SEMI-ANNUAL STATUS REPORT NO. 4

OLIN CHEMICAL SUPERFUND SITE

51 EAMES STREET
WILMINGTON, MASSACHUSETTS

Submitted to:
United States Environmental Protection Agency
Region I – New England
One Congress Street
Boston, Massachusetts 02114

Submitted by:
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Project No. 6107-09-0016/05

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for Peter Thompson
Project Manager *with permission*

Michael J. Murphy
Project Principal

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TABLE OF CONTENTS

1.0 INTRODUCTION 1-1

2.0 SLURRY WALL/CAP 2-1

2.1 GROUNDWATER 2-1
2.2 SURFACE WATER 2-4
2.3 SEDIMENT 2-6
2.4 DATA LOGGER DATA 2-6
2.5 TEMPORARY CAP INSPECTIONS 2-7

3.0 PLANT B 3-1

3.1 GROUNDWATER 3-2
3.2 LIGHT NON-AQUEOUS PHASE LIQUID 3-3

4.0 DAPL EXTRACTION PILOT TEST DESIGN 4-1

4.1 DESIGN SCHEDULE AND PROGRESS 4-1
4.2 DESIGN STATUS 4-1

5.0 ADDITIONAL ACTIVITIES 5-1

5.1 SUBMITTALS AND MEETINGS 5-1
5.2 RESIDENTIAL DRINKING WATER SAMPLING 5-2

6.0 REFERENCES 6-1

TABLES

FIGURES

APPENDICES

List of Tables

Table 2-1 Slurry Wall/Cap Analytical Results for Fourth Quarter 2008 Groundwater Sampling
Table 2-2 Slurry Wall/Cap Analytical Results for First Quarter 2009 Groundwater Sampling
Table 2-3 Slurry Wall/Cap Analytical Results for Fourth Quarter 2008 Surface Water Sampling
Table 2-4 Slurry Wall/Cap Analytical Results for First Quarter 2009 Surface Water Sampling
Table 2-5 Slurry Wall/Cap Analytical Results for Fourth Quarter 2008 Sediment Sampling

Table 3-1 Plant B Analytical Results for Monthly RGP Sampling (October 2008 – March 2009)
Table 3-2 Plant B Analytical Results for Fourth Quarter 2008 Groundwater Sampling
Table 3-3 Plant B Analytical Results for First Quarter 2009 Groundwater Sampling
Table 3-4 Plant B Water Level and Product Recovery Data: October 2008 – December 2008
Table 3-5 Plant B Water Level and Product Recovery Data: January 2009 – March 2009

List of Figures

Figure 1-1 Site Location
Figure 1-2 Site Plan

Figure 2-1 Slurry Wall/Cap Interpreted Water Level Contours – Fourth Quarter 2008
Figure 2-2 Slurry Wall/Cap Interpreted Water Level Contours – First Quarter 2009

Figure 3-1 Plant B Interpreted Water Level Conditions – October 31, 2008
Figure 3-2 Plant B Interpreted Water Level Conditions – December 2, 2008
Figure 3-3 Plant B Interpreted Water Level Conditions – December 30, 2008
Figure 3-4 Plant B Interpreted Water Level Conditions – February 2, 2009
Figure 3-5 Plant B Interpreted Water Level Conditions – February 27, 2009
Figure 3-6 Plant B Interpreted Water Level Conditions – April 1, 2009
Figure 3-7 Plant B Interpreted LNAPL Thickness Contours – October 31, 2008
Figure 3-8 Plant B Interpreted LNAPL Thickness Contours – December 2, 2008
Figure 3-9 Plant B Interpreted LNAPL Thickness Contours – December 30, 2008
Figure 3-10 Plant B Interpreted LNAPL Thickness Contours – February 2, 2009
Figure 3-11 Plant B Interpreted LNAPL Thickness Contours – February 27, 2009
Figure 3-12 Plant B Interpreted LNAPL Thickness Contours – April 1, 2009
Figure 3-13 Monthly and Cumulative LNAPL Recovery
Figure 3-14 Water Levels (WL) and Monthly LNAPL Recovery

List of Appendices

Appendix A Interim Response Steps Field Activity Reports
- A-1 Fourth Quarter 2008 Sampling Event
- A-2 First Quarter 2009 Sampling Event

Appendix B Data Validation Memorandum
- B-1 Fourth Quarter 2008 Sampling Event
- B-2 First Quarter 2009 Sampling Event

Appendix C Weir Monthly Inspection Reports: October 2008 – March 2009

Appendix D Slurry Wall/Cap Groundwater, Surface Water, and Sediment Quality Time Series Plots
- D-1 Groundwater (Aluminum, Ammonia, Chloride, Chromium, Sulfate)
- D-2 Surface Water (Aluminum, Ammonia, Chloride, Chromium, Sulfate)
- D-3 Sediment (Aluminum, Chromium, Iron)

Appendix E Slurry Wall/Cap Data Logger Water Level Plots

GLOSSARY OF ACRONYMS

AS/SVE	air sparging/soil vapor extraction
BEHP	bis(2-ethylhexyl)phthalate
DAPL	dense aqueous phase liquid
FS	Feasibility Study
IRA	Immediate Response Action
IRS	Interim Response Steps
IRSWP	Interim Response Steps Work Plan
ISCO	In-situ Chemical Oxidation
LNAPL	light non-aqueous phase liquid
MACTEC	MACTEC Engineering and Consulting, Inc.
MassDEP	Massachusetts Department of Environmental Protection
MBTA	Massachusetts Bay Transit Authority
MCP	Massachusetts Contingency Plan
MS/MSD	Matrix Spike/Matrix Spike Duplicate
NDMA	N-nitrosodimethylamine
NDPA	N-nitrosodiphenylamine
Olin	Olin Corporation
off-PWD	off-Property West Ditch
QA/QC	Quality Assurance/Quality Control
RAM	Release Abatement Measure
RGP	Remediation General Permit
RI/FS	Remedial Investigation and Feasibility Study
SASR	Semi-Annual Status Report
Site	The Olin Chemical Superfund Site
SVOC	semi-volatile organic compound
USEPA	United States Environmental Protection Agency
UV	ultraviolet
VOC	volatile organic compound
VPH	volatile petroleum hydrocarbon

1.0 INTRODUCTION

This Semi-Annual Status Report (SASR) has been prepared for the Olin Chemical Superfund Site (the Site) in Wilmington, Massachusetts, on behalf of Olin Corporation (Olin) by MACTEC Engineering and Consulting, Inc. (MACTEC). The SASR has been prepared consistent with Section II.C. of the Statement of Work, Remedial Investigation and Feasibility Study (RI/FS), Olin Chemical Superfund Site, prepared by the United States Environmental Protection Agency (USEPA) Region I – New England and dated June 2007 (USEPA, 2007a). This SASR summarizes the field activities that have occurred between October 2008 and March 2009 and presents monitoring data and analytical results including groundwater and surface water data from the Slurry Wall/Cap and Plant B monitoring programs for the fourth quarter of 2008 and first quarter of 2009. Sediment data were collected only in the fourth quarter of 2008. Consistent with resolution of USEPA Comment No. 1 on SASR No. 2, (see Section 5.0), this report transmits validated data for the fourth quarter of 2008 and first quarter 2009 sampling events and the field data reports for those sampling events. The next SASR (No. 5) will include the second and third quarter 2009 field data reports and validated analytical data for those periods.

The Site includes, but is not limited to, the property at 51 Eames Street, Wilmington, Massachusetts. The Site location is presented in **Figure 1-1**. The approximately 50-acre property is the Site of a former chemical manufacturing plant, which was purchased by Olin in 1980. **Figure 1-2** is a Site plan that identifies the three areas that are described in the Interim Response Steps Work Plan (IRSWP) including Slurry Wall/Cap Containment Area, Plant B, and the off-Property West Ditch (off-PWD) area. This SASR discusses field and design activities for those three areas which are ongoing Interim Response Steps (IRS) as described in the IRSWP.

The three specific IRSs are summarized below and include:

- Slurry Wall/Cap – monitoring of groundwater, surface water, and sediment in the area surrounding the Slurry Wall and inspection of the temporary cap;
- Plant B – operation, maintenance, and monitoring of the groundwater recovery/treatment system that was designed to remove and control migration of light non-aqueous phase liquid (LNAPL); and
- Dense Aqueous Phase Liquid (DAPL) Extraction Pilot Test – design, installation and operation of a pilot study to evaluate the efficacy of DAPL extraction in the off-PWD Area.

Each of these IRSs has specific objectives and each was initiated to address previously completed or planned future remedial actions. General descriptions of each of the IRSs are presented in the following paragraphs.

The Slurry Wall/Cap is a containment structure that was constructed in 2000 as a Release Abatement Measure (RAM) consistent with the Massachusetts Contingency Plan (MCP). The intent of this source control action was to eliminate, to the extent feasible, the on-Property DAPL source material as a source of dissolved constituents to groundwater. The containment structure is comprised of a perimeter slurry wall keyed into bedrock and a temporary cap to minimize infiltration of precipitation into the containment area. Construction of the slurry wall was preceded by a pre-design boring program to determine the depth to bedrock. The slurry wall contains, to the maximum extent practicable, the on-Property DAPL and overlying groundwater located within the containment structure. Along the northern, eastern, and southern portions of the slurry wall, the DAPL contained within the perimeter of the slurry wall is at an elevation below the point where the slurry wall is keyed into bedrock. On the western, upgradient side of the slurry wall, a gravel equalization window was constructed in the top of the slurry wall to maintain equal hydraulic pressure between groundwater inside and outside of the containment structure. The temporary cap is a scrim reinforced polyethylene sheet cover held in place by sandbags. The physical condition of the temporary cap has been routinely inspected to identify areas where repairs are necessary. Monitoring of groundwater quality within and around the perimeter of the containment structure and monitoring of surface water quality in the adjacent surface water features (South Ditch and off-PWD) has been conducted since construction of the Slurry Wall/Cap to characterize the long-term effect of this source control measure.

The Plant B groundwater recovery/treatment system has been in operation and its performance has been monitored since 1981 with continued operation from 1997 until 2007 as an Immediate Response Action (IRA) and since 2007 until present as an IRS. The system was installed in response to the seepage of LNAPL into the East Ditch, located at the eastern perimeter of the former facility property. The LNAPL is a processing oil that contains bis(2-ethylhexyl)phthalate (BEHP), N-nitrosodiphenylamine (NDPA), and trimethylpentenes. The system was designed to create a groundwater cone of depression to prevent migration of the LNAPL and allow for mechanical removal of the material. During its operation, various in-situ technologies have also been applied to enhance removal of LNAPL and dissolved phase constituents, including air

sparging/soil vapor extraction (AS/SVE) and bio-stimulation. These additional measures were applied successfully and resulted in a large increase in the rate of contaminant mass removal. The cumulative effect of these remedial measures has been to remove the majority of recoverable LNAPL from the subsurface. As a result, the LNAPL recovery rate has remained low, warranting evaluation of the efficacy of further LNAPL recovery efforts. Groundwater extracted during operation of the system is treated to remove iron and ammonia as well as dissolved organic compounds. The treated groundwater is discharged to surface water on the former facility property in compliance with a Remediation General Permit (RGP). Visual observations of the East Ditch, LNAPL gauging in monitoring and interceptor wells, sampling and analysis of the treatment system influent and effluent, and groundwater monitoring have been components of the monitoring program for Plant B.

The DAPL Extraction Pilot Test (Pilot Test) is planned to determine the feasibility of extraction and off-Site disposal of DAPL from the area immediately to the west of the Slurry Wall/Cap containment area (in the vicinity of the off-PWD). The DAPL pool in this area is a source of dissolved constituents to groundwater, some of which flows toward and discharges, in part, to the Upper South Ditch, located on the former facility property. The Pilot Test will be conducted at the off-PWD area to evaluate the technical feasibility of DAPL extraction. The Pilot Test will include the extraction and off-Site disposal of DAPL material and completion of a monitoring program to document existing groundwater conditions prior to start up, as well as, monitoring of groundwater conditions throughout the Pilot Test. The results of the Pilot Test will be used in the Feasibility Study (FS) to support evaluation of remedial alternatives.

The scope of this SASR includes presentation of the results of surface water, groundwater and sediment sampling and analysis and a tabulation of water level data and reporting of progress for the DAPL Extraction Pilot Test. For the Slurry Wall/Cap and Plant B, this SASR provides a tabulation of analytical data that have been validated to date for the sampling events within the monitoring period of the report, including the fourth quarter 2008 and first quarter 2009 sampling events. This report provides a general discussion concerning whether these data are consistent with prior results. For Plant B, this SASR also includes a tabulation of the monthly water level and LNAPL recovery data and plots of interpreted groundwater levels and LNAPL thickness for the past six months (October 2008 to March 2009). In addition, this report documents the field activities which are summarized in the field activity reports for each sampling event (including the fourth quarter 2008 and first quarter 2009 events) for the Slurry Wall/Cap and Plant B which

are included in **Appendix A**. These reports describe the sampling event and present figures and tables concerning:

- Locations sampled and the analytical program;
- Final field parameters for groundwater and surface water sampling;
- Groundwater elevations;
- Field instrument calibration records;
- Field data records;
- Chain of custody records; and
- Temporary cap inspection results.

This SASR is organized as follows:

Section 1.0 – Introduction

Section 2.0 – Slurry Wall/Cap

Section 3.0 – Plant B

Section 4.0 – DAPL Extraction Pilot Test

Section 5.0 – Additional Activities

Section 6.0 – References

Appendix A – Interim Response Steps Field Activity Reports

A-1 Fourth Quarter 2008 Sampling Event
A-2 First Quarter 2009 Sampling Event

Appendix B – Data Validation Memorandums

B-1 Fourth Quarter 2008 Sampling Event
B-2 First Quarter 2009 Sampling Event

Appendix C – Weir Monthly Inspection Reports: October 2008 – March 2009

Appendix D – Slurry Wall/Cap Groundwater and Surface Water Quality Time Series Plots

D-1 Groundwater (Aluminum, Ammonia, Chloride, Chromium, Sulfate)
D-2 Surface Water (Aluminum, Ammonia, Chloride, Chromium, Sulfate)
D-3 Sediment (Aluminum, Chromium, Iron)

Appendix E – Slurry Wall/Cap Data Logger Water Level Plots

2.0 SLURRY WALL/CAP

The following sections present results of chemical analysis for groundwater, surface water, and sediment during the fourth quarter 2008 and first quarter 2009 sampling events. Consistent with the IRSWP, sediment sampling and analysis was conducted in the fourth quarter 2008 only. Groundwater level data for the fourth quarter 2008 and first quarter 2009 are presented in the field activity reports contained in **Appendices A-1 and A-2**. The data validation reports for the fourth quarter 2008 and first quarter 2009 sampling events are provided in **Appendices B-1 and B-2**, respectively.

In addition to the quarterly sampling conducted in accordance with the IRSWP, Olin personnel conducted weekly observations of the weir and South Ditch and recorded observations concerning wildlife, surface water conditions, and flocculent accumulation. These reports are reviewed by MACTEC and compiled as a monthly report. The monthly reports from October 2008 through March 2009 are attached in **Appendix C**.

2.1 GROUNDWATER

Groundwater sampling and analysis for the fourth quarter 2008 sampling event was completed on November 19-21, 2008. The first quarter 2009 sampling event was completed on February 24-25, 2009.

The fourth quarter 2008 sampling event included groundwater sample collection from 17 monitoring wells (GW-10S, GW-24, GW-25, GW-26, GW-34SR, GW-34D, GW-35S, GW-39, GW-42S, GW-55S, GW-76S, GW-78S, GW-79S, GW-201S, GW-202S, GW-202D, and GW-CA1) and three piezometers (PZ-16RR, PZ-17RR, and PZ-18R) located along the South Ditch. Quality Assurance/Quality Control (QA/QC) samples included two field duplicates and one matrix spike/matrix spike duplicate (MS/MSD). The first quarter 2009 sampling event included groundwater sample collection from five monitoring wells (GW-25, GW-78S, GW-79S, GW-202S, and GW-202D) and two piezometers (PZ-17RR and PZ-18R). PZ-16RR was inaccessible due to ice conditions in the ditch.

The sample locations, details of sampling, and the analytical program are contained in the field activity reports. Field activity reports for the fourth quarter 2008 and first quarter 2009 sampling

events are contained in **Appendices A-1 and A-2**, respectively. The field activity reports also contain tabulated final field parameter measurements collected at the time of sampling, sample collection field data records, and instrument calibration records. Groundwater samples were analyzed by the laboratory for ammonia nitrogen, chloride, sulfate, and specific conductance, and filtered samples were analyzed for aluminum and chromium.

Table 2-1 summarizes analytical results of groundwater samples collected during the fourth quarter 2008 groundwater sampling event. **Table 2-2** summarizes analytical results from the first quarter 2009 groundwater sampling event. Data validation memoranda from the fourth quarter 2008 and first quarter 2009 sampling events are included in **Appendices B-1 and B-2**, respectively. The November 2008 and February 2009 data validation memos indicated that TestAmerica's results were interpreted as useable as reported by the lab, with the following validation actions/exceptions noted below.

The November 2008 validation memo indicated:

- Aluminum concentrations were noted in the laboratory method blank. An action limit was reported at 5X the blank concentration, and aluminum results below that action limit were qualified as non-detect (U) for seven groundwater samples.
- The relative percent difference for ammonia between the field duplicate (OC-GW-202S DUP) and field groundwater sample (OC-GW-202S) was above the control limit, and ammonia results were qualified estimated (J) for both the field sample and the duplicate.

The February 2009 validation memo indicated:

- Dissolved aluminum was noted in the laboratory method blank associated with surface water samples and one groundwater sample (OC-GW-25). An action limit was reported at 5X the blank concentration, and the aluminum result for sample OC-GW-25 was qualified as non-detect (U).
- The percent recovery of chloride in the MS/MSD associated with surface water and groundwater samples was lower than the project limit. Results for chloride in all surface water and groundwater samples were qualified estimated (J).

Appendix D-1 presents time series groundwater concentration plots for aluminum, ammonia, chloride, chromium, specific conductance, and sulfate from the south, southeast, west, and north

areas surrounding the containment structure. These plots include the data from the fourth quarter 2008 and first quarter 2009 sampling events.

The analytical results for metals and inorganic parameters for groundwater samples collected from GW-10S, GW-201S, GW-25, GW-34D, GW-34SR, GW-35, GW-39, GW-42S, GW-55S, GW-76S, GW-78S, GW-CA1, and PZ-16RR are consistent with historical data and are within historical ranges, with a few exceptions. Along the west side of the Containment Area, the concentrations of chloride, sulfate, and specific conductance in groundwater from GW-24 and sulfate and specific conductance in groundwater from GW-26 have declined gradually over the past 10 years (**Appendix D-1, Figures D-1.15, D.1.19, and D-1.23**). On the south side of the Containment Area, recent analytical results for groundwater samples collected from GW-202D were above historical concentrations for filtered aluminum **(Figure D-1.1)**, filtered chromium (**Figure D-1.5**), ammonia (**Figure D-1.9**), and sulfate (**Figure D-1.17**) but within historical concentration ranges for chloride (**Figure D-1.13**) and specific conductance (**Figure D-1.21**). There has been a progressive decrease in pH for groundwater samples collected from GW-202D (from a pH of 5.8 in November 2007 to a pH of 4.5 in February 2009). The concentration of ammonia in groundwater samples collected from GW-202S and GW-79S mimic the general pattern of concentration changes in GW-202D, although ammonia concentrations in these wells may not be increasing overall (**Figure D-1.9**). The concentrations of ammonia have increased over the past three monitoring events in PZ-17RR and PZ-18R (**Figure D-1.9**). Sulfate and specific conductance show a similar pattern in shallow groundwater samples from these piezometers (**Figures D-1.17 and D-1.21**). PZ-18R and PZ-17RR monitor the discharging groundwater beneath the South Ditch. In addition to the continued monitoring under the IRSWP, additional monitoring of wells in the South Ditch area will be conducted as part of the OU3 RI program and will include a comprehensive suite of analytical parameters. Collectively, these data will be further evaluated in the RI/FS process.

Groundwater levels were collected from 18 groundwater monitoring wells and five piezometers prior to each sampling event. These wells include the 17 well locations and three piezometers sampled for chemical analysis, one additional monitoring well (MW-55D), and two additional piezometers (PZ-24 and PZ-25). Water level measurements are tabulated in **Appendices A-1 and A-2**. These measurements and the interpreted groundwater potentiometric surfaces are also depicted on **Figures 2-1 and 2-2**.

The water levels and interpreted groundwater potentiometric surface for both periods indicate shallow groundwater along the west side of the Containment Area flows south and then around the southern sides of the Containment Area which is consistent with prior data (**Figures 2-1 and 2-2**). Groundwater elevation in the northern most well (GW-34SR) is higher than wells to the west, indicating a flow component from the north to the west and the north to the east during the measurement periods which is consistent with prior data. Along the south side of the Slurry Wall, shallow groundwater flows toward the Upper South Ditch. In general, the presence of the Slurry Wall forces groundwater to flow around the Containment Area from north and west to the south and to east.

Vertical gradients from shallow to deep overburden groundwater were downward north of the Containment Area (GW-34SR and GW-34D) during both monitoring periods (see water level data posted on **Figures 2-1 and 2-2, Appendix A**) which is consistent with prior reporting periods. Near the South Ditch, vertical groundwater gradients from deeper to shallow overburden groundwater (GW-202S and GW-202D) were upward during both monitoring periods consistent with recent monitoring data. The water levels elevation in GW-202D are higher than in the nearby stream piezometers, PZ-18R and PZ-17RR, indicating the potential for capture of deeper overburden groundwater within the Upper South Ditch. During the February 2009 sampling event, water in the stand pipe of monitoring wells in Ephemeral drainage (GW-55S and GW-55D) and PZ-16RR in the South Ditch was frozen, and water levels could not be measured (noted as NM on **Figure 2-2**).

2.2 SURFACE WATER

The fourth quarter 2008 and first quarter 2009 sampling events included surface water sample collection from seven locations: ISCO1, ISCO2, ISCO3, PZ-16RR, PZ-17RR, PZ-18R, and SD-17. Unfiltered samples were analyzed by the lab for aluminum, chromium, sodium, ammonia nitrogen, chloride, nitrate, nitrite, sulfate, and specific conductance. In addition, filtered surface water samples were collected and analyzed for metals (aluminum, chromium, and sodium). QA/QC samples included one MS/MSD. The sample locations, details of sampling, and the analytical program are contained in the field activity reports. It should be noted that surface water sample ISCO-3 was collected at the confluence of the East Ditch and South Ditch (not at its historical location which is in the East Ditch upstream of the confluence of the South Ditch and East Ditch). Field activity reports for the fourth quarter 2008 and first quarter 2009 sampling events are contained in **Appendices A-1 and A-2**, respectively and contain sample location figures.

Table 2-3 presents analytical results for the fourth quarter 2008 surface water sampling event, and **Table 2-4** presents the analytical results for the first quarter 2009 surface water sampling event.

The November 2008 and February 2009 data validation memos for surface water are included in **Appendix B** and concluded that TestAmerica's results were useable as reported by the lab, with the following validation actions/exceptions noted below.

The November 2008 validation memo indicated:

- Chromium was reported in the surface water method blank associated with sample OC-ISCO-3. The low concentration of dissolved chromium in OC-ISCO-3 was qualified as non-detect (U).
- Dissolved sodium concentrations in surface water were more than 10 percent greater than the reported total sodium concentrations in four surface water samples (OC-ISCO-2, OC-ISCO-3, OC-SD-17, and OC-PZ-18R). Sodium results were qualified estimated (J) for both the total and dissolved sodium in those four samples.
- The percent recovery for ammonia detected in surface water for MSD (OC-PZ-18R) was below the lower control limit. All ammonia results in surface water were qualified estimated (J).

The February 2009 validation memo indicated:

- Dissolved aluminum was noted in the laboratory method blank associated with the surface water samples and one groundwater sample (OC-GW-25). An action limit was reported at 5X the blank concentration and the aluminum result for sample GW-25 was qualified as non-detect (U).
- The percent recovery of chloride in the MS/MSD associated with surface water and groundwater samples was lower than the project limit. Results for chloride in surface water and groundwater samples from this sampling period were qualified estimated (J).

Appendix D-2 presents time series surface water concentration plots for aluminum, ammonia nitrogen, chloride, chromium, and sulfate from the Upper South Ditch and Lower South Ditch areas. These plots include the data from the fourth quarter 2008 and first quarter 2009 sampling events. The range of detected concentrations and temporal patterns of these metals and inorganic parameters are consistent from Upper South Ditch to Lower South Ditch indicating that the input of these constituents, from groundwater to surface water, occurs primarily in the Upper South Ditch.

The highest concentrations observed in the Lower South Ditch for dissolved aluminum and chromium occurred in November 2008 at location PZ-16RSW. These concentrations were, however, less than the concentrations detected at upstream monitoring points SD-17 and PZ-17RRSW during the same sampling event and indicate some attenuation of dissolved aluminum and chromium.

2.3 SEDIMENT

Sediment samples were collected during the fourth quarter 2008 sampling event from five locations: SD-SD1, SD-SD2, SD-SD3, SD-SD4, and SD-SD5. QA/QC samples included one MS/MSD. These samples were analyzed for aluminum, chromium, iron, percent moisture, and percent solids. **Table 2-5** presents the analytical results for the fourth quarter 2008 sediment sampling.

The November 2008 data validation memo for sediment indicated that TestAmerica's results were interpreted as useable as reported by the lab, with the following validation action/exception noted below.

The November 2008 validation memo indicated:

- A MS/MSD was performed on sample OC-SD-SD3. The percent recovery for chromium detected in sediment in the MS was below the lower control limit. Chromium results from five sediment samples in the sample group were qualified estimated (J).

Appendix D-3 presents time series sediment concentration plots for aluminum, chromium, and iron. These plots include all shallow sediment data (collected between June 2003 and November 2008) for the sampled locations. The analytical results for total aluminum, chromium, and iron are within the historical range of detected concentrations.

2.4 DATA LOGGER DATA

Data loggers were deployed in five monitoring wells (GW-10S, GW-35S, GW-CA1, GW-76S, and GW-78S) to continuously monitor groundwater elevation within and around the Containment Area. **Appendix E** presents time series groundwater elevation plots (**Figure E-1 and Figure E-2**) compared to precipitation data measured at the Site. These plots include groundwater elevations from August 2008 to February 2009 and have been corrected for barometric pressure. The data

acquisition frequency rate is every eight hours (three times a day) to conserve memory since the devices memory was full during prior recovery events. A reprogramming error resulted in loss of data from the data logger deployed in GW-76S for the November 2008 to February 2009 period.

On May 14, 2009, MACTEC increased the data logger data acquisition frequency from once every eight hours to one reading every hour to provide a more detailed data set.

Data plots indicate groundwater within and outside of the Containment Area responds to recharge of the aquifer. Comparison of water levels in GW-35S and GW-CA1 (**Figure E-1**) indicates outward flow through the equalization window from August through September and, subsequently, neutral to inward flow for most of October and November. Comparison of these wells on **Figure E-2** indicates groundwater flow principally out of the Containment Area through the equalization window in December through February. These data are consistent with groundwater elevation data presented in **Figures 2-1 and 2-2**.

2.5 TEMPORARY CAP INSPECTIONS

Inspections of the temporary cap were conducted in November 2008 and March 2009 as part of the fourth quarter 2008 and first quarter 2009 sampling events. USEPA accompanied the inspection in November 2008. Full descriptions of the temporary cap inspections, including observations and necessary repairs completed on the temporary cap, are included in the Field Activity Reports attached in **Appendix A**. Historic repairs completed during previous inspections remain in good condition as of March 2009. Olin instituted use of a new heavy duty tarp repair tape and has repaired all prior repairs that have shown signs of deterioration. In addition, a second variety of repair tape (marine cover repair tape) was acquired, and a side-by-side comparison of the two products is being conducted. Both repair tapes appear to show minimal signs of deterioration as of March 2009.

The general physical condition of the polyethylene cap is good considering its age and service conditions (direct exposure to sunlight and the elements). All observed holes and perforations have been repaired with repair tape, including all well penetrations and the wooden bollards that mark the edge of the slurry wall. The internal drain was inspected, remains clear of vegetation, and is functioning properly. Olin is continuing the program of sand bag replacement.

The polyethylene sheet remains flexible indicating that the ultraviolet (UV) protection provided by the carbon black content continues to protect the polymer from significant UV deterioration. The factory welded seams are intact and the sewn seams show no signs of deterioration. The polyethylene sheet continues to perform its intended function as a temporary cover, and its condition will be monitored through subsequent inspections.

3.0 PLANT B

The following sections present results of chemical analysis of groundwater for the fourth quarter 2008 and first quarter 2009 sampling events. Groundwater level data for the fourth quarter 2008 and first quarter 2009 are presented in field activity reports contained in **Appendices A-1 and A-2**. The data validation reports for the fourth quarter 2008 and first quarter 2009 are provided in **Appendices B-1 and B-2,** respectively.

In addition to the quarterly sampling conducted in accordance with the IRSWP, Olin personnel collected monthly water level, LNAPL thickness, and LNAPL recovery data and sampled the treatment plant influent and effluent in accordance with the RGP. Samples were analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), total metals (iron), ammonia, total phenols, and residual chlorine. The analytical program for the RGP was described in the IRSWP (MACTEC, 2007). The analytical data for the RGP are validated and retained on-Property by Olin in accordance with that permit. A summary table containing Plant B influent and effluent data is presented in **Table 3-1**. The monthly water level and LNAPL thickness data (October 2008 – March 2009) are summarized in the tables and figures of this SASR.

Observations of the East Ditch are made on a daily basis, during normal working days, by Olin staff that operates Plant B. The Plant B Water Treatment Plan Daily Report contains a check box for observation of LNAPL related sheens in the East Ditch. This check box is used if a sheen is observed. Observations are made from the embankment overlooking the East Ditch on a daily basis when the treatment plant is being operated during normal workdays (weekdays). The daily report is an internal Plant B record of operating parameters for the treatment plant. LNAPL related sheens were not been observed from the fourth quarter 2008 through the first quarter 2009.

A staff gauge was previously monitored on a quarterly basis within the East Ditch; however, it has been presumed to have been destroyed (circa 2007) when the Massachusetts Bay Transit Authority (MBTA) completed maintenance activities along the railway. When an agreement has been reached with the MBTA regarding access to the railroad right-of-way, the staff gauge will be re-installed for quarterly monitoring.

3.1 GROUNDWATER

The fourth quarter 2008 sampling event is the annual event (end of year), and groundwater samples were collected from six monitoring or interceptor wells (GW-16R, B-03, GW-101, GW-13, IW-10, and IW-6). The first quarter 2009 sampling event included groundwater sample collection from GW-16R. The groundwater samples were analyzed for trimethylpentenes, NDPA, BEHP, volatile petroleum hydrocarbons (VPHs), ammonia, iron, and pH.

The sample locations, details of sampling, and the analytical program are contained in the field activity reports. Field activity reports for the fourth quarter 2008 and first quarter 2009 sampling events are located in **Appendices A-1 and A-2**, respectively.

Table 3-2 presents analytical results from fourth quarter 2008 groundwater sampling event, and **Table 3-3** summarizes analytical results from the first quarter 2009 sampling event. Data validation reports for the fourth quarter 2008 and first quarter 2009 sampling events are included in **Appendix B**. The November 2008 and February 2009 data validation memos indicated that TestAmerica's results were interpreted as useable, with the following validation actions/exceptions noted below.

The November 2008 data validation memo indicated:

- Dissolved iron concentrations in OC-GW-101 were more than 10 percent greater than the reported total iron concentrations. Iron (total and dissolved) results in sample OC-GW-101 are qualified estimated (J).
- All pH results from groundwater samples were qualified estimated (J) due to the greater than 1X hold time.

The February 2009 data validation memo indicated:

- BEHP was reported in the method blank. An action limit was identified at 10X the blank concentration and the BEHP result for sample OC-GW-16R was qualified as non-detect (U).
- pH results were qualified estimated (J) due to the greater than 1X hold time.

The fourth quarter 2008 and first quarter 2009 analytical results for trimethylpentenes, NDPA, BEHP, VPH, ammonia, iron and pH are consistent with past results.

Groundwater levels are measured by Olin on a monthly frequency in 25 monitoring wells and the three groundwater extraction wells (IW-11, IW-12, and IW-13). If water level probes suggest the presence of LNAPL, the thickness of the LNAPL is measured with an interface probe. The monthly water table elevation data are presented in **Tables 3-4 and 3-5** and in **Figures 3-1 through 3-6** for October 2008 through March 2009.

3.2 LIGHT NON-AQUEOUS PHASE LIQUID

Where present, LNAPL thickness in monitoring and interceptor wells at Plant B is measured on a monthly basis by Olin. The LNAPL layer is extremely thin. The thickness appears to be at the sensitivity of the meter; thus, measurements have shown some variability. A protocol for LNAPL thickness measurement and confirmation of LNAPL presence via visual observation has been developed to address the interpretation of instrument response for what appears to be a very thin LNAPL layer (less than 0.01 feet). The LNAPL thickness measurement data are presented in **Figures 3-7 through 3-12** from October 2008 through March 2009. LNAPL has been observed at least once in the seven observation wells and in two of the three groundwater extractions wells. Measurable LNAPL is consistently observed in GW-23 near the northeast corner of the Plant B foundation. Measurable LNAPL has also been observed frequently in extraction well IW-11. Trace amounts of LNAPL have also been observed in IW-2, IW-12, IW-13, and 12-IN.

The monthly LNAPL recovery data are presented in **Tables 3-4 and 3-5**. The highest monthly amount of LNAPL recovered during this time period was 0.63 gallons in December 2008. The total LNAPL recovered for the October 2008 to March 2009 period was 2.34 gallons and represents a slight decrease in the total LNAPL recovered compared to the previous period. Monthly and cumulative LNAPL recovery data were plotted and summarized in **Figure 3-13**. Groundwater levels relative to monthly LNAPL recovery have been plotted and summarized in **Figure 3-14**.

In general, monthly and cumulative LNAPL recovery data indicate a decreasing LNAPL recovery rate from 2000 to September 2005 then a slightly increasing recovery rate to early 2008 with a general stabilization of the LNAPL recovery rate over 2008. The increase in LNAPL recovery since September 2005 has been accompanied by a gradual increase in groundwater elevation in groundwater extraction wells IW-11 and IW-12. The majority of recovered LNAPL has come from IW-11.

MACTEC has proposed evaluating the effect of pumping rate reductions on LNAPL recovery. The proposed monitoring during this evaluation includes collection of surface water samples in the East Ditch within the MBTA right-of-way. Access to the East Ditch requires a MBTA access agreement which is under negotiation. The pumping rate reduction test will be initiated once an access agreement has been concluded between Olin and the MBTA and proper safety training has been completed.

4.0 DAPL EXTRACTION PILOT TEST DESIGN

This section reports progress on the DAPL Pilot Study design and summarizes communication between Olin and USEPA for the reporting period.

4.1 DESIGN SCHEDULE AND PROGRESS

In a letter dated August 6, 2008, to Olin, USEPA provided conditional approval of the IRSWP. Condition 3 of the approval letter required Olin to modify the design of the DAPL Pilot Study by incorporating a truck loading facility in lieu of the rail car loading facility proposed previously by Olin. Condition 3 also required Olin to provide a draft design report for the truck loading design to USEPA within 45 days of the conditional approval letter. On September 9, 2008, within the 45 day required schedule, MACTEC, on behalf of Olin, provided the requested design report to USEPA electronically.

In a letter dated October 9, 2008, to Olin, USEPA provided conditional approval of the DAPL Pilot Design Report. On October 15, 2008, Olin and USEPA held a telephone conference call to discuss comments contained in the conditional approval letter. The conditional approval required Olin to provide revised drawings and a response to comment letter addressing USEPA comments by October 31, 2008. On October 30, 2008, within the required schedule, MACTEC, on behalf of Olin, provided the requested response to comment letter to USEPA. USEPA requested that Olin provide an updated schedule for implementation of the DAPL Pilot Test. On November 25, 2008, MACTEC, on behalf of Olin, provided a revised schedule to USEPA electronically.

4.2 DESIGN STATUS

A final design has been conditionally approved by USEPA, and that design has been submitted to the property owner. On November 21, 2008, Draft Bid Documents were submitted for Olin internal review. Olin completed the bid document review on December 9, 2008, and initial bids were solicited and received on February 3, 2009. The system was redesigned which effected the overall footprint and cost. Bids for the revised design were solicited and received on March 24, 2009. An award will be made based on these bids unless additional modifications are determined to be necessary. If further modifications are necessary to allow for access, revised bids will be solicited on this new design.

Olin has attempted to expedite town review of the proposed project, but this review cannot proceed until the access agreement has been completed and planning board applications can be submitted under signature by both Olin and the property owner.

Olin will prepare a DAPL Pilot Test Operation, Maintenance and Monitoring Plan upon or prior to completion of construction of the DAPL Pilot Test truck loading facility. The access negotiation has not been completed. Pending completion of the access negotiation, the Site Plans for the design may need to be re-submitted to the Town of Wilmington Planning Board and Board of Appeals prior to rescheduling the Town review process. The time frame of these activities, which must be completed prior to commencing construction, combined with the time frame of construction will be adequate to allow for USEPA review of the Operation, Maintenance and Performance Monitoring Plan. The plan will be prepared in two volumes. One volume will address system operation and maintenance; the other will address performance monitoring activities. Operations and maintenance components of the plan cannot be completed until the access agreement issues are resolved as this has the potential to affect the configuration and operation of the system. The operations and maintenance components will address the physical operation of the pilot facility including description of the alarm sequences, system startup, daily operations, equipment maintenance, and procedures for transfer of DAPL from the storage tank to the tanker trucks and will include manuals for the equipment that is actually installed. The proposed performance monitoring components of the plan (baseline monitoring and DAPL recovery monitoring periods) will remain essentially the same as the draft submitted to the Massachusetts Department of Environmental Protection (MassDEP) in December 2004, and subsequently provided to USEPA. Olin plans to develop a schedule for delivery of these plans and provide it to USEPA for their review at the conclusion of the access agreement process.

5.0 ADDITIONAL ACTIVITIES

Since the last SASR, Olin has submitted the following documents and has summarized meetings and conference calls mentioned below. In addition, residential drinking water samples were collected from several residences within proximity of the Site.

5.1 SUBMITTALS AND MEETINGS

January 20, 2009. Olin responded by letter to USEPA's preliminary comments, dated November 17, 2008, pertaining to the Draft RI/FS Work Plan.

March 19, 2009. On March 12, 2009, USEPA submitted a final comment letter on the Draft Project Operations Plan. Subsequently, on March 19, 2009, Olin and USEPA met to discuss USEPA comments and work through a process to resolve deficiencies in the document identified by USEPA.

March 24, 2009. On March 24, 2009, Olin and MACTEC met with the staff from the Wilmington Department of Planning and Conservation and Board of Health to discuss the town Site plan application and review process for the DAPL Pilot Test.

April 15, 2009. On April 15, 2009, Olin and USEPA held a conference call to discuss Olin's proposed approach to addressing USEPA comments and deficiencies identified in the March 12, 2009, comment letter.

April 30, 2009. On April 30, 2009, Olin submitted a revised RI/FS Work Plan to replace the previously submitted Project Operation Plan. Olin also submitted a written response to USEPA comments dated March 12, 2009.

June 5, 2009. On May 6, 2009, USEPA submitted a comment letter for its review of the SASR No. 3. On June 5, 2009, within the requested timeframe for a response, Olin submitted written responses to that comment letter to USEPA.

5.2 RESIDENTIAL DRINKING WATER SAMPLING

As noted in the previous SASR, on March 18, 2009, MACTEC, USEPA, and Nobis representatives re-sampled residential drinking water at 19 Cook Avenue and 23 Cook Avenue in Wilmington and the samples were submitted for laboratory analysis for hydrazine, SVOCs, N-nitrosodimethylamine (NDMA), and aldehydes. The data have been received from the laboratory and are under review.

6.0 REFERENCES

MACTEC Engineering and Consulting, Inc. (MACTEC), July 25, 2007a. *Interim Response Steps Work Plan*, Olin Chemical Superfund Site, Wilmington, Massachusetts.

MACTEC, December 31, 2007b. *Draft Response to Comments Letter, Draft Interim Response Steps Work Plan*, Olin Chemical Superfund Site, Wilmington, Massachusetts.

MACTEC, January 2, 2008. *Semi-Annual Status Report, Number 1*, Olin Chemical Superfund Site.

MACTEC, June 27, 2008. *Semi-Annual Status Report, Number 2*, Olin Chemical Superfund Site.

MACTEC, December 29, 2008. *Semi-Annual Status Report, Number 3*, Olin Chemical Superfund Site.

Olin Corporation, February 27, 2008. *Second Response to Comments Letter, Draft Interim Response Steps Work Plan*, Olin Chemical Superfund Site, Wilmington, Massachusetts.

Sleeman Hanley & DiNitto, January 16, 2006. *Letter to MassDEP, Seismic Investigation Study and Proposed DAPL Extraction Well Location, Off Property West Ditch (OPWD) DAPL Recovery Prove-Out RAM*. 51 Eames Street Site, Wilmington, MA, RTN 3-0471.

United States Environmental Protection Agency (USEPA), June 2, 2007a. *Statement of Work Remedial Investigation and Feasibility Study*, Olin Chemical Superfund Site. Final.

USEPA, November 2, 2007b. *Review of DRAFT Interim Response Steps Work Plan*, Olin Chemical Superfund Site, Wilmington, Massachusetts.

TABLES

Table 2-1
Slurry Wall/Cap Analytical Results for Fourth Quarter 2008 Groundwater Sampling
Semi-Annual Status Report No. 4
Olin Chemical Superfund Site
Wilmington, Massachusetts

Parameter Name	Frequency of Detection	Range of Reporting Limits for Non-Detects	Range of Detected Concentrations	Average of All Samples	OC-GW-10S 11/19/2008	OC-GW-201S 11/21/2008	OC-GW-202D 11/21/2008	OC-GW-202S 11/21/2008	OC-GW-202S DUP 11/21/2008
Metals, Filtered (mg/L)									
Aluminum	13 / 22	0.1 : 0.1	0.0024 - 8.8	0.6	3.8	0.1 U	8.8	0.1 U	0.1 U
Chromium	18 / 22	0.005 : 0.005	0.0019 - 0.54	0.03	0.005 U	0.012	0.54	0.0037 J	0.0037 J
Inorganics (mg/L)									
Chloride	22 / 22		1.7 - 290	57	35	69	290	62	62
Nitrogen, as Ammonia	22 / 22		0.15 - 300	84	8.8	160	300	120 J	84 J
Specific Conductance **(mS/cm)**	22 / 22		0.089 - 4.6	1	0.41	2.9	4.6	1.6	1.6
Sulfate	22 / 22		9.1 - 1900	471	120	1300	1900	570	560

mg/L - milligrams/liter
mS/cm - milliSiemen/centimeter
U - analyte not detected,
value shown is detection limit.
J - value is estimated

Table 2-1
Slurry Wall/Cap Analytical Results for Fourth Quarter 2008 Groundwater Sampling
Semi-Annual Status Report No. 4
Olin Chemical Superfund Site
Wilmington, Massachusetts

Parameter Name	OC-GW-24 11/19/2008	OC-GW-25 11/19/2008	OC-GW-26 11/19/2008	OC-GW-34D 11/21/2008	OC-GW-34D DUP 11/21/2008	OC-GW-34SR 11/21/2008	OC-GW-35S 11/20/2008	OC-GW-39 11/19/2008	OC-GW-42S 11/17/2008	OC-GW-55S 11/20/2008
Metals, Filtered (mg/L)										
Aluminum	0.1 U	0.0048 J	0.1 U	0.1 U	0.1 U	0.1 U	0.029 J	0.13	0.41	0.54
Chromium	0.005 U	0.0034 J	0.007	0.014	0.014	0.005 U	0.018	0.005 U	0.0085	0.0019 J
Inorganics (mg/L)										
Chloride	8	64	82	7.4	7.5	1.7	5.8	28	61	19
Nitrogen, as Ammonia	52	60	42	15	15	0.34	14	0.15	0.38 J	270
Specific Conductance **(mS/cm)**	0.4	0.8	0.62	0.21	0.2	0.089	1.1	0.73	0.32	3.6
Sulfate	71	170	82	36	35	9.1	480	310	9.3	1400

mg/L - milligrams/liter
mS/cm - milliSiemen/centimeter
U - analyte not detected,
value shown is detection limit.
J - value is estimated

Table 2-1
Slurry Wall/Cap Analytical Results for Fourth Quarter 2008 Groundwater Sampling
Semi-Annual Status Report No. 4
Olin Chemical Superfund Site
Wilmington, Massachusetts

Parameter Name	OC-GW-76S 11/19/2008	OC-GW-78S 11/20/2008	OC-GW-79S 11/20/2008	OC-GW-CA1 11/20/2008	OC-PZ-16RR 11/20/2008	OC-PZ-17RR 11/20/2008	OC-PZ-18R 11/20/2008
Metals, Filtered (mg/L)							
Aluminum	0.0083 J	0.012 J	0.015 J	0.02 J	0.0024 J	0.1 U	0.0049 J
Chromium	0.0022 J	0.0067	0.012	0.0041 J	0.0067	0.002 J	0.017
Inorganics (mg/L)							
Chloride	5.3	25	130	7.3	170	20	100
Nitrogen, as Ammonia	12	74	170	3.1	290	82	65
Specific Conductance **(mS/cm)**	0.22	1.3	2.8	0.66	2.8	1.4	0.93
Sulfate	61	550	1100	110	780	530	180

mg/L - milligrams/liter
mS/cm - milliSiemen/centimeter
U - analyte not detected,
value shown is detection limit.
J - value is estimated

Prepared by / Date: KJC 06/09/09
Checked by / Date: MH 06/11/09

Table 2-2
Slurry Wall/Cap Analytical Results for First Quarter 2009 Groundwater Sampling
Semi-Annual Status Report No. 4
Olin Chemical Superfund Site
Wilmington, Massachusetts

Parameter Name	Frequency of Detection	Range of Reporting Limits for Non-Detects	Range of Detected Concentrations	Average of All Samples	OC-GW-202D 2/25/2009	OC-GW-202S 2/25/2009	OC-GW-25 2/24/2009	OC-GW-78S 2/25/2009	OC-GW-79S 2/25/2009	OC-PZ-17RR 2/25/2009	OC-PZ-18R 2/25/2009
Metals, Filtered (mg/L)											
Aluminum	5 / 7	0.1 : 0.1	0.0046 - 14	2	14	0.1 U	0.1 U	0.0077 J	0.018 J	0.0046 J	0.0046 J
Chromium	7 / 7		0.0029 - 0.94	0.14	0.94	0.0043 J	0.0049 J	0.0055	0.0066	0.0029 J	0.015
Inorganics (mg/L)											
Chloride	7 / 7		17 - 300	104	300 J	50 J	39 J	22 J	170 J	17 J	130 J
Nitrogen, as Ammonia	7 / 7		43 - 360	134	360	99	43	94	190	75	76
Specific Conductance **(mS/cm)**	7 / 7		0.65 - 5.1	2	5.1	1.4	0.65	1.3	3.2	1.4	1
Sulfate	7 / 7		140 - 2000	727	2000	500	140	620	1100	510	220

mg/L - milligrams/liter
mS/cm - milliSiemen/centimeter
U - analyte not detected,
value shown is detection limit.
J - value is estimated

Prepared by / Date: KJC 06/09/09
Checked by / Date: MH 06/11/09

Table 2-3
Slurry Wall/Cap Analytical Results for Fourth Quarter 2008 Surface Water Sampling
Semi-Annual Status Report No. 4
Olin Chemical Superfund Site
Wilmington, Massachusetts

Parameter Name	Frequency of Detection	Range of Reporting Limits for Non-Detects	Range of Detected Concentrations	Average of All Samples	OC-ISCO-1 11/18/2008	OC-ISCO-2 11/18/2008	OC-ISCO-3 11/18/2008	OC-PZ-16RR 11/18/2008	OC-PZ-17RR 11/18/2008	OC-PZ-18R 11/18/2008	OC-SD-17 11/18/2008
Metals, Total (mg/L)											
Aluminum	7 / 7		0.26 - 8.3	3.3	0.26	1.1	1.8	3.5	8.3	0.26	8.2
Chromium	7 / 7		0.044 - 2	0.8	0.044	0.25	0.21	0.86	2	0.045	2
Sodium	7 / 7		54 - 180	120	75	130 J	54 J	160	180	72 J	170 J
Metals, Filtered (mg/L)											
Aluminum	7 / 7		0.039 - 4.6	1.6	0.054 J	0.43	0.039 J	1.9	4.2	0.049 J	4.6
Chromium	7 / 7		0.005 - 1.1	0.4	0.0091	0.13	0.005 U	0.53	1	0.0083	1.1
Sodium	7 / 7		67 - 190	134	81	160 J	67 J	170	190	80 J	190 J
Inorganics (mg/L)											
Chloride	7 / 7		89 - 180	136	89	140	120	150	180	91	180
Nitrate as N	6 / 7	0.05 : 0.05	0.05 - 0.96	0.5	0.05 U	0.83	0.96	0.6	0.36	0.05	0.37
Nitrite as N	0 / 7	0.01 : 0.1			0.01 U	0.01 U	0.01 U	0.01 U	0.1 U	0.01 U	0.1 U
Nitrogen, as Ammonia	7 / 7		3.1 - 150	90	46 J	120 J	3.1 J	120 J	150 J	42 J	150 J
Specific Conductance **(mS/cm)**	7 / 7		0.61 - 2.2	2	0.82	1.9	0.61	2	2.2	0.83	2.2
Sulfate	7 / 7		43 - 710	435	170	610	43	630	700	180	710

mg/L - milligrams/liter
mS/cm - milliSiemen/centimeter
U - not detected,
value is the detection limit
J - value is estimated

Prepared by / Date: KJC 06/09/09
Checked by / Date: MH 06/11/09

Table 2-4
Slurry Wall/Cap Analytical Results for First Quarter 2009 Surface Water Sampling
Semi-Annual Status Report No. 4
Olin Chemical Superfund Site
Wilmington, Massachusetts

Parameter Name	Frequency of Detection	Range of Reporting Limits for Non-Detects	Range of Detected Concentrations	Average of All Samples	OC-ISCO-1 2/24/2009	OC-ISCO-2 2/24/2009	OC-ISCO-3 2/24/2009	OC-PZ-16RRSW 2/24/2009	OC-PZ-17RRSW 2/24/2009
Metals, Total (mg/L)									
Aluminum	7 / 7		0.35 - 3.5	2	0.35	1.3	0.47	3	3.5
Chromium	7 / 7		0.0043 - 0.88	0.41	0.044	0.25	0.0043 J	0.74	0.88
Sodium	7 / 7		90 - 120	103	90	91	91	110	120
Metals, Filtered (mg/L)									
Aluminum	7 / 7		0.039 - 2.2	0.9	0.28	0.8	0.039 J	1.3	2.2
Chromium	7 / 7		0.00038 - 0.44	0.2	0.04	0.16	0.00038 J	0.34	0.44
Sodium	7 / 7		98 - 130	108	98	100	100	120	110
Inorganics (mg/L)									
Chloride	7 / 7		120 - 200	151	140 J	120 J	200 J	150 J	140 J
Nitrate as N	7 / 7		0.4 - 1.1	0.6	0.4	0.81	1.1	0.49	0.48
Nitrite as N	0 / 7	0.01 : 0.1			0.1 U	0.01 U	0.1 U	0.1 U	0.1 U
Nitrogen, as Ammonia	7 / 7		3.3 - 42	27	18	42	3.3	41	34
Specific Conductance **(mS/cm)**	7 / 7		0.73 - 1.1	0.9	0.73	0.9	0.82	1	1
Sulfate	7 / 7		53 - 240	167	94	210	53	240	240

mg/L - milligrams/liter
mS/cm - milliSiemen/centimeter
U - analyte not detected,
value shown is detection limit.
J - value is estimated

Table 2-4
Slurry Wall/Cap Analytical Results for First Quarter 2009 Surface Water Sampling
Semi-Annual Status Report No. 4
Olin Chemical Superfund Site
Wilmington, Massachusetts

Parameter Name	OC-PZ-18RSW 2/24/2009	OC-SD-17 2/24/2009
Metals, Total (mg/L)		
Aluminum	0.37	3.4
Chromium	0.047	0.87
Sodium	100	120
Metals, Filtered (mg/L)		
Aluminum	0.23	1.5
Chromium	0.036	0.39
Sodium	100	130
Inorganics (mg/L)		
Chloride	150 J	160 J
Nitrate as N	0.41	0.45
Nitrite as N	0.1 U	0.1 U
Nitrogen, as Ammonia	17	37
Specific Conductance **(mS/cm)**	0.74	1.1
Sulfate	91	240

mg/L - milligrams/liter
mS/cm - milliSiemen/centimeter
U - analyte not detected,
value shown is detection limit.
J - value is estimated

Prepared by / Date: KJC 06/09/09
Checked by / Date: MH 06/11/09

Table 2-5
Slurry Wall/Cap Analytical Results for Fourth Quarter 2008 Sediment Sampling
Semi-Annual Status Report No. 4
Olin Chemical Superfund Site
Wilmington, Massachusetts

param_name	Frequency of Detection	Range of Reporting Limits for Non-Detects	Range of Detected Concentrations	Average of All Samples	OC-SD-SD1 SD-SD1 11/19/2008	OC-SD-SD2 SD-SD2 11/19/2008	OC-SD-SD3 SD-SD3 11/19/2008	OC-SD-SD4 SD-SD4 11/19/2008	OC-SD-SD5 SD-SD5 11/19/2008
Inorganics (mg/Kg)									
Aluminum	5 / 5		9200 - 15000	11240	11000	15000	9200	10000	11000
Chromium	5 / 5		26 - 620	229	29 J	620 J	130 J	26 J	340 J
Iron	5 / 5		12000 - 23000	15400	14000	23000	12000	14000	14000
Percent Moisture **(%)**	5 / 5		30 - 56	40	43	56	30	38	33
Percent Solids **(%)**	5 / 5		44 - 70	60	57	44	70	62	67

mg/Kg - milligrams/kilogram
J - value is estimated

Prepared by / Date: KJC 06/10/09
Checked by / Date: MH 06/11/09

Table 3-1
Plant B Analytical Results for Monthly RGP Sampling (October 2008 - March 2009)
Semi-Annual Status Report No. 4
Olin Chemical Superfund Site
Wilmington, Massachusetts

Parameter Name	OC - eff 21809 2/18/2009	OC-Eff 101508 10/15/2008	OC-Eff 111908 11/19/2008	OC-Inf 101508 10/15/2008	OC-Inf 111908 11/19/2008
Volatile Organics (mg/L)					
1,1,1-Trichloroethane		0.001 U	0.001 U	0.001 U	0.001 U
1,1-Dichloroethane		0.001 U	0.001 U	0.001 U	0.001 U
2,4,4-Trimethyl-1-pentene		0.001 U	0.001 U	0.057	0.17
2,4,4-Trimethyl-2-Pentene		0.001 U	0.001 U	0.011	0.067
Acetone		0.05 U	0.05 U	0.05 UJ	0.05 U
Benzene		0.001 U	0.001 U	0.001 U	0.001 U
Cis-1,2-Dichloroethene		0.001 U	0.001 U	0.001 U	0.001 U
Ethyl benzene		0.001 U	0.001 U	0.001 U	0.001 U
Naphthalene		0.005 U	0.005 U	0.005 U	0.005 U
Toluene		0.001 U	0.001 U	0.001 U	0.001 U
Trichloroethene		0.001 U	0.001 U	0.001 U	0.001 U
Xylene, m/p		0.002 U	0.002 U	0.002 U	0.002 U
Xylene, o		0.001 U	0.001 U	0.001 U	0.001 U
Semivolatile Organics (mg/L)					
2,4,5-Trichlorophenol		0.0051 U	0.0051 U	0.0051 U	0.0051 U
2,4,6-Trichlorophenol		0.0051 U	0.0051 U	0.0051 U	0.0051 U
2,4-Dichlorophenol		0.0051 U	0.0051 U	0.0051 U	0.0051 U
2,4-Dimethylphenol		0.0051 U	0.0051 U	0.0051 U	0.0051 U
2,4-Dinitrophenol		0.0051 U	0.0051 U	0.0051 U	0.0051 U
2-Chlorophenol		0.0051 U	0.0051 U	0.0051 U	0.0051 U
2-Methylphenol		0.0051 U	0.0051 U	0.0051 U	0.0051 U
2-Nitrophenol		0.0051 U	0.0051 U	0.0051 U	0.0051 U
4,6-Dinitro-2-methylphenol		0.0051 U	0.0051 U	0.0051 U	0.0051 U
4-Chloro-3-methylphenol		0.0051 U	0.0051 U	0.0051 U	0.0051 U
4-Methylphenol		0.0051 U	0.0051 U	0.0051 U	0.0051 U
4-Nitrophenol		0.0051 UJ	0.0051 UJ	0.0051 UJ	0.0051 UJ
Acenaphthene		0.001 U	0.001 U	0.001 U	0.001 U
Acenaphthylene		0.0003 U	0.00031 U	0.00031 U	0.0003 U
Anthracene		0.001 U	0.001 U	0.001 U	0.001 U
Benzo(a)anthracene		0.0003 U	0.00031 U	0.00031 U	0.0003 U
Benzo(a)pyrene		0.0002 U	0.0002 U	0.0002 U	0.0002 U
Benzo(b)fluoranthene		0.0003 U	0.00031 U	0.00031 U	0.0003 U
Benzo(ghi)perylene		0.00051 U	0.00051 U	0.00051 U	0.00051 U
Benzo(k)fluoranthene		0.0003 U	0.00031 U	0.00031 U	0.0003 U
Bis(2-Ethylhexyl)phthalate		0.002 U	0.042 NJ	0.19	0.002 UNJ
Butylbenzylphthalate		0.0051 U	0.0051 U	0.0051 U	0.0051 U
Chrysene		0.001 U	0.001 U	0.001 U	0.001 U
Dibenz(a,h)anthracene		0.00051 U	0.00051 U	0.00051 U	0.00051 U
Diethylphthalate		0.0051 U	0.0051 U	0.0051 U	0.0051 U
Dimethylphthalate		0.0051 U	0.0051 U	0.0051 U	0.0051 U

Table 3-1
Plant B Analytical Results for Monthly RGP Sampling (October 2008 - March 2009)
Semi-Annual Status Report No. 4
Olin Chemical Superfund Site
Wilmington, Massachusetts

Parameter Name	OC - eff 21809 2/18/2009	OC-Eff 101508 10/15/2008	OC-Eff 111908 11/19/2008	OC-Inf 101508 10/15/2008	OC-Inf 111908 11/19/2008
Di-n-butylphthalate		0.0051 U	0.0051 U	0.0051 U	0.0051 U
Di-n-octylphthalate		0.0051 U	0.00037 J	0.00061 J	0.0051 U
Fluoranthene		0.001 U	0.001 U	0.001 U	0.001 U
Fluorene		0.001 U	0.001 U	0.001 U	0.001 U
Indeno(1,2,3-cd)pyrene		0.00051 U	0.00051 U	0.00051 U	0.00051 U
Naphthalene		0.001 U	0.001 U	0.001 U	0.001 U
Pentachlorophenol		0.001 U	0.001 U	0.001 U	0.001 U
Phenanthrene		0.0002 U	0.0002 U	0.0002 U	0.0002 U
Phenol		0.0051 UJ	0.0009 J	0.0006 J	0.0051 UJ
Pyrene		0.0051 U	0.0051 U	0.0051 U	0.0051 U
Metals, Total (mg/L)					
Iron	0.067 J	0.1 U	0.037 J	3.9	4.7
Inorganics (mg/L)					
Chlorine	0.02 UJ	0.02 UJ	0.02 UJ	0.02 UJ	0.02 UJ
Nitrogen, as Ammonia	0.1 U	0.1 U	0.1 U	12	10
pH **(pH units)**	7.56 J	7.7 J	7.65 J	6.7 J	6.65 J
Phenolics, Total Recoverable	0.025 J	0.0072 U	0.024	0.013	0.024
Oil and Grease (mg/L)					
OIL AND GREASE	5.2 U	5.2 U	5.1 U	5.3 U	5.2 U

mg/L - milligrams per liter
U - not detected,
value is the detection limit
J - value is estimated
N - presumptively present

Prepared by / Date: KJC 06/09/09
Checked by / Date: MH 06/11/09

Table 3-2
Plant B Analytical Results for Fourth Quarter 2008 Groundwater Sampling
Semi-Annual Status Report No. 4
Olin Chemical Superfund Site
Wilmington, Massachusetts

Parameter Name	Frequency of Detection	Range of Reporting Limits for Non-Detects	Range of Detected Concentrations	Average of All Samples	OC-B-03 11/24/2008	OC-GW-101 11/24/2008	OC-GW-13 11/24/2008	OC-GW-16 11/24/2008	OC-IW-10 11/24/2008	OC-IW-6 11/24/2008
Volatile Organics (mg/L)										
2,4,4-Trimethyl-1-pentene	3 / 6	0.001 : 0.001	0.16 - 1.3	0.4	0.001 U	0.16	0.001 U	1.3	0.001 U	0.91
2,4,4-Trimethyl-2-Pentene	3 / 6	0.001 : 0.001	0.016 - 0.37	0.09	0.001 U	0.016	0.001 U	0.37	0.001 U	0.15
Semivolatile Organics (mg/L)										
Bis(2-Ethylhexyl)phthalate	4 / 6	0.002 : 0.002	0.00059 - 0.35	0.06	0.0043	0.35	0.002 U	0.00059 J	0.002 U	0.00088 J
N-Nitrosodiphenylamine	5 / 6	0.0051 : 0.0051	0.0011 - 0.38	0.07	0.003 J	0.0057	0.0051 U	0.38	0.0088	0.0011 J
Metals, Total (mg/L)										
Iron	6 / 6		0.073 - 10	4	0.073 J	9 J	0.15	2.9	1.9	10
Metals, Filtered (mg/L)										
Iron	4 / 6	0.1 : 0.1	0.23 - 10	4	0.1 U	10 J	0.1 U	2.6	0.23	8.6
Inorganics (mg/L)										
pH **(s.u.)**	6 / 6		5.75 - 7.41	6.4	5.9 J	6.42 J	5.75 J	6.64 J	7.41 J	6.32 J
Nitrogen, as Ammonia	5 / 6	0.1 : 0.1	0.57 - 23	6	0.64	1.3	0.1 U	9.1	23	0.57
Volatile Petroleum Hydrocarbons (mg/L)										
Benzene	0 / 6	0.005 : 0.025			0.005 U	0.005 U	0.005 U	0.025 U	0.005 U	0.005 U
Ethyl benzene	0 / 6	0.005 : 0.025			0.005 U	0.005 U	0.005 U	0.025 U	0.005 U	0.005 U
Methyl Tertbutyl Ether	0 / 6	0.005 : 0.025			0.005 U	0.005 U	0.005 U	0.025 U	0.005 U	0.005 U
Naphthalene	0 / 6	0.01 : 0.05			0.01 U	0.01 U	0.01 U	0.05 U	0.01 U	0.01 U
Toluene	0 / 6	0.005 : 0.025			0.005 U	0.005 U	0.005 U	0.025 U	0.005 U	0.005 U
Xylene, m/p	0 / 6	0.01 : 0.05			0.01 U	0.01 U	0.01 U	0.05 U	0.01 U	0.01 U
Xylene, o	1 / 6	0.005 : 0.025	0.021 - 0.021	0.007	0.005 U	0.005 U	0.005 U	0.025 U	0.005 U	0.021
C5-C8 Aliphatics	3 / 6	0.1 : 0.1	0.35 - 1.9	0.6	0.1 U	0.35	0.1 U	1.4	0.1 U	1.9
C5-C8 Aliphatics (unadj.)	3 / 6	0.1 : 0.1	0.35 - 1.9	0.6	0.1 U	0.35	0.1 U	1.4	0.1 U	1.9
C9-C10 Aromatics	0 / 6	0.1 : 0.5			0.1 U	0.1 U	0.1 U	0.5 U	0.1 U	0.1 U
C9-C12 Aliphatics	1 / 6	0.1 : 0.5	0.11 - 0.11	0.09	0.1 U	0.1 U	0.1 U	0.5 U	0.1 U	0.11
C9-C12 Aliphatics (unadj.)	1 / 6	0.1 : 0.5	0.13 - 0.13	0.1	0.1 U	0.1 U	0.1 U	0.5 U	0.1 U	0.13
Volatile Petroleum Hydrocarbons, Total	3 / 6	0.1 : 0.1	0.35 - 2	0.7	0.1 U	0.35	0.1 U	1.4	0.1 U	2

mg/L - milligrams/liter
s.u. - Standard Units
U - analyte not detected,
value shown is detection limit.
J - value is estimated

Prepared by / Date: KJC 06/09/09
Checked by / Date: MH 06/11/09

Table 3-3
Plant B Analytical Results for First Quarter 2009 Groundwater Sampling
Semi-Annual Status Report No. 4
Olin Chemical Superfund Site
Wilmington, Massachusetts

Parameter Name	Frequency of Detection	Range of Reporting Limits for Non-Detects	Range of Detected Concentrations	Average of All Samples	OC-GW-16R 2/24/2009
Volatile Organics (mg/L)					
2,4,4-Trimethyl-1-pentene	1 / 1		1.4 - 1.4	1.4	1.4
2,4,4-Trimethyl-2-Pentene	1 / 1		0.44 - 0.44	0.44	0.44
Semivolatile Organics (mg/L)					
Bis(2-Ethylhexyl)phthalate	0 / 1	0.002 : 0.002			0.002 U
N-Nitrosodiphenylamine	1 / 1		0.33 - 0.33	0.33	0.33
Metals, Filtered (mg/L)					
Iron	1 / 1		1.4 - 1.4	1.4	1.4
Inorganics (mg/L)					
pH **(s.u.)**	1 / 1		6.74 - 6.74	6.74	6.74 J
Nitrogen, as Ammonia	1 / 1		4.7 - 4.7	4.7	4.7
Volatile Petroleum Hydrocarbons (mg/L)					
Benzene	0 / 1	0.025 : 0.025			0.025 U
Ethyl benzene	0 / 1	0.025 : 0.025			0.025 U
Methyl Tertbutyl Ether	0 / 1	0.025 : 0.025			0.025 U
Naphthalene	0 / 1	0.05 : 0.05			0.05 U
Toluene	0 / 1	0.025 : 0.025			0.025 U
Xylene, m/p	0 / 1	0.05 : 0.05			0.05 U
Xylene, o	0 / 1	0.025 : 0.025			0.025 U
C5-C8 Aliphatics	1 / 1		1.7 - 1.7	1.7	1.7
C5-C8 Aliphatics (unadj.)	1 / 1		1.7 - 1.7	1.7	1.7
C9-C10 Aromatics	0 / 1	0.5 : 0.5			0.5 U
C9-C12 Aliphatics	0 / 1	0.5 : 0.5			0.5 U
C9-C12 Aliphatics (unadj.)	0 / 1	0.5 : 0.5			0.5 U
Volatile Petroleum Hydrocarbons, Total	1 / 1		1.7 - 1.7	1.7	1.7

mg/L - milligrams/liter
s.u. - Standard Units
U - analyte not detected,
value shown is detection limit.
J - value is estimated

Prepared by / Date: KJC 06/09/09
Checked by / Date: MH 06/11/09

Table 3-4
Plant B Water Level and Product Recovery Data: October 2008 - December 2008 [1]
Semi-Annual Status Report No. 4
Olin Chemical Superfund Site
Wilmington, Massachusetts

Well	Depth to Water feet[2]			Depth to Product feet[2]			Product Thickness feet[3, 4]			Reference Elevation	Potentiometric Surface Elevation (feet NGVD) Corrected for Product [5]			Product Removed gallons		
ID	10/31/2008	12/2/2008	12/30/2008	10/31/2008	12/2/2008	12/30/2008	10/31/2008	12/2/2008	12/30/2008	feet	10/31/2008	12/2/2008	12/30/2008	10/31/2008	12/2/2008	12/30/2008
B-2	11.82	11.81	11.00	NPD	NPD	NPD	NA	NA	NA	90.48	78.66	78.67	79.48			
B-3	11.69	11.51	10.35	NPD	NPD	NPD	NA	NA	NA	90.32	78.63	78.81	79.97			
B-5R	12.02	11.75	10.27	NPD	NPD	NPD	NA	NA	NA	91.38	79.36	79.63	81.11			
B-7A	7.72	8.27	6.51	NPD	NPD	NPD	NA	NA	NA	88.81	81.09	80.54	82.30			
B-17	9.10	9.40	7.84	NPD	NPD	NPD	NA	NA	NA	91.55	82.45	82.15	83.71			
GW-13	11.60	11.56	10.59	NPD	NPD	NPD	NA	NA	NA	90.57	78.97	79.01	79.98			
GW-14	9.65	9.24	7.61	NPD	NPD	NPD	NA	NA	NA	88.70	79.05	79.46	81.09			
GW-15	11.06	8.95	6.55	NPD	NPD	NPD	NA	NA	NA	90.01	78.95	81.06	83.46			
GW-16R	10.64	11.13	9.20	NPD	NPD	NPD	NA	NA	NA	92.46	81.82	81.33	83.26			
GW-23	12.34	12.77	11.87	12.33	12.77	11.86	0.01	Trace	0.01	91.04	78.71	78.28	79.18			
GW-52S	9.09	8.58	6.48	NPD	NPD	NPD	NA	NA	NA	87.95	78.86	79.37	81.47			
GW-100	11.90	11.73	11.04	NPD	NPD	NPD	NA	NA	NA	90.15	78.25	78.42	79.11			
GW-101	12.10	11.88	11.15	NPD	NPD	NPD	NA	NA	NA	90.14	78.04	78.26	78.99			
GW-102	10.83	10.63	9.88	NPD	NPD	NPD	NA	NA	NA	89.00	78.17	78.37	79.12			
IW-1	12.12	11.88	10.86	NPD	NPD	NPD	NA	NA	NA	90.71	78.59	78.83	79.85			
IW-2	12.96	12.51	12.49	12.95	12.50	12.49	0.01	0.01	Trace	90.53	77.58	78.03	78.05			
IW-3	11.71	11.98	11.08	11.70	11.97	11.08	0.01	0.01	Trace	90.76	79.06	78.79	79.69			
IW-6	11.12	10.99	10.26	NPD	NPD	NPD	NA	NA	NA	89.15	78.03	78.16	78.89			
IW-7	11.79	11.89	11.08	NPD	NPD	NPD	NA	NA	NA	90.10	78.31	78.21	79.02			
IW-8	11.61	11.67	10.97	NPD	NPD	NPD	NA	NA	NA	89.94	78.33	78.27	78.97			
IW-9	11.64	11.72	10.55	NPD	NPD	NPD	NA	NA	NA	89.78	78.14	78.06	79.23			
IW-10	12.04	12.11	11.12	NPD	NPD	NPD	NA	NA	NA	90.43	78.39	78.32	79.31			
IW-11	14.19	13.45	10.21	14.18	13.45	10.19	0.01	Trace	0.02	89.92	75.74	76.48	79.73	0.41	0.10	0.63
IW-12	13.24	12.77	10.68	13.24	12.77	10.68	Trace	Trace	Trace	90.31	77.08	77.55	79.64			
IW-13	18.23	17.93	8.89	18.23	17.92	8.88	Trace	0.01	0.01	89.90	71.68	71.98	81.02	0.12	0.010	0.092
PID	11.41	11.69	10.97	NPD	NPD	NPD	NA	NA	NA	89.97	78.56	78.28	79.00			
P5	12.10	11.82	11.09	NPD	NPD	NPD	NA	NA	NA	90.45	78.35	78.63	79.36			
12-IN	11.16	11.27	10.25	11.15	11.25	10.25	0.01	0.02	Trace	89.84	78.69	78.59	79.60			
											Recovered Product For Month			0.53	0.11	0.73

Notes: NPD - No Product Detected; NM - Not Measured; NA - Not Applicable;
1 - Groundwater measurements and product recovery data collected by Olin.
2 - Measurement collected from top of PVC. If well does not have PVC casing, measurement from top of steel casing.
3 - Collected using ORS brand oil/water interface probe.
4 - Sheens noted at wells are assigned a product thickness of 0.01 feet
5 - Correction equation used: Reference elevation - (depth to water - (product thickness X 0.95))

Prepared by: KJC
Checked by: BJR

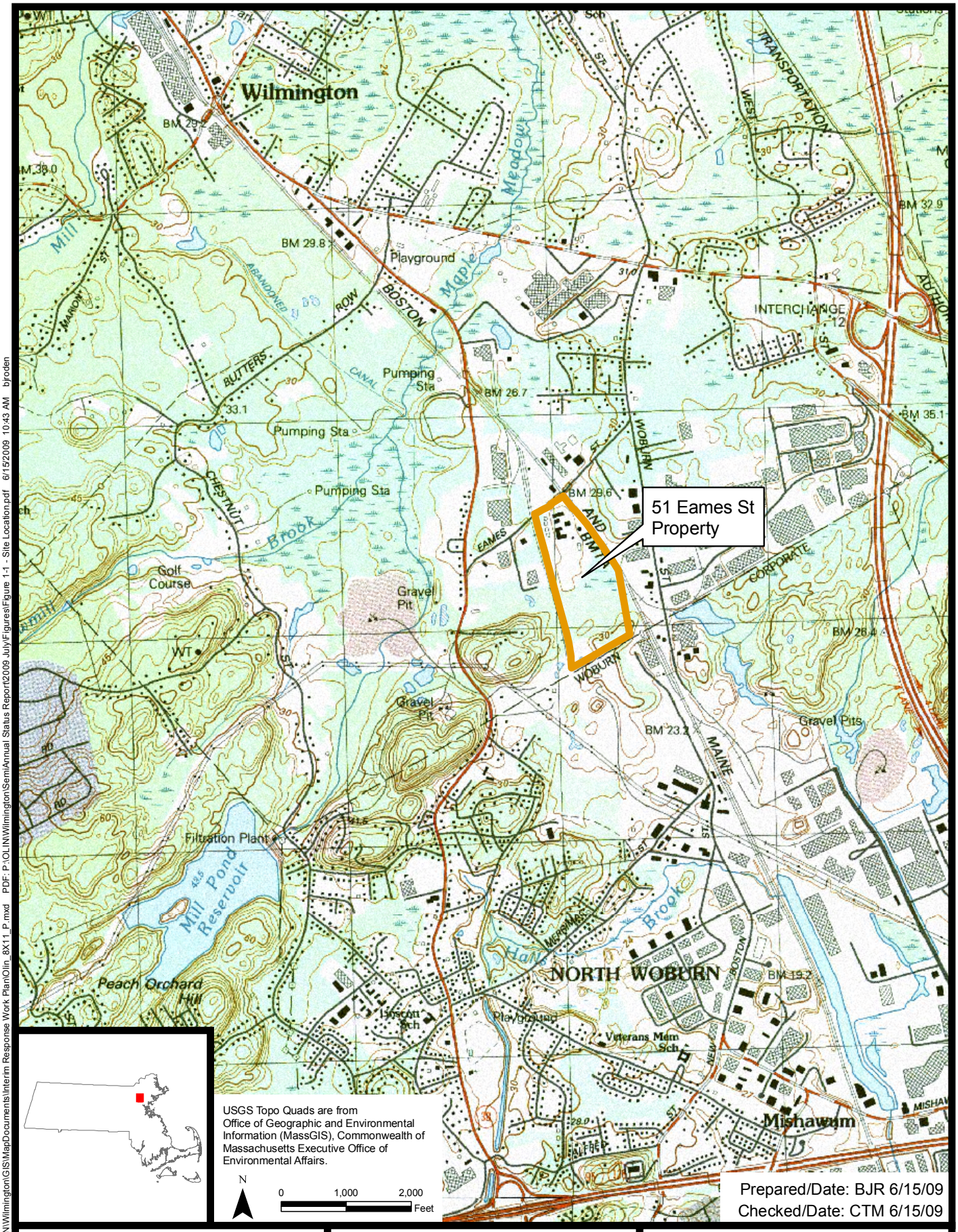
Table 3-5
Plant B Water Level and Product Recovery Data: January 2009 - March 2009 [1]
Semi-Annual Status Report No. 4
Olin Chemical Superfund Site
Wilmington, Massachusetts

Well	Depth to Water feet[2]			Depth to Product feet[2]			Product Thickness feet[3, 4]			Reference Elevation	Potentiometric Surface Elevation (feet NGVD) Corrected for Product [5]			Product Removed gallons		
ID	2/2/2009	2/27/2009	4/1/2009	2/2/2009	2/27/2009	4/1/2009	2/2/2009	2/27/2009	4/1/2009	feet	2/2/2009	2/27/2009	4/1/2009	2/2/2009	2/27/2009	4/1/2009
B-2	11.91	11.67	11.66	NPD	NPD	NPD	NA	NA	NA	90.48	78.57	78.81	78.82			
B-3	11.63	11.22	11.29	NPD	NPD	NPD	NA	NA	NA	90.32	78.69	79.10	79.03			
B-5R	11.51	11.27	11.40	NPD	NPD	NPD	NA	NA	NA	91.38	79.87	80.11	79.98			
B-7A	7.83	7.56	7.87	NPD	NPD	NPD	NA	NA	NA	88.81	80.98	81.25	80.94			
B-17	9.51	8.56	8.98	NPD	NPD	NPD	NA	NA	NA	91.55	82.04	82.99	82.57			
GW-13	11.90	11.17	11.40	NPD	NPD	NPD	NA	NA	NA	90.57	78.67	79.40	79.17			
GW-14	9.41	8.70	8.91	NPD	NPD	NPD	NA	NA	NA	88.70	79.29	80.00	79.79			
GW-15	9.14	8.07	8.27	NPD	NPD	NPD	NA	NA	NA	90.01	80.87	81.94	81.74			
GW-16R	10.61	10.19	10.43	NPD	NPD	NPD	NA	NA	NA	92.46	81.85	82.27	82.03			
GW-23	12.91	12.54	12.63	12.90	12.52	12.61	0.01	0.02	0.02	91.04	78.14	78.52	78.43			
GW-52S	8.58	7.80	7.96	NPD	NPD	NPD	NA	NA	NA	87.95	79.37	80.15	79.99			
GW-100	12.97	11.55	11.50	NPD	NPD	NPD	NA	NA	NA	90.15	77.18	78.60	78.65			
GW-101	12.79	11.77	11.47	NPD	NPD	NPD	NA	NA	NA	90.14	77.35	78.37	78.67			
GW-102	11.09	10.53	10.21	NPD	NPD	NPD	NA	NA	NA	89.00	77.91	78.47	78.79			
IW-1	12.08	11.71	11.83	NPD	NPD	NPD	NA	NA	NA	90.71	78.63	79.00	78.88			
IW-2	13.37	12.88	12.96	13.37	12.87	12.96	Trace	0.01	Trace	90.53	77.17	77.66	77.58			
IW-3	12.07	11.51	11.70	12.07	11.51	11.70	Trace	Trace	Trace	90.76	78.70	79.26	79.07			
IW-6	11.27	10.73	10.88	NPD	NPD	NPD	NA	NA	NA	89.15	77.88	78.42	78.27			
IW-7	12.01	11.45	11.61	NPD	NPD	NPD	NA	NA	NA	90.10	78.09	78.65	78.49			
IW-8	11.78	11.49	11.40	NPD	NPD	NPD	NA	NA	NA	89.94	78.16	78.45	78.54			
IW-9	11.60	11.30	11.32	NPD	NPD	NPD	NA	NA	NA	89.78	78.18	78.48	78.46			
IW-10	12.04	11.78	11.93	NPD	NPD	NPD	NA	NA	NA	90.43	78.39	78.65	78.50			
IW-11	10.89	14.24	14.52	10.88	14.22	14.51	0.01	0.02	0.01	89.92	79.04	75.70	75.41	0.34	0.22	0.41
IW-12	11.49	12.38	12.71	11.48	12.38	12.71	0.01	Trace	Trace	90.31	78.83	77.94	77.61			
IW-13	9.71	18.07	18.12	9.7	18.07	18.11	0.01	Trace	0.01	89.90	80.20	71.84	71.79			
PID	11.80	11.30	11.50	NPD	NPD	NPD	NA	NA	NA	89.97	78.17	78.67	78.47			
P5	12.15	11.63	11.69	NPD	NPD	NPD	NA	NA	NA	90.45	78.30	78.82	78.76			
12-IN	11.35	11.00	10.97	11.34	11.00	10.96	0.01	Trace	0.01	89.84	78.50	78.85	78.88			
											Recovered Product For Month			0.34	0.22	0.41

Notes: NPD - No Product Detected; NM - Not Measured; NA - Not Applicable;
1 - Groundwater measurements and product recovery data collected by Olin.
2 - Measurement collected from top of PVC. If well does not have PVC casing, measurement from top of steel casing.
3 - Collected using ORS brand oil/water interface probe.
4 - Sheens noted at wells are assigned a product thickness of 0.01 feet
5 - Correction equation used: Reference elevation - (depth to water - (product thickness X 0.95))

Prepared by: KJC
Checked by: BJR

FIGURES



Olin Chemical Superfund Site
Wilmington, Massachusetts

MACTEC

Figure 1-1
Site Location
Semi-Annual Status Report No. 4

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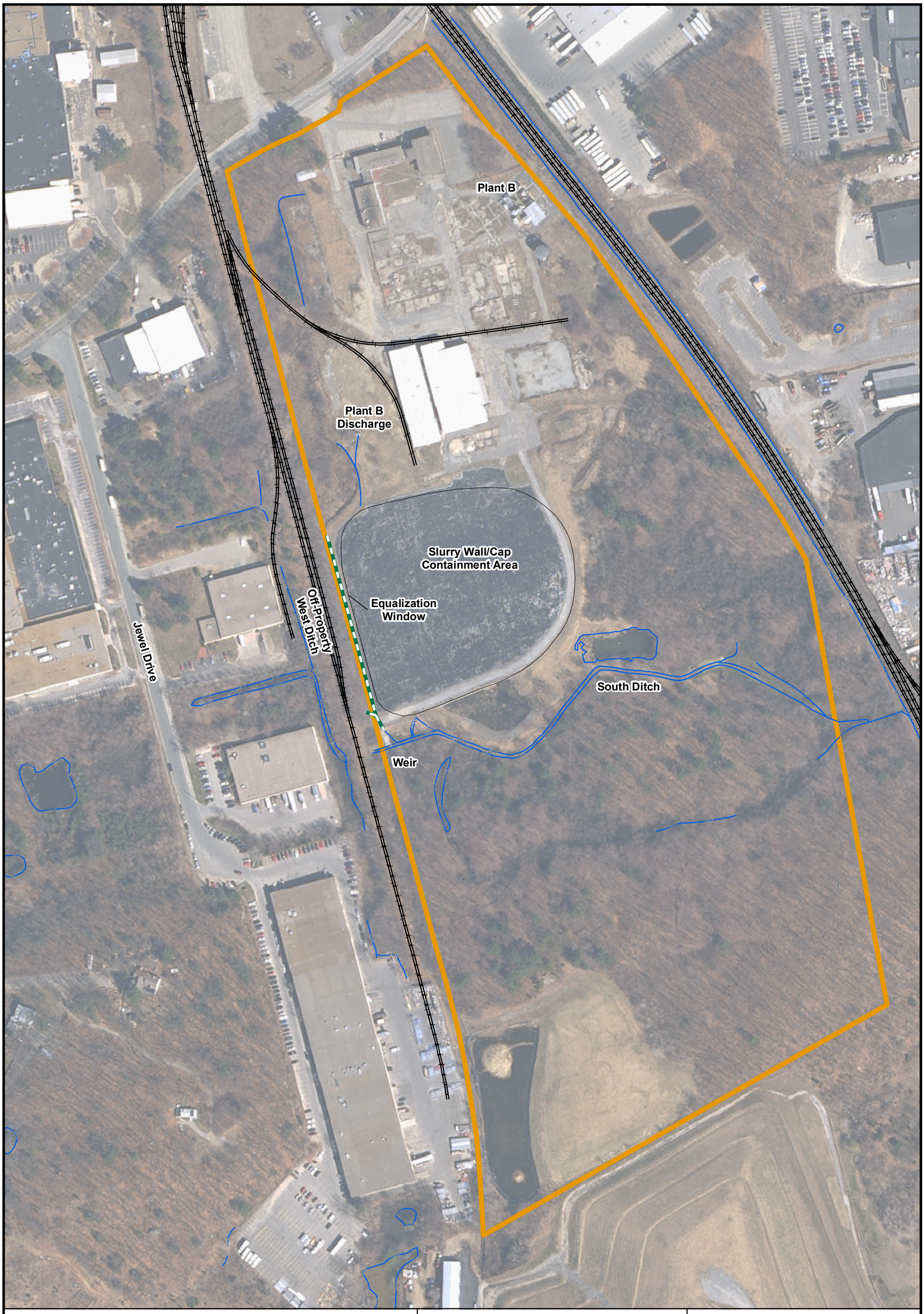

Legend

- Railroad
- Water
- Culvert
- Site Boundary

MACTEC

MACTEC Engineering and Consulting
107 Audubon Road Suite 301
Wakefield, MA 01880

N

0 100 200 400 Feet

Figure 1-2
Site Plan

Semi-Annual Status Report No. 4
Olin Chemical Superfund Site
Wilmington, Massachusetts

Prepared/Date: BJR 06/15/09 | Checked/Date: CTM 06/15/09

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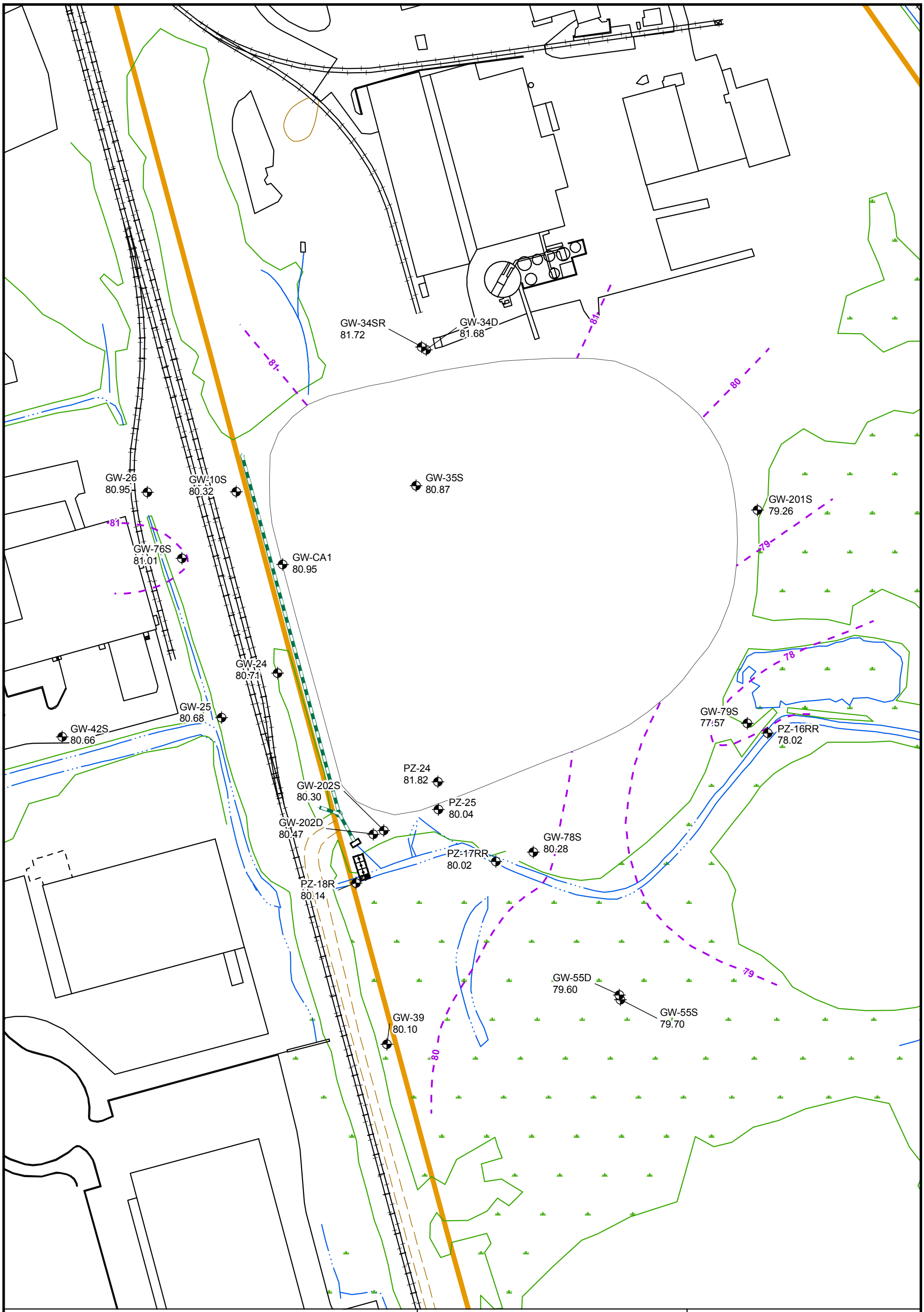

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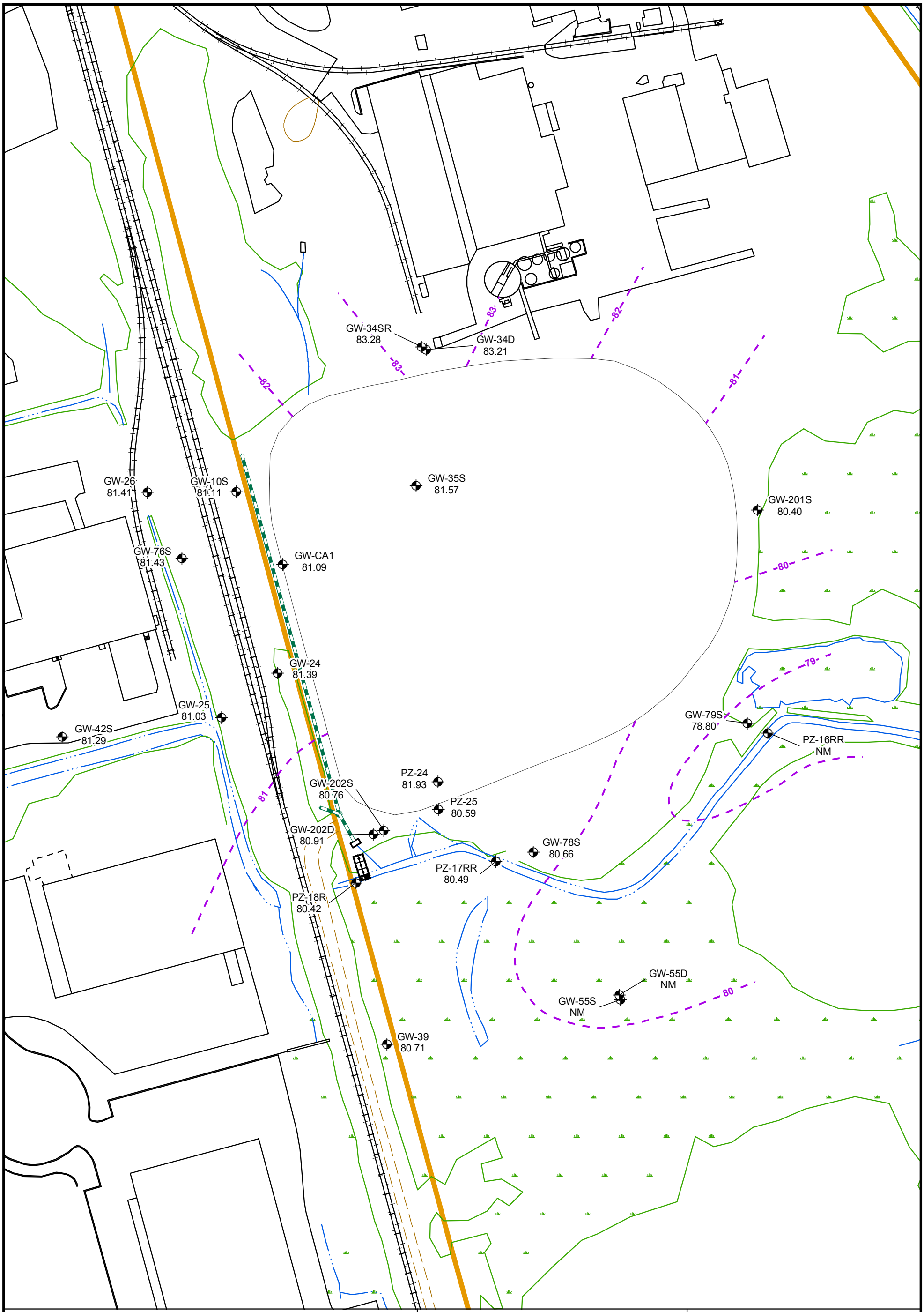

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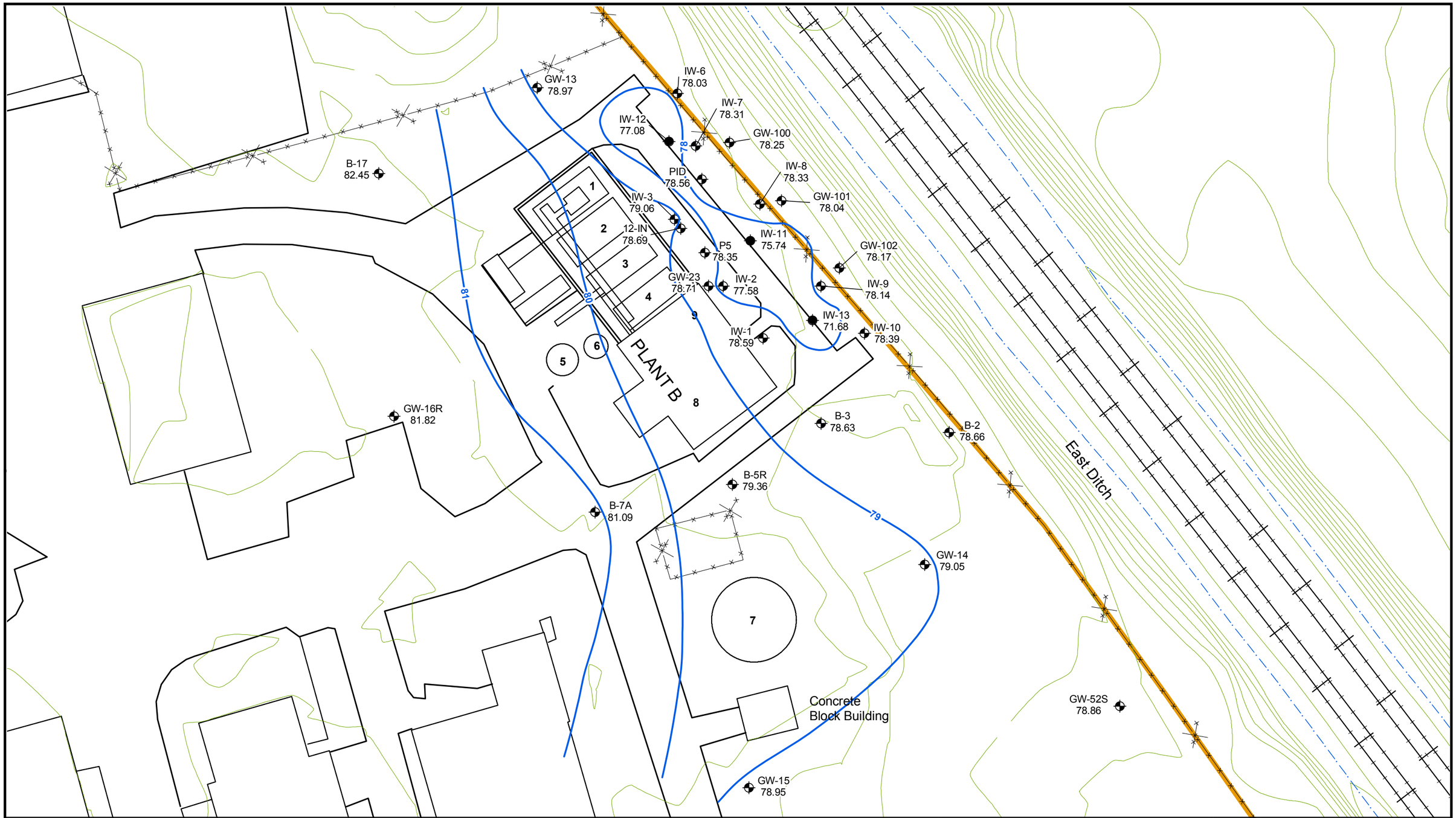

Tank #1 - Receives gravity overflow from Tank 2 and allows for further settling
Tank #2 - Caustic addition and initial iron drop-out
Tank #3 & #4 - Overnight holding tank for treated water
Tank #5 - Pre-carbon hold tank
Tank #6 - Residence tank
Tank #7 - Raw water (pH adjusted)
Tank #8 - Pre-carbon transfer
Tank #9 - Day discharge to NPDES Outfall 002

Legend

- Interpreted Potentiometric Contour Line (FT/MSL)
- Recovery Well
- Monitoring Well
- Ditch
- Elevation Contours

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N

0 15 30 60 Feet

Figure 3-1
Plant B Interpreted Water Level Conditions
October 31, 2008

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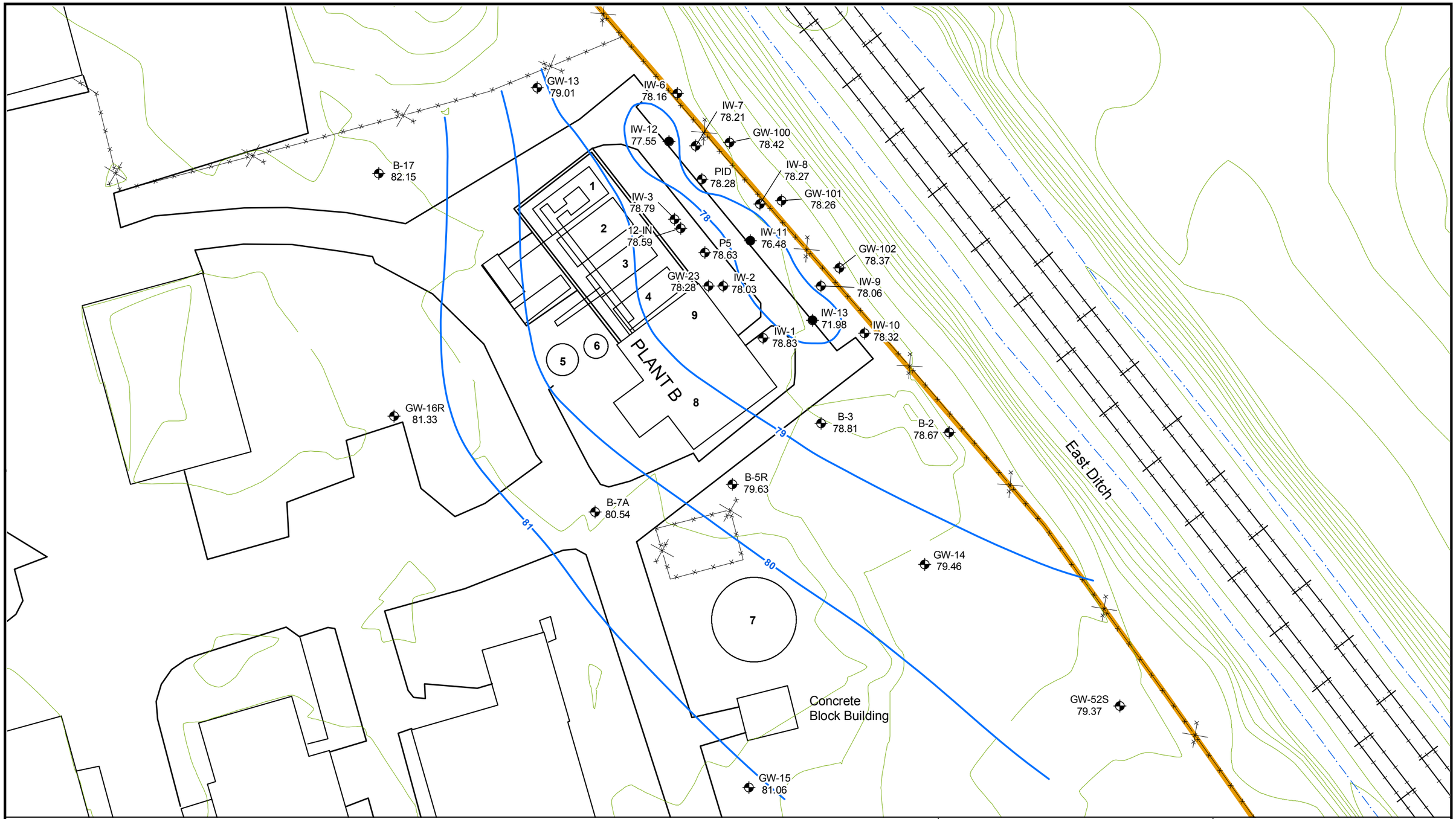

Tank #1 - Receives gravity overflow from Tank 2 and allows for further settling
Tank #2 - Caustic addition and initial iron drop-out
Tank #3 & #4 - Overnight holding tank for treated water
Tank #5 - Pre-carbon hold tank
Tank #6 - Residence tank
Tank #7 - Raw water (pH adjusted)
Tank #8 - Pre-carbon transfer
Tank #9 - Day discharge to NPDES Outfall 002

Legend

- Interpreted Potentiometric Contour Line (FT/MSL)
- Recovery Well
- Monitoring Well
- Ditch
- Elevation Contours

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N

0 15 30 60 Feet

Figure 3-2
Plant B Interpreted Water Level Conditions
December 2, 2008

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GW-13
79.98

IW-6
78.89

IW-7
79.02

IW-12
79.64

GW-100
79.11

B-17
83.71

PID
79

IW-3
79.69

IW-8
78.97

GW-101
78.99

12-IN
79.6

IW-11
79.73

P5
79.36

GW-102
79.12

GW-23
79.18

IW-2
78.05

IW-9
79.23

IW-13
81.02

IW-1
79.85

IW-10
79.31

PLANT B

GW-16R
83.26

B-3
79.97

B-2
79.48

East Ditch

B-5R
81.11

B-7A
82.3

GW-14
81.09

GW-52S
81.47

Concrete
Block Building

GW-15
83.46

Tank #1 - Receives gravity overflow from Tank 2 and allows for further settling
Tank #2 - Caustic addition and initial iron drop-out
Tank #3 & #4 - Overnight holding tank for treated water
Tank #5 - Pre-carbon hold tank
Tank #6 - Residence tank
Tank #7 - Raw water (pH adjusted)
Tank #8 - Pre-carbon transfer
Tank #9 - Day discharge to NPDES Outfall 002

Legend

- Interpreted Potentiometric Contour Line (FT/MSL)
- Recovery Well
- Monitoring Well
- Ditch
- Elevation Contours

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N

0 15 30 60 Feet

Figure 3-3
Plant B Interpreted Water Level Conditions
December 30, 2008

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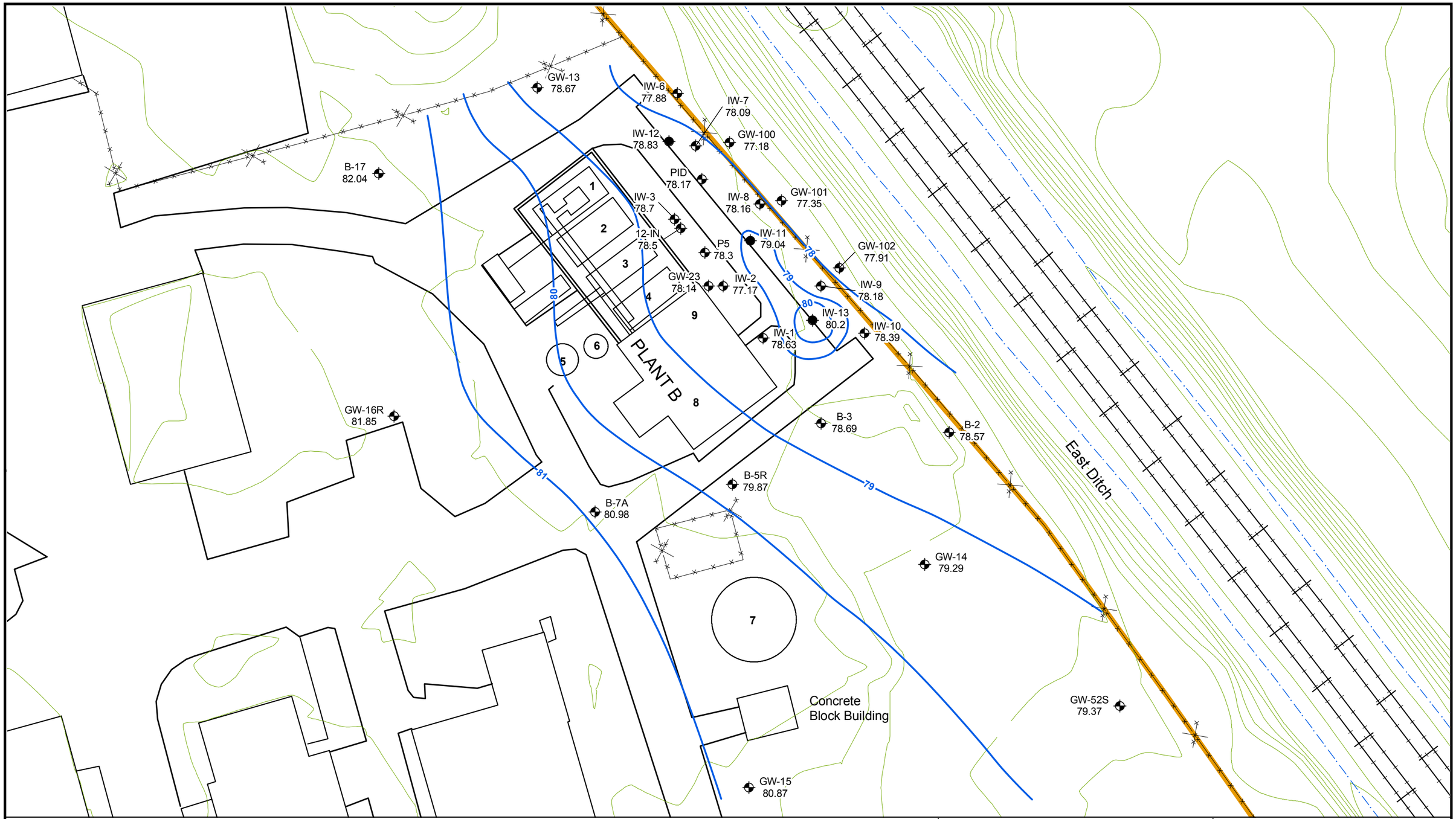

Tank #1 - Receives gravity overflow from Tank 2 and allows for further settling
Tank #2 - Caustic addition and initial iron drop-out
Tank #3 & #4 - Overnight holding tank for treated water
Tank #5 - Pre-carbon hold tank
Tank #6 - Residence tank
Tank #7 - Raw water (pH adjusted)
Tank #8 - Pre-carbon transfer
Tank #9 - Day discharge to NPDES Outfall 002

Legend

- Interpreted Potentiometric Contour Line (FT/MSL)
- Recovery Well
- Monitoring Well
- Ditch
- Elevation Contours

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N

0 15 30 60 Feet

Figure 3-4
Plant B Interpreted Water Level Conditions
February 2, 2009

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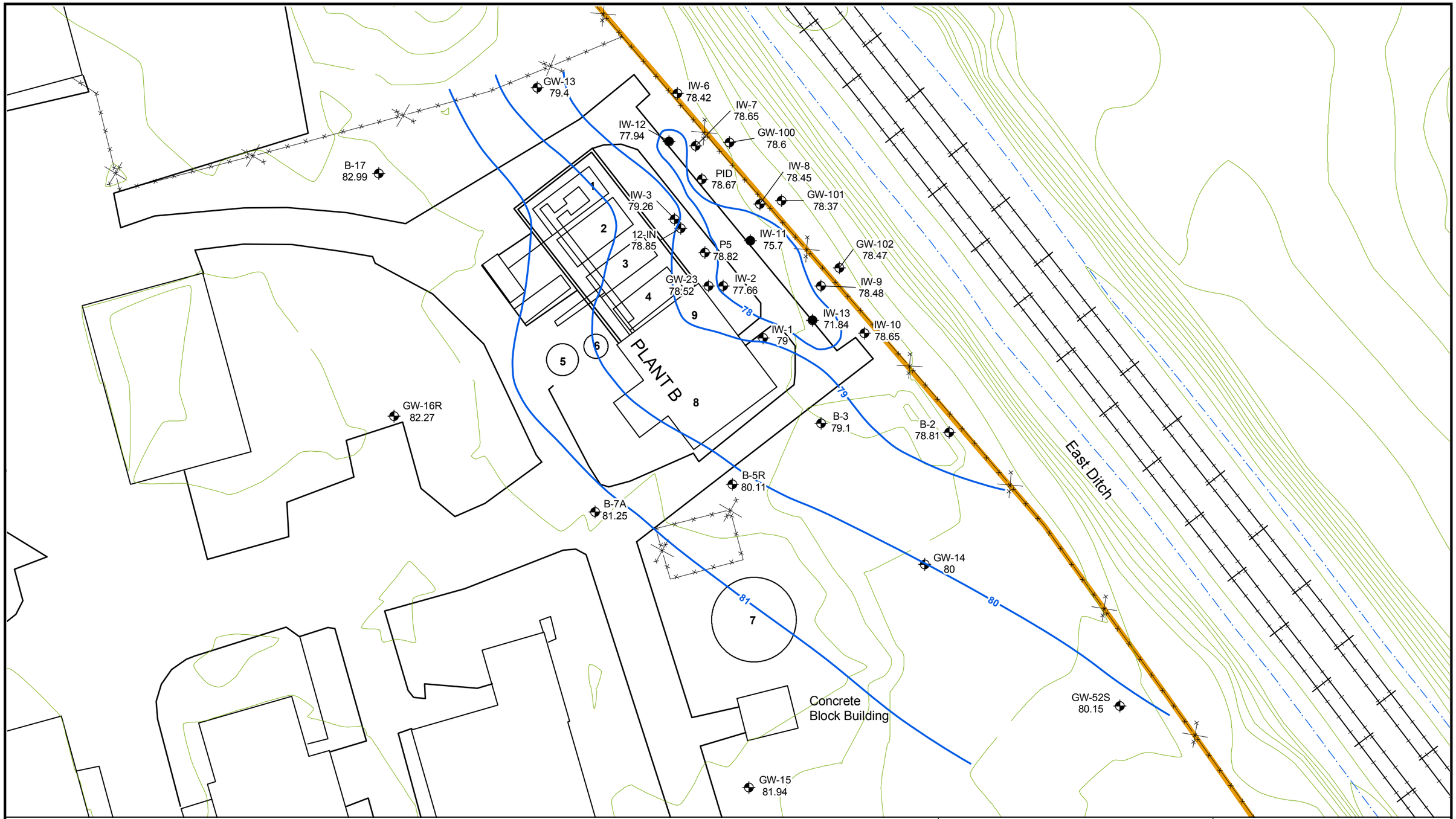

Tank #1 - Receives gravity overflow from Tank 2 and allows for further settling
Tank #2 - Caustic addition and initial iron drop-out
Tank #3 & #4 - Overnight holding tank for treated water
Tank #5 - Pre-carbon hold tank
Tank #6 - Residence tank
Tank #7 - Raw water (pH adjusted)
Tank #8 - Pre-carbon transfer
Tank #9 - Day discharge to NPDES Outfall 002

Legend

- Interpreted Potentiometric Contour Line (FT/MSL)
- Recovery Well
- Monitoring Well
- Ditch
- Elevation Contours

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N

0 15 30 60 Feet

Figure 3-5
Plant B Interpreted Water Level Conditions
February 27, 2009

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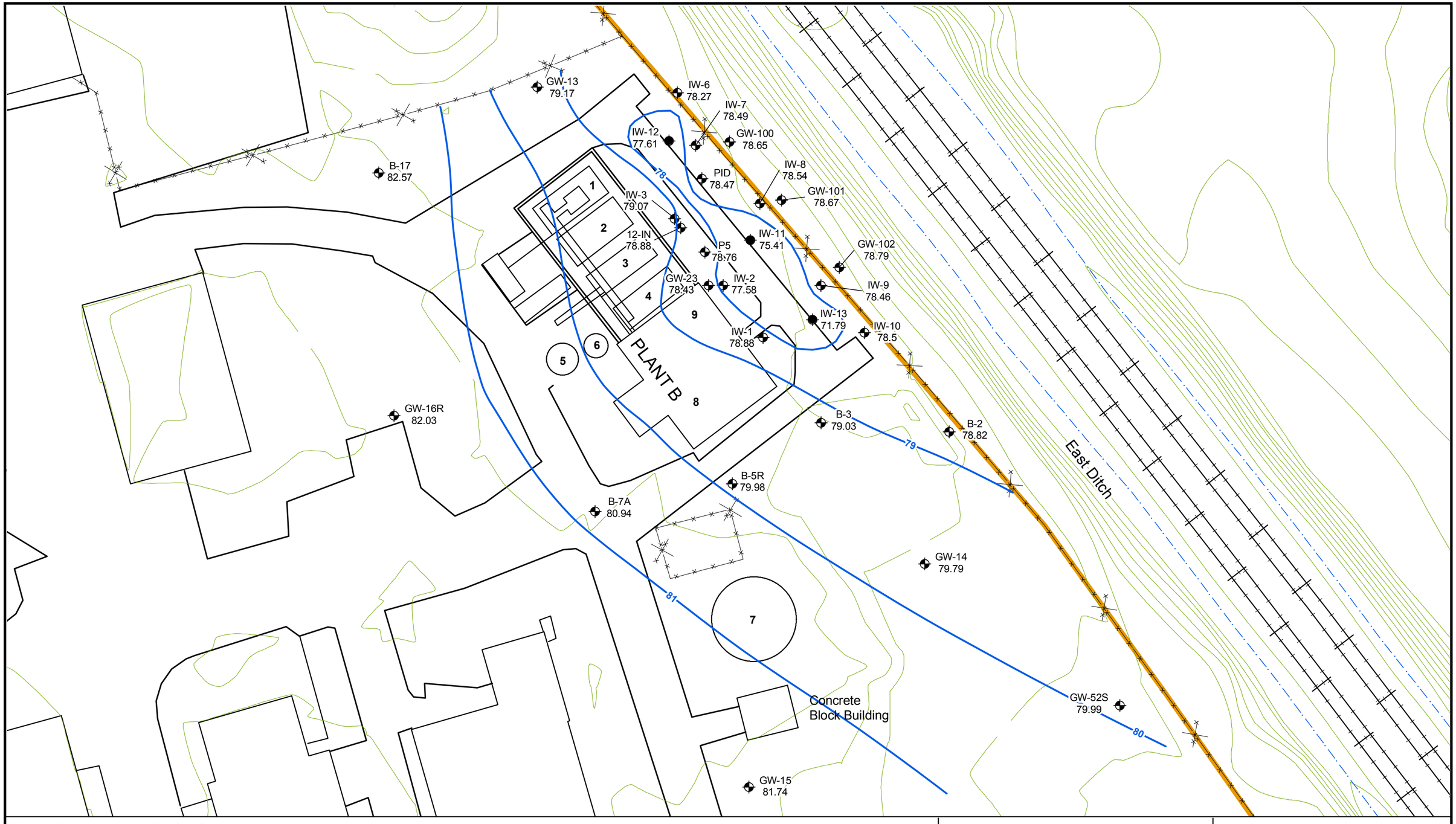

Tank #1 - Receives gravity overflow from Tank 2 and allows for further settling
Tank #2 - Caustic addition and initial iron drop-out
Tank #3 & #4 - Overnight holding tank for treated water
Tank #5 - Pre-carbon hold tank
Tank #6 - Residence tank
Tank #7 - Raw water (pH adjusted)
Tank #8 - Pre-carbon transfer
Tank #9 - Day discharge to NPDES Outfall 002

Legend

- Interpreted Potentiometric Contour Line (FT/MSL)
- Recovery Well
- Monitoring Well
- Ditch
- Elevation Contours

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N

0 15 30 60 Feet

Figure 3-6
Plant B Interpreted Water Level Conditions
April 1, 2009

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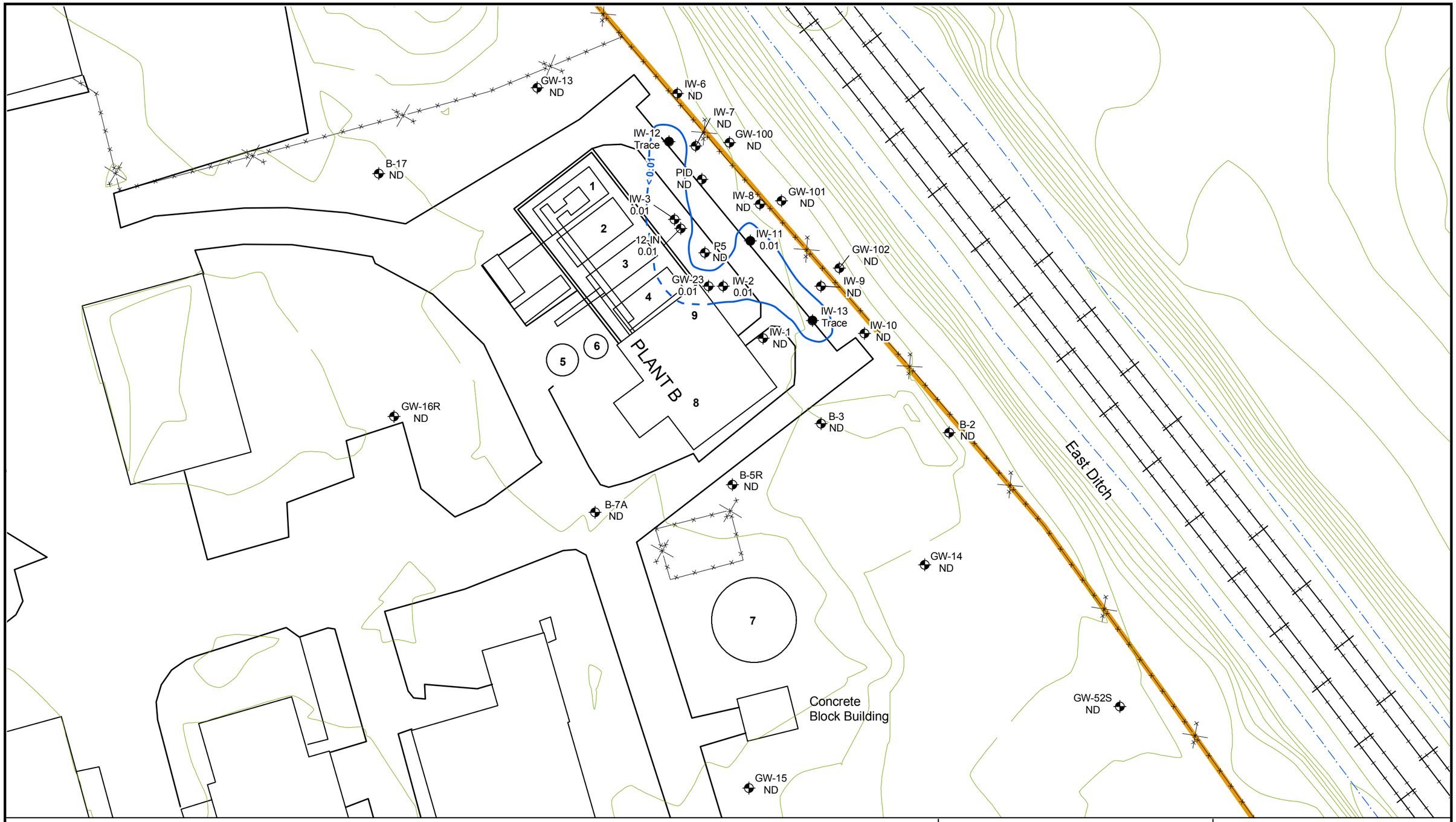

Tank #1 - Receives gravity overflow from Tank 2 and allows for further settling
Tank #2 - Caustic addition and initial iron drop-out
Tank #3 & #4 - Overnight holding tank for treated water
Tank #5 - Pre-carbon hold tank
Tank #6 - Residence tank
Tank #7 - Raw water (pH adjusted)
Tank #8 - Pre-carbon transfer
Tank #9 - Day discharge to NPDES Outfall 002

Legend

- Interpreted LNAPL Thickness Contour (ft)
- Inferred LNAPLThickness Contour (ft)
- Recovery Well
- Monitoring Well
- Ditch
- Elevation Contours

