.0909181400-02	09/18/09 14:00	
LCS2	WG312453-03	EN.0909181400-03	09/18/09 14:00	
MW40D-57.0	L09090356-07	EN.0909181400-04	09/18/09 14:00	
MW40D-107.0	L09090356-08	EN.0909181400-05	09/18/09 14:00	
MW40D-117.0	L09090356-03	EN.0909181400-06	09/18/09 14:00	
MW40D-127.0	L09090356-01	EN.0909181400-09	09/18/09 14:00	
MW40D-127.0-FD	L09090356-02	EN.0909181400-10	09/18/09 14:00	
MW40D-137.0	L09090356-06	EN.0909181400-11	09/18/09 14:00	
MW40D-147.0	L09090356-04	EN.0909181400-12	09/18/09 14:00	
EQUIP-BLK-5	L09090356-05	EN.0909181400-16	09/18/09 14:00	
DUP	WG312453-05	EN.0909181400-17	09/18/09 14:00	

Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L09090356 Prep Date: 09/18/09 14:00 Sample ID: WG312453-01
Instrument ID: OVEN Run Date: 09/18/09 14:00 Prep Method: 160.1
File ID: EN.0909181400-01 Analyst: HJR Method: 160.1
Workgroup (AAB#): WG312453 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: OVEN -

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Total Dissolved Solids	5.00	10.0	10.0	1	ND

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1494093

22-SEP-2009 11:38



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09090356 Analyst: HJR Prep Method: 160.1
Instrument ID: OVEN Matrix: Water Method: 160.1
Workgroup (AAB#): WG312453 Units: mg/L
QC Key: DOWBOA2006 Lot #: STD32441
Sample ID: WG312453-02 LCS File ID: EN.0909181400-02 Run Date: 09/18/2009 14:00
Sample ID: WG312453-03 LCS2 File ID: EN.0909181400-03 Run Date: 09/18/2009 14:00

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Total Dissolved Solids	500	502	100	500	504	101	0.398	80 - 120	25	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 1494094
Report generated: 09/22/2009 11:38



3.0 Attachments

Microbac Laboratories Inc.
Analyst Listing
September 24, 2009

ADC - ANTHONY D. CANTER	AJF - AMANDA J. FICKIESEN	AJM - ANTHONY J. MOSSBURG
ALB - ANNIE L. BROWN	AML - ANTHONY M. LONG	BLG - BRENDA L. GREENWALT
BRG - BRENDA R. GREGORY	CAA - CASSIE A. AUGENSTEIN	CAF - CHERYL A. FLOWERS
CAH - CHARLES A. HALL	CEB - CHAD E. BARNES	CLC - CHRYS L. CRAWFORD
CLW - CHARISSA L. WINTERS	CPD - CHAD P. DAVIS	CSH - CHRIS S. HILL
DDE - DEBRA D. ELLIOTT	DEL - DON E. LIGHTFRITZ	DEV - DAVID E. VANDENBERG
DGB - DOUGLAS G. BUTCHER	DIH - DEANNA I. HESSON	DLB - DAVID L. BUMGARNER
DLP - DOROTHY L. PAYNE	DLR - DIANNA L. RAUCH	DR - DEANNA ROBERTS
ECL - ERIC C. LAWSON	EDA - ERIN D. AGEE	ERP - ERIN R. PORTER
FJB - FRANCES J. BOLDEN	HAV - HEMA VILASAGAR	HJR - HOLLY J. REED
JBK - JEREMY B. KINNEY	JDH - JUSTIN D. HESSON	JKT - JANE K. THOMPSON
JWR - JOHN W. RICHARDS	JWS - JACK W. SHEAVES	JYH - JI Y. HU
KEB - KATHRYN E. BARNES	KHR - KIM H. RHODES	KRA - KATHY R. ALBERTSON
LKN - LINDA K. NEDEFF	LSB - LESLIE S. BUCINA	MDA - MIKE D. ALBERTSON
MDC - MICHAEL D. COCHRAN	MES - MARY E. SCHILLING	MMB - MAREN M. BEERY
MRT - MICHELLE R. TAYLOR	MSW - MATT S. WILSON	NPM - NATHANIEL P. MILLER
PDM - PIERCE D. MORRIS	RAH - ROY A. HALSTEAD	RB - ROBERT BUCHANAN
REK - ROBERT E. KYER	RLK - ROBIN L. KLINGER	RWC - RODNEY W. CAMPBELL
SDH - SHANA D. HINYARD	SLM - STEPHANIE L. MOSSBURG	SLP - SHERI L. PFALZGRAF
TIP - TAE I. PARRISH	TMB - TIFFANY M. BAILEY	TMM - TAMMY M. MORRIS
VC - VICKI COLLIER	WTD - WADE T. DELONG	

September 24, 2009

Qualkey: STD

Qualifier	Description
*	Surrogate or spike compound out of range
+	Correlation coefficient for the MSA is less than 0.995
<	Result is less than the associated numerical value.
>	Result is greater than the associated numerical value.
A	See the report narrative
B	Analyte present in method blank
B1	Target analyte detected in method blank at or above the method reporting limit
B3	Target analyte detected in calibration blank at or above the method reporting limit
C	Confirmed by GC/MS
CG	Confluent growth
DL	Surrogate or spike compound was diluted out
E	Estimated concentration due to sample matrix interference
EDL	Elevated sample reporting limits, presence of non-target analytes
EMPC	Estimated Maximum Possible Concentration
F, S	Estimated result below quantitation limit; method of standard additions(MSA)
FL	Free Liquid
H1	Sample analysis performed past holding time.
I	Semiquantitative result (out of instrument calibration range)
J	The analyte was positively identified, but the quantitation was below the RL
J,B	Analyte detected in both the method blank and sample above the MDL.
J,P	Estimate; columns don't agree to within 40%
J,S	Estimated concentration; analyzed by method of standard addition (MSA)
L	Sample reporting limits elevated due to matrix interference
L1	The associated blank spike (LCS) recovery was above the laboratory acceptance limits.
L2	The associated blank spike (LCS) recovery was below the laboratory acceptance limits.
M	Matrix effect; the concentration is an estimate due to matrix effect.
N	Tentatively identified compound(TIC)
NA	Not applicable
ND	Not detected at or above the reporting limit (RL).
ND, L	Not detected; sample reporting limit (RL) elevated due to interference
ND, S	Not detected; analyzed by method of standard addition (MSA)
NF	Not found by library search
NFL	No free liquid
NI	Non-ignitable
NR	Analyte is not required to be analyzed
NS	Not spiked
P	Concentrations >40% difference between the two GC columns
Q	One or more quality control criteria fail. See narrative.
QNS	Quantity of sample not sufficient to perform analysis
RA	Reanalysis confirms reported results
RE	Reanalysis confirms sample matrix interference
S	Analyzed by method of standard addition (MSA)
SMI	Sample matrix interference on surrogate
SP	Reported results are for spike compounds only
TIC	Library Search Compound
TNTC	Too numerous to count
U	Undetected; the concentration is below the reported MDL.
UJ	Undetected; the MDL and RL are estimated due to quality control discrepancies.
W	Post-digestion spike for furnace AA out of control limits
X	Exceeds regulatory limit
X, S	Exceeds regulatory limit; method of standard additions (MSA)
Z	Cannot be resolved from isomer - see below

*****Special Notes for Organic Analytes**

1. Acrolein and acrylonitrile by method 624 are semi-quantitative screens only.
2. 1,2-Diphenylhydrazine is unstable and is reported as azobenzene.
3. N-nitrosodiphenylamine cannot be separated from diphenylamine.
4. 3-Methylphenol and 4-Methylphenol are unresolvable compounds.
5. m-Xylene and p-Xylene are unresolvable compounds.
6. The reporting limits for Appendix II/IX compounds by method 8270 are based on EPA estimated PQLs referenced in 40 CFR Part 264, Appendix IX. They are not always achievable for every compound and are matrix dependent.



158 Starlite Drive
Marietta, OH 45750

Microbac

Phone: 740-373-4071
Fax: 740-373-4835

CHAIN-OF-CUSTODY RECORD

[illegible]

**Water (W), Soil (S), Solid Waste (SD), Unknown (X)



1000001755

COOLER INSPECTION



Received: 09/17/2009 10:15
Delivery Method: UPS
Opened By: Robin Klinger
Comments:

Login(s): L09090356

Cooler(s)

Cooler #	Temp Gun	Temp	Tracking #	COC #	Comments
0014059	G	0.0	J2142821014	09970	

1	Yes	Were shipping coolers sealed?
2	Yes	Were custody seals intact?
3	Yes	Were cooler temperatures in range of 0-6?
4	Yes	Was ice present?
5	Yes	Were COC's received/information complete/signed and dated?
6	Yes	Were sample containers and labels intact and match COC?
7	Yes	Were the correct containers and volumes received?
8	Yes	Were correct preservatives used? (water only)
9	Yes	Were pH ranges acceptable? (voa's excluded)
10	NA	Were VOA samples free of headspace (<6mm)?
11	Yes	Were samples received within EPA hold times?

Look closer. Go further. Do more.

Microbac - Ohio Valley Division
158 Starlite Drive
Marietta, OH 45750
Tel: (740)373-4071 Fax: (740)373-4835

Internal Chain of Custody Report

Login: L09090356

Account: 2736

Project: 2736.006

Samples: 9

Due Date: 01-OCT-2009

Samplenum **Container ID** **Products**
L09090356-01 615349 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	17-SEP-2009 14:42	RLK	
2	ANALYZ	W1	WET	18-SEP-2009 08:37	JBK	JKT
3	STORE	WET	A2	21-SEP-2009 10:12	HJR	JKT

Samplenum **Container ID** **Products**
L09090356-01 615350 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	17-SEP-2009 14:42	RLK	
2	ANALYZ	W1	WET	18-SEP-2009 08:34	TMM	JKT
3	STORE	WET	A2	22-SEP-2009 16:02	RLK	TMM

Samplenum **Container ID** **Products**
L09090356-02 615351 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	17-SEP-2009 14:42	RLK	
2	ANALYZ	W1	WET	18-SEP-2009 08:37	JBK	JKT
3	STORE	WET	A2	21-SEP-2009 10:12	HJR	JKT

Samplenum **Container ID** **Products**
L09090356-02 615352 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	17-SEP-2009 14:42	RLK	
2	ANALYZ	W1	WET	18-SEP-2009 08:34	TMM	JKT
3	STORE	WET	A2	22-SEP-2009 16:02	RLK	TMM

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09090356

Account: 2736

Project: 2736.006

Samples: 9

Due Date: 01-OCT-2009

Samplenum **Container ID** **Products**
L09090356-03 615353 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	17-SEP-2009 14:42	RLK	
2	ANALYZ	W1	WET	18-SEP-2009 08:37	JBK	JKT
3	STORE	WET	A2	21-SEP-2009 10:12	HJR	JKT