ND Not Detected

Trace Assumes product thickness of 0.01 ft

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N

0 15 30 60 Feet

Figure 3-7
Plant B Interpreted LNAPL Thickness Contours - October 31, 2008

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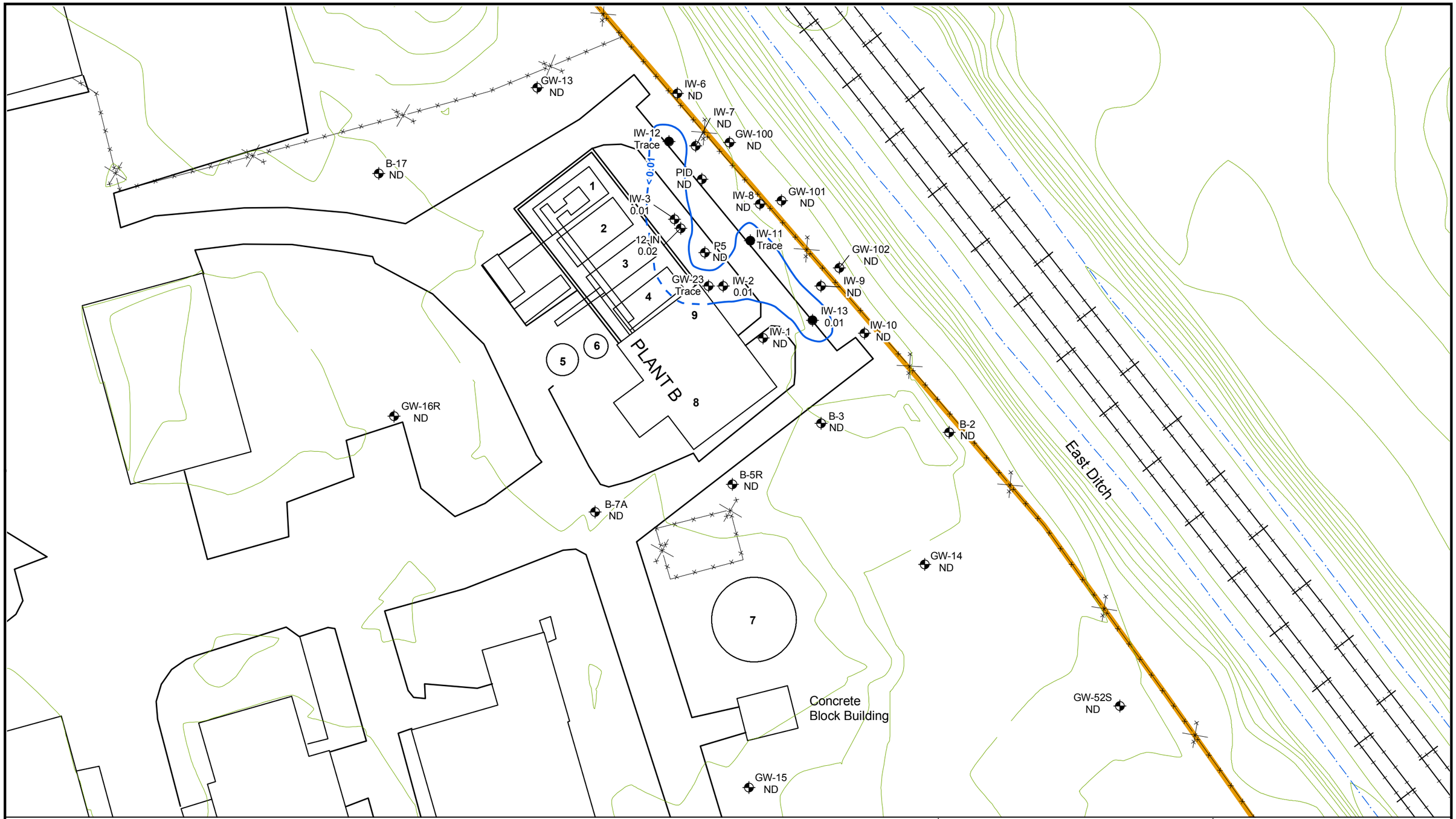

Tank #1 - Receives gravity overflow from Tank 2 and allows for further settling
Tank #2 - Caustic addition and initial iron drop-out
Tank #3 & #4 - Overnight holding tank for treated water
Tank #5 - Pre-carbon hold tank
Tank #6 - Residence tank
Tank #7 - Raw water (pH adjusted)
Tank #8 - Pre-carbon transfer
Tank #9 - Day discharge to NPDES Outfall 002

Legend

- Interpreted LNAPL Thickness Contour (ft)
- Inferred LNAPLThickness Contour (ft)
- Recovery Well
- Monitoring Well
- Ditch
- Elevation Contours

ND Not Detected
Trace Assumes product thickness of 0.01 ft

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N
0 15 30 60 Feet

Figure 3-8
Plant B Interpreted LNAPL Thickness Contours - December 2, 2008

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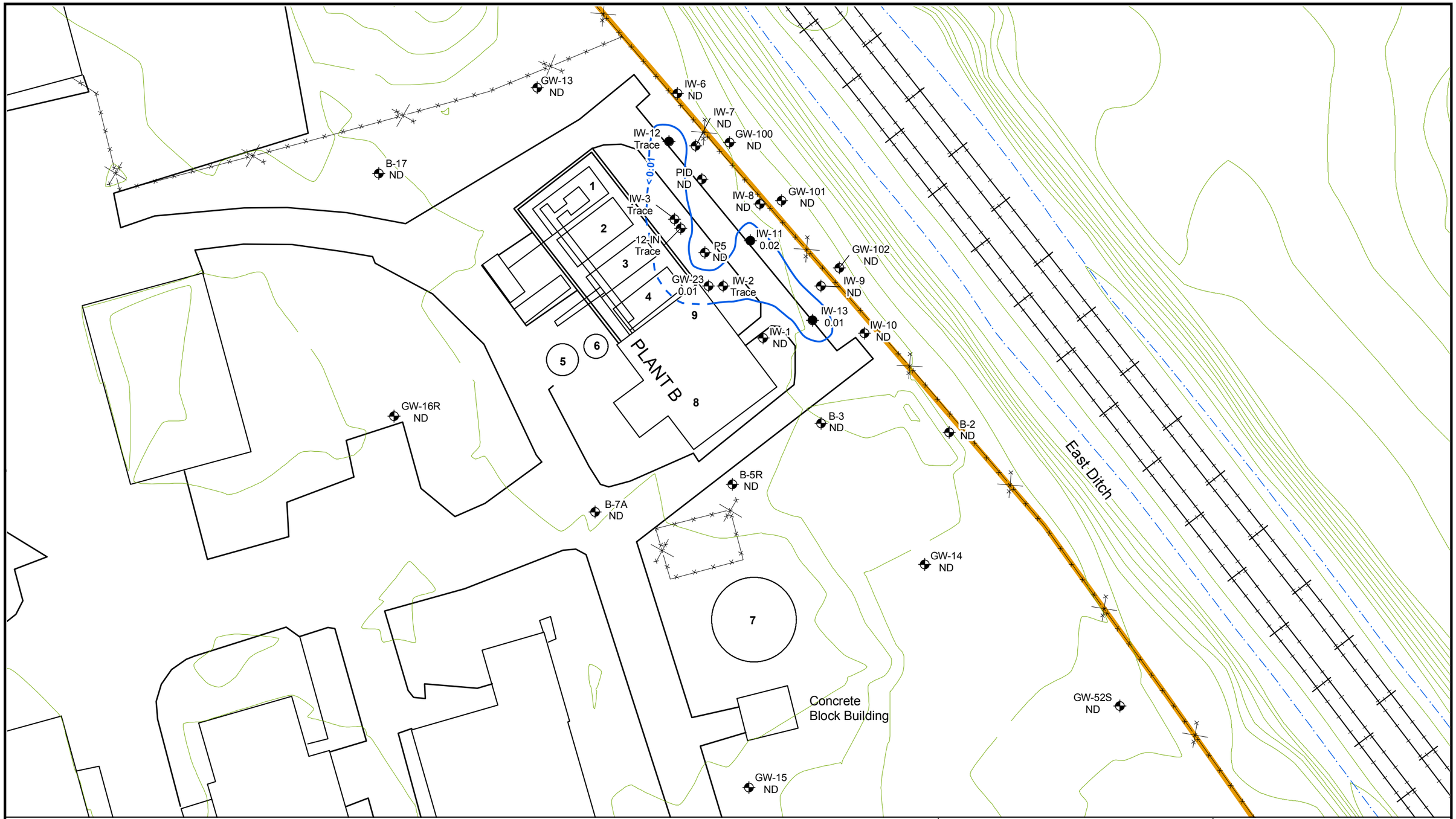

Tank #1 - Receives gravity overflow from Tank 2 and allows for further settling
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Tank #6 - Residence tank
Tank #7 - Raw water (pH adjusted)
Tank #8 - Pre-carbon transfer
Tank #9 - Day discharge to NPDES Outfall 002

Legend

- Interpreted LNAPL Thickness Contour (ft)
- Inferred LNAPLThickness Contour (ft)
- Recovery Well
- Monitoring Well
- Ditch
- Elevation Contours

ND Not Detected
Trace Assumes product thickness of 0.01 ft

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N
0 15 30 60
Feet

Figure 3-9
Plant B Interpreted LNAPL Thickness Contours - December 30, 2008

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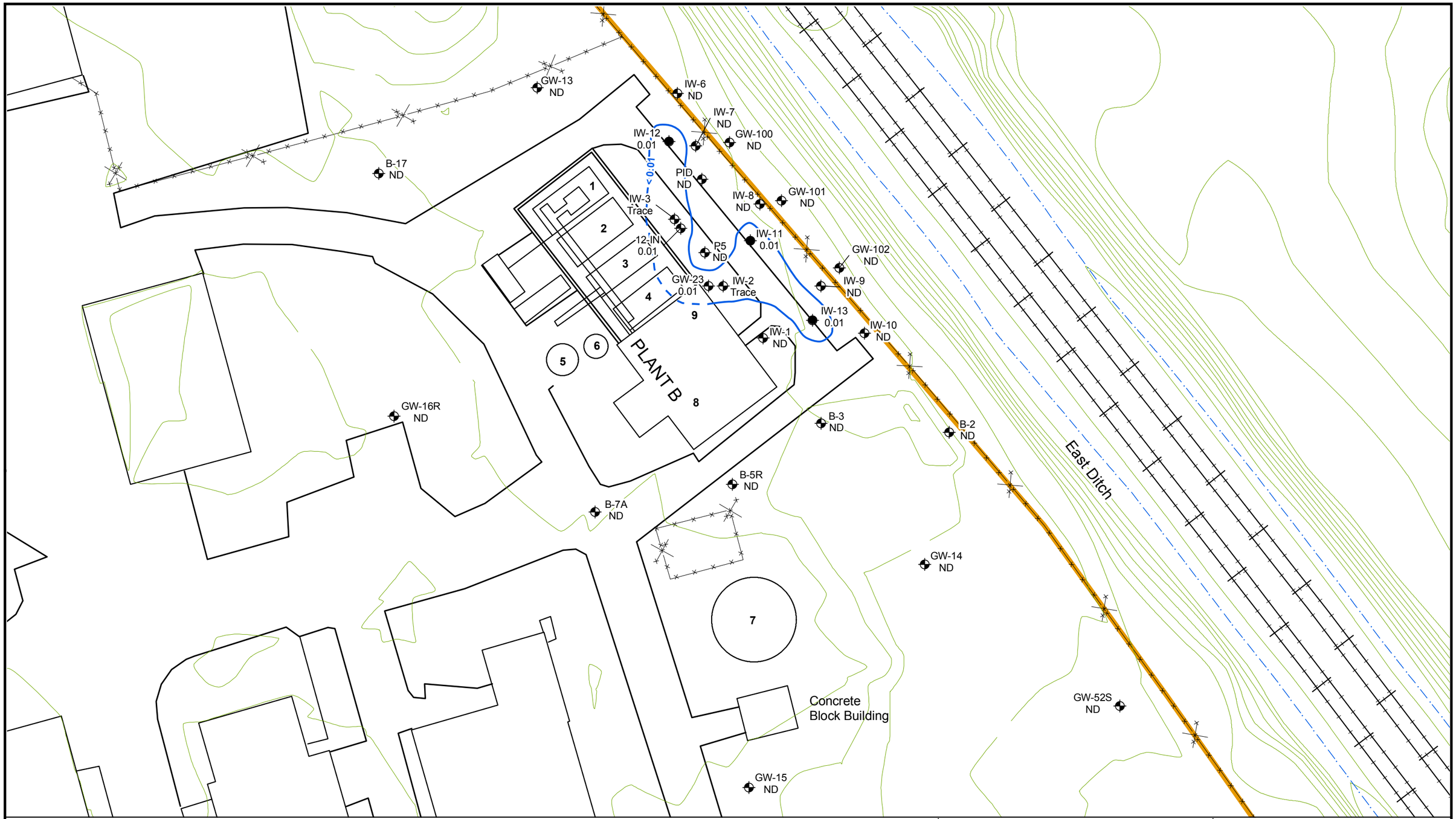

Tank #1 - Receives gravity overflow from Tank 2 and allows for further settling
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Tank #5 - Pre-carbon hold tank
Tank #6 - Residence tank
Tank #7 - Raw water (pH adjusted)
Tank #8 - Pre-carbon transfer
Tank #9 - Day discharge to NPDES Outfall 002

Legend

- Interpreted LNAPL Thickness Contour (ft)
- Inferred LNAPLThickness Contour (ft)
- Recovery Well
- Monitoring Well
- Ditch
- Elevation Contours

ND Not Detected
Trace Assumes product thickness of 0.01 ft

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N
0 15 30 60 Feet

Figure 3-10
Plant B Interpreted LNAPL Thickness Contours - February 2, 2009

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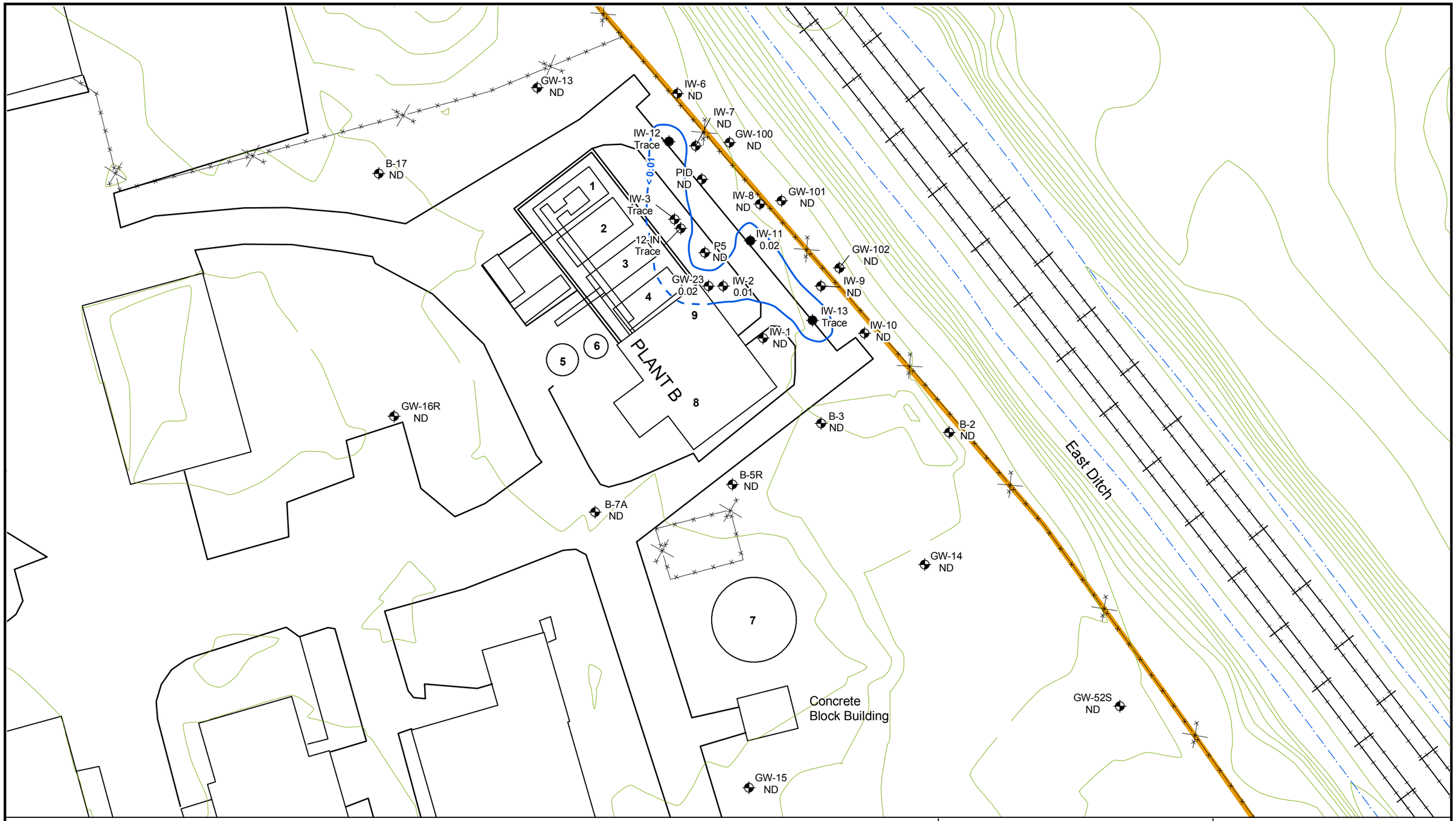

Tank #1 - Receives gravity overflow from Tank 2 and allows for further settling
Tank #2 - Caustic addition and initial iron drop-out
Tank #3 & #4 - Overnight holding tank for treated water
Tank #5 - Pre-carbon hold tank
Tank #6 - Residence tank
Tank #7 - Raw water (pH adjusted)
Tank #8 - Pre-carbon transfer
Tank #9 - Day discharge to NPDES Outfall 002

Legend

- Interpreted LNAPL Thickness Contour (ft)
- Inferred LNAPLThickness Contour (ft)
- Recovery Well
- Monitoring Well
- Ditch
- Elevation Contours

ND Not Detected
Trace Assumes product thickness of 0.01 ft

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N
0 15 30 60 Feet

Figure 3-11
Plant B Interpreted LNAPL Thickness Contours - February 27, 2009

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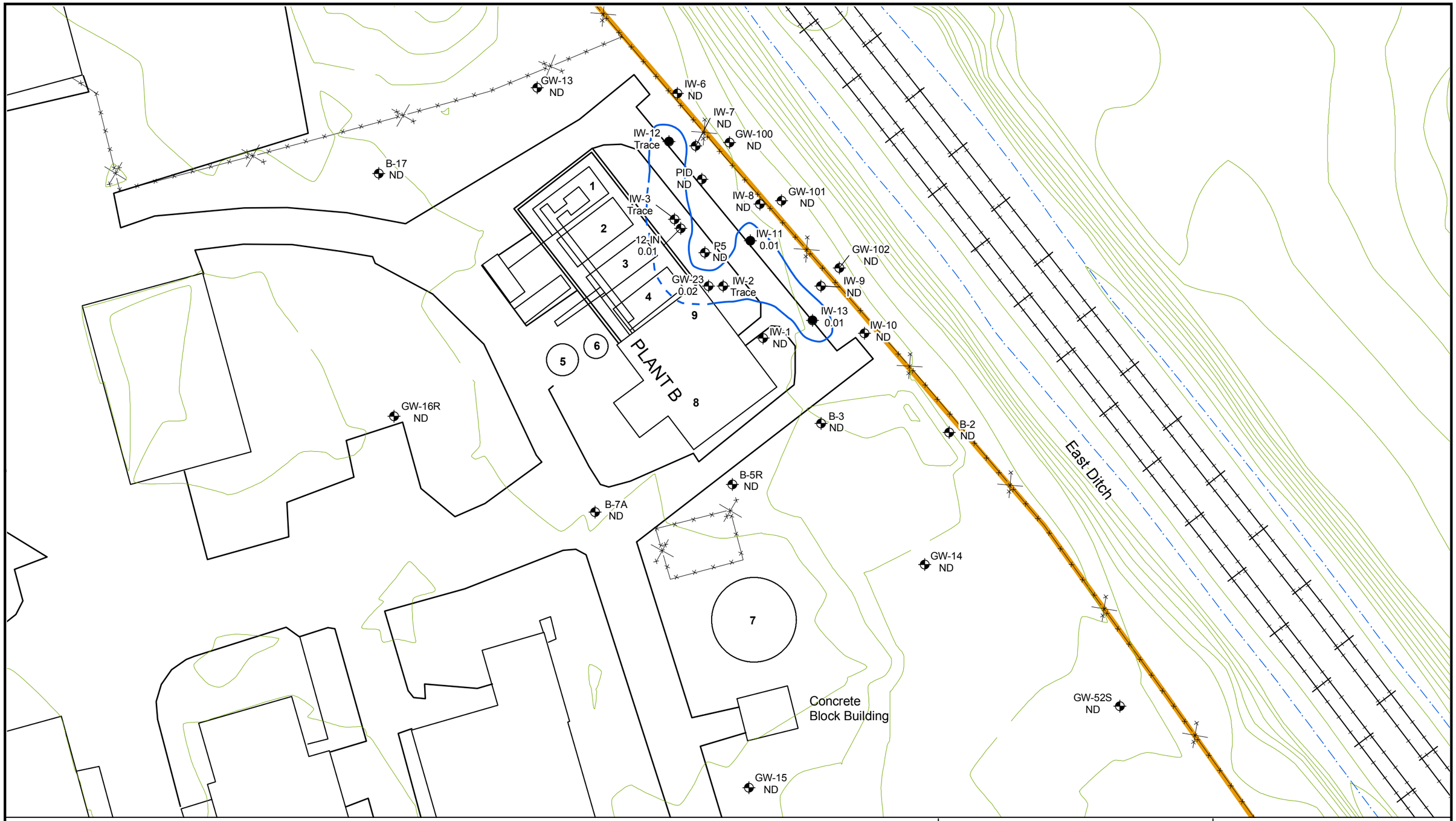

Tank #1 - Receives gravity overflow from Tank 2 and allows for further settling
Tank #2 - Caustic addition and initial iron drop-out
Tank #3 & #4 - Overnight holding tank for treated water
Tank #5 - Pre-carbon hold tank
Tank #6 - Residence tank
Tank #7 - Raw water (pH adjusted)
Tank #8 - Pre-carbon transfer
Tank #9 - Day discharge to NPDES Outfall 002

Legend

- Interpreted LNAPL Thickness Contour (ft)
- Inferred LNAPLThickness Contour (ft)
- Recovery Well
- Monitoring Well
- Ditch
- Elevation Contours

ND Not Detected
Trace Assumes product thickness of 0.01 ft

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N
0 15 30 60 Feet

Figure 3-12
Plant B Interpreted LNAPL Thickness Contours - April 1, 2009

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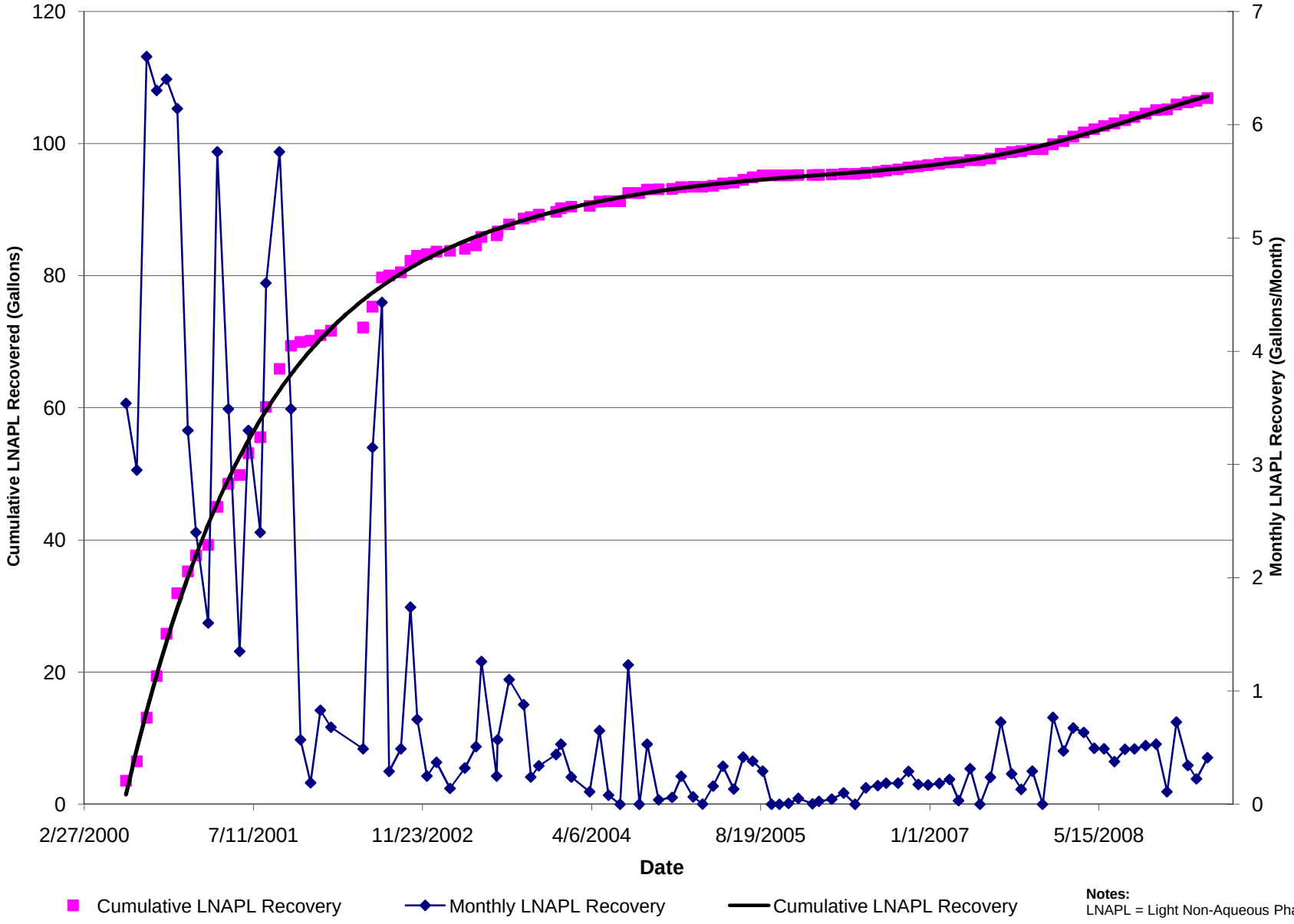
Figure 3-13
Monthly and Cumulative LNAPL Recovery
Semi-Annual Status Report No. 4
Olin Chemical Superfund Site
Wilmington, Massachusetts



Notes:
LNAPL = Light Non-Aqueous Phase Liquid

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Checked/Date: PHT 05/28/09

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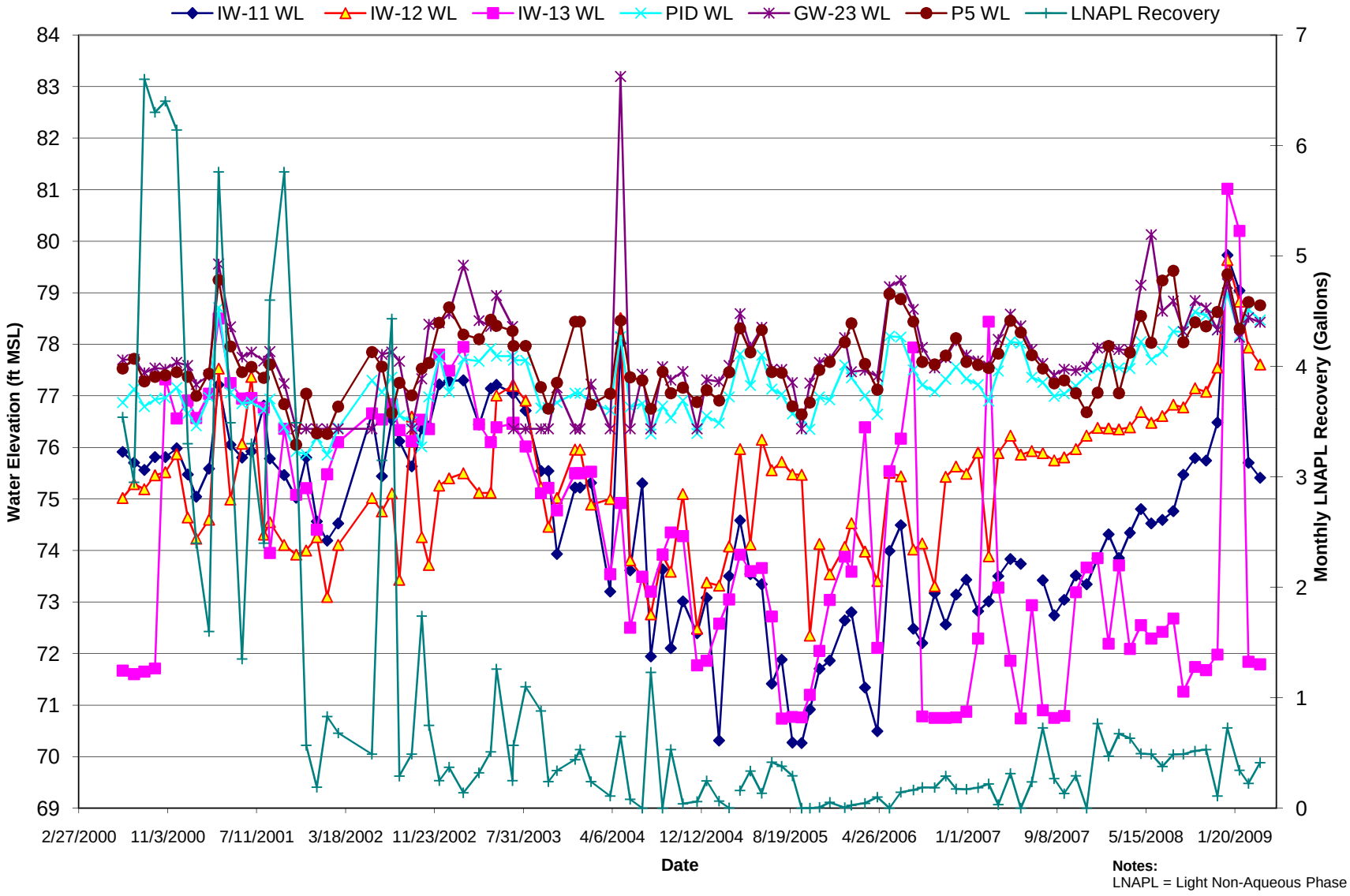
Monthy and Cumulative LNAPL Recovery Data Plot.xls, Figure 3-13

Figure 3-14
Water Levels (WL) and Monthly LNAPL Recovery
Semi-Annual Status Report No. 4
Olin Chemical Superfund Site
Wilmington, Massachusetts



Notes:
LNAPL = Light Non-Aqueous Phase Liquid

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Monthy and Cumulative LNAPL Recovery Data Plot.xls, Figure3-14

APPENDIX A

Interim Response Steps Field Activity Reports

A-1 Fourth Quarter 2008 Sampling Event
A-2 First Quarter 2009 Sampling Event

APPENDIX A

Interim Response Steps Field Activity Reports

A-1 Fourth Quarter 2008 Sampling Event

INTERIM RESPONSE STEPS FIELD ACTIVITY REPORT
FOURTH QUARTER 2008 SAMPLING EVENT
OLIN CHEMICAL SUPERFUND SITE
WILMINGTON, MASSACHUSETTS

INTERIM RESPONSE STEPS FIELD ACTIVITY REPORT
FOURTH QUARTER 2008 SAMPLING EVENT
OLIN CHEMICAL SUPERFUND SITE
WILMINGTON, MASSACHUSETTS

Prepared for:

Olin Corporation
3855 North Ocoee St., Suite 200
Cleveland, Tennessee 37312

Prepared By:

MACTEC Engineering and Consulting, Inc.
107 Audubon Road, Building 2, Suite 301
Wakefield, Massachusetts

MACTEC PROJECT NO. 6107090016.05

May 2009

with permission for

Peter H. Thompson — Date 6/29/09
Project Manager

Michael J. Murphy — Date 6/26/09
Project Principal

Table of Contents

1.0 INTRODUCTION 1-1

1.1 LIMITATIONS 1-1

2.0 SLURRY WALL/CAP MONITORING PROGRAM 2-1

2.1 SCOPE OF WORK 2-1
2.1.1 Groundwater Level Measurement 2-1
2.1.2 Groundwater Sampling 2-2
2.1.3 Surface Water Sampling 2-3
2.1.4 Sediment Sampling 2-4
2.1.5 Data Logger Data Download 2-4
2.1.6 Cap Inspection 2-4
2.1.6.1 Activities Completed During This Inspection 2-5
2.1.6.2 Observations During This Inspection 2-5
2.1.6.3 Discussion 2-6
2.1.6.4 Recommendations 2-6

3.0 PLANT B MONITORING PROGRAM 3-1

3.1 SCOPE OF WORK 3-1
3.1.1 Groundwater Level Measurements and Product Gauging 3-1
3.1.2 Groundwater Sampling 3-2

Tables

Table 1 Groundwater, Surface Water and Sediment Sampling Locations
Table 2 Groundwater Elevations – Slurry Wall/Cap Monitoring Program
Table 3 Final Field Parameters for Groundwater Sampling – Slurry Wall/Cap Monitoring Program
Table 4 Groundwater Analytical Program – Slurry Wall/Cap Monitoring Program
Table 5 Final Field Parameters for Surface Water Sampling – Slurry Wall/Cap Monitoring Program
Table 6 Surface Water Analytical Program – Slurry Wall/Cap Monitoring Program
Table 7 Sediment Analytical Program – Slurry Wall/Cap Monitoring Program
Table 8 Groundwater Elevations – Plant B Monitoring Program
Table 9 Final Field Parameters for Groundwater Sampling – Plant B Monitoring Program
Table 10 Groundwater Analytical Program – Plant B Monitoring Program

Figures

Figure 1 Slurry Wall/Cap Monitoring Program Sampling Locations
Figure 2 Fourth Quarter 2008 Temporary Cap Inspection Observations
Figure 3 Plant B Monitoring Program Sampling Locations

Appendices

Appendix A Field Data Records and Field Instrument Calibration Records
Appendix B Chains of Custody
Appendix C Fourth Quarter 2008 Temporary Cap Inspection Photo Log

GLOSSARY OF ACRONYMS

DO	Dissolved Oxygen
IRSWP	Interim Response Steps Work Plan
LNAPL	Light Non-Aqueous Phase Liquid
MACTEC	MACTEC Engineering and Consulting, Inc.
MassDEP	Massachusetts Department of Environmental Protection
NTU	Nephelometric Turbidity Units
ORP	Oxidation/Reduction Potential
SC	Specific Conductivity
SOPs	Standard Operating Procedures
USEPA	United States Environmental Protection Agency
UV	ultraviolet

1.0 INTRODUCTION

On behalf of the Olin Corporation, MACTEC Engineering and Consulting, Inc. (MACTEC) presents this sampling summary report for field activities completed in association with the Fourth Quarter 2008 surface water, groundwater, and sediment sampling and the cap inspection for the Slurry Wall/Cap Monitoring Program and for the Plant B Monitoring Program.

1.1 LIMITATIONS

This report, including its findings, opinions, and conclusions, is intended for the exclusive use and benefit of, and may be relied upon only by Olin Corporation and the United States Environmental Protection Agency (USEPA).

2.0 SLURRY WALL/CAP MONITORING PROGRAM

The purpose of the Slurry Wall/Cap Monitoring Program is to monitor the concentrations of select groundwater, surface water, and sediment constituents in areas adjacent to and within the South Ditch and to monitor the physical condition of the temporary cap for the former Olin Facility located at 51 Eames Street, Wilmington, Massachusetts.

The Fourth Quarter 2008 groundwater, surface water, and sediment monitoring program included groundwater sampling from 17 groundwater monitoring wells and three piezometers, the collection of surface water samples from seven locations within the South Ditch, the collection of sediment samples from five locations in or adjacent to the South Ditch, and the collection of groundwater level measurements from 23 monitoring wells and piezometers. Groundwater, surface water, and sediment sample locations are listed in **Table 1** and shown on **Figure 1**. The surface water, sediment, and groundwater sampling program is further described in the Final Interim Response Steps Work Plan (IRSWP) (MACTEC 2008) dated August 8, 2008, which has been approved by the USEPA.

2.1 SCOPE OF WORK

The Slurry Wall/Cap Monitoring Program for this sampling event consists of collecting groundwater level measurements from 18 monitoring wells and five piezometers in the vicinity of the South Ditch area; low flow groundwater sampling from 17 monitoring wells (GW-10S, GW-24, GW-25, GW-26, GW-34SR, GW-34D, GW-35S, GW-39, GW-42S, GW-55S, GW-76S, GW-78S, GW-79S, GW-201S, GW-202S, GW-202D, and GW-CA1) and three piezometers (PZ-16RR, PZ-17RR, and PZ-18R); sediment collection from five locations (SD-SD1, SD-SD2, SD-SD3, SD-SD4 and SD-SD5); surface water sampling from seven locations (ISCO-1, ISCO-2, ISCO-3, SD-17, PZ-16RR, PZ-17RR, and PZ-18R); inspecting and documenting the condition of the temporary cap; and downloading water level data from data loggers that have been installed in five monitoring wells (GW-10S, GW-35S, GW-CA1, GW-76S, and GW-78S). Monitoring wells, piezometers, sediment, and surface water sample locations are shown on **Figure 1**.

2.1.1 Groundwater Level Measurement

On November 18, 2008, MACTEC personnel completed a site reconnaissance of the monitoring well locations in the Slurry Wall/Cap Monitoring Program and collected groundwater level measurements. This included measuring depth to groundwater from 23 monitoring wells and

piezometers using a water interface probe. Groundwater level measurements and the calculated groundwater elevations are summarized in **Table 2**.

2.1.2 Groundwater Sampling

On November 19th, 20th, and 21st, 2008, MACTEC personnel sampled groundwater from 17 monitoring wells and three piezometers using the 1996 USEPA low stress (low flow) groundwater sampling method in accordance with the Standard Operating Procedures (SOPs) located in Appendix A of the IRSWP.

Prior to low flow sampling, two water quality meters (Horiba U-22 water monitoring instrument and Hach 2100P turbidity meter) were calibrated according to the instrument manufacturer's specifications using certified calibration solutions. The field instrument calibration records are contained in **Appendix A**. No readings were noted outside the manufacturer calibration ranges.

Groundwater was purged using an adjustable rate peristaltic pump along with dedicated tubing at each monitoring location. During sampling activities, the purged groundwater was continuously monitored using a Horiba U-22 multi-parameter water quality meter for pH, temperature, specific conductivity (SC), dissolved oxygen (DO), and oxidation/reduction potential (ORP) while turbidity was monitored using the Hach turbidity meter. Well purging continued at each location until these field parameters stabilized as indicated in Appendix A of the IRSWP.

Groundwater readings greater than 1 nephelometric turbidity units (NTU) and outside the ±10 percent range included: GW-25, GW-26, GW-34D, GW-42S, GW-55S, GW-76S, GW-201S, GW-202S, PZ-17RR, and PZ-18R. Groundwater readings from GW-24, GW-35S, GW-79S, GW-202D, and PZ-16RR had turbidity readings above 5 NTU but were within the ±10 percent range. The high turbidity readings from PZ-16RR were not within the ±10 percent range and likely due to the piezometer going dry.

Groundwater readings greater than ±10 percent range for DO included: GW-10S, GW-25, GW-39, GW-55S, GW-201S, and PZ-16RR.

The final low flow field parameter readings are presented in **Table 3**. Field data records from each monitoring well location are attached in **Appendix A**.

Upon groundwater stabilization, groundwater samples were collected by directly filling the laboratory prepared bottles. A 0.45-micron pore diameter, in-line Teflon™ filter was used to field filter groundwater for dissolved metal analysis. The samples were placed on ice and transferred to TestAmerica of Westfield, Massachusetts, under chain-of-custody for chemical analyses as summarized in **Table 4**. Copies of the chain-of-custody documents are provided in **Appendix B**.

Purged groundwater from each monitoring well was collected in collapsible plastic containers, transported to the on-site groundwater treatment building (Plant B), and containerized in a secured 55-gallon drum.

2.1.3 Surface Water Sampling

On November 18, 2008, MACTEC personnel collected seven surface water samples (ISCO-1, ISCO-2, ISCO-3, PZ-16RR, PZ-17RR, PZ-18R, and SD-17), from downstream to upstream, along the East Ditch and South Ditch. Sample locations are shown in **Figure 1**. It should be noted that surface water sample location ISCO-3 was collected at the confluence of the East Ditch and South Ditch.

Before sampling activities began, a Horiba U-22 multi-parameter water quality meter and Hach turbidity meter were properly calibrated to monitor surface water quality parameters at each location. The calibration records can be found in **Appendix A**.

At each of the seven field locations, surface water parameter measurements (pH, temperature, SC, ORP, DO, and turbidity) were collected. Readings were collected by directly submersing the Horiba probe into the surface water of the South Ditch until parameter stabilization. The final surface water field parameter readings are summarized in **Table 5**. Field data records from each surface water location are attached in **Appendix A**.

Filtered surface water samples were collected by submerging dedicated tubing attached to a peristaltic pump into the water (approximately 0.3 feet into the surface water). A peristaltic pump was used to reduce the entrapment of floating or suspended sediment and to provide positive

pressure for field filtering the water through the 0.45-micron pore diameter filter for dissolved metal analysis.

Surface water samples were collected by directly filling the laboratory prepared bottles. The samples were then placed on ice, for delivery to TestAmerica of Westfield, Massachusetts, under chain-of-custody for chemical analyses summarized in **Table 6**. Copies of the chain-of-custody documents are provided in **Appendix B**.

2.1.4 Sediment Sampling

Surficial sediment samples were collected within the ditch system at the five locations identified in **Table 1** and in **Figure 1**. The samples were collected using a shovel, mixed in stainless steel bowls using stainless steel spoons, and were placed in sample containers provided by the laboratory. The samples were submitted to TestAmerica on ice and under chain of custody for analysis summarized in **Table 7**. Field data records from the sediment sampling are attached in **Appendix A**. Copies of the chain-of-custody documents are provided in **Appendix B**.

2.1.5 Data Logger Data Download

Data loggers are deployed in five monitoring wells (GW-10S, GW-35S, GW-CA1, GW-76S, and GW-78S) to continuously monitor groundwater elevation proximate to the cap area. On November 21, 2008, MACTEC downloaded data from these data loggers and re-deployed them into the monitoring wells. Additional data will be collected during the next quarterly event scheduled for February 2009. Downloaded data logger data will be summarized in the Semi-annual Status Report scheduled for submittal in July 2009.

2.1.6 Cap Inspection

The Fourth Quarter 2008 Temporary Cap Inspection at the Site was completed by MACTEC on November 17, 2008, with the assistance of the Massachusetts Department of Environmental Protection (MassDEP), USEPA, and Olin personnel. The temporary cap is composed of 10 large and three small scrim reinforced polyethylene sheets of 8 mil thickness (**Figure 2**). These sheets are composed of smaller, narrower panels that were factory seamed to produce the large sheets. The factory seams are double welded seams. The seams between the large sheets were field fabricated by folding and sewing the edges of the sheets together with an ultraviolet (UV) resistant thread. The original temporary cap was installed in 2001 and consisted of a 6 mil thick

sheet. Due to deterioration of the 6 mil sheet, it was replaced by the current 8 mil thick cover in 2003. The 8 mil cover was placed directly over the 6 mil cover and re-ballasted with sand bags to resist wind uplift. Quarterly inspections of the 8 mil cover were instituted in 2003 to evaluate the need for periodic maintenance and to document maintenance and repair activities.

On November 17, 2008, MACTEC field personnel, as well as Jim DiLorenzo (USEPA), Joe Coyne (MassDEP), and Brian Guichard (Olin), performed a visual inspection of the Temporary Cap surface. Photographs taken during the inspection are presented in **Appendix C**. In general, the Temporary Cap appeared to be in good condition with only minor perforations (less than one-half inch). The Temporary Cap surface contained some sediment, water deposited in low lying areas and vegetation growing on the cap material at some locations. Temporary cap monitoring activities are summarized below.

2.1.6.1 Activities Completed During This Inspection

- Walking and inspecting the sewn seams for evidence of deterioration of the UV resistant thread.
- Observing areas of sewn seams that were in low spots and in contact with or submerged under ponded water.
- Checking sand bags where vegetation has rooted to verify that roots do not penetrate the polyethylene cover.
- Investigating areas of vegetation growth above cap to ensure cap material hasn't been compromised.
- Providing photo-documentation of typical cap conditions.

2.1.6.2 Observations During This Inspection

- The scrim reinforced polyethylene cover remains flexible and is generally in good condition.
- Sewn seams utilizing UV-resistant thread are intact and do not show signs of deterioration.
- Many small perforations no more than one half inch in diameter require patching.
- Wild seeding of some degraded sandbags has resulted in vegetation outgrowths from underneath and surrounding the bags. Plant roots, where observed, do not penetrate the underlying polyethylene sheet.
- The gravel ballast placed along the perimeter of the cap remains in place.
- Pools of water support rafts of vegetation, mainly grass, which do not deleteriously affect the cap.
- Patches of vegetation are growing on the cap surface, but do not appear to have affected polyethylene sheet.
- The Temporary Cap internal drain grate was free of vegetation.

- Several UV-resistant sandbags have lost a sufficient amount of sand to warrant a recommendation for their replacement. Olin is conducting a replacement program that includes replacement of these bags.

2.1.6.3 Discussion

Overall, the Temporary Cap was observed to be in good condition. The general physical condition of the membrane is good considering its age and service conditions (direct exposure to sunlight and the elements). The presence of ponded water does not necessarily signify leakage in those ponded areas. The presence of ponded water suggests that the underlying polyethylene sheeting is intact and is not leaking, or is not leaking extensively. Much of the water loss from ponded areas is probably due to evaporation. The general pattern of ponded water on the cover is consistent with older survey data of the temporary cap area. The cap is internally graded to a drain which outlets to the sedimentation basin located to the south between the containment area and South Ditch. During the site cap inspection, MACTEC observed the drain to be free of vegetation.

Several UV-resistant sandbags are recommended for replacement (see **Figure 2**); however, the deterioration of the majority of the sand bags does not adversely affect their purpose which is to place weight on the cover to resist wind uplift forces. Degraded sandbags are currently being replaced with new sandbags.

Although areas of vegetation growth exist on the cap surface, there appears to be no adverse effect on the polyethylene sheeting after further investigation. The polyethylene sheet continues to perform its intended function as the UV protection provided by its carbon black content has protected the polymer from significant deterioration.

2.1.6.4 Recommendations

Olin site personnel have repaired previous perforations and minor damage to the cap with repair tape. These repairs were generally observed to be in good condition and do not require resealing. A polyethylene tape with a mastic backing that is typically used on shrink wrap polyethylene covers (marine industry use) is being used as an alternative repair tape if current repairs fail prematurely.

It is recommended that the current program of cap inspections and maintenance (including patching the small perforations noted during the cap inspection, replacing sandbags at identified locations, and continuing cap monitoring for future changes in condition) be continued. The continued inspection of build-up of vegetation from the cap's internal drainage grate is also recommended (to facilitate drainage of ponded water).

3.0 PLANT B MONITORING PROGRAM

The purpose of the Plant B groundwater sampling and analysis program is to monitor groundwater quality at select monitoring wells and conduct gauging activities to determine groundwater elevations and light non-aqueous phase liquid (LNAPL) thickness.

The Fourth Quarter 2008 Plant B monitoring program includes groundwater gauging at 28 monitoring wells and sampling six of the monitoring wells (GW-16R, B-03, GW-101, GW-13, IW-10, and IW-6). Groundwater monitoring wells in the Plant B Monitoring Program are listed in **Table 8** and locations are shown on **Figure 3**.

3.1 SCOPE OF WORK

The Plant B Monitoring Program for this monitoring period consists of measuring groundwater levels in 28 monitoring wells within the Plant B area; gauging LNAPL thickness in monitoring wells where LNAPL was observed; and USEPA low flow (low stress) groundwater sampling at monitoring wells GW-16R (which replaced GW-16 on April 25, 2008), B-03, GW-101, GW-13, IW-10, and IW-6. Monitoring well locations are shown on **Figure 3**.

3.1.1 Groundwater Level Measurements and Product Gauging

On November 17, 2008, MACTEC personnel completed a site reconnaissance of the monitoring well locations in the Plant B Monitoring Program along with groundwater level measurements and LNAPL thickness measurements in monitoring wells with observed LNAPL. Depth to groundwater was measured in 28 monitoring wells using a water interface probe. For wells with observed LNAPL, LNAPL thickness was measured using an oil/water interface probe. Groundwater level measurements, groundwater elevations, and LNAPL thickness measurements are summarized in **Table 8**.

It should be noted that MACTEC completed a search from the top of the embankment for the staff gauge located within the East Ditch of the Plant B area. The staff gauge was not found and is presumed to have been destroyed.

3.1.2 Groundwater Sampling

On November 24, 2008, MACTEC personnel sampled groundwater from monitoring wells GW-16R, B-03, GW-101, GW-13, IW-10, and IW-6 using the 1996 USEPA low stress (low flow) groundwater sampling method in accordance with the SOPs located in Appendix A of the IRSWP.

Prior to low flow sampling, the water quality meters (Horiba U-22 water quality meter and Hach 2100P turbidity meter) were calibrated in accordance with manufacturer specifications using certified calibration solutions. The field instrument calibration records are contained in **Appendix A**. No readings were noted outside the manufacturer calibration ranges.

Groundwater was purged using an adjustable rate peristaltic pump along with dedicated tubing. During sampling activities, the purged groundwater was continuously monitored using a Horiba U-22 water quality instrument for pH, temperature, SC, DO, and ORP. Turbidity was monitored using a Hach turbidity meter. Well purging continued until these field parameters stabilized as indicated in Appendix A of the IRSWP.

Groundwater readings greater than 1 NTU and outside the ±10 percent range included: GW-13, GW-16R and B-03. Groundwater readings from monitoring wells IW-6 and IW-10 had turbidity readings above 5 NTU but within the ±10 percent range. Groundwater readings from GW-101 had a turbidity reading above 5 NTU and were slightly outside the ±10 percent range.

The final low flow purging field parameter information at stabilization is presented in **Table 9**. Field data records have been attached in **Appendix A**.

Upon groundwater stabilization, groundwater samples were collected by directly filling the laboratory prepared bottles. The samples were placed on ice, and were transferred to TestAmerica of Westfield, Massachusetts, under chain-of-custody for chemical analyses as summarized in **Table 10**. Copies of the chain-of-custody documents are provided in **Appendix B**.

Purged groundwater from each monitoring well was collected in collapsible plastic containers, transported to the on-site groundwater treatment building, and containerized in a secured 55-gallon drum.

TABLES

Table 1
Groundwater, Surface Water, and Sediment Sampling Locations
Fourth Quarter 2008 Sampling Event
Olin Chemical Superfund Site
Wilmington, Massachusetts

Ground Water	Surface Water	Sediment
GW-10S	ISCO1	SD-SD1
GW-24	ISCO2	SD-SD2
GW-25	ISCO3	SD-SD3 [2]
GW-26	PZ-16RR	SD-SD4
GW-34SR	PZ-17RR	SD-SD5
GW-34D [1]	PZ-18R	
GW-35S	SD-17	
GW-39		
GW-42S		
GW-43S**		
GW-55S		
GW-76S		
GW-78S		
GW-79S		
GW-201S		
GW-202S [1,2]		
GW-202D		
GW-CA1		
PZ-16RR		
PZ-17RR		
PZ-18R [2]		
GW-16R*		
B-03*		
GW-101*		
GW-13*		
IW-10*		
IW-6*		

Notes:
1 - DUP collected
2 - MS/MSD collected
* - Plant B Monitoring Well
** - The plan calls for sampling monitoring well GW-43S. However, this well was previously destroyed during asphalt paving activities and could not be sampled.

Prepared by: DLC 12/19/08
Checked by: TRH 1/2/09

Table 2
Groundwater Elevations
Slurry Wall/Cap Monitoring Program
Fourth Quarter 2008 Sampling Event
Olin Chemical Superfund Site
Wilmington, Massachusetts

WELL/ SG- ID	Reference Elevation	Depth to Water (1, 2)	Groundwater Elevation (3)	Notes	Date Measured
I.D.	(ft msl)	(ft)	(feet NGVD)		
GW-10S	89.10	8.78	80.32		11/18/2008
GW-24	83.43	2.72	80.71		11/18/2008
GW-25	85.97	5.29	80.68		11/18/2008
GW-26	84.93	3.98	80.95		11/18/2008
GW-34D	90.36	8.68	81.68		11/18/2008
GW-34SR	89.13	7.41	81.72		11/18/2008
GW-35S	88.51	7.64	80.87		11/18/2008
GW-39	83.64	3.54	80.10		11/18/2008
GW-42S	84.18	3.52	80.66		11/18/2008
GW-43S	NG	NG	NG	Destroyed	NG
GW-55S	81.70	2.00	79.70		11/18/2008
GW-55D	81.95	2.35	79.60		11/18/2008
GW-76S	88.45	7.44	81.01	TOC	11/18/2008
GW-78S	84.89	4.61	80.28		11/18/2008
GW-79S	81.54	3.97	77.57		11/18/2008
GW-201S	83.29	4.03	79.26		11/18/2008
GW-202S	86.97	6.67	80.30		11/18/2008
GW-202D	86.52	6.05	80.47		11/18/2008
GW-CA1	88.01	7.06	80.95		11/18/2008
PZ-16RR/IN	81.0	2.98	78.02		11/18/2008
PZ-16RR/OUT (4)	81.0	2.86	78.14		11/18/2008
PZ-17RR/IN	82.43	2.41	80.02		11/18/2008
PZ-17RR/OUT (4)	82.43	3.42	79.01		11/18/2008
PZ-18R/IN	82.42	2.28	80.14		11/18/2008
PZ-18R/OUT (4)	82.42	1.89	80.53		11/18/2008
PZ-24	89.43	7.61	81.82		11/18/2008
PZ-25	88.90	8.86	80.04		11/18/2008

Notes:
(1) - Top of PVC. If no PVC, measurement from TOC
(2) - Collected using a Solinst water interface probe
(3) - Groundwater Elevation = Reference Elevation - Depth to Water
(4) - Reported elevation for surface water adjacent to piezometer
TOC - Water level measurement taken from Top of Casing
NG - Not gauged

Prepared by: DLC 12/19/08
Checked by: TRH 1/2/09

Table 3
Final Field Parameters for Groundwater Sampling
Slurry Wall/Cap Monitoring Program
Fourth Quarter 2008 Sampling Event
Olin Chemical Superfund Site
Wilmington, Massachusetts

Quarterly Slurry Wall/Cap Monitoring Well Samples

Location	GW-25	GW-78S	GW-79S	GW-202S	GW-202D
Date	11/19/2008	11/20/2008	11/20/2008	11/21/2008	11/21/2008
Depth to Water (ft)	5.56	4.93	3.71	6.75	6.27
Temperature (ºCelcius)	11.3	11.5	10.3	12.8	12.8
Conductivity (µS/cm)	682	1,430	3,160	1,730	5,310
pH (standard units)	6.80	5.97	5.94	6.25	4.82
Dissolved oxygen (mg/L)	0.50	0.38	<0.1	<0.1	<0.1
Turbidity (NTU)	1.30	0.32	14.0	1.27	22.1
Redox (millivolts)	-103	84	-45	58	158

Semiannual Slurry Wall/Cap Monitoring Well Samples

Location	GW-10S	GW-201S	GW-24	GW-26	GW-34D	GW-34SR	GW-35S	GW-39	GW-42S	GW-55S	GW-76S	GW-CA-1
Date	11/19/2008	11/21/2008	11/19/2008	11/19/2008	11/21/2008	11/21/2008	11/20/2008	11/19/2008	11/17/2008	11/20/2008	11/19/2008	11/20/2008
Depth to Water (ft)	8.83	4.49	11.30	4.03	8.68	7.79	7.74	3.74	3.52	2.18	7.55	8.05
Temperature (ºCelcius)	12.7	11.4	12.3	11.8	12.6	11.1	15.5	9.8	13.47	10.3	11.5	12.9
Conductivity (µS/cm)	411	3,090	397	500	159	103	1,240	673	357	3,900	218	621
pH (standard units)	3.90	7.09	8.26	6.09	6.38	5.95	7.11	5.78	8.50	5.89	5.85	6.62
Dissolved oxygen (mg/L)	0.38	<0.1	<0.1	<0.1	6.53	1.25	0.11	1.12	0.77	0.41	<0.1	1.20
Turbidity (NTU)	<0.01	3.39	17.9	1.72	1.51	1.62	5.93	1.68	4.26	2.34	2.65	0.63
Redox (millivolts)	278	-7	-162	-6	109	128	-175	25	-160	21	165	49

Slurry Wall/Cap Piezometer Samples

Location	PZ-16RR	PZ-17RR	PZ-18R
Date	11/20/2008	11/20/2008	11/20/2008
Depth of Water (ft)	6.00	3.09	2.15
Temperature (ºCelcius)	5.3	8.9	8.2
Conductivity (µS/cm)	3,160	1,590	765
pH (standard units)	7.23	7.49	6.84
Dissolved oxygen (mg/L)	3.21	10.20	8.52
Turbidity (NTU)	14.2	1.89	1.6
Redox (millivolts)	-157	-87	-87

Notes:
ft - feet
µS/cm - microSiemens per centimeter
mg/L - milligrams per liter
NTU - nephelometric turbidity units

Prepared by: DLC 12/22/08
Checked by: TRH 1/2/09

Table 4
Groundwater Laboratory Analytical Program
Slurry Wall/Cap Monitoring Program
Fourth Quarter 2008 Sampling Event
Olin Chemical Superfund Site
Wilmington, Massachusetts

Analyte	Analysis Method	Detection Limit	Units
Physical/Inorganic Parameters			
Ammonia-Nitrogen	EPA 350.1 (10-107-06-1-K)	0.1	mg/L
Chloride	EPA 300.0	1	mg/L
Specific Conductivity	SM18 2510B	1	µmhos/cm
Sulfate	EPA 300.0	2	mg/L
Filtered Metals			
Aluminum, filtered	SW846 6010B	100	µg/L
Chromium, filtered	SW846 6010B	5	µg/L

Notes:
NA - not applicable
mg/L - milligrams per liter
µmhos/cm - micromhos per centimeter
µg/L - micrograms per liter

Prepared by: DLC 12/22/08
Checked by: TRH 1/2/09

Table 5
Final Field Parameters for Surface Water Sampling
Slurry Wall/Cap Monitoring Program
Fourth Quarter 2008 Sampling Event
Olin Chemical Superfund Site
Wilmington, Massachusetts

Surface Water Samples							
Location	ISCO1	ISCO2	ISCO3	PZ-16RR	PZ-17RR	PZ-18R	SD-17
Date	11/18/2008	11/18/2008	11/18/2008	11/18/2008	11/18/2008	11/18/2008	11/18/2008
Depth of Water (ft)	1.0	0.3	0.4	0.6	0.4	1.5	0.5
pH (standard units)	5.73	6.20	6.01	5.24	4.92	4.92	5.08
Conductivity (µS/cm)	873	1360	2150	2220	2290	885	2310
Dissolved oxygen (mg/L)	4.46	1.62	10.10	6.31	7.56	10.72	5.81
Temperature (ºCelcius)	5.3	7.4	4.7	5.3	7.0	4.1	6.8
Turbidity (NTU)	4.73	>1000	29.3	22.3	22.9	5.3	20.9
Redox (millivolts)	68	-71	65	107	106	93	110

Notes:
ft - feet
µS/cm - microSiemens per centimeter
mg/L - milligrams per liter
NTU - nephelometric turbidity units

Prepared by: DLC 12/22/08
Checked by: TRH 1/2/09

Table 6
Surface Water Analytical Program
Slurry Wall/Cap Monitoring Program
Fourth Quarter 2008 Sampling Event
Olin Chemical Superfund Site
Wilmington, Massachusetts

Analyte	Analysis Method	Detection Limit	Units
Physical/Inorganic Parameters			
Ammonia-Nitrogen	EPA 350.1 (10-107-06-1-K)	0.1	mg/L
Nitrate	EPA 300.0	0.05	mg/L
Nitrite	EPA 300.0	0.01	mg/L
Chloride	EPA 300.0	1	mg/L
Specific Conductivity	SM18 2510B	1	µmhos/cm
Sulfate	EPA 300.0	2	mg/L
Total Metals			
Aluminum, Total	SW846 6010B	100	µg/L
Chromium, Total	SW846 6010B	5	µg/L
Sodium, Total	SW846 6010B	2000	µg/L
Filtered Metals			
Aluminum, Filtered	SW846 6010B	100	µg/L
Chromium, Filtered	SW846 6010B	5	µg/L
Sodium, Filtered	SW846 6010B	2000	µg/L

Notes:
mg/L - milligrams per liter
µmhos/cm - micromhos per centimeter
µg/L - micrograms per liter

Prepared by: DLC 12/22/08
Checked by: TRH 1/2/09

Table 7
Sediment Analytical Program
Slurry Wall/Cap Monitoring Program
Fourth Quarter 2008 Sampling Event
Olin Chemical Superfund Site
Wilmington, Massachusetts

Analyte	Analysis Method	Detection Limit	Units
Physical/Inorganic Parameters			
Percent Moisture	EPA 160.3	1.0	Percent
Metals			
Aluminum	SW846 6010B	2.5	mg/Kg
Chromium	SW846 6010B	0.50	mg/Kg
Iron	SW846 6010B	5.0	mg/Kg

Notes:
mg/Kg - milligrams per kilogram

Prepared by: DLC 12/22/08
Checked by: TRH 1/2/09

Table 8
Groundwater Elevations
Plant B Monitoring Program
Fourth Quarter 2008 Sampling Event
Olin Chemical Superfund Site
Wilmington, Massachusetts

WELL/ SG- ID	Reference Elevation (1)	Depth to Water (2)	Depth to Product (3)	Product Thickness (4)	Groundwater Elevation (5)	Date Measured
I.D.	(ft msl)	(ft)	(ft)	(ft)	(feet NGVD)	
B-2	90.48	12.11	NPD	NA	78.37	11/17/2008
B-3	90.32	11.88	NPD	NA	78.44	11/17/2008
B-5R	91.38	12.35	NPD	NA	79.03	11/17/2008
B-7A	88.81	9.00	NPD	NA	79.81	11/17/2008
B-17	91.55	10.62	NPD	NA	80.93	11/17/2008
GW-13	90.57	11.98	NPD	NA	78.59	11/17/2008
GW-14	88.70	10.01	NPD	NA	78.69	11/17/2008
GW-15	90.01	9.85	NPD	NA	80.16	11/17/2008
GW-16R	92.46	11.99	NPD	NA	80.47	11/17/2008
GW-23	91.04	13.03	12.77	0.26	78.26	11/17/2008
GW-52S	87.95	9.34	NPD	NA	78.61	11/17/2008
GW-100	90.15	11.91	NPD	NA	78.24	11/17/2008
GW-101	90.14	12.00	NPD	NA	78.14	11/17/2008
GW-102	89.00	12.81	NPD	NA	76.19	11/17/2008
IW-1	90.71	12.15	NPD	NA	78.56	11/17/2008
IW-2	90.53	13.20	13.19	<0.01	77.33	11/17/2008
IW-3	90.76	12.12	12.11	<0.01	78.64	11/17/2008
IW-6	89.15	11.19	NPD	NA	77.96	11/17/2008
IW-7	90.10	12.09	NPD	NA	78.01	11/17/2008
IW-8	89.94	11.78	NPD	NA	78.16	11/17/2008
IW-9	89.78	11.65	NPD	NA	78.13	11/17/2008
IW-10	90.43	12.19	NPD	NA	78.24	11/17/2008
IW-11	89.92	13.11	13.10	<0.01	76.81	11/17/2008
IW-12	90.31	13.72	13.71	<0.01	76.59	11/17/2008
IW-13	89.90	18.41	18.40	<0.01	71.49	11/17/2008
PID	89.97	12.04	12.03	<0.01	77.93	11/17/2008
P5	90.45	12.30	12.29	<0.01	78.15	11/17/2008
12-IN	89.84	11.50	11.49	<0.01	78.34	11/17/2008

Notes:

Prepared by: DLC 12/22/08
Checked by: TRH 1/2/09

(1) - Reference elevations surveyed 11/97. New TOC survey by Dana Perkins 4-5/98
(2) - Top of PVC. If no PVC, measurement from top of steel casing
(3) - Collected using a Solinst water interface probe or Geotech oil/water interface probe
(4) - Sheen noted with a product thickness of 0.01 feet
(5) - Groundwater Elevation = Reference Elevation - (Depth to Water - (Product Thickness x 0.95))
TOC - Top of Casing
NPD - No Product Detected
NA - Not Applicable

Table 9
Final Field Parameters for Groundwater Sampling
Plant B Monitoring Program
Fourth Quarter 2008 Sampling Event
Olin Chemical Superfund Site
Wilmington, Massachusetts

Quarterly Plant B Monitoring Wells	
Location	GW-16R
Date	11/24/2008
Depth to Water (ft)	12.83
Temperature (ºCelcius)	14.2
Conductivity (µS/cm)	234
pH (standard units)	6.23
Dissolved oxygen (mg/L)	6.98
Turbidity (NTU)	3.4
Redox (millivolts)	2

Annual Plant B Monitoring Wells					
Location	B-03	GW-101	GW-13	IW-10	IW-6
Date	11/24/2008	11/24/2008	11/24/2008	11/24/2008	11/24/2008
Depth to Water (ft)	12.71	12.62	13.40	12.5	11.43
Temperature (ºCelcius)	14.5	13.1	12.5	14.3	14.0
Conductivity (µS/cm)	58	2,050	46	371	504
pH (standard units)	5.10	6.39	5.00	6.92	5.97
Dissolved oxygen (mg/L)	2.20	3.95	0.74	<0.1	<0.1
Turbidity (NTU)	2.92	11.8	1.62	12.9	11.5
Redox (millivolts)	172	-112	265	21	-65

Notes:
ft - feet
µS/cm - microSiemens per centimeter
mg/L - milligrams per liter
NTU - nephelometric turbidity units

Prepared by: DLC 12/22/08
Checked by: TRH 1/2/09

Table 10
Groundwater Laboratory Analytical Program
Plant B Monitoring Program
Fourth Quarter 2008 Sampling Event
Olin Chemical Superfund Site
Wilmington, Massachusetts

Analyte	Analysis Method	Detection Limit	Units
Volatile organic compounds (VOC)			
2,4,4-Trimethyl-1-pentene	SW846 8260B	1	µg/L
2,4,4-Trimethyl-2-pentene	SW846 8260B	1	µg/L
Semivolatile organic compounds (SVOC)			
N-nitrosodiphenylamine	SW846 8270C	10	µg/L
bis(2-ethylhexyl)phthalate	SW846 8270C	10	µg/L
Volatile Petroleum Hydrocarbons (VPH)			
C5-C8 Aliphatics	MA VPH	100	µg/L
C5-C8 Aliphatics, Unadjusted	MA VPH	100	µg/L
C9-C12 Aliphatics	MA VPH	100	µg/L
C9-C12 Aliphatics, Unadjusted	MA VPH	100	µg/L
C9-C10 Aromatics	MA VPH	100	µg/L
Methyl-tert-butyl-ether (MTBE)	MA VPH	5	µg/L
Benzene	MA VPH	5	µg/L
Ethylbenzene	MA VPH	5	µg/L
m,p-Xylene	MA VPH	10	µg/L
o-Xylene	MA VPH	5	µg/L
Toluene	MA VPH	5	µg/L
Naphthalene	MA VPH	10	µg/L
Physical/Inorganic Parameters			
Ammonia-Nitrogen	EPA 350.1 (10-107-06-1-K)	0.1	mg/L
pH	SM 4500 H+ B	0.1	SU
Total Metals			
Iron, Total	SW846 6010B	100	µg/L
Filtered Metals			
Iron, Filtered	SW846 6010B	100	µg/L

Notes:
µg/L - micrograms per liter
mg/L - milligrams per liter
SU - standard units

Prepared by: DLC 12/22/08
Checked by: TRH 1/2/09

FIGURES

SD-SD1
GW-34SR
GW-34D
GW-35S
GW-26
GW-10S
GW-76S
GW-CA1
GW-24
GW-25
GW-42S
GW-202S
GW-202D
PZ-24
PZ-25
ISCO1
PZ-18R
SD-SD2
GW-78S
SD-17
PZ-17RR
GW-55D
GW-55S
GW-39
GW-201S
SD-SD4
GW-79S
SD-SD5
SD-SD3
PZ-16RR
ISCO3
ISCO2

Legend

- Groundwater Sample Location
- Groundwater and Surface Water Sample Location
- Surface Water Location
- Sediment Sample Location
- Site Boundary
- Wetland Boundary
- Paved Road
- Unpaved Road
- Railroad
- Structure
- Water
- Culvert
- Trail

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Wakefield, MA 01880

N

0 85 170 340 Feet

Figure 1
Slurry Wall/Cap Monitoring Program
Sampling Locations
Interim Response Steps Field Activity Report
Fourth Quarter 2008 Sampling Event
Olin Chemical Superfund Site
Wilmington, Massachusetts

Prepared/Date: BJR 4/10/09 | Checked/Date: CTM 4/10/09

Document: P:\OLIN\Wilmington\GIS\MapDocuments\Interim Response Work Plan\Olin_IRWP2.mxd PDF: P:\OLIN\Wilmington\2008 Quarterly Sampling\Nov Quarterly\Report\Figures\Figure 1 - Fourth Quarter 2008 Sampling Locations.pdf 4/10/2009 2:47 PM bjroden

Legend

- Seam
- Monitoring Well

R-# = Previous repair; includes new sandbags
W-# = Water pooling
S-# = Sandbag recommended for replacement
SM-# = Frayed seam
P-# = Perforation

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Wakefield, MA 01880

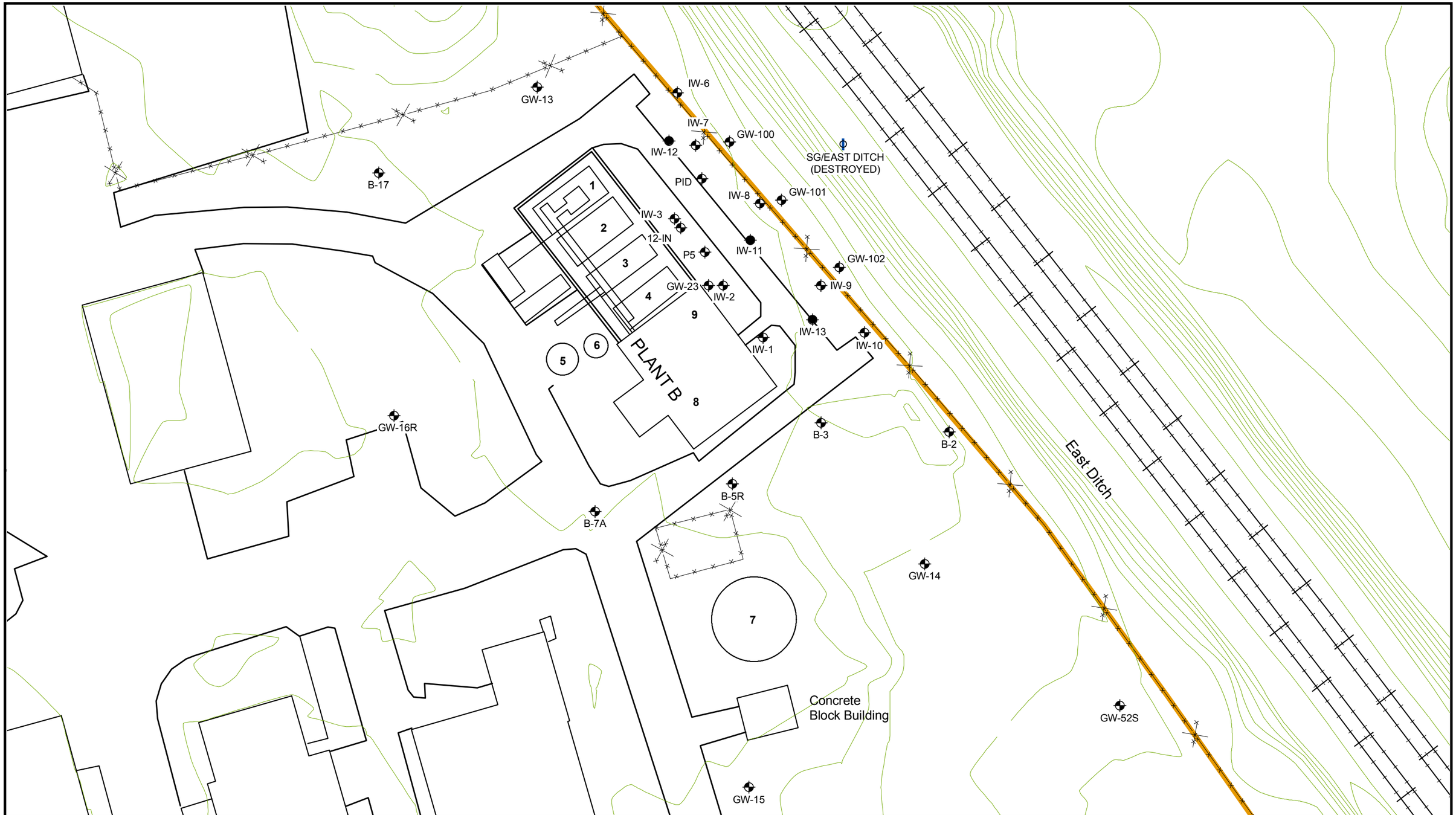
N

0 30 60 120
Feet

Figure 2
Fourth Quarter 2008 Temporary Cap Inspection Observations
Interim Response Steps Field Activity Report
Fourth Quarter 2008 Sampling Event
Olin Chemical Superfund Site
Wilmington, Massachusetts

Prepared by BJR | Checked by DLC

Document: P:\OLIN\Wilmington\GIS\MapDocuments\Olin_11X17_LS.mxd PDF: P:\OLIN\Wilmington\2008 Quarterly Sampling\Nov Quarterly\Report\Figures\Figure 2 - Fourth Quarter 2008 Temporary Cap Inspection Observations.pdf 04/23/2009 2:42 PM bjroden



Tank #1 - Receives gravity overflow from Tank 2 and allows for further settling
Tank #2 - Caustic addition and initial iron drop-out
Tank #3 & #4 - Overnight holding tank for treated water
Tank #5 - Pre-carbon hold tank
Tank #6 - Residence tank
Tank #7 - Raw water (pH adjusted)
Tank #8 - Pre-carbon transfer
Tank #9 - Day discharge to NPDES Outfall 002

Legend

- Monitoring Well
- Recovery Well
- Staff Gauge (Destroyed)
- Elevation Contours

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Wakefield, MA 01880

N

0 15 30 60 Feet

Figure 3
Plant B Monitoring Program
Sampling Locations
Interim Response Steps Field Activity Report
Fourth Quarter 2008 Sampling Event
Olin Chemical Superfund Site
Wilmington, Massachusetts

Prepared/Date: BJR 4/10/09 | Checked/Date: CTM 4/15/09

Document: P:\OLIN\Wilmington\GIS\MapDocuments\Interim Response Work Plan\Olin_PlantB_11X17_LS.mxd PDF: P:\OLIN\Wilmington\2008 Quarterly Sampling\Nov Quarterly\Report\Figures\Figure 3 - Plant B Monitoring Program Sampling Locations Fourth Quarter 2008.pdf.pdf 4/10/2009 4:50 PM bjroden

APPENDIX A

Field Data Records and Field Instrument Calibration Records

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	SAMPLE ID	OC-GW-10S	ROUND NO.	4
SAMPLE ID	OC-GW-10S	SITE TYPE	Superfund	DATE	11/19/2008
TIME	START 11:10 END 11:50	JOB NUMBER	6100-08-0016.04	BOTTLE TIME	11:45

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT
- [X] TOP OF WELL RISER
- [ ] TOP OF PROTECTIVE CASING
- [ ] OTHER

PROTECTIVE CASING STICKUP (FROM GROUND): 1.6 FT.

PROTECTIVE CASING / WELL DIFFERENCE: 0.4 FT.

INITIAL DEPTH TO WATER: 8.80 FT.

WELL DEPTH (TOR): 9.19 FT.

PID AMBIENT AIR: N/A PPMV

WELL DIAMETER: 1.5 IN.

FINAL DEPTH TO WATER: 8.83 FT.

SCREEN LENGTH: See Survey FT.

PID WELL MOUTH: N/A PPMV

WELL INTEGRITY:

	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: 0.03 FT.
(initial - final x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED: 0.0095

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 3.17 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/L) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (µS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)	TURBIDITY (NTU) (10%) (0-2)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
11:16	8.83	300	12.3	356	3.70	2.52	0.80	266	8.90	
11:19	8.83	300	12.6	377	3.77	2.28	0.31	270	8.90	
11:22	8.83	300	12.7	398	3.80	2.19	0.36	272	8.90	
11:29	8.83	300	12.6	409	3.85	1.22	0.49	279	8.90	
11:33	8.83	300	12.7	409	3.88	0.35	0.06	281	8.90	
11:36	8.83	300	12.7	410	3.89	0.32	<0.01	281	8.90	
11:39	8.83	300	12.7	411	3.90	0.38	<0.01	278	8.90	
11:45	Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
[ ] QED BLADDER	[ ] TEFLON OR TEFLON LINED	[ ] POLYVINYL CHLORIDE	[ ] TEFLON
[ ] SIMCO BLADDER	[ ] HIGH DENSITY POLYETHYLENE	[ ] STAINLESS STEEL	[ ] OTHER
[X] GEOPUMP	[X] LDPE (Dedicated)	[X] SILICON (Dedicated)	

ANALYTICAL PARAMETERS

GROUNDWATER

	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] Total Fe	6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Total Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED [YES] NO

NUMBER OF GALLONS GENERATED: 3.5

LOCATION SKETCH

NOTES

SIGNATURE:

MACTEC

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	SAMPLE ID	OC-GW-24	ROUND NO.	4
SAMPLE ID	OC-GW-24	SITE TYPE	Superfund	DATE	11/19/2008
TIME	START 12:42 END 13:40	JOB NUMBER	6100-08-0016.04	BOTTLE TIME	13:30

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT
- [X] TOP OF WELL RISER
- [ ] TOP OF PROTECTIVE CASING
- [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): 0.6 FT.

PROTECTIVE CASING / WELL DIFFERENCE: +0.1 FT.

INITIAL DEPTH TO WATER: 2.68 FT.

WELL DEPTH (TOR): 12.10 FT.

PID AMBIENT AIR: N/A PPMV

WELL DIAMETER: 1.5 IN.

FINAL DEPTH TO WATER: 11.30 FT.

SCREEN LENGTH: See Survey FT.

PID WELL MOUTH: N/A PPMV

WELL INTEGRITY:

	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: 1.38 FT.
(initial - final x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED: 0.90

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 1.53 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/L) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (µS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)	TURBIDITY (NTU) (10%) (0-2)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
12:58	7.62	100	12.3	364	8.01	0.58	24.1	-81	12	
13:01	9.20	100	12.4	376	8.14	0.35	17.8	-115	12	
13:04	9.67	100	12.3	383	8.26	0.04	19.2	-143	12	
13:09	10.09	100	12.4	388	8.23	0.18	18.4	-144	12	
13:12	10.44	100	12.3	391	8.25	0.33	18.5	-151	12	
13:17	10.76	100	12.3	392	8.26	0.25	17.9	-149	12	
13:20	11.04	100	12.3	397	8.27	<0.1	16.9	-157	12	
13:23	11.15	100	12.3	398	8.27	<0.1	17.2	-160	12	
13:26	11.30	100	12.3	397	8.26	<0.1	17.9	-162	12	
13:30	Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP
- [ ] QED BLADDER
- [ ] SIMCO BLADDER
- [X] GEOPUMP

TYPE OF TUBING
- [ ] TEFLON OR TEFLON LINED
- [ ] HIGH DENSITY POLYETHYLENE
- [X] LDPE (Dedicated)

TYPE OF PUMP MATERIAL
- [ ] POLYVINYL CHLORIDE
- [ ] STAINLESS STEEL
- [X] SILICON (Dedicated)

TYPE OF BLADDER MATERIAL
- [ ] TEFLON
- [ ] OTHER _____

ANALYTICAL PARAMETERS

GROUNDWATER

	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] Total Fe	6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Total Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNI HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED [YES] NO

NUMBER OF GALLONS GENERATED: 2

LOCATION SKETCH

NOTES

SIGNATURE:

MACTEC

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	SAMPLE ID	OC-GW-25	ROUND NO.	4
SAMPLE ID	OC-GW-25	SITE TYPE	Superfund	DATE	11/19/2008
TIME	START 13:55 END 14:45	JOB NUMBER	6100-08-0016.04	BOTTLE TIME	14:40

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT
- [X] TOP OF WELL RISER
- [ ] TOP OF PROTECTIVE CASING
- [ ] OTHER

PROTECTIVE CASING STICKUP (FROM GROUND): 3.0 FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 5.29 FT.

WELL DEPTH (TOR): 13.45 FT.

PID AMBIENT AIR: N/A PPMV

WELL DIAMETER: 1.5 IN.

FINAL DEPTH TO WATER: 5.56 FT.

SCREEN LENGTH: See Survey FT.

PID WELL MOUTH: N/A PPMV

WELL INTEGRITY:	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: 0.025 FT.
(initial - final x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED: 0.008

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 3.0 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/L) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (µS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)	TURBIDITY (NTU) (10%) (0-2)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
14:05	5.56	250	10.8	579	7.14	0.89	5.30	-165	11.45	
14:10	5.56	250	11.2	691	7.08	6.50	2.82	-150	11.45	
14:15	5.56	250	11.3	708	6.97	5.40	2.48	-129	11.45	
14:20	5.56	250	11.2	703	6.89	3.88	1.46	-116	11.45	
14:25	5.56	250	11.2	700	6.85	2.75	1.19	-109	11.45	
14:30	5.56	250	11.3	692	6.82	0.60	1.30	-106	11.45	
14:33	5.56	250	11.2	686	6.81	0.53	1.01	-104	11.45	
14:36	5.56	250	11.3	682	6.80	0.50	1.30	-103	11.45	
14:40	Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP
- [ ] QED BLADDER
- [ ] SIMCO BLADDER
- [X] GEOPUMP

TYPE OF TUBING
- [ ] TEFLON OR TEFLON LINED
- [ ] HIGH DENSITY POLYETHYLENE
- [X] LDPE (Dedicated)

TYPE OF PUMP MATERIAL
- [ ] POLYVINYL CHLORIDE
- [ ] STAINLESS STEEL
- [X] SILICON (Dedicated)

TYPE OF BLADDER MATERIAL
- [ ] TEFLON
- [ ] OTHER

ANALYTICAL PARAMETERS

GROUNDWATER

	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] Total Fe	6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Total Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED [YES] NO

NUMBER OF GALLONS GENERATED: 3.0

NOTES

LOCATION SKETCH

SIGNATURE: Mark Massimo

MACTEC

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	SAMPLE ID	OC-GW-26	ROUND NO	4
SAMPLE ID	OC-GW-26	SITE TYPE	Superfund	DATE	11/19/2008
TIME	START 11:15 END 12:00	JOB NUMBER	6100-08-0016.04	BOTTLE TIME	11:55

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT
- [X] TOP OF WELL RISER
- [ ] TOP OF PROTECTIVE CASING
- [ ] OTHER

PROTECTIVE CASING STICKUP (FROM GROUND): 0.2 FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 4.03 FT.

WELL DEPTH (TOR): 6.08 FT.

PID AMBIENT AIR: N/A PPMV

WELL DIAMETER: 1.5 IN.

FINAL DEPTH TO WATER: 4.03 FT.

SCREEN LENGTH: See Survey FT.

PID WELL MOUTH: N/A PPMV

WELL INTEGRITY:	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: 0.00 FT.
(initial - final x 0.16 (2-inch) or x 0.65 (4-inch))

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED: 0

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 4.2 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/L) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (µS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)	TURBIDITY (NTU) (10%) (0-2)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
11:30	4.03	400	11.6	482	6.31	<0.1	15.9	-3	5	
11:35	4.03	400	11.4	498	6.21	<0.1	9.08	1	5	
11:40	4.03	400	11.5	500	6.16	<0.1	5.77	0	5	
11:45	4.03	400	11.6	501	6.12	<0.1	3.53	-4	5	
11:50	4.03	400	11.7	501	6.10	<0.1	2.66	-6	5	
11:53	4.03	400	11.8	500	6.09	<0.1	1.72	-6	5	
11:55	Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP
- [ ] QED BLADDER
- [ ] SIMCO BLADDER
- [X] GEOPUMP

TYPE OF TUBING
- [ ] TEFLON OR TEFLON LINED
- [ ] HIGH DENSITY POLYETHYLENE
- [X] LDPE (Dedicated)

TYPE OF PUMP MATERIAL
- [ ] POLYVINYL CHLORIDE
- [ ] STAINLESS STEEL
- [X] SILICON (Dedicated)

TYPE OF BLADDER MATERIAL
- [ ] TEFLON
- [ ] OTHER

ANALYTICAL PARAMETERS

GROUNDWATER

	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] Total Fe	6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Total Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED: [YES] NO

NUMBER OF GALLONS GENERATED: 4.2

LOCATION SKETCH

NOTES

SIGNATURE: Mark Massiora

MACTEC

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	SAMPLE ID	OC-GW-34SR	ROUND NO.	4
SAMPLE ID	OC-GW-34SR	SITE TYPE	Superfund	DATE	11/21/2008
TIME	START 9:30 END 10:30	JOB NUMBER	6100-08-0016.04	BOTTLE TIME	10:25

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT
- [X] TOP OF WELL RISER
- [ ] TOP OF PROTECTIVE CASING
- [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): 1.6 FT.

PROTECTIVE CASING / WELL DIFFERENCE: 0.4 FT.

INITIAL DEPTH TO WATER: 7.36 FT.

WELL DEPTH (TOR): 16.98 FT.

PID AMBIENT AIR: N/A PPMV

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 7.79 FT.

SCREEN LENGTH: See Survey FT.

PID WELL MOUTH: N/A PPMV

WELL INTEGRITY:

	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: 0.0580 FT.
(initial - final x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED: 0.015

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 3.96 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/L) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (µS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)	TURBIDITY (NTU) (10%) (0-2)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
9:46	7.77	250	11.0	146	6.14	2.80	5.59	123	16.5	
9:51	7.79	250	11.0	131	5.98	2.19	3.25	116	16.5	
9:56	7.79	250	10.9	122	5.97	2.05	1.79	117	16.5	
9:59	7.79	250	10.9	116	5.95	1.81	1.72	118	16.5	
10:02	7.79	250	11.0	109	5.94	1.32	1.69	120	16.5	
10:16	7.79	250	11.1	105	5.93	1.31	1.66	126	16.5	
10:19	7.79	250	11.1	103	5.95	1.25	1.62	128	16.5	
10:25	Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP
- [ ] QED BLADDER
- [ ] SIMCO BLADDER
- [X] GEOPUMP

TYPE OF TUBING
- [ ] TEFLON OR TEFLON LINED
- [ ] HIGH DENSITY POLYETHYLENE
- [X] LDPE (Dedicated)

TYPE OF PUMP MATERIAL
- [ ] POLYVINYL CHLORIDE
- [ ] STAINLESS STEEL
- [X] SILICON (Dedicated)

TYPE OF BLADDER MATERIAL
- [ ] TEFLON
- [ ] OTHER _____

ANALYTICAL PARAMETERS

GROUNDWATER

	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] Total Fe	6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Total Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED [YES] NO

NUMBER OF GALLONS GENERATED: 4.0

LOCATION SKETCH

NOTES

SIGNATURE:

MACTEC

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	SAMPLE ID	OC-GW-34D	ROUND NO.	4
SAMPLE ID	OC-GW-34D	SITE TYPE	Superfund	DATE	11/21/2008
TIME	START 9:35 END 10:05	JOB NUMBER	6100-08-0016.04	BOTTLE TIME	10:00

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: DUP

MEASUREMENT POINT
- [X] TOP OF WELL RISER
- [ ] TOP OF PROTECTIVE CASING
- [ ] OTHER

PROTECTIVE CASING STICKUP (FROM GROUND): 2 FT.

PROTECTIVE CASING / WELL DIFFERENCE: 0 FT.

INITIAL DEPTH TO WATER: 8.68 FT.

WELL DEPTH (TOR): 25.2 FT.

PID AMBIENT AIR: N/A PPMV

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 8.68 FT.

SCREEN LENGTH: See Survey FT.

PID WELL MOUTH: N/A PPMV

WELL INTEGRITY:

	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: 0.00 FT.
(initial - final x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED: 0

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 3.1 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/L) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (µS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)	TURBIDITY (NTU) (10%) (0-2)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
9:43	8.68	400	12.8	160	6.42	7.07	2.57	106	23.0	
9:47	8.68	400	12.9	158	6.38	6.59	2.17	107	23.0	
9:51	8.68	400	12.5	160	6.38	6.51	2.35	106	23.0	
9:55	8.68	400	12.6	159	6.38	6.53	1.51	109	23.0	
10:00	Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP
- [ ] QED BLADDER
- [ ] SIMCO BLADDER
- [X] GEOPUMP

TYPE OF TUBING
- [ ] TEFLON OR TEFLON LINED
- [ ] HIGH DENSITY POLYETHYLENE
- [X] LDPE (Dedicated)

TYPE OF PUMP MATERIAL
- [ ] POLYVINYL CHLORIDE
- [ ] STAINLESS STEEL
- [X] SILICON (Dedicated)

TYPE OF BLADDER MATERIAL
- [ ] TEFLON
- [ ] OTHER

ANALYTICAL PARAMETERS

GROUNDWATER

	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] Total Fe	6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Total Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED: [YES] NO

NUMBER OF GALLONS GENERATED: 3.25

LOCATION SKETCH

NOTES

SIGNATURE: Mark Massey

MACTEC

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	SAMPLE ID	OC-GW-35S	ROUND NO.	4
SAMPLE ID	OC-GW-35S	SITE TYPE	Superfund	DATE	11/20/2008
TIME	START 14:15 END 14:55	JOB NUMBER	6100-08-0016.04	BOTTLE TIME	14:45

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT
- [X] TOP OF WELL RISER
- [ ] TOP OF PROTECTIVE CASING
- [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): --- FT.

PROTECTIVE CASING / WELL DIFFERENCE: --- FT.

INITIAL DEPTH TO WATER: 7.50 FT.

WELL DEPTH (TOR): 19.53 FT.

PID AMBIENT AIR: N/A PPMV

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 7.74 FT.

SCREEN LENGTH: See Survey FT.

PID WELL MOUTH: N/A PPMV

WELL INTEGRITY:

	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: 0.040 FT.
(initial - final x 0.16 (2-inch) or x 0.65 (4-inch))

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED: 0.02

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 2.11 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/L) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (µS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)	TURBIDITY (NTU) (10%) (0-2)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
14:22	7.74	200	15.1	1250	7.28	0.28	10.9	-171	18.5	
14:25	7.74	200	15.3	1240	7.25	0.22	9.26	-172	18.5	
14:30	7.74	200	15.4	1210	7.24	0.18	8.17	-174	18.5	
14:33	7.74	200	15.4	1220	7.21	0.17	7.26	-174	18.5	
14:36	7.74	200	15.3	1230	7.16	0.15	6.27	-174	18.5	
14:39	7.74	200	15.4	1230	7.12	0.16	5.71	-175	18.5	
14:42	7.74	200	15.5	1240	7.11	0.11	5.93	-175	18.5	
14:45	Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
[ ] QED BLADDER	[ ] TEFLON OR TEFLON LINED	[ ] POLYVINYL CHLORIDE	[ ] TEFLON
[ ] SIMCO BLADDER	[ ] HIGH DENSITY POLYETHYLENE	[ ] STAINLESS STEEL	[ ] OTHER _____
[X] GEOPUMP	[X] LDPE (Dedicated)	[X] SILICON (Dedicated)	

ANALYTICAL PARAMETERS

GROUNDWATER

	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] Total Fe	6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Total Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED [YES] NO

NUMBER OF GALLONS GENERATED: 2.25

LOCATION SKETCH

NOTES

SIGNATURE:

MACTEC

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	SAMPLE ID	OC-GW-39	ROUND NO.	4
SAMPLE ID	OC-GW-39	SITE TYPE	Superfund	DATE	11/19/2008
TIME	START 14:20 END 15:20	JOB NUMBER	6100-08-0016.04	BOTTLE TIME	15:10

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT
- [X] TOP OF WELL RISER
- [ ] TOP OF PROTECTIVE CASING
- [ ] OTHER

PROTECTIVE CASING STICKUP (FROM GROUND): 2.2 FT.

PROTECTIVE CASING / WELL DIFFERENCE: +0.1 FT.

INITIAL DEPTH TO WATER: 3.53 FT.

WELL DEPTH (TOR): 12.10 FT.

PID AMBIENT AIR: N/A PPMV

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 3.74 FT.

SCREEN LENGTH: See Survey FT.

PID WELL MOUTH: N/A PPMV

WELL INTEGRITY:

	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: 0.034 FT.
(initial - final x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED: 0.007

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 4.76 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/L) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (µS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)	TURBIDITY (NTU) (10%) (0-2)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
14:27	3.74	300	9.1	601	6.93	5.07	5.47	14	14	
14:32	3.74	300	10.0	602	6.61	2.69	3.70	41	14	
14:35	3.74	300	10.0	557	6.37	2.52	3.29	63	14	
14:38	3.74	300	10.0	535	6.04	2.40	2.74	76	14	
14:41	3.74	300	9.9	533	5.94	2.31	3.26	77	14	
14:46	3.74	300	9.9	548	5.88	2.08	3.38	64	14	
14:49	3.74	300	9.8	575	5.86	1.87	3.19	50	14	
14:58	3.74	300	9.7	663	5.76	1.24	1.70	30	14	
15:01	3.74	300	9.8	678	5.77	1.11	1.60	26	14	
15:04	3.74	300	9.8	673	5.78	1.12	1.68	25	14	
15:10	Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP
- [ ] QED BLADDER
- [ ] SIMCO BLADDER
- [X] GEOPUMP

TYPE OF TUBING
- [ ] TEFLON OR TEFLON LINED
- [ ] HIGH DENSITY POLYETHYLENE
- [X] LDPE (Dedicated)

TYPE OF PUMP MATERIAL
- [ ] POLYVINYL CHLORIDE
- [ ] STAINLESS STEEL
- [X] SILICON (Dedicated)

TYPE OF BLADDER MATERIAL
- [ ] TEFLON
- [ ] OTHER

ANALYTICAL PARAMETERS

GROUNDWATER

	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] Total Fe	6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Total Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED [YES] NO

NUMBER OF GALLONS GENERATED: 5.0

NOTES

LOCATION SKETCH

SIGNATURE:

MACTEC

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	SAMPLE ID	OC-GW-42S	ROUND NO.	4
SAMPLE ID	OC-GW-42S	SITE TYPE	Superfund	DATE	11/17/2008
TIME	START 13:30 END 14:30	JOB NUMBER	6100-08-0016.04	BOTTLE TIME	14:25

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT
- [X] TOP OF WELL RISER
- [ ] TOP OF PROTECTIVE CASING
- [ ] OTHER

PROTECTIVE CASING STICKUP (FROM GROUND): N/A FT.

PROTECTIVE CASING / WELL DIFFERENCE: 0.35 FT.

INITIAL DEPTH TO WATER: 3.27 FT.

WELL DEPTH (TOR): 17.91 FT.

PID AMBIENT AIR: N/A PPMV

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 3.52 FT.

SCREEN LENGTH: See Survey FT.

PID WELL MOUTH: N/A PPMV

WELL INTEGRITY:

	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: 0.04 FT.
(initial - final x 0.16 (2-inch) or x 0.65 (4-inch))

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED: 0.006

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 6.34 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/L) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (µS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)	TURBIDITY (NTU) (10%) (0-2)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
13:37	3.52	400	13.12	378	6.89	3.28	92.1	-154	16.5	
13:47	3.52	400	13.55	283	8.10	1.93	21.2	-145	16.5	
13:52	3.52	400	13.76	288	8.24	1.03	9.49	-145	16.5	
13:57	3.52	400	13.64	314	8.20	0.93	8.22	-149	16.5	
14:00	3.52	400	13.52	329	8.30	0.94	5.65	-150	16.5	
14:03	3.52	400	13.46	330	8.33	0.90	4.11	-151	16.5	
14:06	3.52	400	13.41	336	8.33	0.86	4.40	-151	16.5	
14:09	3.52	400	13.38	346	8.50	0.76	3.62	-152	16.5	
14:14	3.52	400	13.35	353	8.44	0.74	3.16	-154	16.5	
14:19	3.52	400	13.47	357	8.50	0.77	4.26	-160	16.5	
14:25	Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP
- [ ] QED BLADDER
- [ ] SIMCO BLADDER
- [X] GEOPUMP

TYPE OF TUBING
- [ ] TEFLON OR TEFLON LINED
- [ ] HIGH DENSITY POLYETHYLENE
- [X] LDPE (Dedicated)

TYPE OF PUMP MATERIAL
- [ ] POLYVINYL CHLORIDE
- [ ] STAINLESS STEEL
- [X] SILICON (Dedicated)

TYPE OF BLADDER MATERIAL
- [ ] TEFLON
- [ ] OTHER

ANALYTICAL PARAMETERS

GROUNDWATER

	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] Total Fe	6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Total Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HN HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED [YES] NO

NUMBER OF GALLONS GENERATED: 6.5

NOTES

SIGNATURE:

LOCATION SKETCH

MACTEC

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	SAMPLE ID	OC-GW-55S	ROUND NO.	4
SAMPLE ID	OC-GW-55S	SITE TYPE	Superfund	DATE	11/20/2008
TIME	START 12:57 END 13:40	JOB NUMBER	6100-08-0016.04	BOTTLE TIME	13:30

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT
- [X] TOP OF WELL RISER
- [ ] TOP OF PROTECTIVE CASING
- [ ] OTHER

PROTECTIVE CASING STICKUP (FROM GROUND): 2.2 FT.

PROTECTIVE CASING / WELL DIFFERENCE: 0.6 FT.

INITIAL DEPTH TO WATER: 2.09 FT.

WELL DEPTH (TOR): 12.10 FT.

PID AMBIENT AIR: N/A PPMV

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 2.18 FT.

SCREEN LENGTH: See Survey FT.

PID WELL MOUTH: N/A PPMV

WELL INTEGRITY:	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: 0.014 FT.
(initial - final x 0.16 (2-inch) or x 0.65 (4-inch))

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED: 0.0047

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 3.12 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/L) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (µS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)	TURBIDITY (NTU) (10%) (0-2)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
13:00	2.16	275	10.0	3730	5.61	1.58	25.2	85	11.5	
13:10	2.17	275	10.2	3750	5.84	1.04	7.7	36	11.5	
13:13	2.18	275	10.2	3790	5.86	0.85	4.24	33	11.5	
13:16	2.18	275	10.3	3840	5.87	0.59	2.67	28	11.5	
13:19	2.18	275	10.3	3860	5.88	0.42	2.52	26	11.5	
13:22	2.18	275	10.3	3900	5.89	0.41	2.34	21	11.5	
13:30	Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
[ ] QED BLADDER	[ ] TEFLON OR TEFLON LINED	[ ] POLYVINYL CHLORIDE	[ ] TEFLON
[ ] SIMCO BLADDER	[ ] HIGH DENSITY POLYETHYLENE	[ ] STAINLESS STEEL	[ ] OTHER
[X] GEOPUMP	[X] LDPE (Dedicated)	[X] SILICON (Dedicated)	

ANALYTICAL PARAMETERS

GROUNDWATER	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] Total Fe	6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Total Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED [YES] NO

NUMBER OF GALLONS GENERATED: 3.25

NOTES

LOCATION SKETCH

SIGNATURE:

MACTEC

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	SAMPLE ID	OC-GW-76S	ROUND NO.	4
SAMPLE ID	OC-GW-76S	SITE TYPE	Superfund	DATE	11/19/2008
TIME	START 12:40 END 13:45	JOB NUMBER	6100-08-0016.04	BOTTLE TIME	13:35

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT
- [X] TOP OF WELL RISER
- [ ] TOP OF PROTECTIVE CASING
- [ ] OTHER

PROTECTIVE CASING STICKUP (FROM GROUND): 2.53 FT.

PROTECTIVE CASING / WELL DIFFERENCE: 1.06 FT.

INITIAL DEPTH TO WATER: 7.55 FT.

WELL DEPTH (TOR): 14.5 FT.

PID AMBIENT AIR: N/A PPMV

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 7.55 FT.

SCREEN LENGTH: See Survey FT.

PID WELL MOUTH: N/A PPMV

WELL INTEGRITY:	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: 0.00 FT.
(initial - final x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED: 0

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 4.9 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/L) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (µS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)	TURBIDITY (NTU) (10%) (0-2)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
12:50	7.55	350	11.1	168	5.94	<0.1	32.10	129	14	
12:55	7.55	350	11.3	179	5.94	<0.1	16.60	127	14	
13:00	7.55	350	11.4	184	5.91	<0.1	11.60	132	14	
13:05	7.55	350	11.2	188	5.89	<0.1	7.60	145	14	
13:10	7.55	350	11.3	186	5.89	<0.1	6.29	151	14	
13:15	7.55	350	11.4	194	5.87	<0.1	4.52	155	14	
13:20	7.55	350	11.5	199	5.87	<0.1	4.22	159	14	
13:25	7.55	350	11.6	203	5.86	<0.1	3.45	161	14	
13:28	7.55	350	11.6	213	5.86	<0.1	3.02	163	14	
13:31	7.55	350	11.5	217	5.86	<0.1	2.83	164	14	
13:34	7.55	350	11.5	218	5.85	<0.1	2.65	165	14	
13:35	Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
[ ] QED BLADDER	[ ] TEFLON OR TEFLON LINED	[ ] POLYVINYL CHLORIDE	[ ] TEFLON
[ ] SIMCO BLADDER	[ ] HIGH DENSITY POLYETHYLENE	[ ] STAINLESS STEEL	[ ] OTHER
[X] GEOPUMP	[X] LDPE (Dedicated)	[X] SILICON (Dedicated)	

ANALYTICAL PARAMETERS

GROUNDWATER

	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] Total Fe	6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Total Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[x] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[x] Ammonia-Nitrogen
[x] Chloride	300.0	4 DEG. C	1 X 500 mL	[x] Chloride
[x] Sulfate	300.0	4 DEG. C	1 X 500 mL	[x] Sulfate
[x] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[x] Specific Conductivity
[x] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[x] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED [YES] NO

NUMBER OF GALLONS GENERATED: 5

NOTES

LOCATION SKETCH

SIGNATURE: Mark Maggio

MACTEC

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	SAMPLE ID	OC-GW-78S	ROUND NO.	4
SAMPLE ID	OC-GW-78S	SITE TYPE	Superfund	DATE	11/20/2008
TIME	START 10:35 END 11:37	JOB NUMBER	6100-08-0016.04	BOTTLE TIME	11:30

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT
- [X] TOP OF WELL RISER
- [ ] TOP OF PROTECTIVE CASING
- [ ] OTHER

PROTECTIVE CASING STICKUP (FROM GROUND): See Survey FT.

PROTECTIVE CASING / WELL DIFFERENCE: 0.3 FT.

INITIAL DEPTH TO WATER: 4.55 FT.

WELL DEPTH (TOR): 10.28 FT.

PID AMBIENT AIR: N/A PPMV

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 4.93 FT.

SCREEN LENGTH: See Survey FT.

PID WELL MOUTH: N/A PPMV

WELL INTEGRITY:	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: 0.060 FT.
(initial - final x 0.16 (2-inch) or x 0.65 (4-inch))

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED: 0.01

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 5.32 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/L) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (µS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)	TURBIDITY (NTU) (10%) (0-2)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
10:41	4.87	325	9.8	1400	5.99	3.15	205	51	10	
10:51	4.91	325	11.8	1420	5.93	1.22	35.8	83	10	
10:54	4.92	325	11.7	1430	5.94	1.05	27.7	86	10	
10:57	4.92	325	11.8	1430	5.95	0.04	23.0	87	10	
11:07	4.93	325	11.8	1430	5.96	0.73	10.7	86	10	
11:12	4.93	325	11.8	1430	5.97	0.49	5.61	86	10	
11:17	4.93	325	11.6	1430	5.96	0.39	0.11	85	10	
11:22	4.93	325	11.6	1430	5.97	0.35	<0.1	84	10	
11:25	4.93	325	11.5	1430	5.97	0.38	0.32	84	10	
11:30	Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
[ ] QED BLADDER	[ ] TEFLON OR TEFLON LINED	[ ] POLYVINYL CHLORIDE	[ ] TEFLON
[ ] SIMCO BLADDER	[ ] HIGH DENSITY POLYETHYLENE	[ ] STAINLESS STEEL	[ ] OTHER
[X] GEOPUMP	[X] LDPE (Dedicated)	[X] SILICON (Dedicated)	

ANALYTICAL PARAMETERS

GROUNDWATER	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] Total Fe	6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Total Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED [YES] NO

NUMBER OF GALLONS GENERATED: 5.5

LOCATION SKETCH

NOTES

SIGNATURE:

MACTEC

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	SAMPLE ID	OC-GW-79S	ROUND NO.	4
SAMPLE ID	OC-GW-79S	SITE TYPE	Superfund	DATE	11/20/2008
TIME	START 9:00 END 9:50	JOB NUMBER	6100-08-0016.04	BOTTLE TIME	9:45

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT
- [X] TOP OF WELL RISER
- [ ] TOP OF PROTECTIVE CASING
- [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): 2.0 FT.

PROTECTIVE CASING / WELL DIFFERENCE: 0.3 FT.

INITIAL DEPTH TO WATER: 3.43 FT.

WELL DEPTH (TOR): 11.3 FT.

PID AMBIENT AIR: N/A PPMV

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 3.71 FT.

SCREEN LENGTH: See Survey FT.

PID WELL MOUTH: N/A PPMV

WELL INTEGRITY:

	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: 0.045 FT.
(initial - final x 0.16 (2-inch) or x 0.65 (4-inch))

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED: 0.016

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 2.9 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/L) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (µS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)	TURBIDITY (NTU) (10%) (0-2)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
9:10	3.71	275	9.8	3580	5.85	<0.1	42.2	-16	9.0	
9:15	3.71	275	9.7	3510	5.87	<0.1	18.3	-25	9.0	
9:20	3.71	275	10.2	3440	5.89	<0.1	14.9	-32	9.0	
9:25	3.71	275	10.2	3350	5.91	<0.1	11.1	-38	9.0	
9:30	3.71	275	10.1	3280	5.92	<0.1	12.2	-41	9.0	
9:35	3.71	275	10.3	3220	5.93	<0.1	13.6	-43	9.0	
9:40	3.71	275	10.3	3160	5.94	<0.1	14.0	-45	9.0	
9:45	Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
[ ] QED BLADDER	[ ] TEFLON OR TEFLON LINED	[ ] POLYVINYL CHLORIDE	[ ] TEFLON
[ ] SIMCO BLADDER	[ ] HIGH DENSITY POLYETHYLENE	[ ] STAINLESS STEEL	[ ] OTHER _____
[X] GEOPUMP	[X] LDPE (Dedicated)	[X] SILICON (Dedicated)	

ANALYTICAL PARAMETERS

GROUNDWATER	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] Total Fe	6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Total Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED [YES] NO

NUMBER OF GALLONS GENERATED: 3.0

LOCATION SKETCH

NOTES

SIGNATURE: Mark Massih

MACTEC

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	SAMPLE ID	OC-GW-201S	ROUND NO.	4
SAMPLE ID	OC-GW-201S	SITE TYPE	Superfund	DATE	11/21/2008
TIME	START 11:00 END 12:15	JOB NUMBER	6100-08-0016.04	BOTTLE TIME	12:10

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT
- [X] TOP OF WELL RISER
- [ ] TOP OF PROTECTIVE CASING
- [ ] OTHER

PROTECTIVE CASING STICKUP (FROM GROUND): 2.2 FT.

PROTECTIVE CASING / WELL DIFFERENCE: 0 FT.

INITIAL DEPTH TO WATER: 4.22 FT.

WELL DEPTH (TOR): 15 FT.

PID AMBIENT AIR: N/A PPMV

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 4.49 FT.

SCREEN LENGTH: See Survey FT.

PID WELL MOUTH: N/A PPMV

WELL INTEGRITY:

	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: 0.0432 FT.
(initial - final x 0.16 (2-inch) or x 0.65 (4-inch))

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED: 0.011

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 3.9 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/L) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (µS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)	TURBIDITY (NTU) (10%) (0-2)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
11:11	4.49	200	9.8	3210	7.00	4.03	40.0	8	13.0	
11:16	4.49	200	10.7	3070	7.03	2.93	41.0	-1	13.0	
11:21	4.49	200	10.9	3020	7.05	1.92	42.2	1	13.0	
11:25	4.49	200	10.8	3020	7.06	1.51	32.3	3	13.0	
11:31	4.49	200	10.9	3020	7.06	1.26	26.3	2	13.0	
11:36	4.48	200	11.0	3030	7.06	0.78	21.5	0	13.0	
11:41	4.49	200	11.1	3030	7.04	0.56	17.0	-2	13.0	
11:46	4.49	200	11.3	3030	7.05	0.36	11.9	-3	13.0	
11:51	4.49	200	11.3	3040	7.09	0.18	6.31	-3	13.0	
11:56	4.49	200	11.3	3060	7.09	0.07	5.39	-6	13.0	
12:01	4.49	200	11.5	3070	7.09	<0.1	4.30	-6	13.0	
12:06	4.49	200	11.4	3090	7.09	<0.1	3.39	-7	13.0	Sample at 12:10

EQUIPMENT DOCUMENTATION

TYPE OF PUMP
- [ ] QED BLADDER
- [ ] SIMCO BLADDER
- [X] GEOPUMP

TYPE OF TUBING
- [ ] TEFLON OR TEFLON LINED
- [ ] HIGH DENSITY POLYETHYLENE
- [X] LDPE (Dedicated)

TYPE OF PUMP MATERIAL
- [ ] POLYVINYL CHLORIDE
- [ ] STAINLESS STEEL
- [X] SILICON (Dedicated)

TYPE OF BLADDER MATERIAL
- [ ] TEFLON
- [ ] OTHER

ANALYTICAL PARAMETERS

GROUNDWATER

	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] Total Fe	6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Total Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED [YES] NO

NUMBER OF GALLONS GENERATED: 4.0

NOTES

LOCATION SKETCH

SIGNATURE: Mark Massin

MACTEC

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	SAMPLE ID	OC-GW-202S	ROUND NO.	4
SAMPLE ID	OC-GW-202S	SITE TYPE	Superfund	DATE	11/21/2008
TIME	START 8:25 END 9:00	JOB NUMBER	6100-08-0016.04	BOTTLE TIME	8:45

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: DUP, MS, MSD

MEASUREMENT POINT
- [X] TOP OF WELL RISER
- [ ] TOP OF PROTECTIVE CASING
- [ ] OTHER

PROTECTIVE CASING STICKUP (FROM GROUND): 0.10 FT.

PROTECTIVE CASING / WELL DIFFERENCE: 0.2 FT.

INITIAL DEPTH TO WATER: 6.70 FT.

WELL DEPTH (TOR): 18.5 FT.

PID AMBIENT AIR: N/A PPMV

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 0.75 FT.

SCREEN LENGTH: See Survey FT.

PID WELL MOUTH: N/A PPMV

WELL INTEGRITY:

	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: 0.01 FT.
(initial - final x 0.16 (2-inch) or x 0.65 (4-inch))

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED: 0.0002

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 3.64 GAL
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/L) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (µS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)	TURBIDITY (NTU) (10%) (0-2)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
8:32	6.75	400	12.5	1710	6.21	<0.1	4.56	49	16.0	
8:35	6.75	400	12.6	1730	6.25	<0.1	1.94	53	16.0	
8:38	6.75	400	12.8	1730	6.26	<0.1	1.07	55	16.0	
8:41	6.75	400	12.8	1730	6.25	<0.1	1.27	58	16.0	
8:45	Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
[ ] QED BLADDER	[ ] TEFLON OR TEFLON LINED	[ ] POLYVINYL CHLORIDE	[ ] TEFLON
[ ] SIMCO BLADDER	[ ] HIGH DENSITY POLYETHYLENE	[ ] STAINLESS STEEL	[ ] OTHER
[X] GEOPUMP	[X] LDPE (Dedicated)	[X] SILICON (Dedicated)	

ANALYTICAL PARAMETERS

GROUNDWATER

	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] Total Fe	6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Total Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNI HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED [YES] NO

NUMBER OF GALLONS GENERATED: 3.8

LOCATION SKETCH

NOTES

SIGNATURE: Mark Maggiore

MACTEC

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	SAMPLE ID	OC-GW-202D	ROUND NO.	4
SAMPLE ID	OC-GW-202D	SITE TYPE	Superfund	DATE	11/21/2008
TIME	START 8:25 END 9:25	JOB NUMBER	6100-08-0016.04	BOTTLE TIME	9:20

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT
- [X] TOP OF WELL RISER
- [ ] TOP OF PROTECTIVE CASING
- [ ] OTHER

PROTECTIVE CASING STICKUP (FROM GROUND): 1.5 FT.

PROTECTIVE CASING / WELL DIFFERENCE: 0.3 FT.

INITIAL DEPTH TO WATER: 6.07 FT.

WELL DEPTH (TOR): 23.63 FT.

PID AMBIENT AIR: N/A PPMV

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 6.27 FT.

SCREEN LENGTH: See Survey FT.

PID WELL MOUTH: N/A PPMV

WELL INTEGRITY:

	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: 0.32 FT.
(initial - final x 0.16 (2-inch) or x 0.65 (4-inch))

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED: 0.067

PRESSURE TO PUMP: N/A PSI

TOTAL VOL PURGED: 4.76 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/L) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (µS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)	TURBIDITY (NTU) (10%) (0-2)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
8:40	6.24	300	12.0	7170	4.79	0.77	458	133	23	
9:00	6.27	300	12.7	5310	4.78	<0.1	29.0	160	23	
9:05	6.27	300	12.7	5310	4.80	<0.1	24.9	159	23	
9:10	6.27	300	12.8	5320	4.81	<0.1	22.6	158	23	
9:15	6.27	300	12.8	5310	4.82	<0.1	22.1	158	23	
9:20	Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
[ ] QED BLADDER	[ ] TEFLON OR TEFLON LINED	[ ] POLYVINYL CHLORIDE	[ ] TEFLON
[ ] SIMCO BLADDER	[ ] HIGH DENSITY POLYETHYLENE	[ ] STAINLESS STEEL	[ ] OTHER
[X] GEOPUMP	[X] LDPE (Dedicated)	[X] SILICON (Dedicated)	

ANALYTICAL PARAMETERS

GROUNDWATER	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] Total Fe	6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Total Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED [YES] NO

NUMBER OF GALLONS GENERATED: 5.0

NOTES

LOCATION SKETCH

SIGNATURE:

MACTEC

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	SAMPLE ID	OC-PZ-16RR	ROUND NO.	4
SAMPLE ID	OC-PZ-16RR	SITE TYPE	Superfund	DATE	11/20/2008
TIME	START 9:05 END 10:10	JOB NUMBER	6100-08-0016.04	BOTTLE TIME	9:35

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT
- [X] TOP OF WELL RISER
- [ ] TOP OF PROTECTIVE CASING
- [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): --- FT.

PROTECTIVE CASING / WELL DIFFERENCE: --- FT.

INITIAL DEPTH TO WATER: 3.00 FT.

WELL DEPTH (TOR): 6.05 FT.

PID AMBIENT AIR: N/A PPMV

WELL DIAMETER: 1 IN.

FINAL DEPTH TO WATER: 6.00 FT.

SCREEN LENGTH: See Survey FT.

PID WELL MOUTH: N/A PPMV

WELL INTEGRITY:

	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: 0.30 FT.
(initial - final x 0.16 (2-inch) or x 0.65 (4-inch))

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED: 1

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 0.30 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/L) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (µS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)	TURBIDITY (NTU) (10%) (0-2)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
9:10	6.00	300	4.4	2900	7.77	7.69	90.7	-181	6.00	Well goes dry. Will purge, collect readings
9:15	6.00	300	4.5	3170	7.23	3.22	16.9	-158	6.00	wait for recharge, repeat
9:25	6.00	300	5.3	3160	7.23	3.21	14.2	-157	6.00	
9:35	Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP
- [ ] QED BLADDER
- [ ] SIMCO BLADDER
- [X] GEOPUMP

TYPE OF TUBING
- [ ] TEFLON OR TEFLON LINED
- [ ] HIGH DENSITY POLYETHYLENE
- [X] LDPE (Dedicated)

TYPE OF PUMP MATERIAL
- [ ] POLYVINYL CHLORIDE
- [ ] STAINLESS STEEL
- [X] SILICON (Dedicated)

TYPE OF BLADDER MATERIAL
- [ ] TEFLON
- [ ] OTHER _____

ANALYTICAL PARAMETERS

GROUNDWATER

		METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ]	VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ]	SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ]	VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ]	Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ]	Total Fe	6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Total Fe
[ ]	pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X]	Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X]	Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X]	Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X]	Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X]	Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED [YES] NO

NUMBER OF GALLONS GENERATED: 0.3

NOTES

LOCATION SKETCH

SIGNATURE:

MACTEC

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	SAMPLE ID	OC-PZ-17RR	ROUND NO.	4
SAMPLE ID	OC-PZ-17RR	SITE TYPE	Superfund	DATE	11/20/2008
TIME	START 13:00 END 14:00	JOB NUMBER	6100-08-0016.04	BOTTLE TIME	13:50

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT
- [X] TOP OF WELL RISER
- [ ] TOP OF PROTECTIVE CASING
- [ ] OTHER

PROTECTIVE CASING STICKUP (FROM GROUND): 3.5 FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 2.15 FT.

WELL DEPTH (TOR): 6.05 FT.

PID AMBIENT AIR: N/A PPMV

WELL DIAMETER: 1.5 IN.

FINAL DEPTH TO WATER: 3.09 FT.

SCREEN LENGTH: See Survey FT.

PID WELL MOUTH: N/A PPMV

WELL INTEGRITY:

	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: 0.15 FT.
(initial - final x 0.16 (2-inch) or x 0.65 (4-inch))

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED: 0.1

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 1.36 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/L) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (µS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)	TURBIDITY (NTU) (10%) (0-2)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
13:08	2.15	100	8.1	1280	7.27	3.65	>1000	-112	5.5	
13:16	2.20	100	8.5	1620	7.17	5.61	1.52	-75	5.5	
13:21	2.65	100	8.9	1580	7.39	9.22	34.4	-92	5.5	
13:26	2.95	100	9.1	1570	7.47	9.89	22.9	-92	5.5	
13:31	2.95	100	9.1	1570	7.49	9.99	9.26	-92	5.5	
13:36	3.00	100	9.0	1510	7.50	10.03	4.03	-90	5.5	
13:40	3.01	100	9.0	1590	7.49	10.06	3.00	-88	5.5	
13:43	3.03	100	8.9	1600	7.49	10.15	2.54	-87	5.5	
13:49	3.09	100	8.9	1590	7.49	10.20	1.89	-87	5.5	
13:50	Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP
- [ ] QED BLADDER
- [ ] SIMCO BLADDER
- [X] GEOPUMP

TYPE OF TUBING
- [ ] TEFLON OR TEFLON LINED
- [ ] HIGH DENSITY POLYETHYLENE
- [X] LDPE (Dedicated)

TYPE OF PUMP MATERIAL
- [ ] POLYVINYL CHLORIDE
- [ ] STAINLESS STEEL
- [X] SILICON (Dedicated)

TYPE OF BLADDER MATERIAL
- [ ] TEFLON
- [ ] OTHER

ANALYTICAL PARAMETERS

GROUNDWATER

		METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED		SAMPLE COLLECTED
[ ]	VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ]	VOCs
[ ]	SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ]	SVOCs
[ ]	VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ]	VPH
[ ]	Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ]	Dis. Fe
[ ]	Total Fe	6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ]	Total Fe
[ ]	pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ]	pH
[X]	Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X]	Ammonia-Nitrogen
[X]	Chloride	300.0	4 DEG. C	1 X 500 mL	[X]	Chloride
[X]	Sulfate	300.0	4 DEG. C	1 X 500 mL	[X]	Sulfate
[X]	Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X]	Specific Conductivity
[X]	Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X]	Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED [YES] NO

NUMBER OF GALLONS GENERATED: 1.6

LOCATION SKETCH

NOTES

SIGNATURE: Mark Massimo

MACTEC

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	SAMPLE ID	OC-PZ-18R	ROUND NO.	4
SAMPLE ID	OC-PZ-18R	SITE TYPE	Superfund	DATE	11/20/2008
TIME	START 10:55 END 11:38	JOB NUMBER	6100-08-0016.04	BOTTLE TIME	11:30

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT
- [X] TOP OF WELL RISER
- [ ] TOP OF PROTECTIVE CASING
- [ ] OTHER

PROTECTIVE CASING STICKUP (FROM GROUND): 1.9 FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 2.15 FT.

WELL DEPTH (TOR): 6.15 FT.

PID AMBIENT AIR: N/A PPMV

WELL DIAMETER: 1 IN.

FINAL DEPTH TO WATER: 2.15 FT.

SCREEN LENGTH: See Survey FT.

PID WELL MOUTH: N/A PPMV

WELL INTEGRITY:

	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: 0.0 FT.
(initial - final x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED: 1

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 2.0 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/L) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (µS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)	TURBIDITY (NTU) (10%) (0-2)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
11:00	2.15	100	7.5	812	6.85	6.91	43.7	-122	5.0	
11:11	2.15	250	7.8	763	6.94	7.38	9.61	-95	5.0	
11:16	2.15	250	8.0	767	6.89	9.14	2.59	-88	5.0	
11:21	2.15	250	8.2	770	6.86	8.90	1.24	-84	5.0	
11:24	2.15	250	8.2	763	6.85	8.50	1.52	-82	5.0	
11:27	2.15	250	8.2	765	6.84	8.52	1.56	-87	5.0	
11:30	Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP
- [ ] QED BLADDER
- [ ] SIMCO BLADDER
- [X] GEOPUMP

TYPE OF TUBING
- [ ] TEFLON OR TEFLON LINED
- [ ] HIGH DENSITY POLYETHYLENE
- [X] LDPE (Dedicated)

TYPE OF PUMP MATERIAL
- [ ] POLYVINYL CHLORIDE
- [ ] STAINLESS STEEL
- [X] SILICON (Dedicated)

TYPE OF BLADDER MATERIAL
- [ ] TEFLON
- [ ] OTHER

ANALYTICAL PARAMETERS

GROUNDWATER

		METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ]	VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ]	SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ]	VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ]	Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ]	Total Fe	6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Total Fe
[ ]	pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X]	Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X]	Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X]	Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X]	Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X]	Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED [YES] NO

NUMBER OF GALLONS GENERATED: 2.0

NOTES

LOCATION SKETCH

SIGNATURE: Mark Maggio

MACTEC

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	SAMPLE ID	OC-GW-CA1	ROUND NO.	4
SAMPLE ID	OC-GW-CA1	SITE TYPE	Superfund	DATE	11/20/2008
TIME	START 14:25 END 15:05	JOB NUMBER	6100-08-0016.04	BOTTLE TIME	14:55

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT
- [X] TOP OF WELL RISER
- [ ] TOP OF PROTECTIVE CASING
- [ ] OTHER

PROTECTIVE CASING STICKUP (FROM GROUND): 2.9 FT.

PROTECTIVE CASING / WELL DIFFERENCE: 0.5 FT.

INITIAL DEPTH TO WATER: 7.20 FT.

WELL DEPTH (TOR): 9.2 FT.

PID AMBIENT AIR: N/A PPMV

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 8.05 FT.

SCREEN LENGTH: See Survey FT.

PID WELL MOUTH: N/A PPMV

WELL INTEGRITY:

	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: 0.136 FT.
(initial - final x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED: 0.085

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 1.6 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/L) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (µS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)	TURBIDITY (NTU) (10%) (0-2)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
14:35	8.05	200	13.0	711	6.65	2.39	5.14	20	8.5	
14:40	8.05	200	13.1	649	6.64	1.73	2.97	34	8.5	
14:45	8.05	200	13.0	622	6.63	1.11	0.96	44	8.5	
14:48	8.05	200	12.9	624	6.63	1.16	0.71	48	8.5	
14:51	8.05	200	12.9	621	6.62	1.20	0.63	49	8.5	
14:55	Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
[ ] QED BLADDER	[ ] TEFLON OR TEFLON LINED	[ ] POLYVINYL CHLORIDE	[ ] TEFLON
[ ] SIMCO BLADDER	[ ] HIGH DENSITY POLYETHYLENE	[ ] STAINLESS STEEL	[ ] OTHER
[X] GEOPUMP	[X] LDPE (Dedicated)	[X] SILICON (Dedicated)	

ANALYTICAL PARAMETERS

GROUNDWATER

	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] Total Fe	6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Total Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNI HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED [YES] NO

NUMBER OF GALLONS GENERATED: 2.0

NOTES

LOCATION SKETCH

SIGNATURE: Mark Massie

MACTEC

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	SAMPLE ID	OC-GW-13	ROUND NO.	4
SAMPLE ID	OC-GW-13	SITE TYPE	Superfund	DATE	11/24/2008
TIME	START 12:35 END 13:45	JOB NUMBER	6100-08-0016.04	BOTTLE TIME	13:10

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT
- [X] TOP OF WELL RISER
- [ ] TOP OF PROTECTIVE CASING
- [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): 2.4 FT.

PROTECTIVE CASING / WELL DIFFERENCE: 0.6 FT.

INITIAL DEPTH TO WATER: 12.48 FT.

WELL DEPTH (TOR): 19.95 FT.

PID AMBIENT AIR: N/A PPMV

WELL DIAMETER: 4 IN.

FINAL DEPTH TO WATER: 13.40 FT.

SCREEN LENGTH: See Survey FT.

PID WELL MOUTH: N/A PPMV

WELL INTEGRITY:	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: 0.59 FT.
(initial - final x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED: 0.246

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 2.4 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/L) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (µS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)	TURBIDITY (NTU) (10%) (0-2)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
12:44	13.40	200	13.2	48	5.10	1.04	5.26	238	17	
12:49	13.40	200	12.8	47	5.06	0.93	3.13	250	17	
12:53	13.40	200	12.5	47	5.05	0.91	3.19	253	17	
12:56	13.40	200	12.2	47	5.04	0.83	3.30	259	17	
12:59	13.40	200	12.3	46	5.03	0.80	2.28	262	17	
13:02	13.40	200	12.5	47	5.02	0.74	2.29	266	17	
13:06	13.40	200	12.5	46	5.00	0.74	1.62	265	17	
13:10	Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP
- [ ] QED BLADDER
- [ ] SIMCO BLADDER
- [X] GEOPUMP

TYPE OF TUBING
- [ ] TEFLON OR TEFLON LINED
- [ ] HIGH DENSITY POLYETHYLENE
- [X] LDPE (Dedicated)

TYPE OF PUMP MATERIAL
- [ ] POLYVINYL CHLORIDE
- [ ] STAINLESS STEEL
- [X] SILICON (Dedicated)

TYPE OF BLADDER MATERIAL
- [ ] TEFLON
- [ ] OTHER _____

ANALYTICAL PARAMETERS

GROUNDWATER	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[X] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[X] VOCs
[X] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[X] SVOCs
[X] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[X] VPH
[X] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Fe
[X] Total Fe	6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Total Fe
[X] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[X] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[ ] Chloride	300.0	4 DEG. C	1 X 500 mL	[ ] Chloride
[ ] Sulfate	300.0	4 DEG. C	1 X 500 mL	[ ] Sulfate
[ ] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[ ] Specific Conductivity
[ ] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED: [YES] NO

NUMBER OF GALLONS GENERATED: 2.5

LOCATION SKETCH

NOTES

SIGNATURE: Mark Massin

MACTEC

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	SAMPLE ID	OC-GW-16	ROUND NO.	4
SAMPLE ID	OC-GW-16R	SITE TYPE	Superfund	DATE	11/24/2008
TIME	START 8:40 END 9:55	JOB NUMBER	6100-08-0016.04	BOTTLE TIME	9:30

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT
- [X] TOP OF WELL RISER
- [ ] TOP OF PROTECTIVE CASING
- [ ] OTHER

PROTECTIVE CASING STICKUP (FROM GROUND): 2.9 FT.

PROTECTIVE CASING / WELL DIFFERENCE: 0.3 FT.

INITIAL DEPTH TO WATER: 12.2 FT.

WELL DEPTH (TOR): 17.8 FT.

PID AMBIENT AIR: N/A PPMV

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 12.83 FT.

SCREEN LENGTH: See Survey FT.

PID WELL MOUTH: N/A PPMV

WELL INTEGRITY:	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: 0.10 FT.
(initial - final x 0.16 (2-inch) or x 0.65 (4-inch))

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED: 0.02

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 4.9 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/L) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (µS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)	TURBIDITY (NTU) (10%) (0-2)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
8:54	12.83	250	14.5	242	6.23	8.96	41.3	0	15	
9:01	12.83	250	14.5	251	6.26	8.93	22.8	2	15	
9:06	12.83	250	14.1	246	6.25	8.60	15.5	1	15	
9:11	12.83	250	14.2	243	6.25	7.96	7.09	1	15	
9:16	12.83	250	14.3	238	6.25	7.05	3.88	1	15	
9:21	12.83	250	14.3	234	6.24	6.97	3.69	1	15	
9:26	12.83	250	14.2	234	6.23	6.98	3.40	2	15	
9:30	Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
[ ] QED BLADDER	[ ] TEFLON OR TEFLON LINED	[ ] POLYVINYL CHLORIDE	[ ] TEFLON
[ ] SIMCO BLADDER	[ ] HIGH DENSITY POLYETHYLENE	[ ] STAINLESS STEEL	[ ] OTHER
[X] GEOPUMP	[X] LDPE (Dedicated)	[X] SILICON (Dedicated)	

ANALYTICAL PARAMETERS

GROUNDWATER

	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[x] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[x] VOCs
[x] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[x] SVOCs
[x] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[x] VPH
[x] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[x] Dis. Fe
[x] Total Fe	6010B	HNO3 / 4 DEG. C	1 X 500 mL	[x] Total Fe
[x] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[x] pH
[x] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[x] Ammonia-Nitrogen
[ ] Chloride	300.0	4 DEG. C	1 X 500 mL	[ ] Chloride
[ ] Sulfate	300.0	4 DEG. C	1 X 500 mL	[ ] Sulfate
[ ] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[ ] Specific Conductivity
[ ] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED [YES] NO

NUMBER OF GALLONS GENERATED: 3.5

NOTES

LOCATION SKETCH

SIGNATURE: Mark Mass-14

MACTEC

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	SAMPLE ID	OC-GW-101	ROUND NO.	4
SAMPLE ID	OC-GW-101	SITE TYPE	Superfund	DATE	11/24/2008
TIME	START 10:30 END 12:00	JOB NUMBER	6100-08-0016.04	BOTTLE TIME	11:45

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT
- [X] TOP OF WELL RISER
- [ ] TOP OF PROTECTIVE CASING
- [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): 1.2 FT.

PROTECTIVE CASING / WELL DIFFERENCE: 0.3 FT.

INITIAL DEPTH TO WATER: 12.17 FT.

WELL DEPTH (TOR): 18.72 FT.

PID AMBIENT AIR: N/A PPMV

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 12.62 FT.

SCREEN LENGTH: See Survey FT.

PID WELL MOUTH: N/A PPMV

WELL INTEGRITY:	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: 0.072 FT.
(initial - final x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED: 0.009

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 7.73 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/L) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (µS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)	TURBIDITY (NTU) (10%) (0-2)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
10:43	12.50	325	12.7	1890	6.4	3.72	128	-120	18	
10:48	12.53	325	12.9	1930	6.42	3.55	135	-122	18	
10:53	12.57	325	12.9	1960	6.43	3.81	156	-123	18	
10:58	12.59	325	12.9	1990	6.43	3.53	100	-124	18	
11:08	12.62	325	13.0	2020	6.44	3.92	31.7	-121	18	
11:13	12.62	325	13.1	2030	6.44	3.89	19.0	-118	18	
11:18	12.62	325	13.0	2050	6.45	4.06	13.3	-118	18	
11:23	12.62	325	13.0	2070	6.43	4.07	12.3	-116	18	
11:41	12.62	325	13.1	2050	6.39	3.95	11.8	-112	18	
11:45	Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
[ ] QED BLADDER	[ ] TEFLON OR TEFLON LINED	[ ] POLYVINYL CHLORIDE	[ ] TEFLON
[ ] SIMCO BLADDER	[ ] HIGH DENSITY POLYETHYLENE	[ ] STAINLESS STEEL	[ ] OTHER _____
[X] GEOPUMP	[X] LDPE (Dedicated)	[X] SILICON (Dedicated)	

ANALYTICAL PARAMETERS

GROUNDWATER

	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[X] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[X] VOCs
[X] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[X] SVOCs
[X] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[X] VPH
[X] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Fe
[X] Total Fe	6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Total Fe
[X] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[X] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[ ] Chloride	300.0	4 DEG. C	1 X 500 mL	[ ] Chloride
[ ] Sulfate	300.0	4 DEG. C	1 X 500 mL	[ ] Sulfate
[ ] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[ ] Specific Conductivity
[ ] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED [YES] NO

NUMBER OF GALLONS GENERATED: 7.25

NOTES

LOCATION SKETCH

SIGNATURE:

MACTEC

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	SAMPLE ID	OC-B-03	ROUND NO.	4
SAMPLE ID	OC-B-03	SITE TYPE	Superfund	DATE	11/24/2008
TIME	START 12:40 END 13:25	JOB NUMBER	6100-08-0016.04	BOTTLE TIME	13:15

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT
- [X] TOP OF WELL RISER
- [ ] TOP OF PROTECTIVE CASING
- [ ] OTHER

PROTECTIVE CASING STICKUP (FROM GROUND): 0.9 FT.

PROTECTIVE CASING / WELL DIFFERENCE: 0.2 FT.

INITIAL DEPTH TO WATER: 11.83 FT.

WELL DEPTH (TOR): 15.41 FT.

PID AMBIENT AIR: N/A PPMV

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 12.71 FT.

SCREEN LENGTH: See Survey FT.

PID WELL MOUTH: N/A PPMV

WELL INTEGRITY:

	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: 0.14 FT.
(initial - final x 0.16 (2-inch) or x 0.65 (4-inch))

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED: 0.04

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 3.57 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/L) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (µS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)	TURBIDITY (NTU) (10%) (0-2)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
12:46	12.63	300	14.2	66	6.24	2.51	20.4	129	15	
12:51	12.63	300	14.3	65	5.23	2.31	13.5	149	15	
12:56	12.69	300	14.5	60	5.17	2.53	7.54	159	15	
12:59	12.70	300	14.5	59	5.16	2.73	6.27	165	15	
13:02	12.71	300	14.6	58	5.14	2.87	5.51	166	15	
13:05	12.71	300	14.5	58	5.14	2.26	3.52	167	15	
13:08	12.71	300	14.5	58	5.12	2.29	2.88	170	15	
13:11	12.71	300	14.5	58	5.10	2.20	2.92	172	15	
13:15	Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP
- [ ] QED BLADDER
- [ ] SIMCO BLADDER
- [X] GEOPUMP

TYPE OF TUBING
- [ ] TEFLON OR TEFLON LINED
- [ ] HIGH DENSITY POLYETHYLENE
- [X] LDPE (Dedicated)

TYPE OF PUMP MATERIAL
- [ ] POLYVINYL CHLORIDE
- [ ] STAINLESS STEEL
- [X] SILICON (Dedicated)

TYPE OF BLADDER MATERIAL
- [ ] TEFLON
- [ ] OTHER

ANALYTICAL PARAMETERS

GROUNDWATER

	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[X] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[X] VOCs
[X] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[X] SVOCs
[X] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[X] VPH
[X] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Fe
[X] Total Fe	6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Total Fe
[X] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[X] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[ ] Chloride	300.0	4 DEG. C	1 X 500 mL	[ ] Chloride
[ ] Sulfate	300.0	4 DEG. C	1 X 500 mL	[ ] Sulfate
[ ] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[ ] Specific Conductivity
[ ] Dissolved Al, Cr	DIS. 6010B	HN HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED [YES] NO

NUMBER OF GALLONS GENERATED: 3

LOCATION SKETCH

NOTES

SIGNATURE:

MACTEC

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	SAMPLE ID	OC-IW-6	ROUND NO.	4
SAMPLE ID	OC-IW-6	SITE TYPE	Superfund	DATE	11/24/2008
TIME	START 8:50 END 10:00	JOB NUMBER	6100-08-0016.04	BOTTLE TIME	9:45

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT
- [X] TOP OF WELL RISER
- [ ] TOP OF PROTECTIVE CASING
- [ ] OTHER

PROTECTIVE CASING STICKUP (FROM GROUND): 0.89 FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 11.07 FT.

WELL DEPTH (TOR): 19.11 FT.

PID AMBIENT AIR: N/A PPMV

WELL DIAMETER: 6 IN.

FINAL DEPTH TO WATER: 11.45 FT.

SCREEN LENGTH: See Survey FT.

PID WELL MOUTH: N/A PPMV

WELL INTEGRITY:

	YES	NO	N/A
CAP			X
CASING	X		
LOCKED	X		
COLLAR			X

DRAWDOWN VOLUME: 0.56 FT.
(initial - final x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED: 0.1

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 5.54 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/L) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (µS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)	TURBIDITY (NTU) (10%) (0-2)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
9:00	11.39	300	13.7	422	5.69	0.96	20.2	-27	18	
9:05	11.41	300	13.8	429	5.73	0.73	15.9	-37	18	
9:10	11.41	300	13.8	446	5.80	0.40	13.2	-41	18	
9:13	11.41	300	13.9	450	5.83	0.34	12.9	-46	18	
9:16	11.41	300	14.0	461	5.86	0.20	13.8	-51	18	
9:21	11.41	300	14.1	465	5.91	0.07	12.6	-57	18	
9:26	11.43	300	14.0	479	5.92	0.10	11.8	-60	18	
9:36	11.43	300	14.0	499	5.95	<0.1	11.6	-64	18	
9:39	11.43	300	14.0	504	5.97	<0.1	11.5	-65	18	
9:45	Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP
- [ ] QED BLADDER
- [ ] SIMCO BLADDER
- [X] GEOPUMP

TYPE OF TUBING
- [ ] TEFLON OR TEFLON LINED
- [ ] HIGH DENSITY POLYETHYLENE
- [X] LDPE (Dedicated)

TYPE OF PUMP MATERIAL
- [ ] POLYVINYL CHLORIDE
- [ ] STAINLESS STEEL
- [X] SILICON (Dedicated)

TYPE OF BLADDER MATERIAL
- [ ] TEFLON
- [ ] OTHER

ANALYTICAL PARAMETERS

GROUNDWATER

	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[X] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[X] VOCs
[X] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[X] SVOCs
[X] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[X] VPH
[X] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Fe
[X] Total Fe	6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Total Fe
[X] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[X] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[ ] Chloride	300.0	4 DEG. C	1 X 500 mL	[ ] Chloride
[ ] Sulfate	300.0	4 DEG. C	1 X 500 mL	[ ] Sulfate
[ ] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[ ] Specific Conductivity
[ ] Dissolved Al, Cr	DIS. 6010B	HN HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED [YES] NO

NUMBER OF GALLONS GENERATED: 6

NOTES

LOCATION SKETCH

SIGNATURE:

MACTEC

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	SAMPLE ID	OC-IW-10	ROUND NO.	4
SAMPLE ID	OC-IW-10	SITE TYPE	Superfund	DATE	11/24/2008
TIME	START 10:50 END 11:59	JOB NUMBER	6100-08-0016.04	BOTTLE TIME	11:40

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT
- [X] TOP OF WELL RISER
- [ ] TOP OF PROTECTIVE CASING
- [ ] OTHER

PROTECTIVE CASING STICKUP (FROM GROUND): 2.5 FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 12.5 FT.

WELL DEPTH (TOR): 17.7 FT.

PID AMBIENT AIR: N/A PPMV

WELL DIAMETER: 6 IN.

FINAL DEPTH TO WATER: 12.5 FT.

SCREEN LENGTH: See Survey FT.

PID WELL MOUTH: N/A PPMV

WELL INTEGRITY:	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: 0 FT.
(initial - final x 0.16 (2-inch) or x 0.65 (4-inch))

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED: 0

PRESSURE TO PUMP: N/A PSI

TOTAL VOL PURGED: 7.29 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/L) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (µS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)	TURBIDITY (NTU) (10%) (0-2)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
10:55	12.5	400	14.4	406	7.23	<0.1	40.4	-7	15	
11:03	12.5	400	14.6	416	7.14	<0.1	25.6	-10	15	
11:08	12.5	400	14.4	499	7.07	<0.1	26.8	-1	15	
11:13	12.5	400	14.4	473	7.02	<0.1	18.6	5	15	
11:18	12.5	400	14.3	477	7.00	<0.1	18.4	9	15	
11:23	12.5	400	14.3	399	6.98	<0.1	14.6	13	15	
11:28	12.5	400	14.4	386	6.96	<0.1	13.6	18	15	
11:34	12.5	400	14.3	376	6.94	<0.1	13.0	20	15	
11:37	12.5	400	14.3	371	6.92	<0.1	12.9	21	15	
11:40	Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
[ ] QED BLADDER	[ ] TEFLON OR TEFLON LINED	[ ] POLYVINYL CHLORIDE	[ ] TEFLON
[ ] SIMCO BLADDER	[ ] HIGH DENSITY POLYETHYLENE	[ ] STAINLESS STEEL	[ ] OTHER
[X] GEOPUMP	[X] LDPE (Dedicated)	[X] SILICON (Dedicated)	

ANALYTICAL PARAMETERS

GROUNDWATER

	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[x] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[x] VOCs
[x] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[x] SVOCs
[x] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[x] VPH
[x] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[x] Dis. Fe
[x] Total Fe	6010B	HNO3 / 4 DEG. C	1 X 500 mL	[x] Total Fe
[x] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[x] pH
[x] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[x] Ammonia-Nitrogen
[ ] Chloride	300.0	4 DEG. C	1 X 500 mL	[ ] Chloride
[ ] Sulfate	300.0	4 DEG. C	1 X 500 mL	[ ] Sulfate
[ ] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[ ] Specific Conductivity
[ ] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED [YES] NO

NUMBER OF GALLONS GENERATED: 6.75

LOCATION SKETCH

NOTES

SIGNATURE: Mark Massimo

MACTEC

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - SURFACE WATER

PROJECT: OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA | JOB NUMBER: 6100-08-0016.04 | DATE: 11/18/2008

FIELD SAMPLE NUMBER: OC-ISCO-1 | ACTIVITY TIME: START 13:25 END 13:32 | BOTTLE TIME: 13:30

QC SAMPLES COLLECTED:

SURFACE WATER DATA

WATER DEPTH AT LOCATION	1.0 FT	SPEC. COND	0.873 mS/cm
DEPTH OF SAMPLE FROM SURFACE	0.3 FT	D.O.	4.46 mg/L
TEMPERATURE	5.3 DEG C	SALINITY	<0.1 %
TURBIDITY	4.73 NTU	ORP	68 mV
PH	5.73 UNITS	ASSOCIATED TRIP BLANK	N/A
RINSATE BLANK	N/A		

EQUIPMENT USED:
- [ ] BEAKER
- [ ] PACS BOMB
- [X] PERISTALTIC PUMP
- [X] FILTER (0.45 micron)
- [X] LDPE Tubing & Silicon

TYPE OF SURFACE WATER:
- [X] STREAM/ RIVER
- [ ] LAKE/ POND
- [ ] SEEP
- [ ] MARSH
- [ ] OTHER

DECON FLUIDS USED:
- [ ] DI WATER N2 PURGE
- [ ] POTABLE WATER
- [X] NONE

SEDIMENT DATA

ASSOCIATED TRIP BLANK: | RINSATE BLANK:

DEPTH OF SEDIMENT:

TYPE OF SAMPLE:
- [ ] DISCRETE
- [ ] COMPOSITE

SAMPLE OBSERVATIONS:
- ODOR
- COLOR

TYPE OF SEDIMENT:
- [ ] ORGANIC
- [ ] SAND
- [ ] GRAVEL
- [ ] CLAY
- [ ] OTHER

EQUIPMENT FOR COLLECTION:
- [ ] HAND CORER
- [ ] S.S. SPOON
- [ ] ALUMINIUM PAN
- [ ] DREDGE
- [ ] OTHER

DECON FLUIDS USED:
- [ ] DI WATER N2 PURGE
- [ ] POTABLE WATER
- [ ] LIQUINOX
- [ ] OTHER

ANALYTICAL PARAMETERS
SURFACE WATER

		METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
X	Ammonia-Nitrogen	10-107-06-1	N	H2SO4 / 4 DEG. C	1 X 250 mL	X
X	Nitrate / Nitrite	300.0	N	4 DEG. C	1 X 500 mL	X
X	Chloride	300.0	N	4 DEG. C	1 X 500 mL	X
X	Sulfate	300.0	N	4 DEG. C	1 X 500 mL	X
X	Specific Conductivity	SM 2510B	N	4 DEG. C	1 X 500 mL	X
X	Total Al, Cr, Na	Total 6010B	N	HNO3 / 4 DEG. C	1 X 500 mL	X
X	Dissolved Al, Cr, Na	DIS. 6010B	Y	HNO3 / 4 DEG. C	1 X 500 mL	X

ANALYTICAL PARAMETERS
SEDIMENT

		METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
	% Solids / Moisture	160.3	4 DEG. C	1 X 8 oz.	
	Total Al, Cr, Fe	Total 6010B	4 DEG. C	1 X 8 oz.	

NOTES

SIGNATURE:

Created By: DLC 12/17/08
Checked By: TRH 1/2/09

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - SURFACE WATER

PROJECT: OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA | JOB NUMBER: 6100-08-0016.04 | DATE: 11/18/2008

FIELD SAMPLE NUMBER: OC-ISCO-2 | ACTIVITY TIME: START 12:05 END 12:12 | BOTTLE TIME: 12:10

QC SAMPLES COLLECTED: N/A

SURFACE WATER DATA

WATER DEPTH AT LOCATION	0.3 FT	SPEC. COND	1.36 mS/cm
DEPTH OF SAMPLE FROM SURFACE	0.2 FT	D.O.	1.62 mg/L
TEMPERATURE	7.4 DEG C	SALINITY	0.1 %
TURBIDITY	>1000 NTU	ORP	-71 mV
PH	6.20 UNITS		

ASSOCIATED TRIP BLANK: N/A | RINSATE BLANK: N/A

EQUIPMENT USED:
- [ ] BEAKER
- [ ] PACS BOMB
- [X] PERISTALTIC PUMP
- [X] FILTER (0.45 micron)
- [X] LDPE Tubing & Silicon

TYPE OF SURFACE WATER:
- [X] STREAM/ RIVER
- [ ] LAKE/ POND
- [ ] SEEP
- [ ] MARSH
- [ ] OTHER

DECON FLUIDS USED:
- [ ] DI WATER N2 PURGE
- [ ] POTABLE WATER
- [X] NONE

SEDIMENT DATA

ASSOCIATED TRIP BLANK: | RINSATE BLANK:

DEPTH OF SEDIMENT:

TYPE OF SAMPLE:
- [ ] DISCRETE
- [ ] COMPOSITE

SAMPLE OBSERVATIONS:
- ODOR: _____
- COLOR: _____

TYPE OF SEDIMENT:
- [ ] ORGANIC
- [ ] SAND
- [ ] GRAVEL
- [ ] CLAY
- [ ] OTHER

EQUIPMENT FOR COLLECTION:
- [ ] HAND CORER
- [ ] S.S. SPOON
- [ ] ALUMINIUM PAN
- [ ] DREDGE
- [ ] OTHER

DECON FLUIDS USED:
- [ ] DI WATER N2 PURGE
- [ ] POTABLE WATER
- [ ] LIQUINOX
- [ ] OTHER

ANALYTICAL PARAMETERS
SURFACE WATER

		METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
X	Ammonia-Nitrogen	10-107-06-1	N	H2SO4 / 4 DEG. C	1 X 250 mL	X
X	Nitrate / Nitrite	300.0	N	4 DEG. C	1 X 500 mL	X
X	Chloride	300.0	N	4 DEG. C	1 X 500 mL	X
X	Sulfate	300.0	N	4 DEG. C	1 X 500 mL	X
X	Specific Conductivity	SM 2510B	N	4 DEG. C	1 X 500 mL	X
X	Total Al, Cr, Na	Total 6010B	N	HNO3 / 4 DEG. C	1 X 500 mL	X
X	Dissolved Al, Cr, Na	DIS. 6010B	Y	HNO3 / 4 DEG. C	1 X 500 mL	X

ANALYTICAL PARAMETERS
SEDIMENT

		METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
	% Solids / Moisture	160.3	4 DEG. C	1 X 8 oz.	
	Total Al, Cr, Fe	Total 6010B	4 DEG. C	1 X 8 oz.	

NOTES

SIGNATURE: _____

Created By: DLC 12/17/08
Checked By: TRH 1/2/09

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - SURFACE WATER

PROJECT: OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA | JOB NUMBER: 6100-08-0016.04 | DATE: 11/18/2008

FIELD SAMPLE NUMBER: OC-ISCO-3 | ACTIVITY TIME: START 11:50 END 12:03 | BOTTLE TIME: 12:00

QC SAMPLES COLLECTED: N/A

SURFACE WATER DATA

WATER DEPTH AT LOCATION	0.4 FT	SPEC. COND	2.15 mS/cm
DEPTH OF SAMPLE FROM SURFACE	0.2 FT	D.O.	10.10 mg/L
TEMPERATURE	4.7 DEG C	SALINITY	<0.1 %
TURBIDITY	29.3 NTU	ORP	65 mV
PH	6.01 UNITS		

ASSOCIATED TRIP BLANK: N/A | RINSATE BLANK: N/A

EQUIPMENT USED:
- [ ] BEAKER
- [ ] PACS BOMB
- [X] PERISTALTIC PUMP
- [X] FILTER (0.45 micron)
- [X] LDPE Tubing & Silicon

TYPE OF SURFACE WATER:
- [X] STREAM/ RIVER
- [ ] LAKE/ POND
- [ ] SEEP
- [ ] MARSH
- [ ] OTHER

DECON FLUIDS USED:
- [ ] DI WATER N2 PURGE
- [ ] POTABLE WATER
- [X] NONE

SEDIMENT DATA

ASSOCIATED TRIP BLANK: | RINSATE BLANK:

DEPTH OF SEDIMENT:

TYPE OF SAMPLE:
- [ ] DISCRETE
- [ ] COMPOSITE

SAMPLE OBSERVATIONS:
- ODOR
- COLOR

TYPE OF SEDIMENT:
- [ ] ORGANIC
- [ ] SAND
- [ ] GRAVEL
- [ ] CLAY
- [ ] OTHER

EQUIPMENT FOR COLLECTION:
- [ ] HAND CORER
- [ ] S.S. SPOON
- [ ] ALUMINIUM PAN
- [ ] DREDGE
- [ ] OTHER

DECON FLUIDS USED:
- [ ] DI WATER N2 PURGE
- [ ] POTABLE WATER
- [ ] LIQUINOX
- [ ] OTHER

ANALYTICAL PARAMETERS

SURFACE WATER

		METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
X	Ammonia-Nitrogen	10-107-06-1	N	H2SO4 / 4 DEG. C	1 X 250 mL	X
X	Nitrate / Nitrite	300.0	N	4 DEG. C	1 X 500 mL	X
X	Chloride	300.0	N	4 DEG. C	1 X 500 mL	X
X	Sulfate	300.0	N	4 DEG. C	1 X 500 mL	X
X	Specific Conductivity	SM 2510B	N	4 DEG. C	1 X 500 mL	X
X	Total Al, Cr, Na	Total 6010B	N	HNO3 / 4 DEG. C	1 X 500 mL	X
X	Dissolved Al, Cr, Na	DIS. 6010B	Y	HNO3 / 4 DEG. C	1 X 500 mL	X

SEDIMENT

		METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
	% Solids / Moisture	160.3	4 DEG. C	1 X 8 oz.	
	Total Al, Cr, Fe	Total 6010B	4 DEG. C	1 X 8 oz.	

NOTES

SIGNATURE:

Created By: DLC 12/17/08
Checked By: TRH 1/2/09

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - SURFACE WATER

PROJECT: OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA | JOB NUMBER: 6100-08-0016.04 | DATE: 11/18/2008

FIELD SAMPLE NUMBER: OC-PZ-16RR | ACTIVITY TIME: START 12:30 END 12:37 | BOTTLE TIME: 12:35

QC SAMPLES COLLECTED: N/A

SURFACE WATER DATA

WATER DEPTH AT LOCATION	0.6 FT	SPEC. COND	2.22 mS/cm
DEPTH OF SAMPLE FROM SURFACE	0.2 FT	D.O.	6.31 mg/L
TEMPERATURE	5.3 DEG C	SALINITY	<0.1 %
TURBIDITY	22.3 NTU	ORP	107 mV
PH	5.24 UNITS		

ASSOCIATED TRIP BLANK: N/A | RINSATE BLANK: N/A

EQUIPMENT USED:
- [ ] BEAKER
- [ ] PACS BOMB
- [X] PERISTALTIC PUMP
- [X] FILTER (0.45 micron)
- [X] LDPE Tubing & Silicon

TYPE OF SURFACE WATER:
- [X] STREAM/ RIVER
- [ ] LAKE/ POND
- [ ] SEEP
- [ ] MARSH
- [ ] OTHER

DECON FLUIDS USED:
- [ ] DI WATER N2 PURGE
- [ ] POTABLE WATER
- [X] NONE

SEDIMENT DATA

ASSOCIATED TRIP BLANK: | RINSATE BLANK:

DEPTH OF SEDIMENT:

TYPE OF SAMPLE:
- [ ] DISCRETE
- [ ] COMPOSITE

SAMPLE OBSERVATIONS:
- ODOR
- COLOR

TYPE OF SEDIMENT:
- [ ] ORGANIC
- [ ] SAND
- [ ] GRAVEL
- [ ] CLAY
- [ ] OTHER

EQUIPMENT FOR COLLECTION:
- [ ] HAND CORER
- [ ] S.S. SPOON
- [ ] ALUMINIUM PAN
- [ ] DREDGE
- [ ] OTHER

DECON FLUIDS USED:
- [ ] DI WATER N2 PURGE
- [ ] POTABLE WATER
- [ ] LIQUINOX
- [ ] OTHER

ANALYTICAL PARAMETERS
SURFACE WATER

		METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
X	Ammonia-Nitrogen	10-107-06-1	N	H2SO4 / 4 DEG. C	1 X 250 mL	X
X	Nitrate / Nitrite	300.0	N	4 DEG. C	1 X 500 mL	X
X	Chloride	300.0	N	4 DEG. C	1 X 500 mL	X
X	Sulfate	300.0	N	4 DEG. C	1 X 500 mL	X
X	Specific Conductivity	SM 2510B	N	4 DEG. C	1 X 500 mL	X
X	Total Al, Cr, Na	Total 6010B	N	HNO3 / 4 DEG. C	1 X 500 mL	X
X	Dissolved Al, Cr, Na	DIS. 6010B	Y	HNO3 / 4 DEG. C	1 X 500 mL	X

ANALYTICAL PARAMETERS
SEDIMENT

		METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
	% Solids / Moisture	160.3	4 DEG. C	1 X 8 oz.	
	Total Al, Cr, Fe	Total 6010B	4 DEG. C	1 X 8 oz.	

NOTES

SIGNATURE:

Created By: DLC 12/17/08
Checked By: TRH 1/2/09

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - SURFACE WATER

PROJECT: OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA | JOB NUMBER: 6100-08-0016.04 | DATE: 11/18/2008

FIELD SAMPLE NUMBER: OC-PZ-17RR | ACTIVITY TIME: START 12:45 END 12:53 | BOTTLE TIME: 12:50

QC SAMPLES COLLECTED: N/A

SURFACE WATER DATA

WATER DEPTH AT LOCATION	0.4 FT	SPEC. COND	2.29 mS/cm
DEPTH OF SAMPLE FROM SURFACE	0.2 FT	D.O.	7.56 mg/L
TEMPERATURE	7.0 DEG C	SALINITY	<0.1 %
TURBIDITY	22.9 NTU	ORP	106 mV
PH	4.92 UNITS		

ASSOCIATED TRIP BLANK: N/A | RINSATE BLANK: N/A

EQUIPMENT USED:
- [ ] BEAKER
- [ ] PACS BOMB
- [X] PERISTALTIC PUMP
- [X] FILTER (0.45 micron)
- [X] LDPE Tubing & Silicon

TYPE OF SURFACE WATER:
- [X] STREAM/ RIVER
- [ ] LAKE/ POND
- [ ] SEEP
- [ ] MARSH
- [ ] OTHER

DECON FLUIDS USED:
- [ ] DI WATER N2 PURGE
- [ ] POTABLE WATER
- [X] NONE

SEDIMENT DATA

ASSOCIATED TRIP BLANK: | RINSATE BLANK:

DEPTH OF SEDIMENT:

TYPE OF SAMPLE:
- [ ] DISCRETE
- [ ] COMPOSITE

SAMPLE OBSERVATIONS:
- ODOR: _____
- COLOR: _____

TYPE OF SEDIMENT:
- [ ] ORGANIC
- [ ] SAND
- [ ] GRAVEL
- [ ] CLAY
- [ ] OTHER

EQUIPMENT FOR COLLECTION:
- [ ] HAND CORER
- [ ] S.S. SPOON
- [ ] ALUMINIUM PAN
- [ ] DREDGE
- [ ] OTHER

DECON FLUIDS USED:
- [ ] DI WATER N2 PURGE
- [ ] POTABLE WATER
- [ ] LIQUINOX
- [ ] OTHER

ANALYTICAL PARAMETERS
SURFACE WATER

		METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
X	Ammonia-Nitrogen	10-107-06-1	N	H2SO4 / 4 DEG. C	1 X 250 mL	X
X	Nitrate / Nitrite	300.0	N	4 DEG. C	1 X 500 mL	X
X	Chloride	300.0	N	4 DEG. C	1 X 500 mL	X
X	Sulfate	300.0	N	4 DEG. C	1 X 500 mL	X
X	Specific Conductivity	SM 2510B	N	4 DEG. C	1 X 500 mL	X
X	Total Al, Cr, Na	Total 6010B	N	HNO3 / 4 DEG. C	1 X 500 mL	X
X	Dissolved Al, Cr, Na	DIS. 6010B	Y	HNO3 / 4 DEG. C	1 X 500 mL	X

ANALYTICAL PARAMETERS
SEDIMENT

		METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
	% Solids / Moisture	160.3	4 DEG. C	1 X 8 oz.	
	Total Al, Cr, Fe	Total 6010B	4 DEG. C	1 X 8 oz.	

NOTES

SIGNATURE: _____

Created By: DLC 12/17/08
Checked By: TRH 1/2/09

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - SURFACE WATER

PROJECT: OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA | JOB NUMBER: 6100-08-0016.04 | DATE: 11/18/2008

FIELD SAMPLE NUMBER: OC-PZ-18R | ACTIVITY TIME: START 13:05 END 13:12 | BOTTLE TIME: 13:10

QC SAMPLES COLLECTED: DUP, MS, MSD

SURFACE WATER DATA

WATER DEPTH AT LOCATION	1.5 FT	SPEC. COND	0.885 mS/cm
DEPTH OF SAMPLE FROM SURFACE	0.3 FT	D.O.	10.72 mg/L
TEMPERATURE	4.1 DEG C	SALINITY	<0.1 %
TURBIDITY	5.3 NTU	ORP	93 mV
PH	4.92 UNITS		

ASSOCIATED TRIP BLANK: N/A | RINSATE BLANK: N/A

EQUIPMENT USED:
- [ ] BEAKER
- [ ] PACS BOMB
- [X] PERISTALTIC PUMP
- [X] FILTER (0.45 micron)
- [X] LDPE Tubing & Silicon

TYPE OF SURFACE WATER:
- [X] STREAM/ RIVER
- [ ] LAKE/ POND
- [ ] SEEP
- [ ] MARSH
- [ ] OTHER

DECON FLUIDS USED:
- [ ] DI WATER N2 PURGE
- [ ] POTABLE WATER
- [X] NONE

SEDIMENT DATA

ASSOCIATED TRIP BLANK: | RINSATE BLANK:

DEPTH OF SEDIMENT:

TYPE OF SAMPLE:
- [ ] DISCRETE
- [ ] COMPOSITE

SAMPLE OBSERVATIONS:
- ODOR
- COLOR

TYPE OF SEDIMENT:
- [ ] ORGANIC
- [ ] SAND
- [ ] GRAVEL
- [ ] CLAY
- [ ] OTHER

EQUIPMENT FOR COLLECTION:
- [ ] HAND CORER
- [ ] S.S. SPOON
- [ ] ALUMINIUM PAN
- [ ] DREDGE
- [ ] OTHER

DECON FLUIDS USED:
- [ ] DI WATER N2 PURGE
- [ ] POTABLE WATER
- [ ] LIQUINOX
- [ ] OTHER

ANALYTICAL PARAMETERS
SURFACE WATER

		METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
X	Ammonia-Nitrogen	10-107-06-1	N	H2SO4 / 4 DEG. C	1 X 250 mL	X
X	Nitrate / Nitrite	300.0	N	4 DEG. C	1 X 500 mL	X
X	Chloride	300.0	N	4 DEG. C	1 X 500 mL	X
X	Sulfate	300.0	N	4 DEG. C	1 X 500 mL	X
X	Specific Conductivity	SM 2510B	N	4 DEG. C	1 X 500 mL	X
X	Total Al, Cr, Na	Total 6010B	N	HNO3 / 4 DEG. C	1 X 500 mL	X
X	Dissolved Al, Cr, Na	DIS. 6010B	Y	HNO3 / 4 DEG. C	1 X 500 mL	X

ANALYTICAL PARAMETERS
SEDIMENT

		METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
	% Solids / Moisture	160.3	4 DEG. C	1 X 8 oz.	
	Total Al, Cr, Fe	Total 6010B	4 DEG. C	1 X 8 oz.	

NOTES

SIGNATURE:

Created By: DLC 12/17/08
Checked By: TRH 1/2/09

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - SURFACE WATER

PROJECT: OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA | JOB NUMBER: 6100-08-0016.04 | DATE: 11/18/2008

FIELD SAMPLE NUMBER: OC-SD-17 | ACTIVITY TIME: START 12:55 END 13:03 | BOTTLE TIME: 13:00

QC SAMPLES COLLECTED: N/A

SURFACE WATER DATA

WATER DEPTH AT LOCATION	0.5 FT	SPEC. COND	2.31 mS/cm
DEPTH OF SAMPLE FROM SURFACE	0.2 FT	D.O.	5.81 mg/L
TEMPERATURE	6.8 DEG C	SALINITY	<0.1 %
TURBIDITY	20.9 NTU	ORP	110 mV
PH	5.08 UNITS		

ASSOCIATED TRIP BLANK: N/A | RINSATE BLANK: N/A

EQUIPMENT USED:
- [ ] BEAKER
- [ ] PACS BOMB
- [X] PERISTALTIC PUMP
- [X] FILTER (0.45 micron)
- [X] LDPE Tubing & Silicon

TYPE OF SURFACE WATER:
- [X] STREAM/ RIVER
- [ ] LAKE/ POND
- [ ] SEEP
- [ ] MARSH
- [ ] OTHER

DECON FLUIDS USED:
- [ ] DI WATER N2 PURGE
- [ ] POTABLE WATER
- [X] NONE

SEDIMENT DATA

ASSOCIATED TRIP BLANK: | RINSATE BLANK:

DEPTH OF SEDIMENT:

TYPE OF SAMPLE:
- [ ] DISCRETE
- [ ] COMPOSITE

SAMPLE OBSERVATIONS:
- ODOR: _____
- COLOR: _____

TYPE OF SEDIMENT:
- [ ] ORGANIC
- [ ] SAND
- [ ] GRAVEL
- [ ] CLAY
- [ ] OTHER

EQUIPMENT FOR COLLECTION:
- [ ] HAND CORER
- [ ] S.S. SPOON
- [ ] ALUMINIUM PAN
- [ ] DREDGE
- [ ] OTHER

DECON FLUIDS USED:
- [ ] DI WATER N2 PURGE
- [ ] POTABLE WATER
- [ ] LIQUINOX
- [ ] OTHER

ANALYTICAL PARAMETERS
SURFACE WATER

		METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
X	Ammonia-Nitrogen	10-107-06-1	N	H2SO4 / 4 DEG. C	1 X 250 mL	X
X	Nitrate / Nitrite	300.0	N	4 DEG. C	1 X 500 mL	X
X	Chloride	300.0	N	4 DEG. C	1 X 500 mL	X
X	Sulfate	300.0	N	4 DEG. C	1 X 500 mL	X
X	Specific Conductivity	SM 2510B	N	4 DEG. C	1 X 500 mL	X
X	Total Al, Cr, Na	Total 6010B	N	HNO3 / 4 DEG. C	1 X 500 mL	X
X	Dissolved Al, Cr, Na	DIS. 6010B	Y	HNO3 / 4 DEG. C	1 X 500 mL	X

ANALYTICAL PARAMETERS
SEDIMENT

		METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
	% Solids / Moisture	160.3	4 DEG. C	1 X 8 oz.	
	Total Al, Cr, Fe	Total 6010B	4 DEG. C	1 X 8 oz.	

NOTES

SIGNATURE: _____

Created By: DLC 12/17/08
Checked By: TRH 1/2/09

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - SEDIMENT SAMPLING

PROJECT: OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA | JOB NUMBER: 6100-08-0016.04 | DATE: 11/19/2008

FIELD SAMPLE NUMBER: OC-SD-SD1 | ACTIVITY TIME: START 8:50 END 9:00 | BOTTLE TIME: 8:55

QC SAMPLES COLLECTED:

SURFACE WATER DATA

WATER DEPTH AT LOCATION: ____ FT | SPEC. COND: ____ µS/cm

DEPTH OF SAMPLE FROM SURFACE: ____ FT | D.O.: ____ mg/L

TEMPERATURE: ____ DEG C | SALINITY: ____ %

TURBIDITY: ____ NTU | ORP: ____ mV

PH: ____ UNITS | ASSOCIATED TRIP BLANK: ____ | RINSATE BLANK: ____

EQUIPMENT USED
- [ ] BEAKER
- [ ] PACS BOMB
- [ ] PERISTALTIC PUMP
- [ ] FILTER (0.45 micron)
- [ ] LDPE Tubing & Silicon

TYPE OF SURFACE WATER
- [ ] STREAM/ RIVER
- [ ] LAKE/ POND
- [ ] SEEP
- [ ] MARSH
- [ ] OTHER ____

DECON FLUIDS USED:
- [ ] DI WATER N2 PURGE
- [ ] POTABLE WATER
- [ ] NONE

SEDIMENT DATA

ASSOCIATED TRIP BLANK: ____ | RINSATE BLANK: ____

DEPTH OF SEDIMENT: 0.3 ft.

TYPE OF SAMPLE
- [ ] DISCRETE
- [x] COMPOSITE

SAMPLE OBSERVATIONS
- ODOR: N/A
- COLOR: Dark brown/ brown

TYPE OF SEDIMENT:
- [x] ORGANIC
- [x] SAND
- [x] GRAVEL
- [ ] CLAY
- [ ] OTHER ____

EQUIPMENT FOR COLLECTION
- [ ] HAND CORER
- [x] S.S. SPOON
- [x] ALUMINIUM PAN
- [ ] DREDGE
- [x] OTHER Shovel

DECON FLUIDS USED
- [ ] DI WATER N2 PURGE
- [ ] POTABLE WATER
- [ ] LIQUINOX
- [x] OTHER Alconox, D.I.

ANALYTICAL PARAMETERS

SURFACE WATER

		METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ]	Ammonia-Nitrogen	10-107-06-1	N	H2SO4 / 4 DEG. C	1 X 250 mL	[ ]
[ ]	Nitrate / Nitrite	300.0	N	4 DEG. C	1 X 500 mL	[ ]
[ ]	Chloride	300.0	N	4 DEG. C	1 X 500 mL	[ ]
[ ]	Sulfate	300.0	N	4 DEG. C	1 X 500 mL	[ ]
[ ]	Specific Conductivity	SM 2510B	N	4 DEG. C	1 X 500 mL	[ ]
[ ]	Total Al, Cr, Na	Total 6010B	N	HNO3 / 4 DEG. C	1 X 500 mL	[ ]
[ ]	Dissolved Al, Cr, Na	DIS. 6010B	Y	HNO3 / 4 DEG. C	1 X 500 mL	[ ]
[ ]						[ ]
[ ]						[ ]

SEDIMENT

		METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[x]	% Solids / Moisture	160.3	4 DEG. C	1 X 8 oz.	[x]
[x]	Total Al, Cr, Fe	Total 6010B	4 DEG. C	1 X 8 oz.	[x]
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]

NOTES

SIGNATURE:

Created By: DLC 12/17/08
Checked By: TRH 1/2/09

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - SEDIMENT SAMPLING

PROJECT: OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA | JOB NUMBER: 6100-08-0016.04 | DATE: 11/19/2008

FIELD SAMPLE NUMBER: OC-SD-SD2 | ACTIVITY TIME: START 9:05 END 9:15 | BOTTLE TIME: 9:10

QC SAMPLES COLLECTED:

SURFACE WATER DATA

WATER DEPTH AT LOCATION: ____ FT | SPEC. COND: ____ µS/cm

DEPTH OF SAMPLE FROM SURFACE: ____ FT | D.O.: ____ mg/L

TEMPERATURE: ____ DEG C | SALINITY: ____ %

TURBIDITY: ____ NTU | ORP: ____ mV

PH: ____ UNITS | ASSOCIATED TRIP BLANK: ____ | RINSATE BLANK: ____

EQUIPMENT USED
- [ ] BEAKER
- [ ] PACS BOMB
- [ ] PERISTALTIC PUMP
- [ ] FILTER (0.45 micron)
- [ ] LDPE Tubing & Silicon

TYPE OF SURFACE WATER
- [ ] STREAM/ RIVER
- [ ] LAKE/ POND
- [ ] SEEP
- [ ] MARSH
- [ ] OTHER ____

DECON FLUIDS USED:
- [ ] DI WATER N2 PURGE
- [ ] POTABLE WATER
- [ ] NONE

SEDIMENT DATA

ASSOCIATED TRIP BLANK: ____ | RINSATE BLANK: ____

DEPTH OF SEDIMENT: 0.4 ft.

TYPE OF SAMPLE
- [ ] DISCRETE
- [x] COMPOSITE

SAMPLE OBSERVATIONS
- ODOR: Strong Sulfur Odor
- COLOR: Dark brown/ black

TYPE OF SEDIMENT:
- [x] ORGANIC
- [x] SAND
- [ ] GRAVEL
- [ ] CLAY
- [ ] OTHER ____

EQUIPMENT FOR COLLECTION
- [ ] HAND CORER
- [x] S.S. SPOON
- [x] ALUMINIUM PAN
- [ ] DREDGE
- [x] OTHER Shovel

DECON FLUIDS USED
- [ ] DI WATER N2 PURGE
- [ ] POTABLE WATER
- [ ] LIQUINOX
- [x] OTHER Alconox, D.I.

ANALYTICAL PARAMETERS

SURFACE WATER

		METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ]	Ammonia-Nitrogen	10-107-06-1	N	H2SO4 / 4 DEG. C	1 X 250 mL	[ ]
[ ]	Nitrate / Nitrite	300.0	N	4 DEG. C	1 X 500 mL	[ ]
[ ]	Chloride	300.0	N	4 DEG. C	1 X 500 mL	[ ]
[ ]	Sulfate	300.0	N	4 DEG. C	1 X 500 mL	[ ]
[ ]	Specific Conductivity	SM 2510B	N	4 DEG. C	1 X 500 mL	[ ]
[ ]	Total Al, Cr, Na	Total 6010B	N	HNO3 / 4 DEG. C	1 X 500 mL	[ ]
[ ]	Dissolved Al, Cr, Na	DIS. 6010B	Y	HNO3 / 4 DEG. C	1 X 500 mL	[ ]
[ ]						[ ]
[ ]						[ ]

SEDIMENT

		METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[x]	% Solids / Moisture	160.3	4 DEG. C	1 X 8 oz.	[x]
[x]	Total Al, Cr, Fe	Total 6010B	4 DEG. C	1 X 8 oz.	[x]
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]

NOTES

SIGNATURE: _____

Created By: DLC 12/17/08
Checked By: TRH 1/2/09

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - SEDIMENT SAMPLING

PROJECT: OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA | JOB NUMBER: 6100-08-0016.04 | DATE: 11/19/2008

FIELD SAMPLE NUMBER: OC-SD-SD3 | ACTIVITY TIME: START 9:20 END 9:30 | BOTTLE TIME: 9:25

QC SAMPLES COLLECTED: DUP, MS, MSD

SURFACE WATER DATA

WATER DEPTH AT LOCATION: ____ FT | SPEC. COND: ____ µS/cm

DEPTH OF SAMPLE FROM SURFACE: ____ FT | D.O.: ____ mg/L

TEMPERATURE: ____ DEG C | SALINITY: ____ %

TURBIDITY: ____ NTU | ORP: ____ mV

PH: ____ UNITS | ASSOCIATED TRIP BLANK: ____ | RINSATE BLANK: ____

EQUIPMENT USED: [ ] BEAKER [ ] PACS BOMB [ ] PERISTALTIC PUMP [ ] FILTER (0.45 micron) [ ] LDPE Tubing & Silicon

TYPE OF SURFACE WATER: [ ] STREAM/ RIVER [ ] LAKE/ POND [ ] SEEP [ ] MARSH [ ] OTHER ____

DECON FLUIDS USED: [ ] DI WATER N2 PURGE [ ] POTABLE WATER [ ] NONE

SEDIMENT DATA

ASSOCIATED TRIP BLANK: ____ | RINSATE BLANK: ____

DEPTH OF SEDIMENT: 0.4 ft.

TYPE OF SAMPLE: [ ] DISCRETE [x] COMPOSITE

SAMPLE OBSERVATIONS: ODOR: Sulfur | COLOR: Dark brown/ black

TYPE OF SEDIMENT: [x] ORGANIC [x] SAND [ ] GRAVEL [ ] CLAY [ ] OTHER ____

EQUIPMENT FOR COLLECTION: [ ] HAND CORER [x] S.S. SPOON [x] ALUMINIUM PAN [ ] DREDGE [x] OTHER Shovel

DECON FLUIDS USED: [ ] DI WATER N2 PURGE [ ] POTABLE WATER [ ] LIQUINOX [x] OTHER Alconox, D.I.

ANALYTICAL PARAMETERS

SURFACE WATER

		METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ]	Ammonia-Nitrogen	10-107-06-1	N	H2SO4 / 4 DEG. C	1 X 250 mL	[ ]
[ ]	Nitrate / Nitrite	300.0	N	4 DEG. C	1 X 500 mL	[ ]
[ ]	Chloride	300.0	N	4 DEG. C	1 X 500 mL	[ ]
[ ]	Sulfate	300.0	N	4 DEG. C	1 X 500 mL	[ ]
[ ]	Specific Conductivity	SM 2510B	N	4 DEG. C	1 X 500 mL	[ ]
[ ]	Total Al, Cr, Na	Total 6010B	N	HNO3 / 4 DEG. C	1 X 500 mL	[ ]
[ ]	Dissolved Al, Cr, Na	DIS. 6010B	Y	HNO3 / 4 DEG. C	1 X 500 mL	[ ]
[ ]						[ ]
[ ]						[ ]

SEDIMENT

		METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[x]	% Solids / Moisture	160.3	4 DEG. C	1 X 8 oz.	[x]
[x]	Total Al, Cr, Fe	Total 6010B	4 DEG. C	1 X 8 oz.	[x]
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]

NOTES

SIGNATURE:

Created By: DLC 12/17/08
Checked By: TRH 1/2/09

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - SEDIMENT SAMPLING

PROJECT: OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA | JOB NUMBER: 6100-08-0016.04 | DATE: 11/19/2008

FIELD SAMPLE NUMBER: OC-SD-SD4 | ACTIVITY TIME: START 9:45 END 9:55 | BOTTLE TIME: 9:50

QC SAMPLES COLLECTED:

SURFACE WATER DATA

WATER DEPTH AT LOCATION: ____ FT | SPEC. COND: ____ µS/cm

DEPTH OF SAMPLE FROM SURFACE: ____ FT | D.O.: ____ mg/L

TEMPERATURE: ____ DEG C | SALINITY: ____ %

TURBIDITY: ____ NTU | ORP: ____ mV

PH: ____ UNITS | ASSOCIATED TRIP BLANK: ____ | RINSATE BLANK: ____

EQUIPMENT USED
- [ ] BEAKER
- [ ] PACS BOMB
- [ ] PERISTALTIC PUMP
- [ ] FILTER (0.45 micron)
- [ ] LDPE Tubing & Silicon

TYPE OF SURFACE WATER
- [ ] STREAM/ RIVER
- [ ] LAKE/ POND
- [ ] SEEP
- [ ] MARSH
- [ ] OTHER ____

DECON FLUIDS USED:
- [ ] DI WATER N2 PURGE
- [ ] POTABLE WATER
- [ ] NONE

SEDIMENT DATA

ASSOCIATED TRIP BLANK: ____ | RINSATE BLANK: ____

DEPTH OF SEDIMENT: 0.5 ft.

TYPE OF SAMPLE
- [ ] DISCRETE
- [x] COMPOSITE

SAMPLE OBSERVATIONS
- ODOR: Sulfur
- COLOR: Dark brown/ black

TYPE OF SEDIMENT:
- [x] ORGANIC
- [x] SAND
- [ ] GRAVEL
- [ ] CLAY
- [ ] OTHER ____

EQUIPMENT FOR COLLECTION
- [ ] HAND CORER
- [x] S.S. SPOON
- [x] ALUMINIUM PAN
- [ ] DREDGE
- [x] OTHER Shovel

DECON FLUIDS USED
- [ ] DI WATER N2 PURGE
- [ ] POTABLE WATER
- [ ] LIQUINOX
- [x] OTHER Alconox, D.I.

ANALYTICAL PARAMETERS
SURFACE WATER

		METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ]	Ammonia-Nitrogen	10-107-06-1	N	H2SO4 / 4 DEG. C	1 X 250 mL	[ ]
[ ]	Nitrate / Nitrite	300.0	N	4 DEG. C	1 X 500 mL	[ ]
[ ]	Chloride	300.0	N	4 DEG. C	1 X 500 mL	[ ]
[ ]	Sulfate	300.0	N	4 DEG. C	1 X 500 mL	[ ]
[ ]	Specific Conductivity	SM 2510B	N	4 DEG. C	1 X 500 mL	[ ]
[ ]	Total Al, Cr, Na	Total 6010B	N	HNO3 / 4 DEG. C	1 X 500 mL	[ ]
[ ]	Dissolved Al, Cr, Na	DIS. 6010B	Y	HNO3 / 4 DEG. C	1 X 500 mL	[ ]
[ ]						[ ]
[ ]						[ ]

ANALYTICAL PARAMETERS
SEDIMENT

		METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[x]	% Solids / Moisture	160.3	4 DEG. C	1 X 8 oz.	[x]
[x]	Total Al, Cr, Fe	Total 6010B	4 DEG. C	1 X 8 oz.	[x]
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]

NOTES

SIGNATURE:

Created By: DLC 12/17/08
Checked By: TRH 1/2/09

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - SEDIMENT SAMPLING

PROJECT: OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA | JOB NUMBER: 6100-08-0016.04 | DATE: 11/19/2008

FIELD SAMPLE NUMBER: OC-SD-SD5 | ACTIVITY TIME: START 10:05 END 10:15 | BOTTLE TIME: 10:10

QC SAMPLES COLLECTED:

SURFACE WATER DATA

WATER DEPTH AT LOCATION: FT | SPEC. COND: µS/cm

DEPTH OF SAMPLE FROM SURFACE: FT | D.O.: mg/L

TEMPERATURE: DEG C | SALINITY: %

TURBIDITY: NTU | ORP: mV

PH: UNITS | ASSOCIATED TRIP BLANK: | RINSATE BLANK:

EQUIPMENT USED
- [ ] BEAKER
- [ ] PACS BOMB
- [ ] PERISTALTIC PUMP
- [ ] FILTER (0.45 micron)
- [ ] LDPE Tubing & Silicon

TYPE OF SURFACE WATER
- [ ] STREAM/ RIVER
- [ ] LAKE/ POND
- [ ] SEEP
- [ ] MARSH
- [ ] OTHER

DECON FLUIDS USED:
- [ ] DI WATER N2 PURGE
- [ ] POTABLE WATER
- [ ] NONE

SEDIMENT DATA

ASSOCIATED TRIP BLANK: | RINSATE BLANK:

DEPTH OF SEDIMENT: 0.4 ft.

TYPE OF SAMPLE
- [ ] DISCRETE
- [x] COMPOSITE

SAMPLE OBSERVATIONS
- ODOR: Sulfur
- COLOR: Brown/ dark brown

TYPE OF SEDIMENT:
- [x] ORGANIC
- [x] SAND
- [ ] GRAVEL
- [ ] CLAY
- [ ] OTHER

EQUIPMENT FOR COLLECTION
- [ ] HAND CORER
- [x] S.S. SPOON
- [x] ALUMINIUM PAN
- [ ] DREDGE
- [x] OTHER: Shovel

DECON FLUIDS USED
- [ ] DI WATER N2 PURGE
- [ ] POTABLE WATER
- [ ] LIQUINOX
- [x] OTHER: Alconox, D.I.

ANALYTICAL PARAMETERS
SURFACE WATER

		METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ]	Ammonia-Nitrogen	10-107-06-1	N	H2SO4 / 4 DEG. C	1 X 250 mL	[ ]
[ ]	Nitrate / Nitrite	300.0	N	4 DEG. C	1 X 500 mL	[ ]
[ ]	Chloride	300.0	N	4 DEG. C	1 X 500 mL	[ ]
[ ]	Sulfate	300.0	N	4 DEG. C	1 X 500 mL	[ ]
[ ]	Specific Conductivity	SM 2510B	N	4 DEG. C	1 X 500 mL	[ ]
[ ]	Total Al, Cr, Na	Total 6010B	N	HNO3 / 4 DEG. C	1 X 500 mL	[ ]
[ ]	Dissolved Al, Cr, Na	DIS. 6010B	Y	HNO3 / 4 DEG. C	1 X 500 mL	[ ]
[ ]						[ ]
[ ]						[ ]

ANALYTICAL PARAMETERS
SEDIMENT

		METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[x]	% Solids / Moisture	160.3	4 DEG. C	1 X 8 oz.	[x]
[x]	Total Al, Cr, Fe	Total 6010B	4 DEG. C	1 X 8 oz.	[x]
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]

NOTES

SIGNATURE:

Created By: DLC 12/17/08
Checked By: TRH 1/2/09

Please TAKE THIS for your PROJECT FILE!
This helps document measurement quality and manage risks.

FIELD INSTRUMENTATION CALIBRATION RECORD

PROJECT: _____ DATE: 11/10/08

PROJECT NUMBER: 61008.0016/04 CALIBRATED BY: Uh

MULTI-PARAMETER WATER QUALITY MONITORING SYSTEM: MODEL: Horiba-U22 or Horiba-U10
UNIT ID NO.: M015- _____ UNIT ID NO.: M014- _____

	STANDARD VALUE:		METER VALUE:		ACCEPTANCE CRITERIA**
pH	4.0	units	pH _____	units	+/- 10% of standa
Conductivity	4.49	mS/cm	Conductivity _____	mS/cm	+/- 10% of standa
DO	_____	mg/L *	DO _____	mg/L	+/- 10% of standa
Thermometer Temperature	_____	deg. C	Temperature _____	deg. C	+/- 2.0 deg. C

MATERIALS RECORD:
Auto Calibration Fluids: Auto Cal Solution Standard Source: Expiration Date: _____ Lot Number: _____

TURBIDITY METER TYPE: MODEL: HACH 2100P or Lamotte 2020
UNIT ID NO.: M024- 16

STANDARD VALUE:	METER VALUE:		
<0.1 NTU (low)	0.23	NTU	within 0.3 NTU of the standard
800 NTU (high)	786	NTU	+/- 10% of standard

PHOTO IONIZATION DEVICE: MODEL: Thermo 580B or Mini RAE 2000
UNIT ID NO.: M001- _____

BACKGROUND:	METER VALUE:	
Zero Air 0 ppmv	_____	ppmv within 5 ppmv of Zero
Span Gas 100 ppmv	_____	ppmv +/- 10% of standard

Calibration Gas Lot Number: _____

NOTES:

* Indicate in notes section what was used as the DO standard (i.e., based on saturation at room temperature)

** If the meter reading is not within acceptance criteria, clean or replace probe and re-calibrate, or use a different meter if available. If project requirements necessitate use of the instrument, clearly document on all data sheets and log book entries that the parameter was not calibrated to the acceptance criteria.

Please TAKE THIS for your PROJECT FILE!
This helps document measurement quality and manage risks.

FIELD INSTRUMENTATION CALIBRATION RECORD

PROJECT: _____ DATE: 11/11/08

PROJECT NUMBER: 6100080016/04 CALIBRATED BY: BZ

MULTI-PARAMETER WATER QUALITY MONITORING SYSTEM: MODEL: Horiba-U22 or Horiba-U10
UNIT ID NO.: M015- 12 UNIT ID NO.: M014- ____

	STANDARD VALUE:		METER VALUE:		ACCEPTANCE CRITERIA **
	pH 4.0	units	pH 4.00	units	+/- 10% of standar
	Conductivity 4.49	mS/cm	Conductivity 4.49	mS/cm	+/- 10% of standar
	DO 8.68	mg/L *	DO 8.58	mg/L	+/- 10% of standar
Thermometer Temperature	21.5	deg. C	Temperature 20.2	deg. C	+/- 2.0 deg. C

MATERIALS RECORD:
Auto Calibration Fluids: Auto Cal Solution Standard Source: Expiration Date: 7/24/08 Lot Number: 6447

TURBIDITY METER TYPE: MODEL: HACH 2100P or Lamotte 2020
UNIT ID NO.: M024- ____

STANDARD VALUE:	METER VALUE:	
<0.1 NTU (low)	_____ NTU	within 0.3 NTU of the standard
800 NTU (high)	_____ NTU	+/- 10% of standard

PHOTO IONIZATION DEVICE: MODEL: Thermo 580B or Mini RAE 2000
UNIT ID NO.: M001- ____

BACKGROUND:	METER VALUE:
Zero Air 0 ppmv	_____ ppmv within 5 ppmv of Zero
Span Gas 100 ppmv	_____ ppmv +/- 10% of standard

Calibration Gas Lot Number: _____

NOTES:

* = Indicate in notes section what was used as the DO standard (i.e., based on saturation at room temperature)

If the meter reading is not within acceptance criteria, clean or replace probe and re-calibrate, or use a different meter if available. If project requirements necessitate use of the instrument, clearly document on all data sheets and log book entries that the parameter was not calibrated to the acceptance criteria.

Please TAKE THIS for your PROJECT FILE!
This helps document measurement quality and manage risks.

FIELD INSTRUMENTATION CALIBRATION RECORD

PROJECT: _____ DATE: 11/11/08

PROJECT NUMBER: 61000800016/04 CALIBRATED BY: _____

MULTI-PARAMETER WATER QUALITY MONITORING SYSTEM: MODEL: Horiba-U22 or Horiba-U10
UNIT ID NO.: M015- _____ UNIT ID NO.: M014- _____

	STANDARD VALUE:		METER VALUE:		ACCEPTANCE CRITERIA **
pH	4.0	units	pH _____	units	+/- 10% of standa
Conductivity	4.49	mS/cm	Conductivity _____	mS/cm	+/- 10% of standa
DO	_____	mg/L *	DO _____	mg/L	+/- 10% of standa
Thermometer Temperature	_____	deg. C	Temperature _____	deg. C	+/- 2.0 deg. C

MATERIALS RECORD:
Auto Calibration Fluids: Auto Cal Solution Standard Source: Expiration Date: _____ Lot Number: _____

TURBIDITY METER TYPE: MODEL: HACH 2100P or Lamotte 2020
UNIT ID NO.: M024- 17

STANDARD VALUE:	METER VALUE:	
<0.1 NTU (low)	0.12 NTU	within 0.3 NTU of the standard
800 NTU (high)	801 NTU	+/- 10% of standard

PHOTO IONIZATION DEVICE: MODEL: Thermo 580B or Mini RAE 2000
UNIT ID NO.: M001- _____

BACKGROUND:	METER VALUE:
Zero Air 0 ppmv	_____ ppmv within 5 ppmv of Zero
Span Gas 100 ppmv	_____ ppmv +/- 10% of standard

Calibration Gas Lot Number: _____

NOTES:

* Indicate in notes section what was used as the DO standard (i.e., based on saturation at room temperature)

** If the meter reading is not within acceptance criteria, clean or replace probe and re-calibrate, or use a different meter if available. If project requirements necessitate use of the instrument, clearly document on all data sheets and log book entries that the parameter was not calibrated to the acceptance criteria.

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This helps document measurement quality and manage risks.

FIELD INSTRUMENTATION CALIBRATION RECORD

PROJECT: _____ DATE: 11/18/08

PROJECT NUMBER: 61008.0016/0.04 CALIBRATED BY: BC

MULTI-PARAMETER WATER QUALITY MONITORING SYSTEM: MODEL: Horiba-U22 or Horiba-U10
UNIT ID NO.: M015- 11 UNIT ID NO.: M014- ____

STANDARD VALUE:		METER VALUE:		ACCEPTANCE CRITERIA**
pH 4.0	units	pH 4.00	units	+/- 10% of standa
Conductivity 4.49	mS/cm	Conductivity 4.49	mS/cm	+/- 10% of standa
DO 8.68	mg/L *	DO 8.55	mg/L	+/- 10% of standa
Thermometer Temperature 21.5	deg. C	Temperature 20.3	deg. C	+/- 2.0 deg. C

MATERIALS RECORD:
Auto Calibration Fluids: Auto Cal Solution Standard Source: Expiration Date: 7/24/09 Lot Number: 6447.

TURBIDITY METER TYPE: MODEL: HACH 2100P or Lamotte 2020
UNIT ID NO.: M024- ____

STANDARD VALUE:	METER VALUE:	
<0.1 NTU (low)	_____ NTU	within 0.3 NTU of the standard
800 NTU (high)	_____ NTU	+/- 10% of standard

PHOTO IONIZATION DEVICE: MODEL: Thermo 580B or Mini RAE 2000
UNIT ID NO.: M001- ____

BACKGROUND:	METER VALUE:
Zero Air 0 ppmv	_____ ppmv within 5 ppmv of Zero
Span Gas 100 ppmv	_____ ppmv +/- 10% of standard

Calibration Gas Lot Number: _____

NOTES:

* = ate in notes section what was used as the DO standard (i.e., based on saturation at room temperature)

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MACTEC ENGINEERING AND CONSULTING

FIELD INSTRUMENTATION CALIBRATION RECORD

PROJECT: Olin Chemical Superfund Site | DATE: 11/17/2008

CREW ID OR TASK ID: Fourth Quarter 2008 (SW - 4300) | JOB NUMBER: 6100-08-0016

SAMPLER SIGNATURE: Mark Maggiore

EQUIPMENT CALIBRATION	CALIBRATION INFORMATION				ACCEPTANCE
	STANDARD VALUE		METER VALUE		CRITERIA **
HORIBA MODEL NO. U-22	pH 4.00 units		pH 4.00 units		+/- 10% of standard
UNIT ID NC MO15-10	Sp. Conductivity 4.49 mS/cm		Sp. Conductivity 4.51 mS/cm		+/- 10% of standard
	Redox --- mV		Redox 245 mV		see note 1
	DO --- mg/L *		DO 11.00 mg/L		+/- 10% of standard
	Thermometer Temperature --- deg. C		Temperature 13.59 deg. C		+/- 2.0 deg. C
TURBIDITY METER TYPE Hach	<0.1 NTU		0.23 NTU		within 0.3 NTU
MODEL NO. 2100P	20 NTU		20.7 NTU		+/- 10% of standard
UNIT ID NO. MO24-16	100 NTU		101 NTU		+/- 10% of standard
	800 NTU		803 NTU		+/- 10% of standard
PHOTOIONIZATION					
METER TYPE	Background ppmv	Zero Air ppmv	Meter ppmv		within 5 ppmv of Zero
MODEL NO.	Span Gas ppmv		Meter ppmv		+/- 10% of standard
UNIT ID NO.					
OTHER METER TYPE					see note 2
MODEL NO.					see note 2
UNIT ID NO.					see note 2
OTHER METER TYPE					see note 2
MODEL NO.					see note 2
UNIT ID NO.					see note 2

MATERIALS RECORD	Lot Number	Calibration Fluids/	
Deionized Water Source:		Standard Source:	Auto Cal #6447
Trip Blank Water Source:		Lot Numbers pH	Auto Cal #6447
Sample Preservatives Source:		mV	Auto Cal #6447
Disposable Filter Type:		Sp. Cond.	Auto Cal #6447
Other		Turb.	Cal Set #16

NOTES:

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1 = meter must read within specified range of the Zobell solution (usually 231 +/- 10 mv @ 25 deg C).

2 = specify acceptance criteria in the Notes section

MACTEC ENGINEERING AND CONSULTING

FIELD INSTRUMENTATION CALIBRATION RECORD

PROJECT: Olin Chemical Superfund Site | DATE: 11/18/2008

CREW ID OR TASK ID: Fourth Quarter 2008 (SW - 4300) | JOB NUMBER: 6100-08-0016

SAMPLER SIGNATURE: David Chapman

EQUIPMENT CALIBRATION	CALIBRATION INFORMATION				ACCEPTANCE
	STANDARD VALUE		METER VALUE		CRITERIA **
HORIBA MODEL NO. U-22	pH 4.00	units	pH 4.00	units	+/- 10% of standard
UNIT ID NC MO15-12	Sp. Conductivity 4.49	mS/cm	Sp. Conductivity 4.59	mS/cm	+/- 10% of standard
	Redox 100	mV	Redox 104	mV	see note 1
	DO ---	mg/L *	DO 12.91	mg/L	+/- 10% of standard
	Thermometer Temperature ---	deg. C	Temperature 5.2	deg. C	+/- 2.0 deg. C
TURBIDITY METER TYPE Hach	<0.1	NTU	0.23	NTU	within 0.3 NTU
MODEL NO. 2100P	20	NTU	19.4	NTU	+/- 10% of standard
UNIT ID NO. MO24-17	100	NTU	100	NTU	+/- 10% of standard
	800	NTU	798	NTU	+/- 10% of standard
PHOTOIONIZATION					
METER TYPE	Background ppmv	Zero Air ppmv	Meter	ppmv	within 5 ppmv of Zero
MODEL NO.	Span Gas	ppmv	Meter	ppmv	+/- 10% of standard
UNIT ID NO.					
OTHER METER TYPE					see note 2
MODEL NO.					see note 2
UNIT ID NO.					see note 2
OTHER METER TYPE					see note 2
MODEL NO.					see note 2
UNIT ID NO.					see note 2

MATERIALS RECORD	Lot Number	Calibration Fluids/	
Deionized Water Source:		Standard Source:	Auto Cal #6449
Trip Blank Water Source:		Lot Numbers pH	Auto Cal #6449
Sample Preservatives Source:		mV	Auto Cal #6449
Disposable Filter Type:		Sp. Cond.	Auto Cal #6449
Other		Turb.	Cal Set #17

NOTES:

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MACTEC ENGINEERING AND CONSULTING

FIELD INSTRUMENTATION CALIBRATION RECORD

PROJECT: Olin Chemical Superfund Site | DATE: 11/18/2008

CREW ID OR TASK ID: Fourth Quarter 2008 (SW - 4300) | JOB NUMBER: 6100-08-0016

SAMPLER SIGNATURE: Mark Maggiore

EQUIPMENT CALIBRATION	CALIBRATION INFORMATION					ACCEPTANCE
		STANDARD VALUE		METER VALUE		CRITERIA **
HORIBA MODEL NO. U-22	pH	4.00	units	pH 3.98	units	+/- 10% of standard
UNIT ID NC MO24-16	Sp. Conductivity	4.49	mS/cm	Sp. Conductivity 4.5	mS/cm	+/- 10% of standard
	Redox	100	mV	Redox 101	mV	see note 1
	DO	---	mg/L *	DO 11.43	mg/L	+/- 10% of standard
	Thermometer Temperature	---	deg. C	Temperature 5.3	deg. C	+/- 2.0 deg. C
TURBIDITY METER TYPE Hach		<0.1	NTU	0.22	NTU	within 0.3 NTU
MODEL NO. 2100P		20	NTU	20.4	NTU	+/- 10% of standard
UNIT ID NO. MO24-16		100	NTU	101	NTU	+/- 10% of standard
		800	NTU	792	NTU	+/- 10% of standard
PHOTOIONIZATION						
METER TYPE	Background	ppmv	Zero Air ppmv	Meter	ppmv	within 5 ppmv of Zero
MODEL NO.	Span Gas	ppmv		Meter	ppmv	+/- 10% of standard
UNIT ID NO.						
OTHER METER TYPE						see note 2
MODEL NO.						see note 2
UNIT ID NO.						see note 2
OTHER METER TYPE						see note 2
MODEL NO.						see note 2
UNIT ID NO.						see note 2

MATERIALS RECORD	Lot Number	Calibration Fluids/	
Deionized Water Source:		Standard Source:	Auto Cal #6447
Trip Blank Water Source:		Lot Numbers pH	Auto Cal #6447
Sample Preservatives Source:		mV	Auto Cal #6447
Disposable Filter Type:		Sp. Cond.	Auto Cal #6447
Other		Turb.	Cal Set #16

NOTES:

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MACTEC ENGINEERING AND CONSULTING

FIELD INSTRUMENTATION CALIBRATION RECORD

PROJECT: Olin Chemical Superfund Site | DATE: 11/19/2008

CREW ID OR TASK ID: Fourth Quarter 2008 (SW - 4300) | JOB NUMBER: 6100-08-0016

SAMPLER SIGNATURE: Mark Maggiore

EQUIPMENT CALIBRATION	CALIBRATION INFORMATION	STANDARD VALUE		METER VALUE		ACCEPTANCE CRITERIA **
HORIBA MODEL NO. U-22	pH	4.00	units	3.99	units	+/- 10% of standard
UNIT ID NC MO15-11	Sp. Conductivity	4.49	mS/cm	4.62	mS/cm	+/- 10% of standard
	Redox	---	mV	300	mV	see note 1
	DO	---	mg/L *	12.39	mg/L	+/- 10% of standard
	Thermometer Temperature	---	deg. C	5.5	deg. C	+/- 2.0 deg. C
TURBIDITY METER TYPE Hach		<0.1	NTU	0.3	NTU	within 0.3 NTU
MODEL NO. 2100P		20	NTU	21.1	NTU	+/- 10% of standard
UNIT ID NO. MO24-16		100	NTU	101	NTU	+/- 10% of standard
		800	NTU	802	NTU	+/- 10% of standard
PHOTOIONIZATION						
METER TYPE	Background	ppmv	Zero Air ppmv	Meter	ppmv	within 5 ppmv of Zero
MODEL NO.	Span Gas	ppmv		Meter	ppmv	+/- 10% of standard
UNIT ID NO.						
OTHER METER TYPE						see note 2
MODEL NO.						see note 2
UNIT ID NO.						see note 2
OTHER METER TYPE						see note 2
MODEL NO.						see note 2
UNIT ID NO.						see note 2

MATERIALS RECORD	Lot Number	Calibration Fluids/	
Deionized Water Source:		Standard Source:	Auto Cal #6447
Trip Blank Water Source:		Lot Numbers pH	Auto Cal #6447
Sample Preservatives Source:		mV	Auto Cal #6447
Disposable Filter Type:		Sp. Cond.	Auto Cal #6447
Other		Turb.	Cal Set #16

NOTES:

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2 = specify acceptance criteria in the Notes section

MACTEC ENGINEERING AND CONSULTING

FIELD INSTRUMENTATION CALIBRATION RECORD

PROJECT: Olin Chemical Superfund Site | DATE: 11/19/2008

CREW ID OR TASK ID: Fourth Quarter 2008 (SW - 4300) | JOB NUMBER: 6100-08-0016

SAMPLER SIGNATURE: David Chapman

EQUIPMENT CALIBRATION	CALIBRATION INFORMATION				ACCEPTANCE
	STANDARD VALUE		METER VALUE		CRITERIA **
HORIBA MODEL NO. U-22	pH 4.00 units		pH 4.00 units		+/- 10% of standard
UNIT ID NO. MO15-12	Sp. Conductivity 4.49 mS/cm		Sp. Conductivity 4.70 mS/cm		+/- 10% of standard
	Redox --- mV		Redox 154 mV		see note 1
	DO --- mg/L *		DO 14.94 mg/L		+/- 10% of standard
	Thermometer Temperature --- deg. C		Temperature 4.1 deg. C		+/- 2.0 deg. C
TURBIDITY METER TYPE Hach	<0.1 NTU		0.25 NTU		within 0.3 NTU
MODEL NO. 2100P	20 NTU		20.0 NTU		+/- 10% of standard
UNIT ID NO. MO24-17	100 NTU		99.3 NTU		+/- 10% of standard
	800 NTU		785 NTU		+/- 10% of standard
PHOTOIONIZATION					
METER TYPE	Background ppmv	Zero Air ppmv	Meter ppmv		within 5 ppmv of Zero
MODEL NO.	Span Gas ppmv		Meter ppmv		+/- 10% of standard
UNIT ID NO.					
OTHER METER TYPE					see note 2
MODEL NO.					see note 2
UNIT ID NO.					see note 2
OTHER METER TYPE					see note 2
MODEL NO.					see note 2
UNIT ID NO.					see note 2

MATERIALS RECORD	Lot Number	Calibration Fluids/	
Deionized Water Source:		Standard Source:	Auto Cal #6447
Trip Blank Water Source:		Lot Numbers pH	Auto Cal #6447
Sample Preservatives Source:		mV	Auto Cal #6447
Disposable Filter Type:		Sp. Cond.	Auto Cal #6447
Other		Turb.	Cal Set #17

NOTES:

* = Indicate in notes section what was used as the DO standard (i.e., based on saturation at room temperature)

** = If the meter reading is not within acceptance criteria, clean or replace probe and re-calibrate, or use a different meter if available. If project requirements necessitate use of the instrument, clearly document on all data sheets and log book entries that the specified parameter was not calibrated to the acceptance criteria.

1 = meter must read within specified range of the Zobell solution (usually 231 +/- 10 mv @ 25 deg C).

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MACTEC ENGINEERING AND CONSULTING

FIELD INSTRUMENTATION CALIBRATION RECORD

PROJECT: Olin Chemical Superfund Site | DATE: 11/20/2008

CREW ID OR TASK ID: Fourth Quarter 2008 (SW - 4300) | JOB NUMBER: 6100-08-0016

SAMPLER SIGNATURE: Mark Maggiore

EQUIPMENT CALIBRATION	CALIBRATION INFORMATION	STANDARD VALUE		METER VALUE		ACCEPTANCE CRITERIA **
HORIBA MODEL NO. U-22	pH	4.00 units		pH 4.00 units		+/- 10% of standard
UNIT ID NC MO15-11	Sp. Conductivity	4.49 mS/cm		Sp. Conductivity 4.51 mS/cm		+/- 10% of standard
	Redox	--- mV		Redox 338 mV		see note 1
	DO	--- mg/L *		DO 10.26 mg/L		+/- 10% of standard
	Thermometer Temperature	--- deg. C		Temperature 14.1 deg. C		+/- 2.0 deg. C
TURBIDITY METER TYPE Hach		<0.1 NTU		0.29 NTU		within 0.3 NTU
MODEL NO. 2100P		20 NTU		21.8 NTU		+/- 10% of standard
UNIT ID NO. MO24-16		100 NTU		105 NTU		+/- 10% of standard
		800 NTU		804 NTU		+/- 10% of standard
PHOTOIONIZATION						
METER TYPE	Background ppmv	Zero Air ppmv		Meter ppmv		within 5 ppmv of Zero
MODEL NO.	Span Gas ppmv			Meter ppmv		+/- 10% of standard
UNIT ID NO.						
OTHER METER TYPE						see note 2
MODEL NO.						see note 2
UNIT ID NO.						see note 2
OTHER METER TYPE						see note 2
MODEL NO.						see note 2
UNIT ID NO.						see note 2

MATERIALS RECORD	Lot Number	Calibration Fluids/ Lot Numbers	
Deionized Water Source:		Standard Source:	Auto Cal #6447
Trip Blank Water Source:		pH	Auto Cal #6447
Sample Preservatives Source:		mV	Auto Cal #6447
Disposable Filter Type:		Sp. Cond.	Auto Cal #6447
Other		Turb.	Cal Set #15

NOTES:

* = Indicate in notes section what was used as the DO standard (i.e., based on saturation at room temperature)

** = If the meter reading is not within acceptance criteria, clean or replace probe and re-calibrate, or use a different meter if available. If project requirements necessitate use of the instrument, clearly document on all data sheets and log book entries that the specified parameter was not calibrated to the acceptance criteria.

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2 = specify acceptance criteria in the Notes section

MACTEC ENGINEERING AND CONSULTING

FIELD INSTRUMENTATION CALIBRATION RECORD

PROJECT: Olin Chemical Superfund Site | DATE: 11/20/2008

CREW ID OR TASK ID: Fourth Quarter 2008 (SW - 4300) | JOB NUMBER: 6100-08-0016

SAMPLER SIGNATURE: David Chapman

EQUIPMENT CALIBRATION	CALIBRATION INFORMATION				ACCEPTANCE
	STANDARD VALUE		METER VALUE		CRITERIA **
HORIBA MODEL NO. U-22	pH 4.00	units	pH 4.00	units	+/- 10% of standard
UNIT ID NC MO15-12	Sp. Conductivity 4.49	mS/cm	Sp. Conductivity 4.57	mS/cm	+/- 10% of standard
	Redox ---	mV	Redox 149	mV	see note 1
	DO ---	mg/L *	DO 10.01	mg/L	+/- 10% of standard
	Thermometer Temperature ---	deg. C	Temperature 14.4	deg. C	+/- 2.0 deg. C
TURBIDITY METER TYPE Hach	<0.1	NTU	0.24	NTU	within 0.3 NTU
MODEL NO. 2100P	20	NTU	20.5	NTU	+/- 10% of standard
UNIT ID NO. MO24-17	100	NTU	102	NTU	+/- 10% of standard
	800	NTU	797	NTU	+/- 10% of standard
PHOTOIONIZATION					
METER TYPE	Background ppmv	Zero Air ppmv	Meter	ppmv	within 5 ppmv of Zero
MODEL NO.	Span Gas	ppmv	Meter	ppmv	+/- 10% of standard
UNIT ID NO.					
OTHER METER TYPE					see note 2
MODEL NO.					see note 2
UNIT ID NO.					see note 2
OTHER METER TYPE					see note 2
MODEL NO.					see note 2
UNIT ID NO.					see note 2

MATERIALS RECORD	Lot Number	Calibration Fluids/	
Deionized Water Source:		Standard Source:	Auto Cal #6447
Trip Blank Water Source:		Lot Numbers pH	Auto Cal #6447
Sample Preservatives Source:		mV	Auto Cal #6447
Disposable Filter Type:		Sp. Cond.	Auto Cal #6447
Other		Turb.	Cal Set #17

NOTES:

* = Indicate in notes section what was used as the DO standard (i.e., based on saturation at room temperature)

** = If the meter reading is not within acceptance criteria, clean or replace probe and re-calibrate, or use a different meter if available. If project requirements necessitate use of the instrument, clearly document on all data sheets and log book entries that the specified parameter was not calibrated to the acceptance criteria.

1 = meter must read within specified range of the Zobell solution (usually 231 +/- 10 mv @ 25 deg C).

2 = specify acceptance criteria in the Notes section

MACTEC ENGINEERING AND CONSULTING

FIELD INSTRUMENTATION CALIBRATION RECORD

PROJECT: Olin Chemical Superfund Site | DATE: 11/21/2008

CREW ID OR TASK ID: Fourth Quarter 2008 (SW - 4300) | JOB NUMBER: 6100-08-0016

SAMPLER SIGNATURE: Mark Maggiore

EQUIPMENT CALIBRATION		CALIBRATION INFORMATION STANDARD VALUE			METER VALUE			ACCEPTANCE CRITERIA **
HORIBA MODEL NO. U-22	pH	4.00	units	pH	4.00	units		+/- 10% of standard
UNIT ID NC MO15-11	Sp. Conductivity	4.49	mS/cm	Sp. Conductivity	4.53	mS/cm		+/- 10% of standard
	Redox	---	mV	Redox	238	mV		see note 1
	DO	---	mg/L *	DO	11.21	mg/L		+/- 10% of standard
	Thermometer Temperature	---	deg. C	Temperature	11.1	deg. C		+/- 2.0 deg. C
TURBIDITY METER TYPE Hach		<0.1	NTU		0.28	NTU		within 0.3 NTU
MODEL NO. 2100P		20	NTU		21.9	NTU		+/- 10% of standard
UNIT ID NO. MO24-16		100	NTU		100	NTU		+/- 10% of standard
		800	NTU		792	NTU		+/- 10% of standard
PHOTOIONIZATION								
METER TYPE	Background	ppmv	Zero Air ppmv	Meter		ppmv		within 5 ppmv of Zero
MODEL NO.	Span Gas	ppmv		Meter		ppmv		+/- 10% of standard
UNIT ID NO.								
OTHER METER TYPE								see note 2
MODEL NO.								see note 2
UNIT ID NO.								see note 2
OTHER METER TYPE								see note 2
MODEL NO.								see note 2
UNIT ID NO.								see note 2

MATERIALS RECORD	Lot Number	Calibration Fluids/	
Deionized Water Source:		Standard Source:	Auto Cal #6449
Trip Blank Water Source:		Lot Numbers pH	Auto Cal #6449
Sample Preservatives Source:		mV	Auto Cal #6449
Disposable Filter Type:		Sp. Cond.	Auto Cal #6449
Other		Turb.	Cal Set #16

NOTES:

* = Indicate in notes section what was used as the DO standard (i.e., based on saturation at room temperature)

** = If the meter reading is not within acceptance criteria, clean or replace probe and re-calibrate, or use a different meter if available. If project requirements necessitate use of the instrument, clearly document on all data sheets and log book entries that the specified parameter was not calibrated to the acceptance criteria.

1 = meter must read within specified range of the Zobell solution (usually 231 +/- 10 mv @ 25 deg C).

2 = specify acceptance criteria in the Notes section

MACTEC ENGINEERING AND CONSULTING

FIELD INSTRUMENTATION CALIBRATION RECORD

PROJECT: Olin Chemical Superfund Site | DATE: 11/21/2008

CREW ID OR TASK ID: Fourth Quarter 2008 (SW - 4300) | JOB NUMBER: 6100-08-0016

SAMPLER SIGNATURE: David Chapman

EQUIPMENT CALIBRATION		CALIBRATION INFORMATION STANDARD VALUE			METER VALUE			ACCEPTANCE CRITERIA **
HORIBA MODEL NO. U-22	pH	4.00	units	pH	4.00	units		+/- 10% of standard
UNIT ID NC MO15-12	Sp. Conductivity	4.49	mS/cm	Sp. Conductivity	4.57	mS/cm		+/- 10% of standard
	Redox	---	mV	Redox	142	mV		see note 1
	DO	---	mg/L *	DO	10.11	mg/L		+/- 10% of standard
	Thermometer Temperature	---	deg. C	Temperature	14.8	deg. C		+/- 2.0 deg. C
TURBIDITY METER TYPE Hach		<0.1	NTU		0.34	NTU		within 0.3 NTU
MODEL NO. 2100P		20	NTU		22.0	NTU		+/- 10% of standard
UNIT ID NO. MO24-17		100	NTU		102	NTU		+/- 10% of standard
		800	NTU		800	NTU		+/- 10% of standard
PHOTOIONIZATION								
METER TYPE	Background	ppmv	Zero Air	ppmv	Meter		ppmv	within 5 ppmv of Zero
MODEL NO.	Span Gas	ppmv			Meter		ppmv	+/- 10% of standard
UNIT ID NO.								
OTHER METER TYPE								see note 2
MODEL NO.								see note 2
UNIT ID NO.								see note 2
OTHER METER TYPE								see note 2
MODEL NO.								see note 2
UNIT ID NO.								see note 2

MATERIALS RECORD	Lot Number	Calibration Fluids/	
Deionized Water Source:		Standard Source:	Auto Cal #6447
Trip Blank Water Source:		Lot Numbers pH	Auto Cal #6447
Sample Preservatives Source:		mV	Auto Cal #6447
Disposable Filter Type:		Sp. Cond.	Auto Cal #6447
Other		Turb.	Cal Set #17

NOTES:

* = Indicate in notes section what was used as the DO standard (i.e., based on saturation at room temperature)

** = If the meter reading is not within acceptance criteria, clean or replace probe and re-calibrate, or use a different meter if available. If project requirements necessitate use of the instrument, clearly document on all data sheets and log book entries that the specified parameter was not calibrated to the acceptance criteria.

1 = meter must read within specified range of the Zobell solution (usually 231 +/- 10 mv @ 25 deg C).

2 = specify acceptance criteria in the Notes section

MACTEC ENGINEERING AND CONSULTING

FIELD INSTRUMENTATION CALIBRATION RECORD

PROJECT: Olin Chemical Superfund Site | DATE: 11/24/2008

CREW ID OR TASK ID: Fourth Quarter 2008 (SW - 4300) | JOB NUMBER: 6100-08-0016

SAMPLER SIGNATURE: David Chapman

EQUIPMENT CALIBRATION	CALIBRATION INFORMATION					ACCEPTANCE
		STANDARD VALUE			METER VALUE	CRITERIA **
HORIBA MODEL NO. U-22	pH	4.00 units		pH	4.00 units	+/- 10% of standard
UNIT ID NC MO15-12	Sp. Conductivity	4.49 mS/cm		Sp. Conductivity	4.57 mS/cm	+/- 10% of standard
	Redox	--- mV		Redox	138 mV	see note 1
	DO	--- mg/L *		DO	11.68 mg/L	+/- 10% of standard
	Thermometer Temperature	--- deg. C		Temperature	9.2 deg. C	+/- 2.0 deg. C
TURBIDITY METER TYPE Hach		<0.1 NTU			0.24 NTU	within 0.3 NTU
MODEL NO. 2100P		20 NTU			20.2 NTU	+/- 10% of standard
UNIT ID NO. MO24-17		100 NTU			102 NTU	+/- 10% of standard
		800 NTU			796 NTU	+/- 10% of standard
PHOTOIONIZATION						
METER TYPE	Background ppmv	Zero Air ppmv		Meter ppmv		within 5 ppmv of Zero
MODEL NO.	Span Gas ppmv			Meter ppmv		+/- 10% of standard
UNIT ID NO.						
OTHER METER TYPE						see note 2
MODEL NO.						see note 2
UNIT ID NO.						see note 2
OTHER METER TYPE						see note 2
MODEL NO.						see note 2
UNIT ID NO.						see note 2

MATERIALS RECORD	Lot Number	Calibration Fluids/	
Deionized Water Source:		Standard Source:	Auto Cal #6447
Trip Blank Water Source:		Lot Numbers pH	Auto Cal #6447
Sample Preservatives Source:		mV	Auto Cal #6447
Disposable Filter Type:		Sp. Cond.	Auto Cal #6447
Other		Turb.	Cal Set #17

NOTES:

* = Indicate in notes section what was used as the DO standard (i.e., based on saturation at room temperature)

** = If the meter reading is not within acceptance criteria, clean or replace probe and re-calibrate, or use a different meter if available. If project requirements necessitate use of the instrument, clearly document on all data sheets and log book entries that the specified parameter was not calibrated to the acceptance criteria.

1 = meter must read within specified range of the Zobell solution (usually 231 +/- 10 mv @ 25 deg C).

2 = specify acceptance criteria in the Notes section

MACTEC ENGINEERING AND CONSULTING

FIELD INSTRUMENTATION CALIBRATION RECORD

PROJECT: Olin Chemical Superfund Site | DATE: 11/24/2008

CREW ID OR TASK ID: Fourth Quarter 2008 (SW - 4300) | JOB NUMBER: 6100-08-0016

SAMPLER SIGNATURE: Mark Maggiore

EQUIPMENT CALIBRATION	CALIBRATION INFORMATION	STANDARD VALUE		METER VALUE		ACCEPTANCE CRITERIA **
HORIBA MODEL NO. U-22	pH	4.00 units		pH 4.01 units		+/- 10% of standard
UNIT ID NC MO15-11	Sp. Conductivity	4.49 mS/cm		Sp. Conductivity 4.70 mS/cm		+/- 10% of standard
	Redox	--- mV		Redox 238 mV		see note 1
	DO	--- mg/L *		DO 15.23 mg/L		+/- 10% of standard
	Thermometer Temperature	--- deg. C		Temperature 3.5 deg. C		+/- 2.0 deg. C
TURBIDITY METER TYPE Hach		<0.1 NTU		0.3 NTU		within 0.3 NTU
MODEL NO. 2100P		20 NTU		20.7 NTU		+/- 10% of standard
UNIT ID NO. MO24-16		100 NTU		101 NTU		+/- 10% of standard
		800 NTU		799 NTU		+/- 10% of standard
PHOTOIONIZATION						
METER TYPE	Background ppmv	Zero Air ppmv		Meter ppmv		within 5 ppmv of Zero
MODEL NO.	Span Gas ppmv			Meter ppmv		+/- 10% of standard
UNIT ID NO.						
OTHER METER TYPE						see note 2
MODEL NO.						see note 2
UNIT ID NO.						see note 2
OTHER METER TYPE						see note 2
MODEL NO.						see note 2
UNIT ID NO.						see note 2

MATERIALS RECORD	Lot Number	Calibration Fluids/	
Deionized Water Source:		Standard Source:	Auto Cal #6447
Trip Blank Water Source:		Lot Numbers pH	Auto Cal #6447
Sample Preservatives Source:		mV	Auto Cal #6447
Disposable Filter Type:		Sp. Cond.	Auto Cal #6447
Other		Turb.	Cal Set #16

NOTES:

* = Indicate in notes section what was used as the DO standard (i.e., based on saturation at room temperature)

** = If the meter reading is not within acceptance criteria, clean or replace probe and re-calibrate, or use a different meter if available. If project requirements necessitate use of the instrument, clearly document on all data sheets and log book entries that the specified parameter was not calibrated to the acceptance criteria.

1 = meter must read within specified range of the Zobell solution (usually 231 +/- 10 mv @ 25 deg C).

2 = specify acceptance criteria in the Notes section

APPENDIX B

Chains of Custody

TestAmerica Laboratories, Inc.

Chain of Custody Form

testamerica
THE LEADER IN ENVIRONMENTAL TESTING

•53 Southampton Road
Westfield, MA 01085
(P) 413-572-4000
(F) 413-572-3707

•149 Rangeway Road
N. Billerica, MA 01862
(P) 978-667-1400
(F) 978-667-7871

Client: Olin Chemical/MACTEC
Address: 51 Eames Street
Wilmington, MA 01887
Phone: Fax:

Project #: 61000.00016
Project Manager: Peter Thompson
Work ID: ~~PCMP~~ Slurry Wall/Slurry Cap
Contact: David Chapman

Job# | Quote# | PO#

Requested Turn Around Time
10 Business Day (Std) XX
15 Business Day
Other
Rush TAT Requested: 24 hrs 72 hrs 48 hrs 5 Day

Regulatory Classification / Special Report Format
NPDES Drinking Water DEP Form(s)
RCRA MCP GW1/S1 MWRA Smart Rpt
Other MCP QA/QC Rpt XX

Shaded areas for office use

Analysis Requested
Check analysis and specify method and analytes in comments section.
For example:
500-series for drinking water
600-series for waste water
8000-series for haz/solid waste
Use comments section to further define.

Comments (Special Instructions)

MCP case narrative

Sample Type Codes
WW-Wastewater DW-Drinking water SW-Surfacewater
LW-Labwater GW-Groundwater A-Air
S-Solid / Soil SL-Sludge O-Oil Z-Other

Sample ID	Sample Type	Sampler's Initials	Date Time Collected	Grab	Comp.	# Containers	Plastic(P) or Glass(G)	Preservative: NaHSO4/MeOH	HNO3 to pH <2	H2SO4 to pH <2	HCl to pH <2	NaOH to pH >12	NAOH/ZNAC	None / 4° C	Ammonia-Nitrogen	Chloride, Sulfate	Specific Conductivity	Nitrate, Nitrite	Groundwater metals	Surfacewater metals	Sediment: Al/Cr/Fe	Other	Other	Other	Other	Other	Other
OC-ISCO-3	SW	MC/MAH	11/18/08 12:00	X		4	P		X	X				X	X	X	X	X		X						
OC-ISCO-2			11/18/08 12:10												X	X	X	X		X						
OC-PZ-16RR			11/18/08 12:55												X	X	X	X		X						
OC-PZ-17RR			11/18/08 12:50												X	X	X	X		X						
OC-SD-17			11/18/08 13:00												X	X	X	X		X						
OC-PZ-18R			11/18/08 13:10												X	X	X	X		X						
OC-ISCO-1			11/18/08 13:25												X	X	X	X		X						
OC-PZ-18RMS			11/18/08 13:15												X	X	X	X		X						
OC-PZ-18RMSD			11/18/08 13:15												X	X	X	X		X						
OC-GW-42S	GW		11/17/08 14:25			3									X	X	X		X							

Dissolved metals are field filtered.

Groundwater Metals: Dissolved Al/Cr

Surfacewater Metals: Dissolved/Total Al/Cr/Na

All surface water samples have short hold (Nitrate/Nitrite)

Sampled by (print): David Chapman / Mark Maggiore
Signature:

Relinquished by: David Chapman Date: 11/18/08 Time: 1500
Received by: Date: 11/18/08 Time: 1500

Relinquished by: Date: Time:
Received by: Date: Time:

Method of shipment:

TestAmerica-Westfield

Cooler? Y / N Samples Iced? Y / N

Temp @ receipt: _____ °C

Preservation/pH checked

By: _____ **Date:** _____

White = Lab file Yellow = Report copy Pink = Customer copy
STL-8245 (1000)

TestAmerica Laboratories, Inc.

Chain of Custody Form

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Westfield, MA 01085
(P) 413-572-4000
(F) 413-572-3707

Billerica, MA 01862
(P) 978-667-1400
(F) 978-667-7871

Client: Olin Chemical/MACTEC
Address: 51 Eames Street
Wilmington, MA 01887
Phone: Fax:

Project #: 6100080016
Project Manager: ~~Peter Thompson~~
Work ID: PCMP Slurry wall
Contact: David Chapman Slurry cap

Job#	Quote#	PO#

Requested Turn Around Time
10 Business Day (Std) XX
15 Business Day
Other
Rush TAT Requested: 24 hrs 72 hrs 48 hrs 5 Day

Regulatory Classification / Special Report Format
NPDES Drinking Water DEP Form(s)
RCRA MCP GW1/S1 MWRA Smart Rpt
Other MCP QA/QC Rpt XX

Shaded areas for office use

Analysis Requested
Check analysis and specify method and analytes in comments section.
For example:
500-series for drinking water
600-series for waste water
8000-series for haz/solid waste
Use comments section to further define.

5

Comments
(Special Instructions)

MCP case narrative

Sample Type Codes
WW-Wastewater DW-Drinking water SW-Surfacewater
LW-Labwater GW-Groundwater A-Air
S-Solid / Soil SL-Sludge O-Oil Z-Other

Sample ID	Sample Type	Sampler's Initials	Date Time Collected	Grab	Comp.	# Containers	Plastic(P) or Glass(G)	Preservative: NaHSO4/MeOH	HNO3 to pH <2	H2SO4 to pH <2	HCl to pH <2	NaOH to pH >12	NAOH/ZNAC	None / 4° C	Ammonia-Nitrogen	Chloride, Sulfate	Specific Conductivity	Nitrate, Nitrite	Groundwater metals	Surfacewater metals	Sediment: Al/Cr/Fe	Other 9o moist	Other	Other	Other	Other	Other
OC-SD-SD1	SD	DLC/MAM	11-19-08 8:55		X	1	G							X							X	X					
OC-SD-SD2	SD	DLC/MAM	11-19-08 9:10		X	1	G							X							X	X					
OC-SD-SD3	SD	DLC/MAM	11-19-08 9:25		X	1	G							X							X	X					
OC-SD-SD4	SD	DLC/MAM	11-19-08 9:50		X	1	G							X							X	X					
OC-SD-SD5	SD	DLC/MAM	11-19-08 10:10		X	1	G							X							X	X					
OC-SD-SD3MS	SD	DLC/MAM	11-19-08 9:25		X	1	G							X							X	X					
OC-SD-SD3MSD	SD	DLC/MAM	11-19-08 9:25		X	1	G							X							X	X					
OC-GW-10S	GW	DLC	11-19-08 11:45	X		3	P		X	X				X	X	X	X		X								
OC-GW-24	GW	DLC	11-19-08 13:30	X		3	P		X	X				X	X	X	X		X								
OC-GW-39	GW	DLC	11-19-08 15:10	X		3	P		X	X				X	X	X	X		X								

Dissolved metals are field filtered.

Groundwater Metals: Dissolved Al/Cr

Surfacewater Metals: Dissolved/Total Al/Cr/Na

Sampled by (print): David Chapman / Mark Maggiore
Signature:

Relinquished by: David Chapman Date: 11-21-08 Time: 14:15
Received by: Date: 11/21/08 Time: 1415

Relinquished by: Date: Time:
Received by: Date: Time:

Method of shipment:

TestAmerica-Westfield

Cooler ? Y / N Samples Iced? Y / N
Temp @ receipt: °C
Preservation/pH checked
By: Date:

White = Lab file Yellow = Report copy Pink = Customer copy
STL-8245 (1000)

TestAmerica Laboratories, Inc.

Chain of Custody Form

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Westfield, MA 01085
(P) 413-572-4000
(F) 413-572-3707

N. Billerica, MA 01862
(P) 978-667-1400
(F) 978-667-7871

Client: Olin Chemical/MACTEC
Address: 51 Eames Street
Wilmington, MA 01887
Phone: Fax:

Project #: 61000E0016
Project Manager: Peter Thompson
Work ID: ~~PCMP~~ Slurry wall/ slurry GP
Contact: David Chapman

Job# | Quote# | PO#

Requested Turn Around Time
10 Business Day (Std) XX
15 Business Day
Other
Rush TAT Requested: 24 hrs 72 hrs 48 hrs 5 Day

Regulatory Classification / Special Report Format
NPDES Drinking Water DEP Form(s)
RCRA MCP GW1/S1 MWRA Smart Rpt
Other MCP QA/QC Rpt XX

Shaded areas for office use

Analysis Requested
Check analysis and specify method and analytes in comments section.
For example:
500-series for drinking water
600-series for waste water
8000-series for haz/solid waste
Use comments section to further define.

Comments
(Special Instructions)

MCP case narrative

Dissolved metals are field filtered.

Groundwater Metals: Dissolved Al/Cr

Surfacewater Metals: Dissolved/Total Al/Cr/Na

Sample Type Codes
WW-Wastewater DW-Drinking water SW-Surfacewater
LW-Labwater GW-Groundwater A-Air
S-Solid / Soil SL-Sludge O-Oil Z-Other

Sample ID	Sample Type	Sampler's Initials	Date Time Collected	Grab	Comp.	# Containers	Plastic(P) or Glass(G)	Preservative: NaHSO4/MeOH	HNO3 to pH <2	H2SO4 to pH <2	HCl to pH <2	NaOH to pH >12	NAOH/ZNAC	None / 4° C	Ammonia-Nitrogen	Chloride, Sulfate	Specific Conductivity	Nitrate, Nitrite	Groundwater metals	Surfacewater metals	Sediment: Al/Cr/Fe	Other	Other	Other	Other	Other	Other
OC-GW-26	GW	MAM	11-19-08 11:55	X		3	P		X	X				X	X	X	X		X								
OC-GW-76S	GW	MAM	11-19-08 13:35	X		3	P		X	X				X	X	X	X		X								
OC-GW-25	GW	MAM	11-19-08 14:40	X		3	P		X	X				X	X	X	X		X								
OC-PZ-16RR	GW	DLC	11-20-08 9:35	X		3	P		X	X				X	X	X	X		X								
OC-GW-78S	GW	DLC	11-20-08 11:30	X		3	P		X	X				X	X	X	X		X								
OC-GW-55S	GW	DLC	11-20-08 13:30	X		3	P		X	X				X	X	X	X		X								
OC-GW-35S	GW	DLC	11-20-08 14:45	X		3	P		X	X				X	X	X	X		X								
OC-GW-79S	GW	MAM	11-20-08 9:45	X		3	P		X	X				X	X	X	X		X								
OC-PZ-17RR	GW	MAM	11-20-08 13:50	X		3	P		X	X				X	X	X	X		X								
OC-PZ-18R	GW	MAM	11-20-08 11:30	X		3	P		X	X				X	X	X	X		X								

Sampled by (print): David Chapman / Mark Maggiore
Signature:

Relinquished by: David Chapman Date: 11-21-08 Time: 14:15
Received by: Date: 11/21/08 Time: 1415

Relinquished by: Date: Time:
Received by: Date: Time:

Method of shipment:

TestAmerica-Westfield

Cooler ? Y / N Samples Iced? Y / N

Temp @ receipt: _____ °C

Preservation/pH checked

By: _____ **Date:** _____

White = Lab file Yellow = Report copy Pink = Customer copy
STL-8245 (1000)

TestAmerica Laboratories, Inc.
Chain of Custody Form

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

•53 Southampton Road
Westfield, MA 01085
(P) 413-572-4000
(F) 413-572-3707

Road
N. Billerica, MA 01862
(P) 978-667-1400
(F) 978-667-7871

Client: Olin Chemical/MACTEC
Address: 51 Eames Street
Wilmington, MA 01887
Phone: Fax:

Project #: 6100080016
Project Manager: Peter Thompson
Work ID: PCMP Slurry Wall
Contact: David Chapman Slurry Cap

Job# | Quote# | PO#

Shaded areas for office use

Analysis Requested
Check analysis and specify method and analytes in comments section.
For example:
500-series for drinking water
600-series for waste water
8000-series for haz/solid waste
Use comments section to further define.

Comments
(Special Instructions)

MCP case narrative

Dissolved metals are field filtered.

Groundwater Metals: Dissolved Al/Cr

Surfacewater Metals: Dissolved/Total Al/Cr/Na

Requested Turn Around Time
10 Business Day (Std) XX
15 Business Day
Other
Rush TAT Requested:
24 hrs 72 hrs
48 hrs 5 Day

Regulatory Classification / Special Report Format
NPDES Drinking Water DEP Form(s)
RCRA MCP GW1/S1 MWRA Smart Rpt
Other MCP QA/QC Rpt XX

Sample Type Codes
WW-Wastewater DW-Drinking water SW-Surfacewater
LW-Labwater GW-Groundwater A-Air
S-Solid / Soil SL-Sludge O-Oil Z-Other

Sample ID	Sample Type	Sampler's Initials	Date Time Collected	Grab	Comp.	# Containers	Plastic(P) or Glass(G)	NaHSO4/MeOH	HNO3 to pH <2	H2SO4 to pH <2	HCl to pH <2	NaOH to pH >12	NAOH/ZNAC	None / 4° C	Ammonia-Nitrogen	Chloride, Sulfate	Specific Condutivity	Nitrate, Nitrite	Groundwater metals	Surfacewater metals	Sediment: Al/Cr/Fe	Other	Other	Other	Other	Other	Other
OC-GW-CA1	GW	MAM	11-20-08 14:55	X		3	P		X	X				X	X	X	X		X								
OC-GW-202D	GW	DLC	11-21-08 9:20	X		3	P		X	X				X	X	X	X		X								
OC-GW-34SR	GW	DLC	11-21-08 10:25	X		3	P		X	X				X	X	X	X		X								
OC-GW-202S	GW	MAM	11-21-08 8:45	X		3	P		X	X				X	X	X	X		X								
OC-GW-202S DUP	GW	MAM	11-21-08 8:45	X		3	P		X	X				X	X	X	X		X								
OC-GW-202S MS	GW	MAM	11-21-08 8:45	X		3	P		X	X				X	X	X	X		X								
OC-GW-202S MSD	GW	MAM	11-21-08 8:45	X		3	P		X	X				X	X	X	X		X								
OC-GW-34D	GW	MAM	11-21-08 10:00	X		3	P		X	X				X	X	X	X		X								
OC-GW-34D DUP	GW	MAM	11-21-08 10:00	X		3	P		X	X				X	X	X	X		X								
OC-GW-201S	GW	MAM	11-21-08	X		3	P		X	X				X	X	X	X		X								

Sampled by (print): David Chapman / Mark Maggiore
Signature:

Relinquished by:	Date:	Time:	Received by:	Date:	Time:
David Chapman	11-21-08	1415	[signature]	11/21/08	1415
Relinquished by:	Date:	Time:	Received by:	Date:	Time:

Method of shipment:

TestAmerica-Westfield

Cooler ? Y / N Samples Iced? Y / N
Temp @ receipt: _____ °C
Preservation/pH checked
By: _____ Date: _____

White = Lab file Yellow = Report copy Pink = Customer copy
STL-8245 (1000)

TestAmerica Laboratories, Inc.

Chain of Custody Form

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Westfield, MA 01085
(P) 413-572-4000
(F) 413-572-3707

Billerica, MA 01862
(P) 978-667-1400
(F) 978-667-7871

Client: Olin Chemical/MACTEC
Address: 51 Eames Street
Wilmington, MA 01887
Phone: Fax:

Project #: 61000800116
Project Manager: Peter Thompson
Work ID: Plant B
Contact: David Chapman

Job#	Quote#	PO#

Requested Turn Around Time

10 Business Day (Std) XX
15 Business Day
Other

Rush TAT Requested: 24 hrs ___ 48 hrs ___ 72 hrs ___ 5 Day ___

Regulatory Classification / Special Report Format

NPDES ___ Drinking Water ___ DEP Form(s) ___
RCRA ___ MCP GW1/S1 ___ MWRA Smart Rpt ___
Other ___ MCP QA/QC Rpt XX

Shaded areas for office use

Analysis Requested

Check analysis and specify method and analytes in comments section.
For example:
500-series for drinking water
600-series for waste water
8000-series for haz/solid waste
Use comments section to further define.

Comments
(Special Instructions)

MCP case narrative

Sample Type Codes
WW-Wastewater DW-Drinking water SW-Surfacewater
LW-Labwater GW-Groundwater A-Air
S-Solid / Soil SL-Sludge O-Oil Z-Other

Sample ID (DLC)	Sample Type	Sampler's Initials	Date Time Collected	Grab	Comp.	# Containers	Plastic(P) or Glass(G)	Preservative: NaHSO4/MeOH	HNO3 to pH <2	H2SO4 to pH <2	HCl to pH <2	NaOH to pH >12	NAOH/ZNAC	None / 4° C	8260	VPH	8270	Ammonia	Iron by 6010	pH	Other Total Fe	Other	Other	Other	Other	Other	Other
~~OC-GW-EX1~~	~~GW~~	~~MAM~~	~~11-20-08 11:55~~	X		12	V G		1	1	7			3	X	X	X	X	X	X							
OC-GW-16	GW	MAM	11-24-08 9:30	X		13	V G		2	1	7			3	X	X	X	X	X	X	X						
OC-IW-10	GW	MAM	11-24-08 11:40	X		13	V G		2	1	7			3	X	X	X	X	X	X	X						
OC-GW-13	GW	MAM	11-24-08 13:10	X		13	V G		2	1	7			3	X	X	X	X	X	X	X						
OC-IW-6	GW	DLC	11-24-08 9:45	X		13	V G		2	1	7			3	X	X	X	X	X	X	X						
OC-GW-101	GW	DLC	11-24-08 11:45	X		13	V G		2	1	7			3	X	X	X	X	X	X	X						
OC-B-03	GW	DLC	11-24-08 13:15	X		13	V G		2	1	7			3	X	X	X	X	X	X	X						

8260 Compounds Only:
2,4,4 Trimethyl-1-pentene
2,4,4 Trimethyl-2-pentene

8270 Comounds Only:
NDPA
BEHP

Sampled by (print): David Chapman / Mark Maggiore
Signature:

Relinquished by:	Date:	Time:	Received by:	Date:	Time:
	11/25/08	1115		11/25/08	1115
Relinquished by:	Date:	Time:	Received by:	Date:	Time:

Method of shipment:

TestAmerica-Westfield

Cooler ? Y / N Samples Iced? Y / N

Temp @ receipt: ___ °C

Preservation/pH checked

By: ___ Date: ___

White = Lab file Yellow = Report copy Pink = Customer copy
STL-8245 (1000)

APPENDIX C

Fourth Quarter 2008
Temporary Cap Inspection Photo Log

Photo 1: Previous Patch Repair

Photo 2: Sandbag Recommended for Replacement

Photo 3: Replacement Sandbags

Photo 4: Repairs Along Cap

APPENDIX A

Interim Response Steps Field Activity Reports

A-2 First Quarter 2009 Sampling Event

INTERIM RESPONSE STEPS FIELD ACTIVITY REPORT
FIRST QUARTER 2009 SAMPLING EVENT
OLIN CHEMICAL SUPERFUND SITE
WILMINGTON, MASSACHUSETTS

INTERIM RESPONSE STEPS FIELD ACTIVITY REPORT
FIRST QUARTER 2009 SAMPLING EVENT
OLIN CHEMICAL SUPERFUND SITE
WILMINGTON, MASSACHUSETTS

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MACTEC PROJECT NO. 6107090016.05

May 2009

with permission for

6/29/09

Peter H. Thompson — Date
Project Manager

6/26/09

Michael J. Murphy — Date
Project Principal

Table of Contents

1.0 INTRODUCTION 1-1

1.1 LIMITATIONS 1-1

2.0 SLURRY WALL/CAP MONITORING PROGRAM 2-1

2.1 SCOPE OF WORK 2-1
2.1.1 Groundwater Level Measurement 2-1
2.1.2 Groundwater Sampling 2-2
2.1.3 Surface Water Sampling 2-3
2.1.4 Data Logger Data Download 2-4
2.1.5 Cap Inspection 2-4
2.1.5.1 Activities Completed During This Inspection 2-4
2.1.5.2 Observations During This Inspection 2-5
2.1.5.3 Discussion 2-5
2.1.5.4 Recommendations 2-6

3.0 PLANT B MONITORING PROGRAM 3-1

3.1 SCOPE OF WORK 3-1
3.1.1 Groundwater Level Measurements and Product Gauging 3-1
3.1.2 Groundwater Sampling 3-1

Tables

Table 1 Groundwater and Surface Water Sampling Locations
Table 2 Groundwater Elevations – Slurry Wall/Cap Monitoring Program
Table 3 Final Field Parameters for Groundwater Sampling – Slurry Wall/Cap Monitoring Program
Table 4 Groundwater Analytical Program – Slurry Wall/Cap Monitoring Program
Table 5 Final Field Parameters for Surface Water Sampling – Slurry Wall/Cap Monitoring Program
Table 6 Surface Water Analytical Program – Slurry Wall/Cap Monitoring Program
Table 7 Groundwater Elevations – Plant B Monitoring Program
Table 8 Final Field Parameters for Groundwater Sampling – Plant B Monitoring Program
Table 9 Groundwater Analytical Program – Plant B Monitoring Program

Figures

Figure 1 Slurry Wall/Cap Monitoring Program Sampling Locations
Figure 2 First Quarter 2009 Temporary Cap Inspection Observations
Figure 3 Plant B Monitoring Program Sampling Locations

Appendices

Appendix A Field Data Records and Field Instrument Calibration Records
Appendix B Chains of Custody
Appendix C First Quarter 2009 Temporary Cap Inspection Photo Log

GLOSSARY OF ACRONYMS

DO	Dissolved Oxygen
IRSWP	Interim Response Steps Work Plan
LNAPL	Light Non-Aqueous Phase Liquid
MACTEC	MACTEC Engineering and Consulting, Inc.
NTU	Nephelometric Turbidity Units
ORP	Oxidation/Reduction Potential
SC	Specific Conductivity
SOPs	Standard Operating Procedures
USEPA	United States Environmental Protection Agency
UV	Ultraviolet

1.0 INTRODUCTION

On behalf of the Olin Corporation, MACTEC Engineering and Consulting, Inc. (MACTEC) presents this sampling summary report for field activities completed in association with the First Quarter 2009 surface water and groundwater sampling and the cap inspection for the Slurry Wall/Cap Monitoring Program and for the Plant B Monitoring Program.

1.1 LIMITATIONS

This report, including its findings, opinions, and conclusions, is intended for the exclusive use and benefit of, and may be relied upon only by Olin Corporation and the United States Environmental Protection Agency (USEPA).

2.0 SLURRY WALL/CAP MONITORING PROGRAM

The purpose of the Slurry Wall/Cap Monitoring Program is to monitor the concentrations of select groundwater, surface water and sediment constituents in areas adjacent to and within the South Ditch and to monitor the physical condition of the temporary cap for the former Olin Facility located at 51 Eames Street, Wilmington, Massachusetts.