Samplenum **Container ID** **Products**
L09090356-03 615354 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	17-SEP-2009 14:42	RLK	
2	ANALYZ	W1	WET	18-SEP-2009 08:34	TMM	JKT
3	STORE	WET	A2	22-SEP-2009 16:02	RLK	TMM

Samplenum **Container ID** **Products**
L09090356-04 615355 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	17-SEP-2009 14:42	RLK	
2	ANALYZ	W1	WET	18-SEP-2009 08:37	JBK	JKT
3	STORE	WET	A2	21-SEP-2009 10:12	HJR	JKT

Samplenum **Container ID** **Products**
L09090356-04 615356 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	17-SEP-2009 14:42	RLK	
2	ANALYZ	W1	WET	18-SEP-2009 08:34	TMM	JKT
3	STORE	WET	A2	22-SEP-2009 16:02	RLK	TMM

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09090356

Account: 2736

Project: 2736.006

Samples: 9

Due Date: 01-OCT-2009

Samplenum **Container ID** **Products**
L09090356-05 615357 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	17-SEP-2009 14:42	RLK	
2	ANALYZ	W1	WET	18-SEP-2009 08:37	JBK	JKT
3	STORE	WET	A2	21-SEP-2009 10:12	HJR	JKT

Samplenum **Container ID** **Products**
L09090356-05 615358 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	17-SEP-2009 14:42	RLK	
2	ANALYZ	W1	WET	18-SEP-2009 08:34	TMM	JKT
3	STORE	WET	A2	22-SEP-2009 16:02	RLK	TMM

Samplenum **Container ID** **Products**
L09090356-06 615359 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	17-SEP-2009 14:42	RLK	
2	ANALYZ	W1	WET	18-SEP-2009 08:37	JBK	JKT
3	STORE	WET	A2	21-SEP-2009 10:12	HJR	JKT

Samplenum **Container ID** **Products**
L09090356-06 615360 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	17-SEP-2009 14:42	RLK	
2	ANALYZ	W1	WET	18-SEP-2009 08:34	TMM	JKT
3	STORE	WET	A2	22-SEP-2009 16:02	RLK	TMM

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09090356

Account: 2736

Project: 2736.006

Samples: 9

Due Date: 01-OCT-2009

Samplenum **Container ID** **Products**
L09090356-07 615361 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	17-SEP-2009 14:42	RLK	
2	ANALYZ	W1	WET	18-SEP-2009 08:37	JBK	JKT
3	STORE	WET	A2	21-SEP-2009 10:12	HJR	JKT

Samplenum **Container ID** **Products**
L09090356-07 615362 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	17-SEP-2009 14:42	RLK	
2	ANALYZ	W1	WET	18-SEP-2009 08:34	TMM	JKT
3	STORE	WET	A2	22-SEP-2009 16:02	RLK	TMM

Samplenum **Container ID** **Products**
L09090356-08 615363 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	17-SEP-2009 14:42	RLK	
2	ANALYZ	W1	WET	18-SEP-2009 08:37	JBK	JKT
3	STORE	WET	A2	21-SEP-2009 10:12	HJR	JKT

Samplenum **Container ID** **Products**
L09090356-08 615364 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	17-SEP-2009 14:42	RLK	
2	ANALYZ	W1	WET	18-SEP-2009 08:34	TMM	JKT
3	STORE	WET	A2	22-SEP-2009 16:02	RLK	TMM

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09090356**Account:** 2736**Project:** 2736.006**Samples:** 9**Due Date:** 01-OCT-2009

<u>Samplenum</u>	<u>Container ID</u>	<u>Products</u>
L09090356-09	615365	PCT-S

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	17-SEP-2009 14:42	RLK	
2	ANALYZ	W1	WET	21-SEP-2009 13:26	JBK	JKT
3	STORE	WET	A2	22-SEP-2009 08:26	JKT	CPD

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login





158 Starlite Drive, Marietta, OH 45750 • T:740-373-4071 • F:740-373-4835 • <http://www.microbac.com>

Laboratory Report Number: L09090508

Client: Michael J. Zamboni, CH2MHILL, Chantilly, VA, 20151

Please find enclosed the analytical results for the samples you submitted to Microbac Laboratories.

Review and compilation of your report was completed by Microbac's Sales and Service Team. If you have questions, comments or require further assistance regarding this report, please contact your team member noted in the reviewed box below at 800-373-4071. Team member e-mail addresses also appear here for your convenience.

Kathy Albertson	<i>Team Chemist/Data Specialist</i>	kalbertson@microbac.com
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Tony Long	<i>Team Chemist/Data Specialist</i>	tlong@microbac.com
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Annie Brown	<i>Client Services Specialist</i>	abrown@microbac.com

This report was reviewed on September 30, 2009.

Kathy Albertson - Team Chemist/Data Specialist

I certify that all test results meet all of the requirements of the accrediting authority listed below. All results for soil samples are reported on a 'dry-weight' basis unless specified otherwise. Analytical results for water and wastes are reported on a 'as received' basis unless specified otherwise. A statement of uncertainty for each analysis is available upon request. This laboratory report shall not be reproduced, except in full, without the written approval of Microbac Laboratories. The reported results are related only to the samples analyzed as received.

This report was certified on September 30, 2009.

David Vandenberg - Managing Director

State of origin: Michigan

Accrediting authority: N/A ID:N/A

QAPP: Microbac OVD

This report contains a total of 132 pages.

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Ohio Valley Division
158 Starlite Drive
Marietta, OH 45750

Phone: 800.373.4071
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Microbac REPORT L09090508
PREPARED FOR CH2MHILL, Inc
WORK ID:

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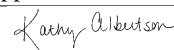
1.0 Introduction

Microbac Laboratories Inc.
REPORT NARRATIVE**Microbac Login No:** L09090508**CHAIN OF CUSTODY:** The chain of custody number was 09971 and 09972**SHIPMENT CONDITIONS:** The chain of custody forms were received sealed in a cooler. The cooler temperature was 3 and 3 degrees C.**SAMPLE MANAGEMENT:** All samples received were intact.

L09090508-01	PLT-X001
L09090508-02	PLT-X002
L09090508-03	PLT-X003
L09090508-04	PLT-X004
L09090508-05	PLT-X005
L09090508-06	PLT-X006
L09090508-07	PLT-X007
L09090508-08	PLT-X008
L09090508-09	PLT-X009
L09090508-10	PLT-X010
L09090508-11	PLT-X011
L09090508-12	PLT-X012
L09090508-13	PLT-X013
L09090508-14	PLT-X014
L09090508-15	PLT-X015
L09090508-16	PLT-X016
L09090508-17	PLT-X017
L09090508-18	PLT-X018
L09090508-19	PLT-X019
L09090508-20	PLT-X020
L09090508-21	PLT-X021
L09090508-22	PLT-X022
L09090508-23	PLT-X023
L09090508-24	PLT-X003
L09090508-25	PLT-X003

I certify that this data package is in compliance with the terms and conditions agreed to by the client and Microbac Laboratories Inc., both technically and for completeness, except for the conditions noted above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or designated person, as verified by the following signature.

Approved: 29-SEP-09



2.0 Data Package

2.1 General Chemistry Data

2.1.1 Chloride Data

2.1.1.1 Summary Data

LABORATORY REPORT

L09090508

09/30/09 13:08

Submitted By

Microbac Laboratories Inc.
158 Starlite Drive
Marietta, OH 45750
(740) 373-4071

For

Account Name: CH2MHILL, Inc
CH2MHILL
15010 Conference Center Drive Suite 200
Chantilly, VA 20151
Attention: Michael J. Zamboni

Project Number: 2736.006
Project: MI-Dow Ludington
Site: LUDINGTON, MI

P.O. Number: 935272

Sample Analysis Summary

Client ID	QC Type	Lab ID	Method	Dilution	Date Received
PLT-X001		L09090508-01	325.2	50	24-SEP-09
PLT-X002		L09090508-02	325.2	25	24-SEP-09
PLT-X003		L09090508-03	325.2	1	24-SEP-09
PLT-X004		L09090508-04	325.2	1	24-SEP-09
PLT-X005		L09090508-05	325.2	1	24-SEP-09
PLT-X006		L09090508-06	325.2	25	24-SEP-09
PLT-X007		L09090508-07	325.2	25	24-SEP-09
PLT-X008		L09090508-08	325.2	25	24-SEP-09
PLT-X009		L09090508-09	325.2	50	24-SEP-09
PLT-X010		L09090508-10	325.2	1	24-SEP-09
PLT-X011		L09090508-11	325.2	50	24-SEP-09
PLT-X012		L09090508-12	325.2	50	24-SEP-09
PLT-X013		L09090508-13	325.2	25	24-SEP-09
PLT-X014		L09090508-14	325.2	1	24-SEP-09
PLT-X015		L09090508-15	325.2	50	24-SEP-09
PLT-X016		L09090508-16	325.2	50	24-SEP-09
PLT-X017		L09090508-17	325.2	100	24-SEP-09
PLT-X018		L09090508-18	325.2	25	24-SEP-09
PLT-X019		L09090508-19	325.2	1	24-SEP-09
PLT-X020		L09090508-20	325.2	25	24-SEP-09
PLT-X021		L09090508-21	325.2	25	24-SEP-09
PLT-X022		L09090508-22	325.2	50	24-SEP-09
PLT-X023		L09090508-23	325.2	1	24-SEP-09
PLT-X003	MS	L09090508-24	325.2	1	24-SEP-09
PLT-X003	MSD	L09090508-25	325.2	1	24-SEP-09

L1_A_PROD - Modified 03/06/2008
PDF File ID: 1500371
Report generated: 09/30/2009 13:08

1 OF 1



Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-01**
Client ID: **PLT-X001**
Matrix: **Water**
Workgroup Number: **WG312914**
Collect Date: **09/22/2009 12:05**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **50**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/25/2009 11:36**
Cal Date: **09/25/2009 11:28**
Run Date: **09/25/2009 11:36**
File ID: **SC090925002.022**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	1670		100	50.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-02**
Client ID: **PLT-X002**
Matrix: **Water**
Workgroup Number: **WG312914**
Collect Date: **09/22/2009 12:35**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **25**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/25/2009 11:37**
Cal Date: **09/25/2009 11:28**
Run Date: **09/25/2009 11:37**
File ID: **SC090925002.023**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	626		50.0	25.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-03**
Client ID: **PLT-X003**
Matrix: **Water**
Workgroup Number: **WG312914**
Collect Date: **09/22/2009 14:30**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/25/2009 11:38**
Cal Date: **09/25/2009 11:28**
Run Date: **09/25/2009 11:38**
File ID: **SC090925002.024**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6		ND	2.00	1.00

ND Not detected at or above the reporting limit (RL).

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-04**
Client ID: **PLT-X004**
Matrix: **Water**
Workgroup Number: **WG312914**
Collect Date: **09/22/2009 15:25**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/25/2009 11:40**
Cal Date: **09/25/2009 11:28**
Run Date: **09/25/2009 11:40**
File ID: **SC090925002.028**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6		ND	2.00	1.00

ND Not detected at or above the reporting limit (RL).