The First Quarter 2009 groundwater and surface water monitoring program included sampling groundwater from five monitoring wells and two piezometers, the collection of surface water samples from seven locations within the South Ditch, and the collection of groundwater level measurements from 20 monitoring wells and piezometers. Groundwater and surface water sample locations are listed in **Table 1** and shown on **Figure 1**. The surface water and groundwater sampling program is further described in the Final Interim Response Steps Work Plan (IRSWP) (MACTEC 2008) dated August 8, 2008, which has been approved by the USEPA.

2.1 SCOPE OF WORK

The Slurry Wall/Cap Monitoring Program for this sampling event consists of: collecting groundwater level measurements from 18 monitoring wells and two piezometers in the vicinity of the South Ditch area; groundwater sampling five monitoring wells (GW-25, GW-78S, GW-79S, GW-202S, and GW-202D) and two piezometers (PZ-17RR and PZ-18R); surface water sampling from seven locations: (ISCO-1, ISCO-2, ISCO-3, SD-17, PZ-16RR, PZ-17RR, and PZ-18R); inspecting and documenting the condition of the temporary cap; and downloading water level data from data loggers that have been installed in five monitoring wells (GW-10S, GW-35S, GW-CA1, GW-76S, and GW-78S). Monitoring wells, piezometers and surface water sample locations are shown on **Figure 1**.

2.1.1 Groundwater Level Measurement

On February 23, 2009, MACTEC personnel completed a site reconnaissance of the monitoring well locations in the Slurry Wall/Cap Monitoring Program and collected groundwater level measurements. This included measuring depth to groundwater from 20 monitoring wells and piezometers using a water interface probe. Groundwater levels could not be measured from monitoring wells GW-55S, GW-55D, and PZ-16RR due to frozen conditions. Groundwater level measurements and groundwater elevations are summarized in **Table 2**.

2.1.2 Groundwater Sampling

On February 24 and 25, 2009, MACTEC personnel sampled groundwater from five monitoring wells and two piezometers using the 1996 USEPA low stress (low flow) groundwater sampling method in accordance with the Standard Operating Procedures (SOPs) located in Appendix A of the IRSWP. Groundwater was not collected from piezometer PZ-16RR due to ice conditions in the ditch.

Prior to low flow sampling, two water quality meters (Horiba U-22 water monitoring instrument and Hach 2100P turbidity meter) were calibrated according to the instrument manufacturer's specifications using certified calibration solutions. The field instrument calibration records are contained in **Appendix A**. No readings were noted outside the manufacturer calibration ranges.

Groundwater was purged using an adjustable rate peristaltic pump along with dedicated tubing at each monitoring location. During sampling activities, the purged groundwater was continuously monitored using a Horiba U-22 multi-parameter water quality meter for pH, temperature, specific conductivity (SC), dissolved oxygen (DO), and oxidation/reduction potential (ORP) while turbidity was monitored using the Hach turbidity meter. Well purging continued at each location until these field parameters stabilized as indicated in Appendix A of the IRSWP.

Groundwater readings greater than 1 nephelometric turbidity units (NTU) and outside the ±10 percent range included: GW-202D, PZ-17RR, and PZ-18R. Groundwater readings at PZ-17RR and PZ-18R were greater than ±10 percent range for DO.

The final low flow purging field parameter information at stabilization is presented in **Table 3**. Field data records for each groundwater monitoring location are attached in **Appendix A**.

Upon groundwater stabilization, groundwater samples were collected by directly filling the laboratory prepared glassware. A 0.45-micron pore diameter, in-line Teflon™ filter was used to field filter groundwater for dissolved metal analysis. The samples were placed on ice and transferred to TestAmerica of Westfield, Massachusetts, under chain-of-custody for chemical analyses as summarized in **Table 4**. Copies of the chain-of-custody documents are provided in **Appendix B**.

Purged groundwater from each monitoring well was collected in collapsible plastic containers, transported to the on-site groundwater treatment building (Plant B), and containerized in a secured 55-gallon drum.

2.1.3 Surface Water Sampling

On February 24, 2009, MACTEC personnel collected seven surface water samples from the East Ditch and South Ditch sampled from downstream to upstream (locations identified as ISCO-3, ISCO-2, PZ-16RR, PZ-17RR, SD-17, PZ-18R, and ISCO-1). Sample locations are shown on **Figure 1**. It should be noted that surface water sample location ISCO-3 was collected at the confluence of the East Ditch and South Ditch.

Before field activities began, a Horiba U-22 multi-parameter water quality meter and a Hach turbidity meter were properly calibrated to monitor surface water quality parameters at each location. The calibration records can be found in **Appendix A**.

At each of the seven field locations, surface water parameter measurements (pH, temperature, SC, ORP, DO, and turbidity) were collected. Readings were collected by directly submersing the Horiba probe into the surface water of the South Ditch until parameter stabilization. The final surface water field parameters are summarized in **Table 5**. Field data records from each surface water sample location are attached in **Appendix A**.

Filtered surface water samples (dissolved) were collected by submerging dedicated tubing attached to a peristaltic pump into the water (approximately 0.3 feet into the surface water). A peristaltic pump was used to reduce the entrapment of floating or suspended sediment and provide positive pressure for field filtering the water through the 0.45-micron pore diameter filter for dissolved metal analysis.

Surface water samples were collected by directly filling the laboratory prepared glassware. The samples were then placed on ice for delivery to TestAmerica of Westfield, Massachusetts, under chain-of-custody for chemical analyses summarized in **Table 6**. Copies of the chain-of-custody documents are provided in **Appendix B**.

2.1.4 Data Logger Data Download

Data loggers are deployed in five monitoring wells (GW-10S, GW-35S, GW-CA1, GW-76S, and GW-78S) to continuously monitor groundwater elevation proximate to the cap area. On February 25, 2009, MACTEC downloaded the data from the loggers. A logging error occurred in monitoring well GW-76S, and no data was collected or reviewed from that well during this event. The logger was subsequently reset and deployed back into the well. Additional data will be collected during the next quarterly event scheduled for May 2009. Downloaded data from the loggers is summarized in the Semi-annual Status Report dated July 2009.

2.1.5 Cap Inspection

The First Quarter 2009 Temporary Cap Inspection at the Site was completed on March 25, 2009. The temporary cap is composed of ten large and three small scrim reinforced polyethylene sheets of 8 mil thickness (**Figure 2**). These sheets are composed of smaller, narrower panels that were factory seamed to produce the large sheets. The factory seams are double welded seams. The seams between the large sheets were field fabricated by folding and sewing the edges of the sheets together with an ultraviolet (UV) resistant thread. The original temporary cap was installed in 2001 and consisted of a 6 mil thick sheet. Due to deterioration of the 6 mil sheet, it was replaced by the current 8 mil thick cover in 2003. The 8 mil cover was placed directly over the 6 mil cover and re-ballasted with sand bags to resist wind uplift. Quarterly inspections of the 8 mil cover were instituted in 2003 to evaluate the need for periodic maintenance and to document maintenance and repair activities.

On March 25, 2009, MACTEC field personnel performed a visual inspection of the Temporary Cap surface. Photographs taken during the inspection are presented in **Appendix C**. In general, the Temporary Cap appeared to be in good condition, although some minor perforations (less than one-half inch) were identified. The Temporary Cap surface contained some sediment from deteriorated sand bags, water deposited in low lying areas, and some minor fraying to the edges of some sheets that did not compromise the welded seams. MACTEC's observations are summarized in **Figure 2**. Temporary cap monitoring activities are summarized below.

2.1.5.1 Activities Completed During This Inspection

- Walking and inspecting the sewn seams for evidence of deterioration of the UV resistant thread.

- Observing areas of sewn seams that were in low spots and in contact with or submerged under ponded water.
- Checking sand bags where vegetation has rooted to verify that roots do not penetrate the polyethylene cover.
- Investigating areas of vegetation growth above cap to ensure cap material has not been compromised.
- Providing photo-documentation of typical cap conditions.

2.1.5.2 Observations During This Inspection

- The scrim reinforced polyethylene cover remains flexible and is generally in good condition.
- Aside from some instances of minor damage, sewn seams utilizing UV-resistant thread are intact and do not show signs of deterioration.
- Nine small perforations no more than one-half inch in diameter require patching.
- Wild seeding of some degraded sandbags has resulted in vegetation outgrowths from underneath and surrounding the bags. Plant roots, where observed, do not penetrate the underlying polyethylene sheet.
- The gravel ballast placed along the perimeter of the cap remains in place.
- Water pooling is minimal; little to no vegetation is growing in low-lying areas.
- Patches of vegetation are growing above the cap surface, but do not appear to have affected polyethylene sheet.
- The Temporary Cap internal drain grate free of vegetation.
- Several UV-resistant sandbags have lost a sufficient amount of sand to warrant a recommendation for their replacement. Olin is conducting a replacement program that includes replacement of these bags.

2.1.5.3 Discussion

Overall, the Temporary Cap was observed to be in good condition. The general physical condition of the membrane is good considering its age and service conditions (direct exposure to sunlight and the elements). The presence of ponded water does not necessarily signify leakage in those ponded areas. The presence of ponded water suggests that the underlying polyethylene sheeting is intact and is not leaking, or is not leaking extensively. Much of the water loss from ponded areas is probably due to evaporation. The general pattern of ponded water on the cover is consistent with older survey data of the temporary cap area. The cap is internally graded to a drain which outlets to the sedimentation basin located to the south between the containment area and South Ditch. During the site cap inspection, MACTEC observed the drain to be free of vegetation.

Several UV-resistant sandbags are recommended for replacement (see **Figure 2**); however, the deterioration of the majority of the sandbags does not adversely affect their purpose which is to place weight on the cover to resist wind uplift forces. Degraded sandbags are currently being

replaced with new sandbags.

The areas of vegetation growth that exists above the cap surface do not appear to affect the polyethylene sheeting. The polyethylene sheet continues to perform its intended function as the UV protection provided by its carbon black content has protected the polymer from significant deterioration.

2.1.5.4 Recommendations

Olin site personnel have repaired previous perforations and minor damage to the cap with repair tape. These repairs were generally observed to be in good condition and do not require resealing. A polyethylene tape with a mastic backing that is typically used on shrink wrap polyethylene covers (marine industry use) is being used as an alternative repair tape if current repairs fail prematurely.

It is recommended that the current program of cap inspections and maintenance (including patching the small perforations noted during the cap inspection, replacing sandbags at identified locations, and continuing cap monitoring for future changes in condition) be continued. The continued inspection of build-up of vegetation from the cap's internal drainage grate is also recommended (to facilitate drainage of ponded water).

3.0 PLANT B MONITORING PROGRAM

The purpose of the Plant B groundwater sampling and analysis program is to monitor groundwater quality at select monitoring wells and conduct gauging activities to determine groundwater elevations and light non-aqueous phase liquid (LNAPL) thickness.

The First Quarter 2009 Plant B monitoring program includes groundwater gauging at 28 monitoring wells and sampling one of the monitoring wells (GW-16R). Groundwater monitoring wells in the Plant B Monitoring Program are listed in **Table 7** and locations are shown on **Figure 3**.

3.1 SCOPE OF WORK

The Plant B Monitoring Program for this monitoring period consists of measuring groundwater levels in 28 monitoring wells within the Plant B area; gauging LNAPL thickness in monitoring wells where LNAPL was observed; and USEPA low flow (low stress) groundwater sampling at monitoring well GW-16R. Monitoring well locations are shown on **Figure 3**.

3.1.1 Groundwater Level Measurements and Product Gauging

On February 23, 2009, MACTEC personnel completed a site reconnaissance of the monitoring well locations in the Plant B Monitoring Program and collected groundwater level measurements and LNAPL thickness measurements. Depth to groundwater was measured in 28 monitoring wells using a water interface probe. For wells with observed LNAPL, LNAPL thickness was measured using an oil/water interface probe. Groundwater level measurements, groundwater elevations, and LNAPL thickness measurements are summarized in **Table 7**.

3.1.2 Groundwater Sampling

On February 24, 2009, MACTEC personnel sampled groundwater from monitoring well GW-16R (which was replaced in April 2008) using the 1996 USEPA low stress (low flow) groundwater sampling method in accordance with the SOPs located in Appendix A of the IRSWP.

Prior to low flow sampling, the water quality meters (Horiba U-22 water quality meter and Hach 2100P turbidity meter) were calibrated in accordance with manufacturer's specifications using

certified calibration solutions. The field instrument calibration records are contained in **Appendix A**. No readings were noted outside the manufacturer calibration ranges.

Groundwater was purged using an adjustable rate peristaltic pump along with dedicated tubing. During sampling activities, the purged groundwater was continuously monitored using a Horiba U-22 water quality instrument for pH, temperature, SC, DO, and ORP. Turbidity was monitored using a Hach turbidity meter. Well purging continued until these field parameters stabilized as indicated in Appendix A of the IRSWP.

Groundwater readings greater than 1 NTU and outside the ±10 percent range were noted at GW-16R.

The final low flow purging field parameter information at stabilization is presented in **Table 8**. Field data records have been attached in **Appendix A**.

Upon groundwater stabilization, groundwater samples were collected by directly filling the laboratory prepared glassware. The samples were placed on ice, and were transferred to TestAmerica of Westfield, Massachusetts, under chain-of-custody for chemical analyses as summarized in **Table 9**. Copies of the chain-of-custody documents are provided in **Appendix B**.

Purged groundwater from each monitoring well was collected in collapsible plastic containers, transported to the on-site groundwater treatment building, and containerized in a secured 55-gallon drum.

TABLES

Table 1
Groundwater and Surface Water Sampling Locations
First Quarter 2009 Sampling Event
Olin Chemical Superfund Site
Wilmington, Massachusetts

Ground Water	Surface Water
GW-25	ISCO1
GW-78S	ISCO2
GW-79S	ISCO3
GW-202S	PZ-16RR
GW-202D	PZ-17RR
PZ-16RR**	PZ-18R
PZ-17RR	SD-17
PZ-18R	
GW-16R*	

Notes:
* Well sampled as part of Plant B Program
** Piezometer not sampled during program (Frozen)

Prepared by: DLC 2/27/09
Checked by: CTM 4/10/09

Table 2
Groundwater Elevations
Slurry Wall/Cap Monitoring Program
First Quarter 2009 Sampling Event
Olin Chemical Superfund Site
Wilmington, Massachusetts

WELL/ SG- ID	Reference Elevation	Depth to Water (1, 2)	Groundwater Elevation (3)	Notes	Date Measured
I.D.	(ft msl)	(ft)	(feet NGVD)		2/23/2009
GW-10S	89.10	7.99	81.11		2/23/2009
GW-24	83.43	2.04	81.39		2/23/2009
GW-25	85.97	4.94	81.03		2/23/2009
GW-26	84.93	3.52	81.41		2/23/2009
GW-34D	90.36	7.15	83.21		2/23/2009
GW-34SR	89.13	5.85	83.28		2/23/2009
GW-35S	88.51	6.94	81.57		2/23/2009
GW-39	83.64	2.93	80.71		2/23/2009
GW-42S	84.18	2.89	81.29		2/23/2009
GW-43S	NG	NG	NG	Destroyed	NG
GW-55S	NG	NG	NG	Frozen	NG
GW-55D	NG	NG	NG	Frozen	NG
GW-76S	88.45	7.02	81.43	TOC	2/23/2009
GW-78S	84.89	4.23	80.66		2/23/2009
GW-79S	81.54	2.74	78.80		2/23/2009
GW-201S	83.29	2.89	80.40		2/23/2009
GW-202S	86.97	6.21	80.76		2/23/2009
GW-202D	86.52	5.61	80.91		2/23/2009
GW-CA1	88.01	6.92	81.09		2/23/2009
PZ-16RR/IN	NG	NG	NG	Frozen @ 2.62 ft.	2/23/2009
PZ-16RR/OUT (4)	81.0	2.82	78.18		2/23/2009
PZ-17RR/IN	82.43	1.94	80.49		2/23/2009
PZ-17RR/OUT (4)	82.43	3.31	79.12		2/23/2009
PZ-18R/IN	82.42	2.00	80.42		2/23/2009
PZ-18R/OUT (4)	82.42	1.87	80.55		2/23/2009
PZ-24	89.43	7.50	81.93		2/23/2009
PZ-25	88.90	8.31	80.59		2/23/2009

Notes:
(1) - Top of PVC. If no PVC, measurement from TOC
(2) - Collected using a Solinst water interface probe
(3) - Groundwater Elevation = Reference Elevation - Depth to Water
(4) - Reported elevation for surface water adjacent to piezometer
TOC - Water level measurement taken from Top of Casing
NG - Not gauged

Prepared by: DLC 2/26/09
Checked by: DGK 2/26/09

Table 3
Final Field Parameters for Groundwater Sampling
Slurry Wall/Cap Monitoring Program
First Quarter 2009 Sampling Event
Olin Chemical Superfund Site
Wilmington, Massachusetts

Monitoring Well Samples					
Location	GW-25	GW-78S	GW-79S	GW-202S	GW-202D
Date	2/24/2009	2/25/2009	2/25/2009	2/25/2009	2/25/2009
Depth to Water (ft)	5.37	4.46	3.21	6.44	5.87
Temperature (ºCelsius)	9.52	6.32	5.53	9.58	10.69
Conductivity (µS/cm)	681	1570	3740	1580	5880
pH (standard units)	7.92	6.01	6.25	6.64	4.47
Dissolved oxygen (mg/L)	2.69	<0.1	<0.1	<0.1	7.29
Turbidity (NTUS)	3.30	4.63	3.39	0.64	7.26
Redox (millivolts)	-87	133	-31	110	250

Piezometer Samples			
Location	PZ-16RR*	PZ-17RR	PZ-18R
Date	2/25/2009	2/25/2009	2/25/2009
Depth to Water (ft)	Frozen	1.94	3.70
Temperature (ºCelsius)	--	4.45	4.48
Conductivity (µS/cm)	--	1620	1280
pH (standard units)	--	8.07	7.33
Dissolved oxygen (mg/L)	--	1.16	0.08
Turbidity (NTU)	--	12.1	2.89
Redox (millivolts)	--	-46	-119

Notes:
ft - feet
µS/cm - microSiemens per centimeter
mg/L - milligrams per liter
NTU - nephelometric turbidity units
PZ-16RR not sampled (frozen)

Prepared by: DLC 2/27/09
Checked by: MAM 4/13/09

Table 4
Groundwater Laboratory Analytical Program
Slurry Wall/Cap Monitoring Program
First Quarter 2009 Sampling Event
Olin Chemical Superfund Site
Wilmington, Massachusetts

Analyte	Analysis Method	Detection Limit	Units
Physical/Inorganic Parameters			
Ammonia-Nitrogen	EPA 350.1 (10-107-06-1-K)	0.1	mg/L
Chloride	EPA 300.0	1	mg/L
Specific Conductivity	SM18 2510B	1	µmhos/cm
Sulfate	EPA 300.0	2	mg/L
Filtered Metals			
Aluminum, filtered	SW846 6010B	100	µg/L
Chromium, filtered	SW846 6010B	5	µg/L

Notes:
NA - not applicable
mg/L - milligrams per liter
µmhos/cm - micromhos per centimeter
µg/L - micrograms per liter

Prepared by: DLC 2/27/09
Checked by: MAM 4/1309

Table 5
Final Field Parameters for Surface Water Sampling
Slurry Wall/Cap Monitoring Program
First Quarter 2009 Sampling Event
Olin Chemical Superfund Site
Wilmington, Massachusetts

Surface Water Samples							
Location	ISCO1	ISCO2	ISCO3	PZ-16RR	PZ-17RR	PZ-18R	SD-17
Date	2/24/2009	2/24/2009	2/24/2009	2/24/2009	2/24/2009	2/24/2009	2/24/2009
Depth of Water (ft)	1.1	0.4	0.7	0.2	0.5	1.5	0.3
Temperature (ºCelsius)	0.94	0.04	1.15	0.17	0.85	0.96	0.99
Conductivity (µS/cm)	833	1030	960	1180	1180	858	1220
pH (standard units)	5.70	5.54	6.80	5.51	5.32	5.90	5.43
Dissolved oxygen (mg/L)	6.21	9.48	10.28	8.77	7.76	5.81	6.75
Turbidity (NTU)	3.33	4.29	2.61	11.0	9.06	3.33	13.9
Redox (millivolts)	99	158	75	139	172	116	163

Notes:
ft - feet
µS/cm - microSiemens per centimeter
mg/L - milligrams per liter
NTU - nephelometric turbidity units

Prepared by: DLC 2/27/09
Checked by: MAM 4/13/09

Table 6
Surface Water Analytical Program
Slurry Wall/Cap Monitoring Program
First Quarter 2009 Sampling Event
Olin Chemical Superfund Site
Wilmington, Massachusetts

Analyte	Analysis Method	Detection Limit	Units
Physical/Inorganic Parameters			
Ammonia-Nitrogen	EPA 350.1 (10-107-06-1-K)	0.1	mg/L
Nitrate	EPA 300.0	0.05	mg/L
Nitrite	EPA 300.0	0.01	mg/L
Chloride	EPA 300.0	1	mg/L
Specific Conductivity	SM18 2510B	1	µmhos/cm
Sulfate	EPA 300.0	2	mg/L
Total Metals			
Aluminum, Total	SW846 6010B	100	µg/L
Chromium, Total	SW846 6010B	5	µg/L
Sodium, Total	SW846 6010B	2000	µg/L
Filtered Metals			
Aluminum, Filtered	SW846 6010B	100	µg/L
Chromium, Filtered	SW846 6010B	5	µg/L
Sodium, Filtered	SW846 6010B	2000	µg/L

Notes:
mg/L - milligrams per liter
µmhos/cm - micromhos per centimeter
µg/L - micrograms per liter

Prepared by: DLC 2/27/09
Checked by: MAM 4/13/09

Table 7
Groundwater Elevations
Plant B Monitoring Program
First Quarter 2009 Sampling Event
Olin Chemical Superfund Site
Wilmington, Massachusetts

WELL/ SG- ID	Reference Elevation (1)	Depth to Water (2)	Depth to Product (3)	Product Thickness (4)	Groundwater Elevation (5)	Date Measured
I.D.	(ft msl)	(ft)	(ft)	(ft)	(feet NGVD)	
B-2	90.48	11.56	NPD	NA	78.92	2/23/2009
B-3	90.32	11.02	NPD	NA	79.30	2/23/2009
B-5R	91.38	11.15	NPD	NA	80.23	2/23/2009
B-7A	88.81	7.75	NPD	NA	81.06	2/23/2009
B-17	91.55	8.78	NPD	NA	82.77	2/23/2009
GW-13	90.57	11.22	NPD	NA	79.35	2/23/2009
GW-14	88.70	8.57	NPD	NA	80.13	2/23/2009
GW-15	90.01	8.34	NPD	NA	81.67	2/23/2009
GW-16R	92.46	10.32	NPD	NA	82.14	2/23/2009
GW-23	91.04	12.24	11.87	0.37	79.15	2/23/2009
GW-52S	87.95	7.73	NPD	NA	80.22	2/23/2009
GW-100	90.15	11.33	NPD	NA	78.82	2/23/2009
GW-101	90.14	11.28	NPD	NA	78.86	2/23/2009
GW-102	89.00	10.17	NPD	NA	78.83	2/23/2009
IW-1	90.71	11.35	NPD	NA	79.36	2/23/2009
IW-2	90.53	11.41	11.40	<0.01	79.12	2/23/2009
IW-3	90.76	11.55	11.54	<0.01	79.21	2/23/2009
IW-6	89.15	10.56	NPD	NA	78.59	2/23/2009
IW-7	90.10	11.35	NPD	NA	78.75	2/23/2009
IW-8	89.94	11.04	NPD	NA	78.90	2/23/2009
IW-9	89.78	10.92	NPD	NA	78.86	2/23/2009
IW-10	90.43	11.58	NPD	NA	78.85	2/23/2009
IW-11	89.92	10.19	10.18	<0.01	79.73	2/23/2009
IW-12	90.31	11.00	10.99	<0.01	79.31	2/23/2009
IW-13	89.90	16.15	16.14	<0.01	73.75	2/23/2009
PID	89.97	11.11	11.10	<0.01	78.86	2/23/2009
P5	90.45	11.42	11.41	<0.01	79.03	2/23/2009
12-IN	89.84	10.72	10.71	<0.01	79.12	2/23/2009

Notes:

Prepared by: DLC 2/26/09

Checked by: DGK 2/26/09

(1) - Reference elevations surveyed 11/97. New TOC survey by Dana Perkins 4-5/98

(2) - Top of PVC. If no PVC, measurement from top of steel casing

(3) - Collected using a Solinst water interface probe or Geotech oil/water interface probe

(4) - Sheen noted with a product thickness of 0.01 feet

(5) - Groundwater Elevation = Reference Elevation - (Depth to Water - (Product Thickness x 0.95))

TOC - Top of Casing

NPD - No Product Detected

NA - Not Applicable

Table 8
Final Field Parameters for Groundwater Sampling
Plant B Monitoring Program
First Quarter 2009 Sampling Event
Olin Chemical Superfund Site
Wilmington, Massachusetts

Quarterly Plant B Monitoring Wells	
Location	GW-16R
Date	2/24/2009
Depth to Water (ft)	11.65
Temperature (ºCelsius)	9.32
Conductivity (µS/cm)	231
pH (standard units)	6.69
Dissolved oxygen (mg/L)	3.10
Turbidity (NTU)	2.21
Redox (millivolts)	34

Notes:
ft - feet
µS/cm - microSiemens per centimeter
mg/L - milligrams per liter
NTU - nephelometric turbidity units

Prepared by: DLC 2/27/09
Checked by: MAM 4/13/09

Table 9
Groundwater Laboratory Analytical Program
Plant B Monitoring Program
First Quarter 2009 Sampling Event
Olin Chemical Superfund Site
Wilmington, Massachusetts

Analyte	Analysis Method	Detection Limit	Units
Volatile organic compounds (VOC)			
2,4,4-Trimethyl-1-pentene	SW846 8260B	1	µg/L
2,4,4-Trimethyl-2-pentene	SW846 8260B	1	µg/L
Semivolatile organic compounds (SVOC)			
N-nitrosodiphenylamine	SW846 8270C	10	µg/L
bis(2-ethylhexyl)phthalate	SW846 8270C	10	µg/L
Volatile Petroleum Hydrocarbons (VPH)			
C5-C8 Aliphatics	MA VPH	100	µg/L
C5-C8 Aliphatics, Unadjusted	MA VPH	100	µg/L
C9-C12 Aliphatics	MA VPH	100	µg/L
C9-C12 Aliphatics, Unadjusted	MA VPH	100	µg/L
C9-C10 Aromatics	MA VPH	100	µg/L
Methyl-tert-butyl-ether (MTBE)	MA VPH	5	µg/L
Benzene	MA VPH	5	µg/L
Ethylbenzene	MA VPH	5	µg/L
m,p-Xylene	MA VPH	10	µg/L
o-Xylene	MA VPH	5	µg/L
Toluene	MA VPH	5	µg/L
Naphthalene	MA VPH	10	µg/L
Physical/Inorganic Parameters			
Ammonia-Nitrogen	EPA 350.1 (10-107-06-1-K)	0.1	mg/L
pH	SM 4500 H+ B	0.1	SU
Total Metals			
Iron, Total	SW846 6010B	100	µg/L
Filtered Metals			
Iron, Filtered	SW846 6010B	100	µg/L

Notes:
µg/L - micrograms per liter
mg/L - milligrams per liter
SU - standard units

Prepared by: DLC 2/27/09
Checked by: MAM 4/13/09

FIGURES

SD-SD1
GW-34SR
GW-34D
GW-35S
GW-26
GW-10S
GW-76S
GW-CA1
GW-24
GW-25
GW-42S
GW-202S
GW-202D
PZ-24
PZ-25
ISCO1
PZ-18R
SD-SD2
GW-78S
SD-17
PZ-17RR
GW-55D
GW-55S
GW-39
GW-201S
SD-SD4
GW-79S
SD-SD5
SD-SD3
PZ-16RR
ISCO3
ISCO2

Legend

- Groundwater Sample Location
- Groundwater and Surface Water Sample Location
- Surface Water Location
- Sediment Sample Location
- Site Boundary
- Wetland Boundary
- Paved Road
- Unpaved Road
- Railroad
- Structure
- Water
- Culvert
- Trail

MACTEC Engineering and Consulting
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Wakefield, MA 01880

N

0 85 170 340 Feet

Figure 1
Slurry Wall/Cap Monitoring Program
Sampling Locations
Interim Response Steps Field Activity Report
First Quarter 2009 Sampling Event
Olin Chemical Superfund Site
Wilmington, Massachusetts

Prepared/Date: BJR 4/10/09 | Checked/Date: CTM 4/10/09

Document: P:\OLIN\Wilmington\GIS\MapDocuments\Interim Response Work Plan\Olin_IRWP2.mxd PDF: P:\OLIN\Wilmington\2009 Quarterly Sampling\Feb Quarterly\Report\Figures\Figure 1 - First Quarter 2009 Sampling Locations.pdf 4/10/2009 2:47 PM bjroden

Legend

- Seam
- Monitoring Well

R-# = Previous repair; includes new sandbags
W-# = Water pooling
S-# = Sandbag recommended for replacement
SM-# = Frayed seam
P-# = Perforation

MACTEC Engineering and Consulting
107 Audubon Road Suite 301
Wakefield, MA 01880

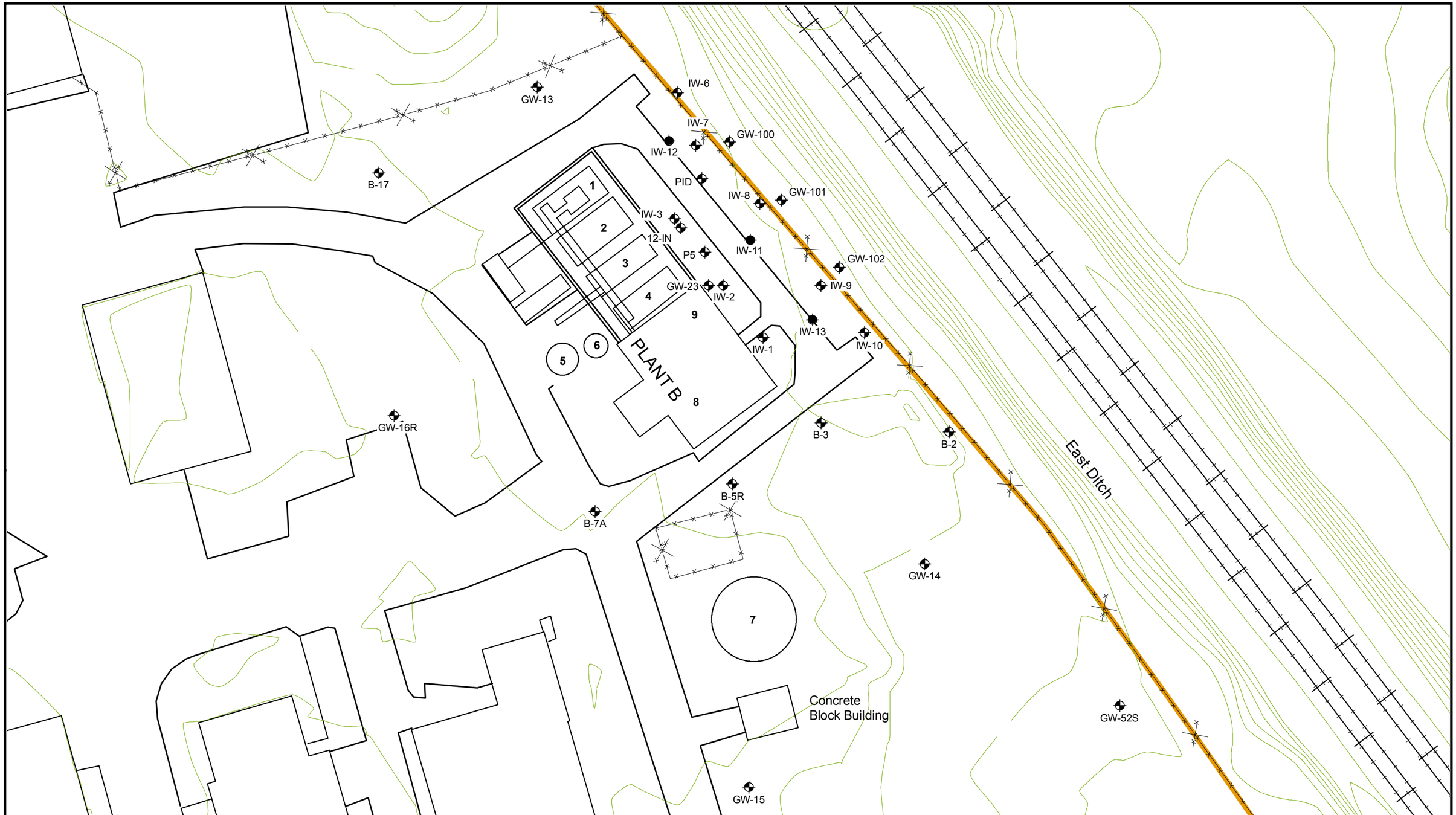
N

0 30 60 120 Feet

Figure 2
First Quarter 2009 Temporary Cap Inspection Observations
Interim Response Steps Field Activity Report
First Quarter 2009 Sampling Event
Olin Chemical Superfund Site
Wilmington, Massachusetts

Prepared by BJR | Checked by DLC

Document: P:\OLIN\Wilmington\GIS\MapDocuments\Olin_11X17_LS.mxd PDF: P:\OLIN\Wilmington\2009 Quarterly Sampling\February\Report\Figures\Figure 2 - First Quarter 2009 Temporary Cap Inspection Observations.pdf 04/03/2009 2:42 PM bjroden



Tank #1 - Receives gravity overflow from Tank 2 and allows for further settling
Tank #2 - Caustic addition and initial iron drop-out
Tank #3 & #4 - Overnight holding tank for treated water
Tank #5 - Pre-carbon hold tank
Tank #6 - Residence tank
Tank #7 - Raw water (pH adjusted)
Tank #8 - Pre-carbon transfer
Tank #9 - Day discharge to NPDES Outfall 002

Legend

- Monitoring Well
- Recovery Well
- Elevation Contours

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Wakefield, MA 01880

N

0 15 30 60 Feet

Figure 3
Plant B Monitoring Program
Sampling Locations
Interim Response Steps Field Activity Report
First Quarter 2009 Sampling Event
Olin Chemical Superfund Site
Wilmington, Massachusetts

Prepared/Date: BJR 5/05/09 | Checked/Date: CTM 5/05/09

Document: P:\OLIN\Wilmington\GIS\MapDocuments\Interim Response Work Plan\Olin_PlantB_11X17_LS.mxd PDF: P:\OLIN\Wilmington\2009 Quarterly Sampling\Feb Quarterly\Report\Figures\Figure 3 - Plant B Monitoring Program Sampling Locations First Quarter 2009.pdf 4/10/2009 8:43 AM bjroden

APPENDIX A

Field Data Records and Field Instrument Calibration Records

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	SAMPLE ID	OC-GW-16R	ROUND NO.	1
SAMPLE ID	OC-GW-16R	SITE TYPE	Superfund	DATE	2/24/2009
TIME	START 12:30 END 13:30	JOB NUMBER	6107-09-0016.04	BOTTLE TIME	13:25

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

INITIAL DEPTH TO WATER: 10.22 FT.

FINAL DEPTH TO WATER: 11.65 FT.

DRAWDOWN VOLUME: 0.23 FT.
(initial - final x 0.16 (2-inch) or x 0.65 (4-inch))

TOTAL VOL. PURGED: 5.00 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

MEASUREMENT POINT
- [X] TOP OF WELL RISER
- [ ] TOP OF PROTECTIVE CASING
- [ ] OTHER _____

WELL DEPTH (TOR): 17.18 FT.

SCREEN LENGTH: See Survey FT.

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED: 0.05

PROTECTIVE CASING STICKUP (FROM GROUND): --- FT.

PID AMBIENT AIR: N/A PPM

PID WELL MOUTH: N/A PPM

PRESSURE TO PUMP: N/A PSI

REFILL TIMER SETTING: N/A SEC.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

WELL DIAMETER: 2 IN.

WELL INTEGRITY:	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/L) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (uS/cm) (3%)	pH (units) (+/- 0.1 unit)	DISS. O2 (mg/L) (10%)	TURBIDITY (NTU) (10%) (0-2)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
12:40	11.54	350	9.46	275	6.61	2.69	82.6	34	16.0	Reddish brown floc
12:45	11.65	350	9.39	264	6.64	11.03	39.0	33	16.0	Clearing, less floc
12:50	11.65	350	9.34	245	6.65	10.29	26.1	32	16.0	Clearing
12:55	11.65	350	9.35	235	6.67	10.15	15.5	32	16.0	
13:00	11.65	350	9.31	236	6.68	1.55	9.0	33	16.0	
13:05	11.65	350	9.32	232	6.69	2.15	6.26	34	16.0	
13:10	11.65	350	9.34	230	6.69	2.96	4.84	35	16.0	
13:15	11.65	350	9.33	232	6.68	2.98	2.94	35	16.0	
13:20	11.65	350	9.32	231	6.69	3.10	2.21	34	16.0	
13:25	Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP
- [ ] QED BLADDER
- [ ] SIMCO BLADDER
- [X] GEOPUMP

TYPE OF TUBING
- [ ] TEFLON OR TEFLON LINED
- [ ] HIGH DENSITY POLYETHYLENE
- [X] LDPE (Dedicated)

TYPE OF PUMP MATERIAL
- [ ] POLYVINYL CHLORIDE
- [ ] STAINLESS STEEL
- [X] SILICON (Dedicated)

TYPE OF BLADDER MATERIAL
- [ ] TEFLON
- [ ] OTHER _____

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[X] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[X] VOCs
[X] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[X] SVOCs
[X] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[X] VPH
[X] Tota l/ Dissolved Fe	6010B	HNO3 / 4 DEG. C	2 X 500 mL	[X] Tot./ Dis. Fe
[X] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[X] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[ ] Chloride	300.0	4 DEG. C	1 X 500 mL	[ ] Chloride
[ ] Sulfate	300.0	4 DEG. C	1 X 500 mL	[ ] Sulfate
[ ] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[ ] Specific Conductivity
[ ] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED [YES] NO

NUMBER OF GALLONS GENERATED: 5.00

NOTES

LOCATION SKETCH

SIGNATURE:

Prepared by: DLC 2/26/09

Checked by: DGK 2/26/09

MACTEC

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	SAMPLE ID	OC-GW-25	ROUND NO.	1
SAMPLE ID	OC-GW-25	SITE TYPE	Superfund	DATE	2/24/2009
TIME	START 12:30 END 13:35	JOB NUMBER	6107-09-0016.04	BOTTLE TIME	13:30

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT
- [X] TOP OF WELL RISER
- [ ] TOP OF PROTECTIVE CASING
- [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): --- FT.

PROTECTIVE CASING / WELL DIFFERENCE: --- FT.

INITIAL DEPTH TO WATER: 5.35 FT.

WELL DEPTH (TOR): 14.45 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 1 IN.

FINAL DEPTH TO WATER: 5.37 FT.

SCREEN LENGTH: See Survey FT.

PID WELL MOUTH: N/A PPM

WELL INTEGRITY:

	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: 0.0033 FT.
(initial - final x 0.16 (2-inch) or x 0.65 (4-inch))

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED: <0.01

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 6.01 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/L) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (uS/cm) (3%)	pH (units) (+/- 0.1 unit)	DISS. O2 (mg/L) (10%)	TURBIDITY (NTU) (10%) (0-2)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
12:35	5.37	350	8.89	694	8.54	1.83	10.7	-140	13.0	
12:40	5.37	350	9.25	692	8.69	7.18	7.82	-146	13.0	
12:45	5.37	350	9.54	685	8.38	5.64	7.46	-120	13.0	
12:50	5.37	350	9.57	681	8.22	4.37	5.84	-107	13.0	
12:55	5.37	350	9.61	680	8.14	3.89	5.74	-100	13.0	
13:00	5.37	350	9.66	679	8.04	3.01	5.08	-96	13.0	
13:05	5.37	350	9.69	679	8.02	2.92	4.62	-95	13.0	
13:10	5.37	350	9.71	678	7.99	2.89	3.37	-94	13.0	
13:15	5.37	350	9.63	679	7.96	2.79	3.32	-90	13.0	
13:20	5.37	350	9.52	681	7.92	2.69	3.30	-87	13.0	
13:30	Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP
- [ ] QED BLADDER
- [ ] SIMCO BLADDER
- [X] GEOPUMP

TYPE OF TUBING
- [ ] TEFLON OR TEFLON LINED
- [ ] HIGH DENSITY POLYETHYLENE
- [X] LDPE (Dedicated)

TYPE OF PUMP MATERIAL
- [ ] POLYVINYL CHLORIDE
- [ ] STAINLESS STEEL
- [X] SILICON (Dedicated)

TYPE OF BLADDER MATERIAL
- [ ] TEFLON
- [ ] OTHER _____

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED: [YES] NO

NUMBER OF GALLONS GENERATED: 5.50

NOTES

LOCATION SKETCH

Prepared by: DLC 2/26/09

Checked by: DGK 2/26/09

SIGNATURE:

MACTEC

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	SAMPLE ID	OC-GW-78S	ROUND NO.	1
SAMPLE ID	OC-GW-78S	SITE TYPE	Superfund	DATE	2/25/2009
TIME	START 11:00 END 12:00	JOB NUMBER	6107-09-0016.04	BOTTLE TIME	11:55

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT
- [X] TOP OF WELL RISER
- [ ] TOP OF PROTECTIVE CASING
- [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): --- FT.

PROTECTIVE CASING / WELL DIFFERENCE: --- FT.

INITIAL DEPTH TO WATER: 4.41 FT.

WELL DEPTH (TOR): 10.30 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 4.46 FT.

SCREEN LENGTH: See Survey FT.

PID WELL MOUTH: N/A PPM

WELL INTEGRITY:

	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: 0.008 FT.
(initial - final x 0.16 (2-inch) or x 0.65 (4-inch))

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED: <0.01

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 4.76 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/L) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (uS/cm) (3%)	pH (units) (+/- 0.1 unit)	DISS. O2 (mg/L) (10%)	TURBIDITY (NTU) (10%) (0-2)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
11:05	4.46	300	5.24	1570	6.34	1.48	>1000	97	9.5	
11:10	4.46	300	6.23	1570	6.18	<0.1	38	113	9.5	
11:15	4.46	300	6.39	1580	6.12	<0.1	21.3	122	9.5	
11:20	4.46	300	6.62	1580	6.05	<0.1	18.1	130	9.5	
11:25	4.46	300	6.50	1580	6.02	<0.1	12.2	131	9.5	
11:30	4.46	300	6.38	1580	6.01	<0.1	8.63	132	9.5	
11:35	4.46	300	6.42	1570	6.01	<0.1	5.96	132	9.5	
11:40	4.46	300	6.32	1580	6.00	<0.1	4.78	133	9.5	
11:45	4.46	300	6.32	1580	6.00	<0.1	4.73	133	9.5	
11:50	4.46	300	6.32	1570	6.01	<0.1	4.63	133	9.5	
11:55	Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP
- [ ] QED BLADDER
- [ ] SIMCO BLADDER
- [X] GEOPUMP

TYPE OF TUBING
- [ ] TEFLON OR TEFLON LINED
- [ ] HIGH DENSITY POLYETHYLENE
- [X] LDPE (Dedicated)

TYPE OF PUMP MATERIAL
- [ ] POLYVINYL CHLORIDE
- [ ] STAINLESS STEEL
- [X] SILICON (Dedicated)

TYPE OF BLADDER MATERIAL
- [ ] TEFLON
- [ ] OTHER _____

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED: [YES] NO

NUMBER OF GALLONS GENERATED: 2.75

NOTES

LOCATION SKETCH

Prepared by: DLC 2/26/09

Checked by: DGK 2/26/09

SIGNATURE:

MACTEC

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	SAMPLE ID	OC-GW-79S	ROUND NO.	1
SAMPLE ID	OC-GW-79S	SITE TYPE	Superfund	DATE	2/25/2009
TIME	START 11:00 END 11:45	JOB NUMBER	6107-09-0016.04	BOTTLE TIME	11:40

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT
- [X] TOP OF WELL RISER
- [ ] TOP OF PROTECTIVE CASING
- [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): 2.0 FT.

PROTECTIVE CASING / WELL DIFFERENCE: --- FT.

INITIAL DEPTH TO WATER: 3.11 FT.

WELL DEPTH (TOR): 11.7 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 3.21 FT.

SCREEN LENGTH: See Survey FT.

PID WELL MOUTH: N/A PPM

WELL INTEGRITY:

	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: 0.02 FT.
(initial - final x 0.16 (2-inch) or x 0.65 (4-inch))

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED: 0.008

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 2.38 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/L) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (uS/cm) (3%)	pH (units) (+/- 0.1 unit)	DISS. O2 (mg/L) (10%)	TURBIDITY (NTU) (10%) (0-2)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
11:10	3.31	200	5.51	3830	6.25	1.51	11.50	-13	10.5	Tan floc
11:15	3.21	200	5.59	3800	6.25	0.42	5.64	-19	10.5	
11:20	3.21	200	5.69	3750	6.26	<0.1	5.84	-24	10.5	
11:25	3.22	200	5.52	3750	6.25	<0.1	3.33	-28	10.5	
11:30	3.22	200	5.50	3740	6.25	<0.1	3.78	-30	10.5	
11:35	3.21	200	5.53	3740	6.25	<0.1	3.39	-31	10.5	
11:40	Sample collected									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP
- [ ] QED BLADDER
- [ ] SIMCO BLADDER
- [X] GEOPUMP

TYPE OF TUBING
- [ ] TEFLON OR TEFLON LINED
- [ ] HIGH DENSITY POLYETHYLENE
- [X] LDPE (Dedicated)

TYPE OF PUMP MATERIAL
- [ ] POLYVINYL CHLORIDE
- [ ] STAINLESS STEEL
- [X] SILICON (Dedicated)

TYPE OF BLADDER MATERIAL
- [ ] TEFLON
- [ ] OTHER _____

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED: [YES] NO

NUMBER OF GALLONS GENERATED: 3

NOTES

LOCATION SKETCH

SIGNATURE:

Prepared by: DLC 2/26/09

Checked by: DGK 2/26/09

MACTEC

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	SAMPLE ID	OC-GW-202S	ROUND NO.	1
SAMPLE ID	OC-GW-202S	SITE TYPE	Superfund	DATE	2/25/2009
TIME	START 8:30 END 9:15	JOB NUMBER	6107-09-0016.04	BOTTLE TIME	9:10

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT
- [X] TOP OF WELL RISER
- [ ] TOP OF PROTECTIVE CASING
- [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): --- FT.

PROTECTIVE CASING / WELL DIFFERENCE: --- FT.

INITIAL DEPTH TO WATER: 6.35 FT.

WELL DEPTH (TOR): 13.35 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 6.44 FT.

SCREEN LENGTH: See Survey FT.

PID WELL MOUTH: N/A PPM

WELL INTEGRITY:

	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: 0.02 FT.
(initial - final x 0.16 (2-inch) or x 0.65 (4-inch))

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED: <0.01

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 4.76 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/L) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (uS/cm) (3%)	pH (units) (+/- 0.1 unit)	DISS. O2 (mg/L) (10%)	TURBIDITY (NTU) (10%) (0-2)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
8:35	6.45	400	8.72	1550	6.49	1.69	1.75	150	13.0	Clear
8:40	6.44	400	8.74	1580	6.50	1.42	1.92	151	13.0	
8:45	6.44	400	9.14	1560	6.51	1.56	1.36	130	13.0	
8:50	6.44	400	9.18	1560	6.53	1.58	1.28	120	13.0	
8:55	6.44	400	9.21	1570	6.54	<0.1	1.06	115	13.0	
9:00	6.44	400	9.56	1570	6.59	<0.1	0.75	110	13.0	
9:05	6.44	400	9.58	1580	6.54	<0.1	0.64	110	13.0	
9:10	Sample Collected									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP
- [ ] QED BLADDER
- [ ] SIMCO BLADDER
- [X] GEOPUMP

TYPE OF TUBING
- [ ] TEFLON OR TEFLON LINED
- [ ] HIGH DENSITY POLYETHYLENE
- [X] LDPE (Dedicated)

TYPE OF PUMP MATERIAL
- [ ] POLYVINYL CHLORIDE
- [ ] STAINLESS STEEL
- [X] SILICON (Dedicated)

TYPE OF BLADDER MATERIAL
- [ ] TEFLON
- [ ] OTHER _____

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED [YES] NO

NUMBER OF GALLONS GENERATED 4.5

NOTES

LOCATION SKETCH

SIGNATURE:

Prepared by: DLC 2/26/09

Checked by: DGK 2/26/09

MACTEC

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	SAMPLE ID	OC-GW-202D	ROUND NO.	1
SAMPLE ID	OC-GW-202D	SITE TYPE	Superfund	DATE	2/25/2009
TIME	START 8:30 END 9:20	JOB NUMBER	6107-09-0016.04	BOTTLE TIME	9:15

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT
- [X] TOP OF WELL RISER
- [ ] TOP OF PROTECTIVE CASING
- [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): 2.16 FT.

PROTECTIVE CASING / WELL DIFFERENCE: --- FT.

INITIAL DEPTH TO WATER: 5.81 FT.

WELL DEPTH (TOR): 23.89 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 5.87 FT.

SCREEN LENGTH: See Survey FT.

PID WELL MOUTH: N/A PPM

WELL INTEGRITY:

	YES	NO	N/A
CAP	X		
CASING	X		
LOCKED	X		
COLLAR	X		

DRAWDOWN VOLUME: 0.0098 FT.
(initial - final x 0.16 (2-inch) or x 0.65 (4-inch))

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED: 0.002

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 4.62 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/L) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (uS/cm) (3%)	pH (units) (+/- 0.1 unit)	DISS. O2 (mg/L) (10%)	TURBIDITY (NTU) (10%) (0-2)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
8:35	5.87	350	8.77	6150	4.36	2.68	84.7	243	23	
8:40	5.87	350	9.21	6040	4.36	5.67	53.8	255	23	
8:45	5.87	350	9.65	5940	4.36	7.73	22.2	261	23	
8:50	5.87	350	9.87	5900	4.31	7.29	16.4	259	23	
8:55	5.87	350	10.19	5910	4.34	7.78	12.9	259	23	
9:00	5.87	350	10.24	5910	4.40	7.37	10.31	254	23	
9:05	5.87	350	10.34	5900	4.43	7.79	5.92	252	23	
9:10	5.87	350	10.69	5880	4.47	7.29	7.26	250	23	
9:15	Sample									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP
- [ ] QED BLADDER
- [ ] SIMCO BLADDER
- [X] GEOPUMP

TYPE OF TUBING
- [ ] TEFLON OR TEFLON LINED
- [ ] HIGH DENSITY POLYETHYLENE
- [X] LDPE (Dedicated)

TYPE OF PUMP MATERIAL
- [ ] POLYVINYL CHLORIDE
- [ ] STAINLESS STEEL
- [X] SILICON (Dedicated)

TYPE OF BLADDER MATERIAL
- [ ] TEFLON
- [ ] OTHER _____

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED: [YES] NO

NUMBER OF GALLONS GENERATED: 4.5

NOTES

LOCATION SKETCH

Prepared by: DLC 2/26/09

Checked by: DGK 2/26/09

SIGNATURE:

MACTEC

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	SAMPLE ID	OC-PZ-17RR	ROUND NO.	1
SAMPLE ID	OC-PZ-17RR	SITE TYPE	Superfund	DATE	2/25/2009
TIME	START 9:55 END 10:35	JOB NUMBER	6107-09-0016.04	BOTTLE TIME	10:30

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT
- [X] TOP OF WELL RISER
- [ ] TOP OF PROTECTIVE CASING
- [ ] OTHER

PROTECTIVE CASING STICKUP (FROM GROUND): 3.67 FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 1.94 FT.

WELL DEPTH (TOR): 6.05 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 1 IN.

FINAL DEPTH TO WATER: Dry FT.

SCREEN LENGTH: See Survey FT.

PID WELL MOUTH: N/A PPM

WELL INTEGRITY:

	YES	NO	N/A
CAP	X		
CASING			X
LOCKED			X
COLLAR			X

DRAWDOWN VOLUME: --- FT.
(initial - final x 0.16 (2-inch) or x 0.65 (4-inch))

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED: 100%

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: Approx 0.25 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/L) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (uS/cm) (3%)	pH (units) (+/- 0.1 unit)	DISS. O2 (mg/L) (10%)	TURBIDITY (NTU) (10%) (0-2)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
10:07	---	150	5.19	1520	8.30	3.50	76.0	-74	6.0	Well draws down.
10:16	---	150	4.52	1620	8.12	2.44	16.4	-49	6.0	Purge well dry,
10:25	---	150	4.45	1620	8.07	1.16	12.1	-46	6.0	collect readings and wait
10:30	Sample									for recharge three times
										before sampling

EQUIPMENT DOCUMENTATION

TYPE OF PUMP
- [ ] QED BLADDER
- [ ] SIMCO BLADDER
- [X] GEOPUMP

TYPE OF TUBING
- [ ] TEFLON OR TEFLON LINED
- [ ] HIGH DENSITY POLYETHYLENE
- [X] LDPE (Dedicated)

TYPE OF PUMP MATERIAL
- [ ] POLYVINYL CHLORIDE
- [ ] STAINLESS STEEL
- [X] SILICON (Dedicated)

TYPE OF BLADDER MATERIAL
- [ ] TEFLON
- [ ] OTHER

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED: [YES] NO

NUMBER OF GALLONS GENERATED: 0.10

NOTES Something in well blocking water level probe.

SIGNATURE:

LOCATION SKETCH

Prepared by: DLC 2/26/09

Checked by: DGK 2/26/09

MACTEC

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	SAMPLE ID	OC-PZ-18R	ROUND NO.	1
SAMPLE ID	OC-PZ-18R	SITE TYPE	Superfund	DATE	2/25/2009
TIME	START 9:20 END 10:35	JOB NUMBER	6107-09-0016.04	BOTTLE TIME	10:30

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

MEASUREMENT POINT
- [X] TOP OF WELL RISER
- [ ] TOP OF PROTECTIVE CASING
- [ ] OTHER _____

PROTECTIVE CASING STICKUP (FROM GROUND): --- FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 1.95 FT.

WELL DEPTH (TOR): 6.05 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 1 IN.

FINAL DEPTH TO WATER: 3.70 FT.

SCREEN LENGTH: See Survey FT.

PID WELL MOUTH: N/A PPM

WELL INTEGRITY:

	YES	NO	N/A
CAP		X	
CASING			X
LOCKED			X
COLLAR			X

DRAWDOWN VOLUME: 0.075 FT.
(initial - final x 0.16 (2-inch) or x 0.65 (4-inch))

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED: 0.02

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 3.47 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/L) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (uS/cm) (3%)	pH (units) (+/- 0.1 unit)	DISS. O2 (mg/L) (10%)	TURBIDITY (NTU) (10%) (0-2)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH (ft.)	COMMENTS
9:20	3.87	250	4.19	1270	7.45	2.09	137	-133	5.0	Transparent orange
9:25	3.91	250	4.32	1230	7.40	5.00	12.70	-112	5.0	Geopump stopping.
9:30	3.91	250	4.38	1220	7.39	6.71	6.75	-114	5.0	Trade out for new unit
9:35	3.91	250	4.48	1210	7.38	5.81	2.83	-110	5.0	
9:40	Turn off pump for recharge.									
9:50	Switch out geopump for new unit									
9:55	3.71	100	4.29	1280	7.35	1.29	4.24	-119	5.0	
10:00	3.71	100	4.29	1280	7.34	1.10	4.10	-119	5.0	
10:05	3.71	100	4.35	1270	7.34	0.10	3.30	-119	5.0	
10:20	3.70	100	4.48	1290	7.34	0.08	3.38	-119	5.0	
10:25	3.70	100	4.48	1280	7.33	0.08	2.89	-119	5.0	
10:30	Sample collected									

EQUIPMENT DOCUMENTATION

TYPE OF PUMP
- [ ] QED BLADDER
- [ ] SIMCO BLADDER
- [X] GEOPUMP

TYPE OF TUBING
- [ ] TEFLON OR TEFLON LINED
- [ ] HIGH DENSITY POLYETHYLENE
- [X] LDPE (Dedicated)

TYPE OF PUMP MATERIAL
- [ ] POLYVINYL CHLORIDE
- [ ] STAINLESS STEEL
- [X] SILICON (Dedicated)

TYPE OF BLADDER MATERIAL
- [ ] TEFLON
- [ ] OTHER _____

ANALYTICAL PARAMETERS

To Be Collected	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
[ ] VOCs: Trimethylpentenes	8260 B	HCL / 4 DEG. C	3 X 40 mL	[ ] VOCs
[ ] SVOCs: NDPA and BEHP	8270 C	4 DEG. C	2 X 1 L AG	[ ] SVOCs
[ ] VPH	MA VPH	HCL / 4 DEG. C	3 X 40 mL	[ ] VPH
[ ] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[ ] Dis. Fe
[ ] pH	SM 4500 H+B	4 DEG. C	1 X 500 mL	[ ] pH
[X] Ammonia-Nitrogen	10-107-06-1	H2SO4 / 4 DEG. C	1 X 250 mL	[X] Ammonia-Nitrogen
[X] Chloride	300.0	4 DEG. C	1 X 500 mL	[X] Chloride
[X] Sulfate	300.0	4 DEG. C	1 X 500 mL	[X] Sulfate
[X] Specific Conductivity	SM 2510B	4 DEG. C	1 X 500 mL	[X] Specific Conductivity
[X] Dissolved Al, Cr	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED [YES] NO

NUMBER OF GALLONS GENERATED: 4.0

NOTES

SIGNATURE:

LOCATION SKETCH

Prepared by: DLC 2/26/09

Checked by: DGK 2/26/09

MACTEC

MACTEC ENGINEERING AND CONSULTING, INC. PAGE 1 OF 1

FIELD DATA RECORD - SURFACE WATER

PROJECT: OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA | JOB NUMBER: 6107-09-0016.04 | DATE: 2/24/2009

FIELD SAMPLE NUMBER: OC-ISCO-1 | ACTIVITY TIME: START 10:00 END 10:05 | BOTTLE TIME: 10:05

QC SAMPLES COLLECTED: NA

SURFACE WATER DATA

WATER DEPTH AT LOCATION: 1.1 FT | SPEC. COND: 833 uS/cm

DEPTH OF SAMPLE FROM SURFACE: 0.2 FT | D.O.: 6.21 mg/L

TEMPERATURE: 0.94 DEG C | SALINITY: N/A %

TURBIDITY: 3.33 NTU | ORP: 99 mV

PH: 5.70 UNITS | ASSOCIATED TRIP BLANK: N/A | RINSATE BLANK: N/A

EQUIPMENT USED
- [ ] BEAKER
- [ ] PACS BOMB
- [X] PERISTALTIC PUMP
- [X] FILTER (0.45 micron)
- [X] LDPE Tubing & Silicon

TYPE OF SURFACE WATER
- [X] STREAM/ RIVER
- [ ] LAKE/ POND
- [ ] SEEP
- [ ] MARSH
- [ ] OTHER

DECON FLUIDS USED:
- [ ] DI WATER N2 PURGE
- [ ] POTABLE WATER
- [X] NONE

SEDIMENT DATA

ASSOCIATED TRIP BLANK: | RINSATE BLANK:

DEPTH OF SEDIMENT:

TYPE OF SAMPLE
- [ ] DISCRETE
- [ ] COMPOSITE

SAMPLE OBSERVATIONS
- ODOR: _____
- COLOR: _____

TYPE OF SEDIMENT:
- [ ] ORGANIC
- [ ] SAND
- [ ] GRAVEL
- [ ] CLAY
- [ ] OTHER _____

EQUIPMENT FOR COLLECTION
- [ ] HAND CORER
- [ ] S.S. SPOON
- [ ] ALUMINIUM PAN
- [ ] DREDGE
- [ ] OTHER _____

DECON FLUIDS USED
- [ ] DI WATER N2 PURGE
- [ ] POTABLE WATER
- [ ] LIQUINOX
- [ ] OTHER _____

ANALYTICAL PARAMETERS
SURFACE WATER

		METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
X	Ammonia-Nitrogen	10-107-06-1	N	H2SO4 / 4 DEG. C	1 X 250 mL	X
X	Nitrate / Nitrite	300.0	N	4 DEG. C	1 X 500 mL	X
X	Chloride	300.0	N	4 DEG. C	1 X 500 mL	X
X	Sulfate	300.0	N	4 DEG. C	1 X 500 mL	X
X	Specific Conductivity	SM 2510B	N	4 DEG. C	1 X 500 mL	X
X	Total Al, Cr, Na	Total 6010B	N	HNO3 / 4 DEG. C	1 X 500 mL	X
X	Dissolved Al, Cr, Na	Dis. 6010B	Y	HNO3 / 4 DEG. C	1 X 500 mL	X

ANALYTICAL PARAMETERS
SOIL

		METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
	% Solids / Moisture	160.3	4 DEG. C	1 X 8 oz.	
	Total Al, Cr, Fe	Total 6010B	4 DEG. C	1 X 8 oz.	

NOTES

SIGNATURE: Daron Kurkjian

Created By: DLC 2/26/09
Checked By: DGK 2/26/09

MACTEC ENGINEERING AND CONSULTING, INC. PAGE 1 OF 1

FIELD DATA RECORD - SURFACE WATER

PROJECT: OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA | JOB NUMBER: 6107-09-0016.04 | DATE: 2/24/2009

FIELD SAMPLE NUMBER: OC-ISCO-2 | ACTIVITY TIME: START 9:00 END 9:00 | BOTTLE TIME: 9:00

QC SAMPLES COLLECTED: NA

SURFACE WATER DATA

WATER DEPTH AT LOCATION: 0.4 FT
SPEC. COND: 1,030 uS/cm
DEPTH OF SAMPLE FROM SURFACE: 0.1 FT
D.O.: 9.48 mg/L
TEMPERATURE: 0.04 DEG C
SALINITY: N/A %
TURBIDITY: 4.29 NTU
ORP: 158 mV
PH: 5.54 UNITS
ASSOCIATED TRIP BLANK: N/A
RINSATE BLANK: N/A

EQUIPMENT USED
- [ ] BEAKER
- [ ] PACS BOMB
- [X] PERISTALTIC PUMP
- [X] FILTER (0.45 micron)
- [X] LDPE Tubing & Silicon

TYPE OF SURFACE WATER
- [X] STREAM/ RIVER
- [ ] LAKE/ POND
- [ ] SEEP
- [ ] MARSH
- [ ] OTHER

DECON FLUIDS USED:
- [ ] DI WATER N2 PURGE
- [ ] POTABLE WATER
- [X] NONE

SEDIMENT DATA

ASSOCIATED TRIP BLANK: | RINSATE BLANK:

DEPTH OF SEDIMENT:

TYPE OF SAMPLE
- [ ] DISCRETE
- [ ] COMPOSITE

SAMPLE OBSERVATIONS
- ODOR
- COLOR

TYPE OF SEDIMENT:
- [ ] ORGANIC
- [ ] SAND
- [ ] GRAVEL
- [ ] CLAY
- [ ] OTHER

EQUIPMENT FOR COLLECTION
- [ ] HAND CORER
- [ ] S.S. SPOON
- [ ] ALUMINIUM PAN
- [ ] DREDGE
- [ ] OTHER

DECON FLUIDS USED
- [ ] DI WATER N2 PURGE
- [ ] POTABLE WATER
- [ ] LIQUINOX
- [ ] OTHER

ANALYTICAL PARAMETERS
SURFACE WATER

		METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
X	Ammonia-Nitrogen	10-107-06-1	N	H2SO4 / 4 DEG. C	1 X 250 mL	X
X	Nitrate / Nitrite	300.0	N	4 DEG. C	1 X 500 mL	X
X	Chloride	300.0	N	4 DEG. C	1 X 500 mL	X
X	Sulfate	300.0	N	4 DEG. C	1 X 500 mL	X
X	Specific Conductivity	SM 2510B	N	4 DEG. C	1 X 500 mL	X
X	Total Al, Cr, Na	Total 6010B	N	HNO3 / 4 DEG. C	1 X 500 mL	X
X	Dissolved Al, Cr, Na	Dis. 6010B	Y	HNO3 / 4 DEG. C	1 X 500 mL	X

ANALYTICAL PARAMETERS
SOIL

		METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
	% Solids / Moisture	160.3	4 DEG. C	1 X 8 oz.	
	Total Al, Cr, Fe	Total 6010B	4 DEG. C	1 X 8 oz.	

NOTES

SIGNATURE: Daron Kurkjian

Created By: DLC 2/26/09
Checked By:DGK 2/26/09

MACTEC ENGINEERING AND CONSULTING, INC. PAGE 1 OF 1

FIELD DATA RECORD - SURFACE WATER

PROJECT: OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA | JOB NUMBER: 6107-09-0016.04 | DATE: 2/24/2009

FIELD SAMPLE NUMBER: OC-ISCO-3 | ACTIVITY TIME: START 8:35 END 8:35 | BOTTLE TIME: 8:35

QC SAMPLES COLLECTED: NA

SURFACE WATER DATA

WATER DEPTH AT LOCATION: 0.7 FT | SPEC. COND: 960 uS/cm

DEPTH OF SAMPLE FROM SURFACE: 0.1 FT | D.O.: 10.28 mg/L

TEMPERATURE: 1.15 DEG C | SALINITY: N/A %

TURBIDITY: 2.61 NTU | ORP: 75 mV

PH: 6.80 UNITS | ASSOCIATED TRIP BLANK: N/A | RINSATE BLANK: N/A

EQUIPMENT USED
- [ ] BEAKER
- [ ] PACS BOMB
- [X] PERISTALTIC PUMP
- [X] FILTER (0.45 micron)
- [X] LDPE Tubing & Silicon

TYPE OF SURFACE WATER
- [X] STREAM/ RIVER
- [ ] LAKE/ POND
- [ ] SEEP
- [ ] MARSH
- [ ] OTHER

DECON FLUIDS USED:
- [ ] DI WATER N2 PURGE
- [ ] POTABLE WATER
- [X] NONE

SEDIMENT DATA

ASSOCIATED TRIP BLANK: | RINSATE BLANK:

DEPTH OF SEDIMENT:

TYPE OF SAMPLE
- [ ] DISCRETE
- [ ] COMPOSITE

SAMPLE OBSERVATIONS
- ODOR:
- COLOR:

TYPE OF SEDIMENT:
- [ ] ORGANIC
- [ ] SAND
- [ ] GRAVEL
- [ ] CLAY
- [ ] OTHER

EQUIPMENT FOR COLLECTION
- [ ] HAND CORER
- [ ] S.S. SPOON
- [ ] ALUMINIUM PAN
- [ ] DREDGE
- [ ] OTHER

DECON FLUIDS USED
- [ ] DI WATER N2 PURGE
- [ ] POTABLE WATER
- [ ] LIQUINOX
- [ ] OTHER

ANALYTICAL PARAMETERS
SURFACE WATER

		METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
X	Ammonia-Nitrogen	10-107-06-1	N	H2SO4 / 4 DEG. C	1 X 250 mL	X
X	Nitrate / Nitrite	300.0	N	4 DEG. C	1 X 500 mL	X
X	Chloride	300.0	N	4 DEG. C	1 X 500 mL	X
X	Sulfate	300.0	N	4 DEG. C	1 X 500 mL	X
X	Specific Conductivity	SM 2510B	N	4 DEG. C	1 X 500 mL	X
X	Total Al, Cr, Na	Total 6010B	N	HNO3 / 4 DEG. C	1 X 500 mL	X
X	Dissolved Al, Cr, Na	Dis. 6010B	Y	HNO3 / 4 DEG. C	1 X 500 mL	X

ANALYTICAL PARAMETERS
SOIL

		METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
	% Solids / Moisture	160.3	4 DEG. C	1 X 8 oz.	
	Total Al, Cr, Fe	Total 6010B	4 DEG. C	1 X 8 oz.	

NOTES

SIGNATURE: Daron Kurkjian

Created By: DLC 2/26/09
Checked By: DGK 2/26/09

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - SURFACE WATER

PROJECT: OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA | JOB NUMBER: 6107-09-0016.04 | DATE: 2/24/2009

FIELD SAMPLE NUMBER: OC-PZ-16RRSW | ACTIVITY TIME: START 9:05 END 9:10 | BOTTLE TIME: 9:05

QC SAMPLES COLLECTED: NA

SURFACE WATER DATA

WATER DEPTH AT LOCATION	0.2 FT	SPEC. COND	1,180 uS/cm
DEPTH OF SAMPLE FROM SURFACE	0.1 FT	D.O.	8.77 mg/L
TEMPERATURE	0.17 DEG C	SALINITY	N/A %
TURBIDITY	11 NTU	ORP	139 mV
PH	5.51 UNITS		

ASSOCIATED TRIP BLANK: N/A | RINSATE BLANK: N/A

EQUIPMENT USED:
- [ ] BEAKER
- [ ] PACS BOMB
- [X] PERISTALTIC PUMP
- [X] FILTER (0.45 micron)
- [X] LDPE Tubing & Silicon

TYPE OF SURFACE WATER:
- [X] STREAM/ RIVER
- [ ] LAKE/ POND
- [ ] SEEP
- [ ] MARSH
- [ ] OTHER

DECON FLUIDS USED:
- [ ] DI WATER N2 PURGE
- [ ] POTABLE WATER
- [X] NONE

SEDIMENT DATA

ASSOCIATED TRIP BLANK: | RINSATE BLANK:

DEPTH OF SEDIMENT:

TYPE OF SAMPLE:
- [ ] DISCRETE
- [ ] COMPOSITE

SAMPLE OBSERVATIONS:
- ODOR
- COLOR

TYPE OF SEDIMENT:
- [ ] ORGANIC
- [ ] SAND
- [ ] GRAVEL
- [ ] CLAY
- [ ] OTHER

EQUIPMENT FOR COLLECTION:
- [ ] HAND CORER
- [ ] S.S. SPOON
- [ ] ALUMINIUM PAN
- [ ] DREDGE
- [ ] OTHER

DECON FLUIDS USED:
- [ ] DI WATER N2 PURGE
- [ ] POTABLE WATER
- [ ] LIQUINOX
- [ ] OTHER

ANALYTICAL PARAMETERS

SURFACE WATER

		METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
X	Ammonia-Nitrogen	10-107-06-1	N	H2SO4 / 4 DEG. C	1 X 250 mL	X
X	Nitrate / Nitrite	300.0	N	4 DEG. C	1 X 500 mL	X
X	Chloride	300.0	N	4 DEG. C	1 X 500 mL	X
X	Sulfate	300.0	N	4 DEG. C	1 X 500 mL	X
X	Specific Conductivity	SM 2510B	N	4 DEG. C	1 X 500 mL	X
X	Total Al, Cr, Na	Total 6010B	N	HNO3 / 4 DEG. C	1 X 500 mL	X
X	Dissolved Al, Cr, Na	Dis. 6010B	Y	HNO3 / 4 DEG. C	1 X 500 mL	X

SOIL

		METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
	% Solids / Moisture	160.3	4 DEG. C	1 X 8 oz.	
	Total Al, Cr, Fe	Total 6010B	4 DEG. C	1 X 8 oz.	

NOTES

SIGNATURE: Daron Kurkjian

Created By: DLC 2/26/09
Checked By: DGK 2/26/09

MACTEC ENGINEERING AND CONSULTING, INC. PAGE 1 OF 1

FIELD DATA RECORD - SURFACE WATER

PROJECT: OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA | JOB NUMBER: 6107-09-0016.04 | DATE: 2/24/2009

FIELD SAMPLE NUMBER: OC-PZ-17RRSW | ACTIVITY TIME: START 9:30 END 9:35 | BOTTLE TIME: 9:30

QC SAMPLES COLLECTED: NA

SURFACE WATER DATA

WATER DEPTH AT LOCATION: 0.5 FT | SPEC. COND: 1,180 uS/cm

DEPTH OF SAMPLE FROM SURFACE: 0.1 FT | D.O.: 7.76 mg/L

TEMPERATURE: 0.85 DEG C | SALINITY: N/A %

TURBIDITY: 9.06 NTU | ORP: 172 mV

PH: 5.32 UNITS | ASSOCIATED TRIP BLANK: N/A | RINSATE BLANK: N/A

EQUIPMENT USED
- [ ] BEAKER
- [ ] PACS BOMB
- [X] PERISTALTIC PUMP
- [X] FILTER (0.45 micron)
- [X] LDPE Tubing & Silicon

TYPE OF SURFACE WATER
- [X] STREAM/ RIVER
- [ ] LAKE/ POND
- [ ] SEEP
- [ ] MARSH
- [ ] OTHER

DECON FLUIDS USED:
- [ ] DI WATER N2 PURGE
- [ ] POTABLE WATER
- [X] NONE

SEDIMENT DATA

ASSOCIATED TRIP BLANK: | RINSATE BLANK:

DEPTH OF SEDIMENT:

TYPE OF SAMPLE
- [ ] DISCRETE
- [ ] COMPOSITE

SAMPLE OBSERVATIONS
- ODOR: _____
- COLOR: _____

TYPE OF SEDIMENT:
- [ ] ORGANIC
- [ ] SAND
- [ ] GRAVEL
- [ ] CLAY
- [ ] OTHER

EQUIPMENT FOR COLLECTION
- [ ] HAND CORER
- [ ] S.S. SPOON
- [ ] ALUMINIUM PAN
- [ ] DREDGE
- [ ] OTHER

DECON FLUIDS USED
- [ ] DI WATER N2 PURGE
- [ ] POTABLE WATER
- [ ] LIQUINOX
- [ ] OTHER

ANALYTICAL PARAMETERS
SURFACE WATER

		METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
X	Ammonia-Nitrogen	10-107-06-1	N	H2SO4 / 4 DEG. C	1 X 250 mL	X
X	Nitrate / Nitrite	300.0	N	4 DEG. C	1 X 500 mL	X
X	Chloride	300.0	N	4 DEG. C	1 X 500 mL	X
X	Sulfate	300.0	N	4 DEG. C	1 X 500 mL	X
X	Specific Conductivity	SM 2510B	N	4 DEG. C	1 X 500 mL	X
X	Total Al, Cr, Na	Total 6010B	N	HNO3 / 4 DEG. C	1 X 500 mL	X
X	Dissolved Al, Cr, Na	Dis. 6010B	Y	HNO3 / 4 DEG. C	1 X 500 mL	X

ANALYTICAL PARAMETERS
SOIL

		METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
	% Solids / Moisture	160.3	4 DEG. C	1 X 8 oz.	
	Total Al, Cr, Fe	Total 6010B	4 DEG. C	1 X 8 oz.	

NOTES

SIGNATURE: Daron Kurkjian

Created By: DLC 2/26/09
Checked By: DGK 2/26/09

MACTEC ENGINEERING AND CONSULTING, INC. PAGE 1 OF 1

FIELD DATA RECORD - SURFACE WATER

PROJECT: OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA | JOB NUMBER: 6107-09-0016.04 | DATE: 2/24/2009

FIELD SAMPLE NUMBER: OC-PZ-18RSW | ACTIVITY TIME: START 9:55 END 10:00 | BOTTLE TIME: 9:55

QC SAMPLES COLLECTED: NA

SURFACE WATER DATA

WATER DEPTH AT LOCATION	1.5 FT	SPEC. COND	858 uS/cm
DEPTH OF SAMPLE FROM SURFACE	0.2 FT	D.O.	5.81 mg/L
TEMPERATURE	0.96 DEG C	SALINITY	N/A %
TURBIDITY	3.33 NTU	ORP	116 mV
PH	5.90 UNITS	ASSOCIATED TRIP BLANK	N/A
RINSATE BLANK	N/A		

EQUIPMENT USED:
- [ ] BEAKER
- [ ] PACS BOMB
- [X] PERISTALTIC PUMP
- [X] FILTER (0.45 micron)
- [X] LDPE Tubing & Silicon

TYPE OF SURFACE WATER:
- [X] STREAM/ RIVER
- [ ] LAKE/ POND
- [ ] SEEP
- [ ] MARSH
- [ ] OTHER

DECON FLUIDS USED:
- [ ] DI WATER N2 PURGE
- [ ] POTABLE WATER
- [X] NONE

SEDIMENT DATA

ASSOCIATED TRIP BLANK: | RINSATE BLANK:

DEPTH OF SEDIMENT:

TYPE OF SAMPLE: [ ] DISCRETE [ ] COMPOSITE

SAMPLE OBSERVATIONS: ODOR _____ COLOR _____

TYPE OF SEDIMENT:
- [ ] ORGANIC
- [ ] SAND
- [ ] GRAVEL
- [ ] CLAY
- [ ] OTHER

EQUIPMENT FOR COLLECTION:
- [ ] HAND CORER
- [ ] S.S. SPOON
- [ ] ALUMINIUM PAN
- [ ] DREDGE
- [ ] OTHER

DECON FLUIDS USED:
- [ ] DI WATER N2 PURGE
- [ ] POTABLE WATER
- [ ] LIQUINOX
- [ ] OTHER

ANALYTICAL PARAMETERS

SURFACE WATER

		METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
X	Ammonia-Nitrogen	10-107-06-1	N	H2SO4 / 4 DEG. C	1 X 250 mL	X
X	Nitrate / Nitrite	300.0	N	4 DEG. C	1 X 500 mL	X
X	Chloride	300.0	N	4 DEG. C	1 X 500 mL	X
X	Sulfate	300.0	N	4 DEG. C	1 X 500 mL	X
X	Specific Conductivity	SM 2510B	N	4 DEG. C	1 X 500 mL	X
X	Total Al, Cr, Na	Total 6010B	N	HNO3 / 4 DEG. C	1 X 500 mL	X
X	Dissolved Al, Cr, Na	Dis. 6010B	Y	HNO3 / 4 DEG. C	1 X 500 mL	X

ANALYTICAL PARAMETERS

SOIL

		METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
	% Solids / Moisture	160.3	4 DEG. C	1 X 8 oz.	
	Total Al, Cr, Fe	Total 6010B	4 DEG. C	1 X 8 oz.	

NOTES

SIGNATURE: Daron Kurkjian

Created By: DLC 2/26/09
Checked By: DGK 2/26/09

MACTEC ENGINEERING AND CONSULTING, INC. PAGE 1 OF 1

FIELD DATA RECORD - SURFACE WATER

PROJECT: OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA | JOB NUMBER: 6107-09-0016.04 | DATE: 2/24/2009

FIELD SAMPLE NUMBER: OC-SD-17 | ACTIVITY TIME: START 9:35 END 9:40 | BOTTLE TIME: 9:40

QC SAMPLES COLLECTED: NA

SURFACE WATER DATA

WATER DEPTH AT LOCATION: 0.3 FT | SPEC. COND: 1,220 uS/cm

DEPTH OF SAMPLE FROM SURFACE: 0.1 FT | D.O.: 6.75 mg/L

TEMPERATURE: 0.99 DEG C | SALINITY: N/A %

TURBIDITY: 13.9 NTU | ORP: 163 mV

PH: 5.43 UNITS | ASSOCIATED TRIP BLANK: N/A | RINSATE BLANK: N/A

EQUIPMENT USED
- [ ] BEAKER
- [ ] PACS BOMB
- [X] PERISTALTIC PUMP
- [X] FILTER (0.45 micron)
- [X] LDPE Tubing & Silicon

TYPE OF SURFACE WATER
- [X] STREAM/ RIVER
- [ ] LAKE/ POND
- [ ] SEEP
- [ ] MARSH
- [ ] OTHER

DECON FLUIDS USED:
- [ ] DI WATER N2 PURGE
- [ ] POTABLE WATER
- [X] NONE

SEDIMENT DATA

ASSOCIATED TRIP BLANK: | RINSATE BLANK:

DEPTH OF SEDIMENT:

TYPE OF SAMPLE
- [ ] DISCRETE
- [ ] COMPOSITE

SAMPLE OBSERVATIONS
- ODOR:
- COLOR:

TYPE OF SEDIMENT:
- [ ] ORGANIC
- [ ] SAND
- [ ] GRAVEL
- [ ] CLAY
- [ ] OTHER

EQUIPMENT FOR COLLECTION
- [ ] HAND CORER
- [ ] S.S. SPOON
- [ ] ALUMINIUM PAN
- [ ] DREDGE
- [ ] OTHER

DECON FLUIDS USED
- [ ] DI WATER N2 PURGE
- [ ] POTABLE WATER
- [ ] LIQUINOX
- [ ] OTHER

ANALYTICAL PARAMETERS
SURFACE WATER

		METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
X	Ammonia-Nitrogen	10-107-06-1	N	H2SO4 / 4 DEG. C	1 X 250 mL	X
X	Nitrate / Nitrite	300.0	N	4 DEG. C	1 X 500 mL	X
X	Chloride	300.0	N	4 DEG. C	1 X 500 mL	X
X	Sulfate	300.0	N	4 DEG. C	1 X 500 mL	X
X	Specific Conductivity	SM 2510B	N	4 DEG. C	1 X 500 mL	X
X	Total Al, Cr, Na	Total 6010B	N	HNO3 / 4 DEG. C	1 X 500 mL	X
X	Dissolved Al, Cr, Na	Dis. 6010B	Y	HNO3 / 4 DEG. C	1 X 500 mL	X

ANALYTICAL PARAMETERS
SOIL

		METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED
	% Solids / Moisture	160.3	4 DEG. C	1 X 8 oz.	
	Total Al, Cr, Fe	Total 6010B	4 DEG. C	1 X 8 oz.	

NOTES

SIGNATURE: Daron Kurkjian

Created By: DLC 2/26/09
Checked By: DGK 2/26/09

MACTEC ENGINEERING AND CONSULTING

FIELD INSTRUMENTATION CALIBRATION RECORD

PROJECT: Olin Chemical Superfund Site | DATE: 2/23/2009

CREW ID OR TASK ID: First Quarter 2009 - 04 | JOB NUMBER: 6107-09-0016

SAMPLER SIGNATURE: David Chapman

EQUIPMENT CALIBRATION		CALIBRATION INFORMATION STANDARD VALUE		CALIBRATION INFORMATION METER VALUE		ACCEPTANCE CRITERIA **
HORIBA MODEL NO. U-22	pH	4.00 units		pH 4.00 units		+/- 10% of standard
UNIT ID NC MO15-04	Sp. Conductivity	4.49 mS/cm		Sp. Conductivity 4.52 mS/cm		+/- 10% of standard
	Redox	--- mV		Redox 275 mV		see note 1
	DO	--- mg/L *		DO 11.23 mg/L		+/- 10% of standard
	Thermometer Temperature	--- deg. C		Temperature 11.75 deg. C		+/- 2.0 deg. C
TURBIDITY METER TYPE Hach		<0.1 NTU		0.24 NTU		within 0.3 NTU
MODEL NO. 2100P		800 NTU		800 NTU		+/- 10% of standard
UNIT ID NO. MO24-20						
PHOTOIONIZATION						
METER TYPE	Background ppmv	Zero Air ppmv		Meter ppmv		within 5 ppmv of Zero
MODEL NO.	Span Gas ppmv			Meter ppmv		+/- 10% of standard
UNIT ID NO.						
OTHER METER TYPE						see note 2
MODEL NO.						see note 2
UNIT ID NO.						see note 2
OTHER METER TYPE						see note 2
MODEL NO.						see note 2
UNIT ID NO.						see note 2

MATERIALS RECORD	Lot Number	Calibration Fluids/	
Deionized Water Source:		Standard Source:	Auto Cal #6640
Trip Blank Water Source:		Lot Numbers pH	Auto Cal #6640
Sample Preservatives Source:		mV	Auto Cal #6640
Disposable Filter Type:		Sp. Cond.	Auto Cal #6640
Other		Turb.	Cal Set #20

NOTES:

* = Indicate in notes section what was used as the DO standard (i.e., based on saturation at room temperature)

** = If the meter reading is not within acceptance criteria, clean or replace probe and re-calibrate, or use a different meter if available. If project requirements necessitate use of the instrument, clearly document on all data sheets and log book entries that the specified parameter was not calibrated to the acceptance criteria.

1 = meter must read within specified range of the Zobell solution (usually 231 +/- 10 mv @ 25 deg C).

2 = specify acceptance criteria in the Notes section

Prepared by: DLC 2/26/09

Checkedy by: DGK 2/26/09

MACTEC ENGINEERING AND CONSULTING

FIELD INSTRUMENTATION CALIBRATION RECORD

PROJECT: Olin Chemical Superfund Site | DATE: 2/24/2009

CREW ID OR TASK ID: First Quarter 2009 - 04 | JOB NUMBER: 6107-09-0016

SAMPLER SIGNATURE: David Chapman

EQUIPMENT CALIBRATION		CALIBRATION INFORMATION STANDARD VALUE		CALIBRATION INFORMATION METER VALUE		ACCEPTANCE CRITERIA **
HORIBA MODEL NO. U-22	pH	4.00	units	3.99	units	+/- 10% of standard
UNIT ID NC MO15-03	Sp. Conductivity	4.49	mS/cm	4.51	mS/cm	+/- 10% of standard
	Redox	---	mV	220	mV	see note 1
	DO	---	mg/L *	11.93	mg/L	+/- 10% of standard
	Thermometer Temperature	---	deg. C	10.88	deg. C	+/- 2.0 deg. C
TURBIDITY METER TYPE Hach		<0.1	NTU	0.22	NTU	within 0.3 NTU
MODEL NO. 2100P		800	NTU	807	NTU	+/- 10% of standard
UNIT ID NO. MO24-18						
PHOTOIONIZATION						
METER TYPE	Background ppmv	Zero Air ppmv		Meter	ppmv	within 5 ppmv of Zero
MODEL NO.	Span Gas	ppmv		Meter	ppmv	+/- 10% of standard
UNIT ID NO.						
OTHER METER TYPE						see note 2
MODEL NO.						see note 2
UNIT ID NO.						see note 2
OTHER METER TYPE						see note 2
MODEL NO.						see note 2
UNIT ID NO.						see note 2

MATERIALS RECORD	Lot Number	Calibration Fluids/	
Deionized Water Source:		Standard Source:	Auto Cal #6640
Trip Blank Water Source:		Lot Numbers pH	Auto Cal #6640
Sample Preservatives Source:		mV	Auto Cal #6640
Disposable Filter Type:		Sp. Cond.	Auto Cal #6640
Other		Turb.	Cal Set #18

NOTES:

* = Indicate in notes section what was used as the DO standard (i.e., based on saturation at room temperature)

** = If the meter reading is not within acceptance criteria, clean or replace probe and re-calibrate, or use a different meter if available. If project requirements necessitate use of the instrument, clearly document on all data sheets and log book entries that the specified parameter was not calibrated to the acceptance criteria.

1 = meter must read within specified range of the Zobell solution (usually 231 +/- 10 mv @ 25 deg C).

2 = specify acceptance criteria in the Notes section

Prepared by: DLC 2/26/09

Checkedy by: DGK 2/26/09

MACTEC ENGINEERING AND CONSULTING

FIELD INSTRUMENTATION CALIBRATION RECORD

PROJECT: Olin Chemical Superfund Site | DATE: 2/24/2009

CREW ID OR TASK ID: First Quarter 2009 - 04 | JOB NUMBER: 6107-09-0016

SAMPLER SIGNATURE: David Chapman/

EQUIPMENT CALIBRATION		CALIBRATION INFORMATION STANDARD VALUE		METER VALUE		ACCEPTANCE CRITERIA **
HORIBA MODEL NO. U-22	pH	4.00	units	3.96	units	+/- 10% of standard
UNIT ID NC MO15-04	Sp. Conductivity	4.49	mS/cm	4.55	mS/cm	+/- 10% of standard
	Redox	---	mV	294	mV	see note 1
	DO	---	mg/L *	12.29	mg/L	+/- 10% of standard
	Thermometer Temperature	---	deg. C	6.09	deg. C	+/- 2.0 deg. C
TURBIDITY METER TYPE Hach		<0.1	NTU	0.23	NTU	within 0.3 NTU
MODEL NO. 2100P		800	NTU	802	NTU	+/- 10% of standard
UNIT ID NO. MO24-18						
PHOTOIONIZATION METER TYPE	Background ppmv	Zero Air ppmv		Meter	ppmv	within 5 ppmv of Zero
MODEL NO.	Span Gas	ppmv		Meter	ppmv	+/- 10% of standard
UNIT ID NO.						
OTHER METER TYPE						see note 2
MODEL NO.						see note 2
UNIT ID NO.						see note 2
OTHER METER TYPE						see note 2
MODEL NO.						see note 2
UNIT ID NO.						see note 2

MATERIALS RECORD	Lot Number	Calibration Fluids/	
Deionized Water Source:		Standard Source:	Auto Cal #6640
Trip Blank Water Source:		Lot Numbers pH	Auto Cal #6640
Sample Preservatives Source:		mV	Auto Cal #6640
Disposable Filter Type:		Sp. Cond.	Auto Cal #6640
Other		Turb.	Cal Set #18

NOTES:

* = Indicate in notes section what was used as the DO standard (i.e., based on saturation at room temperature)

** = If the meter reading is not within acceptance criteria, clean or replace probe and re-calibrate, or use a different meter if available. If project requirements necessitate use of the instrument, clearly document on all data sheets and log book entries that the specified parameter was not calibrated to the acceptance criteria.

1 = meter must read within specified range of the Zobell solution (usually 231 +/- 10 mv @ 25 deg C).

2 = specify acceptance criteria in the Notes section

Prepared by: DLC 2/26/09

Checkedy by: DGK 2/26/09

MACTEC ENGINEERING AND CONSULTING

FIELD INSTRUMENTATION CALIBRATION RECORD

PROJECT: Olin Chemical Superfund Site | DATE: 2/25/2009

CREW ID OR TASK ID: First Quarter 2009 - 04 | JOB NUMBER: 6107-09-0016

SAMPLER SIGNATURE: Daron Kurkjian

EQUIPMENT CALIBRATION		CALIBRATION INFORMATION STANDARD VALUE		METER VALUE		ACCEPTANCE CRITERIA **
HORIBA MODEL NO. U-22	pH	4.00 units	pH	4.00 units		+/- 10% of standard
UNIT ID NC MO15-04	Sp. Conductivity	4.49 mS/cm	Sp. Conductivity	4.56 mS/cm		+/- 10% of standard
	Redox	--- mV	Redox	250 mV		see note 1
	DO	--- mg/L *	DO	11.83 mg/L		+/- 10% of standard
	Thermometer Temperature	--- deg. C	Temperature	8.33 deg. C		+/- 2.0 deg. C
TURBIDITY METER TYPE Hach		<0.1 NTU		0.26 NTU		within 0.3 NTU
MODEL NO. 2100P		800 NTU		788 NTU		+/- 10% of standard
UNIT ID NO. MO24-20						
PHOTOIONIZATION						
METER TYPE	Background ppmv	Zero Air ppmv	Meter ppmv			within 5 ppmv of Zero
MODEL NO.	Span Gas ppmv		Meter ppmv			+/- 10% of standard
UNIT ID NO.						
OTHER METER TYPE						see note 2
MODEL NO.						see note 2
UNIT ID NO.						see note 2
OTHER METER TYPE						see note 2
MODEL NO.						see note 2
UNIT ID NO.						see note 2

MATERIALS RECORD	Lot Number	Calibration Fluids/	
Deionized Water Source:		Standard Source:	Auto Cal #6640
Trip Blank Water Source:		Lot Numbers pH	Auto Cal #6640
Sample Preservatives Source:		mV	Auto Cal #6640
Disposable Filter Type:		Sp. Cond.	Auto Cal #6640
Other		Turb.	Cal Set #20

NOTES:

* = Indicate in notes section what was used as the DO standard (i.e., based on saturation at room temperature)

** = If the meter reading is not within acceptance criteria, clean or replace probe and re-calibrate, or use a different meter if available. If project requirements necessitate use of the instrument, clearly document on all data sheets and log book entries that the specified parameter was not calibrated to the acceptance criteria.

1 = meter must read within specified range of the Zobell solution (usually 231 +/- 10 mv @ 25 deg C).

2 = specify acceptance criteria in the Notes section

Prepared by: DLC 2/26/09

Checkedy by: DGK 2/26/09

MACTEC ENGINEERING AND CONSULTING

FIELD INSTRUMENTATION CALIBRATION RECORD

PROJECT: Olin Chemical Superfund Site | DATE: 2/25/2009

CREW ID OR TASK ID: First Quarter 2009 - 04 | JOB NUMBER: 6107-09-0016

SAMPLER SIGNATURE: Daron Kurkjian

EQUIPMENT CALIBRATION		CALIBRATION INFORMATION STANDARD VALUE		CALIBRATION INFORMATION METER VALUE		ACCEPTANCE CRITERIA **
HORIBA MODEL NO. U-22	pH	4.00 units	pH	3.99 units		+/- 10% of standard
UNIT ID NC MO15-03	Sp. Conductivity	4.49 mS/cm	Sp. Conductivity	4.56 mS/cm		+/- 10% of standard
	Redox	--- mV	Redox	261 mV		see note 1
	DO	--- mg/L *	DO	12.15 mg/L		+/- 10% of standard
	Thermometer Temperature	--- deg. C	Temperature	8.86 deg. C		+/- 2.0 deg. C
TURBIDITY METER TYPE Hach		<0.1 NTU		0.20 NTU		within 0.3 NTU
MODEL NO. 2100P		800 NTU		798 NTU		+/- 10% of standard
UNIT ID NO. MO24-18						
PHOTOIONIZATION						
METER TYPE	Background ppmv	Zero Air ppmv	Meter ppmv			within 5 ppmv of Zero
MODEL NO.	Span Gas ppmv		Meter ppmv			+/- 10% of standard
UNIT ID NO.						
OTHER METER TYPE						see note 2
MODEL NO.						see note 2
UNIT ID NO.						see note 2
OTHER METER TYPE						see note 2
MODEL NO.						see note 2
UNIT ID NO.						see note 2

MATERIALS RECORD	Lot Number	Calibration Fluids/	
Deionized Water Source:		Standard Source:	Auto Cal #6640
Trip Blank Water Source:		Lot Numbers pH	Auto Cal #6640
Sample Preservatives Source:		mV	Auto Cal #6640
Disposable Filter Type:		Sp. Cond.	Auto Cal #6640
Other		Turb.	Cal Set #20

NOTES:

* = Indicate in notes section what was used as the DO standard (i.e., based on saturation at room temperature)

** = If the meter reading is not within acceptance criteria, clean or replace probe and re-calibrate, or use a different meter if available. If project requirements necessitate use of the instrument, clearly document on all data sheets and log book entries that the specified parameter was not calibrated to the acceptance criteria.

1 = meter must read within specified range of the Zobell solution (usually 231 +/- 10 mv @ 25 deg C).

2 = specify acceptance criteria in the Notes section

Prepared by: DLC 2/26/09

Checkedy by: DGK 2/26/09

APPENDIX B

Chains of Custody

Te[illegible]merica Laboratories, Inc.
Chain of Custody Form

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

•53 Sout[illegible] [illegible]pton R[illegible] [illegible]oad
Westfield, MA 01085 N. Billerica, [illegible].862
(P) 413-572-4000 (P) 978-667-1400
(F) 413-572-3707 (F) 978-667-7871

Client: Olin Chemical/MACTEC
Address: 51 Eames Street
Wilmington, MA 01887
Phone: Fax:

Project #: 6107090016 / 04
Project Manager: Peter Thompson
Work ID: ~~PCMP~~ Slurry Wall/Cap
Contact: David Chapman

Job# | Quote# | PO#

Shaded areas for office use

Analysis Requested
Check analysis and specify method and analytes in comments section.
For example:
500-series for drinking water
600-series for waste water
8000-series for haz/solid waste
Use comments section to further define.

Comments (Special Instructions)

MCP case narrative

Requested Turn Around Time
10 Business Day (Std) XX
15 Business Day
Other
Rush TAT Requested:
24 hrs 72 hrs
48 hrs 5 Day

Regulatory Classification / Special Report Format
NPDES Drinking Water DEP Form(s)
RCRA MCP GW1/S1 MWRA Smart Rpt
Other MCP QA/QC Rpt XX

Sample Type Codes
WW-Wastewater DW-Drinking water SW-Surfacewater
LW-Labwater GW-Groundwater A-Air
S-Solid / Soil SL-Sludge O-Oil Z-Other

Sample ID	Sample Type	Sampler's Initials	Date / Time Collected	Grab	Comp.	# Containers	Plastic(P) or Glass(G)	NaHSO4/MeOH	HNO3 to pH <2	H2SO4 to pH <2	HCl to pH <2	NaOH to pH >12	NAOH/ZNAC	None / 4° C	Ammonia-Nitrogen	Chloride, Sulfate	Specific Condutivity	Nitrate, Nitrite	Groundwater metals	Surfacewater metals	Sediment: Al/Cr/Fe	Other	Other	Other	Other	Other	Other
OC-ISCO-3	SW	DLC DGK	2-24-09 8:35	X		4	P		X	X				X	X	X	X	X		X							
OC-ISCO-2	SW	DLC DGK	2-24-09 9:00	X		4	P		X	X				X	X	X	X	X		X							
OC-PZ-16RRSW	SW	DLC DGK	2-24-09 9:05	X		4	P		X	X				X	X	X	X	X		X							
OC-PZ-17RRSW	SW	DLC DGK	2-24-09 9:30	X		4	P		X	X				X	X	X	X	X		X							
OC-~~PZ~~ SD-17	SW	DLC DGK	2-24-09 9:40	X		4	P		X	X				X	X	X	X	X		X							
OC-PZ-18RSW	SW	DLC DGK	2-24-09 9:55	X		4	P		X	X				X	X	X	X	X		X							
OC-ISCO-1	SW	DLC DGK	2-24-09 10:05	X		4	P		X	X				X	X	X	X	X		X							
OC-GW-25	GW	DLC	2-24-09 13:30	X		3	P		X	X				X	X	X	X		X								

Dissolved metals are field filtered.

Groundwater Metals: Dissolved Al/Cr

Surfacewater Metals: Dissolved/Total Al/Cr/Na

Sampled by (print): David Chapman / Doran Kurkian
Signature: [signature]

Relinquished by:	Date:	Time:	Received by:	Date:	Time:
David Chapman	2-24-09	14	[signature]	2/24/09	14:00
Relinquished by:	Date:	Time:	Received by:	Date:	Time:

Method of shipment:

TestAmerica-Westfield

Cooler ? Y / N Samples Iced? Y / N
Temp @ receipt: _____ °C
Preservation/pH checked
By: _____ Date: _____

Page 1 of 1

White = Lab file Yellow = Report copy Pink = Customer copy
STL-8245 (1000)

TestAmerica Laboratories, Inc.

Chain of Custody Form

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Westfield, MA 01085
(P) 413-572-4000
(F) 413-572-3707

149 Rangeway Road
N. Billerica, MA 01862
(P) 978-667-1400
(F) 978-667-7871

Client: Olin Chemical/MACTEC
Address: 51 Eames Street
Wilmington, MA 01887
Phone: Fax:

Project #: 61070900016 / 04
Project Manager: Peter Thompson
Work ID: Plant B
Contact: David Chapman

Job# | Quote# | PO#

Requested Turn Around Time

10 Business Day (Std) XX | Rush TAT Requested:
15 Business Day ____ | 24 hrs ____ 72 hrs ____
Other ____ | 48 hrs ____ 5 Day ____

Regulatory Classification / Special Report Format

NPDES ____ Drinking Water ____ DEP Form(s) ____
RCRA ____ MCP GW1/S1 ____ MWRA Smart Rpt ____
Other ____ MCP QA/QC Rpt XX

Shaded areas for office use

Analysis Requested

Check analysis and specify method and analytes in comments section.
For example:
500-series for drinking water
600-series for waste water
8000-series for haz/solid waste
Use comments section to further define.

Comments
(Special Instructions)

MCP case narrative

Sample Type Codes
WW-Wastewater DW-Drinking water SW-Surfacewater
LW-Labwater GW-Groundwater A-Air
S-Solid / Soil SL-Sludge O-Oil Z-Other

Sample ID	Sample Type	Sampler's Initials	Date Time Collected	Grab	Comp.	# Containers	Plastic(P) or Glass(G)	Preservative: NaHSO4/MeOH	HNO3 to pH <2	H2SO4 to pH <2	HCl to pH <2	NaOH to pH >12	NAOH/ZNAC	None / 4° C	8260	VPH	8270	Ammonia	Iron by 6010	pH	Other	Other	Other	Other	Other	Other	Other
OC-GW-16B	GW	DGC	3-24-09 13:25	X		12	V G		1	1	7			3	X	X	X	X	X	X							

8260 Compounds Only:
2,4,4 Trimethyl-1-pentene
2,4,4 Trimethyl-2-pentene

8270 Comounds Only:
NDPA
BEHP

Sampled by (print): Doron Kurkjian
Signature: Doron Kurkjian

Relinquished by: David Chapman Date: 3-24-09 Time: 14:
Received by: Date: 3/24/09 Time: 1440

Relinquished by: Date: Time:
Received by: Date: Time:

Method of shipment:

TestAmerica-Westfield

Cooler ? Y / N Samples Iced? Y / N

Temp @ receipt: ____ °C

Preservation/pH checked

By: ____ Date: ____

White = Lab file Yellow = Report copy Pink = Customer copy
STL-8245 (1000)

TestAmerica Laboratories, Inc.

Chain of Custody Form

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

•53 Southampton Road
Westfield, MA 01085
(P) 413-572-4000
(F) 413-572-3707

•149 Rangeway Rd
N. Billerica, MA 01862
(P) 978-667-1400
(F) 978-667-7871

Client: Olin Chemical/MACTEC
Address: 51 Eames Street
Wilmington, MA 01887
Phone: Fax:

Project #: 61079001G/04
Project Manager: PETER THOMPSON
Work ID: ~~PCMP~~ Slurry Wall/Cap
Contact: David Chapman

Job# | Quote# | PO#

Requested Turn Around Time
10 Business Day (Std) XX
15 Business Day
Other
Rush TAT Requested: 24 hrs ___ 48 hrs ___ 72 hrs ___ 5 Day ___

Regulatory Classification / Special Report Format
NPDES ___ Drinking Water ___ DEP Form(s) ___
RCRA ___ MCP GW1/S1 ___ MWRA Smart Rpt ___
Other ___ MCP QA/QC Rpt XX

Shaded areas for office use

Analysis Requested
Check analysis and specify method and analytes in comments section.
For example:
500-series for drinking water
600-series for waste water
8000-series for haz/solid waste
Use comments section to further define.

Comments
(Special Instructions)

MCP case narrative

DO NOT RUN NITRATE

Dissolved metals are field filtered.

Groundwater Metals: Dissolved Al/Cr

Surfacewater Metals: Dissolved/Total Al/Cr/Na

Sample Type Codes
WW-Wastewater DW-Drinking water SW-Surfacewater
LW-Labwater GW-Groundwater A-Air
S-Solid / Soil SL-Sludge O-Oil Z-Other

Sample ID	Sample Type	Sampler's Initials	Date Time Collected	Grab	Comp.	# Containers	Plastic(P) or Glass(G)	Preservative: NaHSO4/MeOH	HNO3 to pH <2	H2SO4 to pH <2	HCl to pH <2	NaOH to pH >12	NAOH/ZNAC	None / 4° C	Ammonia-Nitrogen	Chloride, Sulfate	Specific Conductivity	Nitrate, Nitrite DNL	Groundwater metals	Surfacewater metals	Sediment: Al/Cr/Fe	Other	Other	Other	Other	Other	Other
OC-GW-202S	GW	DLC DLH	2/25/09 0910	X		3	P	X	X					X	X	X	X	X	X							
OC-PZ-18R		DLC DLH	2/25/09 1030	X		3	P	X	X					X	X	X	X		X							
OC-GW-79S		DLC DLH	2/25/09 11:40	X		3	P	X	X					X	X	X	X		X							
OC-PZ-17RR		DLC DLH	2/25/09 1030	X		3	P	X	X					X	X	X	X		X							
OC-GW-202D		DLC DLH	2/25/09 9:15	X		3	P	X	X					X	X	X	X		X							
OC-GW-78S		DLC DLH	2/25/09 11:55	X		3	P	X	X					X	X	X	X		X							

2/25/09

Sampled by (print): DARON KURKJIAN/DAVID CHAPMAN
Signature:

Relinquished by: David Chapman Date: 2/26/09 Time: 1245
Received by: Date: 2/26/09 Time: 1245

Relinquished by: Date: Time:
Received by: Date: Time:

Method of shipment:

TestAmerica-Westfield

Cooler ? Y / N Samples Iced? Y / N
Temp @ receipt: ___ °C
Preservation/pH checked
By: ___ Date: ___

White = Lab file Yellow = Report copy Pink = Customer copy
STL-8245 (1000)

APPENDIX C

First Quarter 2009
Temporary Cap Inspection Photo Log

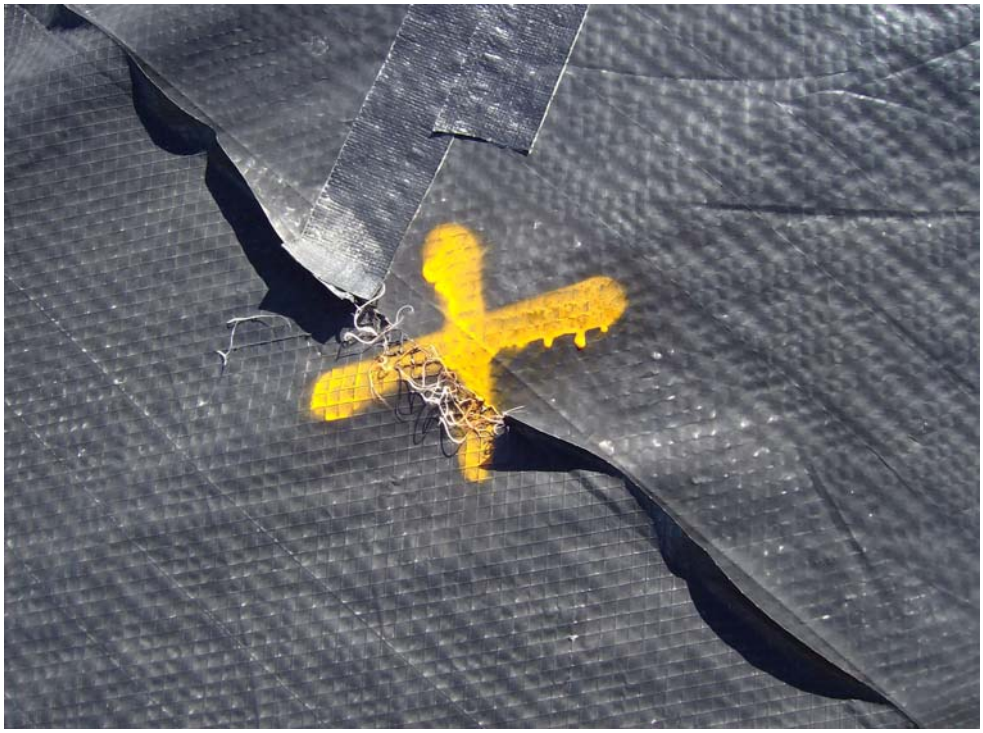

Photo 1: Minor Seam Damage

Photo 2: Degrading Sandbags

Photo 3: New UV Resistant Sandbag

Photo 4: Small Area of Pooling Water

APPENDIX B

Data Validation Memorandum

B-1 Fourth Quarter 2008 Sampling Event
B-2 First Quarter 2009 Sampling Event

APPENDIX B

Data Validation Memorandum

B-1 Fourth Quarter 2008 Sampling Event

MACTEC

Engineering and Consulting, Inc.
511 Congress Street
P.O. Box 7050
Portland, Maine 04112-7050
Telephone: 207/775-5401
Fax: 207/772-4762
Home Page: www.mactec.com

FILE COPY

To: Steve Morrow
From: Chris Ricardi
Date: February 25, 2009
Subject:: Interim Response Steps Work Plan Slurry Wall/Cap Monitoring Program 4Q08– November 2008

DATA VALIDATION REPORT
NOVEMBER 2008 SW/C SURFACE WATER, GROUNDWATER AND SEDIMENT
OLIN CHEMICAL SUPERFUND SITE
WILMINGTON, MASSACHUSETTS
TestAmerica Laboratories Data Sets 360-19938, 360-20017, and 360-20018

1.0 INTRODUCTION

Surface water, groundwater, and sediment samples were collected from the Olin Chemical Superfund Site on November 17 to 21, 2008. Samples were analyzed by TestAmerica Laboratories in Westfield, Massachusetts. Data were reported in sample delivery groups (SDGs) 360-19938, 360-20017, and 360-20018. A summary of samples included in this review is contained in Table 1. Samples reviewed in this report were analyzed for the following USEPA SW-846 (USEPA, 1996), USEPA wastewater (USEPA, 1993), or Standard Methods (APHA, 1995):

- dissolved and total metals (aluminum, chromium, and sodium) by USEPA Method 6010B in surface water;
- dissolved metals (aluminum and chromium) by USEPA Method 6010B in groundwater;
- general chemistry analyses for ammonia by Method 350.1 (Lachat 10-107-06-1), chloride, sulfate, nitrate, and nitrite by Method 300, and specific conductance by SM18 SM 2510B; and
- metals (aluminum, chromium, and iron) by USEPA Method 6010B in sediment.

The Draft Interim Response Steps Work Plan (MACTEC, 2007) and the MADEP Compendium of Quality Assurance and Quality Control Requirements and Performance Standards for Selected Analytical Methods Used in Support of Response Actions for the Massachusetts Contingency Plan (MCP) [MADEP, 2004] were used as a reference during the review. Analytical packages were reviewed using the Level 1 Data Quality Evaluation checklists that were developed for the Olin Wilmington annual and quarterly groundwater monitoring tasks. Final sample results are presented on data summaries in Table 2.

The laboratory sample receiving report for SDG 360-19938 indicates that a surface water duplicate sample was submitted with a sample ID on the label of ISCO-1 Dup. The Chain of Custody identified the sample as PZ-18R DUP. The final sample result is reported as PZ-18R DUP.

2.0 METALS

Data were reviewed for the following parameters:

* Data Completeness
* Holding Time
  Blanks
  Matrix Spike Analysis
* Laboratory Duplicate Analysis
* Field Duplicate Results
* Laboratory Control Sample
* Detection limits
  Sample Result Verification/Electronic Evaluation Verification

* = indicates that criteria were met for this parameter

Blanks

Chromium (0.44 µg/L) was reported in the method blank associated with surface water sample OC-ISCO-3. Action levels were calculated at five times the blank concentration and compared to sample data. The low concentration detection of dissolved chromium in sample OC-ISCO-3 qualified as non-detected (U).

Aluminum (3.8 µg/L) was reported in the method blank associated with groundwater samples in SDGs 360-20017 and 360-20018 analyzed in analysis batch 360-39051. An action level (19 µg/L) was calculated at five times the blank concentration and compared to sample data. The following samples had detections of dissolved aluminum below the action level and were qualified as non-detected (U) at the reporting limit of 100 µg/L:

SDG	Lab Sample ID	Sample ID	Analyte	Final Concentration (µg/L)	Final Qualifier	Lab Concentration (µg/L)	Lab Qualifier
360-20017	360-20017-13	OC-GW-34SR	Aluminum	100	U	3.3	J B
360-20017	360-20017-14	OC-GW-202S	Aluminum	100	U	6.3	J B
360-20017	360-20017-15	OC-GW-202S DUP	Aluminum	100	U	3	J B
360-20017	360-20017-16	OC-GW-34D	Aluminum	100	U	6.3	J B
360-20017	360-20017-17	OC-GW-34D DUP	Aluminum	100	U	15	J B
360-20017	360-20017-18	OC-GW-201S	Aluminum	100	U	3.7	J B
360-20018	360-20018-7	OC-GW-24	Aluminum	100	U	4.6	J B

The laboratory qualified sample results with a (B) when the analyte was detected in the sample and associated method blank. When the sample concentration was greater than five times the concentration reported in the blank, the (B) qualifier was removed from the final data set.

Matrix Spikes

A matrix spike (MS) and matrix spike duplicate (MSD) was performed on sediment sample OC-SD-SD3. The percent recovery for chromium (71) in the MS was below the lower control limit of 75. The percent recovery of chromium in the MSD (82) was within control limits. Chromium was qualified estimated (J) in the following sediment samples in SDG 360-20018:

lab_sample_id	field_sample_id	param_name	final_result (mg/kg dry)	final_qualifier
360-20018-1	OC-SD-SD1	Chromium	29	J
360-20018-2	OC-SD-SD2	Chromium	620	J
360-20018-3	OC-SD-SD3	Chromium	130	J
360-20018-4	OC-SD-SD4	Chromium	26	J
360-20018-5	OC-SD-SD5	Chromium	340	J

Sample Result Verification

The sodium concentrations reported in dissolved samples were more than ten percent greater than the concentrations reported in the total fractions for the following surface water samples: OC-ISCO-2, OC-ISCO-3, OC-SD-17, and OC-PZ-18R. Sodium results were qualified estimated (J) in the total and dissolved fractions for these samples.

3.0 GENERAL CHEMISTRY – Ammonia, Chloride, Sulfate, Nitrate, Nitrite, and Specific Conductance

Data were reviewed for the following parameters:

* Data Completeness
* Holding Time
* Blanks
  Matrix Spike Analysis
* Laboratory Duplicate Analysis
  Field Duplicate Analysis
* Laboratory Control Sample
* Detection limits
* Sample Result Verification/Electronic Evaluation Verification

* = indicates that criteria were met for this parameter

Matrix Spike Results

An MS/MSD analysis was completed using sample OC-PZ-18R. Recovery of ammonia (67%) in the MSD was less than the project limits of 75-125 percent. Results for ammonia in all samples in data set 360-19938 were qualified as estimated (J) in the final data.

Field Duplicates

A field duplicate sample was submitted with groundwater sample OC-GW-202S. The relative percent difference (35) between the ammonia results for the field sample (120 mg/L) and field duplicate (84 mg/L) was above the control limit of 30. Ammonia results were qualified estimated (J) in sample OC-GW-202S and OC-GW-202S DUP.

Except for the validation actions noted above, the results are interpreted to be usable as reported by TestAmerica.

Chris Ricardi

February 25, 2009

Chris Ricardi, NRCC-EAC
Senior Chemist

Date

Michael Murphy

2/25/09

Michael Murphy
Project Principal

Date

Reference:

American Public Health Association (APHA), 1995. "Standard Methods for Examination of Water and Wastewater"; 19th Edition; APHA, 1015 Fifteenth St., NW., Washington, D.C. 20005.

MACTEC Engineering and Consulting, Inc. (MACTEC), July 25, 2007. "Draft Interim Response Steps Work Plan"; Olin Chemical Superfund Site, 51 Eames Street, Wilmington, Massachusetts.; Project No. 6300-06-0010/41.1.

Massachusetts Department of Environmental Protection (MADEP), May, 2004. "The Compendium of Quality Assurance and Quality Control Requirements and Performance Standards for Selected Analytical Methods Used in Support of Response Actions for the Massachusetts Contingency Plan (MCP)"; Bureau of Waste Site Cleanup; 1 Winter Street, Boston, Massachusetts 02108; WSC-CAM.

U.S. Environmental Protection Agency (USEPA), 1993. "Methods for Chemical Analysis and Water and Wastes (MCAWW)", EPA/600/4-79-020 (March 1983) with updates and supplements EPA/600/4-91-010 (June 1991), EPA/600/R-92-129 (August 1992) and EPA/600/R-93-100 (August 1993).

USEPA, December, 1996. "Test Methods for Evaluating Solid Waste"; Laboratory Manual Physical/Chemical Methods; Office of Solid Waste and Emergency Response; Washington, DC; SW-846; November 1986; Revision 4 -December, 1996.

MACTEC
Engineering and Consulting, Inc.
511 Congress Street
P.O. Box 7050
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Telephone: 207/775-5401
Fax: 207/772-4762
Home Page: www.mactec.com

Table 1 - NOVEMBER 2008 SLURRY WALL/CAP MONITORING PROGRAM

				SW846 6010B Total	SW846 6010B Filtered	E350.1 (QuickChem 10-107-06-1-K)	SM 2510B	40CFR136A 300.0	E160.3
Lab Sample ID	Location	Sample ID	Sample Date						
Groundwater									
360-19938-8	GW-42S	OC-GW-42S	11/17/2008		2	1	1	2	
360-20018-6	GW-10S	OC-GW-10S	11/19/2008		2	1	1	2	
360-20018-7	GW-24	OC-GW-24	11/19/2008		2	1	1	2	
360-20018-8	GW-39	OC-GW-39	11/19/2008		2	1	1	2	
360-20017-1	GW-26	OC-GW-26	11/19/2008		2	1	1	2	
360-20017-2	GW-76S	OC-GW-76S	11/19/2008		2	1	1	2	
360-20017-3	GW-25	OC-GW-25	11/19/2008		2	1	1	2	
360-20017-4	PZ-16RR	OC-PZ-16RR	11/20/2008		2	1	1	2	
360-20017-5	GW-78S	OC-GW-78S	11/20/2008		2	1	1	2	
360-20017-6	GW-55S	OC-GW-55S	11/20/2008		2	1	1	2	
360-20017-7	GW-35S	OC-GW-35S	11/20/2008		2	1	1	2	
360-20017-8	GW-79S	OC-GW-79S	11/20/2008		2	1	1	2	
360-20017-9	PZ-17RR	OC-PZ-17RR	11/20/2008		2	1	1	2	
360-20017-10	PZ-18R	OC-PZ-18R	11/20/2008		2	1	1	2	
360-20017-11	GW-CA1	OC-GW-CA1	11/20/2008		2	1	1	2	
360-20017-12	GW-202D	OC-GW-202D	11/21/2008		2	1	1	2	
360-20017-13	GW-34SR	OC-GW-34SR	11/21/2008		2	1	1	2	
360-20017-14	GW-202S	OC-GW-202S	11/21/2008		2	1	1	2	
360-20017-15	GW-202S	OC-GW-202S DUP	11/21/2008		2	1	1	2	
360-20017-16	GW-34D	OC-GW-34D	11/21/2008		2	1	1	2	
360-20017-17	GW-34D	OC-GW-34D DUP	11/21/2008		2	1	1	2	
360-20017-18	GW-201S	OC-GW-201S	11/21/2008		2	1	1	2	

				SW846 6010B Total	SW846 6010B Filtered	E350.1 (QuickChem 10-107-06-1-K)	SM 2510B	40CFR136A 300.0	E160.3
Lab Sample ID	**Location**	**Sample ID**	**Sample Date**						
Surface Water									
360-19938-1	ISCO3	OC-ISCO-3	11/18/2008	3	3	1	1	4	
360-19938-2	ISCO2	OC-ISCO-2	11/18/2008	3	3	1	1	4	
360-19938-3	PZ-16RR	OC-PZ-16RR	11/18/2008	3	3	1	1	4	
360-19938-4	PZ-17RR	OC-PZ-17RR	11/18/2008	3	3	1	1	4	
360-19938-5	SD-17	OC-SD-17	11/18/2008	3	3	1	1	4	
360-19938-6	PZ-18R	OC-PZ-18R	11/18/2008	3	3	1	1	4	
360-19938-7	ISCO1	OC-ISCO-1	11/18/2008	3	3	1	1	4	
Sediment									
360-20018-1	SD-SD-1	OC-SD-SD1	11/18/2008	3					2
360-20018-2	SD-SD-2	OC-SD-SD2	11/18/2008	3					2
360-20018-3	SD-SD-3	OC-SD-SD3	11/18/2008	3					2
360-20018-4	SD-SD-4	OC-SD-SD4	11/18/2008	3					2
360-20018-5	SD-SD-5	OC-SD-SD5	11/18/2008	3					2

Notes:
Number listed under method indicates number of target analytes reported.