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-05**
Client ID: **PLT-X005**
Matrix: **Water**
Workgroup Number: **WG312914**
Collect Date: **09/22/2009 16:35**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/25/2009 11:40**
Cal Date: **09/25/2009 11:28**
Run Date: **09/25/2009 11:40**
File ID: **SC090925002.029**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	2.15		2.00	1.00

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-06**
Client ID: **PLT-X006**
Matrix: **Water**
Workgroup Number: **WG312914**
Collect Date: **09/22/2009 17:15**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **25**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/25/2009 11:41**
Cal Date: **09/25/2009 11:28**
Run Date: **09/25/2009 11:41**
File ID: **SC090925002.030**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	1230		50.0	25.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-07**
Client ID: **PLT-X007**
Matrix: **Water**
Workgroup Number: **WG312914**
Collect Date: **09/22/2009 17:45**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **25**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/25/2009 11:43**
Cal Date: **09/25/2009 11:28**
Run Date: **09/25/2009 11:43**
File ID: **SC090925002.033**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	967		50.0	25.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-08**
Client ID: **PLT-X008**
Matrix: **Water**
Workgroup Number: **WG312914**
Collect Date: **09/22/2009 17:50**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **25**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/25/2009 11:44**
Cal Date: **09/25/2009 11:28**
Run Date: **09/25/2009 11:44**
File ID: **SC090925002.034**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	1040		50.0	25.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-09**
Client ID: **PLT-X009**
Matrix: **Water**
Workgroup Number: **WG312914**
Collect Date: **09/22/2009 18:20**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **50**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/25/2009 11:44**
Cal Date: **09/25/2009 11:28**
Run Date: **09/25/2009 11:44**
File ID: **SC090925002.035**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	1560		100	50.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-10**
Client ID: **PLT-X010**
Matrix: **Water**
Workgroup Number: **WG312914**
Collect Date: **09/22/2009 18:50**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/25/2009 11:45**
Cal Date: **09/25/2009 11:28**
Run Date: **09/25/2009 11:45**
File ID: **SC090925002.036**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6		ND	2.00	1.00

ND Not detected at or above the reporting limit (RL).

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-11**
Client ID: **PLT-X011**
Matrix: **Water**
Workgroup Number: **WG312914**
Collect Date: **09/23/2009 08:25**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **50**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/25/2009 11:45**
Cal Date: **09/25/2009 11:28**
Run Date: **09/25/2009 11:45**
File ID: **SC090925002.037**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	1450		100	50.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-12**
Client ID: **PLT-X012**
Matrix: **Water**
Workgroup Number: **WG312914**
Collect Date: **09/23/2009 08:30**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **50**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/25/2009 11:46**
Cal Date: **09/25/2009 11:28**
Run Date: **09/25/2009 11:46**
File ID: **SC090925002.038**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	1410		100	50.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-13**
Client ID: **PLT-X013**
Matrix: **Water**
Workgroup Number: **WG312914**
Collect Date: **09/23/2009 08:55**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **25**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/25/2009 11:46**
Cal Date: **09/25/2009 11:28**
Run Date: **09/25/2009 11:46**
File ID: **SC090925002.039**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	919		50.0	25.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-14**
Client ID: **PLT-X014**
Matrix: **Water**
Workgroup Number: **WG312915**
Collect Date: **09/23/2009 08:50**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/25/2009 11:50**
Cal Date: **09/25/2009 11:28**
Run Date: **09/25/2009 11:50**
File ID: **SC090925002.045**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6		ND	2.00	1.00

ND Not detected at or above the reporting limit (RL).

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-15**
Client ID: **PLT-X015**
Matrix: **Water**
Workgroup Number: **WG312915**
Collect Date: **09/23/2009 10:00**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **50**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/25/2009 11:51**
Cal Date: **09/25/2009 11:28**
Run Date: **09/25/2009 11:51**
File ID: **SC090925002.046**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	819		100	50.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-16**
Client ID: **PLT-X016**
Matrix: **Water**
Workgroup Number: **WG312915**
Collect Date: **09/23/2009 10:20**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **50**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/25/2009 11:51**
Cal Date: **09/25/2009 11:28**
Run Date: **09/25/2009 11:51**
File ID: **SC090925002.047**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	3490		100	50.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-17**
Client ID: **PLT-X017**
Matrix: **Water**
Workgroup Number: **WG312915**
Collect Date: **09/23/2009 10:50**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **100**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/25/2009 11:52**
Cal Date: **09/25/2009 11:28**
Run Date: **09/25/2009 11:52**
File ID: **SC090925002.048**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	4220		200	100

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-18**
Client ID: **PLT-X018**
Matrix: **Water**
Workgroup Number: **WG312915**
Collect Date: **09/23/2009 11:05**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **25**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/25/2009 11:52**
Cal Date: **09/25/2009 11:28**
Run Date: **09/25/2009 11:52**
File ID: **SC090925002.049**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	999		50.0	25.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-19**
Client ID: **PLT-X019**
Matrix: **Water**
Workgroup Number: **WG312915**
Collect Date: **09/23/2009 12:05**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/25/2009 11:53**
Cal Date: **09/25/2009 11:28**
Run Date: **09/25/2009 11:53**
File ID: **SC090925002.050**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	65.2		2.00	1.00

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-20**
Client ID: **PLT-X020**
Matrix: **Water**
Workgroup Number: **WG312915**
Collect Date: **09/23/2009 15:40**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **25**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/25/2009 11:53**
Cal Date: **09/25/2009 11:28**
Run Date: **09/25/2009 11:53**
File ID: **SC090925002.051**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	1380		50.0	25.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-21**
Client ID: **PLT-X021**
Matrix: **Water**
Workgroup Number: **WG312915**
Collect Date: **09/23/2009 16:25**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **25**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/25/2009 11:54**
Cal Date: **09/25/2009 11:28**
Run Date: **09/25/2009 11:54**
File ID: **SC090925002.052**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	903		50.0	25.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-22**
Client ID: **PLT-X022**
Matrix: **Water**
Workgroup Number: **WG312915**
Collect Date: **09/23/2009 17:15**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **50**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/25/2009 11:55**
Cal Date: **09/25/2009 11:28**
Run Date: **09/25/2009 11:55**
File ID: **SC090925002.053**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	2070		100	50.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-23**
Client ID: **PLT-X023**
Matrix: **Water**
Workgroup Number: **WG312915**
Collect Date: **09/23/2009 17:20**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/25/2009 11:56**
Cal Date: **09/25/2009 11:28**
Run Date: **09/25/2009 11:56**
File ID: **SC090925002.054**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6		ND	2.00	1.00

ND Not detected at or above the reporting limit (RL).

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-24**
Client ID: **PLT-X003**
Matrix: **Water**
Workgroup Number: **WG312914**
Collect Date: **09/22/2009 14:30**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/25/2009 11:39**
Cal Date: **09/25/2009 11:28**
Run Date: **09/25/2009 11:39**
File ID: **SC090925002.026**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	19.5		2.00	1.00

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-25**
Client ID: **PLT-X003**
Matrix: **Water**
Workgroup Number: **WG312914**
Collect Date: **09/22/2009 14:30**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **325.2**
Analytical Method: **325.2**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/25/2009 11:39**
Cal Date: **09/25/2009 11:28**
Run Date: **09/25/2009 11:39**
File ID: **SC090925002.027**

Analyte	CAS. Number	Result	Qual	RL	MDL
Chloride	16887-00-6	19.7		2.00	1.00

2.1.1.2 QC Summary Data

METHOD BLANK SUMMARY

Login Number: L09090508
 Blank File ID: SC090925002.010
 Prep Date: 09/25/09 11:29
 Analyzed Date: 09/25/09 11:29
 Analyst: JBK

Work Group: WG312914
 Blank Sample ID: WG312914-01
 Instrument ID: SMARTCHEM
 Method: 325.2

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG312914-02	SC090925002.011	09/25/09 11:29	01
LCS2	WG312914-03	SC090925002.012	09/25/09 11:30	01
PLT-X001	L09090508-01	SC090925002.022	09/25/09 11:36	DL01
PLT-X002	L09090508-02	SC090925002.023	09/25/09 11:37	DL01
PLT-X003	L09090508-03	SC090925002.024	09/25/09 11:38	01
DUP	WG312914-05	SC090925002.025	09/25/09 11:38	01
PLT-X003	L09090508-24	SC090925002.026	09/25/09 11:39	01
PLT-X003	L09090508-25	SC090925002.027	09/25/09 11:39	01
PLT-X004	L09090508-04	SC090925002.028	09/25/09 11:40	01
PLT-X005	L09090508-05	SC090925002.029	09/25/09 11:40	01
PLT-X006	L09090508-06	SC090925002.030	09/25/09 11:41	DL01
PLT-X007	L09090508-07	SC090925002.033	09/25/09 11:43	DL01
PLT-X008	L09090508-08	SC090925002.034	09/25/09 11:44	DL01
PLT-X009	L09090508-09	SC090925002.035	09/25/09 11:44	DL01
PLT-X010	L09090508-10	SC090925002.036	09/25/09 11:45	01
PLT-X011	L09090508-11	SC090925002.037	09/25/09 11:45	DL01
PLT-X012	L09090508-12	SC090925002.038	09/25/09 11:46	DL01
PLT-X013	L09090508-13	SC090925002.039	09/25/09 11:46	DL01



METHOD BLANK SUMMARY

Login Number: L09090508
 Blank File ID: SC090925002.040
 Prep Date: 09/25/09 11:47
 Analyzed Date: 09/25/09 11:47
 Analyst: JBK

Work Group: WG312915
 Blank Sample ID: WG312915-01
 Instrument ID: SMARTCHEM
 Method: 325.2

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG312915-02	SC090925002.041	09/25/09 11:47	01
LCS2	WG312915-03	SC090925002.042	09/25/09 11:48	01
PLT-X014	L09090508-14	SC090925002.045	09/25/09 11:50	01
PLT-X015	L09090508-15	SC090925002.046	09/25/09 11:51	DL01
PLT-X016	L09090508-16	SC090925002.047	09/25/09 11:51	DL01
PLT-X017	L09090508-17	SC090925002.048	09/25/09 11:52	DL01
PLT-X018	L09090508-18	SC090925002.049	09/25/09 11:52	DL01
PLT-X019	L09090508-19	SC090925002.050	09/25/09 11:53	01
PLT-X020	L09090508-20	SC090925002.051	09/25/09 11:53	DL01
PLT-X021	L09090508-21	SC090925002.052	09/25/09 11:54	DL01
PLT-X022	L09090508-22	SC090925002.053	09/25/09 11:55	DL01
PLT-X023	L09090508-23	SC090925002.054	09/25/09 11:56	01
DUP	WG312915-05	SC090925002.057	09/25/09 11:57	01



Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L09090508 Prep Date: 09/25/09 11:29 Sample ID: WG312914-01
Instrument ID: SMARTCHEM Run Date: 09/25/09 11:29 Prep Method: 325.2
File ID: SC090925002.010 Analyst: JBK Method: 325.2
Workgroup (AAB#): WG312914 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: SMARTC - 25-SEP-09

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Chloride	1.00	2.00	2.00	1	ND

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1498306

29-SEP-2009 09:33



Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L09090508 Prep Date: 09/25/09 11:47 Sample ID: WG312915-01
Instrument ID: SMARTCHEM Run Date: 09/25/09 11:47 Prep Method: 325.2
File ID: SC090925002.040 Analyst: JBK Method: 325.2
Workgroup (AAB#): WG312915 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: SMARTC - 25-SEP-09

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Chloride	1.00	2.00	-1.44	1	ND

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1498306

29-SEP-2009 09:33



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09090508 Analyst: JBK Prep Method: 325.2
Instrument ID: SMARTCHEM Matrix: Water Method: 325.2
Workgroup (AAB#): WG312914 Units: mg/L
QC Key: DOWBOA2006 Lot #: STD35142
Sample ID: WG312914-02 LCS File ID: SC090925002.011 Run Date: 09/25/2009 11:29
Sample ID: WG312914-03 LCS2 File ID: SC090925002.012 Run Date: 09/25/2009 11:30

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Chloride	50.0	47.5	95.1	50.0	46.7	93.4	1.73	90 - 110	10	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 1498307
Report generated: 09/29/2009 09:33



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09090508 Analyst: JBK Prep Method: 325.2
Instrument ID: SMARTCHEM Matrix: Water Method: 325.2
Workgroup (AAB#): WG312915 Units: mg/L
QC Key: DOWB0A2006 Lot #: STD35142
Sample ID: WG312915-02 LCS File ID: SC090925002.041 Run Date: 09/25/2009 11:47
Sample ID: WG312915-03 LCS2 File ID: SC090925002.042 Run Date: 09/25/2009 11:48

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Chloride	50.0	46.6	93.1	50.0	45.9	91.7	1.50	90 - 110	10	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 1498307
Report generated: 09/29/2009 09:33



MS/MSD REPORT

Loginnum: L09090508 Cal ID: SMARTCHEM- 25-SEP-09
 Instrument ID: SMARTCHEM Contract #: _____
 Parent ID: L09090508-03 File ID: SC090925002.024 Dil: 1
 Sample ID: L09090508-24 MS File ID: SC090925002.026 Dil: 1
 Sample ID: L09090508-25 MSD File ID: SC090925002.027 Dil: 1

Worknum: WG312914
 Prep Method: 325.2
 Method: 325.2
 Matrix: Water
 Units: mg/L

Analyte	Parent	MS Spiked	MS Found	MS %Rec	MSD Spiked	MSD Found	MSD %Rec	%RPD	%Rec Limits	RPD Limit	Q
Chloride	ND	20.0	19.5	97.3	20.0	19.7	98.6	1.38	90 - 110	10	

* FAILS %REC LIMIT

FAILS RPD LIMIT

2.1.2 Ammonia Data

2.1.2.1 Summary Data

LABORATORY REPORT

L09090508

09/30/09 13:08

Submitted By

Microbac Laboratories Inc.
158 Starlite Drive
Marietta , OH 45750
(740) 373 - 4071

For

Account Name: CH2MHILL, Inc
CH2MHILL
15010 Conference Center Drive Suite 200
Chantilly, VA 20151
Attention: Michael J. Zamboni

Project Number: 2736.006
Project: MI-Dow Ludington
Site: LUDINGTON, MI

P.O. Number: 935272

Sample Analysis Summary

Client ID	QC Type	Lab ID	Method	Dilution	Date Received
PLT-X001		L09090508-01	350.1	4	24-SEP-09
PLT-X002		L09090508-02	350.1	2	24-SEP-09
PLT-X003		L09090508-03	350.1	2	24-SEP-09
PLT-X004		L09090508-04	350.1	1	24-SEP-09
PLT-X005		L09090508-05	350.1	1	24-SEP-09
PLT-X006		L09090508-06	350.1	4	24-SEP-09
PLT-X007		L09090508-07	350.1	2	24-SEP-09
PLT-X008		L09090508-08	350.1	2	24-SEP-09
PLT-X009		L09090508-09	350.1	50	24-SEP-09
PLT-X010		L09090508-10	350.1	1	24-SEP-09
PLT-X011		L09090508-11	350.1	10	24-SEP-09
PLT-X012		L09090508-12	350.1	4	24-SEP-09
PLT-X013		L09090508-13	350.1	2	24-SEP-09
PLT-X014		L09090508-14	350.1	1	24-SEP-09
PLT-X019		L09090508-19	350.1	1	24-SEP-09
PLT-X020		L09090508-20	350.1	2	24-SEP-09
PLT-X021		L09090508-21	350.1	100	24-SEP-09
PLT-X022		L09090508-22	350.1	20	24-SEP-09
PLT-X023		L09090508-23	350.1	1	24-SEP-09
PLT-X003	MS	L09090508-24	350.1	2	24-SEP-09
PLT-X003	MSD	L09090508-25	350.1	2	24-SEP-09



Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-01**
Client ID: **PLT-X001**
Matrix: **Water**
Workgroup Number: **WG313017**
Collect Date: **09/22/2009 12:05**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **4**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/28/2009 12:01**
Cal Date: **09/28/2009 10:12**
Run Date: **09/28/2009 12:01**
File ID: **SC090928001.108**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	7.51		0.400	0.200

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-02**
Client ID: **PLT-X002**
Matrix: **Water**
Workgroup Number: **WG313017**
Collect Date: **09/22/2009 12:35**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **2**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/28/2009 12:02**
Cal Date: **09/28/2009 10:12**
Run Date: **09/28/2009 12:02**
File ID: **SC090928001.109**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	4.74		0.200	0.100

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-03**
Client ID: **PLT-X003**
Matrix: **Water**
Workgroup Number: **WG313017**
Collect Date: **09/22/2009 14:30**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **2**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/28/2009 12:04**
Cal Date: **09/28/2009 10:12**
Run Date: **09/28/2009 12:04**
File ID: **SC090928001.110**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	4.24		0.200	0.100

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-04**
Client ID: **PLT-X004**
Matrix: **Water**
Workgroup Number: **WG313017**
Collect Date: **09/22/2009 15:25**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/28/2009 10:48**
Cal Date: **09/28/2009 10:12**
Run Date: **09/28/2009 10:48**
File ID: **SC090928001.047**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	0.787		0.100	0.0500

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-05**
Client ID: **PLT-X005**
Matrix: **Water**
Workgroup Number: **WG313017**
Collect Date: **09/22/2009 16:35**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/28/2009 10:49**
Cal Date: **09/28/2009 10:12**
Run Date: **09/28/2009 10:49**
File ID: **SC090928001.048**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	0.298		0.100	0.0500

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-06**
Client ID: **PLT-X006**
Matrix: **Water**
Workgroup Number: **WG313017**
Collect Date: **09/22/2009 17:15**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **4**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/28/2009 12:10**
Cal Date: **09/28/2009 10:12**
Run Date: **09/28/2009 12:10**
File ID: **SC090928001.113**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	7.94		0.400	0.200

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-07**
Client ID: **PLT-X007**
Matrix: **Water**
Workgroup Number: **WG313017**
Collect Date: **09/22/2009 17:45**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **2**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/28/2009 12:11**
Cal Date: **09/28/2009 10:12**
Run Date: **09/28/2009 12:11**
File ID: **SC090928001.114**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	5.25		0.200	0.100

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-08**
Client ID: **PLT-X008**
Matrix: **Water**
Workgroup Number: **WG313017**
Collect Date: **09/22/2009 17:50**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **2**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/28/2009 12:15**
Cal Date: **09/28/2009 10:12**
Run Date: **09/28/2009 12:15**
File ID: **SC090928001.115**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	5.13		0.200	0.100

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-09**
Client ID: **PLT-X009**
Matrix: **Water**
Workgroup Number: **WG313017**
Collect Date: **09/22/2009 18:20**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **50**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/28/2009 12:43**
Cal Date: **09/28/2009 10:12**
Run Date: **09/28/2009 12:43**
File ID: **SC090928001.127**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	81.9		5.00	2.50

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-10**
Client ID: **PLT-X010**
Matrix: **Water**
Workgroup Number: **WG313017**
Collect Date: **09/22/2009 18:50**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/28/2009 10:53**
Cal Date: **09/28/2009 10:12**
Run Date: **09/28/2009 10:53**
File ID: **SC090928001.053**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	1.98		0.100	0.0500

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-11**
Client ID: **PLT-X011**
Matrix: **Water**
Workgroup Number: **WG313017**
Collect Date: **09/23/2009 08:25**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **10**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/28/2009 12:45**
Cal Date: **09/28/2009 10:12**
Run Date: **09/28/2009 12:45**
File ID: **SC090928001.128**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	10.8		1.00	0.500

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-12**
Client ID: **PLT-X012**
Matrix: **Water**
Workgroup Number: **WG313017**
Collect Date: **09/23/2009 08:30**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **4**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/28/2009 12:22**
Cal Date: **09/28/2009 10:12**
Run Date: **09/28/2009 12:22**
File ID: **SC090928001.120**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	10.9		0.400	0.200

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-13**
Client ID: **PLT-X013**
Matrix: **Water**
Workgroup Number: **WG313017**
Collect Date: **09/23/2009 08:55**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **2**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/28/2009 12:24**
Cal Date: **09/28/2009 10:12**
Run Date: **09/28/2009 12:24**
File ID: **SC090928001.121**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	4.57		0.200	0.100

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-14**
Client ID: **PLT-X014**
Matrix: **Water**
Workgroup Number: **WG313017**
Collect Date: **09/23/2009 08:50**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/28/2009 10:58**
Cal Date: **09/28/2009 10:12**
Run Date: **09/28/2009 10:58**
File ID: **SC090928001.059**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7		ND	0.100	0.0500

ND Not detected at or above the reporting limit (RL).