Prepared by/Date: KJC 12/12/08
Checked by/Date: TLC 2/2/09

Table 2
Final Results Summary - 360-19938 & 360-20017 & 360-20018
November 2008 Slurry Wall / Cap Groundwater, Surface Water and Sediment
Olin Chemical Superfund Site
Wilmington, Massachusetts

			Loc Name	GW-10S		GW-201S		GW-202D		GW-202S		GW-202S	
			Field Sample Id	OC-GW-10S		OC-GW-201S		OC-GW-202D		OC-GW-202S		OC-GW-202S DUP	
			Field Sample Date	11/19/08		11/21/08		11/21/08		11/21/08		11/21/08	
			QC Code	FS		FS		FS		FS		FD	
			Lab Sample Delivery Group	360-20018-1		360-20017-1		360-20017-1		360-20017-1		360-20017-1	
Frac	Method	Analyte	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
F	SW846 6010	Aluminum	ug/l	3800		100 U		8800		100 U		100 U	
F	SW846 6010	Chromium	ug/l	5 U		12		540		3.7 J		3.7 J	
N	EPA 300.0A	Chloride	mg/l	35		69		290		62		62	
N	EPA 300.0A	Sulfate	mg/l	120		1300		1900		570		560	
N	LACH_107_06_1_B	Nitrogen, as Ammonia	mg/l	8.8		160		300		120 J		84 J	
N	SM2510B	LAB SPECIFIC CONDUCTANCE	umhos/cm	410		2900		4600		1600		1600	

Table 2
Final Results Summary - 360-19938 & 360-20017 & 360-20018
November 2008 Slurry Wall / Cap Groundwater, Surface Water and Sediment
Olin Chemical Superfund Site
Wilmington, Massachusetts

			Loc Name	GW-24		GW-25		GW-26		GW-34D		GW-34D	
			Field Sample Id	OC-GW-24		OC-GW-25		OC-GW-26		OC-GW-34D		OC-GW-34D DUP	
			Field Sample Date	11/19/08		11/19/08		11/19/08		11/21/08		11/21/08	
			QC Code	FS		FS		FS		FS		FD	
			Lab Sample Delivery Group	360-20018-1		360-20017-1		360-20017-1		360-20017-1		360-20017-1	
Frac	Method	Analyte	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
F	SW846 6010	Aluminum	ug/l	100 U		4.8 J		100 U		100 U		100 U	
F	SW846 6010	Chromium	ug/l	5 U		3.4 J		7		14		14	
N	EPA 300.0A	Chloride	mg/l	8		64		82		7.4		7.5	
N	EPA 300.0A	Sulfate	mg/l	71		170		82		36		35	
N	LACH_107_06_1_B	Nitrogen, as Ammonia	mg/l	52		60		42		15		15	
N	SM2510B	LAB SPECIFIC CONDUCTANCE	umhos/cm	400		800		620		210		200	

Table 2
Final Results Summary - 360-19938 & 360-20017 & 360-20018
November 2008 Slurry Wall / Cap Groundwater, Surface Water and Sediment
Olin Chemical Superfund Site
Wilmington, Massachusetts

			Loc Name	GW-34SR		GW-35S		GW-39		GW-42S		GW-55S	
			Field Sample Id	OC-GW-34SR		OC-GW-35S		OC-GW-39		OC-GW-42S		OC-GW-55S	
			Field Sample Date	11/21/08		11/20/08		11/19/08		11/17/08		11/20/08	
			QC Code	FS		FS		FS		FS		FS	
			Lab Sample Delivery Group	360-20017-1		360-20017-1		360-20018-1		360-19938-1		360-20017-1	
Frac	Method	Analyte	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
F	SW846 6010	Aluminum	ug/l	100 U		29 J		130		410		540	
F	SW846 6010	Chromium	ug/l	5 U		18		5 U		8.5		1.9 J	
N	EPA 300.0A	Chloride	mg/l	1.7		5.8		28		61		19	
N	EPA 300.0A	Sulfate	mg/l	9.1		480		310		9.3		1400	
N	LACH_107_06_1_B	Nitrogen, as Ammonia	mg/l	0.34		14		0.15		0.38 J		270	
N	SM2510B	LAB SPECIFIC CONDUCTANCE	umhos/cm	89		1100		730		320		3600	

Table 2
Final Results Summary - 360-19938 & 360-20017 & 360-20018
November 2008 Slurry Wall / Cap Groundwater, Surface Water and Sediment
Olin Chemical Superfund Site
Wilmington, Massachusetts

			Loc Name	GW-76S		GW-78S		GW-79S		GW-CA1		PZ-16RR	
			Field Sample Id	OC-GW-76S		OC-GW-78S		OC-GW-79S		OC-GW-CA1		OC-PZ-16RR	
			Field Sample Date	11/19/08		11/20/08		11/20/08		11/20/08		11/20/08	
			QC Code	FS		FS		FS		FS		FS	
			Lab Sample Delivery Group	360-20017-1		360-20017-1		360-20017-1		360-20017-1		360-20017-1	
Frac	Method	Analyte	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
F	SW846 6010	Aluminum	ug/l	8.3 J		12 J		15 J		20 J		2.4 J	
F	SW846 6010	Chromium	ug/l	2.2 J		6.7		12		4.1 J		6.7	
N	EPA 300.0A	Chloride	mg/l	5.3		25		130		7.3		170	
N	EPA 300.0A	Sulfate	mg/l	61		550		1100		110		780	
N	LACH_107_06_1_B	Nitrogen, as Ammonia	mg/l	12		74		170		3.1		290	
N	SM2510B	LAB SPECIFIC CONDUCTANCE	umhos/cm	220		1300		2800		660		2800	

Table 2
Final Results Summary - 360-19938 & 360-20017 & 360-20018
November 2008 Slurry Wall / Cap Groundwater, Surface Water and Sediment
Olin Chemical Superfund Site
Wilmington, Massachusetts

			Loc Name	PZ-17RR		PZ-18R	
			Field Sample Id	OC-PZ-17RR		OC-PZ-18R	
			Field Sample Date	11/20/08		11/20/08	
			QC Code	FS		FS	
			Lab Sample Delivery Group	360-20017-1		360-20017-1	
Frac	Method	Analyte	Units	Result	Qual	Result	Qual
F	SW846 6010	Aluminum	ug/l	100	U	4.9	J
F	SW846 6010	Chromium	ug/l	2	J	17	
N	EPA 300.0A	Chloride	mg/l	20		100	
N	EPA 300.0A	Sulfate	mg/l	530		180	
N	LACH_107_06_1_B	Nitrogen, as Ammonia	mg/l	82		65	
N	SM2510B	LAB SPECIFIC CONDUCTANCE	umhos/cm	1400		930	

Table 2
Final Results Summary - 360-19938 & 360-20017 & 360-20018
November 2008 Slurry Wall / Cap Groundwater, Surface Water and Sediment
Olin Chemical Superfund Site
Wilmington, Massachusetts

			Loc Name	ISCO1		ISCO2		ISCO3		PZ-16RR		PZ-17RR	
			Field Sample Id	OC-ISCO-1		OC-ISCO-2		OC-ISCO-3		OC-PZ-16RR		OC-PZ-17RR	
			Field Sample Date	11/18/08		11/18/08		11/18/08		11/18/08		11/18/08	
			QC Code	FS		FS		FS		FS		FS	
			Lab Sample Delivery Group	360-19938-1		360-19938-1		360-19938-1		360-19938-1		360-19938-1	
Frac	Method	Analyte	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
F	SW846 6010	Aluminum	ug/l	54	J	430		39	J	1900		4200	
F	SW846 6010	Chromium	ug/l	9.1		130		5	U	530		1000	
F	SW846 6010	Sodium	ug/l	81000		160000	J	67000	J	170000		190000	
N	E300	Chloride	mg/l	89		140		120		150		180	
N	E300	Nitrate as N	mg/l	0.05	U	0.83		0.96		0.6		0.36	
N	E300	Nitrite as N	mg/l	0.01	U	0.01	U	0.01	U	0.01	U	0.1	U
N	E300	Sulfate	mg/l	170		610		43		630		700	
N	LACH_107_06_1_B	Nitrogen, as Ammonia	mg/l	46	J	120	J	3.1	J	120	J	150	J
N	SM2510B	LAB SPECIFIC CONDUCTANCE	umhos/cm	820		1900		610		2000		2200	
T	SW846 6010	Aluminum	ug/l	260		1100		1800		3500		8300	
T	SW846 6010	Chromium	ug/l	44		250		210		860		2000	
T	SW846 6010	Sodium	ug/l	75000		130000	J	54000	J	160000		180000	

Table 2
Final Results Summary - 360-19938 & 360-20017 & 360-20018
November 2008 Slurry Wall / Cap Groundwater, Surface Water and Sediment
Olin Chemical Superfund Site
Wilmington, Massachusetts

			Loc Name	PZ-18R		SD-17	
			Field Sample Id	OC-PZ-18R		OC-SD-17	
			Field Sample Date	11/18/08		11/18/08	
			QC Code	FS		FS	
			Lab Sample Delivery Group	360-19938-1		360-19938-1	
Frac	Method	Analyte	Units	Result	Qual	Result	Qual
F	SW846 6010	Aluminum	ug/l	49	J	4600	
F	SW846 6010	Chromium	ug/l	8.3		1100	
F	SW846 6010	Sodium	ug/l	80000	J	190000	J
N	E300	Chloride	mg/l	91		180	
N	E300	Nitrate as N	mg/l	0.05		0.37	
N	E300	Nitrite as N	mg/l	0.01	U	0.1	U
N	E300	Sulfate	mg/l	180		710	
N	LACH_107_06_1_B	Nitrogen, as Ammonia	mg/l	42	J	150	J
N	SM2510B	LAB SPECIFIC CONDUCTANCE	umhos/cm	830		2200	
T	SW846 6010	Aluminum	ug/l	260		8200	
T	SW846 6010	Chromium	ug/l	45		2000	
T	SW846 6010	Sodium	ug/l	72000	J	170000	J

Table 2
Final Results Summary - 360-19938 & 360-20017 & 360-20018
November 2008 Slurry Wall / Cap Groundwater, Surface Water and Sediment
Olin Chemical Superfund Site
Wilmington, Massachusetts

			Loc Name	SD-SD1		SD-SD2		SD-SD3		SD-SD4		SD-SD5	
			Field Sample Id	OC-SD-SD1		OC-SD-SD2		OC-SD-SD3		OC-SD-SD4		OC-SD-SD5	
			Field Sample Date	11/19/08		11/19/08		11/19/08		11/19/08		11/19/08	
			QC Code	FS		FS		FS		FS		FS	
			Lab Sample Delivery Group	360-20018-1		360-20018-1		360-20018-1		360-20018-1		360-20018-1	
Frac	Method	Analyte	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
N	EPA 160.3	Percent Moisture	percent	43		56		30		38		33	
N	EPA 160.3	Percent Solids	percent	57		44		70		62		67	
T	SW846 6010	Aluminum	mg/kg	11000		15000		9200		10000		11000	
T	SW846 6010	Chromium	mg/kg	29	J	620	J	130	J	26	J	340	J
T	SW846 6010	Iron	mg/kg	14000		23000		12000		14000		14000	

Prepared by / Date: KJC 02/03/09
Checked by / Date: TLC 02/03/09

Notes:
N = normal
T = total (unfiltered)
F = filtered
FS = field sample
FD = field duplicate
U = not detected, value is the detection limit
J = value is estimated

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

FILE COPY

ANALYTICAL REPORT

Job Number: 360-19938-1

Job Description: Slurry Wall/Slurry Cap

For:
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Attention: Mr. Steven Morrow

CHECKED FOR COMPLETENESS OF PARAMETERS ORDERED BY:
Chr Ricardi
12/15/08

Joseph A. Chimi

Approved for release.
Joe Chimi
Report Production Representative
12/1/08 11:21 AM

Designee for
Becky C Mason
Project Manager II
becky.mason@testamericainc.com
12/01/2008

The test results in this report meet all NELAP requirements for accredited parameters. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced except in full, and with written approval from the laboratory.
TestAmerica Westfield Certifications and Approvals: MADEP MA014, RIDOH57, CTDPH 0494, VT DECWSD, NH DES 2539, NELAP FL E87912 TOX, NELAP NJ MA008 TOX, NELAP NY 10843, NY DOH 10843.

Field sampling is performed under SOPs WE-FLD-001 and WE-FLD-002

TestAmerica Laboratories, Inc.
TestAmerica Westfield Westfield Executive Park, 53 Southampton Road, Westfield, MA 01085
Tel (413) 572-4000 Fax (413) 572-3707 www.testamericainc.com

ACCREDITED IN ACCORDANCE WITH nelac

Table of Contents

Cover Title Page 1
Report Narrative 3
Method Summary 8
Method / Analyst Summary 9
Sample Summary 10
Sample Results 11
Sample Datasheets 12
Data Qualifiers 28
QC Results 29
Qc Association Summary 30
Qc Reports 34
Sample Receipt Checklist 46
Client Chain of Custody 47

MADEP MCP Analytical Method Report Certification Form

Laboratory Name:	**TestAmerica Westfield**	Project #:	**360-19938-1**
Project Location:	**Slurry Wall/Slurry Cap**	MADEP RTN[1]:	

This form provides certifications for the following data set:[list Laboratory Sample ID Number(s)]
360-19938-(1-8)

Sample Matrices: **Groundwater** Soil/Sediment Drinking Water **Other:**

MCP SW-846 Methods Used	8260B( )	8151A ( )	8330 ( )	6010B (**x**)	7470A/1A ( )	Other ( )
	8270C( )	8081A ( )	VPH ( )	6020 ( )	9014M[2]/9012 ( )	
As specified in MADEP Compendium of Analytical Methods. (check all that apply)	8082 ( )	8021B ( )	EPH ( )	7000 S[3]( )	7196A ( )	

1 List Release Tracking Number (RTN), if known
2 M - SW-846 Method 9014 or MADEP Physiologically Available Cyanide (PAC) Method
3 S - SW-846 Methods 7000 Series List individual method and analyte.

An affirmative response to questions A, B, C and D is required for "Presumptive Certainty" status

A	Were all samples received by the laboratory in a condition consistent with that described on the Chain-of-Custody documentation for the data set?	Yes √		No[1]
B	Were all QA/QC procedures required for the specified analytical method(s) included in this report followed, including the requirement to note and discuss in a narrative QC data that did not meet appropriate performance standards or guidelines?	Yes √		No[1]
C	Does the analytical data included in this report meet all the requirements for "Presumptive Certainty", as described in Section 2.0 (a), (b), (c) and (d) of the MADEP document CAM VII A, " Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	Yes √	N/A	No[1]
D	**VPH and EPH methods only:** Was the VPH or EPH Method conducted without significant modifications (see Section 11.3 of respective Methods)?	Yes	N/A √	No[1]

A response to questions E and F below is required for "Presumptive Certainty" status

E	Were all QC performance standards and recommendations for the specified methods achieved?	Yes √		No[1]
F	Were results for all analyte-list compounds/elements for the specified method(s) reported?	Yes	N/A	No[1] √

[1] All Negative responses must be addressed in an attached Environmental Laboratory case narrative.

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.

Signature: **Position:** Laboratory Director

Printed Name: Steven C. Hartmann **Date:** 12/1/08 11:05

The certification form has been electronically signed and approved. CAM VII A, Rev 3.2 April-04

TestAmerica
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MADEP MA014
NY DOH 10843
RI DOH 57
CT DPH 0494
VT DECWSD

NELAP FL E87912 TOX
NELAP NJ MA008 TOX
NELAP NY 10843
NH DES 253901-A

TestAmerica Westfield
53 Southampton Rd,
Westfield, MA 01085
Tel:(413)572-4000
Fax:(413)572-3707

MADEP MCP Analytical Method Report Certification Form

Laboratory Name:	**TestAmerica Westfield**	Project #:	**360-19938-1**
Project Location:	**Slurry Wall/Slurry Cap**	MADEP RTN[1]:	

This form provides certifications for the following data set:[list Laboratory Sample ID Number(s)]
360-19938-(1-8)

Sample Matrices: **Groundwater** Soil/Sediment Drinking Water **Other:**

MCP SW-846 Methods Used	8260B( )	8151A ( )	8330 ( )	6010B ( )	7470A/1A ( )	Other (**x**)
	8270C( )	8081A ( )	VPH ( )	6020 ( )	9014M[2]/9012 ( )	
As specified in MADEP Compendium of Analytical Methods. (check all that apply)	8082 ( )	8021B ( )	EPH ( )	7000 S[3]( )	7196A ( )	

1 List Release Tracking Number (RTN), if known
2 M - SW-846 Method 9014 or MADEP Physiologically Available Cyanide (PAC) Method
3 S - SW-846 Methods 7000 Series List individual method and analyte.

An affirmative response to questions A, B, C and D is required for "Presumptive Certainty" status

A	Were all samples received by the laboratory in a condition consistent with that described on the Chain-of-Custody documentation for the data set?	Yes √		No[1]
B	Were all QA/QC procedures required for the specified analytical method(s) included in this report followed, including the requirement to note and discuss in a narrative QC data that did not meet appropriate performance standards or guidelines?	Yes √		No[1]
C	Does the analytical data included in this report meet all the requirements for "Presumptive Certainty", as described in Section 2.0 (a), (b), (c) and (d) of the MADEP document CAM VII A, " Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	Yes	N/A √	No[1]
D	**VPH and EPH methods only:** Was the VPH or EPH Method conducted without significant modifications (see Section 11.3 of respective Methods)?	Yes	N/A √	No[1]

A response to questions E and F below is required for "Presumptive Certainty" status

E	Were all QC performance standards and recommendations for the specified methods achieved?	Yes		No[1] √
F	Were results for all analyte-list compounds/elements for the specified method(s) reported?	Yes	N/A √	No[1]

[1] All Negative responses must be addressed in an attached Environmental Laboratory case narrative.

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.

Signature: **Position:** Laboratory Director

Printed Name: Steven C. Hartmann **Date:** 12/1/08 11:05

The certification form has been electronically signed and approved. CAM VII A, Rev 3.2 April-04

CASE NARRATIVE

Client: Olin Corporation

Project: Slurry Wall/Slurry Cap

Report Number: 360-19938-1

This case narrative is in the form of an exception report, where only the anomalies related to this report, method specific performance and/or QA/QC issues are discussed. If there are no issues to report, this narrative will include a statement that documents that there are no relevant data issues as stipulated in the MCP reporting requirements.

In order to facilitate report review, a separate MCP Analytical Method Report Certification Form is included for each method requested.

It should be noted that samples with elevated Reporting Limits (RLs) as a result of a dilution may not be able to satisfy "MCP program" reporting limits in some cases if the "adjusted" RL is greater than the applicable MCP standards or criterion to which the concentration is being compared. Such increases in the RLs are an unavoidable but acceptable consequence of sample dilution that enables quantification of target analytes which exceed the calibration range.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

The samples were received on 11/18/2008; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 4.2ºC.

Note: All samples which require thermal preservation are considered acceptable if the arrival temperature is within 2C of the required temperature or method specified range. For samples with a specified temperature of 4C, samples with a temperature ranging from just above freezing temperature of water to 6C shall be acceptable. Samples that are hand delivered immediately following collection may not meet these criteria, however they will be deemed acceptable according to NELAC and MADEP standards, if there is evidence that the chilling process has begun, such as arrival on ice, etc.

MCP regulatory standard criteria were not specified for this report. Therefore, method reporting limits (RLs) were not assessed against any MCP standards as it may pertain to Question "E" on the Presumptive Certainty Certification Form (MADEP reference: WSC-CAM-AN-093008 - WSC-CAM Analytical Notes).

DISSOLVED METALS

Samples 360-19938-1 through 360-19938-8 were analyzed for dissolved metals in accordance with EPA SW846 Method 6010B. The samples were analyzed on 11/19/2008.

All QA/QC procedures required to meet Presumptive Certainty for the specified analytical method were performed as per section B of the MADEP MCP analytical method report Certification form.

All QC performance standards and recommendations, which may affect Data Usability for this specific method, were achieved.

General method information:
Chromium was detected in method blank MB 360-38879/2 at a level that was above the method detection limit but below the reporting limit. The value should be considered an estimate, and has been flagged "J". If the associated sample reported a result above the MDL and/or RL, the result has been "B" flagged. Refer to the QC report for details.

At the request of the client, an abbreviated/modified MCP analyte list was reported for this job.

TOTAL METALS

Samples 360-19938-1 through 360-19938-7 were analyzed for total metals in accordance with EPA SW846 Method 6010B. The samples were prepared and analyzed on 11/19/2008.

All QA/QC procedures required to meet Presumptive Certainty for the specified analytical method were performed as per section B of the MADEP MCP analytical method report Certification form.

All QC performance standards and recommendations, which may affect Data Usability for this specific method, were achieved.

General method information:
Chromium was detected in method blank MB 360-38824/1-A at a level that was above the method detection limit but below the reporting limit. The value should be considered an estimate, and has been flagged "J". If the associated sample reported a result above the MDL and/or RL, the result has been "B" flagged. Refer to the QC report for details.

At the request of the client, an abbreviated/modified MCP analyte list was reported for this job.

The following reported methods are not listed in the MADEP Massachusetts Contingency Plan (MCP) Compendium of Analytical Methods (CAM), pursuant to the provisions of 310 CMR 40.0017(2).

ANIONS

Samples 360-19938-1 through 360-19938-8 were analyzed for anions in accordance with EPA Method 300.0. The samples were analyzed on 11/19/2008.

All QC performance standards and recommendations for this specific method were achieved.

Samples 360-19938-1 through 360-19938-8(10X) required dilution prior to analysis. The reporting limits have been adjusted accordingly. Dilutions were due to high target concentration.

AMMONIA

Samples 360-19938-1 through 360-19938-8 were analyzed for ammonia in accordance with LACHAT 107-06-1B. The samples were prepared and analyzed on 11/21/2008 and 11/28/2008.

All QC performance standards and recommendations for this specific method were achieved with the exception of:

Ammonia failed the MS/MSD recovery criteria low for the matrix spike duplicate of sample 360-19938-6. The associated LCS recovered within control limits. Refer to the QC report for details.

Samples 360-19938-2 through 360-19938-5(10X), 360-19938-6 and 360-19938-7(5X) required dilution prior to analysis. The reporting limits have been adjusted accordingly. Dilutions were due to high concentration.

SPECIFIC CONDUCTANCE (CONDUCTIVITY)

Samples 360-19938-1 through 360-19938-8 were analyzed for Specific Conductance (Conductivity) in accordance with SM 2510B. The samples were analyzed on 11/19/2008.

All QC performance standards and recommendations for this specific method were achieved.

This case narrative is available in Word format upon request.

METHOD SUMMARY

Client: Olin Corporation Job Number: 360-19938-1

Description	Lab Location	Method	Preparation Method
Matrix: Water			
Dissolved Metals	TAL WFD	SW846 6010B	
Total Metals	TAL WFD	SW846 6010B	
Sample Filtration, Field	TAL WFD		FIELD_FLTRD
Preparation, Total Metals	TAL WFD		SW846 3010A
Chloride & Sulfate	TAL WFD	40CFR136A 300.0	
Nitrate & Nitrite	TAL WFD	40CFR136A 300.0	
Nitrogen Ammonia	TAL WFD	LACHAT L107-06-1B	
Distillation, Ammonia	TAL WFD		Distill/Ammonia
Conductivity, Specific Conductance	TAL WFD	SM SM 2510B	

Lab References:

TAL WFD = TestAmerica Westfield

Method References:

40CFR136A = "Methods for Organic Chemical Analysis of Municipal Industrial Wastewater", 40CFR, Part 136, Appendix A, October 26, 1984 and subsequent revisions.

LACHAT = LACHAT

SM = "Standard Methods For The Examination Of Water And Wastewater",

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

METHOD / ANALYST SUMMARY

Client: Olin Corporation

Job Number: 360-19938-1

Method	Analyst	Analyst ID
SW846 6010B	Smith, Tim J	TJS
40CFR136A 300.0	Lalashius, Andrew L	ALL
LACHAT L107-06-1B	Lalashius, Andrew L	ALL
SM SM 2510B	Emerich, Rich W	RWE

SAMPLE SUMMARY

Client: Olin Corporation Job Number: 360-19938-1

Lab Sample ID	Client Sample ID	Client Matrix	Date/Time Sampled	Date/Time Received
360-19938-1	OC - ISCO-3	Water	11/18/2008 1200	11/18/2008 1640
360-19938-2	OC - ISCO-2	Water	11/18/2008 1210	11/18/2008 1640
360-19938-3	OC - PZ-16RR	Water	11/18/2008 1235	11/18/2008 1640
360-19938-4	OC - PZ-17RR	Water	11/18/2008 1250	11/18/2008 1640
360-19938-5	OC - SD-17	Water	11/18/2008 1300	11/18/2008 1640
360-19938-6	OC - PZ-18R	Water	11/18/2008 1310	11/18/2008 1640
360-19938-6MS	OC - PZ-18R MS	Water	11/18/2008 1310	11/18/2008 1640
360-19938-6MSD	OC - PZ-18R MSD	Water	11/18/2008 1310	11/18/2008 1640
360-19938-7	OC - ISCO-1	Water	11/18/2008 1325	11/18/2008 1640
360-19938-8	OC - GW-42S	Ground Water	11/17/2008 1425	11/18/2008 1640

SAMPLE RESULTS

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Job Number: 360-19938-1

Client Sample ID: OC - ISCO-3
Lab Sample ID: 360-19938-1

Date Sampled: 11/18/2008 1200
Date Received: 11/18/2008 1640
Client Matrix: Water

Analyte	Result/Qualifier		Unit	MDL	RL	Dilution
Method: Dissolved-6010B			Date Analyzed:	11/19/2008 1417		
Aluminum	39	J	ug/L	2.2	100	1.0
Chromium	~~0.24~~ ND	~~J B~~	ug/L	0.17	5.0	1.0
Sodium	67000		ug/L	65	2000	1.0
Method: 6010B			Date Analyzed:	11/19/2008 1742		
Prep Method: 3010A			Date Prepared:	11/19/2008 0745		
Aluminum	1800		ug/L	2.2	100	1.0
Chromium	210	B	ug/L	0.17	5.0	1.0
Sodium	54000		ug/L	65	2000	1.0

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Job Number: 360-19938-1

Client Sample ID: OC - ISCO-3
Lab Sample ID: 360-19938-1

Date Sampled: 11/18/2008 1200
Date Received: 11/18/2008 1640
Client Matrix: Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 300.0		Date Analyzed:	11/19/2008 1300		
Sulfate	43	mg/L	2.0	2.0	1.0
Nitrate as N	0.96	mg/L	0.050	0.050	1.0
Nitrite as N	ND	mg/L	0.010	0.010	1.0
Method: 300.0		Date Analyzed:	11/19/2008 1316		
Chloride	120	mg/L	10	10	10
Method: L107-06-1B		Date Analyzed:	11/21/2008 1513		
Prep Method: Distill/Ammonia		Date Prepared:	11/21/2008 1318		
Ammonia	3.1 J	mg/L	0.10	0.10	1.0
Method: SM 2510B		Date Analyzed:	11/19/2008 1500		
Specific Conductance	610	umhos/cm	1.0	1.0	1.0

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Job Number: 360-19938-1

Client Sample ID: OC - ISCO-2
Lab Sample ID: 360-19938-2

Date Sampled: 11/18/2008 1210
Date Received: 11/18/2008 1640
Client Matrix: Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B		Date Analyzed:	11/19/2008 1420		
Aluminum	430	ug/L	2.2	100	1.0
Chromium	130 B	ug/L	0.17	5.0	1.0
Sodium	160000 J	ug/L	65	2000	1.0
Method: 6010B		Date Analyzed:	11/19/2008 1745		
Prep Method: 3010A		Date Prepared:	11/19/2008 0745		
Aluminum	1100	ug/L	2.2	100	1.0
Chromium	250 B	ug/L	0.17	5.0	1.0
Sodium	130000 J	ug/L	65	2000	1.0

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Job Number: 360-19938-1

Client Sample ID: OC - ISCO-2
Lab Sample ID: 360-19938-2

Date Sampled: 11/18/2008 1210
Date Received: 11/18/2008 1640
Client Matrix: Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 300.0		Date Analyzed:	11/19/2008 1331		
Nitrate as N	0.83	mg/L	0.050	0.050	1.0
Nitrite as N	ND	mg/L	0.010	0.010	1.0
Method: 300.0		Date Analyzed:	11/19/2008 1346		
Sulfate	610	mg/L	20	20	10
Chloride	140	mg/L	10	10	10
Method: L107-06-1B		Date Analyzed:	11/21/2008 1520		
Prep Method: Distill/Ammonia		Date Prepared:	11/21/2008 1318		
Ammonia	120 J	mg/L	1.0	1.0	10
Method: SM 2510B		Date Analyzed:	11/19/2008 1502		
Specific Conductance	1900	umhos/cm	1.0	1.0	1.0

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Job Number: 360-19938-1

Client Sample ID: OC - PZ-16RR
Lab Sample ID: 360-19938-3

Date Sampled: 11/18/2008 1235
Date Received: 11/18/2008 1640
Client Matrix: Water

Analyte	Result/Qualifier		Unit	MDL	RL	Dilution
Method: Dissolved-6010B			Date Analyzed:		11/19/2008 1423	
Aluminum	1900		ug/L	2.2	100	1.0
Chromium	530	B	ug/L	0.17	5.0	1.0
Sodium	170000		ug/L	65	2000	1.0
Method: 6010B			Date Analyzed:		11/19/2008 1748	
Prep Method: 3010A			Date Prepared:		11/19/2008 0745	
Aluminum	3500		ug/L	2.2	100	1.0
Chromium	860	B	ug/L	0.17	5.0	1.0
Sodium	160000		ug/L	65	2000	1.0

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Job Number: 360-19938-1

Client Sample ID: OC - PZ-16RR
Lab Sample ID: 360-19938-3

Date Sampled: 11/18/2008 1235
Date Received: 11/18/2008 1640
Client Matrix: Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 300.0		Date Analyzed:	11/19/2008 1401		
Nitrate as N	0.60	mg/L	0.050	0.050	1.0
Nitrite as N	ND	mg/L	0.010	0.010	1.0
Method: 300.0		Date Analyzed:	11/19/2008 1416		
Sulfate	630	mg/L	20	20	10
Chloride	150	mg/L	10	10	10
Method: L107-06-1B		Date Analyzed:	11/21/2008 1520		
Prep Method: Distill/Ammonia		Date Prepared:	11/21/2008 1318		
Ammonia	120 J	mg/L	1.0	1.0	10
Method: SM 2510B		Date Analyzed:	11/19/2008 1503		
Specific Conductance	2000	umhos/cm	1.0	1.0	1.0

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Job Number: 360-19938-1

Client Sample ID: OC - PZ-17RR
Lab Sample ID: 360-19938-4

Date Sampled: 11/18/2008 1250
Date Received: 11/18/2008 1640
Client Matrix: Water

Analyte	Result/Qualifier		Unit	MDL	RL	Dilution
Method: Dissolved-6010B			Date Analyzed:	11/19/2008 1426		
Aluminum	4200		ug/L	2.2	100	1.0
Chromium	1000	B	ug/L	0.17	5.0	1.0
Sodium	190000		ug/L	65	2000	1.0
Method: 6010B			Date Analyzed:	11/19/2008 1751		
Prep Method: 3010A			Date Prepared:	11/19/2008 0745		
Aluminum	8300		ug/L	2.2	100	1.0
Chromium	2000	B	ug/L	0.17	5.0	1.0
Sodium	180000		ug/L	65	2000	1.0

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Job Number: 360-19938-1

Client Sample ID: OC - PZ-17RR
Lab Sample ID: 360-19938-4

Date Sampled: 11/18/2008 1250
Date Received: 11/18/2008 1640
Client Matrix: Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 300.0		Date Analyzed:	11/19/2008 1431		
Nitrate as N	0.36	mg/L	0.050	0.050	1.0
Method: 300.0		Date Analyzed:	11/19/2008 1516		
Sulfate	700	mg/L	20	20	10
Chloride	180	mg/L	10	10	10
Nitrite as N	ND	mg/L	0.10	0.10	10
Method: L107-06-1B		Date Analyzed:	11/28/2008 1118		
Prep Method: Distill/Ammonia		Date Prepared:	11/28/2008 0923		
Ammonia	150 J	mg/L	1.0	1.0	10
Method: SM 2510B		Date Analyzed:	11/19/2008 1505		
Specific Conductance	2200	umhos/cm	1.0	1.0	1.0

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Job Number: 360-19938-1

Client Sample ID: OC - SD-17
Lab Sample ID: 360-19938-5

Date Sampled: 11/18/2008 1300
Date Received: 11/18/2008 1640
Client Matrix: Water

Analyte	Result/Qualifier		Unit	MDL	RL	Dilution
Method: Dissolved-6010B			Date Analyzed:	11/19/2008 1429		
Aluminum	4600		ug/L	2.2	100	1.0
Chromium	1100	B	ug/L	0.17	5.0	1.0
Sodium	190000	J	ug/L	65	2000	1.0
Method: 6010B			Date Analyzed:	11/19/2008 1754		
Prep Method: 3010A			Date Prepared:	11/19/2008 0745		
Aluminum	8200		ug/L	2.2	100	1.0
Chromium	2000	B	ug/L	0.17	5.0	1.0
Sodium	170000	J	ug/L	65	2000	1.0

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Job Number: 360-19938-1

Client Sample ID: OC - SD-17
Lab Sample ID: 360-19938-5

Date Sampled: 11/18/2008 1300
Date Received: 11/18/2008 1640
Client Matrix: Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 300.0		Date Analyzed:	11/19/2008 1531		
Nitrate as N	0.37	mg/L	0.050	0.050	1.0
Method: 300.0		Date Analyzed:	11/19/2008 1547		
Sulfate	710	mg/L	20	20	10
Chloride	180	mg/L	10	10	10
Nitrite as N	ND	mg/L	0.10	0.10	10
Method: L107-06-1B		Date Analyzed:	11/28/2008 1119		
Prep Method: Distill/Ammonia		Date Prepared:	11/28/2008 0923		
Ammonia	150 J	mg/L	1.0	1.0	10
Method: SM 2510B		Date Analyzed:	11/19/2008 1506		
Specific Conductance	2200	umhos/cm	1.0	1.0	1.0

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Job Number: 360-19938-1

Client Sample ID: OC - PZ-18R
Lab Sample ID: 360-19938-6

Date Sampled: 11/18/2008 1310
Date Received: 11/18/2008 1640
Client Matrix: Water

Analyte	Result/Qualifier		Unit	MDL	RL	Dilution
Method: Dissolved-6010B			Date Analyzed:	11/19/2008 1432		
Aluminum	49	J	ug/L	2.2	100	1.0
Chromium	8.3	B	ug/L	0.17	5.0	1.0
Sodium	80000	J	ug/L	65	2000	1.0
Method: 6010B			Date Analyzed:	11/19/2008 1731		
Prep Method: 3010A			Date Prepared:	11/19/2008 0745		
Aluminum	260		ug/L	2.2	100	1.0
Chromium	45	B	ug/L	0.17	5.0	1.0
Sodium	72000	J	ug/L	65	2000	1.0

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Job Number: 360-19938-1

Client Sample ID: OC - PZ-18R
Lab Sample ID: 360-19938-6

Date Sampled: 11/18/2008 1310
Date Received: 11/18/2008 1640
Client Matrix: Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 300.0		Date Analyzed:	11/19/2008 1602		
Nitrate as N	0.050	mg/L	0.050	0.050	1.0
Nitrite as N	ND	mg/L	0.010	0.010	1.0
Method: 300.0		Date Analyzed:	11/19/2008 1617		
Sulfate	180	mg/L	20	20	10
Chloride	91	mg/L	10	10	10
Method: L107-06-1B		Date Analyzed:	11/28/2008 1120		
Prep Method: Distill/Ammonia		Date Prepared:	11/28/2008 0923		
Ammonia	42 J	mg/L	0.50	0.50	5.0
Method: SM 2510B		Date Analyzed:	11/19/2008 1507		
Specific Conductance	830	umhos/cm	1.0	1.0	1.0

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Job Number: 360-19938-1

Client Sample ID: OC - ISCO-1
Lab Sample ID: 360-19938-7

Date Sampled: 11/18/2008 1325
Date Received: 11/18/2008 1640
Client Matrix: Water

Analyte	Result/Qualifier		Unit	MDL	RL	Dilution
Method: Dissolved-6010B			Date Analyzed:	11/19/2008 1453		
Aluminum	54	J	ug/L	2.2	100	1.0
Chromium	9.1	B	ug/L	0.17	5.0	1.0
Sodium	81000		ug/L	65	2000	1.0
Method: 6010B			Date Analyzed:	11/19/2008 1757		
Prep Method: 3010A			Date Prepared:	11/19/2008 0745		
Aluminum	260		ug/L	2.2	100	1.0
Chromium	44	B	ug/L	0.17	5.0	1.0
Sodium	75000		ug/L	65	2000	1.0

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Job Number: 360-19938-1

Client Sample ID: OC - ISCO-1
Lab Sample ID: 360-19938-7

Date Sampled: 11/18/2008 1325
Date Received: 11/18/2008 1640
Client Matrix: Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 300.0		Date Analyzed:	11/19/2008 1702		
Nitrate as N	ND	mg/L	0.050	0.050	1.0
Nitrite as N	ND	mg/L	0.010	0.010	1.0
Method: 300.0		Date Analyzed:	11/19/2008 1717		
Sulfate	170	mg/L	20	20	10
Chloride	89	mg/L	10	10	10
Method: L107-06-1B		Date Analyzed:	11/28/2008 1123		
Prep Method: Distill/Ammonia		Date Prepared:	11/28/2008 0923		
Ammonia	46 J	mg/L	0.50	0.50	5.0
Method: SM 2510B		Date Analyzed:	11/19/2008 1509		
Specific Conductance	820	umhos/cm	1.0	1.0	1.0

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Job Number: 360-19938-1

Client Sample ID: OC - GW-42S
Lab Sample ID: 360-19938-8

Date Sampled: 11/17/2008 1425
Date Received: 11/18/2008 1640
Client Matrix: Ground Water

Analyte	Result/Qualifier		Unit	MDL	RL	Dilution
Method: Dissolved-6010B			Date Analyzed:		11/19/2008 1456	
Aluminum	410	J	ug/L	2.2	100	1.0
Chromium	8.5	B	ug/L	0.17	5.0	1.0

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Job Number: 360-19938-1

Client Sample ID: OC - GW-42S
Lab Sample ID: 360-19938-8

Date Sampled: 11/17/2008 1425
Date Received: 11/18/2008 1640
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 300.0		Date Analyzed:		11/19/2008 1732	
Sulfate	9.3	mg/L	2.0	2.0	1.0
Method: 300.0		Date Analyzed:		11/19/2008 1848	
Chloride	61	mg/L	10	10	10
Method: L107-06-1B		Date Analyzed:		11/28/2008 1103	
Prep Method: Distill/Ammonia		Date Prepared:		11/28/2008 0923	
Ammonia	0.38 J	mg/L	0.10	0.10	1.0
Method: SM 2510B		Date Analyzed:		11/19/2008 1510	
Specific Conductance	320	umhos/cm	1.0	1.0	1.0

DATA REPORTING QUALIFIERS

Client: Olin Corporation Job Number: 360-19938-1

Lab Section	Qualifier	Description
Metals		
	B	Compound was found in the blank and sample.
	J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
General Chemistry		
	4	MS, MSD: The analyte present in the original sample is 4 times greater than the matrix spike concentration; therefore, control limits are not applicable.

QUALITY CONTROL RESULTS

Client: Olin Corporation Job Number: 360-19938-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
Metals					
Prep Batch: 360-38824					
LCS 360-38824/2-A	Lab Control Spike	T	Water	3010A	
LCSD 360-38824/3-A	Lab Control Spike Duplicate	T	Water	3010A	
MB 360-38824/1-A	Method Blank	T	Water	3010A	
360-19938-1	OC - ISCO-3	T	Water	3010A	
360-19938-2	OC - ISCO-2	T	Water	3010A	
360-19938-3	OC - PZ-16RR	T	Water	3010A	
360-19938-4	OC - PZ-17RR	T	Water	3010A	
360-19938-5	OC - SD-17	T	Water	3010A	
360-19938-6	OC - PZ-18R	T	Water	3010A	
360-19938-6MS	Matrix Spike	T	Water	3010A	
360-19938-6MSD	Matrix Spike Duplicate	T	Water	3010A	
360-19938-7	OC - ISCO-1	T	Water	3010A	
Analysis Batch:360-38879					
LCS 360-38879/1	Lab Control Spike	T	Water	6010B	
LCSD 360-38879/12	Lab Control Spike Duplicate	T	Water	6010B	
MB 360-38879/2	Method Blank	T	Water	6010B	
360-19938-1	OC - ISCO-3	D	Water	6010B	
360-19938-2	OC - ISCO-2	D	Water	6010B	
360-19938-3	OC - PZ-16RR	D	Water	6010B	
360-19938-4	OC - PZ-17RR	D	Water	6010B	
360-19938-5	OC - SD-17	D	Water	6010B	
360-19938-6	OC - PZ-18R	D	Water	6010B	
360-19938-6MS	Matrix Spike	D	Water	6010B	
360-19938-6MSD	Matrix Spike Duplicate	D	Water	6010B	
360-19938-7	OC - ISCO-1	D	Water	6010B	
360-19938-8	OC - GW-42S	D	Water	6010B	
Analysis Batch:360-38886					
LCS 360-38824/2-A	Lab Control Spike	T	Water	6010B	360-38824
LCSD 360-38824/3-A	Lab Control Spike Duplicate	T	Water	6010B	360-38824
MB 360-38824/1-A	Method Blank	T	Water	6010B	360-38824
360-19938-1	OC - ISCO-3	T	Water	6010B	360-38824
360-19938-2	OC - ISCO-2	T	Water	6010B	360-38824
360-19938-3	OC - PZ-16RR	T	Water	6010B	360-38824
360-19938-4	OC - PZ-17RR	T	Water	6010B	360-38824
360-19938-5	OC - SD-17	T	Water	6010B	360-38824
360-19938-6	OC - PZ-18R	T	Water	6010B	360-38824
360-19938-6MS	Matrix Spike	T	Water	6010B	360-38824
360-19938-6MSD	Matrix Spike Duplicate	T	Water	6010B	360-38824
360-19938-7	OC - ISCO-1	T	Water	6010B	360-38824

Client: Olin Corporation Job Number: 360-19938-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch

Report Basis
D = Dissolved
T = Total

Client: Olin Corporation Job Number: 360-19938-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
General Chemistry					
Analysis Batch:360-38877					
LCS 360-38877/1	Lab Control Spike	T	Water	SM 2510B	
MB 360-38877/4	Method Blank	T	Water	SM 2510B	
360-19938-1	OC - ISCO-3	T	Water	SM 2510B	
360-19938-2	OC - ISCO-2	T	Water	SM 2510B	
360-19938-3	OC - PZ-16RR	T	Water	SM 2510B	
360-19938-4	OC - PZ-17RR	T	Water	SM 2510B	
360-19938-5	OC - SD-17	T	Water	SM 2510B	
360-19938-6	OC - PZ-18R	T	Water	SM 2510B	
360-19938-7	OC - ISCO-1	T	Water	SM 2510B	
360-19938-8	OC - GW-42S	T	Water	SM 2510B	
Analysis Batch:360-38932					
LCS 360-38932/2	Lab Control Spike	T	Water	300.0	
MB 360-38932/1	Method Blank	T	Water	300.0	
360-19938-1	OC - ISCO-3	T	Water	300.0	
360-19938-2	OC - ISCO-2	T	Water	300.0	
360-19938-3	OC - PZ-16RR	T	Water	300.0	
360-19938-4	OC - PZ-17RR	T	Water	300.0	
360-19938-5	OC - SD-17	T	Water	300.0	
360-19938-6	OC - PZ-18R	T	Water	300.0	
360-19938-6MS	Matrix Spike	T	Water	300.0	
360-19938-6MSD	Matrix Spike Duplicate	T	Water	300.0	
360-19938-7	OC - ISCO-1	T	Water	300.0	
360-19938-8	OC - GW-42S	T	Water	300.0	
Analysis Batch:360-38937					
LCS 360-38937/2	Lab Control Spike	T	Water	300.0	
MB 360-38937/1	Method Blank	T	Water	300.0	
360-19938-8	OC - GW-42S	T	Water	300.0	
Analysis Batch:360-38940					
LCS 360-38940/2	Lab Control Spike	T	Water	300.0	
MB 360-38940/1	Method Blank	T	Water	300.0	
360-19938-1	OC - ISCO-3	T	Water	300.0	
360-19938-2	OC - ISCO-2	T	Water	300.0	
360-19938-3	OC - PZ-16RR	T	Water	300.0	
360-19938-4	OC - PZ-17RR	T	Water	300.0	
360-19938-5	OC - SD-17	T	Water	300.0	
360-19938-6	OC - PZ-18R	T	Water	300.0	
360-19938-6MS	Matrix Spike	T	Water	300.0	
360-19938-6MSD	Matrix Spike Duplicate	T	Water	300.0	
360-19938-7	OC - ISCO-1	T	Water	300.0	

Client: Olin Corporation Job Number: 360-19938-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
General Chemistry					
Prep Batch: 360-38981					
LCS 360-38981/2-A	Lab Control Spike	T	Water	Distill/Ammonia	
MB 360-38981/1-A	Method Blank	T	Water	Distill/Ammonia	
360-19938-1	OC - ISCO-3	T	Water	Distill/Ammonia	
360-19938-2	OC - ISCO-2	T	Water	Distill/Ammonia	
360-19938-3	OC - PZ-16RR	T	Water	Distill/Ammonia	
Analysis Batch:360-38987					
LCS 360-38981/2-A	Lab Control Spike	T	Water	L107-06-1B	360-38981
MB 360-38981/1-A	Method Blank	T	Water	L107-06-1B	360-38981
360-19938-1	OC - ISCO-3	T	Water	L107-06-1B	360-38981
360-19938-2	OC - ISCO-2	T	Water	L107-06-1B	360-38981
360-19938-3	OC - PZ-16RR	T	Water	L107-06-1B	360-38981
Prep Batch: 360-39163					
LCS 360-39163/2-A	Lab Control Spike	T	Water	Distill/Ammonia	
MB 360-39163/1-A	Method Blank	T	Water	Distill/Ammonia	
360-19938-4	OC - PZ-17RR	T	Water	Distill/Ammonia	
360-19938-5	OC - SD-17	T	Water	Distill/Ammonia	
360-19938-6	OC - PZ-18R	T	Water	Distill/Ammonia	
360-19938-6MS	Matrix Spike	T	Water	Distill/Ammonia	
360-19938-6MSD	Matrix Spike Duplicate	T	Water	Distill/Ammonia	
360-19938-7	OC - ISCO-1	T	Water	Distill/Ammonia	
360-19938-8	OC - GW-42S	T	Water	Distill/Ammonia	
Analysis Batch:360-39164					
LCS 360-39163/2-A	Lab Control Spike	T	Water	L107-06-1B	360-39163
MB 360-39163/1-A	Method Blank	T	Water	L107-06-1B	360-39163
360-19938-4	OC - PZ-17RR	T	Water	L107-06-1B	360-39163
360-19938-5	OC - SD-17	T	Water	L107-06-1B	360-39163
360-19938-6	OC - PZ-18R	T	Water	L107-06-1B	360-39163
360-19938-6MS	Matrix Spike	T	Water	L107-06-1B	360-39163
360-19938-6MSD	Matrix Spike Duplicate	T	Water	L107-06-1B	360-39163
360-19938-7	OC - ISCO-1	T	Water	L107-06-1B	360-39163
360-19938-8	OC - GW-42S	T	Water	L107-06-1B	360-39163

Report Basis
T = Total

Client: Olin Corporation Job Number: 360-19938-1

Method Blank - Batch: 360-38824

Method: 6010B
Preparation: 3010A

Lab Sample ID: MB 360-38824/1-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/19/2008 1716
Date Prepared: 11/19/2008 0745

Analysis Batch: 360-38886
Prep Batch: 360-38824
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume: 50 mL
Final Weight/Volume: 50 mL

Analyte	Result	Qual	MDL	RL
Aluminum	ND		2.2	100
Chromium	0.44	J	0.17	5.0
Sodium	ND		65	2000

Lab Control Spike/
Lab Control Spike Duplicate Recovery Report - Batch: 360-38824

Method: 6010B
Preparation: 3010A

LCS Lab Sample ID: LCS 360-38824/2-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/19/2008 1719
Date Prepared: 11/19/2008 0745

Analysis Batch: 360-38886
Prep Batch: 360-38824
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume: 50 mL
Final Weight/Volume: 50 mL

LCSD Lab Sample ID: LCSD 360-38824/3-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/19/2008 1722
Date Prepared: 11/19/2008 0745

Analysis Batch: 360-38886
Prep Batch: 360-38824
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume: 50 mL
Final Weight/Volume: 50 mL

Analyte	% Rec. LCS	% Rec. LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Aluminum	88	102	80 - 120	16	20		
Chromium	91	106	80 - 120	16	20		
Sodium	86	99	80 - 120	14	20		

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-19938-1

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 360-38824

Method: 6010B
Preparation: 3010A

MS Lab Sample ID:	360-19938-6	Analysis Batch:	360-38886	Instrument ID:	Varian 720 ES ICP
Client Matrix:	Water	Prep Batch:	360-38824	Lab File ID:	N/A
Dilution:	1.0			Initial Weight/Volume:	50 mL
Date Analyzed:	11/19/2008 1734			Final Weight/Volume:	50 mL
Date Prepared:	11/19/2008 0745				

MSD Lab Sample ID:	360-19938-6	Analysis Batch:	360-38886	Instrument ID:	Varian 720 ES ICP
Client Matrix:	Water	Prep Batch:	360-38824	Lab File ID:	N/A
Dilution:	1.0			Initial Weight/Volume:	50 mL
Date Analyzed:	11/19/2008 1736			Final Weight/Volume:	50 mL
Date Prepared:	11/19/2008 0745				

	% Rec.						
Analyte	MS	MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Aluminum	98	97	75 - 125	1	20		
Chromium	100	99	75 - 125	1	20		
Sodium	95	90	75 - 125	1	20		

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation Job Number: 360-19938-1

Method Blank - Batch: 360-38879

Method: 6010B
Preparation: N/A

Lab Sample ID: MB 360-38879/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/19/2008 1411
Date Prepared: N/A

Analysis Batch: 360-38879
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 1.0 mL

Analyte	Result	Qual	MDL	RL
Aluminum	ND		2.2	100
Chromium	0.30	J	0.17	5.0
Sodium	ND		65	2000

Lab Control Spike/
Lab Control Spike Duplicate Recovery Report - Batch: 360-38879

Method: 6010B
Preparation: N/A

LCS Lab Sample ID: LCS 360-38879/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/19/2008 1408
Date Prepared: N/A

Analysis Batch: 360-38879
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 10 mL

LCSD Lab Sample ID: LCSD 360-38879/12
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/19/2008 1447
Date Prepared: N/A

Analysis Batch: 360-38879
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 10 mL

Analyte	% Rec. LCS	% Rec. LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Aluminum	103	104	80 - 120	1	20		
Chromium	102	103	80 - 120	1	20		
Sodium	102	103	80 - 120	1	20		

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-19938-1

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 360-38879

Method: 6010B
Preparation: N/A

MS Lab Sample ID:	360-19938-6	Analysis Batch:	360-38879	Instrument ID:	Varian 720 ES ICP
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	N/A
Dilution:	1.0			Initial Weight/Volume:	
Date Analyzed:	11/19/2008 1434			Final Weight/Volume:	10 mL
Date Prepared:	N/A				

MSD Lab Sample ID:	360-19938-6	Analysis Batch:	360-38879	Instrument ID:	Varian 720 ES ICP
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	N/A
Dilution:	1.0			Initial Weight/Volume:	
Date Analyzed:	11/19/2008 1437			Final Weight/Volume:	10 mL
Date Prepared:	N/A				

	% Rec.						
Analyte	MS	MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Aluminum	99	97	75 - 125	2	20		
Chromium	96	95	75 - 125	1	20		
Sodium	79	78	75 - 125	0	20		

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation Job Number: 360-19938-1

Method Blank - Batch: 360-38932

Method: 300.0
Preparation: N/A

Lab Sample ID: MB 360-38932/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/19/2008 1145
Date Prepared: N/A

Analysis Batch: 360-38932
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 1.0 mL

Analyte	Result	Qual	RL	RL
Sulfate	ND		2.0	2.0
Chloride	ND		1.0	1.0

Lab Control Spike - Batch: 360-38932

Method: 300.0
Preparation: N/A

Lab Sample ID: LCS 360-38932/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/19/2008 1200
Date Prepared: N/A

Analysis Batch: 360-38932
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 1.0 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Sulfate	80.0	79.8	100	85 - 115	
Chloride	40.0	40.3	101	85 - 115	

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation Job Number: 360-19938-1

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 360-38932

Method: 300.0
Preparation: N/A

MS Lab Sample ID:	360-19938-6	Analysis Batch:	360-38932	Instrument ID:	No Equipment Assigned
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	N/A
Dilution:	10			Initial Weight/Volume:	1.0 mL
Date Analyzed:	11/19/2008 1632			Final Weight/Volume:	10 mL
Date Prepared:	N/A				

MSD Lab Sample ID:	360-19938-6	Analysis Batch:	360-38932	Instrument ID:	No Equipment Assigned
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	N/A
Dilution:	10			Initial Weight/Volume:	1.0 mL
Date Analyzed:	11/19/2008 1647			Final Weight/Volume:	10 mL
Date Prepared:	N/A				

	% Rec.						
Analyte	MS	MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Sulfate	107	107	75 - 125	0	20		
Chloride	104	104	75 - 125	0	20		

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation Job Number: 360-19938-1

Method Blank - Batch: 360-38937

Method: 300.0
Preparation: N/A

Lab Sample ID: MB 360-38937/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/19/2008 1818
Date Prepared: N/A

Analysis Batch: 360-38937
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 1.0 mL

Analyte	Result	Qual	RL	RL
Sulfate	ND		2.0	2.0
Chloride	ND		1.0	1.0

Lab Control Spike - Batch: 360-38937

Method: 300.0
Preparation: N/A

Lab Sample ID: LCS 360-38937/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/19/2008 1833
Date Prepared: N/A

Analysis Batch: 360-38937
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 1.0 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Sulfate	80.0	79.9	100	85 - 115	
Chloride	40.0	40.3	101	85 - 115	

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation Job Number: 360-19938-1

Method Blank - Batch: 360-38940

Method: 300.0
Preparation: N/A

Lab Sample ID: MB 360-38940/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/19/2008 1145
Date Prepared: N/A

Analysis Batch: 360-38940
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 1.0 mL

Analyte	Result	Qual	RL	RL
Nitrate as N	ND		0.050	0.050
Nitrite as N	ND		0.010	0.010

Lab Control Spike - Batch: 360-38940

Method: 300.0
Preparation: N/A

Lab Sample ID: LCS 360-38940/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/19/2008 1200
Date Prepared: N/A

Analysis Batch: 360-38940
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 1.0 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Nitrate as N	4.00	3.95	99	85 - 115	
Nitrite as N	4.00	4.09	102	85 - 115	

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-19938-1

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 360-38940

Method: 300.0
Preparation: N/A

MS Lab Sample ID:	360-19938-6	Analysis Batch: 360-38940	Instrument ID: No Equipment Assigned
Client Matrix:	Water	Prep Batch: N/A	Lab File ID: N/A
Dilution:	10		Initial Weight/Volume: 1.0 mL
Date Analyzed:	11/19/2008 1632		Final Weight/Volume: 10 mL
Date Prepared:	N/A		

MSD Lab Sample ID:	360-19938-6	Analysis Batch: 360-38940	Instrument ID: No Equipment Assigned
Client Matrix:	Water	Prep Batch: N/A	Lab File ID: N/A
Dilution:	10		Initial Weight/Volume: 1.0 mL
Date Analyzed:	11/19/2008 1647		Final Weight/Volume: 10 mL
Date Prepared:	N/A		

	% Rec.						
Analyte	MS	MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Nitrate as N	96	96	75 - 125	0	20		
Nitrite as N	100	100	75 - 125	0	20		

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-19938-1

Method Blank - Batch: 360-38981

Method: L107-06-1B
Preparation: Distill/Ammonia

Lab Sample ID: MB 360-38981/1-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/21/2008 1454
Date Prepared: 11/21/2008 1318

Analysis Batch: 360-38987
Prep Batch: 360-38981
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 50 mL

Analyte	Result	Qual	RL	RL
Ammonia	ND		0.10	0.10

Lab Control Spike - Batch: 360-38981

Method: L107-06-1B
Preparation: Distill/Ammonia

Lab Sample ID: LCS 360-38981/2-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/21/2008 1455
Date Prepared: 11/21/2008 1318

Analysis Batch: 360-38987
Prep Batch: 360-38981
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 50 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Ammonia	10.0	9.39	94	85 - 115	

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-19938-1

Method Blank - Batch: 360-39163

Method: L107-06-1B
Preparation: Distill/Ammonia

Lab Sample ID: MB 360-39163/1-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/28/2008 1055
Date Prepared: 11/28/2008 0923

Analysis Batch: 360-39164
Prep Batch: 360-39163
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 50 mL

Analyte	Result	Qual	RL	RL
Ammonia	ND		0.10	0.10

Lab Control Spike - Batch: 360-39163

Method: L107-06-1B
Preparation: Distill/Ammonia

Lab Sample ID: LCS 360-39163/2-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/28/2008 1056
Date Prepared: 11/28/2008 0923

Analysis Batch: 360-39164
Prep Batch: 360-39163
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 50 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Ammonia	10.0	9.10	91	85 - 115	

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 360-39163

Method: L107-06-1B
Preparation: Distill/Ammonia

MS Lab Sample ID: 360-19938-6
Client Matrix: Water
Dilution: 5.0
Date Analyzed: 11/28/2008 1121
Date Prepared: 11/28/2008 0923

Analysis Batch: 360-39164
Prep Batch: 360-39163

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 50 mL

MSD Lab Sample ID: 360-19938-6
Client Matrix: Water
Dilution: 5.0
Date Analyzed: 11/28/2008 1122
Date Prepared: 11/28/2008 0923

Analysis Batch: 360-39164
Prep Batch: 360-39163

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 50 mL

Analyte	% Rec. MS	% Rec. MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Ammonia	99	67	75 - 125	6	20	4	4

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-19938-1

Method Blank - Batch: 360-38877

Method: SM 2510B
Preparation: N/A

Lab Sample ID: MB 360-38877/4
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/19/2008 1145
Date Prepared: N/A

Analysis Batch: 360-38877
Prep Batch: N/A
Units: umhos/cm

Instrument ID: MAN-TECH Ion Plus
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 1.0 mL

Analyte	Result	Qual	RL	RL
Specific Conductance	ND		1.0	1.0

Lab Control Spike - Batch: 360-38877

Method: SM 2510B
Preparation: N/A

Lab Sample ID: LCS 360-38877/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/19/2008 1122
Date Prepared: N/A

Analysis Batch: 360-38877
Prep Batch: N/A
Units: umhos/cm

Instrument ID: MAN-TECH Ion Plus
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 1.0 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Specific Conductance	1420	1440	101	85 - 115	

Calculations are performed before rounding to avoid round-off errors in calculated results.

Login Sample Receipt Check List

Client: Olin Corporation

Job Number: 360-19938-1

Login Number: 19938
List Source: TestAmerica Westfield
Creator: Rinard, Kimberley A
List Number: 1

Question	T / F/ NA	Comment
Radioactivity either was not measured or, if measured, is at or below background	N/A	
The cooler's custody seal, if present, is intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	4.2 C
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	N/A	
If necessary, staff have been informed of any short hold time or quick TAT needs	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	

TestAmerica Laboratories, Inc.
Chain of Custody Form

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

360-19938

•53 Southampton Road
Westfield, MA 01085
(P) 413-572-4000
(F) 413-572-3707

•149 Rangeway Road
N. Billerica, MA 01862
(P) 978-667-1400
(F) 978-667-7871

Client: Olin Chemical/MACTEC
Address: 51 Eames Street
Wilmington, MA 01887
Phone: Fax:

Project #: 6100080016
Project Manager: Peter Thompson
Work ID: ~~PCMP~~ Slurry Wall/ Slurry Cap
Contact: David Chapman

Job# | Quote# | PO#

Requested Turn Around Time
10 Business Day (Std) XX | Rush TAT Requested:
15 Business Day | 24 hrs | 72 hrs
Other | 48 hrs | 5 Day

Regulatory Classification / Special Report Format
NPDES | Drinking Water | DEP Form(s)
RCRA | MCP GW1/S1 | MWRA Smart Rpt
Other | MCP QA/QC Rpt XX

Shaded areas for office use

Analysis Requested
Check analysis and specify method and analytes in comments section.
For example:
500-series for drinking water
600-series for waste water
8000-series for haz/solid waste
Use comments section to further define.

Comments
(Special Instructions)

MCP case narrative

Sample Type Codes
WW-Wastewater DW-Drinking water SW-Surfacewater
LW-Labwater GW-Groundwater A-Air
S-Solid / Soil SL-Sludge O-Oil Z-Other

Sample ID	Sample Type	Sampler's Initials	Date Time Collected	Grab	Comp.	# Containers	Plastic(P) or Glass(G)	Preservative: NaHSO4/MeOH	HNO3 to pH <2	H2SO4 to pH <2	HCl to pH <2	NaOH to pH >12	NAOH/ZNAC	None / 4° C	Ammonia-Nitrogen	Chloride, Sulfate	Specific Conductivity	Nitrate, Nitrite	Groundwater metals	Surfacewater metals	Sediment: Al/Cr/Fe	Other	Other	Other	Other	Other	Other
OC-ISCO-3	SW	PLC/MAH	11/18/08 12:00	X		4	P		X	X				X	X	X	X	X		X						
OC-ISCO-2			11/18/08 12:10												X	X	X	X		X						
OC-PZ-16RR			11/18/08 12:35												X	X	X	X		X						
OC-PZ-17RR			11/18/08 12:50												X	X	X	X		X						
OC-SD-17			11/18/08 13:00												X	X	X	X		X						
OC-PZ-18R			11/18/08 13:10												X	X	X	X		X						
OC-ISCO-1			11/18/08 13:25												X	X	X	X		X						
OC-PZ-18RMS			11/18/08 13:10												X	X	X	X		X						
OC-PZ-18RMSD			11/18/08 13:10												X	X	X	X		X						
OC-GW-42S	GW		11/17/08 14:25			3									X	X	X		X							

Dissolved metals are field filtered.

Groundwater Metals: Dissolved Al/Cr

Surfacewater Metals: Dissolved/Total Al/Cr/Na

All surface water samples have short hold (Nitrate/Nitrite)

Sampled by (print): David Chapman / Mark Maggiore
Signature:

Relinquished by:	Date:	Time:	Received by:	Date:	Time:
David Chapman	11/18/08	1500		11/18/08	1500
	11/18/08	1640		11/18/08	1640

Method of shipment:

TestAmerica-Westfield

Cooler? (Y) N Samples Iced? (Y) / N
Temp @ receipt: 4.2 °C
Preservation/pH checked
By: VAC Date: 11/18/08

White = Lab file Yellow = Report copy Pink = Customer copy
STL-8245 (1000)

OLIN-WILMINGTON
LEVEL I DATA QUALITY EVALUATION
STANDARD OPERATING PROCEDURE AND CHECKLIST
ICP METALS BY METHOD 6010B/200.7

Reviewer/Date
Sr. Review/Date Chris Grandi 12/6/08
Lab Report # 19938
Project # 6100080016

1.0 Laboratory Deliverable Requirements

1.1 Laboratory Information: Was all of the following provided in the laboratory report? Yes [✓] No [ ] N/A [ ] Comments:
Check items received.

☑ *Name of Laboratory* ☑ *Address* ☑ *Project ID* ☑ *Phone #* ☑ *Sample identification – Field and Laboratory*

Client Information: ☑ *Name* ☑ *Address* ☑ *Client Contact* *(IDs must be cross-referenced)*

ACTION: If no, contact lab for submission of missing or illegible information.

1.2 Laboratory Report Certification Statement *Yes [✓] No [ ] N/A [ ] Comments:*

Does the laboratory report include a completed Analytical Report Certification in the required format?

***ACTION**: If no, contact lab for submission of missing certification or certification with correct format.*

1.3 Laboratory Case Narrative: *Yes [✓] No [ ] N/A [ ] Comments:*

☑ *Narrative serves as an exception report for the project and method QA/QC performance.* ☐ *Narrative includes an explanation of each discrepancy on the*

NA *Certification Statement.* Cr in MBK

***ACTION**: If no, contact lab for submission of missing or illegible information.*

1.4 Chain of Custody (COC) copy present with all documentation completed Yes [✓] No [ ] N/A [ ] Comments:

NOTE: Olin receives and maintains the *original COC.*

ACTION: If no, contact lab for submission of copy of completed *COC.*

1.5 Sample Receipt Information (*Cooler Receipt Form present?*): Yes [✓] No [ ] N/A [ ] Comments:

Were each of the following tasks completed and recorded upon receipt of the sample(s) into the laboratory?

☑ Sample temperature confirmed: must be 1° – 10° C. (If samples were sent by courier and delivered on the same day as collection, temperature requirement does not apply).

☑ Container type noted ☑ sample condition observed ☑ pH verified (where applicable) ☑ Field and lab IDs cross referenced

ACTION: If no, contact lab for submission of missing or incomplete documentation.

1.5.1 Were all samples delivered to the laboratory without breakage? **Yes** [✓] No [ ] N/A [ ] Comments:

1.5.2 Does the *Cooler Receipt Form* or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data? Yes [ ] **No** [✓] N/A [ ] Comments:

1.6 Sample Results Section: *Was each of the following requirements supplied in the laboratory report for each sample?* **Yes** [✓] No [ ] N/A [ ] Comments:

☑ Field ID and Lab ID ☑ *Date and time collected* ☑ Analyst Initials ☑ *Dilution Factor* NA ☐ % moisture or solids ☑ *Reporting limits*
NA ☐ *Clean-up method* ☑ Analysis method ☑ *Preparation method* ☑ *Date of preparation/extraction/digestion clean-up and analysis, where applicable*
☑ Matrix ☑ Target analytes and concentrations ☐ Units (soils must be reported in dry weight)

ACTION: If no, contact lab for submission of missing or incomplete information.

1.7 QA/QC Information: Was each of the following information supplied in the laboratory report for each sample batch? **Yes** [✓] No [ ] N/A [ ] Comments:

☐ Method blank results ☑ LCS recoveries ☑ MS/MSD recoveries and RPDs ☐ Laboratory duplicate results (where applicable)

LCSD

ACTION: If no, contact lab for submission of missing or incomplete information.

2.0 Holding Times

Have any technical holding times, determined from date of collection to date of analysis, been exceeded? Holding time for metals is 180 days from sample collection to analysis for both water and soil. Yes [ ] **No [✓]** N/A [ ] Comments:

NOTE: List samples that exceed hold time with # of days exceeded on checklist

ACTION: If technical holding times are exceeded, qualify all positive results (J) and non-detects (UJ). If grossly exceeded (2X holding time) reject (R) all non-detect results.

3.0 Laboratory Method

3.1 Was the correct laboratory method used? **Yes [✓]** No [ ] N/A [ ] Comments:

Water Digestion	3005A or 3010A or 3020A
Soil Digestion	3050B
Metals	6010B or 200.7

ACTION: If no, contact laboratory to provide justification for method change compared to the requested method. Contact senior chemist to inform Client of change and to request variance.

3.2 Are the practical quantitation limits the same as those specified by the **Yes [✓]** No [ ] N/A [ ] Comments:
☐ SOW ☐ QAPP ☐ Lab ☐ MADEP

NOTE: *Verify that the reported metals match the target list specified on the COC.*

IRWP

ACTION: If no, evaluate variation with respect to sample matrix, preparation, dilution, moisture, etc. If sample PQL is indeterminate, contact lab for explanation.

3.3 Are results present for each sample in the SDG? Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If no, check Request for Analysis to verify if method was ordered and COC to verify that it was sent, and contact lab for resubmission of the missing data

3.4 If dilutions were required, were dilution factors reported? Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact the lab for submission.

4.0 Method Blanks

4.1 Is the Method Blank Summary present? Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If no, call the laboratory for submission of missing data.

4.2 Frequency of Analysis: Was a method blank analyzed for each digestion batch of < 20 field samples? Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact laboratory for justification. Consult senior chemist for action needed. Narrate non-compliance.

4.3 Is the method blank less than the PQLs for all target elements? Yes [✓] No [ ] N/A [ ] Comments:

NOTE: *MADEP requires the method blank to be matrix matched and digested with the samples*

4.4 Do any method blanks have positive results for metals? Qualify data according to the following: Yes [ ] **No** [✓] N/A [ ] Comments:

Cr 0.44 J ISCO-3 u

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

ACTION: For any blank with positive results, list all contaminants for each method blank including the concentration detected and the flagging level (flagging level = 5x the blank value) and the associated samples and qualifiers.

5.0 Laboratory Control Standard

5.1 Was a laboratory control standard run with each analytical batch of 20 samples or less?

Yes [✓] No [ ] N/A [ ] Comments:

NOTE: *A full target, second source LCS is required by MADEP.*
ACTION: Call laboratory for LCS form submittal. If data are not available, use professional judgement to evaluate data accuracy associated with that batch.

5.2 Is a LCS Summary Form present?

Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact lab for resubmission of missing data.

5.3 Is the recovery of any analyte outside of MADEP control limits?

Yes [ ] **No [✓]** N/A [ ] Comments:

Sample Type	*MADEP % Rec*
Water	*80-120*
Soil	within Lab generated limits

ACTION: If recovery is above the upper limit, qualify all positive sample results within the batch as (J). If recovery is below the lower limit, qualify all positive and non-detects results within the batch as (J). If LCS recovery is <30%, positive and non-detect results are rejected (R).

Comments:

6.0 Matrix Spikes

Matrix spikes may be collected at different frequencies based on monthly, quarterly, or task specific schedules. Confirm spike requirements for each set with the senior chemist.

6.1 Were project-specific MS/MSDs collected? List project samples that were spiked.

Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact senior chemist to see if any were specified.

6.2 Is the Matrix Spike/Matrix Spike Duplicate Recovery Form present?

Yes [✓] No [ ] N/A [ ] Comments:

NOTE: *A full target, second source MS/MSD is required by MADEP.*
ACTION: If any matrix spike data are missing, call lab for resubmission.

6.3 Were matrix spikes analyzed as indicated on the COC and project schedule?

Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If any matrix spike data are missing, call lab for resubmission. If none, no qualification is needed. Narrate non-compliance.

6.4 Are any metal spike recoveries outside of the QC limits?

Yes [ ] No [✓] N/A [ ] Comments:

Sample Type	***MADEP*** ***% Rec***	QAPP % Rec	Method
Water	*75-125*	N/A	6010B
Water	*N/A*	70-130	200.7
Soil	*75-125*	75-125	6010B

NOTE: $\%R = \frac{(SSR-SR)}{SA} \times 100\%$ Where: SSR = Spiked sample result, SR = Sample result, SA = Spike added

NOTE: If dilutions are required due to high sample concentrations (> 4X spike), the data are evaluated, but no flags are applied.

NOTE: If only one of the recoveries for an MS/MSD pair is outside of the control limits, no qualification is necessary. Use professional judgment for the MS/MSD flags.

ACTION: MS/MSD flags only apply to the sample spiked. If the recoveries of the MS and MSD exceed the upper control limit, qualify positive results as estimated (J). If the recoveries of the MS and MSD are lower than the lower control limit, qualify positive results and non-detects (J).

6.5 Are any RPDs for MS/MSD recoveries outside of the QC limits? Yes [ ] **No** [✓] N/A [ ] Comments:

NOTE: RPD = $\frac{S-D}{(S+D)/2} \times 100\%$ Where: S = MS sample result
D = MSD sample result

NOTE: If dilutions are required due to high sample concentrations, the data are evaluated, but no flags are applied.

ACTION: If the RPD exceeds the control limit, qualify positive results and non-detects (J).

7.0 Laboratory Duplicate

7.1 Was a laboratory duplicate sample analyzed? If so, is the Laboratory Duplicate Sample Form present? **Yes** [ ] No [✓] N/A [ ] Comments:

See LCSD

NOTE: *MADEP refers to this sample as a "matrix duplicate".*

ACTION: If not analyzed, qualification is not needed. If data is missing, contact laboratory for resubmission of report. Narrate non-compliance.

7.2 Is the RPD between the result for the laboratory duplicate sample and the result for the parent sample outside of the QA/QC limits? Yes [ ] **No** [✓] N/A [ ] Comments:

MADEP Laboratory Duplicate Sample RPD Criteria:	QAPP RPD
For aqueous results > 5× RL, RPD must be ± 20%	20
For aqueous results < 5× RL, RPD must be ≤ RL	20
For soil/sediment results > 5× RL, RPD must be ± 35%	20
For soil/sediment results < 5× RL, RPD must be ≤ 2× RL	20

ACTION: If the RPD exceeds the limits, qualify both positive results and non-detects as estimated and flag them J. Narrate non-compliance

8.0 Sampling Accuracy

The majority of ground water samples are collected directly from a tap, process stream, or with dedicated tubing. Rinse blanks will not be collected.

8.1 Were rinsate blanks collected? Prior to evaluating rinsate blanks, obtain a list of the associated samples from the senior chemist. Yes [ ] No [✓] N/A [ ] Comments:

8.2 Do any rinsate blanks have positive results? Yes [ ] **No** [ ] N/A [✓] Comments:

***NOTE**: MADEP does not require the collection of rinsate blanks.*

ACTION: Evaluate rinsate results against blank results to determine if contaminant may be laboratory-derived. If results are not lab-related, qualify according to below.

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

9.0 Field Duplicates

9.1 Were field duplicate samples collected? Obtain a list of samples and their associated field duplicates. Yes [ ] **No** [✓] N/A [ ] Comments:

9.2 Were field duplicates collected per the required frequency? Yes [ ] No [ ] N/A [✓] Comments:

SOW ☐ QAPP *(1 per 10)* ☐ *MADEP Option 1 (1 per 20)* ☐ *MADEP Option 3 (1 per 10)* ☐

9.3 Was the RPD ≤ 50% for soils or waters? Calculate the RPD for all results and attach to this review. Yes [ ] No [ ] N/A [ ] Comments:

ACTION: RPD must be ≤50% for soil and water. Qualify data (J) for both sample results if the RPD exceeds 50%.

10.0 Special QA/QC

10.1 Were both total and dissolved metals analysis performed? If so, the dissolved metal concentration should not exceed that of the total metal. Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If results for both total and dissolved are ≥ 5x the PQL **and** the dissolved concentration is 10% higher than the total, flag both results as estimated (J). If total and dissolved concentrations are less than 5x the PQL **and** the **difference** exceeds 2x the PQL, flag both results as estimated (J)

ISCO-3
ISCO-2
SD-17
PZ-18R

J qual
Sdum.

10.0 Application of Validation Qualifiers

Was any of the data qualified? Yes [✓] No [__] N/A [__] Comments:

If so, apply data qualifiers directly to the DQE copy of laboratory report and **flag pages** for entry in database.

CV Blanks
Dissolve vs Total

REFERENCES

LAW, 1999, "Final Quality Assurance Project Plan, Olin Wilmington Property, 51 Eames Street, Wilmington, MA", LAW Engineering and Environmental Services, Kennesaw, GA 30144. August 1999

U.S. Environmental Protection Agency (USEPA), 1989. "Region 1 Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses"; Hazardous Site Evaluation Division; February 1989.

MADEP, 2001. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Massachusetts Quality Assurance and Quality Control (QA/QC) Requirements." BWSC-CAM, Interim Final Draft, Revision No. 2, 5 October 2001.

MADEP, 2001. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Quality Assurance and Quality Control Guidelines for Sampling, Data Evaluation and Reporting Activities," BWSC-CAM, Section VII, Public Comment Draft, Revision No. 0, 21 December 2001.

OLIN-WILMINGTON
LEVEL I DATA QUALITY EVALUATION
STANDARD OPERATING PROCEDURE AND CHECKLIST
WET CHEMISTRY PARAMETERS BY VARIOUS METHODS

Reviewer/Date
Sr. Review/Date Chris Ricciardi 12/6/08
Lab Report # 19938
Project # 610008001G

Note: The following analyses will be evaluated according to the "MADEP QA/QC Guidelines for **Sampling, Data Evaluation and Reporting Activities.**" MADEP, however, may not list QA/QC criteria for every chemical analysis. Where not defined by MADEP, criteria will default to values stipulated in the QAPP. Where the QAPP does not define criteria, QA/QC requirements will default to limits employed by the laboratory.

1.0 Laboratory Deliverable Requirements

1.1 Laboratory Information: Was all of the following provided in the laboratory report? Yes [✓] No [ ] N/A [ ] Comments:
Check items received.

☑ *Name of Laboratory* ☑ *Address* ☑ *Project ID* ☑ *Phone #* ☐ *Sample identification – Field and Laboratory*

Client Information: ☑ *Name* ☐ *Address* ☑ *Client Contact* *(IDs must be cross-referenced)*

ACTION: If no, contact lab for submission of missing or illegible information.

1.2 Laboratory Report Certification Statement *Yes [✓] No [ ] N/A [ ] Comments:*

Does the laboratory report include a completed Analytical Report Certification in the required format?

***ACTION**: If no, contact lab for submission of missing certification or certification with correct format.*

1.3 Laboratory Case Narrative: *Yes [✓] No [ ] N/A [ ] Comments:*

☑ *Narrative serves as an exception report for the project and method QA/QC performance.* ☑ *Narrative includes an explanation of each discrepancy on the Certification Statement.* IC runs at 10X dilution NH3 Fails MS

***ACTION**: If no, contact lab for submission of missing or illegible information.*

1.4 Chain of Custody (COC) copy present with all documentation completed? Yes [✓] No [ ] N/A [ ] Comments:

Does the laboratory report include copies of Chain of Custody forms containing all samples in this SDG?

NOTE: Olin receives and maintains the *original* COC.

ACTION: If no, contact lab for submission of copy of missing completed COC.

1.5 Sample Receipt Information (*Cooler Receipt Form*): Were each of the following tasks completed and recorded upon receipt of the sample(s) into the laboratory?

Yes [✓] No [ ] N/A [ ] Comments:

☑ Sample temperature confirmed: must be 1° – 10° C. (If samples were sent by courier and delivered on the same day as collection, temperature requirement does not apply).

☑ Container type noted ☑ Condition observed ☑ pH verified (where applicable) ☐ Field and lab IDs cross referenced

ACTION: If no, contact lab for submission of missing or incomplete documentation.

1.5.1 Were the correct bottles and preservatives used? Yes [✓] No [ ] N/A [ ] Comments:

Ammonia,– 1 Liter polyethylene/H_2SO_4 to pH<2,cool to 4°C

Oil & Grease – 1 Liter glass/HCL or H2SO4 to pH<2,cool to 4°C

Alkalinity – 1 Liter polyethylene/cool to 4°C

Chemical Oxygen Demand – 50 mL polyethylene/H_2SO_4 to pH<2,cool to 4°C

Chloride, pH, sulfate, nitrate, nitrite - 50 mL polyethylene/cool to 4°C

Nitrate/nitrite - H2SO4 to pH<2,cool to 4°C

Organic Carbon – 500 mL amber glass bottle/HCl or H_2SO_4 to pH<2,cool to 4°C

Sulfide – 50 mL polyethylene/ZnAcetate + NaOH to pH>9, cool to 4°C

Phenolics - H_2SO_4 to pH<2,cool to 4°C

Specific conductance, TDS, TSS – 100 mL polyethylene/cool to 4°C

ACTION: If no, inform senior chemist. Document justification for change in container/volume (if applicable), qualify positive and non-detect data (J) data if cooler temperature exceeds 10°C. Rejection of data requires professional judgment

1.5.2 Were all samples delivered to the laboratory without breakage? Yes [✓] No [ ] N/A [ ] Comments:

1.5.3 Does the *Cooler Receipt Form* or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data? Yes [ ] No [✓] N/A [ ] Comments:

1.6 **Sample Results Section:** *Was the following information supplied in the laboratory report for each sample?* **Yes** [✓] No [ ] N/A [ ] Comments:

- [✓] Field ID and Lab ID
- [✓] Date and time collected
- [✓] Analyst Initials
- [✓] Dilution Factor
- [ ] % moisture or solids (NA)
- [✓] Reporting limits
- [NA] *Clean-up method*
- [✓] Analysis method
- [✓] Preparation method
- [✓] Date of preparation/extraction/digestion clean-up and analysis, where applicable
- [✓] Matrix
- [✓] Target analytes and concentrations
- [✓] Units (soils must be reported in dry weight)

ACTION: If no, contact lab for submission of missing or incomplete information.

1.7 **QA/QC Information:** Was the following information provided in the laboratory report for each sample batch? **Yes** [✓] No [ ] N/A [ ] Comments:

- [✓] Method blank results
- [✓] LCS recoveries
- [✓] MS/MSD recoveries and RPDs
- [ ] Laboratory duplicate results (where applicable) (ND)

Cl, SO_4, NO_2, NO_3

ACTION: If no, contact lab for submission of missing or incomplete information.

2.0 **Holding Times** Yes [ ] **No** [✓] N/A [ ] Comments:

Have any technical holding times, determined from date of collection to date of analysis, been exceeded? The holding times are as follows:

28 days = ammonia, chemical oxygen demand, chloride, organic carbon, oil & grease, specific conductance, total organic carbon and sulfate

Alkalinity = 14 days | Sulfide, TDS, TSS = 7 days | pH = analyze immediately | Nitrate nitrogen as N = 48 hrs ✓

Nitrite nitrogen as N = 48 hrs ✓ | Nitrate + Nitrite as N = 28 days

NOTE: List samples that exceed hold time with # of days exceeded on checklist

ACTION: If technical holding times are exceeded qualify results (J). For water samples that are grossly exceeded (>2X hold time) reject (R) all non-detect results. Professional judgment used to qualify soils.

3.0 **Laboratory Method** **Yes** [✓] No [ ] N/A [ ] Comments:

3.1 Was the correct laboratory method used?

ACTION: If no, contact lab to provide justification for method change compared to the requested method. Contact senior chemist to inform Client of change or to request variance.

3.2 Are the practical quantitation limits the same as those specified by the ☑ QAPP/IRSWP ☐ Lab? **Yes** [✓] No [ ] N/A [ ] Comments:

Note: *The MADEP QA/QC Guidelines do not yet list PQLs for wet chemistry analyses, therefore all criteria will default to values stipulated in the QAPP*. Where the QAPP does not define criteria, QA/QC requirements default to limits employed by the lab**. Other criteria may also apply.*

Ammonia* ☑ = 0.1 mg/ L	Alkalinity** ☐ = 1 mg/L	Bicarbonate Alkalinity** ☐ = 1 mg/L	Carbonate Alkalinity** ☐ = 1 mg/L
Nitrate Nitrogen as N* ☑ = .05 mg/L	Nitrite Nitrogen as N* ☑ = .01 mg/L	Chloride* ☑ = 1 mg/L	Hardness * ☐ = 2 mg/L
Spec. Cond.** ☐ 3 umhos/cm	Total Organic Carbon** ☐ = 1 mg/L	Oil & Grease* ☐ = 5.5 mg/L	Sulfate (EPA 300.0)* ☑ = 2 mg/L
COD:* Low – 20 mg/L	COD* High - 50 mg/L ☐	TDS* ☐ = 10 mg/L	TSS* ☐ = 5 mg/L
pH* ☐ < 2 to > 12	Phenolic - 0.01 mg/L		

Other parameter(list) _____ PQL = _____ ☐ Source of PQL = _____

Other parameter(list) _____ PQL = _____ ☐ Source of PQL = _____

ACTION: If no, evaluate change with respect to sample matrix, preparation, dilution, moisture, etc. If sample PQL is indeterminate, contact lab for explanation.

3.3 Are the appropriate parameter results present for each sample in the SDG? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, check Request for Analysis to verify if method was ordered and COC to verify that it was sent, and contact lab for resubmission of the missing data

3.4 If *dilutions were required, were dilution factors reported?* **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact the lab for submission.

4.0 Method Blanks **Yes** [✓] No [ ] N/A [ ] Comments:

4.1 Are the Method Blank Summaries present?

ACTION: If no, call the laboratory for submission of missing data.

4.2 Was a method blank analyzed for each analysis batch of wet chemistry field samples of 20 or less? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, document discrepancy in case narrative and contact lab for justification. Consult senior chemist for action needed.

4.3 Is the method blank less than the PQL? (See Section 3.2 for PQLs). **Yes [✓]** No [ ] N/A [ ] Comments:

4.4 Do any method blanks have positive results for wet chemistry parameters? Qualify data according to the following: Yes [ ] **No [✓]** N/A [ ] Comments:

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

ACTION: If any blank has positive results, list all the concentrations detected and flagging level (flagging level = 5 × blank value) on the checklist. List all affected samples and their qualifiers.

5.0 Laboratory Control Standards

5.1 Was a laboratory control standard (LCS) run with each analytical batch of 20 samples or less? **Yes [✓]** No [ ] N/A [ ] Comments:

ACTION: If no, call laboratory for LCS form submittal. If data is not available, use professional judgment to determine qualification actions for data associated with the batch.

5.2 Is a LCS Summary Form present? **Yes [✓]** No [ ] N/A [ ] Comments:

ACTION: If no, contact lab for resubmission of missing data.

5.3 Is any wet chemistry analyte LCS recovery outside the control limits? Yes [ ] **No [✓]** N/A [ ] Comments:

LCS Limits:

Alkalinity** ☐ = 80-120%	Bicarbonate Alkalinity** ☐ = 80-120%	Carbonate Alkalinity** ☐ = 80-120%	Specific Conductivity *☐ = 80-120%
Total Organic Carbon** ☐ = 80-120%	TDS** ☐ = 80-120%	Oil & Grease* ☐ = 80-120%	Ammonia Nitrogen as N* ☑ = 80-120%
COD Low* ☐ = 80-120%	COD High* ☐ = 80-120%	Nitrate Nitrogen as N** ☑ = 80-120%	Nitrite Nitrogen as N** ☑ = 80-120%
Hardness* ☐ = 80-120%	Chloride* ☑ = 80-120%	Sulfate (EPA 300.0)* ☑ = 80-120%	pH* ☐ = 98-102% TSS* NA

Other parameter(list) _____ %R = _____ ☐ Rec Limits= _____

Other parameter(list) _____ %R = _____ ☐ Rec Limits = _____

(MADEP has not yet defined LCS recovery limits for wet chemistry analyses.)

ACTION: If recovery is above the upper limit, qualify all positive sample results within the batch as (J). If recovery is below the lower limit, qualify all positive and no-detect results within the batch as (J). If LCS recovery is <10%, non-detect results are rejected (R).

6.0 Matrix Spikes

Matrix spikes may be collected at different frequencies based on monthly, quarterly, or task specific schedules. Confirm spike requirements for each set with the senior chemist.

6.1 Were project-specific MS/MSDs analyzed? List project samples that were spiked.

ACTION: If no, contact senior chemist to see if any were specified.

Yes [✓] No [ ] N/A [ ] Comments:

6.2 Is the MS/MSD Recovery Form present?

ACTION: If no, contact lab for resubmission of missing data.

Yes [✓] No [ ] N/A [ ] Comments:

6.3 Were matrix spikes analyzed at the required frequency of 1 per 20 samples per matrix?

ACTION: If any matrix spike data is missing, call lab for resubmission.

Yes [✓] No [ ] N/A [ ] Comments:

6.4 Are any wet chemistry analyte spike recoveries outside of the QC limits?

Yes [ ] No [✓] N/A [ ] Comments:

NH_3 67 % in MSD
J all results

NOTE: $\%R = \frac{(SSR-SR)}{SA} \times 100\%$ Where: SSR = Spiked sample result
SR = Sample result
SA = Spike added

MSD out

MS/MSD Recovery Limits:

Alkalinity* = NA | Bicarbonate Alkalinity* = NA | Carbonate alkalinity* = NA | Ammonia* (LACHAT) ☐ = 75-125%

Chloride*(SM 4500 Cl) ☑ = 75-125% | Specific Conductivity * = NA | Total Organic Carbon* = NA | TDS** = NA

Oil & Grease* = NA | COD Low* ☐ = 75-125% | COD High* ☐ = 75-125% | Nitrate Nitrogen as N** ☑ = 75-125%

Nitrite Nitrogen as N** ☑ = 75-125% | Hardness* ☐ = 75-125% | Sulfate (EPA 300.0)* ☑ = 75-125% | pH* = NA | TSS* = NA

Other parameter(list) _____ % R = _____ ☐ Rec Limits = _____

* = Laboratory Limits ** = Olin QAPP Limits (*MADEP has not yet defined LCS recovery limits for wet chemistry analyses.*)

NOTES: 1) If only one of the recoveries for an MS/MSD pair is outside of the control limits, no qualification is necessary. Use professional judgment for the MS/MSD flags.
2) If the MS/MSD was performed by the laboratory on a non-project sample, no qualification is required.

ACTION: MS/MSD flags only apply to the sample spiked. Do not evaluate if sample concentration is > 4X spike. If the recoveries of the MS and MSD exceed the upper control limit, qualify positive results as estimated (J). If the recoveries of the MS and MSD are lower than the lower control limit but > 30%, qualify both positive results and non-detects (J). If the MS/MSD recovery is < 30% and the sample is non-detect, the results are considered unusable and flagged (R).

ACTION: Laboratory control limits apply when spiked sample results fall within the normal calibration range. If dilutions are required due to high sample concentrations, the data is evaluated, but no flags are applied.

6.5 Are any RPDs for MS/MSD recoveries outside of the QA/QC limits?

Yes [✓] **No** [__] N/A [__] Comments:

NOTE: $RPD = \frac{S - D}{(S + D)/2} \times 100\%$ Where S = MS result
D = MSD result

MS/MSD RPD Limits:

RPD ≤20

7.0 Laboratory Duplicate

Are the RPDs for the laboratory duplicates <20% unless otherwise specified below?

Yes [__] No [✓] N/A [__] Comments:

ACTION: If the RPD is greater than specified limits, qualify all results for that analyte as estimated (J).

pH* ☐ = 3% Specific Conductivity *☑ = 5% TSS** ☐ = 6% TDS** ☐ = 6%

8.0 Sampling Accuracy

The majority of ground water samples are collected directly from a tap, process stream, or with dedicated tubing. Rinse blanks will not be collected.

8.1 Were rinsate blanks collected? Prior to evaluating rinsate blanks, obtain a list of the associated samples from the senior chemist. **Yes** [ ] No [✓] N/A [ ] Comments:

8.2 Do any rinsate blanks have positive results? Yes [ ] **No** [ ] N/A [✓] Comments:

ACTION: Evaluate rinsate results vs. blank results to determine if contaminant may be laboratory-derived. If not lab-related, qualify according to the table below.

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

NOTE: *MADEP does not require the collection of rinsate blanks.*

9.0 Field Duplicates

9.1 Were field duplicate samples collected? Obtain a list of samples and their associated field duplicates. **Yes** [ ] No [✓] N/A [ ] Comments:

9.2 Were field duplicates collected per the required frequency? **Yes** [ ] No [ ] N/A [✓] Comments:

QAPP/IRSWP ☐ *MADEP Option 1(1 per 20)* ☐ *MADEP Option 3 (1 per 10)* ☐

9.3 Was the RPD ≤ 30% for waters ≤ 50% for soils? Calculate the RPD for results and attach to this review. **Yes** [ ] No [ ] N/A [✓] Comments:

ACTION:. Qualify data (J) for both sample results if the RPD exceeded.

Was any of the data qualified? Yes [✓] **No** [__] N/A [__] Comments:

If so, apply data qualifiers directly to the DQE copy of laboratory report and **flag pages** for entry in database.

REFERENCES:-

MACTEC, 2007. "Draft Interim Response Steps Work Plan"; Olin Chemical Superfund Site, 51 Eames Street, Wilmington, Massachusetts.; Project No. 6300-06-0010/41.1; July 25, 2007.

Massachusetts Department of Environmental Protection (MADEP), 2004. "The Compendium of Quality Assurance and Quality Control Requirements and Performance Standards for Selected Analytical Methods Used in Support of Response Actions for the Massachusetts Contingency Plan (MCP)"; Bureau of Waste Site Cleanup; 1 Winter Street, Boston, Massachusetts 02108; WSC-CAM; May 2004.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

FILE COPY

ANALYTICAL REPORT

Job Number: 360-20017-1

Job Description: Slurry Wall/ Slurry Cap

For:
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Attention: Mr. Steven Morrow

CHECKED FOR COMPLETENESS OF PARAMETERS ORDERED BY:
2/2/09

Approved for release.
Joe Chimi
Report Production Representative
12/5/08 10:37 AM

Designee for
Becky C Mason
Project Manager II
becky.mason@testamericainc.com
12/05/2008

The test results in this report meet all NELAP requirements for accredited parameters. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced except in full, and with written approval from the laboratory.
TestAmerica Westfield Certifications and Approvals: MADEP MA014, RIDOH57, CTDPH 0494, VT DECWSD, NH DES 2539, NELAP FL E87912 TOX, NELAP NJ MA008 TOX, NELAP NY 10843, NY DOH 10843.

Field sampling is performed under SOPs WE-FLD-001 and WE-FLD-002

Table of Contents

Cover Title Page 1
Report Narrative 3
Method Summary 7
Method / Analyst Summary 8
Sample Summary 9
Sample Results 10
Sample Datasheets 11
Data Qualifiers 47
QC Results 48
Qc Association Summary 49
Qc Reports 54
Sample Receipt Checklist 68
Client Chain of Custody 69

MADEP MCP Analytical Method Report Certification Form

Laboratory Name:	**TestAmerica Westfield**	Project #:	**360-20017-1**
Project Location:	**Slurry Wall/Slurry Cap**	MADEP RTN[1]:	

This form provides certifications for the following data set:[list Laboratory Sample ID Number(s)]
360-20017-(1-18)

Sample Matrices: **Groundwater** Soil/Sediment Drinking Water Other:

MCP SW-846 Methods Used	8260B( )	8151A ( )	8330 ( )	6010B (**x**)	7470A/1A ( )	Other ( )
	8270C( )	8081A ( )	VPH ( )	6020 ( )	9014M[2]/9012 ( )	
As specified in MADEP Compendium of Analytical Methods. (check all that apply)	8082 ( )	8021B ( )	EPH ( )	7000 S[3]( )	7196A ( )	

1 List Release Tracking Number (RTN), if known
2 M - SW-846 Method 9014 or MADEP Physiologically Available Cyanide (PAC) Method
3 S - SW-846 Methods 7000 Series List individual method and analyte.

An affirmative response to questions A, B, C and D is required for "Presumptive Certainty" status

A	Were all samples received by the laboratory in a condition consistent with that described on the Chain-of-Custody documentation for the data set?	Yes √		No[1]
B	Were all QA/QC procedures required for the specified analytical method(s) included in this report followed, including the requirement to note and discuss in a narrative QC data that did not meet appropriate performance standards or guidelines?	Yes √		No[1]
C	Does the analytical data included in this report meet all the requirements for "Presumptive Certainty", as described in Section 2.0 (a), (b), (c) and (d) of the MADEP document CAM VII A, " Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	Yes √	N/A	No[1]
D	**VPH and EPH methods only:** Was the VPH or EPH Method conducted without significant modifications (see Section 11.3 of respective Methods)?	Yes	N/A √	No[1]

A response to questions E and F below is required for "Presumptive Certainty" status

E	Were all QC performance standards and recommendations for the specified methods achieved?	Yes √		No[1]
F	Were results for all analyte-list compounds/elements for the specified method(s) reported?	Yes	N/A	No[1] √

[1] All Negative responses must be addressed in an attached Environmental Laboratory case narrative.

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.

Signature: **Position:** Laboratory Director

Printed Name: Steven C. Hartmann **Date:** 12/5/08 10:33

The certification form has been electronically signed and approved. CAM VII A, Rev 3.2 April-04

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MADEP MA014
NY DOH 10843
RI DOH 57
CT DPH 0494
VT DECWSD

NELAP FL E87912 TOX
NELAP NJ MA008 TOX
NELAP NY 10843
NH DES 253901-A

TestAmerica Westfield
53 Southampton Rd,
Westfield, MA 01085
Tel:(413)572-4000
Fax:(413)572-3707

MADEP MCP Analytical Method Report Certification Form

Laboratory Name:	**TestAmerica Westfield**	Project #:	**360-20017-1**
Project Location:	**Slurry Wall/Slurry Cap**	MADEP RTN[1]:	

This form provides certifications for the following data set:[list Laboratory Sample ID Number(s)]
360-20017-(1-18)

Sample Matrices: **Groundwater** Soil/Sediment Drinking Water Other:

MCP SW-846 Methods Used	8260B( )	8151A ( )	8330 ( )	6010B ( )	7470A/1A ( )	Other (**x**)
	8270C( )	8081A ( )	VPH ( )	6020 ( )	9014M[2]/9012 ( )	
As specified in MADEP Compendium of Analytical Methods. (check all that apply)	8082 ( )	8021B ( )	EPH ( )	7000 S[3]( )	7196A ( )	

1 List Release Tracking Number (RTN), if known
2 M - SW-846 Method 9014 or MADEP Physiologically Available Cyanide (PAC) Method
3 S - SW-846 Methods 7000 Series List individual method and analyte.

An affirmative response to questions A, B, C and D is required for "Presumptive Certainty" status

A	Were all samples received by the laboratory in a condition consistent with that described on the Chain-of-Custody documentation for the data set?	Yes √		No[1]
B	Were all QA/QC procedures required for the specified analytical method(s) included in this report followed, including the requirement to note and discuss in a narrative QC data that did not meet appropriate performance standards or guidelines?	Yes √		No[1]
C	Does the analytical data included in this report meet all the requirements for "Presumptive Certainty", as described in Section 2.0 (a), (b), (c) and (d) of the MADEP document CAM VII A, " Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	Yes	N/A √	No[1]
D	**VPH and EPH methods only:** Was the VPH or EPH Method conducted without significant modifications (see Section 11.3 of respective Methods)?	Yes	N/A √	No[1]

A response to questions E and F below is required for "Presumptive Certainty" status

E	Were all QC performance standards and recommendations for the specified methods achieved?	Yes		No[1] √
F	Were results for all analyte-list compounds/elements for the specified method(s) reported?	Yes	N/A √	No[1]

[1] All Negative responses must be addressed in an attached Environmental Laboratory case narrative.

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.

Signature: **Position:** Laboratory Director

Printed Name: Steven C. Hartmann **Date:** 12/5/08 10:33

The certification form has been electronically signed and approved. CAM VII A, Rev 3.2 April-04

TestAmerica
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MADEP MA014
NY DOH 10843
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NELAP FL E87912 TOX
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NELAP NY 10843
NH DES 253901-A

TestAmerica Westfield
53 Southampton Rd,
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CASE NARRATIVE

Client: Olin Corporation

Project: Slurry Wall/ Slurry Cap

Report Number: 360-20017-1

This case narrative is in the form of an exception report, where only the anomalies related to this report, method specific performance and/or QA/QC issues are discussed. If there are no issues to report, this narrative will include a statement that documents that there are no relevant data issues as stipulated in the MCP reporting requirements.

In order to facilitate report review, a separate MCP Analytical Method Report Certification Form is included for each method requested.

It should be noted that samples with elevated Reporting Limits (RLs) as a result of a dilution may not be able to satisfy "MCP program" reporting limits in some cases if the "adjusted" RL is greater than the applicable MCP standards or criterion to which the concentration is being compared. Such increases in the RLs are an unavoidable but acceptable consequence of sample dilution that enables quantification of target analytes which exceed the calibration range.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

The samples were received on 11/21/2008; the samples arrived in good condition, properly preserved and on ice. The temperatures of the coolers at receipt were 1.2 and 1.0ºC.

Note: All samples which require thermal preservation are considered acceptable if the arrival temperature is within 2C of the required temperature or method specified range. For samples with a specified temperature of 4C, samples with a temperature ranging from just above freezing temperature of water to 6C shall be acceptable. Samples that are hand delivered immediately following collection may not meet these criteria, however they will be deemed acceptable according to NELAC and MADEP standards, if there is evidence that the chilling process has begun, such as arrival on ice, etc.

MCP regulatory standard criteria were not specified for this report. Therefore, method reporting limits (RLs) were not assessed against any MCP standards as it may pertain to Question "E" on the Presumptive Certainty Certification Form (MADEP reference: WSC-CAM-AN-093008 - WSC-CAM Analytical Notes).

DISSOLVED METALS

Samples 360-20017-1 through 360-20017-18 were analyzed for dissolved metals in accordance with EPA SW846 Method 6010B. The samples were analyzed on 11/24/2008.

All QA/QC procedures required to meet Presumptive Certainty for the specified analytical method were performed as per section B of the MADEP MCP analytical method report Certification form.

All QC performance standards and recommendations, which may affect Data Usability for this specific method, were achieved.

General method information:
Aluminum was detected in method blank MB 360-39051/2 at a level that was above the method detection limit but below the reporting limit. The value should be considered an estimate, and has been flagged "J". If the associated sample reported a result above the MDL and/or RL, the result has been "B" flagged. Refer to the QC report for details.

At the request of the client, an abbreviated/modified MCP analyte list was reported for this job.

The following reported methods are not listed in the MADEP Massachusetts Contingency Plan (MCP) Compendium of Analytical Methods (CAM), pursuant to the provisions of 310 CMR 40.0017(2).

ANIONS

Samples 360-20017-1 through 360-20017-18 were analyzed for anions in accordance with EPA Method 300.0. The samples were analyzed on 12/02/2008 and 12/03/2008.

All QC performance standards and recommendations for this specific method were achieved.

Samples 360-20017-1(10X), 360-20017-3 through 360-20017-5(10X), 360-20017-6(20X), 360-20017-7 through 360-20017-10(10X), 360-20017-12(10X), 360-20017-12(20X), 360-20017-14(10X), 360-20017-15(10X), 360-20017-18(10X) and 360-20017-18(20X) required dilution prior to analysis. The reporting limits have been adjusted accordingly. Dilutions were due to high target concentration.

AMMONIA

Samples 360-20017-1 through 360-20017-18 were analyzed for ammonia in accordance with LACHAT 107-06-1B. The samples were prepared on 11/28/2008, 12/02/2008 and 12/03/2008 and analyzed on 11/28/2008 and 12/03/2008.

All QC performance standards and recommendations, which may affect Data Usability for this specific method, were achieved with the exception of:

Ammonia failed the MS/MSD recovery criteria low for the matrix spikes and matrix spike duplicates of samples 360-20017-6 and 360-20017-14. The sample concentrations were greater than four times the spike concentrations. The associated LCS samples recovered within control limits. Refer to the QC report for details.

Samples 360-20017-1(5X), 360-20017-3(5X), 360-20017-4(20X), 360-20017-5(5X), 360-20017-6(20X), 360-20017-8(20X), 360-20017-9(10X), 360-20017-10(10X), 360-20017-12(20X), 360-20017-14(10X), 360-20017-15(10X) and 360-20017-18(10X) required dilution prior to analysis. The reporting limits have been adjusted accordingly. Dilutions were due to high concentration.

SPECIFIC CONDUCTANCE (CONDUCTIVITY)

Samples 360-20017-1 through 360-20017-18 were analyzed for Specific Conductance (Conductivity) in accordance with SM 2510B. The samples were analyzed on 11/24/2008.

All QC performance standards and recommendations for this specific method were achieved.

This case narrative is available in Word format upon request.

METHOD SUMMARY

Client: Olin Corporation Job Number: 360-20017-1

Description	Lab Location	Method	Preparation Method
Matrix: Water			
Dissolved Metals	TAL WFD	SW846 6010B	
Sample Filtration, Field	TAL WFD		FIELD_FLTRD
Chloride & Sulfate	TAL WFD	40CFR136A 300.0	
Nitrogen Ammonia	TAL WFD	LACHAT L107-06-1B	
Distillation, Ammonia	TAL WFD		Distill/Ammonia
Conductivity, Specific Conductance	TAL WFD	SM SM 2510B	

Lab References:

TAL WFD = TestAmerica Westfield

Method References:

40CFR136A = "Methods for Organic Chemical Analysis of Municipal Industrial Wastewater", 40CFR, Part 136, Appendix A, October 26, 1984 and subsequent revisions.

LACHAT = LACHAT

SM = "Standard Methods For The Examination Of Water And Wastewater",

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

METHOD / ANALYST SUMMARY

Client: Olin Corporation

Job Number: 360-20017-1

Method	Analyst	Analyst ID
SW846 6010B	Nasiatka, Ellen M	EMN
SW846 6010B	Smith, Tim J	TJS
40CFR136A 300.0	Lalashius, Andrew L	ALL
LACHAT L107-06-1B	Lalashius, Andrew L	ALL
SM SM 2510B	Emerich, Rich W	RWE

SAMPLE SUMMARY

Client: Olin Corporation Job Number: 360-20017-1

Lab Sample ID	Client Sample ID	Client Matrix	Date/Time Sampled	Date/Time Received
360-20017-1	OC-GW-26	Ground Water	11/19/2008 1155	11/21/2008 1615
360-20017-2	OC-GW-76S	Ground Water	11/19/2008 1335	11/21/2008 1615
360-20017-3	OC-GW-25	Ground Water	11/19/2008 1440	11/21/2008 1615
360-20017-4	OC-PZ-16RR	Ground Water	11/20/2008 0935	11/21/2008 1615
360-20017-5	OC-GW-78S	Ground Water	11/20/2008 1130	11/21/2008 1615
360-20017-6	OC-GW-55S	Ground Water	11/20/2008 1330	11/21/2008 1615
360-20017-7	OC-GW-35S	Ground Water	11/20/2008 1445	11/21/2008 1615
360-20017-8	OC-GW-79S	Ground Water	11/20/2008 0945	11/21/2008 1615
360-20017-9	OC-PZ-17RR	Ground Water	11/20/2008 1350	11/21/2008 1615
360-20017-10	OC-PZ-18R	Ground Water	11/20/2008 1130	11/21/2008 1615
360-20017-11	OC-GW-CA1	Ground Water	11/20/2008 1455	11/21/2008 1615
360-20017-12	OC-GW-202D	Ground Water	11/21/2008 0920	11/21/2008 1615
360-20017-13	OC-GW-34SR	Ground Water	11/21/2008 1025	11/21/2008 1615
360-20017-14	OC-GW-202S	Ground Water	11/21/2008 0845	11/21/2008 1615
360-20017-14MS	OC-GW-202S MS	Ground Water	11/21/2008 0845	11/21/2008 1615
360-20017-14MSD	OC-GW-202S MSD	Ground Water	11/21/2008 0845	11/21/2008 1615
360-20017-15	OC-GW-202S DUP	Ground Water	11/21/2008 0845	11/21/2008 1615
360-20017-16	OC-GW-34D	Ground Water	11/21/2008 1000	11/21/2008 1615
360-20017-17	OC-GW-34D DUP	Ground Water	11/21/2008 1000	11/21/2008 1615
360-20017-18	OC-GW-201S	Ground Water	11/21/2008 1200	11/21/2008 1615

SAMPLE RESULTS

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-20017-1

Client Sample ID: OC-GW-26
Lab Sample ID: 360-20017-1

Date Sampled: 11/19/2008 1155
Date Received: 11/21/2008 1615
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B		Date Analyzed:	11/24/2008 1212		
Aluminum	ND	ug/L	2.2	100	1.0
Chromium	7.0	ug/L	0.17	5.0	1.0

TC 2/2/09

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-20017-1

Client Sample ID: OC-GW-26
Lab Sample ID: 360-20017-1

Date Sampled: 11/19/2008 1155
Date Received: 11/21/2008 1615
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 300.0		Date Analyzed:		12/02/2008 1534	
Sulfate	82	mg/L	2.0	2.0	1.0
Method: 300.0		Date Analyzed:		12/02/2008 1549	
Chloride	82	mg/L	10	10	10
Method: L107-06-1B		Date Analyzed:		11/28/2008 1124	
Prep Method: Distill/Ammonia		Date Prepared:		11/28/2008 0923	
Ammonia	42	mg/L	0.50	0.50	5.0
Method: SM 2510B		Date Analyzed:		11/24/2008 1704	
Specific Conductance	620	umhos/cm	1.0	1.0	1.0

TC 2/2/09

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-20017-1

Client Sample ID: OC-GW-76S
Lab Sample ID: 360-20017-2

Date Sampled: 11/19/2008 1335
Date Received: 11/21/2008 1615
Client Matrix: Ground Water

Analyte	Result/Qualifier		Unit	MDL	RL	Dilution
Method: Dissolved-6010B			Date Analyzed:	11/24/2008 1239		
Aluminum	8.3	J	ug/L	2.2	100	1.0
Chromium	2.2	J	ug/L	0.17	5.0	1.0

TC 2/2/09

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-20017-1

Client Sample ID: OC-GW-76S
Lab Sample ID: 360-20017-2

Date Sampled: 11/19/2008 1335
Date Received: 11/21/2008 1615
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 300.0		Date Analyzed:		12/02/2008 1604	
Sulfate	61	mg/L	2.0	2.0	1.0
Chloride	5.3	mg/L	1.0	1.0	1.0
Method: L107-06-1B		Date Analyzed:		11/28/2008 1109	
Prep Method: Distill/Ammonia		Date Prepared:		11/28/2008 0923	
Ammonia	12	mg/L	0.10	0.10	1.0
Method: SM 2510B		Date Analyzed:		11/24/2008 1707	
Specific Conductance	220	umhos/cm	1.0	1.0	1.0

TC
2/2/09

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-20017-1

Client Sample ID: OC-GW-25
Lab Sample ID: 360-20017-3

Date Sampled: 11/19/2008 1440
Date Received: 11/21/2008 1615
Client Matrix: Ground Water

Analyte	Result/Qualifier		Unit	MDL	RL	Dilution
Method: Dissolved-6010B			Date Analyzed:	11/24/2008 1242		
Aluminum	4.8	J	ug/L	2.2	100	1.0
Chromium	3.4	J	ug/L	0.17	5.0	1.0

TC
2/2/09

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-20017-1

Client Sample ID: OC-GW-25
Lab Sample ID: 360-20017-3

Date Sampled: 11/19/2008 1440
Date Received: 11/21/2008 1615
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 300.0		Date Analyzed:		12/02/2008 1650	
Sulfate	170	mg/L	20	20	10
Chloride	64	mg/L	10	10	10
Method: L107-06-1B		Date Analyzed:		11/28/2008 1125	
Prep Method: Distill/Ammonia		Date Prepared:		11/28/2008 0923	
Ammonia	60	mg/L	0.50	0.50	5.0
Method: SM 2510B		Date Analyzed:		11/24/2008 1709	
Specific Conductance	800	umhos/cm	1.0	1.0	1.0

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Job Number: 360-20017-1

Client Sample ID: OC-PZ-16RR
Lab Sample ID: 360-20017-4

Date Sampled: 11/20/2008 0935
Date Received: 11/21/2008 1615
Client Matrix: Ground Water

Analyte	Result/Qualifier		Unit	MDL	RL	Dilution
Method: Dissolved-6010B			Date Analyzed:	11/24/2008 1245		
Aluminum	2.4	J	ug/L	2.2	100	1.0
Chromium	6.7		ug/L	0.17	5.0	1.0

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Job Number: 360-20017-1

Client Sample ID: OC-PZ-16RR
Lab Sample ID: 360-20017-4

Date Sampled: 11/20/2008 0935
Date Received: 11/21/2008 1615
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 300.0		Date Analyzed:	12/02/2008 1720		
Sulfate	780	mg/L	20	20	10
Chloride	170	mg/L	10	10	10
Method: L107-06-1B		Date Analyzed:	11/28/2008 1126		
Prep Method: Distill/Ammonia		Date Prepared:	11/28/2008 0923		
Ammonia	290	mg/L	2.0	2.0	20
Method: SM 2510B		Date Analyzed:	11/24/2008 1710		
Specific Conductance	2800	umhos/cm	1.0	1.0	1.0

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Job Number: 360-20017-1

Client Sample ID: OC-GW-78S
Lab Sample ID: 360-20017-5

Date Sampled: 11/20/2008 1130
Date Received: 11/21/2008 1615
Client Matrix: Ground Water

Analyte	Result/Qualifier		Unit	MDL	RL	Dilution
Method: Dissolved-6010B			Date Analyzed:		11/24/2008 1248	
Aluminum	12	J	ug/L	2.2	100	1.0
Chromium	6.7		ug/L	0.17	5.0	1.0

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Job Number: 360-20017-1

Client Sample ID: OC-GW-78S
Lab Sample ID: 360-20017-5

Date Sampled: 11/20/2008 1130
Date Received: 11/21/2008 1615
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 300.0		Date Analyzed:		12/02/2008 1834	
Chloride	25	mg/L	1.0	1.0	1.0
Method: 300.0		Date Analyzed:		12/02/2008 1850	
Sulfate	550	mg/L	20	20	10
Method: L107-06-1B		Date Analyzed:		11/28/2008 1127	
Prep Method: Distill/Ammonia		Date Prepared:		11/28/2008 0923	
Ammonia	74	mg/L	0.50	0.50	5.0
Method: SM 2510B		Date Analyzed:		11/24/2008 1712	
Specific Conductance	1300	umhos/cm	1.0	1.0	1.0

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Job Number: 360-20017-1

Client Sample ID: OC-GW-55S
Lab Sample ID: 360-20017-6

Date Sampled: 11/20/2008 1330
Date Received: 11/21/2008 1615
Client Matrix: Ground Water

Analyte	Result/Qualifier		Unit	MDL	RL	Dilution
Method: Dissolved-6010B			Date Analyzed:	11/24/2008 1251		
Aluminum	540		ug/L	2.2	100	1.0
Chromium	1.9	J	ug/L	0.17	5.0	1.0

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Job Number: 360-20017-1

Client Sample ID: OC-GW-55S
Lab Sample ID: 360-20017-6

Date Sampled: 11/20/2008 1330
Date Received: 11/21/2008 1615
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 300.0		Date Analyzed:		12/02/2008 1950	
Chloride	19	mg/L	1.0	1.0	1.0
Method: 300.0		Date Analyzed:		12/03/2008 1326	
Sulfate	1400	mg/L	40	40	20
Method: L107-06-1B		Date Analyzed:		12/03/2008 1523	
Prep Method: Distill/Ammonia		Date Prepared:		12/03/2008 1245	
Ammonia	270	mg/L	2.0	2.0	20
Method: SM 2510B		Date Analyzed:		11/24/2008 1713	
Specific Conductance	3600	umhos/cm	1.0	1.0	1.0

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Job Number: 360-20017-1

Client Sample ID: OC-GW-35S
Lab Sample ID: 360-20017-7

Date Sampled: 11/20/2008 1445
Date Received: 11/21/2008 1615
Client Matrix: Ground Water

Analyte	Result/Qualifier		Unit	MDL	RL	Dilution
Method: Dissolved-6010B			Date Analyzed:		11/24/2008 1259	
Aluminum	29	J	ug/L	2.2	100	1.0
Chromium	18		ug/L	0.17	5.0	1.0

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Job Number: 360-20017-1

Client Sample ID: OC-GW-35S
Lab Sample ID: 360-20017-7

Date Sampled: 11/20/2008 1445
Date Received: 11/21/2008 1615
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 300.0		Date Analyzed:		12/02/2008 2005	
Chloride	5.8	mg/L	1.0	1.0	1.0
Method: 300.0		Date Analyzed:		12/02/2008 2020	
Sulfate	480	mg/L	20	20	10
Method: L107-06-1B		Date Analyzed:		12/03/2008 1455	
Prep Method: Distill/Ammonia		Date Prepared:		12/03/2008 1245	
Ammonia	14	mg/L	0.10	0.10	1.0
Method: SM 2510B		Date Analyzed:		11/24/2008 1714	
Specific Conductance	1100	umhos/cm	1.0	1.0	1.0

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Job Number: 360-20017-1

Client Sample ID: OC-GW-79S
Lab Sample ID: 360-20017-8

Date Sampled: 11/20/2008 0945
Date Received: 11/21/2008 1615
Client Matrix: Ground Water

Analyte	Result/Qualifier		Unit	MDL	RL	Dilution
Method: Dissolved-6010B			Date Analyzed:		11/24/2008 1302	
Aluminum	15	J	ug/L	2.2	100	1.0
Chromium	12		ug/L	0.17	5.0	1.0

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Job Number: 360-20017-1

Client Sample ID: OC-GW-79S
Lab Sample ID: 360-20017-8

Date Sampled: 11/20/2008 0945
Date Received: 11/21/2008 1615
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 300.0		Date Analyzed:		12/02/2008 2050	
Sulfate	1100	mg/L	20	20	10
Chloride	130	mg/L	10	10	10
Method: L107-06-1B		Date Analyzed:		12/03/2008 1526	
Prep Method: Distill/Ammonia		Date Prepared:		12/03/2008 1245	
Ammonia	170	mg/L	2.0	2.0	20
Method: SM 2510B		Date Analyzed:		11/24/2008 1716	
Specific Conductance	2800	umhos/cm	1.0	1.0	1.0

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Job Number: 360-20017-1

Client Sample ID: OC-PZ-17RR
Lab Sample ID: 360-20017-9

Date Sampled: 11/20/2008 1350
Date Received: 11/21/2008 1615
Client Matrix: Ground Water

Analyte	Result/Qualifier		Unit	MDL	RL	Dilution
Method: Dissolved-6010B			Date Analyzed:		11/24/2008 1305	
Aluminum	ND		ug/L	2.2	100	1.0
Chromium	2.0	J	ug/L	0.17	5.0	1.0

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Job Number: 360-20017-1

Client Sample ID: OC-PZ-17RR
Lab Sample ID: 360-20017-9

Date Sampled: 11/20/2008 1350
Date Received: 11/21/2008 1615
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 300.0		Date Analyzed:		12/02/2008 2136	
Chloride	20	mg/L	1.0	1.0	1.0
Method: 300.0		Date Analyzed:		12/02/2008 2151	
Sulfate	530	mg/L	20	20	10
Method: L107-06-1B		Date Analyzed:		12/03/2008 1514	
Prep Method: Distill/Ammonia		Date Prepared:		12/02/2008 1250	
Ammonia	82	mg/L	1.0	1.0	10
Method: SM 2510B		Date Analyzed:		11/24/2008 1717	
Specific Conductance	1400	umhos/cm	1.0	1.0	1.0

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Job Number: 360-20017-1

Client Sample ID: OC-PZ-18R
Lab Sample ID: 360-20017-10

Date Sampled: 11/20/2008 1130
Date Received: 11/21/2008 1615
Client Matrix: Ground Water

Analyte	Result/Qualifier		Unit	MDL	RL	Dilution
Method: Dissolved-6010B			Date Analyzed:		11/24/2008 1307	
Aluminum	4.9	J	ug/L	2.2	100	1.0
Chromium	17		ug/L	0.17	5.0	1.0

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Job Number: 360-20017-1

Client Sample ID: OC-PZ-18R
Lab Sample ID: 360-20017-10

Date Sampled: 11/20/2008 1130
Date Received: 11/21/2008 1615
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 300.0		Date Analyzed:		12/02/2008 2222	
Sulfate	180	mg/L	20	20	10
Chloride	100	mg/L	10	10	10
Method: L107-06-1B		Date Analyzed:		12/03/2008 1515	
Prep Method: Distill/Ammonia		Date Prepared:		12/02/2008 1250	
Ammonia	65	mg/L	1.0	1.0	10
Method: SM 2510B		Date Analyzed:		11/24/2008 1719	
Specific Conductance	930	umhos/cm	1.0	1.0	1.0

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Job Number: 360-20017-1

Client Sample ID: OC-GW-CA1
Lab Sample ID: 360-20017-11

Date Sampled: 11/20/2008 1455
Date Received: 11/21/2008 1615
Client Matrix: Ground Water

Analyte	Result/Qualifier		Unit	MDL	RL	Dilution
Method: Dissolved-6010B			Date Analyzed:	11/24/2008 1706		
Aluminum	20	J B	ug/L	2.2	100	1.0
Chromium	4.1	J	ug/L	0.17	5.0	1.0

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Job Number: 360-20017-1

Client Sample ID: OC-GW-CA1
Lab Sample ID: 360-20017-11

Date Sampled: 11/20/2008 1455
Date Received: 11/21/2008 1615
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 300.0		Date Analyzed:		12/02/2008 2237	
Sulfate	110	mg/L	2.0	2.0	1.0
Chloride	7.3	mg/L	1.0	1.0	1.0
Method: L107-06-1B		Date Analyzed:		12/03/2008 1439	
Prep Method: Distill/Ammonia		Date Prepared:		12/02/2008 1250	
Ammonia	3.1	mg/L	0.10	0.10	1.0
Method: SM 2510B		Date Analyzed:		11/24/2008 1720	
Specific Conductance	660	umhos/cm	1.0	1.0	1.0

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Job Number: 360-20017-1

Client Sample ID: OC-GW-202D
Lab Sample ID: 360-20017-12

Date Sampled: 11/21/2008 0920
Date Received: 11/21/2008 1615
Client Matrix: Ground Water

Analyte	Result/Qualifier		Unit	MDL	RL	Dilution
Method: Dissolved-6010B			Date Analyzed:		11/24/2008 1714	
Aluminum	8800	B	ug/L	2.2	100	1.0
Chromium	540		ug/L	0.17	5.0	1.0

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Job Number: 360-20017-1

Client Sample ID: OC-GW-202D
Lab Sample ID: 360-20017-12

Date Sampled: 11/21/2008 0920
Date Received: 11/21/2008 1615
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 300.0		Date Analyzed:		12/02/2008 2322	
Chloride	290	mg/L	10	10	10
Method: 300.0		Date Analyzed:		12/03/2008 1341	
Sulfate	1900	mg/L	40	40	20
Method: L107-06-1B		Date Analyzed:		12/03/2008 1513	
Prep Method: Distill/Ammonia		Date Prepared:		12/02/2008 1250	
Ammonia	300	mg/L	2.0	2.0	20
Method: SM 2510B		Date Analyzed:		11/24/2008 1722	
Specific Conductance	4600	umhos/cm	1.0	1.0	1.0

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Job Number: 360-20017-1

Client Sample ID: OC-GW-34SR
Lab Sample ID: 360-20017-13

Date Sampled: 11/21/2008 1025
Date Received: 11/21/2008 1615
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B		Date Analyzed:	11/24/2008 1717		
Aluminum	~~3.3~~ ND ~~J B~~ U	ug/L	2.2	100	1.0
Chromium	ND	ug/L	0.17	5.0	1.0

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Job Number: 360-20017-1

Client Sample ID: OC-GW-34SR
Lab Sample ID: 360-20017-13

Date Sampled: 11/21/2008 1025
Date Received: 11/21/2008 1615
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 300.0		Date Analyzed:		12/02/2008 2337	
Sulfate	9.1	mg/L	2.0	2.0	1.0
Chloride	1.7	mg/L	1.0	1.0	1.0
Method: L107-06-1B		Date Analyzed:		12/03/2008 1441	
Prep Method: Distill/Ammonia		Date Prepared:		12/02/2008 1250	
Ammonia	0.34	mg/L	0.10	0.10	1.0
Method: SM 2510B		Date Analyzed:		11/24/2008 1723	
Specific Conductance	89	umhos/cm	1.0	1.0	1.0

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Job Number: 360-20017-1

Client Sample ID: OC-GW-202S
Lab Sample ID: 360-20017-14

Date Sampled: 11/21/2008 0845
Date Received: 11/21/2008 1615
Client Matrix: Ground Water

Analyte	Result/Qualifier		Unit	MDL	RL	Dilution
Method: Dissolved-6010B			Date Analyzed:		11/24/2008 1654	
Aluminum	~~6.3~~ ND	~~J B~~ U	ug/L	2.2	100	1.0
Chromium	3.7	J	ug/L	0.17	5.0	1.0

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Job Number: 360-20017-1

Client Sample ID: OC-GW-202S
Lab Sample ID: 360-20017-14

Date Sampled: 11/21/2008 0845
Date Received: 11/21/2008 1615
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 300.0		Date Analyzed:		12/03/2008 0123	
Sulfate	570	mg/L	20	20	10
Chloride	62	mg/L	10	10	10
Method: L107-06-1B		Date Analyzed:		12/03/2008 1516	
Prep Method: Distill/Ammonia		Date Prepared:		12/02/2008 1250	
Ammonia	120 J	mg/L	1.0	1.0	10
Method: SM 2510B		Date Analyzed:		11/24/2008 1725	
Specific Conductance	1600	umhos/cm	1.0	1.0	1.0

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Job Number: 360-20017-1

Client Sample ID: OC-GW-202S DUP
Lab Sample ID: 360-20017-15

Date Sampled: 11/21/2008 0845
Date Received: 11/21/2008 1615
Client Matrix: Ground Water

Analyte	Result/Qualifier		Unit	MDL	RL	Dilution
Method: Dissolved-6010B			Date Analyzed:	11/24/2008 1720		
Aluminum	~~3.0~~ ND	~~J B~~ U	ug/L	2.2	100	1.0
Chromium	3.7	J	ug/L	0.17	5.0	1.0

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Job Number: 360-20017-1

Client Sample ID: OC-GW-202S DUP
Lab Sample ID: 360-20017-15

Date Sampled: 11/21/2008 0845
Date Received: 11/21/2008 1615
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 300.0		Date Analyzed:		12/03/2008 0222	
Sulfate	560	mg/L	20	20	10
Chloride	62	mg/L	10	10	10
Method: L107-06-1B		Date Analyzed:		12/03/2008 1521	
Prep Method: Distill/Ammonia		Date Prepared:		12/02/2008 1250	
Ammonia	84 J	mg/L	1.0	1.0	10
Method: SM 2510B		Date Analyzed:		11/24/2008 1726	
Specific Conductance	1600	umhos/cm	1.0	1.0	1.0

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Job Number: 360-20017-1

Client Sample ID: OC-GW-34D
Lab Sample ID: 360-20017-16

Date Sampled: 11/21/2008 1000
Date Received: 11/21/2008 1615
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B		Date Analyzed:	11/24/2008 1723		
Aluminum	~~6.3~~ ND ~~J B~~ U	ug/L	2.2	100	1.0
Chromium	14	ug/L	0.17	5.0	1.0

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Job Number: 360-20017-1

Client Sample ID: OC-GW-34D
Lab Sample ID: 360-20017-16

Date Sampled: 11/21/2008 1000
Date Received: 11/21/2008 1615
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 300.0		Date Analyzed:		12/03/2008 0237	
Sulfate	36	mg/L	2.0	2.0	1.0
Chloride	7.4	mg/L	1.0	1.0	1.0
Method: L107-06-1B		Date Analyzed:		12/03/2008 1447	
Prep Method: Distill/Ammonia		Date Prepared:		12/02/2008 1250	
Ammonia	15	mg/L	0.10	0.10	1.0
Method: SM 2510B		Date Analyzed:		11/24/2008 1728	
Specific Conductance	210	umhos/cm	1.0	1.0	1.0

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Job Number: 360-20017-1

Client Sample ID: OC-GW-34D DUP
Lab Sample ID: 360-20017-17

Date Sampled: 11/21/2008 1000
Date Received: 11/21/2008 1615
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B		Date Analyzed:	11/24/2008 1726		
Aluminum	~~15~~ ND ~~J B~~ V	ug/L	2.2	100	1.0
Chromium	14	ug/L	0.17	5.0	1.0

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Job Number: 360-20017-1

Client Sample ID: OC-GW-34D DUP
Lab Sample ID: 360-20017-17

Date Sampled: 11/21/2008 1000
Date Received: 11/21/2008 1615
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 300.0		Date Analyzed:		12/03/2008 0309	
Sulfate	35	mg/L	2.0	2.0	1.0
Chloride	7.5	mg/L	1.0	1.0	1.0
Method: L107-06-1B		Date Analyzed:		12/03/2008 1448	
Prep Method: Distill/Ammonia		Date Prepared:		12/02/2008 1250	
Ammonia	15	mg/L	0.10	0.10	1.0
Method: SM 2510B		Date Analyzed:		11/24/2008 1729	
Specific Conductance	200	umhos/cm	1.0	1.0	1.0

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Job Number: 360-20017-1

Client Sample ID: OC-GW-201S
Lab Sample ID: 360-20017-18

Date Sampled: 11/21/2008 1200
Date Received: 11/21/2008 1615
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B		Date Analyzed:	11/24/2008 1729		
Aluminum	~~3.7~~ ND ~~J B~~ U	ug/L	2.2	100	1.0
Chromium	12	ug/L	0.17	5.0	1.0

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Job Number: 360-20017-1

Client Sample ID: OC-GW-201S
Lab Sample ID: 360-20017-18

Date Sampled: 11/21/2008 1200
Date Received: 11/21/2008 1615
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 300.0		Date Analyzed:		12/03/2008 0423	
Chloride	69	mg/L	10	10	10
Method: 300.0		Date Analyzed:		12/03/2008 1427	
Sulfate	1300	mg/L	40	40	20
Method: L107-06-1B		Date Analyzed:		12/03/2008 1522	
Prep Method: Distill/Ammonia		Date Prepared:		12/02/2008 1250	
Ammonia	160	mg/L	1.0	1.0	10
Method: SM 2510B		Date Analyzed:		11/24/2008 1730	
Specific Conductance	2900	umhos/cm	1.0	1.0	1.0

TC
2/2/09

DATA REPORTING QUALIFIERS

Client: Olin Corporation Job Number: 360-20017-1

Lab Section	Qualifier	Description
Metals		
	B	Compound was found in the blank and sample.
	J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
General Chemistry		
	4	MS, MSD: The analyte present in the original sample is 4 times greater than the matrix spike concentration; therefore, control limits are not applicable.

QUALITY CONTROL RESULTS

Client: Olin Corporation

Job Number: 360-20017-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
Metals					
Analysis Batch:360-39038					
LCS 360-39038/1	Lab Control Spike	T	Water	6010B	
LCSD 360-39038/12	Lab Control Spike Duplicate	T	Water	6010B	
MB 360-39038/2	Method Blank	T	Water	6010B	
360-20017-1	OC-GW-26	D	Water	6010B	
360-20017-1DU	Duplicate	D	Water	6010B	
360-20017-1MS	Matrix Spike	D	Water	6010B	
360-20017-2	OC-GW-76S	D	Water	6010B	
360-20017-3	OC-GW-25	D	Water	6010B	
360-20017-4	OC-PZ-16RR	D	Water	6010B	
360-20017-5	OC-GW-78S	D	Water	6010B	
360-20017-6	OC-GW-55S	D	Water	6010B	
360-20017-7	OC-GW-35S	D	Water	6010B	
360-20017-8	OC-GW-79S	D	Water	6010B	
360-20017-9	OC-PZ-17RR	D	Water	6010B	
360-20017-10	OC-PZ-18R	D	Water	6010B	
Analysis Batch:360-39051					
LCS 360-39051/1	Lab Control Spike	T	Water	6010B	
LCSD 360-39051/8	Lab Control Spike Duplicate	T	Water	6010B	
MB 360-39051/2	Method Blank	T	Water	6010B	
360-20017-11	OC-GW-CA1	D	Water	6010B	
360-20017-12	OC-GW-202D	D	Water	6010B	
360-20017-13	OC-GW-34SR	D	Water	6010B	
360-20017-14	OC-GW-202S	D	Water	6010B	
360-20017-14MS	Matrix Spike	D	Water	6010B	
360-20017-14MSD	Matrix Spike Duplicate	D	Water	6010B	
360-20017-15	OC-GW-202S DUP	D	Water	6010B	
360-20017-16	OC-GW-34D	D	Water	6010B	
360-20017-17	OC-GW-34D DUP	D	Water	6010B	
360-20017-18	OC-GW-201S	D	Water	6010B	

Report Basis
D = Dissolved
T = Total

Contamination of Al @ 3.8 µg/L x 5 = 19 µg/L

Client: Olin Corporation Job Number: 360-20017-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
General Chemistry					
Analysis Batch:360-39059					
LCS 360-39059/1	Lab Control Spike	T	Water	SM 2510B	
MB 360-39059/4	Method Blank	T	Water	SM 2510B	
360-20017-1	OC-GW-26	T	Water	SM 2510B	
360-20017-1DU	Duplicate	T	Water	SM 2510B	
360-20017-2	OC-GW-76S	T	Water	SM 2510B	
360-20017-3	OC-GW-25	T	Water	SM 2510B	
360-20017-4	OC-PZ-16RR	T	Water	SM 2510B	
360-20017-5	OC-GW-78S	T	Water	SM 2510B	
360-20017-6	OC-GW-55S	T	Water	SM 2510B	
360-20017-7	OC-GW-35S	T	Water	SM 2510B	
360-20017-8	OC-GW-79S	T	Water	SM 2510B	
360-20017-9	OC-PZ-17RR	T	Water	SM 2510B	
360-20017-10	OC-PZ-18R	T	Water	SM 2510B	
360-20017-11	OC-GW-CA1	T	Water	SM 2510B	
360-20017-12	OC-GW-202D	T	Water	SM 2510B	
360-20017-13	OC-GW-34SR	T	Water	SM 2510B	
360-20017-14	OC-GW-202S	T	Water	SM 2510B	
360-20017-15	OC-GW-202S DUP	T	Water	SM 2510B	
360-20017-16	OC-GW-34D	T	Water	SM 2510B	
360-20017-17	OC-GW-34D DUP	T	Water	SM 2510B	
360-20017-18	OC-GW-201S	T	Water	SM 2510B	
Prep Batch: 360-39163					
LCS 360-39163/2-A	Lab Control Spike	T	Water	Distill/Ammonia	
MB 360-39163/1-A	Method Blank	T	Water	Distill/Ammonia	
360-20017-1	OC-GW-26	T	Water	Distill/Ammonia	
360-20017-2	OC-GW-76S	T	Water	Distill/Ammonia	
360-20017-3	OC-GW-25	T	Water	Distill/Ammonia	
360-20017-4	OC-PZ-16RR	T	Water	Distill/Ammonia	
360-20017-5	OC-GW-78S	T	Water	Distill/Ammonia	
Analysis Batch:360-39164					
LCS 360-39163/2-A	Lab Control Spike	T	Water	L107-06-1B	360-39163
MB 360-39163/1-A	Method Blank	T	Water	L107-06-1B	360-39163
360-20017-1	OC-GW-26	T	Water	L107-06-1B	360-39163
360-20017-2	OC-GW-76S	T	Water	L107-06-1B	360-39163
360-20017-3	OC-GW-25	T	Water	L107-06-1B	360-39163
360-20017-4	OC-PZ-16RR	T	Water	L107-06-1B	360-39163
360-20017-5	OC-GW-78S	T	Water	L107-06-1B	360-39163

Client: Olin Corporation Job Number: 360-20017-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
General Chemistry					
Prep Batch: 360-39229					
LCS 360-39229/2-A	Lab Control Spike	T	Water	Distill/Ammonia	
MB 360-39229/1-A	Method Blank	T	Water	Distill/Ammonia	
360-20017-9	OC-PZ-17RR	T	Water	Distill/Ammonia	
360-20017-10	OC-PZ-18R	T	Water	Distill/Ammonia	
360-20017-11	OC-GW-CA1	T	Water	Distill/Ammonia	
360-20017-12	OC-GW-202D	T	Water	Distill/Ammonia	
360-20017-13	OC-GW-34SR	T	Water	Distill/Ammonia	
360-20017-14	OC-GW-202S	T	Water	Distill/Ammonia	
360-20017-14MS	Matrix Spike	T	Water	Distill/Ammonia	
360-20017-14MSD	Matrix Spike Duplicate	T	Water	Distill/Ammonia	
360-20017-15	OC-GW-202S DUP	T	Water	Distill/Ammonia	
360-20017-16	OC-GW-34D	T	Water	Distill/Ammonia	
360-20017-17	OC-GW-34D DUP	T	Water	Distill/Ammonia	
360-20017-18	OC-GW-201S	T	Water	Distill/Ammonia	
Analysis Batch:360-39239					
LCS 360-39239/2	Lab Control Spike	T	Water	300.0	
MB 360-39239/1	Method Blank	T	Water	300.0	
360-20017-1	OC-GW-26	T	Water	300.0	
360-20017-2	OC-GW-76S	T	Water	300.0	
360-20017-3	OC-GW-25	T	Water	300.0	
360-20017-4	OC-PZ-16RR	T	Water	300.0	
Analysis Batch:360-39240					
LCS 360-39240/2	Lab Control Spike	T	Water	300.0	
MB 360-39240/1	Method Blank	T	Water	300.0	
360-20017-5	OC-GW-78S	T	Water	300.0	
360-20017-5MS	Matrix Spike	T	Water	300.0	
360-20017-5MSD	Matrix Spike Duplicate	T	Water	300.0	
360-20017-6	OC-GW-55S	T	Water	300.0	
360-20017-7	OC-GW-35S	T	Water	300.0	
360-20017-8	OC-GW-79S	T	Water	300.0	
360-20017-9	OC-PZ-17RR	T	Water	300.0	
360-20017-10	OC-PZ-18R	T	Water	300.0	
360-20017-11	OC-GW-CA1	T	Water	300.0	
360-20017-12	OC-GW-202D	T	Water	300.0	
360-20017-13	OC-GW-34SR	T	Water	300.0	

Client: Olin Corporation Job Number: 360-20017-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
General Chemistry					
Analysis Batch:360-39241					
LCS 360-39241/2	Lab Control Spike	T	Water	300.0	
MB 360-39241/1	Method Blank	T	Water	300.0	
360-20017-14	OC-GW-202S	T	Water	300.0	
360-20017-14MS	Matrix Spike	T	Water	300.0	
360-20017-14MSD	Matrix Spike Duplicate	T	Water	300.0	
360-20017-15	OC-GW-202S DUP	T	Water	300.0	
360-20017-16	OC-GW-34D	T	Water	300.0	
360-20017-17	OC-GW-34D DUP	T	Water	300.0	
360-20017-18	OC-GW-201S	T	Water	300.0	
Prep Batch: 360-39254					
LCS 360-39254/2-A	Lab Control Spike	T	Water	Distill/Ammonia	
MB 360-39254/1-A	Method Blank	T	Water	Distill/Ammonia	
360-20017-6	OC-GW-55S	T	Water	Distill/Ammonia	
360-20017-6MS	Matrix Spike	T	Water	Distill/Ammonia	
360-20017-6MSD	Matrix Spike Duplicate	T	Water	Distill/Ammonia	
360-20017-7	OC-GW-35S	T	Water	Distill/Ammonia	
360-20017-8	OC-GW-79S	T	Water	Distill/Ammonia	
Analysis Batch:360-39261					
LCS 360-39229/2-A	Lab Control Spike	T	Water	L107-06-1B	360-39229
MB 360-39229/1-A	Method Blank	T	Water	L107-06-1B	360-39229
360-20017-9	OC-PZ-17RR	T	Water	L107-06-1B	360-39229
360-20017-10	OC-PZ-18R	T	Water	L107-06-1B	360-39229
360-20017-11	OC-GW-CA1	T	Water	L107-06-1B	360-39229
360-20017-12	OC-GW-202D	T	Water	L107-06-1B	360-39229
360-20017-13	OC-GW-34SR	T	Water	L107-06-1B	360-39229
360-20017-14	OC-GW-202S	T	Water	L107-06-1B	360-39229
360-20017-14MS	Matrix Spike	T	Water	L107-06-1B	360-39229
360-20017-14MSD	Matrix Spike Duplicate	T	Water	L107-06-1B	360-39229
360-20017-15	OC-GW-202S DUP	T	Water	L107-06-1B	360-39229
360-20017-16	OC-GW-34D	T	Water	L107-06-1B	360-39229
360-20017-17	OC-GW-34D DUP	T	Water	L107-06-1B	360-39229
360-20017-18	OC-GW-201S	T	Water	L107-06-1B	360-39229
Analysis Batch:360-39263					
LCS 360-39254/2-A	Lab Control Spike	T	Water	L107-06-1B	360-39254
MB 360-39254/1-A	Method Blank	T	Water	L107-06-1B	360-39254
360-20017-6	OC-GW-55S	T	Water	L107-06-1B	360-39254
360-20017-6MS	Matrix Spike	T	Water	L107-06-1B	360-39254
360-20017-6MSD	Matrix Spike Duplicate	T	Water	L107-06-1B	360-39254
360-20017-7	OC-GW-35S	T	Water	L107-06-1B	360-39254
360-20017-8	OC-GW-79S	T	Water	L107-06-1B	360-39254

Client: Olin Corporation Job Number: 360-20017-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
General Chemistry					
Analysis Batch:360-39276					
LCS 360-39276/2	Lab Control Spike	T	Water	300.0	
MB 360-39276/1	Method Blank	T	Water	300.0	
360-20017-6	OC-GW-55S	T	Water	300.0	
360-20017-12	OC-GW-202D	T	Water	300.0	
360-20017-18	OC-GW-201S	T	Water	300.0	

Report Basis
T = Total

Client: Olin Corporation Job Number: 360-20017-1

Method Blank - Batch: 360-39038

Method: 6010B
Preparation: N/A

Lab Sample ID: MB 360-39038/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/24/2008 1206
Date Prepared: N/A

Analysis Batch: 360-39038
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 1.0 mL

Analyte	Result	Qual	MDL	RL
Aluminum	ND		2.2	100
Chromium	ND		0.17	5.0

Lab Control Spike/
Lab Control Spike Duplicate Recovery Report - Batch: 360-39038

Method: 6010B
Preparation: N/A

LCS Lab Sample ID: LCS 360-39038/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/24/2008 1203
Date Prepared: N/A

Analysis Batch: 360-39038
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 10 mL

LCSD Lab Sample ID: LCSD 360-39038/12
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/24/2008 1254
Date Prepared: N/A

Analysis Batch: 360-39038
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 10 mL

	% Rec.						
Analyte	LCS	LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Aluminum	99	99	80 - 120	0	20		
Chromium	97	98	80 - 120	1	20		

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation Job Number: 360-20017-1

Matrix Spike - Batch: 360-39038

Method: 6010B
Preparation: N/A

Lab Sample ID: 360-20017-1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/24/2008 1233
Date Prepared: N/A

Analysis Batch: 360-39038
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 10 mL

Analyte	Sample Result/Qual	Spike Amount	Result	% Rec.	Limit	Qual
Aluminum	ND	5000	4890	98	75 - 125	
Chromium	7.0	1000	972	97	75 - 125	

Duplicate - Batch: 360-39038

Method: 6010B
Preparation: N/A

Lab Sample ID: 360-20017-1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/24/2008 1215
Date Prepared: N/A

Analysis Batch: 360-39038
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 1.0 mL

Analyte	Sample Result/Qual	Result	RPD	Limit	Qual
Aluminum	ND	ND	NC	20	
Chromium	7.0	6.92	0	20	

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-20017-1

Method Blank - Batch: 360-39051

Method: 6010B
Preparation: N/A

Lab Sample ID: MB 360-39051/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/24/2008 1637
Date Prepared: N/A

Analysis Batch: 360-39051
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 1.0 mL

Analyte	Result	Qual	MDL	RL
Aluminum	3.8	J	2.2	100
Chromium	ND		0.17	5.0

Lab Control Spike/
Lab Control Spike Duplicate Recovery Report - Batch: 360-39051

Method: 6010B
Preparation: N/A

LCS Lab Sample ID: LCS 360-39051/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/24/2008 1634
Date Prepared: N/A

Analysis Batch: 360-39051
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 10 mL

LCSD Lab Sample ID: LCSD 360-39051/8
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/24/2008 1709
Date Prepared: N/A

Analysis Batch: 360-39051
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 10 mL

Analyte	% Rec. LCS	% Rec. LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Aluminum	100	99	80 - 120	1	20		
Chromium	98	97	80 - 120	2	20		

Calculations are performed before rounding to avoid round-off errors in calculated results.

TC 2/2/09

Client: Olin Corporation

Job Number: 360-20017-1

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 360-39051

Method: 6010B
Preparation: N/A

MS Lab Sample ID:	360-20017-14	Analysis Batch:	360-39051	Instrument ID:	Varian 720 ES ICP
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	N/A
Dilution:	1.0			Initial Weight/Volume:	
Date Analyzed:	11/24/2008 1657			Final Weight/Volume:	10 mL
Date Prepared:	N/A				

MSD Lab Sample ID:	360-20017-14	Analysis Batch:	360-39051	Instrument ID:	Varian 720 ES ICP
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	N/A
Dilution:	1.0			Initial Weight/Volume:	
Date Analyzed:	11/24/2008 1700			Final Weight/Volume:	10 mL
Date Prepared:	N/A				

	% Rec.						
Analyte	MS	MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Aluminum	97	96	75 - 125	1	20		
Chromium	92	92	75 - 125	1	20		

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation Job Number: 360-20017-1

Method Blank - Batch: 360-39239

Method: 300.0
Preparation: N/A

Lab Sample ID: MB 360-39239/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 12/02/2008 1131
Date Prepared: N/A

Analysis Batch: 360-39239
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 1.0 mL

Analyte	Result	Qual	RL	RL
Sulfate	ND		2.0	2.0
Chloride	ND		1.0	1.0

Lab Control Spike - Batch: 360-39239

Method: 300.0
Preparation: N/A

Lab Sample ID: LCS 360-39239/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 12/02/2008 1147
Date Prepared: N/A

Analysis Batch: 360-39239
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 1.0 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Sulfate	80.0	81.9	102	85 - 115	
Chloride	40.0	40.8	102	85 - 115	

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation Job Number: 360-20017-1

Method Blank - Batch: 360-39240

Method: 300.0
Preparation: N/A

Lab Sample ID: MB 360-39240/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 12/02/2008 1804
Date Prepared: N/A

Analysis Batch: 360-39240
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 1.0 mL

Analyte	Result	Qual	RL	RL
Sulfate	ND		2.0	2.0
Chloride	ND		1.0	1.0

Lab Control Spike - Batch: 360-39240

Method: 300.0
Preparation: N/A

Lab Sample ID: LCS 360-39240/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 12/02/2008 1819
Date Prepared: N/A

Analysis Batch: 360-39240
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 1.0 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Sulfate	80.0	82.4	103	85 - 115	
Chloride	40.0	41.0	103	85 - 115	

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-20017-1

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 360-39240

Method: 300.0
Preparation: N/A

MS Lab Sample ID:	360-20017-5	Analysis Batch:	360-39240	Instrument ID:	No Equipment Assigned
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	N/A
Dilution:	10			Initial Weight/Volume:	1.0 mL
Date Analyzed:	12/02/2008 1905			Final Weight/Volume:	10 mL
Date Prepared:	N/A				

MSD Lab Sample ID:	360-20017-5	Analysis Batch:	360-39240	Instrument ID:	No Equipment Assigned
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	N/A
Dilution:	10			Initial Weight/Volume:	1.0 mL
Date Analyzed:	12/02/2008 1920			Final Weight/Volume:	10 mL
Date Prepared:	N/A				

	% Rec.						
Analyte	MS	MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Sulfate	110	110	75 - 125	0	20		
Chloride	101	101	75 - 125	0	20		

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation Job Number: 360-20017-1

Method Blank - Batch: 360-39241

Method: 300.0
Preparation: N/A

Lab Sample ID: MB 360-39241/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 12/03/2008 0038
Date Prepared: N/A

Analysis Batch: 360-39241
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 1.0 mL

Analyte	Result	Qual	RL	RL
Sulfate	ND		2.0	2.0
Chloride	ND		1.0	1.0

Lab Control Spike - Batch: 360-39241

Method: 300.0
Preparation: N/A

Lab Sample ID: LCS 360-39241/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 12/03/2008 0053
Date Prepared: N/A

Analysis Batch: 360-39241
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 1.0 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Sulfate	80.0	83.4	104	85 - 115	
Chloride	40.0	41.3	103	85 - 115	

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-20017-1

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 360-39241

Method: 300.0
Preparation: N/A

MS Lab Sample ID:	360-20017-14	Analysis Batch:	360-39241	Instrument ID:	No Equipment Assigned
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	N/A
Dilution:	10			Initial Weight/Volume:	1.0 mL
Date Analyzed:	12/03/2008 0138			Final Weight/Volume:	10 mL
Date Prepared:	N/A				

MSD Lab Sample ID:	360-20017-14	Analysis Batch:	360-39241	Instrument ID:	No Equipment Assigned
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	N/A
Dilution:	10			Initial Weight/Volume:	1.0 mL
Date Analyzed:	12/03/2008 0152			Final Weight/Volume:	10 mL
Date Prepared:	N/A				

	% Rec.						
Analyte	MS	MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Sulfate	97	97	75 - 125	0	20		
Chloride	107	107	75 - 125	0	20		

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation Job Number: 360-20017-1

Method Blank - Batch: 360-39276

Method: 300.0
Preparation: N/A

Lab Sample ID: MB 360-39276/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 12/03/2008 1055
Date Prepared: N/A

Analysis Batch: 360-39276
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 1.0 mL

Analyte	Result	Qual	RL	RL
Sulfate	ND		2.0	2.0
Chloride	ND		1.0	1.0

Lab Control Spike - Batch: 360-39276

Method: 300.0
Preparation: N/A

Lab Sample ID: LCS 360-39276/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 12/03/2008 1110
Date Prepared: N/A

Analysis Batch: 360-39276
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 1.0 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Sulfate	80.0	81.9	102	85 - 115	
Chloride	40.0	40.6	102	85 - 115	

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-20017-1

Method Blank - Batch: 360-39163

Method: L107-06-1B
Preparation: Distill/Ammonia

Lab Sample ID: MB 360-39163/1-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/28/2008 1055
Date Prepared: 11/28/2008 0923

Analysis Batch: 360-39164
Prep Batch: 360-39163
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 50 mL

Analyte	Result	Qual	RL	RL
Ammonia	ND		0.10	0.10

Lab Control Spike - Batch: 360-39163

Method: L107-06-1B
Preparation: Distill/Ammonia

Lab Sample ID: LCS 360-39163/2-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/28/2008 1056
Date Prepared: 11/28/2008 0923

Analysis Batch: 360-39164
Prep Batch: 360-39163
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 50 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Ammonia	10.0	9.10	91	85 - 115	

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation Job Number: 360-20017-1

Method Blank - Batch: 360-39229

Method: L107-06-1B
Preparation: Distill/Ammonia

Lab Sample ID: MB 360-39229/1-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 12/03/2008 1435
Date Prepared: 12/02/2008 1250

Analysis Batch: 360-39261
Prep Batch: 360-39229
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 50 mL

Analyte	Result	Qual	RL	RL
Ammonia	ND		0.10	0.10

Lab Control Spike - Batch: 360-39229

Method: L107-06-1B
Preparation: Distill/Ammonia

Lab Sample ID: LCS 360-39229/2-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 12/03/2008 1436
Date Prepared: 12/02/2008 1250

Analysis Batch: 360-39261
Prep Batch: 360-39229
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 50 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Ammonia	10.0	8.64	86	85 - 115	

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 360-39229

Method: L107-06-1B
Preparation: Distill/Ammonia

MS Lab Sample ID: 360-20017-14
Client Matrix: Water
Dilution: 10
Date Analyzed: 12/03/2008 1517
Date Prepared: 12/02/2008 1250

Analysis Batch: 360-39261
Prep Batch: 360-39229

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 50 mL

MSD Lab Sample ID: 360-20017-14
Client Matrix: Water
Dilution: 10
Date Analyzed: 12/03/2008 1518
Date Prepared: 12/02/2008 1250

Analysis Batch: 360-39261
Prep Batch: 360-39229

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 50 mL

Analyte	% Rec. MS	% Rec. MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Ammonia	-250	-326	75 - 125	8	20	4	4

Calculations are performed before rounding to avoid round-off errors in calculated results.

Method Blank - Batch: 360-39254

Method: L107-06-1B
Preparation: Distill/Ammonia

Lab Sample ID: MB 360-39254/1-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 12/03/2008 1450
Date Prepared: 12/03/2008 1245

Analysis Batch: 360-39263
Prep Batch: 360-39254
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 50 mL

Analyte	Result	Qual	RL	RL
Ammonia	ND		0.10	0.10

Lab Control Spike - Batch: 360-39254

Method: L107-06-1B
Preparation: Distill/Ammonia

Lab Sample ID: LCS 360-39254/2-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 12/03/2008 1451
Date Prepared: 12/03/2008 1245

Analysis Batch: 360-39263
Prep Batch: 360-39254
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 50 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Ammonia	10.0	9.56	96	85 - 115	

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 360-39254

Method: L107-06-1B
Preparation: Distill/Ammonia

MS Lab Sample ID: 360-20017-6
Client Matrix: Water
Dilution: 20
Date Analyzed: 12/03/2008 1524
Date Prepared: 12/03/2008 1245

Analysis Batch: 360-39263
Prep Batch: 360-39254

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 50 mL

MSD Lab Sample ID: 360-20017-6
Client Matrix: Water
Dilution: 20
Date Analyzed: 12/03/2008 1525
Date Prepared: 12/03/2008 1245

Analysis Batch: 360-39263
Prep Batch: 360-39254

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 50 mL

Analyte	% Rec. MS	% Rec. MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Ammonia	341	106	75 - 125	8	20	4	4

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation Job Number: 360-20017-1

Method Blank - Batch: 360-39059

Method: SM 2510B
Preparation: N/A

Lab Sample ID: MB 360-39059/4
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/24/2008 1643
Date Prepared: N/A

Analysis Batch: 360-39059
Prep Batch: N/A
Units: umhos/cm

Instrument ID: MAN-TECH Ion Plus
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 1.0 mL

Analyte	Result	Qual	RL	RL
Specific Conductance	ND		1.0	1.0

Lab Control Spike - Batch: 360-39059

Method: SM 2510B
Preparation: N/A

Lab Sample ID: LCS 360-39059/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/24/2008 1624
Date Prepared: N/A

Analysis Batch: 360-39059
Prep Batch: N/A
Units: umhos/cm

Instrument ID: MAN-TECH Ion Plus
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 1.0 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Specific Conductance	1420	1460	103	85 - 115	

Duplicate - Batch: 360-39059

Method: SM 2510B
Preparation: N/A

Lab Sample ID: 360-20017-1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/24/2008 1706
Date Prepared: N/A

Analysis Batch: 360-39059
Prep Batch: N/A
Units: umhos/cm

Instrument ID: MAN-TECH Ion Plus Autoti
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 1.0 mL

Analyte	Sample Result/Qual	Result	RPD	Limit	Qual
Specific Conductance	620	614	1	20	

Calculations are performed before rounding to avoid round-off errors in calculated results.

Login Sample Receipt Check List

Client: Olin Corporation

Job Number: 360-20017-1

Login Number: 20017
List Source: TestAmerica Westfield
Creator: Rinard, Kimberley A
List Number: 1

Question	T / F/ NA	Comment
Radioactivity either was not measured or, if measured, is at or below background	N/A	
The cooler's custody seal, if present, is intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	1.2/1.0 C
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	N/A	
If necessary, staff have been informed of any short hold time or quick TAT needs	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	

TestAmerica Laboratories, Inc.
Chain of Custody Form

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

360-20017

•53 Southampton Road
Westfield, MA 01085
(P) 413-572-4000
(F) 413-572-3707

•149 Rangeway Road
N. Billerica, MA 01862
(P) 978-667-1400
(F) 978-667-7871

Client: Olin Chemical/MACTEC
Address: 51 Eames Street
Wilmington, MA 01887
Phone: Fax:

Project #: 61000800 16
Project Manager: Peter Thompson
Work ID: ~~PCMP~~ Slurry Wall/Slurry Cap
Contact: David Chapman

Job# | Quote# | PO#

Requested Turn Around Time
10 Business Day (Std) XX | Rush TAT Requested:
15 Business Day | 24 hrs | 72 hrs
Other | 48 hrs | 5 Day

Regulatory Classification / Special Report Format
NPDES | Drinking Water | DEP Form(s)
RCRA | MCP GW1/S1 | MWRA Smart Rpt
Other | MCP QA/QC Rpt XX

Shaded areas for office use

Analysis Requested
Check analysis and specify method and analytes in comments section.
For example:
500-series for drinking water
600-series for waste water
8000-series for haz/solid waste
Use comments section to further define.

Comments
(Special Instructions)

MCP case narrative

Dissolved metals are field filtered.

Groundwater Metals: Dissolved Al/Cr

Surfacewater Metals: Dissolved/Total Al/Cr/Na

Sample Type Codes
WW-Wastewater DW-Drinking water SW-Surfacewater
LW-Labwater GW-Groundwater A-Air
S-Solid / Soil SL-Sludge O-Oil Z-Other

Sample ID	Sample Type	Sampler's Initials	Date Time Collected	Grab	Comp.	# Containers	Plastic(P) or Glass(G)	Preservative: NaHSO4/MeOH	HNO3 to pH <2	H2SO4 to pH <2	HCl to pH <2	NaOH to pH >12	NAOH/ZNAC	None / 4° C	Ammonia-Nitrogen	Chloride, Sulfate	Specific Condutivity	Nitrate, Nitrite	Groundwater metals	Surfacewater metals	Sediment: Al/Cr/Fe	Other	Other	Other	Other	Other	Other
OC-GW-26	GW	MAM	11-19-08 11:55	X		3	P		X	X				X	X	X	X		X							
OC-GW-76S	GW	MAM	11-19-08 13:35	X		3	P		X	X				X	X	X	X		X							
OC-GW-25	GW	MAM	11-19-08 14:40	X		3	P		X	X				X	X	X	X		X							
OC-PZ-16RR	GW	DLC	11-20-08 9:35	X		3	P		X	X				X	X	X	X		X							
OC-GW-78S	GW	DLC	11-20-08 11:30	X		3	P		X	X				X	X	X	X		X							
OC-GW-55S	GW	DLC	11-20-08 13:30	X		3	P		X	X				X	X	X	X		X							
OC-GW-35S	GW	DLC	11-20-08 14:45	X		3	P		X	X				X	X	X	X		X							
OC-GW-79S	GW	MAM	11-20-08 9:45	X		3	P		X	X				X	X	X	X		X							
OC-PZ-17RR	GW	MAM	11-20-08 13:50	X		3	P		X	X				X	X	X	X		X							
OC-PZ-18R	GW	MAM	11-20-08 11:30	X		3	P		X	X				X	X	X	X		X							

Sampled by (print): David Chapman / Mark Maggiore
Signature:

Relinquished by: David Chapman Date: 11-21-08 Time: 14:15
Received by: Date: 11/21/08 Time: 1415

Relinquished by: Date: 11/21/08 Time: 1615
Received by: Date: 11/21/08 Time: 1615

Method of shipment:

TestAmerica-Westfield

Cooler? Y / N Samples Iced? Y / N
Temp @ receipt: 1.2°/1.0° °C
Preservation/pH checked
By: Date: 11/21/08

White = Lab file Yellow = Report copy Pink = Customer copy
STL-8245 (1000)

TestAmerica Laboratories, Inc.
Chain of Custody Form

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

360 20017

•53 Southampton Road
Westfield, MA 01085
(P) 413-572-4000
(F) 413-572-3707

•149 Rangeway Road
N. Billerica, MA 01862
(P) 978-667-1400
(F) 978-667-7871

Client: Olin Chemical/MACTEC
Address: 51 Eames Street
Wilmington, MA 01887
Phone: Fax:

Project #: 61000800 16
Project Manager: Peter Thompson
Work ID: ~~RCMP~~ Slurry Wall
Contact: David Chapman Slurry Cap

Job# | Quote# | PO#

Requested Turn Around Time
10 Business Day (Std) XX | Rush TAT Requested:
15 Business Day | 24 hrs | 72 hrs
Other | 48 hrs | 5 Day

Regulatory Classification / Special Report Format
NPDES | Drinking Water | DEP Form(s)
RCRA | MCP GW1/S1 | MWRA Smart Rpt
Other | MCP QA/QC Rpt XX

Shaded areas for office use

Analysis Requested
Check analysis and specify method and analytes in comments section.
For example:
500-series for drinking water
600-series for waste water
8000-series for haz/solid waste
Use comments section to further define.

Comments
(Special Instructions)

MCP case narrative

Sample Type Codes
WW-Wastewater DW-Drinking water SW-Surfacewater
LW-Labwater GW-Groundwater A-Air
S-Solid / Soil SL-Sludge O-Oil Z-Other

Sample ID	Sample Type	Sampler's Initials	Date Time Collected	Grab	Comp.	# Containers	Plastic(P) or Glass(G)	Preservative: NaHSO4/MeOH	HNO3 to pH <2	H2SO4 to pH <2	HCl to pH <2	NaOH to pH >12	NAOH/ZNAC	None / 4° C	Ammonia-Nitrogen	Chloride, Sulfate	Specific Conductivity	Nitrate, Nitrite	Groundwater metals	Surfacewater metals	Sediment: Al/Cr/Fe	Other	Other	Other	Other	Other	Other
OC-GW-CA1	GW	MAM	11-20-08 14:55	X		3	P		X	X				X	X	X	X		X							
OC-GW-20D	GW	DLC	11-21-08 9:20	X		3	P		X	X				X	X	X	X		X							
OC-GW-34SR	GW	DLC	11-21-08 10:25	X		3	P		X	X				X	X	X	X		X							
OC-GW-20S	GW	MAM	11-21-08 8:45	X		3	P		X	X				X	X	X	X		X							
OC-GW-20S DUP	GW	MAM	11-21-08 8:45	X		3	P		X	X				X	X	X	X		X							
OC-GW-20S MS	GW	MAM	11-21-08 8:45	X		3	P		X	X				X	X	X	X		X							
OC-GW-20S MSD	GW	MAM	11-21-08 8:45	X		3	P		X	X				X	X	X	X		X							
OC-GW-34D	GW	MAM	11-21-08 10:00	X		3	P		X	X				X	X	X	X		X							
OC-GW-34D DUP	GW	MAM	11-21-08 10:00	X		3	P		X	X				X	X	X	X		X							
OC-GW-20S	GW	MAM	11-21-08	X		3	P		X	X				X	X	X	X		X							

Dissolved metals are field filtered.

Groundwater Metals: Dissolved Al/Cr

Surfacewater Metals: Dissolved/Total Al/Cr/Na

Sampled by (print): David Chapman / Mark Maggiore
Signature:

Relinquished by: David Chapman Date: 11-21-08 Time: 14:15
Received by: Date: 11/21/08 Time: 1445

Relinquished by: Date: 11/21/08 Time: 1615
Received by: Date: 11/21/08 Time: 1615

Method of shipment:

TestAmerica-Westfield

Cooler? (Y) / N Samples Iced? (Y) / N
Temp @ receipt: 1.2°C / 1.0°C °C
Preservation/pH checked
By: Date: 11/21/08

White = Lab file Yellow = Report copy Pink = Customer copy
STL-8245 (1000)

OLIN-WILMINGTON
LEVEL I DATA QUALITY EVALUATION
STANDARD OPERATING PROCEDURE AND CHECKLIST
ICP METALS BY METHOD 6010B/200.7
Dissolved Al/Cr

Reviewer/Date Tige Cunningham 1/30/09
Sr. Review/Date Chris Ricardi 2/12/09
Lab Report # 360-20017-1
Project # 6107090016-12

1.0 Laboratory Deliverable Requirements

1.1 Laboratory Information: Was all of the following provided in the laboratory report? **Yes** [☑] No [ ] N/A [ ] Comments:
Check items received.

☑ *Name of Laboratory* ☑ *Address* ☑ *Project ID* ☑ *Phone #* ☑ *Sample identification – Field and Laboratory*
Client Information: ☑ *Name* ☑ *Address* ☑ *Client Contact* *(IDs must be cross-referenced)*

ACTION: If no, contact lab for submission of missing or illegible information.

1.2 Laboratory Report Certification Statement ***Yes*** [☑] *No* [ ] *N/A* [ ] *Comments:*

Does the laboratory report include a completed Analytical Report Certification in the required format?

***ACTION**: If no, contact lab for submission of missing certification or certification with correct format.*

1.3 Laboratory Case Narrative: ***Yes*** [☑] *No* [ ] *N/A* [ ] *Comments:*

☑ *Narrative serves as an exception report for the project and method QA/QC performance.* ☐ *Narrative includes an explanation of each discrepancy on the*

Certification Statement.

***ACTION**: If no, contact lab for submission of missing or illegible information.*

1.4 Chain of Custody (COC) copy present with all documentation completed **Yes** [☑] No [ ] N/A [ ] Comments:

NOTE: Olin receives and maintains the *original COC.*

ACTION: If no, contact lab for submission of copy of completed *COC.*

1.5 Sample Receipt Information (*Cooler Receipt Form present?*): **Yes [✓]** No [ ] N/A [ ] Comments:

Were each of the following tasks completed and recorded upon receipt of the sample(s) into the laboratory?

☑ Sample temperature confirmed: must be 1° – 10° C. (If samples were sent by courier and delivered on the same day as collection, temperature requirement does not apply).

☑ Container type noted ☑ sample condition observed ☑ pH verified (where applicable) ☑ Field and lab IDs cross referenced

ACTION: If no, contact lab for submission of missing or incomplete documentation.

1.5.1 Were all samples delivered to the laboratory without breakage? **Yes [✓]** No [ ] N/A [ ] Comments:

1.5.2 Does the *Cooler Receipt Form* or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data? Yes [ ] **No [✓]** N/A [ ] Comments:

1.6 Sample Results Section: *Was each of the following requirements supplied in the laboratory report for each sample?* **Yes [✓]** No [ ] N/A [ ] Comments:

☑ Field ID and Lab ID ☑ *Date and time collected* ☑ Analyst Initials ☑ *Dilution Factor* ☑ % moisture or solids ☑ *Reporting limits*
☐ *Clean-up method* N/A ☑ Analysis method ☑ *Preparation method* ☑ *Date of preparation/extraction/digestion clean-up and analysis, where applicable*
☑ Matrix ☑ Target analytes and concentrations ☑ Units (soils must be reported in dry weight)

ACTION: If no, contact lab for submission of missing or incomplete information.

1.7 QA/QC Information: Was each of the following information supplied in the laboratory report for each sample batch? **Yes [✓]** No [ ] N/A [ ] Comments:

☑ Method blank results ☑ LCS recoveries ☑ MS/MSD recoveries and RPDs ☑ Laboratory duplicate results (where applicable)

ACTION: If no, contact lab for submission of missing or incomplete information.

2.0 Holding Times

Have any technical holding times, determined from date of collection to date of analysis, been exceeded? Holding time for metals is 180 days from sample collection to analysis for both water and soil.

Yes [ ] **No [✓]** N/A [ ] Comments:

NOTE: List samples that exceed hold time with # of days exceeded on checklist

ACTION: If technical holding times are exceeded, qualify all positive results (J) and non-detects (UJ). If grossly exceeded (2X holding time) reject (R) all non-detect results.

3.0 Laboratory Method

3.1 Was the correct laboratory method used?

Yes [✓] No [ ] N/A [ ] Comments:

Water Digestion	3005A or 3010A or 3020A
Soil Digestion	3050B
Metals	6010B or 200.7

ACTION: If no, contact laboratory to provide justification for method change compared to the requested method. Contact senior chemist to inform Client of change and to request variance.

3.2 Are the practical quantitation limits the same as those specified by the ☑ SOW ☐ QAPP ☐ Lab ☐ MADEP

Yes [✓] No [ ] N/A [ ] Comments:

NOTE: *Verify that the reported metals match the target list specified on the COC.*

ACTION: If no, evaluate variation with respect to sample matrix, preparation, dilution, moisture, etc. If sample PQL is indeterminate, contact lab for explanation.

3.3 Are results present for each sample in the SDG? **Yes** [__] No [__] N/A [__] Comments:

ACTION: If no, check Request for Analysis to verify if method was ordered and COC to verify that it was sent, and contact lab for resubmission of the missing data

3.4 If dilutions were required, were dilution factors reported? **Yes** [__] No [__] N/A [__] Comments:

ACTION: If no, contact the lab for submission.

4.0 Method Blanks

4.1 Is the Method Blank Summary present? **Yes** [✓] No [__] N/A [__] Comments:

ACTION: If no, call the laboratory for submission of missing data.

4.2 Frequency of Analysis: Was a method blank analyzed for each digestion batch of < 20 field samples? **Yes** [✓] No [__] N/A [__] Comments:

ACTION: If no, contact laboratory for justification. Consult senior chemist for action needed. Narrate non-compliance.

4.3 Is the method blank less than the PQLs for all target elements? **Yes** [__] No [✓] N/A [__] Comments:

NOTE: *MADEP requires the method blank to be matrix matched and digested with the samples*

4.4 Do any method blanks have positive results for metals? Qualify data according to the following: Yes [✓] **No** [__] N/A [__] Comments:

Al @ 3.8 mg/L in Batch 360-39051

3.8 × 5 = 19 mg/L

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

ACTION: For any blank with positive results, list all contaminants for each method blank including the concentration detected and the flagging level (flagging level = 5x the blank value) and the associated samples and qualifiers.

5.0 Laboratory Control Standard

5.1 Was a laboratory control standard run with each analytical batch of 20 samples or less? **Yes [✓]** No [ ] N/A [ ] Comments:

NOTE: *A full target, second source LCS is required by MADEP.*
ACTION: Call laboratory for LCS form submittal. If data are not available, use professional judgement to evaluate data accuracy associated with that batch.

5.2 Is a LCS Summary Form present? **Yes [✓]** No [ ] N/A [ ] Comments:

ACTION: If no, contact lab for resubmission of missing data.

5.3 Is the recovery of any analyte outside of MADEP control limits? Yes [ ] **No [✓]** N/A [ ] Comments:

Sample Type	MADEP % Rec
Water	80-120
Soil	within Lab generated limits

ACTION: If recovery is above the upper limit, qualify all positive sample results within the batch as (J). If recovery is below the lower limit, qualify all positive and non-detects results within the batch as (J). If LCS recovery is <30%, positive and non-detect results are rejected (R).

Comments:

6.0 Matrix Spikes

Matrix spikes may be collected at different frequencies based on monthly, quarterly, or task specific schedules. Confirm spike requirements for each set with the senior chemist.

6.1 Were project-specific MS/MSDs collected? List project samples that were spiked.

Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact senior chemist to see if any were specified.

6.2 Is the Matrix Spike/Matrix Spike Duplicate Recovery Form present?

Yes [✓] No [ ] N/A [ ] Comments:

NOTE: *A full target, second source MS/MSD is required by MADEP.*
ACTION: If any matrix spike data are missing, call lab for resubmission.

6.3 Were matrix spikes analyzed as indicated on the COC and project schedule?

Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If any matrix spike data are missing, call lab for resubmission. If none, no qualification is needed. Narrate non-compliance.

6.4 Are any metal spike recoveries outside of the QC limits?

Yes [ ] **No [✓]** N/A [ ] Comments:

Sample Type	***MADEP*** ***% Rec***	QAPP % Rec	Method
Water	*75-125*	N/A	6010B
Water	*N/A*	70-130	200.7
Soil	*75-125*	75-125	6010B

NOTE: $\%R = \frac{(SSR-SR)}{SA} \times 100\%$ Where: SSR = Spiked sample result, SR = Sample result, SA = Spike added

NOTE: If dilutions are required due to high sample concentrations (> 4X spike), the data are evaluated, but no flags are applied.

NOTE: If only one of the recoveries for an MS/MSD pair is outside of the control limits, no qualification is necessary. Use professional judgment for the MS/MSD flags.

ACTION: MS/MSD flags only apply to the sample spiked. If the recoveries of the MS and MSD exceed the upper control limit, qualify positive results as estimated (J). If the recoveries of the MS and MSD are lower than the lower control limit, qualify positive results and non-detects (J).

6.5 Are any RPDs for MS/MSD recoveries outside of the QC limits? Yes [ ] **No** [✓] N/A [ ] Comments:

NOTE: RPD = $\frac{S-D}{(S+D)/2} \times 100\%$ Where: S = MS sample result
D = MSD sample result

NOTE: If dilutions are required due to high sample concentrations, the data are evaluated, but no flags are applied.

ACTION: If the RPD exceeds the control limit, qualify positive results and non-detects (J).

7.0 Laboratory Duplicate

7.1 Was a laboratory duplicate sample analyzed? If so, is the Laboratory Duplicate Sample Form present? **Yes** [✓] No [ ] N/A [ ] Comments:

NOTE: *MADEP refers to this sample as a "matrix duplicate".*

ACTION: If not analyzed, qualification is not needed. If data is missing, contact laboratory for resubmission of report. Narrate non-compliance.

7.2 Is the RPD between the result for the laboratory duplicate sample and the result for the parent sample outside of the QA/QC limits? Yes [ ] **No** [✓] N/A [ ] Comments:

MADEP Laboratory Duplicate Sample RPD Criteria:	QAPP RPD
For aqueous results > 5× RL, RPD must be ± 20%	20
For aqueous results < 5× RL, RPD must be ≤ RL	20
For soil/sediment results > 5× RL, RPD must be ± 35%	20
For soil/sediment results < 5× RL, RPD must be ≤ 2× RL	20

ACTION: If the RPD exceeds the limits, qualify both positive results and non-detects as estimated and flag them J. Narrate non-compliance

8.0 Sampling Accuracy

The majority of ground water samples are collected directly from a tap, process stream, or with dedicated tubing. Rinse blanks will not be collected.

8.1 Were rinsate blanks collected? Prior to evaluating rinsate blanks, obtain a list of the associated samples from the senior chemist. **Yes [__]** No [✓] N/A [__] Comments:

8.2 Do any rinsate blanks have positive results? Yes [__] **No [__]** N/A [✓] Comments:

NOTE: *MADEP does not require the collection of rinsate blanks.*

ACTION: Evaluate rinsate results against blank results to determine if contaminant may be laboratory-derived. If results are not lab-related, qualify according to below.

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

9.0 Field Duplicates

9.1 Were field duplicate samples collected? Obtain a list of samples and their associated field duplicates. Yes [✓] **No [__]** N/A [__] Comments:

9.2 Were field duplicates collected per the required frequency? **Yes** [✓] No [ ] N/A [ ] Comments:

SOW ☑ QAPP *(1 per 10)* ☐ *MADEP Option 1 (1 per 20)* ☐ *MADEP Option 3 (1 per 10)* ☐

9.3 Was the RPD ≤ 50% for soils or waters? Calculate the RPD for all results and attach to this review. **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: RPD must be ≤50% for soil and water. Qualify data (J) for both sample results if the RPD exceeds 50%.

10.0 Special QA/QC

10.1 Were both total and dissolved metals analysis performed? If so, the dissolved metal concentration should not exceed that of the total metal. Yes [ ] **No** [✓] N/A [ ] Comments:

ACTION: If results for both total and dissolved are ≥ 5x the PQL **and** the dissolved concentration is 10% higher than the total, flag both results as estimated (J). If total and dissolved concentrations are less than 5x the PQL **and** the **difference** exceeds 2x the PQL, flag both results as estimated (J)

10.0 Application of Validation Qualifiers

Was any of the data qualified?

Yes [✓] **No** [ ] N/A [ ] Comments:

If so, apply data qualifiers directly to the DQE copy of laboratory report and **flag pages** for entry in database. Aluminum due to Blank Contamination

REFERENCES

LAW, 1999, "Final Quality Assurance Project Plan, Olin Wilmington Property, 51 Eames Street, Wilmington, MA", LAW Engineering and Environmental Services, Kennesaw, GA 30144. August 1999

U.S. Environmental Protection Agency (USEPA), 1989. "Region 1 Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses"; Hazardous Site Evaluation Division; February 1989.

MADEP, 2001. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Massachusetts Quality Assurance and Quality Control (QA/QC) Requirements." BWSC-CAM, Interim Final Draft, Revision No. 2, 5 October 2001.

MADEP, 2001. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Quality Assurance and Quality Control Guidelines for Sampling, Data Evaluation and Reporting Activities," BWSC-CAM, Section VII, Public Comment Draft, Revision No. 0, 21 December 2001.

OLIN-WILMINGTON
LEVEL I DATA QUALITY EVALUATION
STANDARD OPERATING PROCEDURE AND CHECKLIST
WET CHEMISTRY PARAMETERS BY VARIOUS METHODS
Ammonia, Chloride, Conductivity, Sulfate

Reviewer/Date Tige Cunningham 2/2/09
Sr. Review/Date Chris Ricardi 2/12/09
Lab Report # 360-20017-1
Project # 6107090016-12

Note: The following analyses will be evaluated according to the "MADEP QA/QC Guidelines for **Sampling, Data Evaluation and Reporting Activities.**" MADEP, however, may not list QA/QC criteria for every chemical analysis. Where not defined by MADEP, criteria will default to values stipulated in the QAPP. Where the QAPP does not define criteria, QA/QC requirements will default to limits employed by the laboratory.

1.0 Laboratory Deliverable Requirements

1.1 Laboratory Information: Was all of the following provided in the laboratory report? **Yes** [✓] No [ ] N/A [ ] Comments:
Check items received.

☑ *Name of Laboratory* ☑ *Address* ☑ *Project ID* ☑ *Phone #* ☑ *Sample identification – Field and Laboratory*
Client Information: ☑ *Name* ☑ *Address* ☑ *Client Contact* *(IDs must be cross-referenced)*

ACTION: If no, contact lab for submission of missing or illegible information.

1.2 Laboratory Report Certification Statement ***Yes*** [✓] *No* [ ] *N/A* [ ] *Comments:*

Does the laboratory report include a completed Analytical Report Certification in the required format?

***ACTION**: If no, contact lab for submission of missing certification or certification with correct format.*

1.3 Laboratory Case Narrative: ***Yes*** [✓] *No* [ ] *N/A* [ ] *Comments:*

☑ *Narrative serves as an exception report for the project and method QA/QC performance.* ☐ *Narrative includes an explanation of each discrepancy on the Certification Statement.*

***ACTION**: If no, contact lab for submission of missing or illegible information.*

1.4 Chain of Custody (COC) copy present with all documentation completed? **Yes** [✓] No [ ] N/A [ ] Comments:

Does the laboratory report include copies of Chain of Custody forms containing all samples in this SDG?

NOTE: Olin receives and maintains the *original* COC.

ACTION: If no, contact lab for submission of copy of missing completed COC.

1.5 Sample Receipt Information (*Cooler Receipt Form*): Were each of the following tasks completed and recorded upon receipt of the sample(s) into the laboratory?

Yes [✓] No [ ] N/A [ ] Comments:

☑ Sample temperature confirmed: must be 1° – 10° C. (If samples were sent by courier and delivered on the same day as collection, temperature requirement does not apply).

☑ Container type noted ☑ Condition observed ☑ pH verified (where applicable) ☑ Field and lab IDs cross referenced

ACTION: If no, contact lab for submission of missing or incomplete documentation.

1.5.1 Were the correct bottles and preservatives used?

Yes [✓] No [ ] N/A [ ] Comments:

Ammonia, – 1 Liter polyethylene/H_2SO_4 to pH<2,cool to 4°C

Oil & Grease – 1 Liter glass/HCL or H2SO4 to pH<2,cool to 4°C

Alkalinity – 1 Liter polyethylene/cool to 4°C

Chemical Oxygen Demand – 50 mL polyethylene/H_2SO_4 to pH<2,cool to 4°C

Chloride, pH, sulfate, nitrate, nitrite - 50 mL polyethylene/cool to 4°C

Nitrate/nitrite - H2SO4 to pH<2,cool to 4°C

Organic Carbon – 500 mL amber glass bottle/HCl or H_2SO_4 to pH<2,cool to 4°C

Sulfide – 50 mL polyethylene/ZnAcetate + NaOH to pH>9, cool to 4°C

Phenolics - H_2SO_4 to pH<2,cool to 4°C

Specific conductance, TDS, TSS – 100 mL polyethylene/cool to 4°C

ACTION: If no, inform senior chemist. Document justification for change in container/volume (if applicable), qualify positive and non-detect data (J) data if cooler temperature exceeds 10°C. Rejection of data requires professional judgment

1.5.2 Were all samples delivered to the laboratory without breakage?

Yes [✓] No [ ] N/A [ ] Comments:

1.5.3 Does the *Cooler Receipt Form* or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data?

Yes [ ] **No [✓]** N/A [ ] Comments:

1.6 Sample Results Section: *Was the following information supplied in the laboratory report for each sample?* **Yes [✓]** No [ ] N/A [ ] Comments:

☑ Field ID and Lab ID ☑ Date and time collected ☑ Analyst Initials ☑ Dilution Factor ☐ % moisture or solids N/A ☑ Reporting limits
☐ *Clean-up method* N/A ☑ Analysis method ☑ Preparation method ☑ Date of preparation/extraction/digestion clean-up and analysis, where applicable
☑ Matrix ☑ Target analytes and concentrations ☑ Units (soils must be reported in dry weight)

ACTION: If no, contact lab for submission of missing or incomplete information.

1.7 QA/QC Information: Was the following information provided in the laboratory report for each sample batch? **Yes [ ]** No [ ] N/A [ ] Comments:

☑ Method blank results ☑ LCS recoveries ☑ MS/MSD recoveries and RPDs ☑ Laboratory duplicate results (where applicable)

ACTION: If no, contact lab for submission of missing or incomplete information.

2.0 Holding Times Yes [ ] **No [ ]** N/A [ ] Comments:

Have any technical holding times, determined from date of collection to date of analysis, been exceeded? The holding times are as follows:

28 days = ammonia, chemical oxygen demand, chloride, organic carbon, oil & grease, specific conductance, total organic carbon and sulfate

Alkalinity = 14 days | Sulfide, TDS, TSS = 7 days | pH = analyze immediately | Nitrate nitrogen as N = 48 hrs

Nitrite nitrogen as N = 48 hrs | Nitrate + Nitrite as N = 28 days

NOTE: List samples that exceed hold time with # of days exceeded on checklist

ACTION: If technical holding times are exceeded qualify results (J). For water samples that are grossly exceeded (>2X hold time) reject (R) all non-detect results. Professional judgment used to qualify soils.

3.0 Laboratory Method **Yes [✓]** No [ ] N/A [ ] Comments:

3.1 Was the correct laboratory method used?

ACTION: If no, contact lab to provide justification for method change compared to the requested method. Contact senior chemist to inform Client of change or to request variance.

3.2 Are the practical quantitation limits the same as those specified by the ☑ QAPP/IRSWP ☐ Lab? **Yes** [✓] No [ ] N/A [ ] Comments:

Note: *The MADEP QA/QC Guidelines do not yet list PQLs for wet chemistry analyses, therefore all criteria will default to values stipulated in the QAPP*. Where the QAPP does not define criteria, QA/QC requirements default to limits employed by the lab**. Other criteria may also apply.*

Ammonia* ☑ = 0.1 mg/ L	Alkalinity** ☐ = 1 mg/L	Bicarbonate Alkalinity** ☐ = 1 mg/L	Carbonate Alkalinity** ☐ = 1 mg/L
Nitrate Nitrogen as N* ☐ = .05 mg/L	Nitrite Nitrogen as N* ☐ = .01 mg/L	Chloride* ☑ = 1 mg/L	Hardness * ☐ = 2 mg/L
Spec. Cond.** ☑ 3 umhos/cm	Total Organic Carbon** ☐ = 1 mg/L	Oil & Grease* ☐ = 5.5 mg/L	Sulfate (EPA 300.0)* ☑ = 2 mg/L
COD:* Low – 20 mg/L	COD* High - 50 mg/L ☐	TDS* ☐ = 10 mg/L	TSS* ☐ = 5 mg/L
pH* ☐ < 2 to > 12	Phenolic - 0.01 mg/L		

Other parameter(list) _____ PQL = _____ ☐ Source of PQL = _____

Other parameter(list) _____ PQL = _____ ☐ Source of PQL = _____

ACTION: If no, evaluate change with respect to sample matrix, preparation, dilution, moisture, etc. If sample PQL is indeterminate, contact lab for explanation.

3.3 Are the appropriate parameter results present for each sample in the SDG? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, check Request for Analysis to verify if method was ordered and COC to verify that it was sent, and contact lab for resubmission of the missing data

3.4 If *dilutions were required, were dilution factors reported?* **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact the lab for submission.

4.0 <u>Method Blanks</u> **Yes** [✓] No [ ] N/A [ ] Comments:

4.1 Are the Method Blank Summaries present?

ACTION: If no, call the laboratory for submission of missing data.

4.2 Was a method blank analyzed for each analysis batch of wet chemistry field samples of 20 or less? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, document discrepancy in case narrative and contact lab for justification. Consult senior chemist for action needed.

4.3 Is the method blank less than the PQL? (See Section 3.2 for PQLs). **Yes [✓]** No [ ] N/A [ ] Comments:

4.4 Do any method blanks have positive results for wet chemistry parameters? Qualify data according to the following: Yes [ ] **No [✓]** N/A [ ] Comments:

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

ACTION: If any blank has positive results, list all the concentrations detected and flagging level (flagging level = 5 × blank value) on the checklist. List all affected samples and their qualifiers.

5.0 Laboratory Control Standards

5.1 Was a laboratory control standard (LCS) run with each analytical batch of 20 samples or less? **Yes [✓]** No [ ] N/A [ ] Comments:

ACTION: If no, call laboratory for LCS form submittal. If data is not available, use professional judgment to determine qualification actions for data associated with the batch.

5.2 Is a LCS Summary Form present? **Yes [✓]** No [ ] N/A [ ] Comments:

ACTION: If no, contact lab for resubmission of missing data.

5.3 Is any wet chemistry analyte LCS recovery outside the control limits? Yes [ ] **No [✓]** N/A [ ] Comments:

NOTE: $\%R = \frac{(SSR-SR)}{SA} \times 100\%$ Where: SSR = Spiked sample result
SR = Sample result
SA = Spike added

MS/MSD Recovery Limits:

N/A see note below

Alkalinity* = NA	Bicarbonate Alkalinity* = NA	Carbonate alkalinity* = NA	Ammonia* (LACHAT) ☐ = 75-125%
Chloride*(SM 4500 Cl) ☑ = 75-125%	Specific Conductivity * = NA	Total Organic Carbon* = NA	TDS** = NA
Oil & Grease* = NA	COD Low* ☐ = 75-125%	COD High* ☐ = 75-125%	Nitrate Nitrogen as N** ☐ = 75-125%
Nitrite Nitrogen as N** ☐ = 75-125%	Hardness* ☐ = 75-125%	Sulfate (EPA 300.0)* ☑ = 75-125%	pH* = NA TSS* = NA

Other parameter(list) _____ % R = _____ ☐ Rec Limits = _____

* = Laboratory Limits ** = Olin QAPP Limits (*MADEP has not yet defined LCS recovery limits for wet chemistry analyses.*)

NOTES: 1) If only one of the recoveries for an MS/MSD pair is outside of the control limits, no qualification is necessary. Use professional judgment for the MS/MSD flags.
2) If the MS/MSD was performed by the laboratory on a non-project sample, no qualification is required.

Ammonia sample results >4X

ACTION: MS/MSD flags only apply to the sample spiked. Do not evaluate if sample concentration is > 4X spike. If the recoveries of the MS and MSD exceed the upper control limit, SP qualify positive results as estimated (J). If the recoveries of the MS and MSD are lower than the lower control limit but > 30%, qualify both positive results and non-detects (J). If the MS/MSD recovery is < 30% and the sample is non-detect, the results are considered unusable and flagged (R).

ACTION: Laboratory control limits apply when spiked sample results fall within the normal calibration range. If dilutions are required due to high sample concentrations, the data is evaluated, but no flags are applied.

6.5 Are any RPDs for MS/MSD recoveries outside of the QA/QC limits?

Yes [ ] **No [✓]** N/A [ ] Comments:

NOTE: $RPD = \frac{S - D}{(S + D)/2} \times 100\%$ Where S = MS result
D = MSD result

MS/MSD RPD Limits:

RPD ≤20

7.0 **Laboratory Duplicate**

Are the RPDs for the laboratory duplicates <20% unless otherwise specified below?

Yes [✓] No [ ] N/A [ ] Comments:

→ on Conductivity

LCS Limits:

Alkalinity** ☐ = 80-120%	Bicarbonate Alkalinity** ☐ = 80-120%	Carbonate Alkalinity** ☐ = 80-120%	Specific Conductivity *☑ = 80-120%
Total Organic Carbon** ☐ = 80-120%	TDS** ☐ = 80-120%	Oil & Grease* ☐ = 80-120%	Ammonia Nitrogen as N* ☑ = 80-120%
COD Low* ☐ = 80-120%	COD High* ☐ = 80-120%	Nitrate Nitrogen as N**☐ = 80-120%	Nitrite Nitrogen as N** ☐= 80-120%
Hardness* ☐ = 80-120%	Chloride* ☑ = 80-120%	Sulfate (EPA 300.0)* ☑ = 80-120%	pH* ☐ = 98-102% TSS* NA

Other parameter(list) _____ %R = _____ ☐ Rec Limits= _____

Other parameter(list) _____ %R = _____ ☐ Rec Limits = _____

(MADEP has not yet defined LCS recovery limits for wet chemistry analyses.)

ACTION: If recovery is above the upper limit, qualify all positive sample results within the batch as (J). If recovery is below the lower limit, qualify all positive and no-detect results within the batch as (J). If LCS recovery is <10%, non-detect results are rejected (R).

6.0 Matrix Spikes

Matrix spikes may be collected at different frequencies based on monthly, quarterly, or task specific schedules. Confirm spike requirements for each set with the senior chemist.

6.1 Were project-specific MS/MSDs analyzed? List project samples that were spiked.

ACTION: If no, contact senior chemist to see if any were specified.

Yes [✓] No [ ] N/A [ ] Comments:

6.2 Is the MS/MSD Recovery Form present?

ACTION: If no, contact lab for resubmission of missing data.

Yes [✓] No [ ] N/A [ ] Comments:

6.3 Were matrix spikes analyzed at the required frequency of 1 per 20 samples per matrix?

ACTION: If any matrix spike data is missing, call lab for resubmission.

Yes [✓] No [ ] N/A [ ] Comments:

6.4 Are any wet chemistry analyte spike recoveries outside of the QC limits?

Yes [ ] **No** [✓] N/A [ ] Comments:

ACTION: If the RPD is greater than specified limits, qualify all results for that analyte as estimated (J).

pH* ☐ = 3% Specific Conductivity *☑ = 5% TSS** ☐ = 6% TDS** ☐ = 6%

8.0 Sampling Accuracy

The majority of ground water samples are collected directly from a tap, process stream, or with dedicated tubing. Rinse blanks will not be collected.

8.1 Were rinsate blanks collected? Prior to evaluating rinsate blanks, obtain a list of the associated samples from the senior chemist. **Yes** [ ] No [✓] N/A [ ] Comments:

8.2 Do any rinsate blanks have positive results? Yes [ ] **No** [ ] N/A [✓] Comments:

ACTION: Evaluate rinsate results vs. blank results to determine if contaminant may be laboratory-derived. If not lab-related, qualify according to the table below.

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

NOTE: *MADEP does not require the collection of rinsate blanks.*

9.0 Field Duplicates

9.1 Were field duplicate samples collected? Obtain a list of samples and their associated field duplicates. **Yes** [✓] No [ ] N/A [ ] Comments:

9.2 Were field duplicates collected per the required frequency? **Yes** [✓] No [ ] N/A [ ] Comments:

QAPP/IRSWP ☑ *MADEP Option 1(1 per 20)* ☐ *MADEP Option 3 (1 per 10)* ☐

9.3 Was the RPD ≤ 30% for waters ≤ 50% for soils? Calculate the RPD for results and attach to this review. **Yes** [ ] No [✓] N/A [ ] Comments:

OC-GW-2025

	DUP	RPD
Ammonia	120	84	35

ACTION:. Qualify data (J) for both sample results if the RPD exceeded.

Was any of the data qualified? Yes [✓] **No** [__] N/A [__] Comments:

If so, apply data qualifiers directly to the DQE copy of laboratory report and **flag pages** for entry in database.

Ammonia in OC-GW-2025
:
OC-GW-2025 DUP

REFERENCES:-

MACTEC, 2007. "Draft Interim Response Steps Work Plan"; Olin Chemical Superfund Site, 51 Eames Street, Wilmington, Massachusetts.; Project No. 6300-06-0010/41.1; July 25, 2007.

Massachusetts Department of Environmental Protection (MADEP), 2004. "The Compendium of Quality Assurance and Quality Control Requirements and Performance Standards for Selected Analytical Methods Used in Support of Response Actions for the Massachusetts Contingency Plan (MCP)"; Bureau of Waste Site Cleanup; 1 Winter Street, Boston, Massachusetts 02108; WSC-CAM; May 2004.

Olin Chemical
Wilmington, MA
Slurry Wall / Slurry Cap
SDG 360-20018-1

analysis_m	run_id	fracti	lab_sample_id	field_sample_id	param_name	final_result	final_qua	lab_result_	lab_qualifie	result_uom	dilutio	field_sample	extraction_d	analysis_date	validation	validation
E300	2	N	360-20017-1	OC-GW-26	Chloride	82		82		mg/l	10	11/19/2008		12/2/2008	2-Feb	Level I
E300	1	N	360-20017-1	OC-GW-26	Sulfate	82		82		mg/l	1	11/19/2008		12/2/2008	2-Feb	Level I
LACH_107	1	N	360-20017-1	OC-GW-26	Nitrogen, as Ammonia	42		42		mg/l	5	11/19/2008	11/28/2008	11/28/2008	2-Feb	Level I
SM2510B	**2**	**N**	**360-20017-1**	**OC-GW-26**	**LAB SPECIFIC CONDUCTANCE**			**614**		**umhos/cm**	**1**	**11/19/2008**		**11/24/2008**	**2-Feb**	**Level I**
SM2510B	1	N	360-20017-1	OC-GW-26	LAB SPECIFIC CONDUCTANCE	620		620		umhos/cm	1	11/19/2008		11/24/2008	2-Feb	Level I
SW6010	**2**	**D**	**360-20017-1**	**OC-GW-26**	**Aluminum**			**100**	**U**	**ug/l**	**1**	**11/19/2008**		**11/24/2008**	**2-Feb**	**Level I**
SW6010	1	D	360-20017-1	OC-GW-26	Aluminum	100	U	100	U	ug/l	1	11/19/2008		11/24/2008	2-Feb	Level I
SW6010	1	D	360-20017-1	OC-GW-26	Chromium	7		7		ug/l	1	11/19/2008		11/24/2008	2-Feb	Level I
SW6010	**2**	**D**	**360-20017-1**	**OC-GW-26**	**Chromium**			**6.92**		**ug/l**	**1**	**11/19/2008**		**11/24/2008**	**2-Feb**	**Level I**
E300	1	N	360-20017-10	OC-PZ-18R	Chloride	100		100		mg/l	10	11/20/2008		12/2/2008	2-Feb	Level I
E300	1	N	360-20017-10	OC-PZ-18R	Sulfate	180		180		mg/l	10	11/20/2008		12/2/2008	2-Feb	Level I
LACH_107	1	N	360-20017-10	OC-PZ-18R	Nitrogen, as Ammonia	65		65		mg/l	10	11/20/2008	12/2/2008	12/3/2008	2-Feb	Level I
SM2510B	1	N	360-20017-10	OC-PZ-18R	LAB SPECIFIC CONDUCTANCE	930		930		umhos/cm	1	11/20/2008		11/24/2008	2-Feb	Level I
SW6010	1	D	360-20017-10	OC-PZ-18R	Aluminum	4.9	J	4.9	J	ug/l	1	11/20/2008		11/24/2008	2-Feb	Level I
SW6010	1	D	360-20017-10	OC-PZ-18R	Chromium	17		17		ug/l	1	11/20/2008		11/24/2008	2-Feb	Level I
E300	1	N	360-20017-11	OC-GW-CA1	Chloride	7.3		7.3		mg/l	1	11/20/2008		12/2/2008	2-Feb	Level I
E300	1	N	360-20017-11	OC-GW-CA1	Sulfate	110		110		mg/l	1	11/20/2008		12/2/2008	2-Feb	Level I
LACH_107	1	N	360-20017-11	OC-GW-CA1	Nitrogen, as Ammonia	3.1		3.1		mg/l	1	11/20/2008	12/2/2008	12/3/2008	2-Feb	Level I
SM2510B	1	N	360-20017-11	OC-GW-CA1	LAB SPECIFIC CONDUCTANCE	660		660		umhos/cm	1	11/20/2008		11/24/2008	2-Feb	Level I
SW6010	**1**	**D**	**360-20017-11**	**OC-GW-CA1**	**Aluminum**	**20**	**J**	**20**	**J B**	**ug/l**	**1**	**11/20/2008**		**11/24/2008**	2-Feb	Level I
SW6010	1	D	360-20017-11	OC-GW-CA1	Chromium	4.1	J	4.1	J	ug/l	1	11/20/2008		11/24/2008	2-Feb	Level I
E300	1	N	360-20017-12	OC-GW-202D	Chloride	290		290		mg/l	10	11/21/2008		12/2/2008	2-Feb	Level I
E300	2	N	360-20017-12	OC-GW-202D	Sulfate	1900		1900		mg/l	20	11/21/2008		12/3/2008	2-Feb	Level I
LACH_107	1	N	360-20017-12	OC-GW-202D	Nitrogen, as Ammonia	300		300		mg/l	20	11/21/2008	12/2/2008	12/3/2008	2-Feb	Level I
SM2510B	1	N	360-20017-12	OC-GW-202D	LAB SPECIFIC CONDUCTANCE	4600		4600		umhos/cm	1	11/21/2008		11/24/2008	2-Feb	Level I
SW6010	**1**	**D**	**360-20017-12**	**OC-GW-202D**	**Aluminum**	**8800**		**8800**	**B**	**ug/l**	**1**	**11/21/2008**		**11/24/2008**	2-Feb	Level I
SW6010	1	D	360-20017-12	OC-GW-202D	Chromium	540		540		ug/l	1	11/21/2008		11/24/2008	2-Feb	Level I
E300	1	N	360-20017-13	OC-GW-34SR	Chloride	1.7		1.7		mg/l	1	11/21/2008		12/2/2008	2-Feb	Level I
E300	1	N	360-20017-13	OC-GW-34SR	Sulfate	9.1		9.1		mg/l	1	11/21/2008		12/2/2008	2-Feb	Level I
LACH_107	1	N	360-20017-13	OC-GW-34SR	Nitrogen, as Ammonia	0.34		0.34		mg/l	1	11/21/2008	12/2/2008	12/3/2008	2-Feb	Level I
SM2510B	1	N	360-20017-13	OC-GW-34SR	LAB SPECIFIC CONDUCTANCE	89		89		umhos/cm	1	11/21/2008		11/24/2008	2-Feb	Level I
SW6010	**1**	**D**	**360-20017-13**	**OC-GW-34SR**	**Aluminum**	**100**	**U**	**3.3**	**J B**	**ug/l**	**1**	**11/21/2008**		**11/24/2008**	2-Feb	Level I
SW6010	1	D	360-20017-13	OC-GW-34SR	Chromium	5	U	5	U	ug/l	1	11/21/2008		11/24/2008	2-Feb	Level I
E300	1	N	360-20017-14	OC-GW-202S	Chloride	62		62		mg/l	10	11/21/2008		12/3/2008	2-Feb	Level I
E300	1	N	360-20017-14	OC-GW-202S	Sulfate	570		570		mg/l	10	11/21/2008		12/3/2008	2-Feb	Level I
LACH_107	**1**	**N**	**360-20017-14**	**OC-GW-202S**	**Nitrogen, as Ammonia**	**120**	**J**	**120**		**mg/l**	**10**	**11/21/2008**	**12/2/2008**	**12/3/2008**	2-Feb	Level I
SM2510B	1	N	360-20017-14	OC-GW-202S	LAB SPECIFIC CONDUCTANCE	1600		1600		umhos/cm	1	11/21/2008		11/24/2008	2-Feb	Level I
SW6010	**1**	**D**	**360-20017-14**	**OC-GW-202S**	**Aluminum**	**100**	**U**	**6.3**	**J B**	**ug/l**	**1**	**11/21/2008**		**11/24/2008**	2-Feb	Level I
SW6010	1	D	360-20017-14	OC-GW-202S	Chromium	3.7	J	3.7	J	ug/l	1	11/21/2008		11/24/2008	2-Feb	Level I
E300	1	N	360-20017-15	OC-GW-202S DUP	Chloride	62		62		mg/l	10	11/21/2008		12/3/2008	2-Feb	Level I
E300	1	N	360-20017-15	OC-GW-202S DUP	Sulfate	560		560		mg/l	10	11/21/2008		12/3/2008	2-Feb	Level I
LACH_107	**1**	**N**	**360-20017-15**	**OC-GW-202S DUP**	**Nitrogen, as Ammonia**	**84**	**J**	**84**		**mg/l**	**10**	**11/21/2008**	**12/2/2008**	**12/3/2008**	2-Feb	Level I
SM2510B	1	N	360-20017-15	OC-GW-202S DUP	LAB SPECIFIC CONDUCTANCE	1600		1600		umhos/cm	1	11/21/2008		11/24/2008	2-Feb	Level I
SW6010	**1**	**D**	**360-20017-15**	**OC-GW-202S DUP**	**Aluminum**	**100**	**U**	**3**	**J B**	**ug/l**	**1**	**11/21/2008**		**11/24/2008**	2-Feb	Level I
SW6010	1	D	360-20017-15	OC-GW-202S DUP	Chromium	3.7	J	3.7	J	ug/l	1	11/21/2008		11/24/2008	2-Feb	Level I
E300	1	N	360-20017-16	OC-GW-34D	Chloride	7.4		7.4		mg/l	1	11/21/2008		12/3/2008	2-Feb	Level I
E300	1	N	360-20017-16	OC-GW-34D	Sulfate	36		36		mg/l	1	11/21/2008		12/3/2008	2-Feb	Level I

analysis_m	run_id	fractio	lab_sample_id	field_sample_id	param_name	final_result	final_qua	lab_result_	lab_qualifie	result_uom	dilutio	field_sample	extraction_da	analysis_date	validation	validation
LACH_107	1	N	360-20017-16	OC-GW-34D	Nitrogen, as Ammonia	15		15		mg/l	1	11/21/2008	12/2/2008	12/3/2008	2-Feb	Level I
SM2510B	1	N	360-20017-16	OC-GW-34D	LAB SPECIFIC CONDUCTANCE	210		210		umhos/cm	1	11/21/2008		11/24/2008	2-Feb	Level I
SW6010	**1**	**D**	**360-20017-16**	**OC-GW-34D**	**Aluminum**	**100**	**U**	**6.3**	**J B**	**ug/l**	**1**	**11/21/2008**		**11/24/2008**	2-Feb	Level I
SW6010	1	D	360-20017-16	OC-GW-34D	Chromium	14		14		ug/l	1	11/21/2008		11/24/2008	2-Feb	Level I
E300	1	N	360-20017-17	OC-GW-34D DUP	Chloride	7.5		7.5		mg/l	1	11/21/2008		12/3/2008	2-Feb	Level I
E300	1	N	360-20017-17	OC-GW-34D DUP	Sulfate	35		35		mg/l	1	11/21/2008		12/3/2008	2-Feb	Level I
LACH_107	1	N	360-20017-17	OC-GW-34D DUP	Nitrogen, as Ammonia	15		15		mg/l	1	11/21/2008	12/2/2008	12/3/2008	2-Feb	Level I
SM2510B	1	N	360-20017-17	OC-GW-34D DUP	LAB SPECIFIC CONDUCTANCE	200		200		umhos/cm	1	11/21/2008		11/24/2008	2-Feb	Level I
SW6010	**1**	**D**	**360-20017-17**	**OC-GW-34D DUP**	**Aluminum**	**100**	**U**	**15**	**J B**	**ug/l**	**1**	**11/21/2008**		**11/24/2008**	2-Feb	Level I
SW6010	1	D	360-20017-17	OC-GW-34D DUP	Chromium	14		14		ug/l	1	11/21/2008		11/24/2008	2-Feb	Level I
E300	1	N	360-20017-18	OC-GW-201S	Chloride	69		69		mg/l	10	11/21/2008		12/3/2008	2-Feb	Level I
E300	2	N	360-20017-18	OC-GW-201S	Sulfate	1300		1300		mg/l	20	11/21/2008		12/3/2008	2-Feb	Level I
LACH_107	1	N	360-20017-18	OC-GW-201S	Nitrogen, as Ammonia	160		160		mg/l	10	11/21/2008	12/2/2008	12/3/2008	2-Feb	Level I
SM2510B	1	N	360-20017-18	OC-GW-201S	LAB SPECIFIC CONDUCTANCE	2900		2900		umhos/cm	1	11/21/2008		11/24/2008	2-Feb	Level I
SW6010	**1**	**D**	**360-20017-18**	**OC-GW-201S**	**Aluminum**	**100**	**U**	**3.7**	**J B**	**ug/l**	**1**	**11/21/2008**		**11/24/2008**	2-Feb	Level I
SW6010	1	D	360-20017-18	OC-GW-201S	Chromium	12		12		ug/l	1	11/21/2008		11/24/2008	2-Feb	Level I
E300	1	N	360-20017-2	OC-GW-76S	Chloride	5.3		5.3		mg/l	1	11/19/2008		12/2/2008	2-Feb	Level I
E300	1	N	360-20017-2	OC-GW-76S	Sulfate	61		61		mg/l	1	11/19/2008		12/2/2008	2-Feb	Level I
LACH_107	1	N	360-20017-2	OC-GW-76S	Nitrogen, as Ammonia	12		12		mg/l	1	11/19/2008	11/28/2008	11/28/2008	2-Feb	Level I
SM2510B	1	N	360-20017-2	OC-GW-76S	LAB SPECIFIC CONDUCTANCE	220		220		umhos/cm	1	11/19/2008		11/24/2008	2-Feb	Level I
SW6010	1	D	360-20017-2	OC-GW-76S	Aluminum	8.3	J	8.3	J	ug/l	1	11/19/2008		11/24/2008	2-Feb	Level I
SW6010	1	D	360-20017-2	OC-GW-76S	Chromium	2.2	J	2.2	J	ug/l	1	11/19/2008		11/24/2008	2-Feb	Level I
E300	1	N	360-20017-3	OC-GW-25	Chloride	64		64		mg/l	10	11/19/2008		12/2/2008	2-Feb	Level I
E300	1	N	360-20017-3	OC-GW-25	Sulfate	170		170		mg/l	10	11/19/2008		12/2/2008	2-Feb	Level I
LACH_107	1	N	360-20017-3	OC-GW-25	Nitrogen, as Ammonia	60		60		mg/l	5	11/19/2008	11/28/2008	11/28/2008	2-Feb	Level I
SM2510B	1	N	360-20017-3	OC-GW-25	LAB SPECIFIC CONDUCTANCE	800		800		umhos/cm	1	11/19/2008		11/24/2008	2-Feb	Level I
SW6010	1	D	360-20017-3	OC-GW-25	Aluminum	4.8	J	4.8	J	ug/l	1	11/19/2008		11/24/2008	2-Feb	Level I
SW6010	1	D	360-20017-3	OC-GW-25	Chromium	3.4	J	3.4	J	ug/l	1	11/19/2008		11/24/2008	2-Feb	Level I
E300	1	N	360-20017-4	OC-PZ-16RR	Chloride	170		170		mg/l	10	11/20/2008		12/2/2008	2-Feb	Level I
E300	1	N	360-20017-4	OC-PZ-16RR	Sulfate	780		780		mg/l	10	11/20/2008		12/2/2008	2-Feb	Level I
LACH_107	1	N	360-20017-4	OC-PZ-16RR	Nitrogen, as Ammonia	290		290		mg/l	20	11/20/2008	11/28/2008	11/28/2008	2-Feb	Level I
SM2510B	1	N	360-20017-4	OC-PZ-16RR	LAB SPECIFIC CONDUCTANCE	2800		2800		umhos/cm	1	11/20/2008		11/24/2008	2-Feb	Level I
SW6010	1	D	360-20017-4	OC-PZ-16RR	Aluminum	2.4	J	2.4	J	ug/l	1	11/20/2008		11/24/2008	2-Feb	Level I
SW6010	1	D	360-20017-4	OC-PZ-16RR	Chromium	6.7		6.7		ug/l	1	11/20/2008		11/24/2008	2-Feb	Level I
E300	1	N	360-20017-5	OC-GW-78S	Chloride	25		25		mg/l	1	11/20/2008		12/2/2008	2-Feb	Level I
E300	2	N	360-20017-5	OC-GW-78S	Sulfate	550		550		mg/l	10	11/20/2008		12/2/2008	2-Feb	Level I
LACH_107	1	N	360-20017-5	OC-GW-78S	Nitrogen, as Ammonia	74		74		mg/l	5	11/20/2008	11/28/2008	11/28/2008	2-Feb	Level I
SM2510B	1	N	360-20017-5	OC-GW-78S	LAB SPECIFIC CONDUCTANCE	1300		1300		umhos/cm	1	11/20/2008		11/24/2008	2-Feb	Level I
SW6010	1	D	360-20017-5	OC-GW-78S	Aluminum	12	J	12	J	ug/l	1	11/20/2008		11/24/2008	2-Feb	Level I
SW6010	1	D	360-20017-5	OC-GW-78S	Chromium	6.7		6.7		ug/l	1	11/20/2008		11/24/2008	2-Feb	Level I
E300	1	N	360-20017-6	OC-GW-55S	Chloride	19		19		mg/l	1	11/20/2008		12/2/2008	2-Feb	Level I
E300	2	N	360-20017-6	OC-GW-55S	Sulfate	1400		1400		mg/l	20	11/20/2008		12/3/2008	2-Feb	Level I
LACH_107	1	N	360-20017-6	OC-GW-55S	Nitrogen, as Ammonia	270		270		mg/l	20	11/20/2008	12/3/2008	12/3/2008	2-Feb	Level I
SM2510B	1	N	360-20017-6	OC-GW-55S	LAB SPECIFIC CONDUCTANCE	3600		3600		umhos/cm	1	11/20/2008		11/24/2008	2-Feb	Level I
SW6010	1	D	360-20017-6	OC-GW-55S	Aluminum	540		540		ug/l	1	11/20/2008		11/24/2008	2-Feb	Level I
SW6010	1	D	360-20017-6	OC-GW-55S	Chromium	1.9	J	1.9	J	ug/l	1	11/20/2008		11/24/2008	2-Feb	Level I
E300	1	N	360-20017-7	OC-GW-35S	Chloride	5.8		5.8		mg/l	1	11/20/2008		12/2/2008	2-Feb	Level I

analysis_m	run_id	fractio	lab_sample_id	field_sample_id	param_name	final_result	final_qua	lab_result_	lab_qualifie	result_uom	dilutio	field_sample	extraction_da	analysis_date	validation	validation
E300	2	N	360-20017-7	OC-GW-35S	Sulfate	480		480		mg/l	10	11/20/2008		12/2/2008	2-Feb	Level I
LACH_107	1	N	360-20017-7	OC-GW-35S	Nitrogen, as Ammonia	14		14		mg/l	1	11/20/2008	12/3/2008	12/3/2008	2-Feb	Level I
SM2510B	1	N	360-20017-7	OC-GW-35S	LAB SPECIFIC CONDUCTANCE	1100		1100		umhos/cm	1	11/20/2008		11/24/2008	2-Feb	Level I
SW6010	1	D	360-20017-7	OC-GW-35S	Aluminum	29	J	29	J	ug/l	1	11/20/2008		11/24/2008	2-Feb	Level I
SW6010	1	D	360-20017-7	OC-GW-35S	Chromium	18		18		ug/l	1	11/20/2008		11/24/2008	2-Feb	Level I
E300	1	N	360-20017-8	OC-GW-79S	Chloride	130		130		mg/l	10	11/20/2008		12/2/2008	2-Feb	Level I
E300	1	N	360-20017-8	OC-GW-79S	Sulfate	1100		1100		mg/l	10	11/20/2008		12/2/2008	2-Feb	Level I
LACH_107	1	N	360-20017-8	OC-GW-79S	Nitrogen, as Ammonia	170		170		mg/l	20	11/20/2008	12/3/2008	12/3/2008	2-Feb	Level I
SM2510B	1	N	360-20017-8	OC-GW-79S	LAB SPECIFIC CONDUCTANCE	2800		2800		umhos/cm	1	11/20/2008		11/24/2008	2-Feb	Level I
SW6010	1	D	360-20017-8	OC-GW-79S	Aluminum	15	J	15	J	ug/l	1	11/20/2008		11/24/2008	2-Feb	Level I
SW6010	1	D	360-20017-8	OC-GW-79S	Chromium	12		12		ug/l	1	11/20/2008		11/24/2008	2-Feb	Level I
E300	1	N	360-20017-9	OC-PZ-17RR	Chloride	20		20		mg/l	1	11/20/2008		12/2/2008	2-Feb	Level I
E300	2	N	360-20017-9	OC-PZ-17RR	Sulfate	530		530		mg/l	10	11/20/2008		12/2/2008	2-Feb	Level I
LACH_107	1	N	360-20017-9	OC-PZ-17RR	Nitrogen, as Ammonia	82		82		mg/l	10	11/20/2008	12/2/2008	12/3/2008	2-Feb	Level I
SM2510B	1	N	360-20017-9	OC-PZ-17RR	LAB SPECIFIC CONDUCTANCE	1400		1400		umhos/cm	1	11/20/2008		11/24/2008	2-Feb	Level I
SW6010	1	D	360-20017-9	OC-PZ-17RR	Aluminum	100	U	100	U	ug/l	1	11/20/2008		11/24/2008	2-Feb	Level I
SW6010	1	D	360-20017-9	OC-PZ-17RR	Chromium	2	J	2	J	ug/l	1	11/20/2008		11/24/2008	2-Feb	Level I

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ANALYTICAL REPORT

Job Number: 360-20018-1

Job Description: Slurry Wall/ Slurry Cap

For:
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Attention: Mr. Steven Morrow

CHECKED FOR COMPLETENESS OF PARAMETERS ORDERED BY:
1/30/09

Approved for release.
Joe Chimi
Report Production Representative
12/4/08 9:05 AM

Designee for
Becky C Mason
Project Manager II
becky.mason@testamericainc.com
12/04/2008

The test results in this report meet all NELAP requirements for accredited parameters. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced except in full, and with written approval from the laboratory.
TestAmerica Westfield Certifications and Approvals: MADEP MA014, RIDOH57, CTDPH 0494, VT DECWSD, NH DES 2539, NELAP FL E87912 TOX, NELAP NJ MA008 TOX, NELAP NY 10843, NY DOH 10843.

Field sampling is performed under SOPs WE-FLD-001 and WE-FLD-002

TestAmerica Laboratories, Inc.
TestAmerica Westfield Westfield Executive Park, 53 Southampton Road, Westfield, MA 01085
Tel (413) 572-4000 Fax (413) 572-3707 www.testamericainc.com

ACCREDITED IN ACCORDANCE WITH nelac

Table of Contents

Cover Title Page 1
Report Narrative 3
Method Summary 9
Method / Analyst Summary 10
Sample Summary 11
Sample Results 12
Sample Datasheets 13
Data Qualifiers 29
QC Results 30
Qc Association Summary 31
Qc Reports 33
Sample Receipt Checklist 39
Client Chain of Custody 40

MADEP MCP Analytical Method Report Certification Form

Laboratory Name:	**TestAmerica Westfield**	Project #:	**360-20018-1**
Project Location:	**Slurry Wall/Slurry Cap**	MADEP RTN[1]:	

This form provides certifications for the following data set:[list Laboratory Sample ID Number(s)]
360-20018-(1-5)

Sample Matrices: Groundwater **Soil/Sediment** Drinking Water Other:

MCP SW-846 Methods Used	8260B( )	8151A ( )	8330 ( )	6010B (**x**)	7470A/1A ( )	Other ( )
	8270C( )	8081A ( )	VPH ( )	6020 ( )	9014M[2]/9012 ( )	
As specified in MADEP Compendium of Analytical Methods. (check all that apply)	8082 ( )	8021B ( )	EPH ( )	7000 S[3]( )	7196A ( )	

1 List Release Tracking Number (RTN), if known
2 M - SW-846 Method 9014 or MADEP Physiologically Available Cyanide (PAC) Method
3 S - SW-846 Methods 7000 Series List individual method and analyte.

An affirmative response to questions A, B, C and D is required for "Presumptive Certainty" status

A	Were all samples received by the laboratory in a condition consistent with that described on the Chain-of-Custody documentation for the data set?	Yes √		No[1]
B	Were all QA/QC procedures required for the specified analytical method(s) included in this report followed, including the requirement to note and discuss in a narrative QC data that did not meet appropriate performance standards or guidelines?	Yes √		No[1]
C	Does the analytical data included in this report meet all the requirements for "Presumptive Certainty", as described in Section 2.0 (a), (b), (c) and (d) of the MADEP document CAM VII A, " Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	Yes √	N/A	No[1]
D	**VPH and EPH methods only:** Was the VPH or EPH Method conducted without significant modifications (see Section 11.3 of respective Methods)?	Yes	N/A √	No[1]

A response to questions E and F below is required for "Presumptive Certainty" status

E	Were all QC performance standards and recommendations for the specified methods achieved?	Yes		No[1] √
F	Were results for all analyte-list compounds/elements for the specified method(s) reported?	Yes	N/A	No[1] √

[1] All Negative responses must be addressed in an attached Environmental Laboratory case narrative.

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.

Signature: **Position:** Laboratory Director

Printed Name: Steven C. Hartmann **Date:** 12/4/08 8:55

The certification form has been electronically signed and approved. CAM VII A, Rev 3.2 April-04

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MADEP MA014
NY DOH 10843
RI DOH 57
CT DPH 0494
VT DECWSD

NELAP FL E87912 TOX
NELAP NJ MA008 TOX
NELAP NY 10843
NH DES 253901-A

TestAmerica Westfield
53 Southampton Rd,
Westfield, MA 01085
Tel:(413)572-4000
Fax:(413)572-3707

MADEP MCP Analytical Method Report Certification Form

Laboratory Name:	**TestAmerica Westfield**	Project #:	**360-20018-1**
Project Location:	**Slurry Wall/Slurry Cap**	MADEP RTN[1]:	

This form provides certifications for the following data set:[list Laboratory Sample ID Number(s)]
360-20018-(6-8)

Sample Matrices: **Groundwater** Soil/Sediment Drinking Water Other:

MCP SW-846 Methods Used	8260B( )	8151A ( )	8330 ( )	6010B (**x**)	7470A/1A ( )	Other ( )
	8270C( )	8081A ( )	VPH ( )	6020 ( )	9014M[2]/9012 ( )	
As specified in MADEP Compendium of Analytical Methods. (check all that apply)	8082 ( )	8021B ( )	EPH ( )	7000 S[3]( )	7196A ( )	

1 List Release Tracking Number (RTN), if known
2 M - SW-846 Method 9014 or MADEP Physiologically Available Cyanide (PAC) Method
3 S - SW-846 Methods 7000 Series List individual method and analyte.

An affirmative response to questions A, B, C and D is required for "Presumptive Certainty" status

A	Were all samples received by the laboratory in a condition consistent with that described on the Chain-of-Custody documentation for the data set?	Yes √		No[1]
B	Were all QA/QC procedures required for the specified analytical method(s) included in this report followed, including the requirement to note and discuss in a narrative QC data that did not meet appropriate performance standards or guidelines?	Yes √		No[1]
C	Does the analytical data included in this report meet all the requirements for "Presumptive Certainty", as described in Section 2.0 (a), (b), (c) and (d) of the MADEP document CAM VII A, " Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	Yes √	N/A	No[1]
D	**VPH and EPH methods only:** Was the VPH or EPH Method conducted without significant modifications (see Section 11.3 of respective Methods)?	Yes	N/A √	No[1]

A response to questions E and F below is required for "Presumptive Certainty" status

E	Were all QC performance standards and recommendations for the specified methods achieved?	Yes √		No[1]
F	Were results for all analyte-list compounds/elements for the specified method(s) reported?	Yes	N/A	No[1] √

[1] All Negative responses must be addressed in an attached Environmental Laboratory case narrative.

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.

Signature: **Position:** Laboratory Director

Printed Name: Steven C. Hartmann **Date:** 12/4/08 8:55

The certification form has been electronically signed and approved. CAM VII A, Rev 3.2 April-04

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

MADEP MA014
NY DOH 10843
RI DOH 57
CT DPH 0494
VT DECWSD

NELAP FL E87912 TOX
NELAP NJ MA008 TOX
NELAP NY 10843
NH DES 253901-A

TestAmerica Westfield
53 Southampton Rd,
Westfield, MA 01085
Tel:(413)572-4000
Fax:(413)572-3707

MADEP MCP Analytical Method Report Certification Form

Laboratory Name:	**TestAmerica Westfield**	Project #:	**360-20018-1**
Project Location:	**Slurry Wall/Slurry Cap**	MADEP RTN[1]:	

This form provides certifications for the following data set:[list Laboratory Sample ID Number(s)]
360-20018-(6-8)

Sample Matrices: **Groundwater** Soil/Sediment Drinking Water Other:

MCP SW-846 Methods Used	8260B( )	8151A ( )	8330 ( )	6010B ( )	7470A/1A ( )	Other (**x**)
	8270C( )	8081A ( )	VPH ( )	6020 ( )	9014M[2]/9012 ( )	
As specified in MADEP Compendium of Analytical Methods. (check all that apply)	8082 ( )	8021B ( )	EPH ( )	7000 S[3]( )	7196A ( )	

1 List Release Tracking Number (RTN), if known
2 M - SW-846 Method 9014 or MADEP Physiologically Available Cyanide (PAC) Method
3 S - SW-846 Methods 7000 Series List individual method and analyte.

An affirmative response to questions A, B, C and D is required for "Presumptive Certainty" status

A	Were all samples received by the laboratory in a condition consistent with that described on the Chain-of-Custody documentation for the data set?	Yes √		No[1]
B	Were all QA/QC procedures required for the specified analytical method(s) included in this report followed, including the requirement to note and discuss in a narrative QC data that did not meet appropriate performance standards or guidelines?	Yes √		No[1]
C	Does the analytical data included in this report meet all the requirements for "Presumptive Certainty", as described in Section 2.0 (a), (b), (c) and (d) of the MADEP document CAM VII A, " Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	Yes	N/A √	No[1]
D	**VPH and EPH methods only:** Was the VPH or EPH Method conducted without significant modifications (see Section 11.3 of respective Methods)?	Yes	N/A √	No[1]

A response to questions E and F below is required for "Presumptive Certainty" status

E	Were all QC performance standards and recommendations for the specified methods achieved?	Yes √		No[1]
F	Were results for all analyte-list compounds/elements for the specified method(s) reported?	Yes	N/A √	No[1]

[1] All Negative responses must be addressed in an attached Environmental Laboratory case narrative.

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.

Signature: **Position:** Laboratory Director

Printed Name: Steven C. Hartmann **Date:** 12/4/08 8:55

The certification form has been electronically signed and approved. CAM VII A, Rev 3.2 April-04

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

MADEP MA014
NY DOH 10843
RI DOH 57
CT DPH 0494
VT DECWSD

NELAP FL E87912 TOX
NELAP NJ MA008 TOX
NELAP NY 10843
NH DES 253901-A

TestAmerica Westfield
53 Southampton Rd,
Westfield, MA 01085
Tel:(413)572-4000
Fax:(413)572-3707

CASE NARRATIVE

Client: Olin Corporation

Project: Slurry Wall/ Slurry Cap

Report Number: 360-20018-1

This case narrative is in the form of an exception report, where only the anomalies related to this report, method specific performance and/or QA/QC issues are discussed. If there are no issues to report, this narrative will include a statement that documents that there are no relevant data issues as stipulated in the MCP reporting requirements.

In order to facilitate report review, a separate MCP Analytical Method Report Certification Form is included for each method requested.

It should be noted that samples with elevated Reporting Limits (RLs) as a result of a dilution may not be able to satisfy "MCP program" reporting limits in some cases if the "adjusted" RL is greater than the applicable MCP standards or criterion to which the concentration is being compared. Such increases in the RLs are an unavoidable but acceptable consequence of sample dilution that enables quantification of target analytes which exceed the calibration range.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

The samples were received on 11/21/2008; the samples arrived in good condition, properly preserved and on ice. The temperatures of the coolers at receipt were 1.2 and 1.0ºC.

Note: All samples which require thermal preservation are considered acceptable if the arrival temperature is within 2C of the required temperature or method specified range. For samples with a specified temperature of 4C, samples with a temperature ranging from just above freezing temperature of water to 6C shall be acceptable. Samples that are hand delivered immediately following collection may not meet these criteria, however they will be deemed acceptable according to NELAC and MADEP standards, if there is evidence that the chilling process has begun, such as arrival on ice, etc.

MCP regulatory standard criteria were not specified for this report. Therefore, method reporting limits (RLs) were not assessed against any MCP standards as it may pertain to Question "E" on the Presumptive Certainty Certification Form (MADEP reference: WSC-CAM-AN-093008 - WSC-CAM Analytical Notes).

TOTAL METALS

Samples 360-20018-1 through 360-20018-5 were analyzed for total metals in accordance with EPA SW846 Method 6010B. The samples were prepared on 11/24/2008 and analyzed on 11/25/2008.

All QA/QC procedures required to meet Presumptive Certainty for the specified analytical method were performed as per section B of the MADEP MCP analytical method report Certification form.

All QC performance standards and recommendations, which may affect Data Usability for this

specific method, were achieved with the exception of:

Aluminum and Chromium failed the MS/MSD recovery criteria low for the matrix spike of sample 360-20018-3. Iron failed the MS/MSD recovery criteria high. Aluminum and Iron failed the MS/MSD recovery criteria low for the matrix spike duplicate of sample 360-20018-3. The concentration of Aluminum and Iron in the sample was greater than four times the spike concentration. The associated LCS and LCSD recovered within control limits. Refer to the QC report for details.

General method information:
Chromium and Iron were detected in method blank MB 360-39039/1-A at levels that were above the method detection limit but below the reporting limit. The values should be considered estimates, and have been flagged "J". If the associated sample reported a result above the MDL and/or RL, the result has been "B" flagged. Refer to the QC report for details.

At the request of the client, an abbreviated/modified MCP analyte list was reported for this job.

DISSOLVED METALS

Samples 360-20018-6 through 360-20018-8 were analyzed for dissolved metals in accordance with EPA SW846 Method 6010B. The samples were analyzed on 11/24/2008.

All QA/QC procedures required to meet Presumptive Certainty for the specified analytical method were performed as per section B of the MADEP MCP analytical method report Certification form.

All QC performance standards and recommendations, which may affect Data Usability for this specific method, were achieved.

General method information:
Aluminum was detected in method blank MB 360-39051/2 at a level exceeding the reporting limit. If the associated sample reported a result above the MDL and/or RL, the result has been "B" flagged. Refer to the QC report for details.

At the request of the client, an abbreviated/modified MCP analyte list was reported for this job.

The following reported methods are not listed in the MADEP Massachusetts Contingency Plan (MCP) Compendium of Analytical Methods (CAM), pursuant to the provisions of 310 CMR 40.0017(2).

ANIONS

Samples 360-20018-6 through 360-20018-8 were analyzed for anions in accordance with EPA Method 300.0. The samples were analyzed on 12/02/2008.

All QC performance standards and recommendations for this specific method were achieved.

Samples 360-20018-6(10X) and 360-20018-8(10X) required dilution prior to analysis. The reporting limits have been adjusted accordingly. Dilutions were due to high target concentration.

AMMONIA

Samples 360-20018-6 through 360-20018-8 were analyzed for ammonia in accordance with LACHAT 107-06-1B. The samples were prepared on 11/28/2008 and analyzed on 12/03/2008.

All QC performance standards and recommendations for this specific method were achieved.

Sample 360-20018-7(5X) required dilution prior to analysis. The reporting limits have been adjusted accordingly. Dilutions were due to high concentration.

SPECIFIC CONDUCTANCE (CONDUCTIVITY)

Samples 360-20018-6 through 360-20018-8 were analyzed for Specific Conductance (Conductivity) in accordance with SM 2510B. The samples were analyzed on 11/24/2008.

All QC performance standards and recommendations for this specific method were achieved.

PERCENT SOLIDS

Samples 360-20018-1 through 360-20018-5 were analyzed for percent solids in accordance with EPA Method 160.3 Modified. The samples were analyzed on 11/24/2008.

All QC performance standards and recommendations for this specific method were achieved.

This case narrative is available in Word format upon request.

METHOD SUMMARY

Client: Olin Corporation Job Number: 360-20018-1

Description	Lab Location	Method	Preparation Method
Matrix: Solid			
Metals (ICP)	TAL WFD	SW846 6010B	
Preparation, Metals	TAL WFD		SW846 3050B
Matrix: Water			
Dissolved Metals	TAL WFD	SW846 6010B	
Sample Filtration, Field	TAL WFD		FIELD_FLTRD
Chloride & Sulfate	TAL WFD	40CFR136A 300.0	
Nitrogen Ammonia	TAL WFD	LACHAT L107-06-1B	
Distillation, Ammonia	TAL WFD		Distill/Ammonia
Conductivity, Specific Conductance	TAL WFD	SM SM 2510B	

Lab References:

TAL WFD = TestAmerica Westfield

Method References:

40CFR136A = "Methods for Organic Chemical Analysis of Municipal Industrial Wastewater", 40CFR, Part 136, Appendix A, October 26, 1984 and subsequent revisions.

LACHAT = LACHAT

SM = "Standard Methods For The Examination Of Water And Wastewater",

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

METHOD / ANALYST SUMMARY

Client: Olin Corporation

Job Number: 360-20018-1

Method	Analyst	Analyst ID
SW846 6010B	Nasiatka, Ellen M	EMN
40CFR136A 300.0	Lalashius, Andrew L	ALL
LACHAT L107-06-1B	Lalashius, Andrew L	ALL
EPA PercentMoisture	Burton, Teresa F	TFB
SM SM 2510B	Emerich, Rich W	RWE

SAMPLE SUMMARY

Client: Olin Corporation

Job Number: 360-20018-1

Lab Sample ID	Client Sample ID	Client Matrix	Date/Time Sampled	Date/Time Received
360-20018-1	OC-SD-SD1	Solid	11/19/2008 0855	11/21/2008 1615
360-20018-2	OC-SD-SD2	Solid	11/19/2008 0910	11/21/2008 1615
360-20018-3	OC-SD-SD3	Solid	11/19/2008 0925	11/21/2008 1615
360-20018-3MS	OC-SD-SD3 MS	Solid	11/19/2008 0925	11/21/2008 1615
360-20018-3MSD	OC-SD-SD3 MSD	Solid	11/19/2008 0925	11/21/2008 1615
360-20018-4	OC-SD-SD4	Solid	11/19/2008 0950	11/21/2008 1615
360-20018-5	OC-SD-SD5	Solid	11/19/2008 1010	11/21/2008 1615
360-20018-6	OC-GW-10S	Ground Water	11/19/2008 1145	11/21/2008 1615
360-20018-7	OC-GW-24	Ground Water	11/19/2008 1330	11/21/2008 1615
360-20018-8	OC-GW-39	Ground Water	11/19/2008 1510	11/21/2008 1615

SAMPLE RESULTS

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-20018-1

Client Sample ID: OC-SD-SD1
Lab Sample ID: 360-20018-1

Date Sampled: 11/19/2008 0855
Date Received: 11/21/2008 1615
Client Matrix: Solid
Percent Solids: 57

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: 6010B		Date Analyzed:		11/25/2008 1541	
Prep Method: 3050B		Date Prepared:		11/24/2008 1448	
Aluminum	11000	mg/Kg	0.36	4.7	1.0
Chromium	29 J ~~B~~	mg/Kg	0.14	0.93	1.0
Iron	14000 ~~B~~	mg/Kg	1.2	9.3	1.0

TC
12/2/09

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
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Cleveland, TN 37312-4441

Job Number: 360-20018-1

Client Sample ID: OC-SD-SD1
Lab Sample ID: 360-20018-1

Date Sampled: 11/19/2008 0855
Date Received: 11/21/2008 1615
Client Matrix: Solid

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: PercentMoisture		Date Analyzed:	11/24/2008 1320		
Percent Moisture	43	%	1.0	1.0	1.0

TC
1/30/09

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-20018-1

Client Sample ID: OC-SD-SD2
Lab Sample ID: 360-20018-2

Date Sampled: 11/19/2008 0910
Date Received: 11/21/2008 1615
Client Matrix: Solid
Percent Solids: 44

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: 6010B		Date Analyzed:		11/25/2008 1544	
Prep Method: 3050B		Date Prepared:		11/24/2008 1448	
Aluminum	15000	mg/Kg	0.54	6.9	1.0
Chromium	620 J ~~B~~	mg/Kg	0.20	1.4	1.0
Iron	23000 ~~B~~	mg/Kg	1.8	14	1.0

TC
1/30/09

Mr. Steven Morrow
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Suite 200
Cleveland, TN 37312-4441

Job Number: 360-20018-1

Client Sample ID: OC-SD-SD2
Lab Sample ID: 360-20018-2

Date Sampled: 11/19/2008 0910
Date Received: 11/21/2008 1615
Client Matrix: Solid

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: PercentMoisture			Date Analyzed:	11/24/2008 1320	
Percent Moisture	56	%	1.0	1.0	1.0

TC
1/30/09

Mr. Steven Morrow
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Cleveland, TN 37312-4441

Job Number: 360-20018-1

Client Sample ID: OC-SD-SD3
Lab Sample ID: 360-20018-3

Date Sampled: 11/19/2008 0925
Date Received: 11/21/2008 1615
Client Matrix: Solid
Percent Solids: 70

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: 6010B		Date Analyzed:		11/25/2008 1520	
Prep Method: 3050B		Date Prepared:		11/24/2008 1448	
Aluminum	9200	mg/Kg	0.36	4.7	1.0
Chromium	130 J ~~B~~	mg/Kg	0.14	0.94	1.0
Iron	12000 ~~B~~	mg/Kg	1.2	9.4	1.0

TC 1/30/09

Mr. Steven Morrow
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3855 North Ocoee Street
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Cleveland, TN 37312-4441

Job Number: 360-20018-1

Client Sample ID: OC-SD-SD3
Lab Sample ID: 360-20018-3

Date Sampled: 11/19/2008 0925
Date Received: 11/21/2008 1615
Client Matrix: Solid

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: PercentMoisture			Date Analyzed:	11/24/2008 1320	
Percent Moisture	30	%	1.0	1.0	1.0

TC
1/30/09

Mr. Steven Morrow
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Cleveland, TN 37312-4441

Job Number: 360-20018-1

Client Sample ID: OC-SD-SD4
Lab Sample ID: 360-20018-4

Date Sampled: 11/19/2008 0950
Date Received: 11/21/2008 1615
Client Matrix: Solid
Percent Solids: 62

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: 6010B		Date Analyzed:		11/25/2008 1547	
Prep Method: 3050B		Date Prepared:		11/24/2008 1448	
Aluminum	10000	mg/Kg	0.37	4.7	1.0
Chromium	26 J ~~B~~	mg/Kg	0.14	0.95	1.0
Iron	14000 ~~B~~	mg/Kg	1.2	9.5	1.0

TC
11/30/09

Mr. Steven Morrow
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Job Number: 360-20018-1

Client Sample ID: OC-SD-SD4
Lab Sample ID: 360-20018-4

Date Sampled: 11/19/2008 0950
Date Received: 11/21/2008 1615
Client Matrix: Solid

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: PercentMoisture		Date Analyzed:		11/24/2008 1320	
Percent Moisture	38	%	1.0	1.0	1.0

TC

Mr. Steven Morrow
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Cleveland, TN 37312-4441

Job Number: 360-20018-1

Client Sample ID: OC-SD-SD5
Lab Sample ID: 360-20018-5

Date Sampled: 11/19/2008 1010
Date Received: 11/21/2008 1615
Client Matrix: Solid
Percent Solids: 67

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: 6010B		Date Analyzed:		11/25/2008 1605	
Prep Method: 3050B		Date Prepared:		11/24/2008 1448	
Aluminum	11000	mg/Kg	0.37	4.8	1.0
Chromium	340 J	mg/Kg	0.14	0.95	1.0
Iron	14000	mg/Kg	1.2	9.5	1.0

TC
11/30/09

Mr. Steven Morrow
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Job Number: 360-20018-1

Client Sample ID: OC-SD-SD5
Lab Sample ID: 360-20018-5

Date Sampled: 11/19/2008 1010
Date Received: 11/21/2008 1615
Client Matrix: Solid

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: PercentMoisture			Date Analyzed:	11/24/2008 1320	
Percent Moisture	33	%	1.0	1.0	1.0

TC
11/30/09

Mr. Steven Morrow
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Job Number: 360-20018-1

Client Sample ID: OC-GW-10S
Lab Sample ID: 360-20018-6

Date Sampled: 11/19/2008 1145
Date Received: 11/21/2008 1615
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B		Date Analyzed:	11/24/2008 1732		
Aluminum	3800 B	ug/L	2.2	100	1.0
Chromium	ND	ug/L	0.17	5.0	1.0

TC
11/30/09

Mr. Steven Morrow
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Job Number: 360-20018-1

Client Sample ID: OC-GW-10S
Lab Sample ID: 360-20018-6

Date Sampled: 11/19/2008 1145
Date Received: 11/21/2008 1615
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 300.0		Date Analyzed:		12/02/2008 1333	
Chloride	35	mg/L	1.0	1.0	1.0
Method: 300.0		Date Analyzed:		12/02/2008 1348	
Sulfate	120	mg/L	20	20	10
Method: L107-06-1B		Date Analyzed:		12/03/2008 1201	
Prep Method: Distill/Ammonia		Date Prepared:		11/28/2008 0923	
Ammonia	8.8	mg/L	0.10	0.10	1.0
Method: SM 2510B		Date Analyzed:		11/24/2008 1732	
Specific Conductance	410	umhos/cm	1.0	1.0	1.0

TC
11/30/09

Mr. Steven Morrow
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Cleveland, TN 37312-4441

Job Number: 360-20018-1

Client Sample ID: OC-GW-24
Lab Sample ID: 360-20018-7

Date Sampled: 11/19/2008 1330
Date Received: 11/21/2008 1615
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B		Date Analyzed:	11/24/2008 1734		
Aluminum	~~4.6~~ 100 ~~U~~ ~~J B~~	ug/L	2.2	100	1.0
Chromium	ND	ug/L	0.17	5.0	1.0

TC
11/30/09

Mr. Steven Morrow
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Cleveland, TN 37312-4441

Job Number: 360-20018-1

Client Sample ID: OC-GW-24
Lab Sample ID: 360-20018-7

Date Sampled: 11/19/2008 1330
Date Received: 11/21/2008 1615
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 300.0		Date Analyzed:		12/02/2008 1403	
Sulfate	71	mg/L	2.0	2.0	1.0
Chloride	8.0	mg/L	1.0	1.0	1.0
Method: L107-06-1B		Date Analyzed:		12/03/2008 1201	
Prep Method: Distill/Ammonia		Date Prepared:		11/28/2008 0923	
Ammonia	52	mg/L	0.50	0.50	5.0
Method: SM 2510B		Date Analyzed:		11/24/2008 1733	
Specific Conductance	400	umhos/cm	1.0	1.0	1.0

TC
1/30/09

Mr. Steven Morrow
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Job Number: 360-20018-1

Client Sample ID: OC-GW-39
Lab Sample ID: 360-20018-8

Date Sampled: 11/19/2008 1510
Date Received: 11/21/2008 1615
Client Matrix: Ground Water

Analyte	Result/Qualifier		Unit	MDL	RL	Dilution
Method: Dissolved-6010B			Date Analyzed:		11/24/2008 1737	
Aluminum	130	B	ug/L	2.2	100	1.0
Chromium	ND		ug/L	0.17	5.0	1.0

TC
1/30/09

Mr. Steven Morrow
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Cleveland, TN 37312-4441

Job Number: 360-20018-1

Client Sample ID: OC-GW-39
Lab Sample ID: 360-20018-8

Date Sampled: 11/19/2008 1510
Date Received: 11/21/2008 1615
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 300.0		Date Analyzed:		12/02/2008 1504	
Chloride	28	mg/L	1.0	1.0	1.0
Method: 300.0		Date Analyzed:		12/02/2008 1519	
Sulfate	310	mg/L	20	20	10
Method: L107-06-1B		Date Analyzed:		12/03/2008 1201	
Prep Method: Distill/Ammonia		Date Prepared:		11/28/2008 0923	
Ammonia	0.15	mg/L	0.10	0.10	1.0
Method: SM 2510B		Date Analyzed:		11/24/2008 1735	
Specific Conductance	730	umhos/cm	1.0	1.0	1.0

TC
11/30/09

DATA REPORTING QUALIFIERS

Client: Olin Corporation Job Number: 360-20018-1

Lab Section	Qualifier	Description
Metals		
	B	Compound was found in the blank and sample.
	F	MS or MSD exceeds the control limits
	4	MS, MSD: The analyte present in the original sample is 4 times greater than the matrix spike concentration; therefore, control limits are not applicable.
	J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

QUALITY CONTROL RESULTS

Client: Olin Corporation Job Number: 360-20018-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
Metals					
Prep Batch: 360-39039					
LCS 360-39039/2-A	Lab Control Spike	T	Solid	3050B	
LCSD 360-39039/3-A	Lab Control Spike Duplicate	T	Solid	3050B	
MB 360-39039/1-A	Method Blank	T	Solid	3050B	
360-20018-1	OC-SD-SD1	T	Solid	3050B	
360-20018-2	OC-SD-SD2	T	Solid	3050B	
360-20018-3	OC-SD-SD3	T	Solid	3050B	
360-20018-3MS	Matrix Spike	T	Solid	3050B	
360-20018-3MSD	Matrix Spike Duplicate	T	Solid	3050B	
360-20018-4	OC-SD-SD4	T	Solid	3050B	
360-20018-5	OC-SD-SD5	T	Solid	3050B	
Analysis Batch:360-39051					
LCS 360-39051/1	Lab Control Spike	T	Water	6010B	
LCSD 360-39051/8	Lab Control Spike Duplicate	T	Water	6010B	
MB 360-39051/2	Method Blank	T	Water	6010B	
360-20018-6	OC-GW-10S	D	Water	6010B	
360-20018-7	OC-GW-24	D	Water	6010B	
360-20018-8	OC-GW-39	D	Water	6010B	
Analysis Batch:360-39111					
LCS 360-39039/2-A	Lab Control Spike	T	Solid	6010B	360-39039
LCSD 360-39039/3-A	Lab Control Spike Duplicate	T	Solid	6010B	360-39039
MB 360-39039/1-A	Method Blank	T	Solid	6010B	360-39039
360-20018-1	OC-SD-SD1	T	Solid	6010B	360-39039
360-20018-2	OC-SD-SD2	T	Solid	6010B	360-39039
360-20018-3	OC-SD-SD3	T	Solid	6010B	360-39039
360-20018-3MS	Matrix Spike	T	Solid	6010B	360-39039
360-20018-3MSD	Matrix Spike Duplicate	T	Solid	6010B	360-39039
360-20018-4	OC-SD-SD4	T	Solid	6010B	360-39039
360-20018-5	OC-SD-SD5	T	Solid	6010B	360-39039

Report Basis
D = Dissolved
T = Total

Client: Olin Corporation Job Number: 360-20018-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
General Chemistry					
Analysis Batch:360-39032					
360-20018-1	OC-SD-SD1	T	Solid	PercentMoisture	
360-20018-2	OC-SD-SD2	T	Solid	PercentMoisture	
360-20018-3	OC-SD-SD3	T	Solid	PercentMoisture	
360-20018-3MS	Matrix Spike	T	Solid	PercentMoisture	
360-20018-3MSD	Matrix Spike Duplicate	T	Solid	PercentMoisture	
360-20018-4	OC-SD-SD4	T	Solid	PercentMoisture	
360-20018-5	OC-SD-SD5	T	Solid	PercentMoisture	
Analysis Batch:360-39059					
LCS 360-39059/1	Lab Control Spike	T	Water	SM 2510B	
MB 360-39059/4	Method Blank	T	Water	SM 2510B	
360-20018-6	OC-GW-10S	T	Water	SM 2510B	
360-20018-7	OC-GW-24	T	Water	SM 2510B	
360-20018-8	OC-GW-39	T	Water	SM 2510B	
Prep Batch: 360-39163					
LCS 360-39163/2-A	Lab Control Spike	T	Water	Distill/Ammonia	
MB 360-39163/1-A	Method Blank	T	Water	Distill/Ammonia	
360-20018-6	OC-GW-10S	T	Water	Distill/Ammonia	
360-20018-7	OC-GW-24	T	Water	Distill/Ammonia	
360-20018-8	OC-GW-39	T	Water	Distill/Ammonia	
Analysis Batch:360-39164					
LCS 360-39163/2-A	Lab Control Spike	T	Water	L107-06-1B	360-39163
MB 360-39163/1-A	Method Blank	T	Water	L107-06-1B	360-39163
360-20018-6	OC-GW-10S	T	Water	L107-06-1B	360-39163
360-20018-7	OC-GW-24	T	Water	L107-06-1B	360-39163
360-20018-8	OC-GW-39	T	Water	L107-06-1B	360-39163
Analysis Batch:360-39239					
LCS 360-39239/2	Lab Control Spike	T	Water	300.0	
MB 360-39239/1	Method Blank	T	Water	300.0	
360-20018-6	OC-GW-10S	T	Water	300.0	
360-20018-7	OC-GW-24	T	Water	300.0	
360-20018-8	OC-GW-39	T	Water	300.0	

Report Basis
T = Total

Method Blank - Batch: 360-39039

Method: 6010B
Preparation: 3050B

Lab Sample ID: MB 360-39039/1-A
Client Matrix: Solid
Dilution: 1.0
Date Analyzed: 11/25/2008 1813
Date Prepared: 11/24/2008 1448

Analysis Batch: 360-39111
Prep Batch: 360-39039
Units: mg/Kg

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume: 2.00 g
Final Weight/Volume: 100 mL

Analyte	Result	Qual	MDL	RL
Aluminum	ND		0.19	2.5
Chromium	0.39	J	0.073	0.50
Iron	0.69	J	0.64	5.0

Lab Control Spike/
Lab Control Spike Duplicate Recovery Report - Batch: 360-39039

Method: 6010B
Preparation: 3050B

LCS Lab Sample ID: LCS 360-39039/2-A
Client Matrix: Solid
Dilution: 1.0
Date Analyzed: 11/25/2008 1512
Date Prepared: 11/24/2008 1448

Analysis Batch: 360-39111
Prep Batch: 360-39039
Units: mg/Kg

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume: 2.00 g
Final Weight/Volume: 100 mL

LCSD Lab Sample ID: LCSD 360-39039/3-A
Client Matrix: Solid
Dilution: 1.0
Date Analyzed: 11/25/2008 1517
Date Prepared: 11/24/2008 1448

Analysis Batch: 360-39111
Prep Batch: 360-39039
Units: mg/Kg

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume: 2.00 g
Final Weight/Volume: 100 mL

Analyte	% Rec. LCS	% Rec. LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Aluminum	90	92	80 - 120	2	30		
Chromium	90	92	80 - 120	2	30		
Iron	92	94	80 - 120	2	30		

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-20018-1

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 360-39039

Method: 6010B
Preparation: 3050B

MS Lab Sample ID:	360-20018-3	Analysis Batch: 360-39111	Instrument ID: Varian 720 ES ICP
Client Matrix:	Solid	Prep Batch: 360-39039	Lab File ID: N/A
Dilution:	1.0		Initial Weight/Volume: 1.53 g
Date Analyzed:	11/25/2008 1523		Final Weight/Volume: 100 mL
Date Prepared:	11/24/2008 1448		

MSD Lab Sample ID:	360-20018-3	Analysis Batch: 360-39111	Instrument ID: Varian 720 ES ICP
Client Matrix:	Solid	Prep Batch: 360-39039	Lab File ID: N/A
Dilution:	1.0		Initial Weight/Volume: 1.51 g
Date Analyzed:	11/25/2008 1526		Final Weight/Volume: 100 mL
Date Prepared:	11/24/2008 1448		

	% Rec.						
Analyte	MS	MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Aluminum	-123	-113	75 - 125	0	35	4	4
Chromium	71	82	75 - 125	6	35	F	
Iron	337	18	75 - 125	11	35	4	4

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-20018-1

Method Blank - Batch: 360-39051

Method: 6010B
Preparation: N/A

Lab Sample ID: MB 360-39051/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/24/2008 1637
Date Prepared: N/A

Analysis Batch: 360-39051
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 1.0 mL

Analyte	Result	Qual	MDL	RL
Aluminum	3.8 x5= 19	J	2.2	100
Chromium	ND		0.17	5.0

Lab Control Spike/
Lab Control Spike Duplicate Recovery Report - Batch: 360-39051

Method: 6010B
Preparation: N/A

LCS Lab Sample ID: LCS 360-39051/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/24/2008 1634
Date Prepared: N/A

Analysis Batch: 360-39051
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 10 mL

LCSD Lab Sample ID: LCSD 360-39051/8
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/24/2008 1709
Date Prepared: N/A

Analysis Batch: 360-39051
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 10 mL

Analyte	% Rec. LCS	% Rec. LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Aluminum	100	99	80 - 120	1	20		
Chromium	98	97	80 - 120	2	20		

Calculations are performed before rounding to avoid round-off errors in calculated results.