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-19**
Client ID: **PLT-X019**
Matrix: **Water**
Workgroup Number: **WG313014**
Collect Date: **09/23/2009 12:05**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/28/2009 10:30**
Cal Date: **09/28/2009 10:12**
Run Date: **09/28/2009 10:30**
File ID: **SC090928001.027**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	0.116		0.100	0.0500

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-20**
Client ID: **PLT-X020**
Matrix: **Water**
Workgroup Number: **WG313014**
Collect Date: **09/23/2009 15:40**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **2**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/28/2009 11:50**
Cal Date: **09/28/2009 10:12**
Run Date: **09/28/2009 11:50**
File ID: **SC090928001.101**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	4.60		0.200	0.100

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-21**
Client ID: **PLT-X021**
Matrix: **Water**
Workgroup Number: **WG313014**
Collect Date: **09/23/2009 16:25**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **100**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/28/2009 12:58**
Cal Date: **09/28/2009 10:12**
Run Date: **09/28/2009 12:58**
File ID: **SC090928001.131**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	169		10.0	5.00

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-22**
Client ID: **PLT-X022**
Matrix: **Water**
Workgroup Number: **WG313014**
Collect Date: **09/23/2009 17:15**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **20**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/28/2009 11:53**
Cal Date: **09/28/2009 10:12**
Run Date: **09/28/2009 11:53**
File ID: **SC090928001.103**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	37.0		2.00	1.00

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-23**
Client ID: **PLT-X023**
Matrix: **Water**
Workgroup Number: **WG313014**
Collect Date: **09/23/2009 17:20**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **1**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/28/2009 10:35**
Cal Date: **09/28/2009 10:12**
Run Date: **09/28/2009 10:35**
File ID: **SC090928001.033**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	0.217		0.100	0.0500

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-24**
Client ID: **PLT-X003**
Matrix: **Water**
Workgroup Number: **WG313017**
Collect Date: **09/22/2009 14:30**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **2**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/28/2009 12:06**
Cal Date: **09/28/2009 10:12**
Run Date: **09/28/2009 12:06**
File ID: **SC090928001.111**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	5.30		0.200	0.100

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-25**
Client ID: **PLT-X003**
Matrix: **Water**
Workgroup Number: **WG313017**
Collect Date: **09/22/2009 14:30**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **350.1**
Analytical Method: **350.1**
Analyst: **JBK**
Dilution: **2**
Units: **mg/L**

Instrument: **SMARTCHEM**
Prep Date: **09/28/2009 12:08**
Cal Date: **09/28/2009 10:12**
Run Date: **09/28/2009 12:08**
File ID: **SC090928001.112**

Analyte	CAS. Number	Result	Qual	RL	MDL
Nitrogen, Ammonia	7664-41-7	5.31		0.200	0.100

2.1.2.2 QC Summary Data

METHOD BLANK SUMMARY

Login Number: L09090508
 Blank File ID: SC090928001.009
 Prep Date: 09/28/09 10:13
 Analyzed Date: 09/28/09 10:13
 Analyst: JBK

Work Group: WG313014
 Blank Sample ID: WG313014-01
 Instrument ID: SMARTCHEM
 Method: 350.1

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG313014-02	SC090928001.010	09/28/09 10:15	01
PLT-X019	L09090508-19	SC090928001.027	09/28/09 10:30	01
PLT-X023	L09090508-23	SC090928001.033	09/28/09 10:35	01
DUP	WG313014-05	SC090928001.035	09/28/09 10:37	01
PLT-X020	L09090508-20	SC090928001.101	09/28/09 11:50	DL01
PLT-X022	L09090508-22	SC090928001.103	09/28/09 11:53	DL01
PLT-X021	L09090508-21	SC090928001.131	09/28/09 12:58	DL01



METHOD BLANK SUMMARY

Login Number: L09090508
 Blank File ID: SC090928001.038
 Prep Date: 09/28/09 10:40
 Analyzed Date: 09/28/09 10:40
 Analyst: JBK

Work Group: WG313017
 Blank Sample ID: WG313017-01
 Instrument ID: SMARTCHEM
 Method: 350.1

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG313017-02	SC090928001.039	09/28/09 10:40	01
PLT-X004	L09090508-04	SC090928001.047	09/28/09 10:48	01
PLT-X005	L09090508-05	SC090928001.048	09/28/09 10:49	01
PLT-X010	L09090508-10	SC090928001.053	09/28/09 10:53	01
PLT-X014	L09090508-14	SC090928001.059	09/28/09 10:58	01
PLT-X001	L09090508-01	SC090928001.108	09/28/09 12:01	DL01
PLT-X002	L09090508-02	SC090928001.109	09/28/09 12:02	DL01
PLT-X003	L09090508-03	SC090928001.110	09/28/09 12:04	DL01
PLT-X003	L09090508-24	SC090928001.111	09/28/09 12:06	DL01
PLT-X003	L09090508-25	SC090928001.112	09/28/09 12:08	DL01
PLT-X006	L09090508-06	SC090928001.113	09/28/09 12:10	DL01
PLT-X007	L09090508-07	SC090928001.114	09/28/09 12:11	DL01
PLT-X008	L09090508-08	SC090928001.115	09/28/09 12:15	DL01
PLT-X012	L09090508-12	SC090928001.120	09/28/09 12:22	DL01
PLT-X013	L09090508-13	SC090928001.121	09/28/09 12:24	DL01
DUP	WG313017-04	SC090928001.123	09/28/09 12:27	DL01
PLT-X009	L09090508-09	SC090928001.127	09/28/09 12:43	DL01
PLT-X011	L09090508-11	SC090928001.128	09/28/09 12:45	DL01



METHOD BLANK REPORT

Login Number: L09090508 Prep Date: 09/28/09 10:13 Sample ID: WG313014-01
Instrument ID: SMARTCHEM Run Date: 09/28/09 10:13 Prep Method: 350.1
File ID: SC090928001.009 Analyst: JBK Method: 350.1
Workgroup (AAB#): WG313014 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: SMARTC - 28-SEP-09

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Nitrogen, Ammonia	0.0500	0.100	0.100	1	ND

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1499241

29-SEP-2009 16:18



METHOD BLANK REPORT

Login Number: L09090508 Prep Date: 09/28/09 10:40 Sample ID: WG313017-01
Instrument ID: SMARTCHEM Run Date: 09/28/09 10:40 Prep Method: 350.1
File ID: SC090928001.038 Analyst: JBK Method: 350.1
Workgroup (AAB#): WG313017 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: SMARTC - 28-SEP-09

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Nitrogen, Ammonia	0.0500	0.100	0.100	1	ND

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1499241

29-SEP-2009 16:18



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09090508 Run Date: 09/28/2009 Sample ID: WG313014-02
Instrument ID: SMARTCHEM Run Time: 10:15 Prep Method: 350.1
File ID: SC090928001.010 Analyst: JBK Method: 350.1
Workgroup (AAB#): WG313014 Matrix: Water Units: mg/L
QC Key: DOWBOA2006 Lot#: STD33211 Cal ID: SMARTC - 28-SEP-09

Analytes	Expected	Found	% Rec	LCS Limits	Q
Nitrogen, Ammonia	2.00	1.87	93.5	90 - 110	

LCS - Modified 03/06/2008
PDF File ID: 1499242
Report generated: 09/29/2009 16:18



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09090508 Run Date: 09/28/2009 Sample ID: WG313017-02
Instrument ID: SMARTCHEM Run Time: 10:40 Prep Method: 350.1
File ID: SC090928001.039 Analyst: JBK Method: 350.1
Workgroup (AAB#): WG313017 Matrix: Water Units: mg/L
QC Key: DOWBOA2006 Lot#: STD33211 Cal ID: SMARTC - 28-SEP-09

Analytes	Expected	Found	% Rec	LCS Limits	Q
Nitrogen, Ammonia	2.00	1.80	90.2	90 - 110	

LCS - Modified 03/06/2008
PDF File ID: 1499242
Report generated: 09/29/2009 16:18



MS/MSD REPORT

Loginnum: <u>L09090508</u>	Cal ID: <u>SMARTCHEM- 28-SEP-09</u>	Worknum: <u>WG313017</u>
Instrument ID: <u>SMARTCHEM</u>	Contract #: _____	Prep Method: <u>350.1</u>
Parent ID: <u>L09090508-03</u>	File ID: <u>SC090928001.110</u>	Dil: <u>2</u>
Sample ID: <u>L09090508-24 MS</u>	File ID: <u>SC090928001.111</u>	Dil: <u>2</u>
Sample ID: <u>L09090508-25 MSD</u>	File ID: <u>SC090928001.112</u>	Dil: <u>2</u>
		Method: <u>350.1</u>
		Matrix: <u>Water</u>
		Units: <u>mg/L</u>

Analyte	Parent	MS Spiked	MS Found	MS %Rec	MSD Spiked	MSD Found	MSD %Rec	%RPD	%Rec Limits	RPD Limit	Q
Nitrogen, Ammonia	4.24	1.00	5.30	106	1.00	5.31	107	0.145	70 - 125	25	

* FAILS %REC LIMIT

FAILS RPD LIMIT



2.1.3 Total Dissolved Solids Data

2.1.3.1 Summary Data

LABORATORY REPORT

L09090508

09/30/09 13:08

Submitted By

Microbac Laboratories Inc.
158 Starlite Drive
Marietta, OH 45750
(740) 373-4071

For

Account Name: CH2MHILL, Inc
CH2MHILL
15010 Conference Center Drive Suite 200
Chantilly, VA 20151
Attention: Michael J. Zamboni

Project Number: 2736.006
Project: MI-Dow Ludington
Site: LUDINGTON, MI

P.O. Number: 935272

Sample Analysis Summary

Client ID	QC Type	Lab ID	Method	Dilution	Date Received
PLT-X001		L09090508-01	160.1	1	24-SEP-09
PLT-X002		L09090508-02	160.1	1	24-SEP-09
PLT-X003		L09090508-03	160.1	1	24-SEP-09
PLT-X004		L09090508-04	160.1	1	24-SEP-09
PLT-X005		L09090508-05	160.1	1	24-SEP-09
PLT-X006		L09090508-06	160.1	1	24-SEP-09
PLT-X007		L09090508-07	160.1	1	24-SEP-09
PLT-X008		L09090508-08	160.1	1	24-SEP-09
PLT-X009		L09090508-09	160.1	1	24-SEP-09
PLT-X010		L09090508-10	160.1	1	24-SEP-09
PLT-X011		L09090508-11	160.1	1	24-SEP-09
PLT-X012		L09090508-12	160.1	1	24-SEP-09
PLT-X013		L09090508-13	160.1	1	24-SEP-09
PLT-X014		L09090508-14	160.1	1	24-SEP-09
PLT-X015		L09090508-15	160.1	1	24-SEP-09
PLT-X016		L09090508-16	160.1	1	24-SEP-09
PLT-X017		L09090508-17	160.1	1	24-SEP-09
PLT-X018		L09090508-18	160.1	1	24-SEP-09
PLT-X019		L09090508-19	160.1	1	24-SEP-09
PLT-X020		L09090508-20	160.1	1	24-SEP-09
PLT-X021		L09090508-21	160.1	1	24-SEP-09
PLT-X022		L09090508-22	160.1	1	24-SEP-09
PLT-X023		L09090508-23	160.1	1	24-SEP-09
PLT-X003	MS	L09090508-24	160.1	1	24-SEP-09
PLT-X003	MSD	L09090508-25	160.1	1	24-SEP-09

L1_A_PROD - Modified 03/06/2008
PDF File ID: 1500373
Report generated: 09/30/2009 13:08