TC
11/30/08

Client: Olin Corporation

Job Number: 360-20018-1

Method Blank - Batch: 360-39239

Method: 300.0
Preparation: N/A

Lab Sample ID: MB 360-39239/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 12/02/2008 1131
Date Prepared: N/A

Analysis Batch: 360-39239
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 1.0 mL

Analyte	Result	Qual	RL	RL
Sulfate	ND		2.0	2.0
Chloride	ND		1.0	1.0

Lab Control Spike - Batch: 360-39239

Method: 300.0
Preparation: N/A

Lab Sample ID: LCS 360-39239/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 12/02/2008 1147
Date Prepared: N/A

Analysis Batch: 360-39239
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 1.0 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Sulfate	80.0	81.9	102	85 - 115	
Chloride	40.0	40.8	102	85 - 115	

Calculations are performed before rounding to avoid round-off errors in calculated results.

TC
11/30/09

Client: Olin Corporation

Job Number: 360-20018-1

Method Blank - Batch: 360-39163

Method: L107-06-1B
Preparation: Distill/Ammonia

Lab Sample ID: MB 360-39163/1-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/28/2008 1055
Date Prepared: 11/28/2008 0923

Analysis Batch: 360-39164
Prep Batch: 360-39163
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 50 mL

Analyte	Result	Qual	RL	RL
Ammonia	ND		0.10	0.10

Lab Control Spike - Batch: 360-39163

Method: L107-06-1B
Preparation: Distill/Ammonia

Lab Sample ID: LCS 360-39163/2-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/28/2008 1056
Date Prepared: 11/28/2008 0923

Analysis Batch: 360-39164
Prep Batch: 360-39163
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 50 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Ammonia	10.0	9.10	91	85 - 115	

Calculations are performed before rounding to avoid round-off errors in calculated results.

TC
1/30/09

Client: Olin Corporation Job Number: 360-20018-1

Method Blank - Batch: 360-39059

Method: SM 2510B
Preparation: N/A

Lab Sample ID: MB 360-39059/4
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/24/2008 1643
Date Prepared: N/A

Analysis Batch: 360-39059
Prep Batch: N/A
Units: umhos/cm

Instrument ID: MAN-TECH Ion Plus
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 1.0 mL

Analyte	Result	Qual	RL	RL
Specific Conductance	ND		1.0	1.0

Lab Control Spike - Batch: 360-39059

Method: SM 2510B
Preparation: N/A

Lab Sample ID: LCS 360-39059/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/24/2008 1624
Date Prepared: N/A

Analysis Batch: 360-39059
Prep Batch: N/A
Units: umhos/cm

Instrument ID: MAN-TECH Ion Plus
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 1.0 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Specific Conductance	1420	1460	103	85 - 115	

Calculations are performed before rounding to avoid round-off errors in calculated results.

Login Sample Receipt Check List

Client: Olin Corporation

Job Number: 360-20018-1

Login Number: 20018
List Source: TestAmerica Westfield
Creator: Rinard, Kimberley A
List Number: 1

Question	T / F/ NA	Comment
Radioactivity either was not measured or, if measured, is at or below background	N/A	
The cooler's custody seal, if present, is intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	1.2 C / 1.0 C
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	N/A	
If necessary, staff have been informed of any short hold time or quick TAT needs	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	

TestAmerica Laboratories, Inc.
Chain of Custody Form

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

360.20018

•53 Southampton Road
Westfield, MA 01085
(P) 413-572-4000
(F) 413-572-3707

•149 Rangeway Road
N. Billerica, MA 01862
(P) 978-667-1400
(F) 978-667-7871

Client: Olin Chemical/MACTEC
Address: 51 Eames Street
Wilmington, MA 01887
Phone: Fax:

Project #: 6100080016
Project Manager: Peter Thompson
Work ID: ~~PCMP~~ Slurry Wall/ Slurry Cap
Contact: David Chapman

Job# | Quote# | PO#

Requested Turn Around Time
10 Business Day (Std) XX | Rush TAT Requested:
15 Business Day | 24 hrs | 72 hrs
Other | 48 hrs | 5 Day

Regulatory Classification / Special Report Format
NPDES | Drinking Water | DEP Form(s)
RCRA | MCP GW1/S1 | MWRA Smart Rpt
Other | MCP QA/QC Rpt XX

Sample Type Codes
WW-Wastewater DW-Drinking water SW-Surfacewater
LW-Labwater GW-Groundwater A-Air
S-Solid / Soil SL-Sludge O-Oil Z-Other

Shaded areas for office use

Analysis Requested
Check analysis and specify method and analytes in comments section.
For example:
500-series for drinking water
600-series for waste water
8000-series for haz/solid waste
Use comments section to further define.

Sample ID	Sample Type	Sampler's Initials	Date Time Collected	Grab	Comp.	# Containers	Plastic(P) or Glass(G)	Preservative: NaHSO4/MeOH	HNO3 to pH <2	H2SO4 to pH <2	HCl to pH <2	NaOH to pH >12	NAOH/ZNAC	None / 4° C	Ammonia-Nitrogen	Chloride, Sulfate	Specific Condutivity	Nitrate, Nitrite	Groundwater metals	Surfacewater metals	Sediment: Al/Cr/Fe	Other 6 mo's	Other	Other	Other	Other	Other
OC-SD-SD1	SD	DLC/MAM	11-19-08 8:55		X	1	G							X							X	X				
OC-SD-SD2	SD	DLC/MAM	11-19-08 9:10		X	1	G							X							X	X				
OC-SD-SD3	SD	DLC/MAM	11-19-08 9:25		X	1	G							X							X	X				
OC-SD-SD4	SD	DLC/MAM	11-19-08 9:50		X	1	G							X							X	X				
OC-SD-SD5	SD	DLC/MAM	11-19-08 10:10		X	1	G							X							X	X				
OC-SD-SD3MS	SD	DLC/MAM	11-19-08 9:25		X	1	G							X							X	X				
OC-SD-SD3MSD	SD	DLC/MAM	11-19-08 9:25		X	1	G							X							X	X				
OC-GW-10S	GW	DLC	11-19-08 11:45	X		3	P		X	X				X	X	X	X		X							
OC-GW-24	GW	DLC	11-19-08 13:30	X		3	P		X	X				X	X	X	X		X							
OC-GW-39	GW	DLC	11-19-08 15:10	X		3	P		X	X				X	X	X	X		X							

Comments (Special Instructions)

MCP case narrative

Dissolved metals are field filtered.

Groundwater Metals: Dissolved Al/Cr

Surfacewater Metals: Dissolved/Total Al/Cr/Na

Sampled by (print): David Chapman / Mark Maggiore
Signature:

Relinquished by: David Chapman Date: 11-21-08 Time: 14:15
Received by: Date: 11/21/08 Time: 1415

Relinquished by: Date: 11/21/08 Time: 1615
Received by: Date: 11/21/08 Time: 1615

Method of shipment:

TestAmerica-Westfield

Cooler? Y / N Samples Iced? Y / N
Temp @ receipt: 1.2°c / 1.0°c °C
Preservation/pH checked
By: Date: 11/21/08

White = Lab file Yellow = Report copy Pink = Customer copy
STL-8245 (1000)

OLIN-WILMINGTON
LEVEL I DATA QUALITY EVALUATION
STANDARD OPERATING PROCEDURE AND CHECKLIST
ICP METALS BY METHOD 6010B/200.7

Reviewer/Date Tige Cunningham
Sr. Review/Date Chris Ricciardi 2/12/09
Lab Report # 360-20018-1
Project # 6107090016-12

1.0 Laboratory Deliverable Requirements

1.1 Laboratory Information: Was all of the following provided in the laboratory report? **Yes** [✓] No [ ] N/A [ ] Comments:
Check items received.

☑ *Name of Laboratory* ☑ *Address* ☑ *Project ID* ☑ *Phone #* ☑ *Sample identification – Field and Laboratory*
Client Information: ☑ *Name* ☑ *Address* ☑ *Client Contact* *(IDs must be cross-referenced)*

ACTION: If no, contact lab for submission of missing or illegible information.

1.2 Laboratory Report Certification Statement ***Yes*** [✓] *No* [ ] *N/A* [ ] *Comments:*

Does the laboratory report include a completed Analytical Report Certification in the required format?

***ACTION**: If no, contact lab for submission of missing certification or certification with correct format.*

1.3 Laboratory Case Narrative: ***Yes*** [✓] *No* [ ] *N/A* [ ] *Comments:*

☑ *Narrative serves as an exception report for the project and method QA/QC performance.* ☐ *Narrative includes an explanation of each discrepancy on the*

Certification Statement.

***ACTION**: If no, contact lab for submission of missing or illegible information.*

1.4 Chain of Custody (COC) copy present with all documentation completed **Yes** [✓] No [ ] N/A [ ] Comments:

NOTE: Olin receives and maintains the *original COC.*

ACTION: If no, contact lab for submission of copy of completed *COC.*

1.5 Sample Receipt Information (*Cooler Receipt Form present?*): **Yes [✓]** No [ ] N/A [ ] Comments:

Were each of the following tasks completed and recorded upon receipt of the sample(s) into the laboratory?

☑ Sample temperature confirmed: must be 1° – 10° C. (If samples were sent by courier and delivered on the same day as collection, temperature requirement does not apply).

☑ Container type noted ☑ sample condition observed ☑ pH verified (where applicable) ☑ Field and lab IDs cross referenced

ACTION: If no, contact lab for submission of missing or incomplete documentation.

1.5.1 Were all samples delivered to the laboratory without breakage? **Yes [✓]** No [ ] N/A [ ] Comments:

1.5.2 Does the *Cooler Receipt Form* or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data? Yes [ ] **No [✓]** N/A [ ] Comments:

1.6 Sample Results Section: *Was each of the following requirements supplied in the laboratory report for each sample?* **Yes [✓]** No [ ] N/A [ ] Comments:

☑ Field ID and Lab ID ☑ *Date and time collected* ☑ Analyst Initials ☑ *Dilution Factor* ☑ % moisture or solids ☑ *Reporting limits*
☐ *Clean-up method N/A* ☑ Analysis method ☑ *Preparation method* ☑ *Date of preparation/extraction/digestion clean-up and analysis, where applicable*
☑ Matrix ☑ Target analytes and concentrations ☑ Units (soils must be reported in dry weight)

ACTION: If no, contact lab for submission of missing or incomplete information.

1.7 QA/QC Information: Was each of the following information supplied in the laboratory report for each sample batch? **Yes [✓]** No [ ] N/A [ ] Comments:

☑ Method blank results ☑ LCS recoveries ☐ MS/MSD recoveries and RPDs N/A Not Submitted ☐ Laboratory duplicate results (where applicable)

ACTION: If no, contact lab for submission of missing or incomplete information.

2.0 Holding Times

Have any technical holding times, determined from date of collection to date of analysis, been exceeded? Holding time for metals is 180 days from sample collection to analysis for both water and soil. Yes [ ] **No [✓]** N/A [ ] Comments:

NOTE: List samples that exceed hold time with # of days exceeded on checklist

ACTION: If technical holding times are exceeded, qualify all positive results (J) and non-detects (UJ). If grossly exceeded (2X holding time) reject (R) all non-detect results.

3.0 Laboratory Method

3.1 Was the correct laboratory method used? **Yes [✓]** No [ ] N/A [ ] Comments:

Water Digestion	3005A or 3010A or 3020A
Soil Digestion	3050B
Metals	6010B or 200.7

ACTION: If no, contact laboratory to provide justification for method change compared to the requested method. Contact senior chemist to inform Client of change and to request variance.

3.2 Are the practical quantitation limits the same as those specified by the ☐ SOW ☑ QAPP ☐ Lab ☐ MADEP **Yes [✓]** No [ ] N/A [ ] Comments:

NOTE: *Verify that the reported metals match the target list specified on the COC.*

ACTION: If no, evaluate variation with respect to sample matrix, preparation, dilution, moisture, etc. If sample PQL is indeterminate, contact lab for explanation.

3.3 Are results present for each sample in the SDG? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, check Request for Analysis to verify if method was ordered and COC to verify that it was sent, and contact lab for resubmission of the missing data

3.4 If dilutions were required, were dilution factors reported? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact the lab for submission.

4.0 Method Blanks

4.1 Is the Method Blank Summary present? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, call the laboratory for submission of missing data.

4.2 Frequency of Analysis: Was a method blank analyzed for each digestion batch of < 20 field samples? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact laboratory for justification. Consult senior chemist for action needed. Narrate non-compliance.

4.3 Is the method blank less than the PQLs for all target elements? **Yes** [ ] No [✓] N/A [ ] Comments:

NOTE: *MADEP requires the method blank to be matrix matched and digested with the samples*

4.4 Do any method blanks have positive results for metals? Qualify data according to the following: Yes [✓] **No** [ ] N/A [ ] Comments:

Soil { Chromium 0.39 mg/kg × 5 = 1.95 mg/kg (Action) — No Quals all detects were > Act. levels
Iron 0.69 mg/kg × 5 = 3.45 mg/kg

Water Aluminum 3.8 mg/L × 5 = 19 mg/L — Sample QC-Qu- dissolved Quali

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

ACTION: For any blank with positive results, list all contaminants for each method blank including the concentration detected and the flagging level (flagging level = 5x the blank value) and the associated samples and qualifiers.

5.0 Laboratory Control Standard

5.1 Was a laboratory control standard run with each analytical batch of 20 samples or less? **Yes [✓]** No [ ] N/A [ ] Comments:

NOTE: *A full target, second source LCS is required by MADEP.*
ACTION: Call laboratory for LCS form submittal. If data are not available, use professional judgement to evaluate data accuracy associated with that batch.

5.2 Is a LCS Summary Form present? **Yes [✓]** No [ ] N/A [ ] Comments:

ACTION: If no, contact lab for resubmission of missing data.

5.3 Is the recovery of any analyte outside of MADEP control limits? Yes [ ] **No [✓]** N/A [ ] Comments:

Sample Type	***MADEP % Rec***
Water	*80-120*
Soil	within Lab generated limits

ACTION: If recovery is above the upper limit, qualify all positive sample results within the batch as (J). If recovery is below the lower limit, qualify all positive and non-detects results within the batch as (J). If LCS recovery is <30%, positive and non-detect results are rejected (R).

Comments:

6.0 Matrix Spikes

Matrix spikes may be collected at different frequencies based on monthly, quarterly, or task specific schedules. Confirm spike requirements for each set with the senior chemist.

6.1 Were project-specific MS/MSDs collected? List project samples that were spiked.

Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact senior chemist to see if any were specified.

6.2 Is the Matrix Spike/Matrix Spike Duplicate Recovery Form present?

Yes [✓] No [ ] N/A [ ] Comments:

NOTE: *A full target, second source MS/MSD is required by MADEP.*
ACTION: If any matrix spike data are missing, call lab for resubmission.

6.3 Were matrix spikes analyzed as indicated on the COC and project schedule?

Yes [ ] No [ ] N/A [ ] Comments:

ACTION: If any matrix spike data are missing, call lab for resubmission. If none, no qualification is needed. Narrate non-compliance.

6.4 Are any metal spike recoveries outside of the QC limits?

Yes [✓] **No** [ ] N/A [ ] Comments:

Sample Type	***MADEP*** ***% Rec***	QAPP % Rec	Method
Water	*75-125*	N/A	6010B
Water	*N/A*	70-130	200.7
Soil	*75-125*	75-125	6010B

NOTE: %R = (SSR-SR) x 100% / SA Where: SSR = Spiked sample result, SR = Sample result, SA = Spike added

NOTE: If dilutions are required due to high sample concentrations (> 4X spike), the data are evaluated, but no flags are applied.

MS/MSD Recoveries Aluminum & Iron out but native conc. is >4x so no Quals.

Sediment MS/MSD } Chromium in MS out Low @ 71% MSD w/in Limits @ 82%. Chromium was Qualified estimated in all Sediment samples in SDG: OC-SD-SD1, OC-SD-SD2, OC-SD-SD3, OC-SD-SD4, OC-SD-SD5

NOTE: If only one of the recoveries for an MS/MSD pair is outside of the control limits, no qualification is necessary. Use professional judgment for the MS/MSD flags.

ACTION: MS/MSD flags only apply to the sample spiked. If the recoveries of the MS and MSD exceed the upper control limit, qualify positive results as estimated (J). If the recoveries of the MS and MSD are lower than the lower control limit, qualify positive results and non-detects (J).

6.5 Are any RPDs for MS/MSD recoveries outside of the QC limits? Yes [ ] **No** [✓] N/A [ ] Comments:

NOTE: $RPD = \frac{S-D}{(S+D)/2} \times 100\%$ Where: S = MS sample result
D = MSD sample result

NOTE: If dilutions are required due to high sample concentrations, the data are evaluated, but no flags are applied.

ACTION: If the RPD exceeds the control limit, qualify positive results and non-detects (J).

7.0 Laboratory Duplicate

7.1 Was a laboratory duplicate sample analyzed? If so, is the Laboratory Duplicate Sample Form present? **Yes** [ ] No [✓] N/A [ ] Comments:

NOTE: *MADEP refers to this sample as a "matrix duplicate".*

ACTION: If not analyzed, qualification is not needed. If data is missing, contact laboratory for resubmission of report. Narrate non-compliance.

7.2 Is the RPD between the result for the laboratory duplicate sample and the result for the parent sample outside of the QA/QC limits? Yes [ ] **No** [ ] N/A [✓] Comments:

MADEP Laboratory Duplicate Sample RPD Criteria:	QAPP RPD
For aqueous results > 5× RL, RPD must be ± 20%	20
For aqueous results < 5× RL, RPD must be ≤ RL	20
For soil/sediment results > 5× RL, RPD must be ± 35%	20
For soil/sediment results < 5× RL, RPD must be ≤ 2× RL	20

ACTION: If the RPD exceeds the limits, qualify both positive results and non-detects as estimated and flag them J. Narrate non-compliance

8.0 Sampling Accuracy

The majority of ground water samples are collected directly from a tap, process stream, or with dedicated tubing. Rinse blanks will not be collected.

8.1 Were rinsate blanks collected? Prior to evaluating rinsate blanks, obtain a list of the associated samples from the senior chemist. **Yes [ ]** No [✓] N/A [ ] Comments:

8.2 Do any rinsate blanks have positive results? Yes [ ] **No [ ]** N/A [✓] Comments:

NOTE: *MADEP does not require the collection of rinsate blanks.*

ACTION: Evaluate rinsate results against blank results to determine if contaminant may be laboratory-derived. If results are not lab-related, qualify according to below.

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

9.0 Field Duplicates

9.1 Were field duplicate samples collected? Obtain a list of samples and their associated field duplicates. Yes [ ] **No [✓]** N/A [ ] Comments:

9.2 Were field duplicates collected per the required frequency? **Yes** [ ] No [ ] N/A [✓] Comments:

SOW ☐ QAPP *(1 per 10)* ☐ *MADEP Option 1 (1 per 20)* ☐ *MADEP Option 3 (1 per 10)* ☐

9.3 Was the RPD ≤ 50% for soils or waters? Calculate the RPD for all results and attach to this review. **Yes** [ ] No [ ] N/A [ ] Comments:

ACTION: RPD must be ≤50% for soil and water. Qualify data (J) for both sample results if the RPD exceeds 50%.

10.0 Special QA/QC

10.1 Were both total and dissolved metals analysis performed? If so, the dissolved metal concentration should not exceed that of the total metal. Yes [ ] **No** [✓] N/A [ ] Comments:

only dissolved submitted

ACTION: If results for both total and dissolved are ≥ 5x the PQL **and** the dissolved concentration is 10% higher than the total, flag both results as estimated (J). If total and dissolved concentrations are less than 5x the PQL **and** the **difference** exceeds 2x the PQL, flag both results as estimated (J)

10.0 Application of Validation Qualifiers

Was any of the data qualified?

Yes [✓] **No** [ ] N/A [ ] Comments:

If so, apply data qualifiers directly to the DQE copy of laboratory report and **flag pages** for entry in database.

- Method blank Aluminum
- ↓ chromium MS % Rec for Sediment

REFERENCES

LAW, 1999, "Final Quality Assurance Project Plan, Olin Wilmington Property, 51 Eames Street, Wilmington, MA", LAW Engineering and Environmental Services, Kennesaw, GA 30144. August 1999

U.S. Environmental Protection Agency (USEPA), 1989. "Region 1 Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses"; Hazardous Site Evaluation Division; February 1989.

MADEP, 2001. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Massachusetts Quality Assurance and Quality Control (QA/QC) Requirements." BWSC-CAM, Interim Final Draft, Revision No. 2, 5 October 2001.

MADEP, 2001. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Quality Assurance and Quality Control Guidelines for Sampling, Data Evaluation and Reporting Activities," BWSC-CAM, Section VII, Public Comment Draft, Revision No. 0, 21 December 2001.

~~Sediment~~: Groundwater (TC)

OLIN-WILMINGTON
LEVEL I DATA QUALITY EVALUATION
STANDARD OPERATING PROCEDURE AND CHECKLIST
WET CHEMISTRY PARAMETERS BY VARIOUS METHODS

Reviewer/Date Tige Cunningham 1/30/09
Sr. Review/Date Chris Ricardi 2/12/09
Lab Report # 360-20018-1
Project # 6107090016-12

Note: The following analyses will be evaluated according to the "MADEP QA/QC Guidelines for **Sampling, Data Evaluation and Reporting Activities.**" MADEP, however, may not list QA/QC criteria for every chemical analysis. Where not defined by MADEP, criteria will default to values stipulated in the QAPP. Where the QAPP does not define criteria, QA/QC requirements will default to limits employed by the laboratory.

1.0 Laboratory Deliverable Requirements

1.1 Laboratory Information: Was all of the following provided in the laboratory report? **Yes** [✓] No [ ] N/A [ ] Comments:
Check items received.

☑ *Name of Laboratory* ☑ *Address* ☑ *Project ID* ☑ *Phone #* ☑ *Sample identification – Field and Laboratory*

Client Information: ☑ *Name* ☑ *Address* ☑ *Client Contact* *(IDs must be cross-referenced)*

ACTION: If no, contact lab for submission of missing or illegible information.

1.2 Laboratory Report Certification Statement ***Yes*** [✓] *No* [ ] *N/A* [ ] *Comments:*

Does the laboratory report include a completed Analytical Report Certification in the required format?

***ACTION**: If no, contact lab for submission of missing certification or certification with correct format.*

1.3 Laboratory Case Narrative: ***Yes*** [✓] *No* [ ] *N/A* [ ] *Comments:*

☑ *Narrative serves as an exception report for the project and method QA/QC performance.* ☐ *Narrative includes an explanation of each discrepancy on the Certification Statement.*

***ACTION**: If no, contact lab for submission of missing or illegible information.*

1.4 Chain of Custody (COC) copy present with all documentation completed? **Yes** [✓] No [ ] N/A [ ] Comments:

Does the laboratory report include copies of Chain of Custody forms containing all samples in this SDG?

NOTE: Olin receives and maintains the *original* COC.

ACTION: If no, contact lab for submission of copy of missing completed COC.

1.5 Sample Receipt Information (*Cooler Receipt Form*): Were each of the following tasks completed and recorded upon receipt of the sample(s) into the laboratory?

Yes [✓] No [ ] N/A [ ] Comments:

☑ Sample temperature confirmed: must be 1° – 10° C. (If samples were sent by courier and delivered on the same day as collection, temperature requirement does not apply).

☑ Container type noted ☑ Condition observed ☑ pH verified (where applicable) ☑ Field and lab IDs cross referenced

ACTION: If no, contact lab for submission of missing or incomplete documentation.

1.5.1 Were the correct bottles and preservatives used?

Yes [✓] No [ ] N/A [ ] Comments:

Ammonia,– 1 Liter polyethylene/H_2SO_4 to pH<2,cool to 4°C

Oil & Grease – 1 Liter glass/HCL or H2SO4 to pH<2,cool to 4°C

Alkalinity – 1 Liter polyethylene/cool to 4°C

Chemical Oxygen Demand – 50 mL polyethylene/H_2SO_4 to pH<2,cool to 4°C

Chloride, pH, sulfate, nitrate, nitrite - 50 mL polyethylene/cool to 4°C

Nitrate/nitrite - H2SO4 to pH<2,cool to 4°C

Organic Carbon – 500 mL amber glass bottle/HCl or H_2SO_4 to pH<2,cool to 4°C

Sulfide – 50 mL polyethylene/ZnAcetate + NaOH to pH>9, cool to 4°C

Phenolics - H_2SO_4 to pH<2,cool to 4°C

Specific conductance, TDS, TSS – 100 mL polyethylene/cool to 4°C

ACTION: If no, inform senior chemist. Document justification for change in container/volume (if applicable), qualify positive and non-detect data (J) data if cooler temperature exceeds 10°C. Rejection of data requires professional judgment

1.5.2 Were all samples delivered to the laboratory without breakage?

Yes [✓] No [ ] N/A [ ] Comments:

1.5.3 Does the *Cooler Receipt Form* or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data?

Yes [ ] **No** [✓] N/A [ ] Comments:

1.6 Sample Results Section: *Was the following information supplied in the laboratory report for each sample?* **Yes** [✓] No [ ] N/A [ ] Comments:

☑ Field ID and Lab ID ☑ Date and time collected ☑ Analyst Initials ☑ Dilution Factor ☑ % moisture or solids ☑ Reporting limits
☐ *Clean-up method* N/A ☑ Analysis method ☑ Preparation method ☑ Date of preparation/extraction/digestion clean-up and analysis, where applicable
☑ Matrix ☑ Target analytes and concentrations ☑ Units (soils must be reported in dry weight)

ACTION: If no, contact lab for submission of missing or incomplete information.

1.7 QA/QC Information: Was the following information provided in the laboratory report for each sample batch? **Yes** [✓] No [ ] N/A [ ] Comments:

☑ Method blank results ☑ LCS recoveries ☑ MS/MSD recoveries and RPDs ☐ Laboratory duplicate results (where applicable)

ACTION: If no, contact lab for submission of missing or incomplete information.

2.0 Holding Times Yes [ ] **No** [✓] N/A [ ] Comments:

Have any technical holding times, determined from date of collection to date of analysis, been exceeded? The holding times are as follows:

28 days = ammonia, chemical oxygen demand, chloride, organic carbon, oil & grease, specific conductance, total organic carbon and sulfate
Alkalinity = 14 days Sulfide, TDS, TSS = 7 days pH = analyze immediately Nitrate nitrogen as N = 48 hrs
Nitrite nitrogen as N = 48 hrs Nitrate + Nitrite as N = 28 days Sulfate 28days

NOTE: List samples that exceed hold time with # of days exceeded on checklist

ACTION: If technical holding times are exceeded qualify results (J). For water samples that are grossly exceeded (>2X hold time) reject (R) all non-detect results. Professional judgment used to qualify soils.

3.0 Laboratory Method **Yes** [✓] No [ ] N/A [ ] Comments:

3.1 Was the correct laboratory method used?

ACTION: If no, contact lab to provide justification for method change compared to the requested method. Contact senior chemist to inform Client of change or to request variance.

3.2 Are the practical quantitation limits the same as those specified by the ☑ QAPP/IRSWP ☐ Lab? **Yes** [✓] No [ ] N/A [ ] Comments:

Note: *The MADEP QA/QC Guidelines do not yet list PQLs for wet chemistry analyses, therefore all criteria will default to values stipulated in the QAPP*. Where the QAPP does not define criteria, QA/QC requirements default to limits employed by the lab**. Other criteria may also apply.*

Ammonia* ☑ = 0.1 mg/ L	Alkalinity** ☐ = 1 mg/L	Bicarbonate Alkalinity** ☐ = 1 mg/L	Carbonate Alkalinity** ☐ = 1 mg/L
Nitrate Nitrogen as N* ☐ = .05 mg/L	Nitrite Nitrogen as N* ☐ = .01 mg/L	Chloride* ☑ = 1 mg/L	Hardness *☐ = 2 mg/L
Spec. Cond.** ☑ 3 umhos/cm	Total Organic Carbon** ☐ = 1 mg/L	Oil & Grease* ☐ = 5.5 mg/L	Sulfate (EPA 300.0)* ☑ = 2 mg/L
COD:* Low – 20 mg/L	COD* High - 50 mg/L ☐	TDS* ☐ = 10 mg/L	TSS* ☐ = 5 mg/L
pH* ☐ < 2 to > 12	Phenolic - 0.01 mg/L		

Other parameter(list) _____ PQL = _____ ☐ Source of PQL = _____

Other parameter(list) _____ PQL = _____ ☐ Source of PQL = _____

ACTION: If no, evaluate change with respect to sample matrix, preparation, dilution, moisture, etc. If sample PQL is indeterminate, contact lab for explanation.

3.3 Are the appropriate parameter results present for each sample in the SDG? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, check Request for Analysis to verify if method was ordered and COC to verify that it was sent, and contact lab for resubmission of the missing data

3.4 If *dilutions were required, were dilution factors reported?* **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact the lab for submission.

4.0 <u>Method Blanks</u> **Yes** [✓] No [ ] N/A [ ] Comments:

4.1 Are the Method Blank Summaries present?

ACTION: If no, call the laboratory for submission of missing data.

4.2 Was a method blank analyzed for each analysis batch of wet chemistry field samples of 20 or less? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, document discrepancy in case narrative and contact lab for justification. Consult senior chemist for action needed.

4.3 Is the method blank less than the PQL? (See Section 3.2 for PQLs). **Yes [✓]** No [ ] N/A [ ] Comments:

4.4 Do any method blanks have positive results for wet chemistry parameters? Qualify data according to the following: Yes [ ] **No [✓]** N/A [ ] Comments:

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

ACTION: If any blank has positive results, list all the concentrations detected and flagging level (flagging level = 5 × blank value) on the checklist. List all affected samples and their qualifiers.

5.0 Laboratory Control Standards

5.1 Was a laboratory control standard (LCS) run with each analytical batch of 20 samples or less? **Yes [✓]** No [ ] N/A [ ] Comments:

ACTION: If no, call laboratory for LCS form submittal. If data is not available, use professional judgment to determine qualification actions for data associated with the batch.

5.2 Is a LCS Summary Form present? **Yes [✓]** No [ ] N/A [ ] Comments:

ACTION: If no, contact lab for resubmission of missing data.

5.3 Is any wet chemistry analyte LCS recovery outside the control limits? Yes [ ] **No [✓]** N/A [ ] Comments:

LCS Limits:

Alkalinity** ☐ = 80-120%	Bicarbonate Alkalinity** ☐ = 80-120%	Carbonate Alkalinity** ☐ = 80-120%	Specific Conductivity *☑ = 80-120%
Total Organic Carbon** ☐ = 80-120%	TDS** ☐ = 80-120%	Oil & Grease* ☐ = 80-120%	Ammonia Nitrogen as N* ☑ = 80-120%
COD Low* ☐ = 80-120%	COD High* ☐ = 80-120%	Nitrate Nitrogen as N**☐ = 80-120%	Nitrite Nitrogen as N** ☐= 80-120%
Hardness* ☐ = 80-120%	Chloride* ☑ = 80-120%	Sulfate (EPA 300.0)* ☑ = 80-120%	pH* ☐ = 98-102% TSS* NA

Other parameter(list) _____ %R = _____ ☐ Rec Limits= _____

Other parameter(list) _____ %R = _____ ☐ Rec Limits = _____

(MADEP has not yet defined LCS recovery limits for wet chemistry analyses.)

ACTION: If recovery is above the upper limit, qualify all positive sample results within the batch as (J). If recovery is below the lower limit, qualify all positive and no-detect results within the batch as (J). If LCS recovery is <10%, non-detect results are rejected (R).

6.0 Matrix Spikes

Matrix spikes may be collected at different frequencies based on monthly, quarterly, or task specific schedules. Confirm spike requirements for each set with the senior chemist.

6.1 Were project-specific MS/MSDs analyzed? List project samples that were spiked.

ACTION: If no, contact senior chemist to see if any were specified.

Yes [__] No [✓] N/A [__] Comments: Not Collected

6.2 Is the MS/MSD Recovery Form present?

ACTION: If no, contact lab for resubmission of missing data.

Yes [__] No [__] N/A [✓] Comments:

6.3 Were matrix spikes analyzed at the required frequency of 1 per 20 samples per matrix?

ACTION: If any matrix spike data is missing, call lab for resubmission.

Yes [__] No [__] N/A [✓] Comments:

6.4 Are any wet chemistry analyte spike recoveries outside of the QC limits?

Yes [__] **No** [__] N/A [✓] Comments:

NOTE: $\%R = \frac{(SSR-SR)}{SA} \times 100\%$ Where: SSR = Spiked sample result
SR = Sample result
SA = Spike added

MS/MSD Recovery Limits:

Alkalinity* = NA	Bicarbonate Alkalinity* = NA	Carbonate alkalinity* = NA	Ammonia* (LACHAT) ☐ = 75-125%
Chloride*(SM 4500 Cl) ☐= 75-125%	Specific Conductivity * = NA	Total Organic Carbon* = NA	TDS** = NA
Oil & Grease* = NA	COD Low* ☐ = 75-125%	COD High* ☐ = 75-125%	Nitrate Nitrogen as N** ☐ = 75-125%
Nitrite Nitrogen as N** ☐ = 75-125%	Hardness* ☐ = 75-125%	Sulfate (EPA 300.0)* ☐ = 75-125%	pH* = NA TSS* = NA

Other parameter(list) _____ % R = _____ ☐ Rec Limits = _____

* = Laboratory Limits ** = Olin QAPP Limits (*MADEP has not yet defined LCS recovery limits for wet chemistry analyses.*)

NOTES: 1) If only one of the recoveries for an MS/MSD pair is outside of the control limits, no qualification is necessary. Use professional judgment for the MS/MSD flags.
2) If the MS/MSD was performed by the laboratory on a non-project sample, no qualification is required.

ACTION: MS/MSD flags only apply to the sample spiked. Do not evaluate if sample concentration is > 4X spike. If the recoveries of the MS and MSD exceed the upper control limit, qualify positive results as estimated (J). If the recoveries of the MS and MSD are lower than the lower control limit but > 30%, qualify both positive results and non-detects (J). If the MS/MSD recovery is < 30% and the sample is non-detect, the results are considered unusable and flagged (R).

ACTION: Laboratory control limits apply when spiked sample results fall within the normal calibration range. If dilutions are required due to high sample concentrations, the data is evaluated, but no flags are applied.

6.5 Are any RPDs for MS/MSD recoveries outside of the QA/QC limits?

Yes [ ] **No** [ ] N/A [✓] Comments:

NOTE: $RPD = \frac{S - D}{(S + D)/2} \times 100\%$ Where S = MS result
D = MSD result

MS/MSD RPD Limits:

RPD ≤20

7.0 Laboratory Duplicate

Are the RPDs for the laboratory duplicates <20% unless otherwise specified below?

Yes [ ] No [ ] N/A [✓] Comments: Not analyzed

ACTION: If the RPD is greater than specified limits, qualify all results for that analyte as estimated (J).

pH* ☐ = 3% Specific Conductivity *☐ = 5% TSS** ☐ = 6% TDS** ☐ = 6%

8.0 Sampling Accuracy

The majority of ground water samples are collected directly from a tap, process stream, or with dedicated tubing. Rinse blanks will not be collected.

8.1 Were rinsate blanks collected? Prior to evaluating rinsate blanks, obtain a list of the associated samples from the senior chemist. **Yes** [__] No [✓] N/A [__] Comments:

8.2 Do any rinsate blanks have positive results? Yes [__] **No** [__] N/A [✓] Comments:

ACTION: Evaluate rinsate results vs. blank results to determine if contaminant may be laboratory-derived. If not lab-related, qualify according to the table below.

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

NOTE: *MADEP does not require the collection of rinsate blanks.*

9.0 Field Duplicates

9.1 Were field duplicate samples collected? Obtain a list of samples and their associated field duplicates. **Yes** [__] No [✓] N/A [__] Comments:

9.2 Were field duplicates collected per the required frequency? **Yes** [__] No [__] N/A [✓] Comments:

QAPP/IRSWP ☐ *MADEP Option 1(1 per 20)* ☐ *MADEP Option 3 (1 per 10)* ☐

9.3 Was the RPD ≤ 30% for waters ≤ 50% for soils? Calculate the RPD for results and attach to this review. **Yes** [__] No [__] N/A [✓] Comments:

ACTION:. Qualify data (J) for both sample results if the RPD exceeded.

Was any of the data qualified? Yes [ ] **No** [ ] N/A [✓] Comments:

If so, apply data qualifiers directly to the DQE copy of laboratory report and **flag pages** for entry in database.

REFERENCES:-

MACTEC, 2007. "Draft Interim Response Steps Work Plan"; Olin Chemical Superfund Site, 51 Eames Street, Wilmington, Massachusetts.; Project No. 6300-06-0010/41.1; July 25, 2007.

Massachusetts Department of Environmental Protection (MADEP), 2004. "The Compendium of Quality Assurance and Quality Control Requirements and Performance Standards for Selected Analytical Methods Used in Support of Response Actions for the Massachusetts Contingency Plan (MCP)"; Bureau of Waste Site Cleanup; 1 Winter Street, Boston, Massachusetts 02108; WSC-CAM; May 2004.

analysis_method	run_	fracti	lab_sample_id	field_sample_i	param_name	final_result	final_qu	lab_result_t	lab_qual	result_uor	dilut	field_sample_c	extraction_dat	analysis_dat	validation_	validatior	TIC	re	repc
E160.3	1	N	360-20018-1	OC-SD-SD1	Percent Moisture	43		43		percent	1	11/19/2008		11/24/2008	30-Jan	Level I			Y
E160.3	1	N	360-20018-1	OC-SD-SD1	Percent Solids	57		57		percent	1	11/19/2008		11/24/2008	30-Jan	Level I			Y
SW6010	1	T	360-20018-1	OC-SD-SD1	Aluminum	11000		11000		mg/kg	1	11/19/2008	11/24/2008	11/25/2008	30-Jan	Level I			Y
SW6010	**1**	**T**	**360-20018-1**	**OC-SD-SD1**	**Chromium**	**29**	**J**	**29**	**B**	**mg/kg**	**1**	**11/19/2008**	**11/24/2008**	**11/25/2008**	30-Jan	Level I			**Y**
SW6010	1	T	360-20018-1	OC-SD-SD1	Iron	14000		14000	B	mg/kg	1	11/19/2008	11/24/2008	11/25/2008	30-Jan	Level I			Y
E160.3	1	N	360-20018-2	OC-SD-SD2	Percent Moisture	56		56		percent	1	11/19/2008		11/24/2008	30-Jan	Level I			Y
E160.3	1	N	360-20018-2	OC-SD-SD2	Percent Solids	44		44		percent	1	11/19/2008		11/24/2008	30-Jan	Level I			Y
SW6010	1	T	360-20018-2	OC-SD-SD2	Aluminum	15000		15000		mg/kg	1	11/19/2008	11/24/2008	11/25/2008	30-Jan	Level I			Y
SW6010	**1**	**T**	**360-20018-2**	**OC-SD-SD2**	**Chromium**	**620**	**J**	**620**	**B**	**mg/kg**	**1**	**11/19/2008**	**11/24/2008**	**11/25/2008**	30-Jan	Level I			**Y**
SW6010	1	T	360-20018-2	OC-SD-SD2	Iron	23000		23000	B	mg/kg	1	11/19/2008	11/24/2008	11/25/2008	30-Jan	Level I			Y
E160.3	1	N	360-20018-3	OC-SD-SD3	Percent Moisture	30		30		percent	1	11/19/2008		11/24/2008	30-Jan	Level I			Y
E160.3	1	N	360-20018-3	OC-SD-SD3	Percent Solids	70		70		percent	1	11/19/2008		11/24/2008	30-Jan	Level I			Y
SW6010	1	T	360-20018-3	OC-SD-SD3	Aluminum	9200		9200		mg/kg	1	11/19/2008	11/24/2008	11/25/2008	30-Jan	Level I			Y
SW6010	**1**	**T**	**360-20018-3**	**OC-SD-SD3**	**Chromium**	**130**	**J**	**130**	**B**	**mg/kg**	**1**	**11/19/2008**	**11/24/2008**	**11/25/2008**	30-Jan	Level I			**Y**
SW6010	1	T	360-20018-3	OC-SD-SD3	Iron	12000		12000	B	mg/kg	1	11/19/2008	11/24/2008	11/25/2008	30-Jan	Level I			Y
E160.3	1	N	360-20018-4	OC-SD-SD4	Percent Moisture	38		38		percent	1	11/19/2008		11/24/2008	30-Jan	Level I			Y
E160.3	1	N	360-20018-4	OC-SD-SD4	Percent Solids	62		62		percent	1	11/19/2008		11/24/2008	30-Jan	Level I			Y
SW6010	1	T	360-20018-4	OC-SD-SD4	Aluminum	10000		10000		mg/kg	1	11/19/2008	11/24/2008	11/25/2008	30-Jan	Level I			Y
SW6010	**1**	**T**	**360-20018-4**	**OC-SD-SD4**	**Chromium**	**26**	**J**	**26**	**B**	**mg/kg**	**1**	**11/19/2008**	**11/24/2008**	**11/25/2008**	30-Jan	Level I			**Y**
SW6010	1	T	360-20018-4	OC-SD-SD4	Iron	14000		14000	B	mg/kg	1	11/19/2008	11/24/2008	11/25/2008	30-Jan	Level I			Y
E160.3	1	N	360-20018-5	OC-SD-SD5	Percent Moisture	33		33		percent	1	11/19/2008		11/24/2008	30-Jan	Level I			Y
E160.3	1	N	360-20018-5	OC-SD-SD5	Percent Solids	67		67		percent	1	11/19/2008		11/24/2008	30-Jan	Level I			Y
SW6010	1	T	360-20018-5	OC-SD-SD5	Aluminum	11000		11000		mg/kg	1	11/19/2008	11/24/2008	11/25/2008	30-Jan	Level I			Y
SW6010	**1**	**T**	**360-20018-5**	**OC-SD-SD5**	**Chromium**	**340**	**J**	**340**		**mg/kg**	**1**	**11/19/2008**	**11/24/2008**	**11/25/2008**	30-Jan	Level I			**Y**
SW6010	1	T	360-20018-5	OC-SD-SD5	Iron	14000		14000		mg/kg	1	11/19/2008	11/24/2008	11/25/2008	30-Jan	Level I			Y
E300	1	N	360-20018-6	OC-GW-10S	Chloride	35		35		mg/l	1	11/19/2008		12/2/2008	30-Jan	Level I			Y
E300	2	N	360-20018-6	OC-GW-10S	Sulfate	120		120		mg/l	10	11/19/2008		12/2/2008	30-Jan	Level I			Y
LACH_107_06_1_B	1	N	360-20018-6	OC-GW-10S	Nitrogen, as Ammoni	8.8		8.8		mg/l	1	11/19/2008	11/28/2008	12/3/2008	30-Jan	Level I			Y
SM2510B	1	N	360-20018-6	OC-GW-10S	LAB SPECIFIC CONI	410		410		umhos/cn	1	11/19/2008		11/24/2008	30-Jan	Level I			Y
SW6010	1	D	360-20018-6	OC-GW-10S	Aluminum	3800		3800	B	ug/l	1	11/19/2008		11/24/2008	30-Jan	Level I			Y
SW6010	1	D	360-20018-6	OC-GW-10S	Chromium	5	U	5	U	ug/l	1	11/19/2008		11/24/2008	30-Jan	Level I			
E300	1	N	360-20018-7	OC-GW-24	Chloride	8		8		mg/l	1	11/19/2008		12/2/2008	30-Jan	Level I			Y
E300	1	N	360-20018-7	OC-GW-24	Sulfate	71		71		mg/l	1	11/19/2008		12/2/2008	30-Jan	Level I			Y
LACH_107_06_1_B	1	N	360-20018-7	OC-GW-24	Nitrogen, as Ammoni	52		52		mg/l	5	11/19/2008	11/28/2008	12/3/2008	30-Jan	Level I			Y
SM2510B	1	N	360-20018-7	OC-GW-24	LAB SPECIFIC CONI	400		400		umhos/cn	1	11/19/2008		11/24/2008	30-Jan	Level I			Y
SW6010	**1**	**D**	**360-20018-7**	**OC-GW-24**	**Aluminum**	**100**	**U**	**4.6**	**J B**	**ug/l**	**1**	**11/19/2008**		**11/24/2008**	30-Jan	Level I			
SW6010	1	D	360-20018-7	OC-GW-24	Chromium	5	U	5	U	ug/l	1	11/19/2008		11/24/2008	30-Jan	Level I			
E300	1	N	360-20018-8	OC-GW-39	Chloride	28		28		mg/l	1	11/19/2008		12/2/2008	30-Jan	Level I			Y
E300	2	N	360-20018-8	OC-GW-39	Sulfate	310		310		mg/l	10	11/19/2008		12/2/2008	30-Jan	Level I			Y
LACH_107_06_1_B	1	N	360-20018-8	OC-GW-39	Nitrogen, as Ammoni	0.15		0.15		mg/l	1	11/19/2008	11/28/2008	12/3/2008	30-Jan	Level I			Y
SM2510B	1	N	360-20018-8	OC-GW-39	LAB SPECIFIC CONI	730		730		umhos/cn	1	11/19/2008		11/24/2008	30-Jan	Level I			Y
SW6010	1	D	360-20018-8	OC-GW-39	Aluminum	130		130	B	ug/l	1	11/19/2008		11/24/2008	30-Jan	Level I			Y
SW6010	1	D	360-20018-8	OC-GW-39	Chromium	5	U	5	U	ug/l	1	11/19/2008		11/24/2008	30-Jan	Level I			

MACTEC

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To: Steve Morrow
From: Chris Ricardi
Date: January 30, 2009
Subject: 51 Eames Street Property Plant B Quarterly Groundwater November 2008

DATA VALIDATION REPORT
NOVEMBER 2008 PLANT B QUARTERLY GROUNDWATER
OLIN CHEMICAL SUPERFUND SITE
WILMINGTON, MASSACHUSETTS
TestAmerica Laboratories Data Set 360-20062-1

1.0 INTRODUCTION

Groundwater samples were collected from monitoring wells on-site on November 24, 2008 as specified for Plant B monitoring quarterly sampling in the Interim Response Step Work Plan (IRSWP) [MACTEC, 2007]. Samples were analyzed by TestAmerica Laboratories in Westfield, Massachusetts. Data were reported in sample delivery group (SDG) 360-20062-1. A summary of samples included in this review is contained in Table 1. Samples reviewed in this report were analyzed for the following USEPA SW-846 (USEPA, 1996), USEPA wastewater (USEPA, 1993), or Standard Methods (APHA, 1995), or Massachusetts Department of Environmental Protection (MA DEP, 2004a):

- Trimethylpentenes by Method 8260B
- Bis(2-ethylhexyl)phthalate and N-nitrosodiphenylamine (NDPA) by Method 8270C
- Volatile Petroleum Hydrocarbons (VPH) by MADEP MAVPH
- Total and dissolved Iron by Method 6010B
- General chemistry analyses for ammonia by EPA Method 350.1 (Lachat 10-107-06-1)
- pH by SM 4500 H+ B

The Olin Wilmington Quality Assurance Project Plan 1999 (QAPP) and the MADEP Compendium of Quality Assurance and Quality Control Requirements and Performance Standards for Selected Analytical Methods Used in Support of Response Actions for the Massachusetts Contingency Plan (MCP) (MADEP, 2004b) were used as references during the review. Analytical packages were reviewed using the Level 1 Data Quality Evaluation checklists that were developed for the Olin Wilmington annual and quarterly groundwater monitoring tasks. Final sample results are presented on data summaries in Table 2.

2.0 VOLATILE ORGANIC COMPOUNDS (VOC)

2,4,4 Trimethyl-1-pentene and 2,4,4 trimethyl-2-pentene were reported by Method 8260B. Data were reviewed for the following parameters:

* Data Completeness
* Holding Time
* Blanks
* Surrogate Recovery
* Laboratory Control Sample
* Detection Limits
* Sample Result Verification/Electronic Evaluation Verification

* = indicates that criteria were met for this parameter

3.0 SEMIVOLATILE ORGANIC COMPOUNDS (SVOC)

Bis(2-ethylhexyl)phthalate and n-nitrosodiphenylamine (NDPA) were reported by Method 8270C. Data were reviewed for the following parameters:

* Data Completeness
* Holding Time
* Blanks
* Surrogate Recovery
* Laboratory Control Sample
* Detection Limits
* Sample Result Verification/Electronic Evaluation Verification

* = indicates that criteria were met for this parameter

4.0 VOLATILE PETROLEUM HYDROCARBONS (VPH)

Data were reviewed for the following parameters:

* Data Completeness
* Holding Time
* Blanks
* Surrogate Recovery
* Laboratory Control Sample
* Detection Limits
* Sample Result Verification/Electronic Evaluation Verification

* = indicates that criteria were met for this parameter

5.0 METALS (TOTAL AND DISSOLVED IRON)

Data were reviewed for the following parameters:

* Data Completeness
* Holding Time
* Blanks
* Matrix Spike Analysis
* Laboratory Duplicate Analysis
* Laboratory Control Sample
* Detection Limits

  Sample Result Verification/Electronic Evaluation Verification

* = indicates that criteria were met for this parameter

Total and Dissolved Results

The dissolved iron concentration (10000 µg/L) was greater than ten percent higher than the total iron concentration (9000 µg/L) reported in sample OC-GW-101. Iron (total and dissolved) results in sample OC-GW-101 were qualified estimated (J) in the final data set.

6.0 GENERAL CHEMISTRY – Ammonia and pH

Data were reviewed for the following parameters:

* Data Completeness
  Holding Time
* Blanks
* Laboratory Duplicate Analysis
* Laboratory Control Sample
* Detection Limits
* Sample Result Verification/Electronic Evaluation Verification

* = indicates that criteria were met for this parameter

Holding Times

The hold time for pH is immediately upon arrival at the lab. Samples were collected on 11/24/08, received at the lab on 11/25/08 and analyzed on 11/26/08. The pH results for groundwater samples reported in SDG 360-20062-1 were qualified estimated (J) in the final results.

Except for the validation actions noted above, the results are interpreted to be usable as reported by TestAmerica.

Chris Ricardi

1/30/09

Chris Ricardi, NRCC-EAC
Senior Chemist

Date

M J Murphy

2/9/09

Michael Murphy
Project Principal

Date

Reference:

American Public Health Association (APHA), 1995. "Standard Methods for Examination of Water and Wastewater"; 19th Edition; APHA, 1015 Fifteenth St., NW., Washington, D.C. 20005.

LAW, August, 1999, "Final Quality Assurance Project Plan, Olin Wilmington Property, 51 Eames Street, Wilmington, MA", LAW Engineering and Environmental Services, Kennesaw, GA 30144.

Massachusetts Department of Environmental Protection (MADEP), May, 2004a. "Method for the Determination of Volatile Petroleum Hydrocarbons (VPH)"; Division of Environmental Analysis; Office of Research and Standards; Bureau of Waste Site Cleanup; Revision 1.1.

MADEP, May, 2004b. "The Compendium of Quality Assurance and Quality Control Requirements and Performance Standards for Selected Analytical Methods Used in Support of Response Actions for the Massachusetts Contingency Plan (MCP)"; Bureau of Waste Site Cleanup; 1 Winter Street, Boston, Massachusetts 02108; WSC-CAM.

U.S. Environmental Protection Agency (USEPA), 1993. "Methods for Chemical Analysis and Water and Wastes (MCAWW)", EPA/600/4-79-020 (March 1983) with updates and supplements EPA/600/4-91-010 (June 1991), EPA/600/R-92-129 (August 1992) and EPA/600/R-93-100 (August 1993).

USEPA, December, 1996. "Test Methods for Evaluating Solid Waste"; Laboratory Manual Physical/Chemical Methods; Office of Solid Waste and Emergency Response; Washington, DC; SW-846; November 1986; Revision 4.

Table 1 - NOVEMBER 2008 PLANT B QUARTERLY GROUNDWATER

				SW846 8260B	SW846 8270C	SW846 6010B Total	SW846 6010B Filtered	QuickChem 10-107-06-1-K	A4500	MA DEP MAVPH
Lab Sample ID	Location	Sample ID	Sample Date							
360-120062-1	GW-16R	OC-GW-16	11/24/2008	2	2	1	1	1	1	13
360-120062-2	IW-10	OC-IW-10	11/24/2008	2	2	1	1	1	1	13
360-120062-3	GW-13	OC-GW-13	11/24/2008	2	2	1	1	1	1	13
360-120062-4	IW-6	OC-IW-6	11/24/2008	2	2	1	1	1	1	13
360-120062-5	GW-101	OC-GW-101	11/24/2008	2	2	1	1	1	1	13
360-120062-6	B-03	OC-B-03	11/24/2008	2	2	1	1	1	1	13

Prepared by/ KJC
Date: 12/12/08
Checked by/ TLC
Date: 1/16/09

Notes:

Number listed under method indicates number of target analytes reported.

Table 2
Final Results Summary
360-20062 Plant B Quarterly Groundwater
Olin Chemical Superfund Site
Wilmington, Massachusetts

				B-03 OC-B-03 11/24/08 FS 360-20062-1		GW-101 OC-GW-101 11/24/08 FS 360-20062-1		GW-13 OC-GW-13 11/24/08 FS 360-20062-1		GW-16R OC-GW-16 11/24/08 FS 360-20062-1		IW-10 OC-IW-10 11/24/08 FS 360-20062-1		IW-6 OC-IW-6 11/24/08 FS 360-20062-1	
				final_result	final_qualifier	final_result	final_qualifier	final_result	final_qualifier	final_result	final_qualifier	final_result	final_qualifier	final_result	final_qualifier
N	SW846 8260B	2,4,4-Trimethyl-1-pentene	ug/l	1	U	160		1	U	1300		1	U	910	
N	SW846 8260B	2,4,4-Trimethyl-2-Pentene	ug/l	1	U	16		1	U	370		1	U	150	
N	SW846 8270C_LL	Bis(2-Ethylhexyl)phthalate	ug/l	4.3		350		2	U	0.59	J	2	U	0.88	J
N	SW846 8270C_LL	N-Nitrosodiphenylamine	ug/l	3	J	5.7		5.1	U	380		8.8		1.1	J
T	SW846 6010	Iron	ug/l	73	J	9000	J	150		2900		1900		10000	
F	SW846 6010	Iron	ug/l	100	U	10000	J	100	U	2600		230		8600	
N	A4500	pH	PH UNITS	5.9	J	6.42	J	5.75	J	6.64	J	7.41	J	6.32	J
N	LACH_107_06_1_B	Nitrogen, as Ammonia	mg/l	0.64		1.3		0.1	U	9.1		23		0.57	
N	MAVPH	Benzene	ug/l	5	U	5	U	5	U	25	U	5	U	5	U
N	MAVPH	Ethyl benzene	ug/l	5	U	5	U	5	U	25	U	5	U	5	U
N	MAVPH	Methyl Tertbutyl Ether	ug/l	5	U	5	U	5	U	25	U	5	U	5	U
N	MAVPH	Naphthalene	ug/l	10	U	10	U	10	U	50	U	10	U	10	U
N	MAVPH	o-Xylene	ug/l	5	U	5	U	5	U	25	U	5	U	21	
N	MAVPH	Toluene	ug/l	5	U	5	U	5	U	25	U	5	U	5	U
N	MAVPH	Xylene, m/p	ug/l	10	U	10	U	10	U	50	U	10	U	10	U
N	MAVPH	C5-C8 Aliphatics	ug/l	100	U	350		100	U	1400		100	U	1900	
N	MAVPH	C5-C8 Aliphatics (unadj.)	ug/l	100	U	350		100	U	1400		100	U	1900	
N	MAVPH	C9-C10 Aromatics	ug/l	100	U	100	U	100	U	500	U	100	U	100	U
N	MAVPH	C9-C12 Aliphatics	ug/l	100	U	100	U	100	U	500	U	100	U	110	
N	MAVPH	C9-C12 Aliphatics (unadj.)	ug/l	100	U	100	U	100	U	500	U	100	U	130	
N	MAVPH	Volatile Petroleum Hydrocarbc	ug/l	100	U	350		100	U	1400		100	U	2000	

Notes:
N = normal
T = total (unfiltered)
F = filtered
FS = field sample
U = not detected, value is the detection limit
J = value is estimated
ug/l = microgram per liter
mg/l = milligram per liter

Prepared by / Date: KJC 01/19/09
Checked by / Date: CSR 1/22/09

Olin Chemical
Plant Quarterly GW Plant B
November 2008 Samples
SDG 360-20062-1

analysis_m	run_	fract	lab_sample_id	field_sample_i	param_name	final_result	final_	lab_resu	lab_(	result_uom	dilution	field_sample_d	extraction_d	analysis_dat	validatio	validatic
A4500	**1**	**N**	**360-20062-1**	**OC-GW-16**	**pH**	**6.64**	**J**	**6.64**	**HF**	**PH UNITS**	**1**	**11/24/2008**		**11/26/2008**	**16-Jan**	**Tier_I**
A4500	**2**	**N**	**360-20062-1**	**OC-GW-16**	**pH**			**6.73**		**PH UNITS**	**1**	**11/24/2008**		**11/26/2008**	**16-Jan**	**Tier_I**
LACH_107	1	N	360-20062-1	OC-GW-16	Nitrogen, as Ammonia	9.1		9.1		mg/l	1	11/24/2008	12/3/2008	12/3/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-1	OC-GW-16	2,5-Dibromotoluene-FID	103		103		percent	5	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-1	OC-GW-16	2,5-Dibromotoluene-PID	123		123		percent	5	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-1	OC-GW-16	Benzene	25	U	25	U	ug/l	5	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-1	OC-GW-16	C5-C8 Aliphatics	1400		1400		ug/l	5	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-1	OC-GW-16	C5-C8 Aliphatics (unadj.)	1400		1400		ug/l	5	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-1	OC-GW-16	C9-C10 Aromatics	500	U	500	U	ug/l	5	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-1	OC-GW-16	C9-C12 Aliphatics	500	U	500	U	ug/l	5	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-1	OC-GW-16	C9-C12 Aliphatics (unadj.)	500	U	500	U	ug/l	5	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-1	OC-GW-16	Ethyl benzene	25	U	25	U	ug/l	5	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-1	OC-GW-16	Methyl Tertbutyl Ether	25	U	25	U	ug/l	5	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-1	OC-GW-16	Naphthalene	50	U	50	U	ug/l	5	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-1	OC-GW-16	o-Xylene	25	U	25	U	ug/l	5	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-1	OC-GW-16	Toluene	25	U	25	U	ug/l	5	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-1	OC-GW-16	Volatile Petroleum Hydrocarb	1400		1400		ug/l	5	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-1	OC-GW-16	Xylene, m/p	50	U	50	U	ug/l	5	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
SW6010	3	D	360-20062-1	OC-GW-16	Iron	91		91		percent	1	11/24/2008		11/26/2008	16-Jan	Tier_I
SW6010	1	T	360-20062-1	OC-GW-16	Iron	2900		2900		ug/l	1	11/24/2008	11/26/2008	11/26/2008	16-Jan	Tier_I
SW6010	**2**	**D**	**360-20062-1**	**OC-GW-16**	**Iron**			**2610**		**ug/l**	**1**	**11/24/2008**		**11/26/2008**	**16-Jan**	**Tier_I**
SW6010	1	D	360-20062-1	OC-GW-16	Iron	2600		2600		ug/l	1	11/24/2008		11/26/2008	16-Jan	Tier_I
SW8260	1	N	360-20062-1	OC-GW-16	2,4,4-Trimethyl-1-pentene	1300		1300		ug/l	10	11/24/2008	12/1/2008	12/1/2008	16-Jan	Tier_I
SW8260	1	N	360-20062-1	OC-GW-16	2,4,4-Trimethyl-2-Pentene	370		370		ug/l	10	11/24/2008	12/1/2008	12/1/2008	16-Jan	Tier_I
SW8260	1	N	360-20062-1	OC-GW-16	4-Bromofluorobenzene	106		106		percent	10	11/24/2008	12/1/2008	12/1/2008	16-Jan	Tier_I
SW8260	1	N	360-20062-1	OC-GW-16	Dibromofluoromethane	97		97		percent	10	11/24/2008	12/1/2008	12/1/2008	16-Jan	Tier_I
SW8260	1	N	360-20062-1	OC-GW-16	Toluene-d8	99		99		percent	10	11/24/2008	12/1/2008	12/1/2008	16-Jan	Tier_I
SW8270	1	N	360-20062-1	OC-GW-16	2,4,6-Tribromophenol	82		82		percent	1	11/24/2008	12/1/2008	12/2/2008	16-Jan	Tier_I
SW8270	1	N	360-20062-1	OC-GW-16	2-Fluorobiphenyl	69		69		percent	1	11/24/2008	12/1/2008	12/2/2008	16-Jan	Tier_I
SW8270	1	N	360-20062-1	OC-GW-16	2-Fluorophenol	25		25		percent	1	11/24/2008	12/1/2008	12/2/2008	16-Jan	Tier_I
SW8270	1	N	360-20062-1	OC-GW-16	Bis(2-Ethylhexyl)phthalate	0.59	J	0.59	J *	ug/l	1	11/24/2008	12/1/2008	12/2/2008	16-Jan	Tier_I
SW8270	1	N	360-20062-1	OC-GW-16	Nitrobenzene-d5	61		61		percent	1	11/24/2008	12/1/2008	12/2/2008	16-Jan	Tier_I
SW8270	2	N	360-20062-1	OC-GW-16	N-Nitrosodiphenylamine	380		380		ug/l	20	11/24/2008	12/1/2008	12/3/2008	16-Jan	Tier_I
SW8270	1	N	360-20062-1	OC-GW-16	Phenol-d5	14	X	14	X	percent	1	11/24/2008	12/1/2008	12/2/2008	16-Jan	Tier_I
SW8270	1	N	360-20062-1	OC-GW-16	p-Terphenyl-d14	71		71		percent	1	11/24/2008	12/1/2008	12/2/2008	16-Jan	Tier_I
A4500	**1**	**N**	**360-20062-2**	**OC-IW-10**	**pH**	**7.41**	**J**	**7.41**	**HF**	**PH UNITS**	**1**	**11/24/2008**		**11/26/2008**	**16-Jan**	**Tier_I**
LACH_107	1	N	360-20062-2	OC-IW-10	Nitrogen, as Ammonia	23		23		mg/l	2	11/24/2008	12/3/2008	12/3/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-2	OC-IW-10	2,5-Dibromotoluene-FID	102		102		percent	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-2	OC-IW-10	2,5-Dibromotoluene-PID	121		121		percent	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-2	OC-IW-10	Benzene	5	U	5	U	ug/l	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-2	OC-IW-10	C5-C8 Aliphatics	100	U	100	U	ug/l	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I

Olin Chemical
Plant Quarterly GW Plant B
November 2008 Samples
SDG 360-20062-1

analysis_m	run_	fract	lab_sample_id	field_sample_i	param_name	final_result	final_	lab_resu	lab_	result_uom	dilution	field_sample_c	extraction_c	analysis_dat	validatio	validati
MAVPH	1	N	360-20062-2	OC-IW-10	C5-C8 Aliphatics (unadj.)	100	U	100	U	ug/l	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-2	OC-IW-10	C9-C10 Aromatics	100	U	100	U	ug/l	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-2	OC-IW-10	C9-C12 Aliphatics	100	U	100	U	ug/l	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-2	OC-IW-10	C9-C12 Aliphatics (unadj.)	100	U	100	U	ug/l	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-2	OC-IW-10	Ethyl benzene	5	U	5	U	ug/l	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-2	OC-IW-10	Methyl Tertbutyl Ether	5	U	5	U	ug/l	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-2	OC-IW-10	Naphthalene	10	U	10	U	ug/l	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-2	OC-IW-10	o-Xylene	5	U	5	U	ug/l	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-2	OC-IW-10	Toluene	5	U	5	U	ug/l	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-2	OC-IW-10	Volatile Petroleum Hydrocarb	100	U	100	U	ug/l	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-2	OC-IW-10	Xylene, m/p	10	U	10	U	ug/l	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
SW6010	1	D	360-20062-2	OC-IW-10	Iron	230		230		ug/l	1	11/24/2008		11/26/2008	16-Jan	Tier_I
SW6010	1	T	360-20062-2	OC-IW-10	Iron	1900		1900		ug/l	1	11/24/2008	11/26/2008	11/26/2008	16-Jan	Tier_I
SW8260	1	N	360-20062-2	OC-IW-10	2,4,4-Trimethyl-1-pentene	1	U	1	U	ug/l	1	11/24/2008	12/1/2008	12/1/2008	16-Jan	Tier_I
SW8260	1	N	360-20062-2	OC-IW-10	2,4,4-Trimethyl-2-Pentene	1	U	1	U	ug/l	1	11/24/2008	12/1/2008	12/1/2008	16-Jan	Tier_I
SW8260	1	N	360-20062-2	OC-IW-10	4-Bromofluorobenzene	100		100		percent	1	11/24/2008	12/1/2008	12/1/2008	16-Jan	Tier_I
SW8260	1	N	360-20062-2	OC-IW-10	Dibromofluoromethane	101		101		percent	1	11/24/2008	12/1/2008	12/1/2008	16-Jan	Tier_I
SW8260	1	N	360-20062-2	OC-IW-10	Toluene-d8	100		100		percent	1	11/24/2008	12/1/2008	12/1/2008	16-Jan	Tier_I
SW8270	1	N	360-20062-2	OC-IW-10	2,4,6-Tribromophenol	79		79		percent	1	11/24/2008	12/1/2008	12/2/2008	16-Jan	Tier_I
SW8270	1	N	360-20062-2	OC-IW-10	2-Fluorobiphenyl	70		70		percent	1	11/24/2008	12/1/2008	12/2/2008	16-Jan	Tier_I
SW8270	1	N	360-20062-2	OC-IW-10	2-Fluorophenol	23		23		percent	1	11/24/2008	12/1/2008	12/2/2008	16-Jan	Tier_I
SW8270	1	N	360-20062-2	OC-IW-10	Bis(2-Ethylhexyl)phthalate	2	U	2	U *	ug/l	1	11/24/2008	12/1/2008	12/2/2008	16-Jan	Tier_I
SW8270	1	N	360-20062-2	OC-IW-10	Nitrobenzene-d5	60		60		percent	1	11/24/2008	12/1/2008	12/2/2008	16-Jan	Tier_I
SW8270	1	N	360-20062-2	OC-IW-10	N-Nitrosodiphenylamine	8.8		8.8		ug/l	1	11/24/2008	12/1/2008	12/2/2008	16-Jan	Tier_I
SW8270	1	N	360-20062-2	OC-IW-10	Phenol-d5	13	X	13	X	percent	1	11/24/2008	12/1/2008	12/2/2008	16-Jan	Tier_I
SW8270	1	N	360-20062-2	OC-IW-10	p-Terphenyl-d14	73		73		percent	1	11/24/2008	12/1/2008	12/2/2008	16-Jan	Tier_I
A4500	**1**	**N**	**360-20062-3**	**OC-GW-13**	**pH**	**5.75**	**J**	**5.75**	**HF**	**PH UNITS**	**1**	**11/24/2008**		**11/26/2008**	**16-Jan**	**Tier_I**
LACH_107	1	N	360-20062-3	OC-GW-13	Nitrogen, as Ammonia	0.1	U	0.1	U	mg/l	1	11/24/2008	12/3/2008	12/3/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-3	OC-GW-13	2,5-Dibromotoluene-FID	102		102		percent	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-3	OC-GW-13	2,5-Dibromotoluene-PID	122		122		percent	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-3	OC-GW-13	Benzene	5	U	5	U	ug/l	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-3	OC-GW-13	C5-C8 Aliphatics	100	U	100	U	ug/l	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-3	OC-GW-13	C5-C8 Aliphatics (unadj.)	100	U	100	U	ug/l	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-3	OC-GW-13	C9-C10 Aromatics	100	U	100	U	ug/l	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-3	OC-GW-13	C9-C12 Aliphatics	100	U	100	U	ug/l	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-3	OC-GW-13	C9-C12 Aliphatics (unadj.)	100	U	100	U	ug/l	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-3	OC-GW-13	Ethyl benzene	5	U	5	U	ug/l	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-3	OC-GW-13	Methyl Tertbutyl Ether	5	U	5	U	ug/l	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-3	OC-GW-13	Naphthalene	10	U	10	U	ug/l	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-3	OC-GW-13	o-Xylene	5	U	5	U	ug/l	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-3	OC-GW-13	Toluene	5	U	5	U	ug/l	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I

analysis_m	run_	fract	lab_sample_id	field_sample_i	param_name	final_result	final_	lab_resu	lab_	result_uom	dilution	field_sample_c	extraction_c	analysis_dat	validatio	validatic
MAVPH	1	N	360-20062-3	OC-GW-13	Volatile Petroleum Hydrocarb	100	U	100	U	ug/l	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-3	OC-GW-13	Xylene, m/p	10	U	10	U	ug/l	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
SW6010	1	T	360-20062-3	OC-GW-13	Iron	150		150		ug/l	1	11/24/2008	11/26/2008	11/26/2008	16-Jan	Tier_I
SW6010	1	D	360-20062-3	OC-GW-13	Iron	100	U	100	U	ug/l	1	11/24/2008		11/26/2008	16-Jan	Tier_I
SW8260	1	N	360-20062-3	OC-GW-13	2,4,4-Trimethyl-1-pentene	1	U	1	U	ug/l	1	11/24/2008	12/1/2008	12/1/2008	16-Jan	Tier_I
SW8260	1	N	360-20062-3	OC-GW-13	2,4,4-Trimethyl-2-Pentene	1	U	1	U	ug/l	1	11/24/2008	12/1/2008	12/1/2008	16-Jan	Tier_I
SW8260	1	N	360-20062-3	OC-GW-13	4-Bromofluorobenzene	98		98		percent	1	11/24/2008	12/1/2008	12/1/2008	16-Jan	Tier_I
SW8260	1	N	360-20062-3	OC-GW-13	Dibromofluoromethane	101		101		percent	1	11/24/2008	12/1/2008	12/1/2008	16-Jan	Tier_I
SW8260	1	N	360-20062-3	OC-GW-13	Toluene-d8	99		99		percent	1	11/24/2008	12/1/2008	12/1/2008	16-Jan	Tier_I
SW8270	1	N	360-20062-3	OC-GW-13	2,4,6-Tribromophenol	80		80		percent	1	11/24/2008	12/1/2008	12/2/2008	16-Jan	Tier_I
SW8270	1	N	360-20062-3	OC-GW-13	2-Fluorobiphenyl	71		71		percent	1	11/24/2008	12/1/2008	12/2/2008	16-Jan	Tier_I
SW8270	1	N	360-20062-3	OC-GW-13	2-Fluorophenol	26		26		percent	1	11/24/2008	12/1/2008	12/2/2008	16-Jan	Tier_I
SW8270	1	N	360-20062-3	OC-GW-13	Bis(2-Ethylhexyl)phthalate	2	U	2	U *	ug/l	1	11/24/2008	12/1/2008	12/2/2008	16-Jan	Tier_I
SW8270	1	N	360-20062-3	OC-GW-13	Nitrobenzene-d5	67		67		percent	1	11/24/2008	12/1/2008	12/2/2008	16-Jan	Tier_I
SW8270	1	N	360-20062-3	OC-GW-13	N-Nitrosodiphenylamine	5.1	U	5.1	U	ug/l	1	11/24/2008	12/1/2008	12/2/2008	16-Jan	Tier_I
SW8270	1	N	360-20062-3	OC-GW-13	Phenol-d5	14	X	14	X	percent	1	11/24/2008	12/1/2008	12/2/2008	16-Jan	Tier_I
SW8270	1	N	360-20062-3	OC-GW-13	p-Terphenyl-d14	71		71		percent	1	11/24/2008	12/1/2008	12/2/2008	16-Jan	Tier_I
A4500	**1**	**N**	**360-20062-4**	**OC-IW-6**	**pH**	**6.32**	**J**	**6.32**	**HF**	**PH UNITS**	**1**	**11/24/2008**		**11/26/2008**	**16-Jan**	**Tier_I**
LACH_107	1	N	360-20062-4	OC-IW-6	Nitrogen, as Ammonia	0.57		0.57		mg/l	1	11/24/2008	12/3/2008	12/3/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-4	OC-IW-6	2,5-Dibromotoluene-FID	104		104		percent	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-4	OC-IW-6	2,5-Dibromotoluene-PID	114		114		percent	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-4	OC-IW-6	Benzene	5	U	5	U	ug/l	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-4	OC-IW-6	C5-C8 Aliphatics	1900		1900		ug/l	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-4	OC-IW-6	C5-C8 Aliphatics (unadj.)	1900		1900		ug/l	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-4	OC-IW-6	C9-C10 Aromatics	100	U	100	U	ug/l	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-4	OC-IW-6	C9-C12 Aliphatics	110		110		ug/l	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-4	OC-IW-6	C9-C12 Aliphatics (unadj.)	130		130		ug/l	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-4	OC-IW-6	Ethyl benzene	5	U	5	U	ug/l	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-4	OC-IW-6	Methyl Tertbutyl Ether	5	U	5	U	ug/l	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-4	OC-IW-6	Naphthalene	10	U	10	U	ug/l	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-4	OC-IW-6	o-Xylene	21		21		ug/l	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-4	OC-IW-6	Toluene	5	U	5	U	ug/l	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-4	OC-IW-6	Volatile Petroleum Hydrocarb	2000		2000		ug/l	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-4	OC-IW-6	Xylene, m/p	10	U	10	U	ug/l	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
SW6010	1	T	360-20062-4	OC-IW-6	Iron	10000		10000		ug/l	1	11/24/2008	11/26/2008	11/26/2008	16-Jan	Tier_I
SW6010	1	D	360-20062-4	OC-IW-6	Iron	8600		8600		ug/l	1	11/24/2008		11/26/2008	16-Jan	Tier_I
SW8260	2	N	360-20062-4	OC-IW-6	2,4,4-Trimethyl-1-pentene	910		910		ug/l	20	11/24/2008	12/5/2008	12/5/2008	16-Jan	Tier_I
SW8260	1	N	360-20062-4	OC-IW-6	2,4,4-Trimethyl-2-Pentene	150		150		ug/l	5	11/24/2008	12/1/2008	12/1/2008	16-Jan	Tier_I
SW8260	1	N	360-20062-4	OC-IW-6	4-Bromofluorobenzene	110		110		percent	5	11/24/2008	12/1/2008	12/1/2008	16-Jan	Tier_I
SW8260	2	N	360-20062-4	OC-IW-6	4-Bromofluorobenzene	118		118		percent	20	11/24/2008	12/5/2008	12/5/2008	16-Jan	Tier_I
SW8260	2	N	360-20062-4	OC-IW-6	Dibromofluoromethane	115		115		percent	20	11/24/2008	12/5/2008	12/5/2008	16-Jan	Tier_I

analysis_m	run_	fract	lab_sample_id	field_sample_i	param_name	final_result	final_	lab_resu	lab_(	result_uom	dilution	field_sample_d	extraction_d	analysis_dat	validatio	validati
SW8260	1	N	360-20062-4	OC-IW-6	Dibromofluoromethane	95		95		percent	5	11/24/2008	12/1/2008	12/1/2008	16-Jan	Tier_I
SW8260	1	N	360-20062-4	OC-IW-6	Toluene-d8	97		97		percent	5	11/24/2008	12/1/2008	12/1/2008	16-Jan	Tier_I
SW8260	2	N	360-20062-4	OC-IW-6	Toluene-d8	75		75		percent	20	11/24/2008	12/5/2008	12/5/2008	16-Jan	Tier_I
SW8270	1	N	360-20062-4	OC-IW-6	2,4,6-Tribromophenol	82		82		percent	1	11/24/2008	12/1/2008	12/2/2008	16-Jan	Tier_I
SW8270	1	N	360-20062-4	OC-IW-6	2-Fluorobiphenyl	76		76		percent	1	11/24/2008	12/1/2008	12/2/2008	16-Jan	Tier_I
SW8270	1	N	360-20062-4	OC-IW-6	2-Fluorophenol	28		28		percent	1	11/24/2008	12/1/2008	12/2/2008	16-Jan	Tier_I
SW8270	1	N	360-20062-4	OC-IW-6	Bis(2-Ethylhexyl)phthalate	0.88	J	0.88	J *	ug/l	1	11/24/2008	12/1/2008	12/2/2008	16-Jan	Tier_I
SW8270	1	N	360-20062-4	OC-IW-6	Nitrobenzene-d5	73		73		percent	1	11/24/2008	12/1/2008	12/2/2008	16-Jan	Tier_I
SW8270	1	N	360-20062-4	OC-IW-6	N-Nitrosodiphenylamine	1.1	J	1.1	J	ug/l	1	11/24/2008	12/1/2008	12/2/2008	16-Jan	Tier_I
SW8270	1	N	360-20062-4	OC-IW-6	Phenol-d5	15		15		percent	1	11/24/2008	12/1/2008	12/2/2008	16-Jan	Tier_I
SW8270	1	N	360-20062-4	OC-IW-6	p-Terphenyl-d14	80		80		percent	1	11/24/2008	12/1/2008	12/2/2008	16-Jan	Tier_I
A4500	**1**	**N**	**360-20062-5**	**OC-GW-101**	**pH**	**6.42**	**J**	**6.42**	**HF**	**PH UNITS**	**1**	**11/24/2008**		**11/26/2008**	**16-Jan**	**Tier_I**
LACH_107	1	N	360-20062-5	OC-GW-101	Nitrogen, as Ammonia	1.3		1.3		mg/l	1	11/24/2008	12/3/2008	12/3/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-5	OC-GW-101	2,5-Dibromotoluene-FID	103		103		percent	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-5	OC-GW-101	2,5-Dibromotoluene-PID	121		121		percent	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-5	OC-GW-101	Benzene	5	U	5	U	ug/l	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-5	OC-GW-101	C5-C8 Aliphatics	350		350		ug/l	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-5	OC-GW-101	C5-C8 Aliphatics (unadj.)	350		350		ug/l	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-5	OC-GW-101	C9-C10 Aromatics	100	U	100	U	ug/l	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-5	OC-GW-101	C9-C12 Aliphatics	100	U	100	U	ug/l	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-5	OC-GW-101	C9-C12 Aliphatics (unadj.)	100	U	100	U	ug/l	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-5	OC-GW-101	Ethyl benzene	5	U	5	U	ug/l	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-5	OC-GW-101	Methyl Tertbutyl Ether	5	U	5	U	ug/l	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-5	OC-GW-101	Naphthalene	10	U	10	U	ug/l	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-5	OC-GW-101	o-Xylene	5	U	5	U	ug/l	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-5	OC-GW-101	Toluene	5	U	5	U	ug/l	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-5	OC-GW-101	Volatile Petroleum Hydrocarb	350		350		ug/l	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-5	OC-GW-101	Xylene, m/p	10	U	10	U	ug/l	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
SW6010	**1**	**T**	**360-20062-5**	**OC-GW-101**	**Iron**	**9000**	**J**	**9000**		**ug/l**	**1**	**11/24/2008**	**11/26/2008**	**11/26/2008**	**16-Jan**	**Tier_I**
SW6010	**1**	**D**	**360-20062-5**	**OC-GW-101**	**Iron**	**10000**	**J**	**10000**		**ug/l**	**1**	**11/24/2008**		**11/26/2008**	**16-Jan**	**Tier_I**
SW8260	1	N	360-20062-5	OC-GW-101	2,4,4-Trimethyl-1-pentene	160		160		ug/l	1	11/24/2008	12/1/2008	12/1/2008	16-Jan	Tier_I
SW8260	1	N	360-20062-5	OC-GW-101	2,4,4-Trimethyl-2-Pentene	16		16		ug/l	1	11/24/2008	12/1/2008	12/1/2008	16-Jan	Tier_I
SW8260	1	N	360-20062-5	OC-GW-101	4-Bromofluorobenzene	107		107		percent	1	11/24/2008	12/1/2008	12/1/2008	16-Jan	Tier_I
SW8260	1	N	360-20062-5	OC-GW-101	Dibromofluoromethane	96		96		percent	1	11/24/2008	12/1/2008	12/1/2008	16-Jan	Tier_I
SW8260	1	N	360-20062-5	OC-GW-101	Toluene-d8	95		95		percent	1	11/24/2008	12/1/2008	12/1/2008	16-Jan	Tier_I
SW8270	1	N	360-20062-5	OC-GW-101	2,4,6-Tribromophenol	84		84		percent	1	11/24/2008	12/1/2008	12/2/2008	16-Jan	Tier_I
SW8270	1	N	360-20062-5	OC-GW-101	2-Fluorobiphenyl	68		68		percent	1	11/24/2008	12/1/2008	12/2/2008	16-Jan	Tier_I
SW8270	1	N	360-20062-5	OC-GW-101	2-Fluorophenol	24		24		percent	1	11/24/2008	12/1/2008	12/2/2008	16-Jan	Tier_I
SW8270	2	N	360-20062-5	OC-GW-101	Bis(2-Ethylhexyl)phthalate	350		350	*	ug/l	20	11/24/2008	12/1/2008	12/3/2008	16-Jan	Tier_I
SW8270	1	N	360-20062-5	OC-GW-101	Nitrobenzene-d5	65		65		percent	1	11/24/2008	12/1/2008	12/2/2008	16-Jan	Tier_I
SW8270	1	N	360-20062-5	OC-GW-101	N-Nitrosodiphenylamine	5.7		5.7		ug/l	1	11/24/2008	12/1/2008	12/2/2008	16-Jan	Tier_I

Olin Chemical
Plant Quarterly GW Plant B
November 2008 Samples
SDG 360-20062-1

analysis_m	run_	fract	lab_sample_id	field_sample_i	param_name	final_result	final_	lab_resu	lab_(	result_uom	dilution	field_sample_c	extraction_c	analysis_dat	validatio	validatic
SW8270	1	N	360-20062-5	OC-GW-101	Phenol-d5	13	X	13	X	percent	1	11/24/2008	12/1/2008	12/2/2008	16-Jan	Tier_I
SW8270	1	N	360-20062-5	OC-GW-101	p-Terphenyl-d14	72		72		percent	1	11/24/2008	12/1/2008	12/2/2008	16-Jan	Tier_I
A4500	**1**	**N**	**360-20062-6**	**OC-B-03**	**pH**	**5.9**	**J**	**5.9**	**HF**	**PH UNITS**	**1**	**11/24/2008**		**11/26/2008**	**16-Jan**	**Tier_I**
LACH_107	1	N	360-20062-6	OC-B-03	Nitrogen, as Ammonia	0.64		0.64		mg/l	1	11/24/2008	12/3/2008	12/3/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-6	OC-B-03	2,5-Dibromotoluene-FID	104		104		percent	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-6	OC-B-03	2,5-Dibromotoluene-PID	122		122		percent	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-6	OC-B-03	Benzene	5	U	5	U	ug/l	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-6	OC-B-03	C5-C8 Aliphatics	100	U	100	U	ug/l	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-6	OC-B-03	C5-C8 Aliphatics (unadj.)	100	U	100	U	ug/l	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-6	OC-B-03	C9-C10 Aromatics	100	U	100	U	ug/l	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-6	OC-B-03	C9-C12 Aliphatics	100	U	100	U	ug/l	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-6	OC-B-03	C9-C12 Aliphatics (unadj.)	100	U	100	U	ug/l	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-6	OC-B-03	Ethyl benzene	5	U	5	U	ug/l	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-6	OC-B-03	Methyl Tertbutyl Ether	5	U	5	U	ug/l	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-6	OC-B-03	Naphthalene	10	U	10	U	ug/l	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-6	OC-B-03	o-Xylene	5	U	5	U	ug/l	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-6	OC-B-03	Toluene	5	U	5	U	ug/l	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-6	OC-B-03	Volatile Petroleum Hydrocarb	100	U	100	U	ug/l	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
MAVPH	1	N	360-20062-6	OC-B-03	Xylene, m/p	10	U	10	U	ug/l	1	11/24/2008	12/2/2008	12/2/2008	16-Jan	Tier_I
SW6010	1	D	360-20062-6	OC-B-03	Iron	100	U	100	U	ug/l	1	11/24/2008		11/26/2008	16-Jan	Tier_I
SW6010	1	T	360-20062-6	OC-B-03	Iron	73	J	73	J	ug/l	1	11/24/2008	11/26/2008	11/26/2008	16-Jan	Tier_I
SW8260	1	N	360-20062-6	OC-B-03	2,4,4-Trimethyl-1-pentene	1	U	1	U	ug/l	1	11/24/2008	12/5/2008	12/5/2008	16-Jan	Tier_I
SW8260	1	N	360-20062-6	OC-B-03	2,4,4-Trimethyl-2-Pentene	1	U	1	U *	ug/l	1	11/24/2008	12/5/2008	12/5/2008	16-Jan	Tier_I
SW8260	1	N	360-20062-6	OC-B-03	4-Bromofluorobenzene	103		103		percent	1	11/24/2008	12/5/2008	12/5/2008	16-Jan	Tier_I
SW8260	1	N	360-20062-6	OC-B-03	Dibromofluoromethane	137	X	137	X	percent	1	11/24/2008	12/5/2008	12/5/2008	16-Jan	Tier_I
SW8260	1	N	360-20062-6	OC-B-03	Toluene-d8	88		88		percent	1	11/24/2008	12/5/2008	12/5/2008	16-Jan	Tier_I
SW8270	1	N	360-20062-6	OC-B-03	2,4,6-Tribromophenol	75		75		percent	1	11/24/2008	12/1/2008	12/2/2008	16-Jan	Tier_I
SW8270	1	N	360-20062-6	OC-B-03	2-Fluorobiphenyl	68		68		percent	1	11/24/2008	12/1/2008	12/2/2008	16-Jan	Tier_I
SW8270	1	N	360-20062-6	OC-B-03	2-Fluorophenol	24		24		percent	1	11/24/2008	12/1/2008	12/2/2008	16-Jan	Tier_I
SW8270	1	N	360-20062-6	OC-B-03	Bis(2-Ethylhexyl)phthalate	4.3		4.3	*	ug/l	1	11/24/2008	12/1/2008	12/2/2008	16-Jan	Tier_I
SW8270	1	N	360-20062-6	OC-B-03	Nitrobenzene-d5	59		59		percent	1	11/24/2008	12/1/2008	12/2/2008	16-Jan	Tier_I
SW8270	1	N	360-20062-6	OC-B-03	N-Nitrosodiphenylamine	3	J	3	J	ug/l	1	11/24/2008	12/1/2008	12/2/2008	16-Jan	Tier_I
SW8270	1	N	360-20062-6	OC-B-03	Phenol-d5	13	X	13	X	percent	1	11/24/2008	12/1/2008	12/2/2008	16-Jan	Tier_I
SW8270	1	N	360-20062-6	OC-B-03	p-Terphenyl-d14	65		65		percent	1	11/24/2008	12/1/2008	12/2/2008	16-Jan	Tier_I

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TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

Job Number: 360-20062-1

Job Description: Plant B

For:
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Attention: Mr. Steven Morrow

CHECKED FOR COMPLETENESS
OF PARAMETERS ORDERED BY:

Approved for release.
Joe Chimi
Report Production Representative
12/10/08 8:59 AM

Designee for
Becky C Mason
Project Manager II
becky.mason@testamericainc.com
12/10/2008

The test results in this report meet all NELAP requirements for accredited parameters. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced except in full, and with written approval from the laboratory.
TestAmerica Westfield Certifications and Approvals: MADEP MA014, RIDOH57, CTDPH 0494, VT DECWSD, NH DES 2539, NELAP FL E87912 TOX, NELAP NJ MA008 TOX, NELAP NY 10843, NY DOH 10843.

Field sampling is performed under SOPs WE-FLD-001 and WE-FLD-002

TestAmerica Laboratories, Inc.
TestAmerica Westfield Westfield Executive Park, 53 Southampton Road, Westfield, MA 01085
Tel (413) 572-4000 Fax (413) 572-3707 www.testamericainc.com

ACCREDITED IN ACCORDANCE WITH nelac

Table of Contents

Cover Title Page 1
Report Narrative 3
Method Summary 11
Method / Analyst Summary 12
Sample Summary 13
Sample Results 14
Sample Datasheets 15
Data Qualifiers 27
QC Results 28
Qc Association Summary 29
Qc Reports 33
Shipping and Receiving Documents 44
Sample Receipt Checklist 46
Client Chain of Custody 47

MADEP MCP Analytical Method Report Certification Form

Laboratory Name:	**TestAmerica Westfield**	Project #:	**360-20062-1**
Project Location:	**Plant B**	MADEP RTN[1]:	

This form provides certifications for the following data set:[list Laboratory Sample ID Number(s)]
360-20062-(1-6)

Sample Matrices: **Groundwater** Soil/Sediment Drinking Water Other:

MCP SW-846 Methods Used	8260B(**x**)	8151A ( )	8330 ( )	6010B ( )	7470A/1A ( )	Other ( )
	8270C( )	8081A ( )	VPH ( )	6020 ( )	9014M[2]/9012 ( )	
As specified in MADEP Compendium of Analytical Methods. (check all that apply)	8082 ( )	8021B ( )	EPH ( )	7000 S[3]( )	7196A ( )	

1 List Release Tracking Number (RTN), if known
2 M - SW-846 Method 9014 or MADEP Physiologically Available Cyanide (PAC) Method
3 S - SW-846 Methods 7000 Series List individual method and analyte.

An affirmative response to questions A, B, C and D is required for "Presumptive Certainty" status

A	Were all samples received by the laboratory in a condition consistent with that described on the Chain-of-Custody documentation for the data set?	Yes √		No[1]
B	Were all QA/QC procedures required for the specified analytical method(s) included in this report followed, including the requirement to note and discuss in a narrative QC data that did not meet appropriate performance standards or guidelines?	Yes √		No[1]
C	Does the analytical data included in this report meet all the requirements for "Presumptive Certainty", as described in Section 2.0 (a), (b), (c) and (d) of the MADEP document CAM VII A, " Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	Yes √	N/A	No[1]
D	**VPH and EPH methods only:** Was the VPH or EPH Method conducted without significant modifications (see Section 11.3 of respective Methods)?	Yes	N/A √	No[1]

A response to questions E and F below is required for "Presumptive Certainty" status

E	Were all QC performance standards and recommendations for the specified methods achieved?	Yes		No[1] √
F	Were results for all analyte-list compounds/elements for the specified method(s) reported?	Yes	N/A	No[1] √

[1] All Negative responses must be addressed in an attached Environmental Laboratory case narrative.

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.

Signature: **Position:** Technical Manager

Printed Name: James Wickham **Date:** 12/10/08 8:40

The certification form has been electronically signed and approved. CAM VII A, Rev 3.2 April-04

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Project Location:	**Plant B**	MADEP RTN[1]:	

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360-20062-(1-6)

Sample Matrices: **Groundwater** Soil/Sediment Drinking Water Other:

MCP SW-846 Methods Used	8260B( )	8151A ( )	8330 ( )	6010B ( )	7470A/1A ( )	Other ( )
	8270C( )	8081A ( )	VPH (**x**)	6020 ( )	9014M[2]/9012 ( )	
As specified in MADEP Compendium of Analytical Methods. (check all that apply)	8082 ( )	8021B ( )	EPH ( )	7000 S[3]( )	7196A ( )	

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D	**VPH and EPH methods only:** Was the VPH or EPH Method conducted without significant modifications (see Section 11.3 of respective Methods)?	Yes √	N/A	No[1]

A response to questions E and F below is required for "Presumptive Certainty" status

E	Were all QC performance standards and recommendations for the specified methods achieved?	Yes √		No[1]
F	Were results for all analyte-list compounds/elements for the specified method(s) reported?	Yes √	N/A	No[1]

[1] All Negative responses must be addressed in an attached Environmental Laboratory case narrative.

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.

Signature: **Position:** Technical Manager

Printed Name: James Wickham **Date:** 12/10/08 8:40

The certification form has been electronically signed and approved. CAM VII A, Rev 3.2 April-04

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Project Location:	**Plant B**	MADEP RTN[1]:	

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MCP SW-846 Methods Used	8260B( )	8151A ( )	8330 ( )	6010B ( )	7470A/1A ( )	Other ( )
	8270C(**x**)	8081A ( )	VPH ( )	6020 ( )	9014M[2]/9012 ( )	
As specified in MADEP Compendium of Analytical Methods. (check all that apply)	8082 ( )	8021B ( )	EPH ( )	7000 S[3]( )	7196A ( )	

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D	**VPH and EPH methods only:** Was the VPH or EPH Method conducted without significant modifications (see Section 11.3 of respective Methods)?	Yes	N/A √	No[1]

A response to questions E and F below is required for "Presumptive Certainty" status

E	Were all QC performance standards and recommendations for the specified methods achieved?	Yes		No[1] √
F	Were results for all analyte-list compounds/elements for the specified method(s) reported?	Yes	N/A	No[1] √

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Signature: **Position:** Technical Manager

Printed Name: James Wickham **Date:** 12/10/08 8:40

The certification form has been electronically signed and approved. CAM VII A, Rev 3.2 April-04

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360-20062-(1-6)

Sample Matrices: **Groundwater** Soil/Sediment Drinking Water Other:

MCP SW-846 Methods Used	8260B( )	8151A ( )	8330 ( )	6010B (**x**)	7470A/1A ( )	Other ( )
	8270C( )	8081A ( )	VPH ( )	6020 ( )	9014M[2]/9012 ( )	
As specified in MADEP Compendium of Analytical Methods. (check all that apply)	8082 ( )	8021B ( )	EPH ( )	7000 S[3]( )	7196A ( )	

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D	**VPH and EPH methods only:** Was the VPH or EPH Method conducted without significant modifications (see Section 11.3 of respective Methods)?	Yes	N/A √	No[1]

A response to questions E and F below is required for "Presumptive Certainty" status

E	Were all QC performance standards and recommendations for the specified methods achieved?	Yes √		No[1]
F	Were results for all analyte-list compounds/elements for the specified method(s) reported?	Yes	N/A	No[1] √

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Signature: **Position:** Technical Manager

Printed Name: James Wickham **Date:** 12/10/08 8:40

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Project Location:	**Plant B**	MADEP RTN[1]:	

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360-20062-(1-6)

Sample Matrices: **Groundwater** Soil/Sediment Drinking Water Other:

MCP SW-846 Methods Used	8260B( )	8151A ( )	8330 ( )	6010B ( )	7470A/1A ( )	Other (**x**)
	8270C( )	8081A ( )	VPH ( )	6020 ( )	9014M[2]/9012 ( )	
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C	Does the analytical data included in this report meet all the requirements for "Presumptive Certainty", as described in Section 2.0 (a), (b), (c) and (d) of the MADEP document CAM VII A, " Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	Yes	N/A √	No[1]
D	**VPH and EPH methods only:** Was the VPH or EPH Method conducted without significant modifications (see Section 11.3 of respective Methods)?	Yes	N/A √	No[1]

A response to questions E and F below is required for "Presumptive Certainty" status

E	Were all QC performance standards and recommendations for the specified methods achieved?	Yes √		No[1]
F	Were results for all analyte-list compounds/elements for the specified method(s) reported?	Yes	N/A √	No[1]

[1] All Negative responses must be addressed in an attached Environmental Laboratory case narrative.

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.

Signature: **Position:** Technical Manager

Printed Name: James Wickham **Date:** 12/10/08 8:40

The certification form has been electronically signed and approved. CAM VII A, Rev 3.2 April-04

TestAmerica THE LEADER IN ENVIRONMENTAL TESTING

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TestAmerica Westfield
53 Southampton Rd,
Westfield, MA 01085
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CASE NARRATIVE

Client: Olin Corporation

Project: Plant B

Report Number: 360-20062-1

This case narrative is in the form of an exception report, where only the anomalies related to this report, method specific performance and/or QA/QC issues are discussed. If there are no issues to report, this narrative will include a statement that documents that there are no relevant data issues as stipulated in the MCP reporting requirements.

In order to facilitate report review, a separate MCP Analytical Method Report Certification Form is included for each method requested.

It should be noted that samples with elevated Reporting Limits (RLs) as a result of a dilution may not be able to satisfy "MCP program" reporting limits in some cases if the "adjusted" RL is greater than the applicable MCP standards or criterion to which the concentration is being compared. Such increases in the RLs are an unavoidable but acceptable consequence of sample dilution that enables quantification of target analytes which exceed the calibration range.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

The samples were received on 11/25/2008; the samples arrived in good condition, properly preserved and on ice. The temperatures of the coolers at receipt were 4.0 and 3.2ºC.

Note: All samples which require thermal preservation are considered acceptable if the arrival temperature is within 2C of the required temperature or method specified range. For samples with a specified temperature of 4C, samples with a temperature ranging from just above freezing temperature of water to 6C shall be acceptable. Samples that are hand delivered immediately following collection may not meet these criteria, however they will be deemed acceptable according to NELAC and MADEP standards, if there is evidence that the chilling process has begun, such as arrival on ice, etc.

MCP regulatory standard criteria were not specified for this report. Therefore, method reporting limits (RLs) were not assessed against any MCP standards as it may pertain to Question "E" on the Presumptive Certainty Certification Form (MADEP reference: WSC-CAM-AN-093008 - WSC-CAM Analytical Notes).

VOLATILE ORGANICS

Samples 360-20062-1 through 360-20062-6 were analyzed for volatile organics in accordance with EPA SW846 Method 8260B. The samples were analyzed on 12/01/2008 and 12/05/2008.

All QA/QC procedures required to meet Presumptive Certainty for the specified analytical method were performed as per section B of the MADEP MCP analytical method report Certification form.

All QC performance standards and recommendations, which may affect Data Usability for this specific method, were achieved with the exception of:

Dibromofluoromethane failed the surrogate recovery criteria high for 360-20062-6 (137%). No target compounds were detected in this sample. Refer to the QC report for details.

2,4,4-Trimethyl-2-pentene failed the LCS recovery criteria high for LCS 360-39364/1 and LCSD 360-39364/2. Refer to the QC report for details.

For batch 39364, 2,4,4-Trimethyl-2-pentene failed the CCV criteria high.

General method information:
Samples 360-20062-1(10X), 360-20062-4(20X) and 360-20062-4(5X) required dilution prior to analysis. The reporting limits have been adjusted accordingly. Dilutions were due to high target concentration.

At the request of the client, a non-MCP compound list was reported for this job.

VOLATILE PETROLEUM HYDROCARBONS

Samples 360-20062-1 through 360-20062-6 were analyzed for volatile petroleum hydrocarbons in accordance with MADEP VPH. The samples were analyzed on 12/02/2008.

All QA/QC procedures required to meet Presumptive Certainty for the specified analytical method were performed as per section B of the MADEP MCP analytical method report Certification form.

All QC performance standards and recommendations, which may affect Data Usability for this specific method, were achieved.

General method information:
Sample 360-20062-1(5X) required dilution prior to analysis. The reporting limits have been adjusted accordingly. Dilution was due to foaming.

SEMIVOLATILE ORGANICS

Samples 360-20062-1 through 360-20062-6 were analyzed for semivolatile organics in accordance with EPA SW846 Method 8270C LL. The samples were prepared on 12/01/2008 and analyzed on 12/02/2008 and 12/03/2008.

All QA/QC procedures required to meet Presumptive Certainty for the specified analytical method were performed as per section B of the MADEP MCP analytical method report Certification form.

All QC performance standards and recommendations, which may affect Data Usability for this specific method, were achieved with the exception of:

Phenol-d5 failed the surrogate recovery criteria low for 360-20062-1. (14% at 1X), 360-20062-2 (13%), 360-20062-3 (14%), 360-20062-5 (13% at 1X), 360-20062-6 (13%) and LCSD 360-39178/3-A LCSD (14%). Per MCP, re-extraction is only required if two or more surrogates from any one fraction or any single surrogate falls below 10%.

Bis(2-ethylhexyl) phthalate exceeded the LCS rpd limit for LCSD 360-39178/3-A. Percent recoveries were within control limits. Refer to the QC report for details.

General method information:
Samples 360-20062-1(20X) and 360-20062-5(20X) required dilution prior to analysis. The reporting limits have been adjusted accordingly. Dilutions were due to high target concentration. Consequently, all surrogates for these dilutions were diluted outside control limits.

At the request of the client, an abbreviated MCP compound list was reported for this job.

DISSOLVED METALS

Samples 360-20062-1 through 360-20062-6 were analyzed for dissolved metals in accordance with EPA SW846 Method 6010B. The samples were analyzed on 11/26/2008.

All QA/QC procedures required to meet Presumptive Certainty for the specified analytical method were performed as per section B of the MADEP MCP analytical method report Certification form.

All QC performance standards and recommendations, which may affect Data Usability for this specific method, were achieved.

General method information:
At the request of the client, a non-MCP analyte list was reported for this job. Only Iron was requested.

TOTAL METALS

Samples 360-20062-1 through 360-20062-6 were analyzed for total metals in accordance with EPA SW846 Method 6010B. The samples were prepared and analyzed on 11/26/2008.

All QA/QC procedures required to meet Presumptive Certainty for the specified analytical method were performed as per section B of the MADEP MCP analytical method report Certification form.

All QC performance standards and recommendations, which may affect Data Usability for this specific method, were achieved.

General method information:
At the request of the client, a non-MCP analyte list was reported for this job. Only Iron was requested.

The following reported methods are not listed in the MADEP Massachusetts Contingency Plan (MCP) Compendium of Analytical Methods (CAM), pursuant to the provisions of 310 CMR 40.0017(2).

AMMONIA

Samples 360-20062-1 through 360-20062-6 were analyzed for ammonia in accordance with LACHAT 107-06-1B. The samples were prepared and analyzed on 12/03/2008.

All QC performance standards and recommendations for this specific method were achieved.

Sample 360-20062-2(2X) required dilution prior to analysis. The reporting limits have been adjusted accordingly. Dilution was due to high concentration.

PH

Samples 360-20062-1 through 360-20062-6 were analyzed for pH in accordance with SM 4500 H+ B. The samples were analyzed on 11/26/2008.

All QC performance standards and recommendations for this specific method were achieved.

This case narrative is available in Word format upon request.