1 OF 1



Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-01**
Client ID: **PLT-X001**
Matrix: **Water**
Workgroup Number: **WG312943**
Collect Date: **09/22/2009 12:05**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/25/2009 12:15**
Cal Date:
Run Date: **09/25/2009 12:15**
File ID: **EN.0909251215-11**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		3520		20.0	10.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-02**
Client ID: **PLT-X002**
Matrix: **Water**
Workgroup Number: **WG312943**
Collect Date: **09/22/2009 12:35**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/25/2009 12:15**
Cal Date:
Run Date: **09/25/2009 12:15**
File ID: **EN.0909251215-13**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		2530		20.0	10.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-03**
Client ID: **PLT-X003**
Matrix: **Water**
Workgroup Number: **WG312943**
Collect Date: **09/22/2009 14:30**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/25/2009 12:15**
Cal Date:
Run Date: **09/25/2009 12:15**
File ID: **EN.0909251215-15**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		344		20.0	10.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-04**
Client ID: **PLT-X004**
Matrix: **Water**
Workgroup Number: **WG312943**
Collect Date: **09/22/2009 15:25**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/25/2009 12:15**
Cal Date:
Run Date: **09/25/2009 12:15**
File ID: **EN.0909251215-21**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		280		20.0	10.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-05**
Client ID: **PLT-X005**
Matrix: **Water**
Workgroup Number: **WG312943**
Collect Date: **09/22/2009 16:35**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/25/2009 12:15**
Cal Date:
Run Date: **09/25/2009 12:15**
File ID: **EN.0909251215-23**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		190		20.0	10.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-06**
Client ID: **PLT-X006**
Matrix: **Water**
Workgroup Number: **WG312946**
Collect Date: **09/22/2009 17:15**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/25/2009 13:15**
Cal Date:
Run Date: **09/25/2009 13:15**
File ID: **EN.0909251315-04**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		3020		20.0	10.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-07**
Client ID: **PLT-X007**
Matrix: **Water**
Workgroup Number: **WG312946**
Collect Date: **09/22/2009 17:45**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/25/2009 13:15**
Cal Date:
Run Date: **09/25/2009 13:15**
File ID: **EN.0909251315-05**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		2540		20.0	10.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-08**
Client ID: **PLT-X008**
Matrix: **Water**
Workgroup Number: **WG312946**
Collect Date: **09/22/2009 17:50**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/25/2009 13:15**
Cal Date:
Run Date: **09/25/2009 13:15**
File ID: **EN.0909251315-06**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		2680		20.0	10.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-09**
Client ID: **PLT-X009**
Matrix: **Water**
Workgroup Number: **WG312946**
Collect Date: **09/22/2009 18:20**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/25/2009 13:15**
Cal Date:
Run Date: **09/25/2009 13:15**
File ID: **EN.0909251315-07**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		4960		40.0	20.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-10**
Client ID: **PLT-X010**
Matrix: **Water**
Workgroup Number: **WG312946**
Collect Date: **09/22/2009 18:50**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/25/2009 13:15**
Cal Date:
Run Date: **09/25/2009 13:15**
File ID: **EN.0909251315-08**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		452		20.0	10.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-11**
Client ID: **PLT-X011**
Matrix: **Water**
Workgroup Number: **WG312946**
Collect Date: **09/23/2009 08:25**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/25/2009 13:15**
Cal Date:
Run Date: **09/25/2009 13:15**
File ID: **EN.0909251315-09**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		3270		20.0	10.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-12**
Client ID: **PLT-X012**
Matrix: **Water**
Workgroup Number: **WG312946**
Collect Date: **09/23/2009 08:30**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/25/2009 13:15**
Cal Date:
Run Date: **09/25/2009 13:15**
File ID: **EN.0909251315-10**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		3570		20.0	10.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-13**
Client ID: **PLT-X013**
Matrix: **Water**
Workgroup Number: **WG312946**
Collect Date: **09/23/2009 08:55**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/25/2009 13:15**
Cal Date:
Run Date: **09/25/2009 13:15**
File ID: **EN.0909251315-12**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		2720		20.0	10.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-14**
Client ID: **PLT-X014**
Matrix: **Water**
Workgroup Number: **WG312946**
Collect Date: **09/23/2009 08:50**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/25/2009 13:15**
Cal Date:
Run Date: **09/25/2009 13:15**
File ID: **EN.0909251315-11**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids			ND	10.0	5.00

ND Not detected at or above the reporting limit (RL).

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-15**
Client ID: **PLT-X015**
Matrix: **Water**
Workgroup Number: **WG312946**
Collect Date: **09/23/2009 10:00**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/25/2009 13:15**
Cal Date:
Run Date: **09/25/2009 13:15**
File ID: **EN.0909251315-13**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		2900		20.0	10.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-16**
Client ID: **PLT-X016**
Matrix: **Water**
Workgroup Number: **WG312946**
Collect Date: **09/23/2009 10:20**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/25/2009 13:15**
Cal Date:
Run Date: **09/25/2009 13:15**
File ID: **EN.0909251315-19**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		7040		40.0	20.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-17**
Client ID: **PLT-X017**
Matrix: **Water**
Workgroup Number: **WG313036**
Collect Date: **09/23/2009 10:50**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/28/2009 15:00**
Cal Date:
Run Date: **09/28/2009 15:00**
File ID: **EN.0909281500-15**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		8950		100	50.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-18**
Client ID: **PLT-X018**
Matrix: **Water**
Workgroup Number: **WG312946**
Collect Date: **09/23/2009 11:05**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/25/2009 13:15**
Cal Date:
Run Date: **09/25/2009 13:15**
File ID: **EN.0909251315-14**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		3210		20.0	10.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-19**
Client ID: **PLT-X019**
Matrix: **Water**
Workgroup Number: **WG312946**
Collect Date: **09/23/2009 12:05**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/25/2009 13:15**
Cal Date:
Run Date: **09/25/2009 13:15**
File ID: **EN.0909251315-15**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		400		20.0	10.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-20**
Client ID: **PLT-X020**
Matrix: **Water**
Workgroup Number: **WG312946**
Collect Date: **09/23/2009 15:40**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/25/2009 13:15**
Cal Date:
Run Date: **09/25/2009 13:15**
File ID: **EN.0909251315-16**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		3470		20.0	10.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-21**
Client ID: **PLT-X021**
Matrix: **Water**
Workgroup Number: **WG312946**
Collect Date: **09/23/2009 16:25**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/25/2009 13:15**
Cal Date:
Run Date: **09/25/2009 13:15**
File ID: **EN.0909251315-17**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		2270		20.0	10.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-22**
Client ID: **PLT-X022**
Matrix: **Water**
Workgroup Number: **WG312946**
Collect Date: **09/23/2009 17:15**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/25/2009 13:15**
Cal Date:
Run Date: **09/25/2009 13:15**
File ID: **EN.0909251315-20**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		5030		40.0	20.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-23**
Client ID: **PLT-X023**
Matrix: **Water**
Workgroup Number: **WG312946**
Collect Date: **09/23/2009 17:20**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/25/2009 13:15**
Cal Date:
Run Date: **09/25/2009 13:15**
File ID: **EN.0909251315-18**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		80.0		10.0	5.00

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-24**
Client ID: **PLT-X003**
Matrix: **Water**
Workgroup Number: **WG312943**
Collect Date: **09/22/2009 14:30**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/25/2009 12:15**
Cal Date:
Run Date: **09/25/2009 12:15**
File ID: **EN.0909251215-16**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		846		20.0	10.0

Report Number: **L09090508**Report Date : **September 30, 2009**

Sample Number: **L09090508-25**
Client ID: **PLT-X003**
Matrix: **Water**
Workgroup Number: **WG312943**
Collect Date: **09/22/2009 14:30**

PrePrep Method: **NONE**
Prep Method: **160.1**
Analytical Method: **160.1**
Analyst: **HJR**
Dilution: **1**
Units: **mg/L**

Instrument: **OVEN**
Prep Date: **09/25/2009 12:15**
Cal Date:
Run Date: **09/25/2009 12:15**
File ID: **EN.0909251215-17**

Analyte	CAS. Number	Result	Qual	RL	MDL
Total Dissolved Solids		848		20.0	10.0

2.1.3.2 QC Summary Data

METHOD BLANK SUMMARY

Login Number: L09090508
 Blank File ID: EN.0909251215-01
 Prep Date: 09/25/09 12:15
 Analyzed Date: 09/25/09 12:15
 Analyst: HJR

Work Group: WG312943
 Blank Sample ID: WG312943-01
 Instrument ID: OVEN
 Method: 160.1

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG312943-02	EN.0909251215-02	09/25/09 12:15	
LCS2	WG312943-03	EN.0909251215-03	09/25/09 12:15	
PLT-X001	L09090508-01	EN.0909251215-11	09/25/09 12:15	
PLT-X002	L09090508-02	EN.0909251215-13	09/25/09 12:15	
PLT-X003	L09090508-03	EN.0909251215-15	09/25/09 12:15	
PLT-X003	L09090508-24	EN.0909251215-16	09/25/09 12:15	
PLT-X003	L09090508-25	EN.0909251215-17	09/25/09 12:15	
PLT-X004	L09090508-04	EN.0909251215-21	09/25/09 12:15	
PLT-X005	L09090508-05	EN.0909251215-23	09/25/09 12:15	
DUP	WG312943-05	EN.0909251215-24	09/25/09 12:15	

METHOD BLANK SUMMARY

Login Number: L09090508
 Blank File ID: EN.0909251315-01
 Prep Date: 09/25/09 13:15
 Analyzed Date: 09/25/09 13:15
 Analyst: HJR

Work Group: WG312946
 Blank Sample ID: WG312946-01
 Instrument ID: OVEN
 Method: 160.1

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG312946-02	EN.0909251315-02	09/25/09 13:15	
LCS2	WG312946-03	EN.0909251315-03	09/25/09 13:15	
PLT-X006	L09090508-06	EN.0909251315-04	09/25/09 13:15	
PLT-X007	L09090508-07	EN.0909251315-05	09/25/09 13:15	
PLT-X008	L09090508-08	EN.0909251315-06	09/25/09 13:15	
PLT-X009	L09090508-09	EN.0909251315-07	09/25/09 13:15	
PLT-X010	L09090508-10	EN.0909251315-08	09/25/09 13:15	
PLT-X011	L09090508-11	EN.0909251315-09	09/25/09 13:15	
PLT-X012	L09090508-12	EN.0909251315-10	09/25/09 13:15	
PLT-X014	L09090508-14	EN.0909251315-11	09/25/09 13:15	
PLT-X013	L09090508-13	EN.0909251315-12	09/25/09 13:15	
PLT-X015	L09090508-15	EN.0909251315-13	09/25/09 13:15	
PLT-X018	L09090508-18	EN.0909251315-14	09/25/09 13:15	
PLT-X019	L09090508-19	EN.0909251315-15	09/25/09 13:15	
PLT-X020	L09090508-20	EN.0909251315-16	09/25/09 13:15	
PLT-X021	L09090508-21	EN.0909251315-17	09/25/09 13:15	
PLT-X023	L09090508-23	EN.0909251315-18	09/25/09 13:15	
PLT-X016	L09090508-16	EN.0909251315-19	09/25/09 13:15	
PLT-X022	L09090508-22	EN.0909251315-20	09/25/09 13:15	
DUP	WG312946-05	EN.0909251315-21	09/25/09 13:15	



METHOD BLANK SUMMARY

Login Number: L09090508
Blank File ID: EN.0909281500-01
Prep Date: 09/28/09 15:00
Analyzed Date: 09/28/09 15:00
Analyst: HJR

Work Group: WG313036
Blank Sample ID: WG313036-01
Instrument ID: OVEN
Method: 160.1

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG313036-02	EN.0909281500-02	09/28/09 15:00	
LCS2	WG313036-03	EN.0909281500-03	09/28/09 15:00	
PLT-X017	L09090508-17	EN.0909281500-15	09/28/09 15:00	
DUP	WG313036-05	EN.0909281500-16	09/28/09 15:00	



Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L09090508 Prep Date: 09/25/09 12:15 Sample ID: WG312943-01
Instrument ID: OVEN Run Date: 09/25/09 12:15 Prep Method: 160.1
File ID: EN.0909251215-01 Analyst: HJR Method: 160.1
Workgroup (AAB#): WG312943 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: OVEN -

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Total Dissolved Solids	5.00	10.0	10.0	1	ND

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1499151

30-SEP-2009 11:59



Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L09090508 Prep Date: 09/25/09 13:15 Sample ID: WG312946-01
Instrument ID: OVEN Run Date: 09/25/09 13:15 Prep Method: 160.1
File ID: EN.0909251315-01 Analyst: HJR Method: 160.1
Workgroup (AAB#): WG312946 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: OVEN -

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Total Dissolved Solids	5.00	10.0	10.0	1	ND

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1499151

30-SEP-2009 11:59



Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L09090508 Prep Date: 09/28/09 15:00 Sample ID: WG313036-01
Instrument ID: OVEN Run Date: 09/28/09 15:00 Prep Method: 160.1
File ID: EN.0909281500-01 Analyst: HJR Method: 160.1
Workgroup (AAB#): WG313036 Matrix: Water Units: mg/L
Contract #: _____ Cal ID: OVEN -

Analytes	MDL	RL	Concentration	Dilution	Qualifier
Total Dissolved Solids	5.00	10.0	10.0	1	ND

MDL Method Detection Limit

RL Reporting/Practical Quantitation Limit

ND Analyte Not detected at or above reporting limit

* |Analyte concentration| > RL

Report Name: BLANK

PDF ID: 1499151

30-SEP-2009 11:59



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09090508 Analyst: HJR Prep Method: 160.1
Instrument ID: OVEN Matrix: Water Method: 160.1
Workgroup (AAB#): WG312943 Units: mg/L
QC Key: DOWB0A2006 Lot #: STD32441
Sample ID: WG312943-02 LCS File ID: EN.0909251215-02 Run Date: 09/25/2009 12:15
Sample ID: WG312943-03 LCS2 File ID: EN.0909251215-03 Run Date: 09/25/2009 12:15

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Total Dissolved Solids	500	502	100	500	504	101	0.398	80 - 120	25	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 1499152
Report generated: 09/30/2009 11:59



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09090508 Analyst: HJR Prep Method: 160.1
Instrument ID: OVEN Matrix: Water Method: 160.1
Workgroup (AAB#): WG312946 Units: mg/L
QC Key: DOWB0A2006 Lot #: STD32441
Sample ID: WG312946-02 LCS File ID: EN.0909251315-02 Run Date: 09/25/2009 13:15
Sample ID: WG312946-03 LCS2 File ID: EN.0909251315-03 Run Date: 09/25/2009 13:15

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Total Dissolved Solids	500	504	101	500	502	100	0.398	80 - 120	25	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 1499152
Report generated: 09/30/2009 11:59



Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L09090508 Analyst: HJR Prep Method: 160.1
 Instrument ID: OVEN Matrix: Water Method: 160.1
 Workgroup (AAB#): WG313036 Units: mg/L
 QC Key: DOWB0A2006 Lot #: STD32441
 Sample ID: WG313036-02 LCS File ID: EN.0909281500-02 Run Date: 09/28/2009 15:00
 Sample ID: WG313036-03 LCS2 File ID: EN.0909281500-03 Run Date: 09/28/2009 15:00

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Total Dissolved Solids	500	500	100	500	500	100	0.00	80 - 120	25	

LCS_LCS2 - Modified 03/06/2008
 PDF File ID: 1499152
 Report generated: 09/30/2009 11:59



MS/MSD REPORT

Loginnum: L09090508Cal ID: OVEN-Worknum: WG312943Instrument ID: OVEN

Contract #: _____

Prep Method: 160.1Parent ID: L09090508-03File ID: EN.0909251215-15Dil: 1Method: 160.1Sample ID: L09090508-24 MSFile ID: EN.0909251215-16Dil: 1Matrix: WaterSample ID: L09090508-25 MSDFile ID: EN.0909251215-17Dil: 1Units: mg/L

Analyte	Parent	MS Spiked	MS Found	MS %Rec	MSD Spiked	MSD Found	MSD %Rec	%RPD	%Rec Limits	RPD Limit	Q
Total Dissolved Solids	344	500	846	100	500	848	101	0.236	80 - 120	25	

* FAILS %REC LIMIT

FAILS RPD LIMIT

MS_MSD - Modified 09/13/2009

PDF File ID: 1499153

Report generated 09/30/2009 11:59



3.0 Attachments

Microbac Laboratories Inc.
Analyst Listing
September 30, 2009

ADC - ANTHONY D. CANTER	AJF - AMANDA J. FICKIESEN	AJM - ANTHONY J. MOSSBURG
ALB - ANNIE L. BROWN	AML - ANTHONY M. LONG	BLG - BRENDA L. GREENWALT
BRG - BRENDA R. GREGORY	CAA - CASSIE A. AUGENSTEIN	CAF - CHERYL A. FLOWERS
CAH - CHARLES A. HALL	CEB - CHAD E. BARNES	CLC - CHRYS L. CRAWFORD
CLW - CHARISSA L. WINTERS	CPD - CHAD P. DAVIS	CSH - CHRIS S. HILL
DDE - DEBRA D. ELLIOTT	DEL - DON E. LIGHTFRITZ	DEV - DAVID E. VANDENBERG
DGB - DOUGLAS G. BUTCHER	DIH - DEANNA I. HESSON	DLB - DAVID L. BUMGARNER
DLP - DOROTHY L. PAYNE	DLR - DIANNA L. RAUCH	DR - DEANNA ROBERTS
ECL - ERIC C. LAWSON	EDA - ERIN D. AGEE	ERP - ERIN R. PORTER
FJB - FRANCES J. BOLDEN	HAV - HEMA VILASAGAR	HJR - HOLLY J. REED
JBK - JEREMY B. KINNEY	JDH - JUSTIN D. HESSON	JKT - JANE K. THOMPSON
JWR - JOHN W. RICHARDS	JWS - JACK W. SHEAVES	JYH - JI Y. HU
KEB - KATHRYN E. BARNES	KHR - KIM H. RHODES	KRA - KATHY R. ALBERTSON
LKN - LINDA K. NEDEFF	LSB - LESLIE S. BUCINA	MDA - MIKE D. ALBERTSON
MDC - MICHAEL D. COCHRAN	MES - MARY E. SCHILLING	MMB - MAREN M. BEERY
MRT - MICHELLE R. TAYLOR	MSW - MATT S. WILSON	NPM - NATHANIEL P. MILLER
PDM - PIERCE D. MORRIS	RAH - ROY A. HALSTEAD	RB - ROBERT BUCHANAN
REK - ROBERT E. KYER	RLK - ROBIN L. KLINGER	RWC - RODNEY W. CAMPBELL
SDH - SHANA D. HINYARD	SLM - STEPHANIE L. MOSSBURG	SLP - SHERI L. PFALZGRAF
TIP - TAE I. PARRISH	TMB - TIFFANY M. BAILEY	TMM - TAMMY M. MORRIS
VC - VICKI COLLIER	WTD - WADE T. DELONG	

September 30, 2009

Qualkey: STD

Qualifier	Description
*	Surrogate or spike compound out of range
+	Correlation coefficient for the MSA is less than 0.995
<	Result is less than the associated numerical value.
>	Result is greater than the associated numerical value.
A	See the report narrative
B	Analyte present in method blank
B1	Target analyte detected in method blank at or above the method reporting limit
B3	Target analyte detected in calibration blank at or above the method reporting limit
C	Confirmed by GC/MS
CG	Confluent growth
DL	Surrogate or spike compound was diluted out
E	Estimated concentration due to sample matrix interference
EDL	Elevated sample reporting limits, presence of non-target analytes
EMPC	Estimated Maximum Possible Concentration
F, S	Estimated result below quantitation limit; method of standard additions(MSA)
FL	Free Liquid
H1	Sample analysis performed past holding time.
I	Semiquantitative result (out of instrument calibration range)
J	The analyte was positively identified, but the quantitation was below the RL
J,B	Analyte detected in both the method blank and sample above the MDL.
J,P	Estimate; columns don't agree to within 40%
J,S	Estimated concentration; analyzed by method of standard addition (MSA)
L	Sample reporting limits elevated due to matrix interference
L1	The associated blank spike (LCS) recovery was above the laboratory acceptance limits.
L2	The associated blank spike (LCS) recovery was below the laboratory acceptance limits.
M	Matrix effect; the concentration is an estimate due to matrix effect.
N	Tentatively identified compound(TIC)
NA	Not applicable
ND	Not detected at or above the reporting limit (RL).
ND, L	Not detected; sample reporting limit (RL) elevated due to interference
ND, S	Not detected; analyzed by method of standard addition (MSA)
NF	Not found by library search
NFL	No free liquid
NI	Non-ignitable
NR	Analyte is not required to be analyzed
NS	Not spiked
P	Concentrations >40% difference between the two GC columns
Q	One or more quality control criteria fail. See narrative.
QNS	Quantity of sample not sufficient to perform analysis
RA	Reanalysis confirms reported results
RE	Reanalysis confirms sample matrix interference
S	Analyzed by method of standard addition (MSA)
SMI	Sample matrix interference on surrogate
SP	Reported results are for spike compounds only
TIC	Library Search Compound
TNTC	Too numerous to count
U	Undetected; the concentration is below the reported MDL.
UJ	Undetected; the MDL and RL are estimated due to quality control discrepancies.
W	Post-digestion spike for furnace AA out of control limits
X	Exceeds regulatory limit
X, S	Exceeds regulatory limit; method of standard additions (MSA)
Z	Cannot be resolved from isomer - see below

*****Special Notes for Organic Analytes**

1. Acrolein and acrylonitrile by method 624 are semi-quantitative screens only.
2. 1,2-Diphenylhydrazine is unstable and is reported as azobenzene.
3. N-nitrosodiphenylamine cannot be separated from diphenylamine.
4. 3-Methylphenol and 4-Methylphenol are unresolvable compounds.
5. m-Xylene and p-Xylene are unresolvable compounds.
6. The reporting limits for Appendix II/IX compounds by method 8270 are based on EPA estimated PQLs referenced in 40 CFR Part 264, Appendix IX. They are not always achievable for every compound and are matrix dependent.



Page _____ of _____



1000001882

COOLER INSPECTION



Received: 09/24/2009 09:44
Delivery Method: UPS
Opened By: Erin R Porter
Comments:

Login(s): L09090508

Cooler(s)

Cooler #	Temp Gun	Temp	Tracking #	COC #	Comments
0014077	G	3.0	J2142821050	09971 09972	
0014078	G	3.0	J2142821041	09971 09972	

1	Yes	Were shipping coolers sealed?
2	Yes	Were custody seals intact?
3	Yes	Were cooler temperatures in range of 0-6?
4	Yes	Was ice present?
5	Yes	Were COC's received/information complete/signed and dated?
6	Yes	Were sample containers and labels intact and match COC?
7	Yes	Were the correct containers and volumes received?
8	Yes	Were correct preservatives used? (water only)
9	Yes	Were pH ranges acceptable? (voa's excluded)
10	NA	Were VOA samples free of headspace (<6mm)?
11	Yes	Were samples received within EPA hold times?

Look closer. Go further. Do more.

Microbac - Ohio Valley Division
158 Starlite Drive
Marietta, OH 45750
Tel: (740)373-4071 Fax: (740)373-4835

Internal Chain of Custody Report

Login: L09090508**Account:** 2736**Project:** 2736.006**Samples:** 25**Due Date:** 08-OCT-2009

Samplenum **Container ID** **Products**
L09090508-01 617421 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:13	JBK	RLK
3	STORE	WET	A2	28-SEP-2009 09:21	RLK	HJR

Samplenum **Container ID** **Products**
L09090508-01 617422 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:10	DLP	JKT
3	STORE	WET	A2	25-SEP-2009 15:55	RLK	DLP

Samplenum **Container ID** **Products**
L09090508-02 617423 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:13	JBK	RLK
3	STORE	WET	A2	28-SEP-2009 09:21	RLK	HJR

Samplenum **Container ID** **Products**
L09090508-02 617424 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:10	DLP	JKT
3	STORE	WET	A2	25-SEP-2009 15:55	RLK	DLP

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09090508

Account: 2736

Project: 2736.006

Samples: 25

Due Date: 08-OCT-2009

Samplenum **Container ID** **Products**
L09090508-03 617425 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:13	JBK	RLK
3	STORE	WET	A2	28-SEP-2009 09:20	RLK	HJR

Samplenum **Container ID** **Products**
L09090508-03 617426 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:10	DLP	JKT
3	STORE	WET	A2	25-SEP-2009 15:55	RLK	DLP

Samplenum **Container ID** **Products**
L09090508-04 617427 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:13	JBK	RLK
3	STORE	WET	A2	28-SEP-2009 09:21	RLK	HJR

Samplenum **Container ID** **Products**
L09090508-04 617428 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:10	DLP	JKT
3	STORE	WET	A2	25-SEP-2009 15:54	RLK	DLP

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09090508

Account: 2736

Project: 2736.006

Samples: 25

Due Date: 08-OCT-2009

Samplenum **Container ID** **Products**
L09090508-05 617429 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:13	JBK	RLK
3	STORE	WET	A2	28-SEP-2009 09:21	RLK	HJR

Samplenum **Container ID** **Products**
L09090508-05 617430 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:10	DLP	JKT
3	STORE	WET	A2	25-SEP-2009 15:54	RLK	DLP

Samplenum **Container ID** **Products**
L09090508-06 617431 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:13	JBK	RLK
3	STORE	WET	A2	28-SEP-2009 09:21	RLK	HJR

Samplenum **Container ID** **Products**
L09090508-06 617432 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:10	DLP	JKT
3	STORE	WET	A2	25-SEP-2009 15:55	RLK	DLP

Samplenum **Container ID** **Products**
L09090508-07 617433 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:13	JBK	RLK

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09090508

Account: 2736

Project: 2736.006

Samples: 25

Due Date: 08-OCT-2009

Samplenum **Container ID** **Products**
L09090508-07 617434 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:11	DLP	JKT
3	STORE	WET	A2	25-SEP-2009 15:55	RLK	DLP

Samplenum **Container ID** **Products**
L09090508-08 617435 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:13	JBK	RLK
3	STORE	WET	A2	28-SEP-2009 09:21	RLK	HJR

Samplenum **Container ID** **Products**
L09090508-08 617436 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:11	DLP	JKT
3	STORE	WET	A2	25-SEP-2009 15:55	RLK	DLP

Samplenum **Container ID** **Products**
L09090508-09 617437 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:13	JBK	RLK
3	STORE	WET	A2	28-SEP-2009 09:21	RLK	HJR

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09090508

Account: 2736

Project: 2736.006

Samples: 25

Due Date: 08-OCT-2009

Samplenum **Container ID** **Products**
L09090508-09 617438 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:11	DLP	JKT
3	STORE	WET	A2	25-SEP-2009 15:54	RLK	DLP

Samplenum **Container ID** **Products**
L09090508-10 617439 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:13	JBK	RLK
3	STORE	WET	A2	28-SEP-2009 09:21	RLK	HJR

Samplenum **Container ID** **Products**
L09090508-10 617440 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:11	DLP	JKT
3	STORE	WET	A2	25-SEP-2009 15:54	RLK	DLP

Samplenum **Container ID** **Products**
L09090508-11 617441 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:13	JBK	RLK
3	STORE	WET	A2	28-SEP-2009 09:21	RLK	HJR

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09090508

Account: 2736

Project: 2736.006

Samples: 25

Due Date: 08-OCT-2009

Samplenum **Container ID** **Products**
L09090508-11 617442 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:11	DLP	JKT
3	STORE	WET	A2	25-SEP-2009 15:54	RLK	DLP

Samplenum **Container ID** **Products**
L09090508-12 617443 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:13	JBK	RLK
3	STORE	WET	A2	28-SEP-2009 09:22	RLK	HJR

Samplenum **Container ID** **Products**
L09090508-12 617444 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:11	DLP	JKT
3	STORE	WET	A2	25-SEP-2009 15:55	RLK	DLP

Samplenum **Container ID** **Products**
L09090508-13 617445 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:13	JBK	RLK
3	STORE	WET	A2	28-SEP-2009 09:22	RLK	HJR

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09090508

Account: 2736

Project: 2736.006

Samples: 25

Due Date: 08-OCT-2009

Samplenum **Container ID** **Products**
L09090508-13 617446 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:10	DLP	JKT
3	STORE	WET	A2	25-SEP-2009 15:55	RLK	DLP

Samplenum **Container ID** **Products**
L09090508-14 617447 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:13	JBK	RLK
3	STORE	WET	A2	28-SEP-2009 09:21	RLK	HJR

Samplenum **Container ID** **Products**
L09090508-14 617448 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:10	DLP	JKT
3	STORE	WET	A2	25-SEP-2009 15:55	RLK	DLP

Samplenum **Container ID** **Products**
L09090508-15 617449 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:13	JBK	RLK
3	STORE	WET	A2	28-SEP-2009 09:21	RLK	HJR

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09090508

Account: 2736

Project: 2736.006

Samples: 25

Due Date: 08-OCT-2009

Samplenum **Container ID** **Products**
L09090508-16 617450 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:13	JBK	RLK
3	STORE	WET	A2	28-SEP-2009 09:21	RLK	HJR

Samplenum **Container ID** **Products**
L09090508-17 617451 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:13	JBK	RLK
3	STORE	WET	A2	28-SEP-2009 09:21	RLK	HJR

Samplenum **Container ID** **Products**
L09090508-18 617452 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:13	JBK	RLK
3	STORE	WET	A2	28-SEP-2009 09:22	RLK	HJR

Samplenum **Container ID** **Products**
L09090508-19 617453 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:13	JBK	RLK
3	STORE	WET	A2	28-SEP-2009 09:22	RLK	HJR

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09090508

Account: 2736

Project: 2736.006

Samples: 25

Due Date: 08-OCT-2009

Samplenum **Container ID** **Products**
L09090508-19 617454 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:10	DLP	JKT
3	STORE	WET	A2	25-SEP-2009 15:55	RLK	DLP

Samplenum **Container ID** **Products**
L09090508-20 617455 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:13	JBK	RLK
3	STORE	WET	A2	28-SEP-2009 09:21	RLK	HJR

Samplenum **Container ID** **Products**
L09090508-20 617456 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:10	DLP	JKT
3	STORE	WET	A2	25-SEP-2009 15:55	RLK	DLP

Samplenum **Container ID** **Products**
L09090508-21 617457 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:13	JBK	RLK
3	STORE	WET	A2	28-SEP-2009 09:22	RLK	HJR

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09090508

Account: 2736

Project: 2736.006

Samples: 25

Due Date: 08-OCT-2009

Samplenum **Container ID** **Products**
L09090508-21 617458 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:10	DLP	JKT
3	STORE	WET	A2	25-SEP-2009 15:55	RLK	DLP

Samplenum **Container ID** **Products**
L09090508-22 617459 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:13	JBK	RLK
3	STORE	WET	A2	28-SEP-2009 09:21	RLK	HJR

Samplenum **Container ID** **Products**
L09090508-22 617460 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:10	DLP	JKT
3	STORE	WET	A2	25-SEP-2009 15:55	RLK	DLP

Samplenum **Container ID** **Products**
L09090508-23 617461 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:13	JBK	RLK
3	STORE	WET	A2	28-SEP-2009 09:22	RLK	HJR

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09090508

Account: 2736

Project: 2736.006

Samples: 25

Due Date: 08-OCT-2009

Samplenum **Container ID** **Products**
L09090508-23 617462 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:10	DLP	JKT
3	STORE	WET	A2	25-SEP-2009 15:54	RLK	DLP

Samplenum **Container ID** **Products**
L09090508-24 617463 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:13	JBK	RLK
3	STORE	WET	A2	28-SEP-2009 09:21	RLK	HJR

Samplenum **Container ID** **Products**
L09090508-24 617464 NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:10	DLP	JKT
3	STORE	WET	A2	25-SEP-2009 15:54	RLK	DLP

Samplenum **Container ID** **Products**
L09090508-25 617465 CL

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:13	JBK	RLK
3	STORE	WET	A2	28-SEP-2009 09:21	RLK	HJR

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



Internal Chain of Custody Report

Login: L09090508**Account:** 2736**Project:** 2736.006**Samples:** 25**Due Date:** 08-OCT-2009

<u>Samplenum</u>	<u>Container ID</u>	<u>Products</u>
L09090508-25	617466	NH3

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	24-SEP-2009 13:38	ERE	
2	ANALYZ	W1	WET	25-SEP-2009 08:10	DLP	JKT
3	STORE	WET	A2	25-SEP-2009 15:55	RLK	DLP

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login