METHOD SUMMARY

Client: Olin Corporation Job Number: 360-20062-1

Description	Lab Location	Method	Preparation Method
Matrix: Water			
Volatile Organic Compounds (Custom List)	TAL WFD	SW846 8260B	
Purge and Trap	TAL WFD		SW846 5030B
Massachusetts - Volatile Petroleum Hydrocarbons (GC)	TAL WFD	MA DEP MAVPH	
Purge and Trap	TAL WFD		SW846 5030B
Semivolatile Organic Compounds by GCMS - Low Levels	TAL WFD	SW846 8270C LL	
Liquid-Liquid Extraction (Separatory Funnel)	TAL WFD		SW846 3510C
Dissolved Metals	TAL WFD	SW846 6010B	
Metals (ICP)	TAL WFD	SW846 6010B	
Preparation, Total Metals	TAL WFD		SW846 3010A
Sample Filtration, Field	TAL WFD		FIELD_FLTRD
Nitrogen Ammonia	TAL WFD	LACHAT L107-06-1B	
Distillation, Ammonia	TAL WFD		Distill/Ammonia
pH	TAL WFD	SM SM 4500 H+ B	

Lab References:

TAL WFD = TestAmerica Westfield

Method References:

LACHAT = LACHAT

MA DEP = Massachusetts Department Of Environmental Protection

SM = "Standard Methods For The Examination Of Water And Wastewater",

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

METHOD / ANALYST SUMMARY

Client: Olin Corporation Job Number: 360-20062-1

Method	Analyst	Analyst ID
SW846 8260B	Rouleau, Catherine M	CMR
SW846 8260B	Tester, Carla	CT
SW846 8270C LL	Zuccala, Marissa	MZ
MA DEP MAVPH	Rouleau, Catherine M	CMR
SW846 6010B	Smith, Tim J	TJS
LACHAT L107-06-1B	Lalashius, Andrew L	ALL
SM SM 4500 H+ B	Emerich, Rich W	RWE

SAMPLE SUMMARY

Client: Olin Corporation Job Number: 360-20062-1

Lab Sample ID	Client Sample ID	Client Matrix	Date/Time Sampled	Date/Time Received
360-20062-1	OC-GW-16	Ground Water	11/24/2008 0930	11/25/2008 1610
360-20062-2	OC-IW-10	Ground Water	11/24/2008 1140	11/25/2008 1610
360-20062-3	OC-GW-13	Ground Water	11/24/2008 1310	11/25/2008 1610
360-20062-4	OC-IW-6	Ground Water	11/24/2008 0945	11/25/2008 1610
360-20062-5	OC-GW-101	Ground Water	11/24/2008 1145	11/25/2008 1610
360-20062-6	OC-B-03	Ground Water	11/24/2008 1315	11/25/2008 1610

SAMPLE RESULTS

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Job Number: 360-20062-1

Client Sample ID: OC-GW-16
Lab Sample ID: 360-20062-1

Date Sampled: 11/24/2008 0930
Date Received: 11/25/2008 1610
Client Matrix: Ground Water

Analyte	Result/Qualifier		Unit	MDL	RL	Dilution
Method: 8260B			Date Analyzed:		12/01/2008 1833	
Prep Method: 5030B			Date Prepared:		12/01/2008 1833	
2,4,4-Trimethyl-1-pentene	1300		ug/L	8.1	10	10
2,4,4-Trimethyl-2-pentene	370		ug/L	5.0	10	10
Surrogate					Acceptance Limits	
4-Bromofluorobenzene	106		%		70 - 130	
Dibromofluoromethane	97		%		70 - 130	
Toluene-d8 (Surr)	99		%		70 - 130	
Method: 8270C LL			Date Analyzed:		12/02/2008 1816	
Prep Method: 3510C			Date Prepared:		12/01/2008 1101	
Bis(2-ethylhexyl) phthalate	0.59	J	ug/L	0.45	2.2	1.0
Surrogate					Acceptance Limits	
2,4,6-Tribromophenol	82		%		15 - 110	
2-Fluorobiphenyl	69		%		30 - 130	
2-Fluorophenol	25		%		15 - 110	
Nitrobenzene-d5	61		%		30 - 130	
Phenol-d5	14	X	%		15 - 110	
Terphenyl-d14	71		%		30 - 130	
Method: 8270C LL			Date Analyzed:		12/03/2008 1152	
Prep Method: 3510C			Date Prepared:		12/01/2008 1101	
N-Nitrosodiphenylamine	380		ug/L	8.4	110	20
Surrogate					Acceptance Limits	
2,4,6-Tribromophenol	0	X D	%		15 - 110	
2-Fluorobiphenyl	0	X D	%		30 - 130	
2-Fluorophenol	0	X D	%		15 - 110	
Nitrobenzene-d5	0	X D	%		30 - 130	
Phenol-d5	0	X D	%		15 - 110	
Terphenyl-d14	0	X D	%		30 - 130	
Method: Dissolved-6010B			Date Analyzed:		11/26/2008 1707	
Iron	2600		ug/L	16	100	1.0
Method: 6010B			Date Analyzed:		11/26/2008 1331	
Prep Method: 3010A			Date Prepared:		11/26/2008 0752	
Iron	2900		ug/L	16	100	1.0

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Job Number: 360-20062-1

Client Sample ID: OC-GW-16
Lab Sample ID: 360-20062-1

Date Sampled: 11/24/2008 0930
Date Received: 11/25/2008 1610
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: MAVPH		Date Analyzed:		12/02/2008 1727	
Prep Method: 5030B		Date Prepared:		12/02/2008 1727	
Benzene	ND	ug/L	25	25	5.0
Ethylbenzene	ND	ug/L	25	25	5.0
m-Xylene & p-Xylene	ND	ug/L	50	50	5.0
Methyl tert-butyl ether	ND	ug/L	25	25	5.0
Naphthalene	ND	ug/L	50	50	5.0
o-Xylene	ND	ug/L	25	25	5.0
Toluene	ND	ug/L	25	25	5.0
C5-C8 Aliphatics (unadjusted)	1400	ug/L	500	500	5.0
C9-C12 Aliphatics (unadjusted)	ND	ug/L	500	500	5.0
C5-C8 Aliphatics (adjusted)	1400	ug/L	500	500	5.0
C9-C12 Aliphatics (adjusted)	ND	ug/L	500	500	5.0
C9-C10 Aromatics	ND	ug/L	500	500	5.0
Total VPH	1400	ug/L	500	500	5.0
Surrogate				Acceptance Limits	
2,5-Dibromotoluene (fid)	103	%		70 - 130	
2,5-Dibromotoluene (pid)	123	%		70 - 130	
Method: L107-06-1B		Date Analyzed:		12/03/2008 1459	
Prep Method: Distill/Ammonia		Date Prepared:		12/03/2008 1245	
Ammonia	9.1	mg/L	0.10	0.10	1.0
Method: SM 4500 H+ B		Date Analyzed:		11/26/2008 0907	
pH	6.64 J ~~HF~~	SU	0.100	0.100	1.0

TS 12/16/08

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Job Number: 360-20062-1

Client Sample ID: OC-IW-10
Lab Sample ID: 360-20062-2

Date Sampled: 11/24/2008 1140
Date Received: 11/25/2008 1610
Client Matrix: Ground Water

Analyte	Result/Qualifier		Unit	MDL	RL	Dilution
Method: 8260B			Date Analyzed:		12/01/2008 1855	
Prep Method: 5030B			Date Prepared:		12/01/2008 1855	
2,4,4-Trimethyl-1-pentene	ND		ug/L	0.81	1.0	1.0
2,4,4-Trimethyl-2-pentene	ND		ug/L	0.50	1.0	1.0
Surrogate					Acceptance Limits	
4-Bromofluorobenzene	100		%		70 - 130	
Dibromofluoromethane	101		%		70 - 130	
Toluene-d8 (Surr)	100		%		70 - 130	
Method: 8270C LL			Date Analyzed:		12/02/2008 1848	
Prep Method: 3510C			Date Prepared:		12/01/2008 1101	
Bis(2-ethylhexyl) phthalate	ND	*	ug/L	0.42	2.0	1.0
N-Nitrosodiphenylamine	8.8		ug/L	0.39	5.1	1.0
Surrogate					Acceptance Limits	
2,4,6-Tribromophenol	79		%		15 - 110	
2-Fluorobiphenyl	70		%		30 - 130	
2-Fluorophenol	23		%		15 - 110	
Nitrobenzene-d5	60		%		30 - 130	
Phenol-d5	13	X	%		15 - 110	
Terphenyl-d14	73		%		30 - 130	
Method: Dissolved-6010B			Date Analyzed:		11/26/2008 1725	
Iron	230		ug/L	16	100	1.0
Method: 6010B			Date Analyzed:		11/26/2008 1334	
Prep Method: 3010A			Date Prepared:		11/26/2008 0752	
Iron	1900		ug/L	16	100	1.0

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Job Number: 360-20062-1

Client Sample ID: OC-IW-10
Lab Sample ID: 360-20062-2

Date Sampled: 11/24/2008 1140
Date Received: 11/25/2008 1610
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: MAVPH		Date Analyzed:	12/02/2008 1800		
Prep Method: 5030B		Date Prepared:	12/02/2008 1800		
Benzene	ND	ug/L	5.0	5.0	1.0
Ethylbenzene	ND	ug/L	5.0	5.0	1.0
m-Xylene & p-Xylene	ND	ug/L	10	10	1.0
Methyl tert-butyl ether	ND	ug/L	5.0	5.0	1.0
Naphthalene	ND	ug/L	10	10	1.0
o-Xylene	ND	ug/L	5.0	5.0	1.0
Toluene	ND	ug/L	5.0	5.0	1.0
C5-C8 Aliphatics (unadjusted)	ND	ug/L	100	100	1.0
C9-C12 Aliphatics (unadjusted)	ND	ug/L	100	100	1.0
C5-C8 Aliphatics (adjusted)	ND	ug/L	100	100	1.0
C9-C12 Aliphatics (adjusted)	ND	ug/L	100	100	1.0
C9-C10 Aromatics	ND	ug/L	100	100	1.0
Total VPH	ND	ug/L	100	100	1.0
Surrogate				Acceptance Limits	
2,5-Dibromotoluene (fid)	102	%		70 - 130	
2,5-Dibromotoluene (pid)	121	%		70 - 130	
Method: L107-06-1B		Date Analyzed:	12/03/2008 1527		
Prep Method: Distill/Ammonia		Date Prepared:	12/03/2008 1245		
Ammonia	23	mg/L	0.20	0.20	2.0
Method: SM 4500 H+ B		Date Analyzed:	11/26/2008 0915		
pH	7.41 J ~~HF~~	SU	0.100	0.100	1.0

TC 11/16/09

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Job Number: 360-20062-1

Client Sample ID: OC-GW-13
Lab Sample ID: 360-20062-3

Date Sampled: 11/24/2008 1310
Date Received: 11/25/2008 1610
Client Matrix: Ground Water

Analyte	Result/Qualifier		Unit	MDL	RL	Dilution
Method: 8260B			Date Analyzed:		12/01/2008 1916	
Prep Method: 5030B			Date Prepared:		12/01/2008 1916	
2,4,4-Trimethyl-1-pentene	ND		ug/L	0.81	1.0	1.0
2,4,4-Trimethyl-2-pentene	ND		ug/L	0.50	1.0	1.0
Surrogate					Acceptance Limits	
4-Bromofluorobenzene	98		%		70 - 130	
Dibromofluoromethane	101		%		70 - 130	
Toluene-d8 (Surr)	99		%		70 - 130	
Method: 8270C LL			Date Analyzed:		12/02/2008 1609	
Prep Method: 3510C			Date Prepared:		12/01/2008 1101	
Bis(2-ethylhexyl) phthalate	ND		ug/L	0.42	2.0	1.0
N-Nitrosodiphenylamine	ND		ug/L	0.39	5.1	1.0
Surrogate					Acceptance Limits	
2,4,6-Tribromophenol	80		%		15 - 110	
2-Fluorobiphenyl	71		%		30 - 130	
2-Fluorophenol	26		%		15 - 110	
Nitrobenzene-d5	67		%		30 - 130	
Phenol-d5	14	X	%		15 - 110	
Terphenyl-d14	71		%		30 - 130	
Method: Dissolved-6010B			Date Analyzed:		11/26/2008 1728	
Iron	ND		ug/L	16	100	1.0
Method: 6010B			Date Analyzed:		11/26/2008 1337	
Prep Method: 3010A			Date Prepared:		11/26/2008 0752	
Iron	150		ug/L	16	100	1.0

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Job Number: 360-20062-1

Client Sample ID: OC-GW-13
Lab Sample ID: 360-20062-3

Date Sampled: 11/24/2008 1310
Date Received: 11/25/2008 1610
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: MAVPH		Date Analyzed:		12/02/2008 1833	
Prep Method: 5030B		Date Prepared:		12/02/2008 1833	
Benzene	ND	ug/L	5.0	5.0	1.0
Ethylbenzene	ND	ug/L	5.0	5.0	1.0
m-Xylene & p-Xylene	ND	ug/L	10	10	1.0
Methyl tert-butyl ether	ND	ug/L	5.0	5.0	1.0
Naphthalene	ND	ug/L	10	10	1.0
o-Xylene	ND	ug/L	5.0	5.0	1.0
Toluene	ND	ug/L	5.0	5.0	1.0
C5-C8 Aliphatics (unadjusted)	ND	ug/L	100	100	1.0
C9-C12 Aliphatics (unadjusted)	ND	ug/L	100	100	1.0
C5-C8 Aliphatics (adjusted)	ND	ug/L	100	100	1.0
C9-C12 Aliphatics (adjusted)	ND	ug/L	100	100	1.0
C9-C10 Aromatics	ND	ug/L	100	100	1.0
Total VPH	ND	ug/L	100	100	1.0
Surrogate				Acceptance Limits	
2,5-Dibromotoluene (fid)	102	%		70 - 130	
2,5-Dibromotoluene (pid)	122	%		70 - 130	
Method: L107-06-1B		Date Analyzed:		12/03/2008 1501	
Prep Method: Distill/Ammonia		Date Prepared:		12/03/2008 1245	
Ammonia	ND	mg/L	0.10	0.10	1.0
Method: SM 4500 H+ B		Date Analyzed:		11/26/2008 0918	
pH	5.75 J ~~HF~~	SU	0.100	0.100	1.0

TC 11/26/08

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Job Number: 360-20062-1

Client Sample ID: OC-IW-6
Lab Sample ID: 360-20062-4

Date Sampled: 11/24/2008 0945
Date Received: 11/25/2008 1610
Client Matrix: Ground Water

Analyte	Result/Qualifier		Unit	MDL	RL	Dilution
Method: 8260B			Date Analyzed:		12/01/2008 1938	
Prep Method: 5030B			Date Prepared:		12/01/2008 1938	
2,4,4-Trimethyl-2-pentene	150		ug/L	2.5	5.0	5.0
Surrogate					Acceptance Limits	
4-Bromofluorobenzene	110		%		70 - 130	
Dibromofluoromethane	95		%		70 - 130	
Toluene-d8 (Surr)	97		%		70 - 130	
Method: 8260B			Date Analyzed:		12/05/2008 1526	
Prep Method: 5030B			Date Prepared:		12/05/2008 1526	
2,4,4-Trimethyl-1-pentene	910		ug/L	16	20	20
Surrogate					Acceptance Limits	
4-Bromofluorobenzene	118		%		70 - 130	
Dibromofluoromethane	115		%		70 - 130	
Toluene-d8 (Surr)	75		%		70 - 130	
Method: 8270C LL			Date Analyzed:		12/02/2008 1641	
Prep Method: 3510C			Date Prepared:		12/01/2008 1101	
Bis(2-ethylhexyl) phthalate	0.88	J *	ug/L	0.42	2.0	1.0
N-Nitrosodiphenylamine	1.1	J	ug/L	0.39	5.1	1.0
Surrogate					Acceptance Limits	
2,4,6-Tribromophenol	82		%		15 - 110	
2-Fluorobiphenyl	76		%		30 - 130	
2-Fluorophenol	28		%		15 - 110	
Nitrobenzene-d5	73		%		30 - 130	
Phenol-d5	15		%		15 - 110	
Terphenyl-d14	80		%		30 - 130	
Method: Dissolved-6010B			Date Analyzed:		11/26/2008 1731	
Iron	8600		ug/L	16	100	1.0
Method: 6010B			Date Analyzed:		11/26/2008 1340	
Prep Method: 3010A			Date Prepared:		11/26/2008 0752	
Iron	10000		ug/L	16	100	1.0

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Job Number: 360-20062-1

Client Sample ID: OC-IW-6
Lab Sample ID: 360-20062-4

Date Sampled: 11/24/2008 0945
Date Received: 11/25/2008 1610
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: MAVPH		Date Analyzed:		12/02/2008 1906	
Prep Method: 5030B		Date Prepared:		12/02/2008 1906	
Benzene	ND	ug/L	5.0	5.0	1.0
Ethylbenzene	ND	ug/L	5.0	5.0	1.0
m-Xylene & p-Xylene	ND	ug/L	10	10	1.0
Methyl tert-butyl ether	ND	ug/L	5.0	5.0	1.0
Naphthalene	ND	ug/L	10	10	1.0
o-Xylene	21	ug/L	5.0	5.0	1.0
Toluene	ND	ug/L	5.0	5.0	1.0
C5-C8 Aliphatics (unadjusted)	1900	ug/L	100	100	1.0
C9-C12 Aliphatics (unadjusted)	130	ug/L	100	100	1.0
C5-C8 Aliphatics (adjusted)	1900	ug/L	100	100	1.0
C9-C12 Aliphatics (adjusted)	110	ug/L	100	100	1.0
C9-C10 Aromatics	ND	ug/L	100	100	1.0
Total VPH	2000	ug/L	100	100	1.0
Surrogate				Acceptance Limits	
2,5-Dibromotoluene (fid)	104	%		70 - 130	
2,5-Dibromotoluene (pid)	114	%		70 - 130	
Method: L107-06-1B		Date Analyzed:		12/03/2008 1502	
Prep Method: Distill/Ammonia		Date Prepared:		12/03/2008 1245	
Ammonia	0.57	mg/L	0.10	0.10	1.0
Method: SM 4500 H+ B		Date Analyzed:		11/26/2008 0922	
pH	6.32 J ~~HF~~	SU	0.100	0.100	1.0

11/10/09 TC

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Job Number: 360-20062-1

Client Sample ID: OC-GW-101
Lab Sample ID: 360-20062-5

Date Sampled: 11/24/2008 1145
Date Received: 11/25/2008 1610
Client Matrix: Ground Water

Analyte	Result/Qualifier		Unit	MDL	RL	Dilution
Method: 8260B			Date Analyzed:		12/01/2008 1959	
Prep Method: 5030B			Date Prepared:		12/01/2008 1959	
2,4,4-Trimethyl-1-pentene	160		ug/L	0.81	1.0	1.0
2,4,4-Trimethyl-2-pentene	16		ug/L	0.50	1.0	1.0
Surrogate					Acceptance Limits	
4-Bromofluorobenzene	107		%		70 - 130	
Dibromofluoromethane	96		%		70 - 130	
Toluene-d8 (Surr)	95		%		70 - 130	
Method: 8270C LL			Date Analyzed:		12/02/2008 1744	
Prep Method: 3510C			Date Prepared:		12/01/2008 1101	
N-Nitrosodiphenylamine	5.7		ug/L	0.39	5.1	1.0
Surrogate					Acceptance Limits	
2,4,6-Tribromophenol	84		%		15 - 110	
2-Fluorobiphenyl	68		%		30 - 130	
2-Fluorophenol	24		%		15 - 110	
Nitrobenzene-d5	65		%		30 - 130	
Phenol-d5	13	X	%		15 - 110	
Terphenyl-d14	72		%		30 - 130	
Method: 8270C LL			Date Analyzed:		12/03/2008 1045	
Prep Method: 3510C			Date Prepared:		12/01/2008 1101	
Bis(2-ethylhexyl) phthalate	350	*	ug/L	8.4	40	20
Surrogate					Acceptance Limits	
2,4,6-Tribromophenol	0	X D	%		15 - 110	
2-Fluorobiphenyl	0	X D	%		30 - 130	
2-Fluorophenol	0	X D	%		15 - 110	
Nitrobenzene-d5	0	X D	%		30 - 130	
Phenol-d5	0	X D	%		15 - 110	
Terphenyl-d14	0	X D	%		30 - 130	
Method: Dissolved-6010B			Date Analyzed:		11/26/2008 1733	
Iron	10000	J	ug/L	16	100	1.0
Method: 6010B			Date Analyzed:		11/26/2008 1349	
Prep Method: 3010A			Date Prepared:		11/26/2008 0752	
Iron	9000	J	ug/L	16	100	1.0

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Job Number: 360-20062-1

Client Sample ID: OC-GW-101
Lab Sample ID: 360-20062-5

Date Sampled: 11/24/2008 1145
Date Received: 11/25/2008 1610
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: MAVPH		Date Analyzed:	12/02/2008 1939		
Prep Method: 5030B		Date Prepared:	12/02/2008 1939		
Benzene	ND	ug/L	5.0	5.0	1.0
Ethylbenzene	ND	ug/L	5.0	5.0	1.0
m-Xylene & p-Xylene	ND	ug/L	10	10	1.0
Methyl tert-butyl ether	ND	ug/L	5.0	5.0	1.0
Naphthalene	ND	ug/L	10	10	1.0
o-Xylene	ND	ug/L	5.0	5.0	1.0
Toluene	ND	ug/L	5.0	5.0	1.0
C5-C8 Aliphatics (unadjusted)	350	ug/L	100	100	1.0
C9-C12 Aliphatics (unadjusted)	ND	ug/L	100	100	1.0
C5-C8 Aliphatics (adjusted)	350	ug/L	100	100	1.0
C9-C12 Aliphatics (adjusted)	ND	ug/L	100	100	1.0
C9-C10 Aromatics	ND	ug/L	100	100	1.0
Total VPH	350	ug/L	100	100	1.0
Surrogate				Acceptance Limits	
2,5-Dibromotoluene (fid)	103	%		70 - 130	
2,5-Dibromotoluene (pid)	121	%		70 - 130	
Method: L107-06-1B		Date Analyzed:	12/03/2008 1503		
Prep Method: Distill/Ammonia		Date Prepared:	12/03/2008 1245		
Ammonia	1.3	mg/L	0.10	0.10	1.0
Method: SM 4500 H+ B		Date Analyzed:	11/26/2008 0926		
pH	6.42 J ~~HF~~	SU	0.100	0.100	1.0

11/16/09

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Job Number: 360-20062-1

Client Sample ID: OC-B-03
Lab Sample ID: 360-20062-6

Date Sampled: 11/24/2008 1315
Date Received: 11/25/2008 1610
Client Matrix: Ground Water

Analyte	Result/Qualifier		Unit	MDL	RL	Dilution
Method: 8260B			Date Analyzed:		12/05/2008 2000	
Prep Method: 5030B			Date Prepared:		12/05/2008 2000	
2,4,4-Trimethyl-1-pentene	ND		ug/L	0.81	1.0	1.0
2,4,4-Trimethyl-2-pentene	ND		ug/L	0.50	1.0	1.0
Surrogate					Acceptance Limits	
4-Bromofluorobenzene	103		%		70 - 130	
Dibromofluoromethane	137	X	%		70 - 130	
Toluene-d8 (Surr)	88		%		70 - 130	
Method: 8270C LL			Date Analyzed:		12/02/2008 1713	
Prep Method: 3510C			Date Prepared:		12/01/2008 1101	
Bis(2-ethylhexyl) phthalate	4.3		ug/L	0.42	2.0	1.0
N-Nitrosodiphenylamine	3.0	J	ug/L	0.39	5.1	1.0
Surrogate					Acceptance Limits	
2,4,6-Tribromophenol	75		%		15 - 110	
2-Fluorobiphenyl	68		%		30 - 130	
2-Fluorophenol	24		%		15 - 110	
Nitrobenzene-d5	59		%		30 - 130	
Phenol-d5	13	X	%		15 - 110	
Terphenyl-d14	65		%		30 - 130	
Method: Dissolved-6010B			Date Analyzed:		11/26/2008 1736	
Iron	ND		ug/L	16	100	1.0
Method: 6010B			Date Analyzed:		11/26/2008 1352	
Prep Method: 3010A			Date Prepared:		11/26/2008 0752	
Iron	73	J	ug/L	16	100	1.0

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Job Number: 360-20062-1

Client Sample ID: OC-B-03
Lab Sample ID: 360-20062-6

Date Sampled: 11/24/2008 1315
Date Received: 11/25/2008 1610
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: MAVPH		Date Analyzed:		12/02/2008 2012	
Prep Method: 5030B		Date Prepared:		12/02/2008 2012	
Benzene	ND	ug/L	5.0	5.0	1.0
Ethylbenzene	ND	ug/L	5.0	5.0	1.0
m-Xylene & p-Xylene	ND	ug/L	10	10	1.0
Methyl tert-butyl ether	ND	ug/L	5.0	5.0	1.0
Naphthalene	ND	ug/L	10	10	1.0
o-Xylene	ND	ug/L	5.0	5.0	1.0
Toluene	ND	ug/L	5.0	5.0	1.0
C5-C8 Aliphatics (unadjusted)	ND	ug/L	100	100	1.0
C9-C12 Aliphatics (unadjusted)	ND	ug/L	100	100	1.0
C5-C8 Aliphatics (adjusted)	ND	ug/L	100	100	1.0
C9-C12 Aliphatics (adjusted)	ND	ug/L	100	100	1.0
C9-C10 Aromatics	ND	ug/L	100	100	1.0
Total VPH	ND	ug/L	100	100	1.0
Surrogate				Acceptance Limits	
2,5-Dibromotoluene (fid)	104	%		70 - 130	
2,5-Dibromotoluene (pid)	122	%		70 - 130	
Method: L107-06-1B		Date Analyzed:		12/03/2008 1504	
Prep Method: Distill/Ammonia		Date Prepared:		12/03/2008 1245	
Ammonia	0.64	mg/L	0.10	0.10	1.0
Method: SM 4500 H+ B		Date Analyzed:		11/26/2008 0929	
pH	5.90 J ~~HF~~	SU	0.100	0.100	1.0

DATA REPORTING QUALIFIERS

Client: Olin Corporation Job Number: 360-20062-1

Lab Section	Qualifier	Description
GC/MS VOA		
	*	LCS or LCSD exceeds the control limits
	X	Surrogate exceeds the control limits
GC/MS Semi VOA		
	J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
	*	RPD of the LCS and LCSD exceeds the control limits
	X	Surrogate exceeds the control limits
	D	Surrogate or matrix spike recoveries were not obtained because the extract was diluted for analysis; also compounds analyzed at a dilution may be flagged with a D.
Metals		
	J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
General Chemistry		
	HF	Field parameter with a holding time of 15 minutes

QUALITY CONTROL RESULTS

Client: Olin Corporation Job Number: 360-20062-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
GC/MS VOA					
Analysis Batch:360-39219					
LCS 360-39219/1	Lab Control Spike	T	Water	8260B	
LCSD 360-39219/2	Lab Control Spike Duplicate	T	Water	8260B	
MB 360-39219/3	Method Blank	T	Water	8260B	
360-20062-1	OC-GW-16	T	Water	8260B	
360-20062-2	OC-IW-10	T	Water	8260B	
360-20062-3	OC-GW-13	T	Water	8260B	
360-20062-4	OC-IW-6	T	Water	8260B	
360-20062-5	OC-GW-101	T	Water	8260B	
Analysis Batch:360-39364					
LCS 360-39364/1	Lab Control Spike	T	Water	8260B	
LCSD 360-39364/2	Lab Control Spike Duplicate	T	Water	8260B	
MB 360-39364/3	Method Blank	T	Water	8260B	
360-20062-4	OC-IW-6	T	Water	8260B	
360-20062-6	OC-B-03	T	Water	8260B	

Report Basis
T = Total

Client: Olin Corporation Job Number: 360-20062-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
GC/MS Semi VOA					
Prep Batch: 360-39178					
LCS 360-39178/2-A	Lab Control Spike	T	Water	3510C	
LCSD 360-39178/3-A	Lab Control Spike Duplicate	T	Water	3510C	
MB 360-39178/1-A	Method Blank	T	Water	3510C	
360-20062-1	OC-GW-16	T	Water	3510C	
360-20062-2	OC-IW-10	T	Water	3510C	
360-20062-3	OC-GW-13	T	Water	3510C	
360-20062-4	OC-IW-6	T	Water	3510C	
360-20062-5	OC-GW-101	T	Water	3510C	
360-20062-6	OC-B-03	T	Water	3510C	
Analysis Batch:360-39236					
LCS 360-39178/2-A	Lab Control Spike	T	Water	8270C LL	360-39178
LCSD 360-39178/3-A	Lab Control Spike Duplicate	T	Water	8270C LL	360-39178
MB 360-39178/1-A	Method Blank	T	Water	8270C LL	360-39178
360-20062-1	OC-GW-16	T	Water	8270C LL	360-39178
360-20062-2	OC-IW-10	T	Water	8270C LL	360-39178
360-20062-3	OC-GW-13	T	Water	8270C LL	360-39178
360-20062-4	OC-IW-6	T	Water	8270C LL	360-39178
360-20062-5	OC-GW-101	T	Water	8270C LL	360-39178
360-20062-6	OC-B-03	T	Water	8270C LL	360-39178

Report Basis
T = Total

GC VOA					
Analysis Batch:360-39248					
LCS 360-39248/1	Lab Control Spike	T	Water	MAVPH	
LCSD 360-39248/2	Lab Control Spike Duplicate	T	Water	MAVPH	
MB 360-39248/3	Method Blank	T	Water	MAVPH	
360-20062-1	OC-GW-16	T	Water	MAVPH	
360-20062-2	OC-IW-10	T	Water	MAVPH	
360-20062-3	OC-GW-13	T	Water	MAVPH	
360-20062-4	OC-IW-6	T	Water	MAVPH	
360-20062-5	OC-GW-101	T	Water	MAVPH	
360-20062-6	OC-B-03	T	Water	MAVPH	

Report Basis
T = Total

Client: Olin Corporation Job Number: 360-20062-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
Metals					
Prep Batch: 360-39106					
LCS 360-39106/2-A	Lab Control Spike	T	Water	3010A	
LCSD 360-39106/3-A	Lab Control Spike Duplicate	T	Water	3010A	
MB 360-39106/1-A	Method Blank	T	Water	3010A	
360-20062-1	OC-GW-16	T	Water	3010A	
360-20062-2	OC-IW-10	T	Water	3010A	
360-20062-3	OC-GW-13	T	Water	3010A	
360-20062-4	OC-IW-6	T	Water	3010A	
360-20062-5	OC-GW-101	T	Water	3010A	
360-20062-6	OC-B-03	T	Water	3010A	
Analysis Batch:360-39149					
LCS 360-39106/2-A	Lab Control Spike	T	Water	6010B	360-39106
LCSD 360-39106/3-A	Lab Control Spike Duplicate	T	Water	6010B	360-39106
MB 360-39106/1-A	Method Blank	T	Water	6010B	360-39106
360-20062-1	OC-GW-16	T	Water	6010B	360-39106
360-20062-2	OC-IW-10	T	Water	6010B	360-39106
360-20062-3	OC-GW-13	T	Water	6010B	360-39106
360-20062-4	OC-IW-6	T	Water	6010B	360-39106
360-20062-5	OC-GW-101	T	Water	6010B	360-39106
360-20062-6	OC-B-03	T	Water	6010B	360-39106
Analysis Batch:360-39159					
LCS 360-39159/1	Lab Control Spike	T	Water	6010B	
LCSD 360-39159/7	Lab Control Spike Duplicate	T	Water	6010B	
MB 360-39159/2	Method Blank	T	Water	6010B	
360-20062-1	OC-GW-16	D	Water	6010B	
360-20062-1DU	Duplicate	D	Water	6010B	
360-20062-1MS	Matrix Spike	D	Water	6010B	
360-20062-2	OC-IW-10	D	Water	6010B	
360-20062-3	OC-GW-13	D	Water	6010B	
360-20062-4	OC-IW-6	D	Water	6010B	
360-20062-5	OC-GW-101	D	Water	6010B	
360-20062-6	OC-B-03	D	Water	6010B	

Report Basis
D = Dissolved
T = Total

Client: Olin Corporation Job Number: 360-20062-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
General Chemistry					
Analysis Batch:360-39118					
LCS 360-39118/1	Lab Control Spike	T	Water	SM 4500 H+ B	
360-20062-1	OC-GW-16	T	Water	SM 4500 H+ B	
360-20062-1DU	Duplicate	T	Water	SM 4500 H+ B	
360-20062-2	OC-IW-10	T	Water	SM 4500 H+ B	
360-20062-3	OC-GW-13	T	Water	SM 4500 H+ B	
360-20062-4	OC-IW-6	T	Water	SM 4500 H+ B	
360-20062-5	OC-GW-101	T	Water	SM 4500 H+ B	
360-20062-6	OC-B-03	T	Water	SM 4500 H+ B	
Prep Batch: 360-39254					
LCS 360-39254/2-A	Lab Control Spike	T	Water	Distill/Ammonia	
MB 360-39254/1-A	Method Blank	T	Water	Distill/Ammonia	
360-20062-1	OC-GW-16	T	Water	Distill/Ammonia	
360-20062-2	OC-IW-10	T	Water	Distill/Ammonia	
360-20062-3	OC-GW-13	T	Water	Distill/Ammonia	
360-20062-4	OC-IW-6	T	Water	Distill/Ammonia	
360-20062-5	OC-GW-101	T	Water	Distill/Ammonia	
360-20062-6	OC-B-03	T	Water	Distill/Ammonia	
Analysis Batch:360-39263					
LCS 360-39254/2-A	Lab Control Spike	T	Water	L107-06-1B	360-39254
MB 360-39254/1-A	Method Blank	T	Water	L107-06-1B	360-39254
360-20062-1	OC-GW-16	T	Water	L107-06-1B	360-39254
360-20062-2	OC-IW-10	T	Water	L107-06-1B	360-39254
360-20062-3	OC-GW-13	T	Water	L107-06-1B	360-39254
360-20062-4	OC-IW-6	T	Water	L107-06-1B	360-39254
360-20062-5	OC-GW-101	T	Water	L107-06-1B	360-39254
360-20062-6	OC-B-03	T	Water	L107-06-1B	360-39254

Report Basis
T = Total

Method Blank - Batch: 360-39219

Method: 8260B
Preparation: 5030B

Lab Sample ID: MB 360-39219/3
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 12/01/2008 1647
Date Prepared: 12/01/2008 1647

Analysis Batch: 360-39219
Prep Batch: N/A
Units: ug/L

Instrument ID: Agilent 7890/5975 GC/MS
Lab File ID: V01705.D
Initial Weight/Volume: 5 mL
Final Weight/Volume: 5 mL

Analyte	Result	Qual	MDL	RL
2,4,4-Trimethyl-1-pentene	ND		0.81	1.0
2,4,4-Trimethyl-2-pentene	ND		0.50	1.0

Surrogate	% Rec	Acceptance Limits
4-Bromofluorobenzene	101	70 - 130
Dibromofluoromethane	98	70 - 130
Toluene-d8 (Surr)	99	70 - 130

Lab Control Spike/
Lab Control Spike Duplicate Recovery Report - Batch: 360-39219

Method: 8260B
Preparation: 5030B

LCS Lab Sample ID: LCS 360-39219/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 12/01/2008 1542
Date Prepared: 12/01/2008 1542

Analysis Batch: 360-39219
Prep Batch: N/A
Units: ug/L

Instrument ID: Agilent 7890/5975 GC/MS
Lab File ID: V01702.D
Initial Weight/Volume: 5 mL
Final Weight/Volume: 5 mL

LCSD Lab Sample ID: LCSD 360-39219/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 12/01/2008 1604
Date Prepared: 12/01/2008 1604

Analysis Batch: 360-39219
Prep Batch: N/A
Units: ug/L

Instrument ID: Agilent 7890/5975 GC/MS
Lab File ID: V01703.D
Initial Weight/Volume: 5 mL
Final Weight/Volume: 5 mL

Analyte	% Rec. LCS	% Rec. LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
2,4,4-Trimethyl-1-pentene	111	105	70 - 130	6	25		
2,4,4-Trimethyl-2-pentene	110	106	70 - 130	3	25		

Surrogate	LCS % Rec	LCSD % Rec	Acceptance Limits
4-Bromofluorobenzene	104	105	70 - 130
Dibromofluoromethane	98	98	70 - 130
Toluene-d8 (Surr)	102	101	70 - 130

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-20062-1

Method Blank - Batch: 360-39364

Method: 8260B
Preparation: 5030B

Lab Sample ID: MB 360-39364/3
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 12/05/2008 1202
Date Prepared: 12/05/2008 1202

Analysis Batch: 360-39364
Prep Batch: N/A
Units: ug/L

Instrument ID: HP 6890/5973 GC/MS
Lab File ID: V05913.D
Initial Weight/Volume: 5 mL
Final Weight/Volume: 5 mL

Analyte	Result	Qual	MDL	RL
2,4,4-Trimethyl-1-pentene	ND		0.81	1.0
2,4,4-Trimethyl-2-pentene	ND		0.50	1.0

Surrogate	% Rec	Acceptance Limits
4-Bromofluorobenzene	110	70 - 130
Dibromofluoromethane	106	70 - 130
Toluene-d8 (Surr)	89	70 - 130

Lab Control Spike/
Lab Control Spike Duplicate Recovery Report - Batch: 360-39364

Method: 8260B
Preparation: 5030B

LCS Lab Sample ID: LCS 360-39364/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 12/05/2008 1053
Date Prepared: 12/05/2008 1053

Analysis Batch: 360-39364
Prep Batch: N/A
Units: ug/L

Instrument ID: HP 6890/5973 GC/MS
Lab File ID: V05910.D
Initial Weight/Volume: 5 mL
Final Weight/Volume: 5 mL

LCSD Lab Sample ID: LCSD 360-39364/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 12/05/2008 1116
Date Prepared: 12/05/2008 1116

Analysis Batch: 360-39364
Prep Batch: N/A
Units: ug/L

Instrument ID: HP 6890/5973 GC/MS
Lab File ID: V05911.D
Initial Weight/Volume: 5 mL
Final Weight/Volume: 5 mL

Analyte	% Rec. LCS	% Rec. LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
2,4,4-Trimethyl-1-pentene	93	97	70 - 130	4	25		
2,4,4-Trimethyl-2-pentene	141	144	70 - 130	2	25	*	*

Surrogate	LCS % Rec	LCSD % Rec	Acceptance Limits
4-Bromofluorobenzene	109	109	70 - 130
Dibromofluoromethane	97	98	70 - 130
Toluene-d8 (Surr)	102	98	70 - 130

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-20062-1

Method Blank - Batch: 360-39178

Method: 8270C LL
Preparation: 3510C

Lab Sample ID: MB 360-39178/1-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 12/02/2008 1433
Date Prepared: 12/01/2008 1101

Analysis Batch: 360-39236
Prep Batch: 360-39178
Units: ug/L

Instrument ID: Agilent 6890/5973 GC/MS
Lab File ID: B94569.D
Initial Weight/Volume: 1000 mL
Final Weight/Volume: 1.0 mL
Injection Volume: 1.0 uL

Analyte	Result	Qual	MDL	RL
Bis(2-ethylhexyl) phthalate	ND		0.41	2.0
N-Nitrosodiphenylamine	ND		0.38	5.0

Surrogate	% Rec	Acceptance Limits
2,4,6-Tribromophenol	71	15 - 110
2-Fluorobiphenyl	75	30 - 130
2-Fluorophenol	29	15 - 110
Nitrobenzene-d5	69	30 - 130
Phenol-d5	15	15 - 110
Terphenyl-d14	71	30 - 130

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-20062-1

Lab Control Spike/
Lab Control Spike Duplicate Recovery Report - Batch: 360-39178

Method: 8270C LL
Preparation: 3510C

LCS Lab Sample ID:	LCS 360-39178/2-A	Analysis Batch:	360-39236	Instrument ID:	Agilent 6890/5973 GC/MS
Client Matrix:	Water	Prep Batch:	360-39178	Lab File ID:	B94570.D
Dilution:	1.0	Units:	ug/L	Initial Weight/Volume:	1000 mL
Date Analyzed:	12/02/2008 1505			Final Weight/Volume:	1.0 mL
Date Prepared:	12/01/2008 1101			Injection Volume:	1.0 uL

LCSD Lab Sample ID:	LCSD 360-39178/3-A	Analysis Batch:	360-39236	Instrument ID:	Agilent 6890/5973 GC/MS
Client Matrix:	Water	Prep Batch:	360-39178	Lab File ID:	B94571.D
Dilution:	1.0	Units:	ug/L	Initial Weight/Volume:	1000 mL
Date Analyzed:	12/02/2008 1537			Final Weight/Volume:	1.0 mL
Date Prepared:	12/01/2008 1101			Injection Volume:	1.0 uL

	% Rec.					
Analyte	LCS	LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Bis(2-ethylhexyl) phthalate	114	90	40 - 140	23	20		*
N-Nitrosodiphenylamine	89	80	40 - 140	11	20		

Surrogate	LCS % Rec	LCSD % Rec		Acceptance Limits
2,4,6-Tribromophenol	81	73		15 - 110
2-Fluorobiphenyl	78	69		30 - 130
2-Fluorophenol	29	28		15 - 110
Nitrobenzene-d5	71	66		30 - 130
Phenol-d5	15	14	X	15 - 110
Terphenyl-d14	70	58		30 - 130

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-20062-1

Method Blank - Batch: 360-39248

Method: MAVPH
Preparation: 5030B

Lab Sample ID: MB 360-39248/3
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 12/02/2008 1621
Date Prepared: 12/02/2008 1621

Analysis Batch: 360-39248
Prep Batch: N/A
Units: ug/L

Instrument ID: HP 5890II GC w/ PID/FID
Lab File ID: G15249.D
Initial Weight/Volume: 5 mL
Final Weight/Volume: 5 mL
Injection Volume:
Column ID: PRIMARY

Analyte	Result	Qual	RL	RL
Benzene	ND		5.0	5.0
Ethylbenzene	ND		5.0	5.0
m-Xylene & p-Xylene	ND		10	10
Methyl tert-butyl ether	ND		5.0	5.0
Naphthalene	ND		10	10
o-Xylene	ND		5.0	5.0
Toluene	ND		5.0	5.0
C5-C8 Aliphatics (unadjusted)	ND		100	100
C9-C12 Aliphatics (unadjusted)	ND		100	100
C5-C8 Aliphatics (adjusted)	ND		100	100
C9-C12 Aliphatics (adjusted)	ND		100	100
C9-C10 Aromatics	ND		100	100
Total VPH	ND		100	100

Surrogate	% Rec	Acceptance Limits
2,5-Dibromotoluene (fid)	104	70 - 130
2,5-Dibromotoluene (pid)	122	70 - 130

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-20062-1

Lab Control Spike/
Lab Control Spike Duplicate Recovery Report - Batch: 360-39248

Method: MAVPH
Preparation: 5030B

LCS Lab Sample ID: LCS 360-39248/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 12/02/2008 1442
Date Prepared: 12/02/2008 1442

Analysis Batch: 360-39248
Prep Batch: N/A
Units: ug/L

Instrument ID: HP 5890II GC w/ PID/FID
Lab File ID: G15246.D
Initial Weight/Volume: 5 mL
Final Weight/Volume: 5 mL
Injection Volume:
Column ID: PRIMARY

LCSD Lab Sample ID: LCSD 360-39248/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 12/02/2008 1515
Date Prepared: 12/02/2008 1515

Analysis Batch: 360-39248
Prep Batch: N/A
Units: ug/L

Instrument ID: HP 5890II GC w/ PID/FID
Lab File ID: G15247.D
Initial Weight/Volume: 5 mL
Final Weight/Volume: 5 mL
Injection Volume:
Column ID: PRIMARY

Analyte	% Rec. LCS	% Rec. LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Benzene	101	102	70 - 130	2	25		
Ethylbenzene	100	101	70 - 130	1	25		
m-Xylene & p-Xylene	101	102	70 - 130	1	25		
Methyl tert-butyl ether	107	109	70 - 130	2	25		
Naphthalene	111	114	70 - 130	3	25		
o-Xylene	102	102	70 - 130	1	25		
Toluene	100	101	70 - 130	2	25		
C5-C8 Aliphatics (unadjusted)	105	107	70 - 130	2	25		
C9-C12 Aliphatics (unadjusted)	101	102	70 - 130	1	25		
C9-C10 Aromatics	110	110	70 - 130	0	25		

Surrogate	LCS % Rec	LCSD % Rec	Acceptance Limits
2,5-Dibromotoluene (fid)	103	103	70 - 130
2,5-Dibromotoluene (pid)	105	104	70 - 130

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-20062-1

Method Blank - Batch: 360-39106

Method: 6010B
Preparation: 3010A

Lab Sample ID: MB 360-39106/1-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/26/2008 1254
Date Prepared: 11/26/2008 0752

Analysis Batch: 360-39149
Prep Batch: 360-39106
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume: 50 mL
Final Weight/Volume: 50 mL

Analyte	Result	Qual	MDL	RL
Iron	ND		16	100

Lab Control Spike/
Lab Control Spike Duplicate Recovery Report - Batch: 360-39106

Method: 6010B
Preparation: 3010A

LCS Lab Sample ID: LCS 360-39106/2-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/26/2008 1256
Date Prepared: 11/26/2008 0752

Analysis Batch: 360-39149
Prep Batch: 360-39106
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume: 50 mL
Final Weight/Volume: 50 mL

LCSD Lab Sample ID: LCSD 360-39106/3-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/26/2008 1259
Date Prepared: 11/26/2008 0752

Analysis Batch: 360-39149
Prep Batch: 360-39106
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume: 50 mL
Final Weight/Volume: 50 mL

	% Rec.						
Analyte	LCS	LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Iron	102	92	80 - 120	11	20		

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation Job Number: 360-20062-1

Method Blank - Batch: 360-39159

Method: 6010B
Preparation: N/A

Lab Sample ID: MB 360-39159/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/26/2008 1647
Date Prepared: N/A

Analysis Batch: 360-39159
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 1.0 mL

Analyte	Result	Qual	MDL	RL
Iron	ND		16	100

Lab Control Spike/
Lab Control Spike Duplicate Recovery Report - Batch: 360-39159

Method: 6010B
Preparation: N/A

LCS Lab Sample ID: LCS 360-39159/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/26/2008 1644
Date Prepared: N/A

Analysis Batch: 360-39159
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 10 mL

LCSD Lab Sample ID: LCSD 360-39159/7
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/26/2008 1719
Date Prepared: N/A

Analysis Batch: 360-39159
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 10 mL

Analyte	% Rec. LCS	% Rec. LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Iron	99	99	80 - 120	0	20		

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-20062-1

Matrix Spike - Batch: 360-39159

Method: 6010B
Preparation: N/A

Lab Sample ID: 360-20062-1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/26/2008 1713
Date Prepared: N/A

Analysis Batch: 360-39159
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 10 mL

Analyte	Sample Result/Qual	Spike Amount	Result	% Rec.	Limit	Qual
Iron	2600	5000	7160	91	75 - 125	

Duplicate - Batch: 360-39159

Method: 6010B
Preparation: N/A

Lab Sample ID: 360-20062-1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/26/2008 1710
Date Prepared: N/A

Analysis Batch: 360-39159
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 1.0 mL

Analyte	Sample Result/Qual	Result	RPD	Limit	Qual
Iron	2600	2610	0	20	

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-20062-1

Method Blank - Batch: 360-39254

Method: L107-06-1B
Preparation: Distill/Ammonia

Lab Sample ID: MB 360-39254/1-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 12/03/2008 1450
Date Prepared: 12/03/2008 1245

Analysis Batch: 360-39263
Prep Batch: 360-39254
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 50 mL

Analyte	Result	Qual	RL	RL
Ammonia	ND		0.10	0.10

Lab Control Spike - Batch: 360-39254

Method: L107-06-1B
Preparation: Distill/Ammonia

Lab Sample ID: LCS 360-39254/2-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 12/03/2008 1451
Date Prepared: 12/03/2008 1245

Analysis Batch: 360-39263
Prep Batch: 360-39254
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 50 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Ammonia	10.0	9.56	96	85 - 115	

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation Job Number: 360-20062-1

Lab Control Spike - Batch: 360-39118

Method: SM 4500 H+ B
Preparation: N/A

Lab Sample ID: LCS 360-39118/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/26/2008 0900
Date Prepared: N/A

Analysis Batch: 360-39118
Prep Batch: N/A
Units: SU

Instrument ID: MAN-TECH Ion Plus
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 1.0 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
pH	6.00	5.960	99	90 - 110	

Duplicate - Batch: 360-39118

Method: SM 4500 H+ B
Preparation: N/A

Lab Sample ID: 360-20062-1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/26/2008 0911
Date Prepared: N/A

Analysis Batch: 360-39118
Prep Batch: N/A
Units: SU

Instrument ID: MAN-TECH Ion Plus Autoti
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 1.0 mL

Analyte	Sample Result/Qual	Result	RPD	Limit	Qual
pH	6.64	6.730	1	20	

Calculations are performed before rounding to avoid round-off errors in calculated results.

VPH SAMPLE INFORMATION DATA

SAMPLE INFORMATION

Sample ID: 20062-1 Batch# **39248**

Matrix	☒ Aqueous	☐ Soil	☐ Sediment	☐ Other			
Containers	☒ Satisfactory	☐ Broken	☐ Leaking:				
Sample Preservatives	Aqueous (acid Preserved)	☐ N/A	☒ pH<2	☐ pH>2	Comment:		
	Aqueous (TSP Preserved)	☒ N/A	☐ pH<11	☐ pH>11	Comment:		
	Soil or Sediment	☒ N/A container	☐ Samples NOT preserved in Methanol or air-tight			g Soil/sediment mL Methanol	
		☐ Samples rec'd in Methanol: ☐ not covering soil/sediment	☐ covering soil/sediment			☐ 1:1 +/-25%	
		☐ Samples received in air-tight container:				☐ Other:	
Temperature	☒ Received on Ice	☒ Received at 4°C ± 2°C	☐ Other:	°C			

Sample ID: 20062-2 Batch# **39248**

Matrix	☒ Aqueous	☐ Soil	☐ Sediment	☐ Other			
Containers	☒ Satisfactory	☐ Broken	☐ Leaking:				
Sample Preservatives	Aqueous (acid Preserved)	☐ N/A	☒ pH<2	☐ pH>2	Comment:		
	Aqueous (TSP Preserved)	☒ N/A	☐ pH<11	☐ pH>11	Comment:		
	Soil or Sediment	☒ N/A container	☐ Samples NOT preserved in Methanol or air-tight			g Soil/sediment mL Methanol	
		☐ Samples rec'd in Methanol: ☐ not covering soil/sediment	☐ covering soil/sediment			☐ 1:1 +/-25%	
		☐ Samples received in air-tight container:				☐ Other:	
Temperature	☒ Received on Ice	☒ Received at 4°C ± 2°C	☐ Other:	°C			

Sample ID: 20062-3 Batch# **39248**

Matrix	☒ Aqueous	☐ Soil	☐ Sediment	☐ Other			
Containers	☒ Satisfactory	☐ Broken	☐ Leaking:				
Sample Preservatives	Aqueous (acid Preserved)	☐ N/A	☒ pH<2	☐ pH>2	Comment:		
	Aqueous (TSP Preserved)	☒ N/A	☐ pH<11	☐ pH>11	Comment:		
	Soil or Sediment	☒ N/A container	☐ Samples NOT preserved in Methanol or air-tight			g Soil/sediment mL Methanol	
		☐ Samples rec'd in Methanol: ☐ not covering soil/sediment	☐ covering soil/sediment			☐ 1:1 +/-25%	
		☐ Samples received in air-tight container:				☐ Other:	
Temperature	☒ Received on Ice	☒ Received at 4°C ± 2°C	☐ Other:	°C			

VPH SAMPLE INFORMATION DATA

SAMPLE INFORMATION

Sample ID: 20062-4 Batch# **39248**

Matrix	☒ Aqueous	☐ Soil	☐ Sediment	☐ Other			
Containers	☒ Satisfactory	☐ Broken	☐ Leaking:				
Sample Preservatives	Aqueous (acid Preserved)	☐ N/A	☒ pH<2	☐ pH>2	Comment:		
	Aqueous (TSP Preserved)	☒ N/A	☐ pH<11	☐ pH>11	Comment:		
	Soil or Sediment	☒ N/A container	☐ Samples NOT preserved in Methanol or air-tight			g Soil/sediment mL Methanol	
		☐ Samples rec'd in Methanol: ☐ not covering soil/sediment	☐ covering soil/sediment			☐ 1:1 +/-25%	
		☐ Samples received in air-tight container:				☐ Other:	
Temperature	☒ Received on Ice	☒ Received at 4°C ± 2°C	☐ Other:	°C			

Sample ID: 20062-5 Batch# **39248**

Matrix	☒ Aqueous	☐ Soil	☐ Sediment	☐ Other			
Containers	☒ Satisfactory	☐ Broken	☐ Leaking:				
Sample Preservatives	Aqueous (acid Preserved)	☐ N/A	☒ pH<2	☐ pH>2	Comment:		
	Aqueous (TSP Preserved)	☒ N/A	☐ pH<11	☐ pH>11	Comment:		
	Soil or Sediment	☒ N/A container	☐ Samples NOT preserved in Methanol or air-tight			g Soil/sediment mL Methanol	
		☐ Samples rec'd in Methanol: ☐ not covering soil/sediment	☐ covering soil/sediment			☐ 1:1 +/-25%	
		☐ Samples received in air-tight container:				☐ Other:	
Temperature	☒ Received on Ice	☒ Received at 4°C ± 2°C	☐ Other:	°C			

Sample ID: 20062-6 Batch# **39248**

Matrix	☒ Aqueous	☐ Soil	☐ Sediment	☐ Other			
Containers	☒ Satisfactory	☐ Broken	☐ Leaking:				
Sample Preservatives	Aqueous (acid Preserved)	☐ N/A	☒ pH<2	☐ pH>2	Comment:		
	Aqueous (TSP Preserved)	☒ N/A	☐ pH<11	☐ pH>11	Comment:		
	Soil or Sediment	☒ N/A container	☐ Samples NOT preserved in Methanol or air-tight			g Soil/sediment mL Methanol	
		☐ Samples rec'd in Methanol: ☐ not covering soil/sediment	☐ covering soil/sediment			☐ 1:1 +/-25%	
		☐ Samples received in air-tight container:				☐ Other:	
Temperature	☒ Received on Ice	☒ Received at 4°C ± 2°C	☐ Other:	°C			

Login Sample Receipt Check List

Client: Olin Corporation

Job Number: 360-20062-1

Login Number: 20062
List Source: TestAmerica Westfield
Creator: Tremblay, Kara R
List Number: 1

Question	T / F/ NA	Comment
Radioactivity either was not measured or, if measured, is at or below background	N/A	
The cooler's custody seal, if present, is intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	4.0 C / 3.2 C
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	True	
If necessary, staff have been informed of any short hold time or quick TAT needs	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	

TestAmerica Laboratories, Inc.

Chain of Custody Form

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

•53 Southampton Road
Westfield, MA 01085
(P) 413-572-4000
(F) 413-572-3707

•149 Rangeway Road
N. Billerica, MA 01862
(P) 978-667-1400
(F) 978-667-7871

Client: Olin Chemical/MACTEC
Address: 51 Eames Street
Wilmington, MA 01887
Phone: Fax:

Project #: 610008016
Project Manager: Peter Thompson
Work ID: Plant B
Contact: David Chapman

Job# 360-20062 | Quote# | PO#

Requested Turn Around Time
10 Business Day (Std) XX | Rush TAT Requested:
15 Business Day | 24 hrs | 72 hrs
Other | 48 hrs | 5 Day

Regulatory Classification / Special Report Format
NPDES | Drinking Water | DEP Form(s)
RCRA | MCP GW1/S1 | MWRA Smart Rpt
Other | MCP QA/QC Rpt XX

Shaded areas for office use

Analysis Requested
Check analysis and specify method and analytes in comments section.
For example:
500-series for drinking water
600-series for waste water
8000-series for haz/solid waste
Use comments section to further define.

Comments
(Special Instructions)

MCP case narrative

Sample Type Codes
WW-Wastewater DW-Drinking water SW-Surfacewater
LW-Labwater GW-Groundwater A-Air
S-Solid / Soil SL-Sludge O-Oil Z-Other

Sample ID (DLC)	Sample Type	Sampler's Initials	Date / Time Collected	Grab	Comp.	# Containers	Plastic(P) or Glass(G)	Preservative: NaHSO4/MeOH	HNO3 to pH <2	H2SO4 to pH <2	HCl to pH <2	NaOH to pH >12	NAOH/ZNAC	None / 4° C	8260	VPH	8270	Ammonia	Iron by 6010	pH	Other Total Fe	Other	Other	Other	Other	Other	Other
~~OC-GW-15~~	~~GW~~	~~MAM~~	~~11-24-08 11:55~~	X		12	VG		4	1	7			3	X	X	X	X	X	X						
OC-GW-16	GW	MAM	11-24-08 9:30	X		13	VG		2	1	7			3	X	X	X	X	X	X						
OC-IW-10	GW	MAM	11-24-08 11:40	X		13	VG		2	1	7			3	X	X	X	X	X	X						
OC-GW-13	GW	MAM	11-24-08 13:10	X		13	VG		2	1	7			3	X	X	X	X	X	X						
OC-IW-6	GW	DLC	11-24-08 9:45	X		13	VG		2	1	7			3	X	X	X	X	X	X						
OC-GW-101	GW	DLC	11-24-08 11:45	X		13	VG		2	1	7			3	X	X	X	X	X	X						
OC-B-03	GW	DLC	11-24-08 13:15	X		13	VG		2	1	7			3	X	X	X	X	X	X						

8260 Compounds Only:
2,4,4 Trimethyl-1-pentene
2,4,4 Trimethyl-2-pentene

8270 Comounds Only:
NDPA
BEHP

Page 47 of 47

Sampled by (print): David Chapman / Mark Maggiore
Signature:

Relinquished by:	Date: 11/25/08	Time: 1115	Received by:	Date: 11/25/08	Time: 1115
Relinquished by:	Date: 11/25/08	Time: 1610	Received by: Kara Trembley	Date: 11/25/08	Time: 1610
Method of shipment:			**TestAmerica-Westfield**		

Cooler ? (Y) / N Samples Iced? (Y) / N
Temp @ receipt: 4.0/3.2 °C
Preservation/pH checked Yes
By: KRT Date: 11/25/08

White = Lab file Yellow = Report copy Pink = Customer copy
STL-8245 (1000)

Just Trimethylbenzenes analyzed

OLIN-WILMINGTON
LEVEL I DATA QUALITY EVALUATION
STANDARD OPERATING PROCEDURE AND CHECKLIST
VOLATILE ORGANICS BY METHOD SW8260B/624

Reviewer/Date Tige Cunningham 12-16-08
Sr. Review/Date Chris Grant 20062 1/22/09
Lab Report # TAL 360-~~19969~~-1
Project # 610008001G-15B
SDG 360-20062-1

Note: The following analyses will be evaluated according to the "MADEP QA/QC Guidelines for **Sampling, Data Evaluation and Reporting Activities.**" MADEP, however, may not list QA/QC criteria for every chemical analysis. Where not defined by MADEP, criteria will default to values stipulated in the QAPP. Where the QAPP does not define criteria, QA/QC requirements will default to limits employed by the laboratory.

* NO Quals *

1.0 Laboratory Deliverable Requirements

1.1 Laboratory Information: Was all of the following provided in the laboratory report? **Yes** [✓] No [ ] N/A [ ] Comments:
Check items received.

☑ *Name of Laboratory* ☑ *Address* ☑ *Project ID* ☑ *Phone #* ☑ *Sample identification – Field and Laboratory*
Client Information: ☑ *Name* ☑ *Address* ☑ *Client Contact* *(IDs must be cross-referenced)*

ACTION: If no, contact lab for submission of missing or illegible information.

1.2 Laboratory Report Certification Statement ***Yes*** [✓] ***No*** [~~✓~~] (TC) ***N/A*** [ ] ***Comments:***

Does the laboratory report include a completed Analytical Report Certification in the required format?

ACTION: *If no, contact lab for submission of missing certification or certification with correct format.*

1.3 Laboratory Case Narrative: ***Yes*** [✓] ***No*** [ ] ***N/A*** [ ] ***Comments:***

☑ *Narrative serves as an exception report for the project and method QA/QC performance.* ☐ *Narrative includes an explanation of each discrepancy on the Certification Statement.*

ACTION: *If no, contact lab for submission of missing or illegible information.*

1.4 Chain of Custody (COC) copy present with all documentation completed? **Yes** [✓] No [ ] N/A [ ] Comments:

Does the laboratory report include completed Chain of Custody forms containing all samples in this SDG?

NOTE: Olin receives and maintains the *original* COC.

ACTION: If no, contact lab for submission of copy of completed COC.

1.5 Sample Receipt Information (*Cooler Receipt Form present?*):

Yes [✓] No [ ] N/A [ ] Comments:

Were each of the following tasks completed and recorded upon receipt of the sample(s) into the laboratory?

☑ Sample temperature confirmed: must be 1° – 10° C. (If samples were sent by courier and delivered on the same day as collection, temperature requirement does not apply).

☑ Container type noted ☑ Condition observed ☑ Field and lab IDs cross referenced

ACTION: If no, contact lab for submission of missing or incomplete documentation.

1.5.1 Were the correct bottles and preservatives used? Yes [✓] No [ ] N/A [ ] Comments:

Water - 40 mL VOA vial/HCL to pH<2, cool to 4°C
Soil - 5 gram Encore™/cool to 4°C or 40 mL VOA vial with field preservation of sodium bisulfate (low-level) or methanol (high-level) or field preservation in water if soils are reactive to sodium bisulfate (i.e. alkaline conditions, excessive humic acid content, etc.)

ACTION: If no, inform senior chemist. Document justification for change in container/volume (if applicable); qualify both positive data and non-detect data (J) if cooler temperature exceeds 10°C. Rejection of data requires professional judgment

ACTION: If each VOA vial for a sample contains air bubbles or the VOA vial analyzed contained air bubbles, flag positives (J) and reject nondetects (R).

1.5.2 Were all samples delivered to the laboratory without breakage? Yes [✓] No [ ] N/A [ ] Comments:

1.5.3 Does the *Cooler Receipt Form* or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data? Yes [ ] **No [✓]** N/A [ ] Comments:

1.6 Sample Results Section: *Was the following information supplied in the laboratory report for each sample?* Yes [✓] No [ ] N/A [ ] Comments:

☑ Field ID and Lab ID ☑ Date and time collected ☑ Analyst Initials ☑ Dilution Factor ☐ % moisture or solids N/A ☑ Reporting limits
☐ *Clean-up method* N/A ☑ Analysis method ☑ Preparation method ☑ Date of preparation/extraction/digestion clean-up and analysis, where applicable
☑ Matrix ☑ Target analytes and concentrations ☑ Units (soils must be reported in dry weight)

ACTION: If no, contact lab for submission of missing or incomplete information.

1.7 QA/QC Information: Was the following information provided in the laboratory report for each sample batch? Yes [✓] No [ ] N/A [ ] Comments:

☑ Method blank results ☑ LCS recoveries ☐ MS/MSD recoveries and RPDs (Not Collected) ☑ Surrogate recoveries

ACTION: If no, contact lab for submission of missing or incomplete information.

2.0 Holding Times

Have any technical holding times, determined from date of collection to date of analysis, been exceeded? Yes [ ] **No [✓]** N/A [ ] Comments:

For water samples, the holding time is 7 days (aromatics) from sampling for unpreserved samples and 14 days for preserved samples.

For soil samples, the holding time is 14 days from sampling if field preserved with sodium bisulfate/methanol/or water. If an Encore™ sampler was used, the lab must ***preserve*** the sample within 48 hours. Analytical holding time from time of preservation is 14 days.

NOTE: List samples that exceed hold time with # of days exceeded on checklist

ACTION: If technical holding times are exceeded, qualify all positive results (J) and non-detects (UJ). For water samples that are grossly exceeded (>2X hold time) reject (R) all non-detect results. For soil samples professional judgement will be used to determine if rejection is necessary.

3.0 Laboratory Method

3.1 Was the correct laboratory method used? **Yes [✓]** No [ ] N/A [ ] Comments:

Purge and Trap	Water: 5030B	Soil: 5035
Volatile Organics	8260B	

ACTION: If no, contact lab to provide justification for method change compared to the requested method. Contact senior chemist to inform Client of change or to request variance.

3.2 Are the practical quantitation limits the same as those specified by the ☑ SOW ☐ QAPP ☐ Lab ☐ MADEP **Yes [✓]** No [ ] N/A [ ] Comments:

Evaluate PQLs with respect to sample matrix, preparation, dilution, moisture, etc. If sample PQL is indeterminate, contact lab for explanation. Provide a listing of all samples with PQLs that are elevated due to dilution, sample matrix, or preparation factors.

3.3 Are the appropriate parameter results present for each sample in the SDG? Yes [✓] No [ ] N/A [ ] Comments:

NOTE: *The MADEP QA/QC Guidelines requires a minimum compound reporting list for volatile organic compounds. Determine target compound requirement and verify reporting list.*

3.4 Were Tentatively Identified Compounds (TICs) reported? Yes [ ] No [✓] N/A [ ] Comments:

***NOTE**: TICs are only required for samples with full MADEP target list. Determine if TICs are required. MADEP requires that all TICs be reported to the LCS. Per the MADEP guidance, TICs, which are identified as aliphatic hydrocarbons, do not have to be reported as TICs. However, these compounds must be evaluated as part of the health-based risk assessment approach (VPH/EPH).*

***ACTION**: Qualify reported TIC results as estimated and flag (NJ).*

3.5 If *dilutions were required, were dilution factors reported?* Yes [✓] No [ ] N/A [ ] Comments:

NOTE: *MADEP guidance states that if a diluted and an undiluted analysis is performed, the laboratory should report results for the lowest dilution within the valid calibration range for each analyte.*

ACTION: If no, contact the lab for submission.

4.0 Method Blanks

4.1 Are the Method Blank Summaries present? Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If no, call the laboratory for submission of missing data.

4.2 Was a method blank analyzed for each analytical batch of 20 samples or less? Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If no, document discrepancy in case narrative and contact lab for justification. Consult senior chemist for action needed.

4.3 Is the method blank less than the PQL? (See attached table for PQLs). **Yes [✓]** No [ ] N/A [ ] Comments:

NOTE: *MADEP allows common laboratory contaminants (acetone, methylene chloride and 2-butanone) to be present at concentrations < 5x the PQL.*

4.4 Do any method blanks have positive results for VOC parameters? Qualify data according to the following: Yes [ ] **No [✓]** N/A [ ] Comments:

For the common contaminants (methylene chloride, acetone, toluene, and 2-butanone):

If the sample concentration is < 10 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 10 × blank value, no qualification is needed.

For other VOC contaminants:

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

ACTION: If any blank has positive results, list all the concentrations detected and flagging level (flagging level = 10x or 5 × blank value) on the checklist. List all affected samples and their qualifiers.

5.0 Laboratory Control Standards

5.1 Was a laboratory control standard (LCS) run with each analytical batch of 20 samples or less? **Yes [✓]** No [ ] N/A [ ] Comments:

ACTION: If no, call laboratory for LCS form submittal. If data is not available, use professional judgment to determine qualification actions for data associated with that batch.

5.2 Is a LCS Summary Form present? Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact lab for resubmission of missing data.

5.2 Is the recovery of any analyte outside of control limits? Yes [✓] **No** [ ] N/A [ ] Comments:

Batch 360-39364

Limits 70-130

244 Timethyl-2-Pentene LCS = 141% LCSD = 144

NO Associated samples ~~QC Iw-6 detection Qualified estimated~~ had Positive detects, NO Quals. ~~(J) @ 910 ug/L~~ (C)

NOTE: *A full target, second source LCS is required by MADEP.*

NOTE: Use *MADEP guidelines list LCS recovery limits of 70-130.*

ACTION: If recovery is above the upper limit, qualify all positive sample results within the batch as (J). If recovery is below the lower limit but > 10%, qualify all positive and no-detect results within the batch as (J). If LCS recovery is <10%, non-detect results are rejected (R). Document qualified compounds and percent recoveries in the validation report.

5.4 Are 80% of LCS recoveries within laboratory control limits? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If 80% of LCS recoveries are not within limits, use professional judgment and consult Senior Chemist.

6.0 Matrix Spikes

Matrix spikes may be collected at different frequencies based on monthly, quarterly, or task specific schedules. Confirm spike requirements for each set with the senior chemist.

6.1 Were project-specific MS/MSDs collected? List project samples that were spiked. **Yes** [ ] No [✓] N/A [ ] Comments:

ACTION: If no, contact senior chemist to see if any were specified.

6.2 Is the MS/MSD Recovery Form present? **Yes** [ ] No [ ] N/A [✓] Comments:

ACTION: If no, contact lab for resubmission of missing data.

6.3 Were matrix spikes analyzed at the required frequency of 1 per 20 samples per matrix? **Yes** [ ] No [ ] N/A [✓] Comments:

ACTION: If any matrix spike data is missing, call lab for resubmission.

6.4 Are any VOC spike recoveries outside of the QC limits?

Yes [ ] **No** [ ] N/A [✓] Comments:

NOTE: $\%R = \frac{(SSR-SR)}{SA} \times 100\%$ Where: SSR = Spiked sample result
SR = Sample result
SA = Spike added

NOTE: *A full target, second source MS/MSD is required by MADEP.*

NOTE: *MADEP guidelines list MS/MSD recovery limits as 70-130.*

NOTES: 1) If only one of the recoveries for an MS/MSD pair is outside of the control limits, no qualification is necessary. Use professional judgment for the MS/MSD flags.
2) If the MS/MSD was performed by the laboratory on a non-project sample, no qualification is required.

ACTION: MS/MSD flags only apply to the sample spiked. If the recoveries of the MS and MSD exceed the upper control limit, qualify positive results as estimated (J). If the recoveries of the MS and MSD are lower than the lower control limit, qualify both positive results and non-detects (J). If recovery is < 10%, reject non-detects (R).

6.5 Are any RPDs for MS/MSD recoveries outside of the QA/QC limits?

Yes [ ] **No** [ ] N/A [✓] Comments:

NOTE: $RPD = \frac{S - D}{(S + D)/2} \times 100\%$ Where S = MS result
D = MSD result

NOTE: *MADEP guidelines list MS/MSD RPD limits for both water and soils as ≤ 20.*

ACTION: If the RPD exceeds the control limit, qualify positive results and non-detects (J).

7.0 Surrogate Recoveries

Were one or more VOC surrogate recoveries outside of laboratory limits for any Yes [✓] **No** [ ] N/A [ ] Comments:

sample or method blank? If yes, were samples re-analyzed?

Dibromofluoromethane out high @ 137%. No detections reported no Quals

NOTE: %R = QD x 100% Where: S = MS sample result
D = MSD sample result

NOTE: No qualification is required if two of the surrogates are within acceptable QC limits. If surrogate recoveries fail due to dilution, results are not flagged. Document on checklist and in the case narrative.

NOTE: *MADEP guidelines list surrogate limits for both water and soils as 70-130%. Surrogate recovery limits greater than ± 30% are allowed for difficult matrices (wastes, sludges, etc.) with appropriate analytical documentation.*

ACTION: If recoveries are >10%, but fail to meet quality control criteria: (1) For recoveries below the QC limit but >10%, qualify nondetects and positives (J), and (2) For recoveries above the QC limit, qualify only positives (J). If any surrogate recovery is <10% (unless the QC limits are below 10%, in which case, results are flagged as stated above), flag positives (J) and reject nondetects (R).

8.0 Sampling Accuracy

8.1 Were trip blanks shipped with VOC samples and analyzed?

Yes [ ] No [✓] N/A [ ] Comments:

NOTE: *MADEP requires trip blanks per the following frequency:*

	Soil/Sediment	Aqueous	Drinking Water
Option 1	Not Required	Not Required	1 per cooler VOAs/VPH
Option 3	1 per 10 samples	1 per 10 samples	1 per 10 samples

8.2 Do any trip blanks have positive results?

Yes [ ] **No** [ ] N/A [✓] Comments:

ACTION: Prepare a list of samples shipped in the same cooler as a contaminated blank.

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

The majority of ground water samples are collected directly from a tap, process stream, or with dedicated tubing. Rinse blanks will not be collected. Yes [ ] No [ ] N/A [✓] Comments:

8.3 Were rinsate blanks collected? Prior to evaluating rinsate blanks, obtain a list of the associated samples from the senior chemist.

NOTE: *MADEP does not specify the collection of rinsate blanks.*

8.4 Do any rinsate blanks have positive results? Yes [ ] **No [✓]** N/A [ ] Comments:

ACTION: Evaluate rinsate results against blank results to determine if contaminant may be laboratory-, ambient-, or shipment-derived. If results are not lab-, ambient-, or shipment-related, qualify according to the table above (8.2).

9.0 **Field Duplicates**

9.1 Were field duplicate samples collected? Obtain a list of samples and their associated field duplicates. **Yes [ ]** No [✓] N/A [ ] Comments:

9.2 Were field duplicates collected per the required frequency? **Yes [ ]** No [ ] N/A [✓] Comments:

☐ SOW ☐ QAPP *(1 per 10)* ☐ *MADEP Option 1(1 per 20)*

☐ *MADEP Option 3 (1 per 10)*

9.3 Was the RPD ≤ 50% for soils or 30% for waters? Calculate the RPD for all results and attach to this review. **Yes [ ]** No [ ] N/A [✓] Comments:

ACTION: Qualify data (J) for both sample results if the RPD goal is exceeded.

10.0 Application of Validation Qualifiers

Was any of the data qualified? Yes [ ] **No [✓]** N/A [ ] Comments:

If so, apply data qualifiers directly to the DQE copy of laboratory report and **flag pages** for entry in database.

REFERENCES

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U.S. Environmental Protection Agency (USEPA), 1996. "Region 1 EPA-NE Data Validation Guidelines For Evaluating Environmental Analyses"; Quality Assurance Unit Staff; Office of Environmental Measurement and Evaluation; December 1996.

MADEP, 2001. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Massachusetts Quality Assurance / Quality Control (QA / QC Requirements," BWSC-CAM, Interim Final Draft, Revision No. 2, 5 October 2001.

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Plant B November Quarterly Groundwater

Version 1.2, Nov 2002

OLIN-WILMINGTON
LEVEL I DATA QUALITY EVALUATION
STANDARD OPERATING PROCEDURE AND CHECKLIST
SEMI-VOLATILE ORGAINICS BY METHOD 8270C/625

Reviewer/Date Tige Cunningham 1/16/09
Sr. Review/Date Chris Ricardi 1/22/09
Lab Report # SDG 360-20062-1
Project # G1000800 10 - 15B

NO Quals

1.0 Laboratory Deliverable Requirements

1.1 Laboratory Information: Was all of the following provided in the laboratory report? **Yes** [☑] No [ ] N/A [ ] Comments:
Check items received.

☑ *Name of Laboratory* ☑ *Address* ☑ *Project ID* ☑ *Phone #* ☑ *Sample identification – Field and Laboratory*
Client Information: ☑ *Name* ☑ *Address* ☑ *Client Contact* *(IDs must be cross-referenced)*

ACTION: If no, contact lab for submission of missing or illegible information.

1.2 Laboratory Report Certification Statement ***Yes*** [☑] *No* [ ] *N/A* [ ] *Comments:*

Does the laboratory report include a completed Analytical Report Certification in the required format?

***ACTION**: If no, contact lab for submission of missing certification or certification with correct format.*

1.3 Laboratory Case Narrative: ***Yes*** [☑] *No* [ ] *N/A* [ ] *Comments:*

☑ *Narrative serves as an exception report for the project and method QA/QC performance.* ☐ *Narrative includes an explanation of each discrepancy on the Certification Statement.*

***ACTION**: If no, contact lab for submission of missing or illegible information.*

1.4 Chain of Custody (COC) copy present of completed COC? **Yes** [☑] No [ ] N/A [ ] Comments:

Does the laboratory report include a copy of the completed Chain of Custody forms containing all samples in this SDG?

NOTE: Olin receives and maintains the *original* COC.

ACTION: If no, contact lab for submission of missing completed *COC.*

1.5 Sample Receipt Information (*Cooler Receipt Form*): Were each of the following tasks completed and recorded upon receipt of the sample(s) into the laboratory? **Yes [✓]** No [ ] N/A [ ] Comments:

☑ Sample temperature confirmed: must be 1° – 10° C. (If samples were sent by courier and delivered on the same day as collection, temperature requirement does not apply).

☑ Container type noted ☑ Condition observed ☑ pH verified (where applicable) ☑ Field and lab IDs cross referenced

ACTION: If no, contact lab for submission of missing or incomplete documentation.

1.5.1 Were the correct bottles and preservatives used? **Yes [✓]** No [ ] N/A [ ] Comments:

Water - 1 Liter amber bottle/cool to 4°C
Soil - 8 oz soil jar/cool to 4°C

ACTION: If no, inform senior chemist. Document justification for change in container/volume (if applicable), qualify positive and non-detect data (J) if cooler temperature exceeds 10°C. Rejection of data requires professional judgment.

1.5.2 Were all samples delivered to the laboratory without breakage? **Yes [✓]** No [ ] N/A [ ] Comments:

1.5.3 Does the *Cooler Receipt Form* or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data? Yes [ ] **No [✓]** N/A [ ] Comments:

1.6 Sample Results Section: *Was the following information supplied in the laboratory report for each sample?* **Yes [✓]** No [ ] N/A [ ] Comments:

☑ Field ID and Lab ID ☑ *Date and time collected* ☑ Analyst Initials ☑ *Dilution Factor* ☐ % moisture or solids N/A ☑ *Reporting limits*
☐ *Clean-up method* N/A ☐ Analysis method ☑ *Preparation method* ☑ *Date of preparation/extraction/digestion clean-up and analysis, where applicable*
☑ Matrix ☑ Target analytes and concentrations ☑ Units (soils must be reported in dry weight)

ACTION: If no, contact lab for submission of missing or incomplete information.

1.7 QA/QC Information: Was the following information provided in the laboratory report for each sample batch? Yes [✓] No [ ] N/A [ ] Comments:

☑ Method blank results ☑ LCS recoveries ☐ MS/MSD recoveries and RPDs ☑ Surrogate recoveries

Not Collected

ACTION: If no, contact lab for submission of missing or incomplete information.

2.0 Holding Times Yes [ ] No [✓] N/A [ ] Comments:

Have any technical holding times, determined from date of collection to date of analysis, been exceeded?

NOTE: For water samples, the holding time is 7 days from sampling to extraction and 40 days from extraction to analysis. For soil samples, the holding time is 14 days from sampling to extraction and 40 days from extraction to analysis.

ACTION: If technical holding times are exceeded, qualify all positive results (J) and non-detects (UJ). For water samples that are grossly exceeded (>2X hold time) reject (R) all non-detect results. For soil samples professional judgement will be used to determine if rejection is necessary.

3.0 Laboratory Method Yes [✓] No [ ] N/A [ ] Comments:

3.1 Was the correct laboratory method used?

Water Extraction	3510C or *3520C*
Soil Extraction	*3540C* or 3550B
Semi-volatile Organics	8270C

ACTION: If no, contact project manager to inform Client of change; request variance from Client; contact laboratory to provide justification for method change compared to the requested method.

3.2 Are the practical quantitation limits the same as those specified by the ☑ SOW ☐ QAPP ☐ Lab? Yes [✓] No [ ] N/A [ ] Comments:

NOTE: *The QAPP and MADEP QA/QC Guidelines provides PQLs for semi-volatile organic compounds. Verify proper PQLs were used for each data set.*

ACTION: If no, evaluate change with respect to sample matrix, preparation, dilution, moisture, etc. If sample PQL is indeterminate, contact lab for explanation.

3.3 Are the appropriate parameter results present for each sample in the SDG? Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If no, check Request for Analysis to verify if method was ordered and COC to verify that it was sent, and contact lab for resubmission of the missing data

3.4 Were Tentatively Identified Compounds (TICs) reported? Yes [ ] No [✓] N/A [ ] Comments:

NOTE *TICs are only required for samples with full MADEP target list. Determine if TICs are required. MADEP requires that all TICs be reported to the LCS. Per the MADEP guidance, TICs, which are identified as aliphatic hydrocarbons, do not have to be reported as TICs. However, these compounds must be evaluated as part of the health-based risk assessment approach (VPH/EPH).*

ACTION*: Qualify reported TIC results as estimated and flag (NJ).*

3.5 If *dilutions were required, were dilution factors reported?* Yes [✓] No [ ] N/A [~~✓~~] (TC) Comments:

ACTION: If no, contact the lab for submission.

4.0 Method Blanks

4.1 Is the Method Blank Summary present? Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If no, call the laboratory for submission of missing data.

4.2 For the analysis of SVOCs, has a method blank been analyzed for each analysis batch of field samples of 20 or less? Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If no, document discrepancy in case narrative and contact lab for justification. Consult senior chemist for action needed.

4.3 Is the method blank less than the PQL? Yes [✓] No [ ] N/A [ ] Comments:

NOTE: *MADEP allows common laboratory contaminants (such as phthalates) to be present at concentrations < 5x the PQL*

4.4 Do any method blanks have positive results for SVOC parameters? Qualify data according to the following: Yes [ ] No [✓] N/A [ ] Comments:

For the common contaminants (phthalates):

If the sample concentration is < 10 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 10 × blank value, no qualification is needed.

For other SVOC contaminants:

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

ACTION: For any blank with positive results, list all contaminants for each method blank, including the concentration detected and the flagging level (flagging level = 5x or 10x the blank value) and the associated samples and qualifiers.

5.0 Laboratory Control Standard

5.1 Was a laboratory control standard run with each analytical batch of 20 samples or less? Yes [✓] No [ ] N/A [ ] Comments:

ACTION: Call laboratory for LCS form submittal. If data are not available, use professional judgment to determine the usability of sample results associated with that batch.

5.2 Is a LCS Summary Form present? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact lab for resubmission of missing data.

5.3 Is the recovery of any analyte outside of control limits? Yes [ ] **No** [✓] N/A [ ] Comments:

NOTE: *A full target, second source LCS is required by MADEP.*

NOTE: *MADEP guidelines list LCS recovery limits as 40-140 for base-neutral compounds and 30-130 for the acid compounds. The laboratory must identify analytes that routinely exceed these limits.*

RPD between LCS & LCSD was 23 (control = 20) for BEHP. Recoveries w/in Limits No Quals made (TC)

ACTION: If recovery is above the upper limit, qualify all positive sample results within the batch as (J). If recovery is below the lower limit but > 10%, qualify all positive and no-detect results within the batch as (J). If LCS recovery is <10%, non-detect results are rejected (R).

5.4 Are 80% of LCS recoveries within laboratory control limits? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If 80% of LCS recoveries are not within limits, use professional judgment and consult Senior Chemist.

6.0 Matrix Spikes

Matrix spikes may be collected at different frequencies based on monthly, quarterly, or task specific schedules. Confirm spike requirements for each set with the senior chemist.

6.1 Were project specified MS/MSDs collected? List project samples that were spiked. **Yes** [ ] No [✓] N/A [ ] Comments:

ACTION: If no, contact senior chemist to see if any were specified.

6.2 Is the MS/MSD recovery form present? **Yes** [ ] No [ ] N/A [✓] Comments:

ACTION: If no, contact lab for resubmission of missing data.

6.3 Were matrix spikes analyzed at the required frequency of 1 per 20 samples per matrix? **Yes** [ ] No [ ] N/A [✓] Comments:

ACTION: If any matrix spike data are missing, call lab for resubmission.

6.4 Are any SVOC spike recoveries outside of the QC limits?

Yes [ ] **No** [ ] N/A [✓] Comments:

NOTE: $\%R = \frac{(SSR-SR)}{SA} \times 100\%$ Where: SSR = Spiked sample result
SR = Sample result
SA = Spike added

NOTE: *A full target, second source MS/MSD is required by MADEP.*

NOTE: *MADEP guidelines list MS/MSD recovery limits as 40-140 for base-neutral compounds and 30-130 for acid compounds.*

NOTES: 1) If only one of the recoveries for an MS/MSD pair is outside of the control limits, no qualification is necessary. Use professional judgment for the MS/MSD flags.
2) If the MS/MSD was performed by the laboratory on a non-project sample, no qualification is required.

ACTION: MS/MSD flags only apply to the sample spiked. If the recoveries of the MS and MSD exceed the upper control limit, qualify positive results as estimated (J). If the recoveries of the MS and MSD are lower than the lower control limit, qualify both positive results and non-detects (J). If LCS recovery is <10%, non-detect results are rejected (R).

6.5 Are any RPDs for MS/MSD recoveries outside of the QC limits? Yes [ ] **No** [ ] N/A [✓] Comments:

NOTE: RPD = $\frac{S-D}{(S+D)/2}$ x 100% Where: S = MS sample result
D = MSD sample result

NOTE: *MADEP guidelines list MS/MSD RPD limits for water as ≤ 20 and soils as ≤ 30.*

NOTE: Laboratory control limits apply when spiked sample results fall within the normal calibration range. If dilutions are required due to high sample concentrations, the data are evaluated, but no flags are applied.

ACTION: If the RPD exceeds the control limit, qualify positive results and non-detects (J).

7.0 Surrogate Recoveries

Were one or more SVOC surrogate recoveries outside of laboratory limits for any sample or method blank? If yes, were samples re-analyzed? Yes [✓] **No** [ ] N/A [ ] Comments:

NOTE: %R = QD x 100% Where: S = MS sample result
D = MSD sample result

NOTE: *MADEP guidelines list surrogate limits for soils as 30-130% for all surrogates, and for water as 30-130% for base-neutrals and 15-110% for acid surrogates.*

NOTE: Qualify BNE results based upon BNE surrogates and AE results based upon AE surrogates.

ACTION: If recoveries are >10%, but 2 or more from any one fraction (acid or base-neutral) fail to meet QC criteria: (1) For recoveries below the QC limit, qualify non-detects and positives (J), and (2) For recoveries above the QC limit, qualify only positives (J). If any surrogate recovery is <10% (unless the lab QC limits are below

Phenols are acid compounds.
only Phenol-d5 out in samples
so no Quals added to
the two B/N compounds reported.

10%, in which case, results are flagged as stated above), flag positives (J) and reject non-detects (R).

8.0 Sampling Accuracy

The majority of ground water samples are collected directly from a tap, process stream, or with dedicated tubing. Rinse blanks will not be collected.

8.1 Were rinsate blanks collected? Prior to evaluating rinsate blanks, obtain a list of the associated samples from the project chemist. Yes [ ] **No [✓]** N/A [ ] Comments:

NOTE: *MADEP does not specify the collection of rinsate blanks.*

8.2 Do any rinsate blanks have positive results? Yes [ ] **No [ ]** N/A [✓] Comments:

NOTE: For the common contaminants (phthalates), qualification is applied as indicated above using a 10x blank value in lieu of a 5x blank value.

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

9.0 Field Duplicates

9.1 Were field duplicate samples collected? Obtain a list of the samples and their associated field duplicates. Yes [ ] **No [✓]** N/A [ ] Comments:

9.2 Were field duplicates collected per the required frequency? **Yes [ ]** No [ ] N/A [✓] Comments:

☐ SOW ☐ QAPP ☐ *MADEP Option 1(1 per 20)* ☐ *MADEP Option 3 (1 per 10)*

9.3 Was the RPD ≤ 50% for soils or waters? Calculate the RPD for all results and **Yes [ ]** No [ ] N/A [✓] Comments:

attach to this review.

ACTION: RPD must be ≤50% for soil and water. Qualify data (J) for both sample results if the RPD exceeds 50%.

10.0 Application of Validation Qualifiers

Was any of the data qualified? Yes [ ] **No** [✓] N/A [ ] Comments:

If so, apply data qualifiers directly to the DQE copy of laboratory report and **flag pages** for entry in database.

REFERENCES

LAW, 1999, "Final Quality Assurance Project Plan, Olin Wilmington Property, 51 Eames Street, Wilmington, MA", LAW Engineering and Environmental Services, Kennesaw, GA 30144. August 1999.

STL-Westfield, 2002. "Olin – General Chemistry Control Limits (Soil & Water)," Severn Trent Laboratories, Inc., 53 Southampton Road, Westfield, MA, 01085.

U.S. Environmental Protection Agency (USEPA), 1996. "Region 1 EPA-NE Data Validation Guidelines For Evaluating Environmental Analyses"; Quality Assurance Unit Staff; Office of Environmental Measurement and Evaluation; December 1996

MADEP, 2001. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Massachusetts Quality Assurance / Quality Control (QA / QC Requirements," BWSC-CAM, Interim Final Draft, Revision No. 2, 5 October 2001.

MADEP, 2001. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Quality Assurance / Quality Control Guidelines for Sampling, Data Evaluation and reporting Activities, " BWSC-CAM, Section VII, Public Comment Draft, Revision No. 0, 21 December 2001.

Version 1.2, Nov 2002

OLIN-WILMINGTON
LEVEL I DATA QUALITY EVALUATION
STANDARD OPERATING PROCEDURE AND CHECKLIST
ICP METALS BY METHOD 6010B/200.7

Reviewer/Date Tige Cunningham 1/16/09
Sr. Review/Date Chm Reviewer 1/22/09
Lab Report # 360-20062-1
Project # 6100800016-15B

Total & Dissolved Fe — Nov 2008 Plant B Quarterly GW

1.0 Laboratory Deliverable Requirements

1.1 Laboratory Information: Was all of the following provided in the laboratory report? Yes [✓] No [ ] N/A [ ] Comments:
Check items received.

☑ *Name of Laboratory* ☑ *Address* ☑ *Project ID* ☑ *Phone #* ☑ *Sample identification – Field and Laboratory*
Client Information: ☑ *Name* ☑ *Address* ☑ *Client Contact* *(IDs must be cross-referenced)*

ACTION: If no, contact lab for submission of missing or illegible information.

1.2 Laboratory Report Certification Statement *Yes [✓] No [ ] N/A [ ] Comments:*

Does the laboratory report include a completed Analytical Report Certification in the required format?

***ACTION**: If no, contact lab for submission of missing certification or certification with correct format.*

1.3 Laboratory Case Narrative: *Yes [✓] No [ ] N/A [ ] Comments:*

☑ *Narrative serves as an exception report for the project and method QA/QC performance.* ☐ *Narrative includes an explanation of each discrepancy on the*

Certification Statement.

***ACTION**: If no, contact lab for submission of missing or illegible information.*

1.4 Chain of Custody (COC) copy present with all documentation completed Yes [✓] No [ ] N/A [ ] Comments:

NOTE: Olin receives and maintains the *original COC.*

ACTION: If no, contact lab for submission of copy of completed *COC.*

1.5 Sample Receipt Information (*Cooler Receipt Form present?*): Yes [✓] No [ ] N/A [ ] Comments:

Were each of the following tasks completed and recorded upon receipt of the sample(s) into the laboratory?

☑ Sample temperature confirmed: must be 1° – 10° C. (If samples were sent by courier and delivered on the same day as collection, temperature requirement does not apply).

☑ Container type noted ☑ sample condition observed ☑ pH verified (where applicable) ☑ Field and lab IDs cross referenced

ACTION: If no, contact lab for submission of missing or incomplete documentation.

1.5.1 Were all samples delivered to the laboratory without breakage? **Yes** [✓] No [ ] N/A [ ] Comments:

1.5.2 Does the *Cooler Receipt Form* or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data? Yes [ ] **No** [✓] N/A [ ] Comments:

1.6 Sample Results Section: *Was each of the following requirements supplied in the laboratory report for each sample?* **Yes** [✓] No [ ] N/A [ ] Comments:

☑ Field ID and Lab ID ☑ *Date and time collected* ☑ Analyst Initials ☑ *Dilution Factor* ☐ % moisture or solids N/A ☑ *Reporting limits*
☐ *Clean-up method* N/A ☑ Analysis method ☑ *Preparation method* ☑ *Date of preparation/extraction/digestion clean-up and analysis, where applicable*
☑ Matrix ☑ Target analytes and concentrations ☑ Units (soils must be reported in dry weight)

ACTION: If no, contact lab for submission of missing or incomplete information.

1.7 QA/QC Information: Was each of the following information supplied in the laboratory report for each sample batch? **Yes** [✓] No [ ] N/A [ ] Comments:

☑ Method blank results ☑ LCS recoveries ☑ MS/MSD recoveries and RPDs ☑ Laboratory duplicate results (where applicable)

ACTION: If no, contact lab for submission of missing or incomplete information.

2.0 Holding Times

Have any technical holding times, determined from date of collection to date of analysis, been exceeded? Holding time for metals is 180 days from sample collection to analysis for both water and soil.

Yes [ ] **No [✓]** N/A [ ] Comments:

NOTE: List samples that exceed hold time with # of days exceeded on checklist

ACTION: If technical holding times are exceeded, qualify all positive results (J) and non-detects (UJ). If grossly exceeded (2X holding time) reject (R) all non-detect results.

3.0 Laboratory Method

3.1 Was the correct laboratory method used?

Yes [✓] No [ ] N/A [ ] Comments:

Water Digestion	3005A or 3010A or 3020A
Soil Digestion	3050B
Metals	6010B or 200.7

ACTION: If no, contact laboratory to provide justification for method change compared to the requested method. Contact senior chemist to inform Client of change and to request variance.

3.2 Are the practical quantitation limits the same as those specified by the ☑ SOW ☐ QAPP ☐ Lab ☐ MADEP

Yes [✓] No [ ] N/A [ ] Comments:

NOTE: *Verify that the reported metals match the target list specified on the COC.*

ACTION: If no, evaluate variation with respect to sample matrix, preparation, dilution, moisture, etc. If sample PQL is indeterminate, contact lab for explanation.

3.3 Are results present for each sample in the SDG? Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If no, check Request for Analysis to verify if method was ordered and COC to verify that it was sent, and contact lab for resubmission of the missing data

3.4 If dilutions were required, were dilution factors reported? Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact the lab for submission.

4.0 Method Blanks

4.1 Is the Method Blank Summary present? Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If no, call the laboratory for submission of missing data.

4.2 Frequency of Analysis: Was a method blank analyzed for each digestion batch of < 20 field samples? Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact laboratory for justification. Consult senior chemist for action needed. Narrate non-compliance.

4.3 Is the method blank less than the PQLs for all target elements? Yes [✓] No [ ] N/A [ ] Comments:

NOTE: *MADEP requires the method blank to be matrix matched and digested with the samples*

4.4 Do any method blanks have positive results for metals? Qualify data according to the following: Yes [ ] No [✓] N/A [ ] Comments:

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

ACTION: For any blank with positive results, list all contaminants for each method blank including the concentration detected and the flagging level (flagging level = 5x the blank value) and the associated samples and qualifiers.

5.0 Laboratory Control Standard

5.1 Was a laboratory control standard run with each analytical batch of 20 samples or less? **Yes** [✓] No [ ] N/A [ ] Comments:

NOTE: *A full target, second source LCS is required by MADEP.*
ACTION: Call laboratory for LCS form submittal. If data are not available, use professional judgement to evaluate data accuracy associated with that batch.

5.2 Is a LCS Summary Form present? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact lab for resubmission of missing data.

5.3 Is the recovery of any analyte outside of MADEP control limits? Yes [ ] **No** [✓] N/A [ ] Comments:

Sample Type	*MADEP % Rec*
Water	*80-120*
Soil	within Lab generated limits

ACTION: If recovery is above the upper limit, qualify all positive sample results within the batch as (J). If recovery is below the lower limit, qualify all positive and non-detects results within the batch as (J). If LCS recovery is <30%, positive and non-detect results are rejected (R).

Comments:

6.0 Matrix Spikes

Matrix spikes may be collected at different frequencies based on monthly, quarterly, or task specific schedules. Confirm spike requirements for each set with the senior chemist.

6.1 Were project-specific MS/MSDs collected? List project samples that were spiked. **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact senior chemist to see if any were specified.

6.2 Is the Matrix Spike/Matrix Spike Duplicate Recovery Form present? **Yes** [✓] No [ ] N/A [ ] Comments:

NOTE: *A full target, second source MS/MSD is required by MADEP.*
ACTION: If any matrix spike data are missing, call lab for resubmission.

6.3 Were matrix spikes analyzed as indicated on the COC and project schedule? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If any matrix spike data are missing, call lab for resubmission. If none, no qualification is needed. Narrate non-compliance.

6.4 Are any metal spike recoveries outside of the QC limits? Yes [ ] **No** [✓] N/A [ ] Comments:

Sample Type	***MADEP % Rec***	QAPP % Rec	Method
Water	*75-125*	N/A	6010B
Water	*N/A*	70-130	200.7
Soil	*75-125*	75-125	6010B

NOTE: $\%R = \frac{(SSR-SR)}{SA} \times 100\%$ Where: SSR = Spiked sample result, SR = Sample result, SA = Spike added

NOTE: If dilutions are required due to high sample concentrations (> 4X spike), the data are evaluated, but no flags are applied.

NOTE: If only one of the recoveries for an MS/MSD pair is outside of the control limits, no qualification is necessary. Use professional judgment for the MS/MSD flags.

ACTION: MS/MSD flags only apply to the sample spiked. If the recoveries of the MS and MSD exceed the upper control limit, qualify positive results as estimated (J). If the recoveries of the MS and MSD are lower than the lower control limit, qualify positive results and non-detects (J).

6.5 Are any RPDs for MS/MSD recoveries outside of the QC limits? Yes [ ] **No** [ ] N/A [✓] Comments: No MSD

NOTE: RPD = $\frac{S-D}{(S+D)/2} \times 100\%$ Where: S = MS sample result
D = MSD sample result

NOTE: If dilutions are required due to high sample concentrations, the data are evaluated, but no flags are applied.

ACTION: If the RPD exceeds the control limit, qualify positive results and non-detects (J).

7.0 Laboratory Duplicate

7.1 Was a laboratory duplicate sample analyzed? If so, is the Laboratory Duplicate Sample Form present? **Yes** [✓] No [ ] N/A [ ] Comments:

NOTE: *MADEP refers to this sample as a "matrix duplicate".*

ACTION: If not analyzed, qualification is not needed. If data is missing, contact laboratory for resubmission of report. Narrate non-compliance.

7.2 Is the RPD between the result for the laboratory duplicate sample and the result for the parent sample outside of the QA/QC limits? Yes [ ] **No** [✓] N/A [ ] Comments:

MADEP Laboratory Duplicate Sample RPD Criteria:	QAPP RPD
For aqueous results > 5× RL, RPD must be ± 20%	20
For aqueous results < 5× RL, RPD must be ≤ RL	20
For soil/sediment results > 5× RL, RPD must be ± 35%	20
For soil/sediment results < 5× RL, RPD must be ≤ 2× RL	20

ACTION: If the RPD exceeds the limits, qualify both positive results and non-detects as estimated and flag them J. Narrate non-compliance

8.0 Sampling Accuracy

The majority of ground water samples are collected directly from a tap, process stream, or with dedicated tubing. Rinse blanks will not be collected.

8.1 Were rinsate blanks collected? Prior to evaluating rinsate blanks, obtain a list of the associated samples from the senior chemist.

Yes [✓] No [✓] N/A [ ] Comments:

8.2 Do any rinsate blanks have positive results?

Yes [ ] **No** [ ] N/A [✓] Comments:

***NOTE**: MADEP does not require the collection of rinsate blanks.*

ACTION: Evaluate rinsate results against blank results to determine if contaminant may be laboratory-derived. If results are not lab-related, qualify according to below.

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

9.0 Field Duplicates

9.1 Were field duplicate samples collected? Obtain a list of samples and their associated field duplicates.

Yes [ ] **No** [✓] N/A [ ] Comments:

9.2 Were field duplicates collected per the required frequency? **Yes** [ ] No [ ] N/A [✓] Comments:

SOW ☐ QAPP *(1 per 10)* ☐ *MADEP Option 1 (1 per 20)* ☐ *MADEP Option 3 (1 per 10)* ☐

9.3 Was the RPD ≤ 50% for soils or waters? Calculate the RPD for all results and attach to this review. **Yes** [ ] No [ ] N/A [✓] Comments:

ACTION: RPD must be ≤50% for soil and water. Qualify data (J) for both sample results if the RPD exceeds 50%.

10.0 Special QA/QC

10.1 Were both total and dissolved metals analysis performed? If so, the dissolved metal concentration should not exceed that of the total metal. **Yes** [✓] **No** [ ] N/A [ ] Comments:

ACTION: If results for both total and dissolved are ≥ 5x the PQL **and** the dissolved concentration is 10% higher than the total, flag both results as estimated (J). If total and dissolved concentrations are less than 5x the PQL **and** the **difference** exceeds 2x the PQL, flag both results as estimated (J)

	Fe Total	Fe Dissolved
OC-GW-01	9000	10000

J Qual both results

10.0 Application of Validation Qualifiers

Was any of the data qualified? Yes [✓] **No** [__] N/A [__] Comments:

If so, apply data qualifiers directly to the DQE copy of laboratory report and **flag pages** for entry in database.

Total & dissolved Fe for OC-GW-1.

REFERENCES

LAW, 1999, "Final Quality Assurance Project Plan, Olin Wilmington Property, 51 Eames Street, Wilmington, MA", LAW Engineering and Environmental Services, Kennesaw, GA 30144. August 1999

U.S. Environmental Protection Agency (USEPA), 1989. "Region 1 Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses"; Hazardous Site Evaluation Division; February 1989.

MADEP, 2001. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Massachusetts Quality Assurance and Quality Control (QA/QC) Requirements." BWSC-CAM, Interim Final Draft, Revision No. 2, 5 October 2001.

MADEP, 2001. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Quality Assurance and Quality Control Guidelines for Sampling, Data Evaluation and Reporting Activities," BWSC-CAM, Section VII, Public Comment Draft, Revision No. 0, 21 December 2001.

GW Quarterly Plant B

OLIN-WILMINGTON
LEVEL I DATA QUALITY EVALUATION
STANDARD OPERATING PROCEDURE AND CHECKLIST
WET CHEMISTRY PARAMETERS BY VARIOUS METHODS
Ammonia + pH only

Reviewer/Date Tina Cunningham 1/16/09
Sr. Review/Date Chris Ricard 1/22/09
Lab Report # 360-20062-1
Project # 0100080016-15B

Note: The following analyses will be evaluated according to the "MADEP QA/QC Guidelines for **Sampling, Data Evaluation and Reporting Activities.**" MADEP, however, may not list QA/QC criteria for every chemical analysis. Where not defined by MADEP, criteria will default to values stipulated in the QAPP. Where the QAPP does not define criteria, QA/QC requirements will default to limits employed by the laboratory.

J estimated pH results for Hold Time

1.0 Laboratory Deliverable Requirements

1.1 Laboratory Information: Was all of the following provided in the laboratory report? Yes [✓] No [ ] N/A [ ] Comments:
Check items received.

☑ *Name of Laboratory* ☑ *Address* ☑ *Project ID* ☑ *Phone #* ☑ *Sample identification – Field and Laboratory*
Client Information: ☑ *Name* ☑ *Address* ☑ *Client Contact* *(IDs must be cross-referenced)*

ACTION: If no, contact lab for submission of missing or illegible information.

1.2 Laboratory Report Certification Statement *Yes [✓] No [ ] N/A [ ] Comments:*

Does the laboratory report include a completed Analytical Report Certification in the required format?

ACTION: *If no, contact lab for submission of missing certification or certification with correct format.*

1.3 Laboratory Case Narrative: *Yes [✓] No [ ] N/A [ ] Comments:*

☑ *Narrative serves as an exception report for the project and method QA/QC performance.* ☐ *Narrative includes an explanation of each discrepancy on the Certification Statement.*

ACTION: *If no, contact lab for submission of missing or illegible information.*

1.4 Chain of Custody (COC) copy present with all documentation completed? Yes [✓] No [ ] N/A [ ] Comments:

Does the laboratory report include copies of Chain of Custody forms containing all samples in this SDG?

NOTE: Olin receives and maintains the *original* COC.

ACTION: If no, contact lab for submission of copy of missing completed COC.

1.5 Sample Receipt Information (*Cooler Receipt Form*): Were each of the following tasks completed and recorded upon receipt of the sample(s) into the laboratory?

Yes [✓] No [ ] N/A [ ] Comments:

☑ Sample temperature confirmed: must be 1° – 10° C. (If samples were sent by courier and delivered on the same day as collection, temperature requirement does not apply).

☑ Container type noted ☑ Condition observed ☑ pH verified (where applicable) ☑ Field and lab IDs cross referenced

ACTION: If no, contact lab for submission of missing or incomplete documentation.

1.5.1 Were the correct bottles and preservatives used?

Yes [✓] No [ ] N/A [ ] Comments:

Ammonia,– 1 Liter polyethylene/H_2SO_4 to pH<2,cool to 4°C ✓

Oil & Grease – 1 Liter glass/HCL or H2SO4 to pH<2,cool to 4°C

Alkalinity – 1 Liter polyethylene/cool to 4°C

Chemical Oxygen Demand – 50 mL polyethylene/H_2SO_4 to pH<2,cool to 4°C

Chloride, pH, sulfate, nitrate, nitrite - 50 mL polyethylene/cool to 4°C ✓

Nitrate/nitrite - H2SO4 to pH<2,cool to 4°C

Organic Carbon – 500 mL amber glass bottle/HCl or H_2SO_4 to pH<2,cool to 4°C

Sulfide – 50 mL polyethylene/ZnAcetate + NaOH to pH>9, cool to 4°C

Phenolics - H_2SO_4 to pH<2,cool to 4°C

Specific conductance, TDS, TSS – 100 mL polyethylene/cool to 4°C

ACTION: If no, inform senior chemist. Document justification for change in container/volume (if applicable), qualify positive and non-detect data (J) data if cooler temperature exceeds 10°C. Rejection of data requires professional judgment

1.5.2 Were all samples delivered to the laboratory without breakage?

Yes [✓] No [ ] N/A [ ] Comments:

1.5.3 Does the *Cooler Receipt Form* or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data?

Yes [ ] No [✓] N/A [ ] Comments:

Qual

1.6 Sample Results Section: *Was the following information supplied in the laboratory report for each sample?* Yes [✓] No [ ] N/A [ ] Comments:

- [✓] Field ID and Lab ID
- [✓] Date and time collected
- [✓] Analyst Initials
- [✓] Dilution Factor
- [ ] % moisture or solids N/A
- [✓] Reporting limits
- [ ] *Clean-up method* N/A
- [✓] Analysis method
- [✓] Preparation method
- [✓] Date of preparation/extraction/digestion clean-up and analysis, where applicable
- [✓] Matrix
- [✓] Target analytes and concentrations
- [✓] Units (soils must be reported in dry weight)

ACTION: If no, contact lab for submission of missing or incomplete information.

1.7 QA/QC Information: Was the following information provided in the laboratory report for each sample batch? Yes [✓] No [ ] N/A [ ] Comments:

- [✓] Method blank results
- [✓] LCS recoveries
- [ ] MS/MSD recoveries and RPDs
- [ ] Laboratory duplicate results (where applicable)

ACTION: If no, contact lab for submission of missing or incomplete information.

2.0 Holding Times Yes [✓] No [ ] N/A [ ] Comments: ✱

Have any technical holding times, determined from date of collection to date of analysis, been exceeded? The holding times are as follows:

28 days = ammonia, chemical oxygen demand, chloride, organic carbon, oil & grease, specific conductance, total organic carbon and sulfate

Alkalinity = 14 days | Sulfide, TDS, TSS = 7 days | pH = analyze immediately | Nitrate nitrogen as N = 48 hrs

Nitrite nitrogen as N = 48 hrs | Nitrate + Nitrite as N = 28 days

→ collected 11/24/08 delivered 11/25/08, analyzed 11/26/08
J Qual all PH results

NOTE: List samples that exceed hold time with # of days exceeded on checklist

ACTION: If technical holding times are exceeded qualify results (J). For water samples that are grossly exceeded (>2X hold time) reject (R) all non-detect results. Professional judgment used to qualify soils.

3.0 Laboratory Method Yes [✓] No [ ] N/A [ ] Comments:

3.1 Was the correct laboratory method used?

ACTION: If no, contact lab to provide justification for method change compared to the requested method. Contact senior chemist to inform Client of change or to request variance.

3.2 Are the practical quantitation limits the same as those specified by the ☑ QAPP/IRSWP ☐ Lab? Yes [✓] No [ ] N/A [ ] Comments:

Note: *The MADEP QA/QC Guidelines do not yet list PQLs for wet chemistry analyses, therefore all criteria will default to values stipulated in the QAPP*. Where the QAPP does not define criteria, QA/QC requirements default to limits employed by the lab**. Other criteria may also apply.*

Ammonia* ☑ = 0.1 mg/ L	Alkalinity** ☐ = 1 mg/L	Bicarbonate Alkalinity** ☐ = 1 mg/L	Carbonate Alkalinity** ☐ = 1 mg/L
Nitrate Nitrogen as N* ☐ = .05 mg/L	Nitrite Nitrogen as N* ☐ = .01 mg/L	Chloride* ☐ = 1 mg/L	Hardness *☐ = 2 mg/L
Spec. Cond.** ☐ 3 umhos/cm	Total Organic Carbon** ☐ = 1 mg/L	Oil & Grease* ☐ = 5.5 mg/L	Sulfate (EPA 300.0)* ☐ = 2 mg/L
COD:* Low – 20 mg/L	COD* High - 50 mg/L ☐	TDS* ☐ = 10 mg/L	TSS* ☐ = 5 mg/L
pH* ☑ < 2 to > 12	Phenolic - 0.01 mg/L		

Other parameter(list) _____ PQL = _____ ☐ Source of PQL = _____

Other parameter(list) _____ PQL = _____ ☐ Source of PQL = _____

ACTION: If no, evaluate change with respect to sample matrix, preparation, dilution, moisture, etc. If sample PQL is indeterminate, contact lab for explanation.

3.3 Are the appropriate parameter results present for each sample in the SDG? Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If no, check Request for Analysis to verify if method was ordered and COC to verify that it was sent, and contact lab for resubmission of the missing data

3.4 If *dilutions were required, were dilution factors reported?* Yes [ ] No [ ] N/A [✓] Comments:

ACTION: If no, contact the lab for submission.

4.0 Method Blanks Yes [✓] No [ ] N/A [ ] Comments:

4.1 Are the Method Blank Summaries present?

ACTION: If no, call the laboratory for submission of missing data.

4.2 Was a method blank analyzed for each analysis batch of wet chemistry field samples of 20 or less? Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If no, document discrepancy in case narrative and contact lab for justification. Consult senior chemist for action needed.

4.3 Is the method blank less than the PQL? (See Section 3.2 for PQLs). **Yes [✓]** No [ ] N/A [ ] Comments:

4.4 Do any method blanks have positive results for wet chemistry parameters? Qualify data according to the following: Yes [ ] **No [✓]** N/A [ ] Comments:

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

ACTION: If any blank has positive results, list all the concentrations detected and flagging level (flagging level = 5 × blank value) on the checklist. List all affected samples and their qualifiers.

5.0 Laboratory Control Standards

5.1 Was a laboratory control standard (LCS) run with each analytical batch of 20 samples or less? **Yes [✓]** No [ ] N/A [ ] Comments:

ACTION: If no, call laboratory for LCS form submittal. If data is not available, use professional judgment to determine qualification actions for data associated with the batch.

5.2 Is a LCS Summary Form present? **Yes [✓]** No [ ] N/A [ ] Comments:

ACTION: If no, contact lab for resubmission of missing data.

5.3 Is any wet chemistry analyte LCS recovery outside the control limits? Yes [ ] **No [✓]** N/A [ ] Comments:

LCS Limits:

Alkalinity** ☐ = 80-120%	Bicarbonate Alkalinity** ☐ = 80-120%	Carbonate Alkalinity** ☐ = 80-120%	Specific Conductivity *☐ = 80-120%
Total Organic Carbon** ☐ = 80-120%	TDS** ☐ = 80-120%	Oil & Grease* ☐ = 80-120%	Ammonia Nitrogen as N* ☑ = 80-120%
COD Low* ☐ = 80-120%	COD High* ☐ = 80-120%	Nitrate Nitrogen as N**☐ = 80-120%	Nitrite Nitrogen as N** ☐= 80-120%
Hardness* ☐ = 80-120%	Chloride* ☐ = 80-120%	Sulfate (EPA 300.0)* ☐ = 80-120%	pH* ☑ = 98-102% TSS* NA

Other parameter(list) _____ %R = _____ ☐ Rec Limits= _____

Other parameter(list) _____ %R = _____ ☐ Rec Limits = _____

(MADEP has not yet defined LCS recovery limits for wet chemistry analyses.)

ACTION: If recovery is above the upper limit, qualify all positive sample results within the batch as (J). If recovery is below the lower limit, qualify all positive and no-detect results within the batch as (J). If LCS recovery is <10%, non-detect results are rejected (R).

6.0 Matrix Spikes

Matrix spikes may be collected at different frequencies based on monthly, quarterly, or task specific schedules. Confirm spike requirements for each set with the senior chemist.

6.1 Were project-specific MS/MSDs analyzed? List project samples that were spiked.

Yes [__] No [✓] N/A [__] Comments:

ACTION: If no, contact senior chemist to see if any were specified.

6.2 Is the MS/MSD Recovery Form present?

Yes [__] No [__] N/A [✓] Comments:

ACTION: If no, contact lab for resubmission of missing data.

6.3 Were matrix spikes analyzed at the required frequency of 1 per 20 samples per matrix?

Yes [__] No [__] N/A [✓] Comments:

ACTION: If any matrix spike data is missing, call lab for resubmission.

6.4 Are any wet chemistry analyte spike recoveries outside of the QC limits?

Yes [__] **No** [__] N/A [✓] Comments:

NOTE: $\%R = \frac{(SSR-SR)}{SA} \times 100\%$ Where: SSR = Spiked sample result
SR = Sample result
SA = Spike added

MS/MSD Recovery Limits:

Alkalinity* = NA	Bicarbonate Alkalinity* = NA	Carbonate alkalinity* = NA	Ammonia* (LACHAT) ☐ = 75-125%
Chloride*(SM 4500 Cl) ☐= 75-125%	Specific Conductivity * = NA	Total Organic Carbon* = NA	TDS** = NA
Oil & Grease* = NA	COD Low* ☐ = 75-125%	COD High* ☐ = 75-125%	Nitrate Nitrogen as N** ☐ = 75-125%
Nitrite Nitrogen as N** ☐ = 75-125%	Hardness* ☐ = 75-125%	Sulfate (EPA 300.0)* ☐ = 75-125%	pH* = NA TSS* = NA

Other parameter(list) _____ % R = _____ ☐ Rec Limits = _____

* = Laboratory Limits ** = Olin QAPP Limits (*MADEP has not yet defined LCS recovery limits for wet chemistry analyses.*)

NOTES: 1) If only one of the recoveries for an MS/MSD pair is outside of the control limits, no qualification is necessary. Use professional judgment for the MS/MSD flags.
2) If the MS/MSD was performed by the laboratory on a non-project sample, no qualification is required.

ACTION: MS/MSD flags only apply to the sample spiked. Do not evaluate if sample concentration is > 4X spike. If the recoveries of the MS and MSD exceed the upper control limit, qualify positive results as estimated (J). If the recoveries of the MS and MSD are lower than the lower control limit but > 30%, qualify both positive results and non-detects (J). If the MS/MSD recovery is < 30% and the sample is non-detect, the results are considered unusable and flagged (R).

ACTION: Laboratory control limits apply when spiked sample results fall within the normal calibration range. If dilutions are required due to high sample concentrations, the data is evaluated, but no flags are applied.

6.5 Are any RPDs for MS/MSD recoveries outside of the QA/QC limits?

Yes [ ] **No** [ ] N/A [✓] Comments:

NOTE: $RPD = \frac{S - D}{(S + D)/2} \times 100\%$ Where S = MS result
D = MSD result

MS/MSD RPD Limits:

RPD ≤20

7.0 Laboratory Duplicate

Are the RPDs for the laboratory duplicates <20% unless otherwise specified below?

Yes [✓] No [ ] N/A [ ] Comments:

pH only

ACTION: If the RPD is greater than specified limits, qualify all results for that analyte as estimated (J).

pH* ☑ = 3% Specific Conductivity *☐ = 5% TSS** ☐ = 6% TDS** ☐ = 6%

8.0 Sampling Accuracy

The majority of ground water samples are collected directly from a tap, process stream, or with dedicated tubing. Rinse blanks will not be collected.

8.1 Were rinsate blanks collected? Prior to evaluating rinsate blanks, obtain a list of the associated samples from the senior chemist. **Yes** [ ] No [✓] N/A [ ] Comments:

8.2 Do any rinsate blanks have positive results? Yes [ ] **No** [ ] N/A [✓] Comments:

ACTION: Evaluate rinsate results vs. blank results to determine if contaminant may be laboratory-derived. If not lab-related, qualify according to the table below.

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

NOTE: *MADEP does not require the collection of rinsate blanks.*

9.0 Field Duplicates

9.1 Were field duplicate samples collected? Obtain a list of samples and their associated field duplicates. **Yes** [ ] No [✓] N/A [ ] Comments:

9.2 Were field duplicates collected per the required frequency? **Yes** [ ] No [ ] N/A [✓] Comments:

QAPP/IRSWP ☐ *MADEP Option 1(1 per 20)* ☐ *MADEP Option 3 (1 per 10)* ☐

9.3 Was the RPD ≤ 30% for waters ≤ 50% for soils? Calculate the RPD for results and attach to this review. **Yes** [ ] No [ ] N/A [✓] Comments:

ACTION:. Qualify data (J) for both sample results if the RPD exceeded.

Was any of the data qualified? Yes [✓] No [_] N/A [_] Comments:

If so, apply data qualifiers directly to the DQE copy of laboratory report and **flag pages** for entry in database.

All pH results were (J) Qualified due to hold time exceedance

TC

REFERENCES:-

MACTEC, 2007. "Draft Interim Response Steps Work Plan"; Olin Chemical Superfund Site, 51 Eames Street, Wilmington, Massachusetts.; Project No. 6300-06-0010/41.1; July 25, 2007.

Massachusetts Department of Environmental Protection (MADEP), 2004. "The Compendium of Quality Assurance and Quality Control Requirements and Performance Standards for Selected Analytical Methods Used in Support of Response Actions for the Massachusetts Contingency Plan (MCP)"; Bureau of Waste Site Cleanup; 1 Winter Street, Boston, Massachusetts 02108; WSC-CAM; May 2004.

OLIN CORPORATION
LEVEL I DATA QUALITY EVALUATION
STANDARD OPERATING PROCEDURE AND CHECKLIST
VOLATILE PETROLEUM HYDROCARBONS BY METHOD MADEP

Reviewer/Date Tige Cunningham 1/16/09
Sr. Review/Date Chas Arcadi 1/22/09
Lab Report # 320-20062-1
Project # G1000080016-15B

1.0 Laboratory Deliverable Requirements

1.1 Laboratory Information: Was all of the following provided in the laboratory report? **Yes** [✓] No [ ] N/A [ ] Comments:
Check items received.

☑ *Name of Laboratory* ☑ *Certification ID #* ☑ *Address* ☑ *Project ID* ☑ *Phone #* ☑ *Sample identification – Field and Laboratory*

Client Information: ☑ *Name* ☑ *Address* ☑ *Client Contact* *(IDs must be cross-referenced)*

ACTION: If no, contact lab for submission of missing or illegible information.

1.2 Laboratory Report Certification Statement ***Yes*** [✓] *No* [ ] *N/A* [ ] *Comments:*

Does the laboratory report include a completed Analytical Report Certification in the required format?

***ACTION**: If no, contact lab for submission of missing certification or certification with correct format.*

1.3 Laboratory Case Narrative: ***Yes*** [✓] *No* [ ] *N/A* [ ] *Comments:*

☑ *Narrative serves as an exception report for the project and method QA/QC performance.* ☐ *Narrative includes an explanation of each discrepancy on the Certification Statement.*

***ACTION**: If no, contact lab for submission of missing or illegible information.*

1.4 Chain of Custody (COC) **Yes** [✓] No [ ] N/A [ ] Comments:

Does the laboratory report include a copy of the completed Chain of Custody forms containing all samples in this SDG?

NOTE: Olin receives and maintains the *original* COC.

ACTION: If no, contact lab for submission of completed COC.

1.5 Sample Receipt Information (*Cooler Receipt Form*): Were each of the following tasks completed and recorded upon receipt of the sample(s) into the laboratory? **Yes** [✓] No [ ] N/A [ ] Comments:

☑ Sample temperature confirmed: must be 1° – 10° C. (If samples were sent by courier and delivered on the same day as collection, temperature requirement does not apply).

☑ Container type noted ☑ Condition observed ☑ Field and lab IDs cross referenced

ACTION: If no, contact lab for submission of missing or incomplete documentation.

1.5.1 Were the correct bottles and preservatives used? **Yes** [✓] No [ ] N/A [ ] Comments:

Water - 40 mL VOA vial/HCL to pH<2, cool to 4°C
Soil - 5 gram Encore™/cool to 4°C or 40 mL VOA vial with field preservation of sodium bisulfate (low-level) or methanol (high-level) or field preservation in water if soils are reactive to sodium bisulfate (i.e. alkaline conditions, excessive humic acid content, etc.)

ACTION: If no, inform senior chemist. Document justification for change in container/volume (if applicable); qualify both positive data and non-detect data (J) if cooler temperature exceeds 10°C. Rejection of data requires professional judgment.

ACTION: If each VOA vial for a sample contains air bubbles or the VOA vial analyzed contained air bubbles, flag positives (J) and reject nondetects (R).

1.5.2 Were all samples delivered to the laboratory without breakage? **Yes** [✓] No [ ] N/A [ ] Comments:

1.5.3 Does the *Cooler Receipt Form* or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data? Yes [ ] **No** [✓] N/A [ ] Comments:

1.6 Sample Results Section: *Was the following information supplied in the laboratory report for each sample?* **Yes** [✓] No [ ] N/A [ ] Comments:

☑ Field ID and Lab ID ☑ *Date and time collected* ☑ Analyst Initials ☑ *Dilution Factor* ☐ % moisture or solids N/A ☑ *Reporting limits*
☑ Analysis method concentrations ☑ *Preparation method* ☑ *Date of preparation/extraction/digestion clean-up and analysis, where applicable* ☑ Matrix ☑ Target analytes and ☑ Units (soils must be reported in dry weight)

ACTION: If no, contact lab for submission of missing or incomplete information.

1.7 QA/QC Information: Was the following information provided in the laboratory report for each sample batch? **Yes** [✓] No [ ] N/A [ ] Comments:

[✓] Method blank results [✓] LCS recoveries [ ] MS/MSD recoveries and RPDs N/A [✓] Surrogate recoveries

ACTION: If no, contact lab for submission of missing or incomplete information.

2.0 Holding Times

Have any technical holding times, determined from date of collection to date of analysis, been exceeded? Yes [ ] **No** [✓] N/A [ ] Comments:

For water samples, the holding time is 7 days from sampling for unpreserved samples and 14 days for preserved samples.

For soil samples, methanol preservation required with a holding time of 14 days. If an Encore™ sampler was used, the lab must ***preserve*** the sample within 48 hours. Analytical holding time from time of preservation is 14 days.

NOTE: List samples that exceed hold time with # of days exceeded on checklist

ACTION: If technical holding times are exceeded, qualify all positive results (J). Use professional judgment to reject (R) data for grossly exceeded.

3.0 Laboratory Method

3.1 Was the correct laboratory method used? **Yes** [✓] No [ ] N/A [ ] Comments:

Purge and Trap	Water: 5030B	Soil: 5035
Volatile Petroleum Hydrocarbons	MADEP VPH 98-1	

ACTION: If no, contact lab to provide justification for method change compared to the requested method. Contact senior chemist to inform Client of change or to request variance.

3.2 Are the practical quantitation limits the same as those specified by the ☑ SOW ☐ QAPP ☐ Lab ☐ MADEP — Yes [✓] No [ ] N/A [ ] Comments:

NOTE: *The MADEP QA/QC Guidelines provides PQLs for volatile petroleum hydrocarbons. See MADEP PQLs vs. the PQLs listed in the QAPP.*

ACTION: If no, evaluate change with respect to sample matrix, preparation, dilution, moisture, etc. If sample PQL is indeterminate, contact lab for explanation.

3.3 Are the appropriate parameter results present for each sample in the SDG? Yes [✓] No [ ] N/A [ ] Comments:

NOTE: *The MADEP QA/QC Guidelines requires a minimum compound reporting list for volatile organic compounds.*

3.4 If *dilutions were required, were dilution factors reported?* Yes [✓] No [ ] N/A [ ] Comments:

NOTE: *MADEP guidance states that if a diluted and an undiluted analysis is performed, the laboratory should report results for the lowest dilution within the valid calibration range for each analyte.*

ACTION: If no, contact the lab for submission.

4.0 Method Blanks

4.1 Are the Method Blank Summaries present? Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If no, call the laboratory for submission of missing data.

4.2 Was a method blank analyzed for each analytical batch of 20 samples or less? Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If no, document discrepancy in case narrative and contact lab for justification. Consult senior chemist for action needed.

4.3 Is the method blank less than the PQL? (See attached table for PQLs).	**Yes** [✓]	No [ ]	N/A [ ]	Comments:
4.4 Do any method blanks have positive results for VPH parameters? Qualify data according to the following:	Yes [ ]	**No** [✓]	N/A [ ]	Comments:

For VPH contaminants:

Review blank and sample chromatograms to evaluate the nature of the detection in the blank and associated samples. Use professional judgment. The following actions may be applied:

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed..

ACTION: If any blank has positive results, list all the concentrations detected and flagging level (flagging level = 10x or 5 × blank value) on the checklist. List all affected samples and their qualifiers.

5.0 Laboratory Control Standard

5.1 Was a laboratory control standard (LCS) run with each analytical batch of 20 samples or less?	**Yes** [✓]	No [ ]	N/A [ ]	Comments:

ACTION: Call laboratory for LCS form submittal. If data are not available, reject (R) data associated with that batch.

5.2 Is a LCS Summary Form present?	**Yes** [✓]	No [ ]	N/A [ ]	Comments:

ACTION: If no, contact lab for resubmission of missing data.

5.3 Is the recovery of any analyte outside of control limits? Yes [ ] **No [✓]** N/A [ ] Comments:

NOTE: *A full target, second source LCS is required by MADEP.*

NOTE: *MADEP guidelines list LCS recovery limits as 70-130 except for naphthalene. The laboratory must identify any other analytes that routinely exceed 70-130 percent.*

ACTION: If recovery is above the upper limit, qualify all positive sample results within the batch as (J). If recovery is below the lower limit but > 10%, qualify all positive and no-detect results within the batch as (J). If LCS recovery is <10%, positive and non-detect results are rejected (R) unless the QC limit for that compound is below 10% (flag as above).

5.4 Are 80% of LCS recoveries within laboratory control limits? **Yes [✓]** No [ ] N/A [ ] Comments:

ACTION: If 80% of LCS recoveries are not within limits, use professional judgment and consult Senior Chemist. If more than half of the recoveries are above control limits, qualify all positive results as (J). If more than half of the recoveries are below control limits, batch may require rejection and reanalysis

6.0 Matrix Spikes

6.1 Were project-specific MS/MSDs collected? List project samples that were spiked. **Yes [ ]** No [✓] N/A [ ] Comments:

ACTION: If no, contact senior chemist to see if any were specified.

6.2 Is the MS/MSD Recovery Form present? **Yes [ ]** No [ ] N/A [✓] Comments:

ACTION: If no, contact lab for resubmission of missing data.

6.3 Were matrix spikes analyzed at the required frequency of 1 per 20 samples per matrix? **Yes [ ]** No [ ] N/A [✓] Comments:

ACTION: If any matrix spike data are missing, call lab for resubmission.

6.4 Are any VPH spike recoveries outside of the QC limits? Yes [ ] **No** [ ] N/A [✓] Comments:

NOTE: $\%R = \frac{(SSR-SR)}{SA} \times 100\%$ Where: SSR = Spiked sample result
SR = Sample result
SA = Spike added

NOTE: *A full target, second source MS/MSD is required by MADEP.*

NOTE: *MADEP guidelines list MS/MSD recovery limits as 70-130 except for naphthalene.*

NOTES: 1) If only one of the recoveries for an MS/MSD pair is outside of the control limits, no qualification is necessary. Use professional judgment for the MS/MSD flags.
2) If the MS/MSD was performed by the laboratory on a non-project sample, no qualification is required.

ACTION: MS/MSD flags only apply to the sample spiked. If the recoveries of the MS and MSD exceed the upper control limit, qualify positive results as estimated (J). If the recoveries of the MS and MSD are lower than the lower control limit but > 30%, qualify both positive results and non-detects (J). If the MS/MSD recovery is < 30% and the sample is non-detect, the results are considered unusable and flagged (R).

ACTION: Laboratory control limits apply when spiked sample results fall within the normal calibration range. If dilutions are required due to high sample concentrations, the data is evaluated, but no flags are applied.

6.5 Are any RPDs for MS/MSD recoveries outside of the QC limits? Yes [ ] **No** [ ] N/A [✓] Comments:

NOTE: $RPD = \frac{S-D}{(S+D)/2} \times 100\%$ Where: S = MS sample result
D = MSD sample result

NOTE: *MADEP guidelines list MS/MSD RPD limits for both water and soils as ≤ 50.*

ACTION: If the RPD exceeds the control limit, qualify positive results and non-detects (J).

ACTION: Laboratory control limits apply when spiked sample results fall within the normal calibration range. If dilutions are required due to high sample concentrations, the data are evaluated, but no flags are applied.

7.0 Surrogate Recoveries

Were VPH surrogate recoveries outside of laboratory limits for any sample or method blank? If yes, were samples re-analyzed?

Yes [ ] **No [✓]** N/A [ ] Comments:

NOTE: %R = QD x 100% Where: S = MS sample result
D = MSD sample result

NOTE: *MADEP guidelines list surrogate limits for both water and soils as 70-130% for both detectors.*

ACTION: If recoveries are >10%, but fail to meet QC criteria: (1) For recoveries below the QC limit, qualify non-detects and positives (J), and (2) For recoveries above the QC limit, qualify only positives (J). If any surrogate recovery is <10% (unless the QC limits are below 10%, in which case, results are flagged as stated above), flag positives (J) and reject nondetects (R).

NOTE: If surrogate recoveries fail due to dilution, results are not flagged. Document on checklist and in the case narrative.

8.0 Sampling Accuracy

8.1 Were trip blanks shipped with VOC samples and analyzed?

Yes [✓] (TC) No [✓] N/A [ ] Comments:

NOTE: *MADEP requires trip blanks per the following frequency:*

	Soil/Sediment	*Aqueous*	*Drinking Water*
Option 1	*Not Required*	*Not Required*	*1 per cooler VOAs/VPH*
Option 3	*1 per 10 samples*	*1 per 10 samples*	*1 per 10 samples*

8.2 Do any trip blanks have positive results?

Yes [ ] **No [ ]** N/A [✓] Comments:

ACTION: Prepare a list of samples shipped in the same cooler as the contaminated blank.

ACTION: Evaluate trip blank results against method blank results to determine if contaminant may be laboratory-derived. If results are not lab-related, qualify according to the table below.

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

8.3 Were ambient blanks shipped with VPH samples and analyzed? **Yes** [ ] No [ ] N/A [✓] Comments:

NOTE: *MADEP requires ambient (field) blanks per the following frequency:*

	Soil/Sediment	*Aqueous*	*Drinking Water*
Option 1	*Not Required*	*Not Required*	*Not Required*
Option 3	*1 per 10 samples*	*1 per 10 samples*	*1 per 10 samples*

8.4 Do any ambient blanks have positive results? Yes [ ] **No** [ ] N/A [✓] Comments:

ACTION: Prepare a list of samples associated with the contaminated blank (all collected from the site on that day).

ACTION: Evaluate ambient blank results against method and trip blank results to determine if contaminant may be laboratory- and/or shipment-derived. If results are not lab- and/or shipment-related, qualify according to the table above (8.2).

8.5 Were rinsate blanks collected? Prior to evaluating rinsate blanks, obtain a list of the associated samples from the senior chemist. **Yes** [ ] No [✓] N/A [ ] Comments:

NOTE: *MADEP does not specify the collection of rinsate blanks.*

8.6 Do any rinsate blanks have positive results? Yes [ ] **No** [ ] N/A [✓] Comments:

ACTION: Evaluate rinsate results against blank results to determine if contaminant may be laboratory-, ambient-, or shipment-derived. If results are not lab-, ambient-, or shipment-related, qualify according to the table above (8.2).

9.0 Field Duplicates

9.1 Were field duplicate samples collected? Obtain a list of samples and their associated field duplicates. Yes [ ] No [✓] N/A [ ] Comments:

9.2 Were field duplicates collected per the required frequency? Yes [ ] No [ ] N/A [✓] Comments:

☐ SOW ☐ QAPP ☐ *MADEP Option 1(1 per 20)* ☐ *MADEP Option 3 (1 per 10)*

9.3 Was the RPD ≤ 50% for soils or waters? Calculate the RPD for all results and attach to this review. Yes [ ] No [ ] N/A [✓] Comments:

ACTION: RPD must be ≤50% for soil and water. Qualify data (J) for both sample results if the RPD exceeds 50%.

10.0 Application of Validation Qualifiers

Was any of the data qualified? Yes [ ] No [✓] N/A [ ] Comments:

If so, apply data qualifiers directly to the DQE copy of laboratory report and **flag pages** for entry in database.

REFERENCES

LAW, 1999, "Final Quality Assurance Project Plan, Olin Wilmington Property, 51 Eames Street, Wilmington, MA", LAW Engineering and Environmental Services, Kennesaw, GA 30144. August 1999.

Massachusetts Department of Environmental Protection (MADEP), 1998. "Method for the Determination of Volatile Petroleum Hydrocarbons (VPH)"; Division of Environmental Analysis; Office of Research and Standards; Bureau of Waste Site Cleanup; January 1998.

APPENDIX B

Data Validation Memorandum

B-2 First Quarter 2009 Sampling Event

MACTEC

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511 Congress Street
P.O. Box 7050
Portland, Maine 04112-7050
Telephone: 207/775-5401
Fax: 207/772-4762
Home Page: www.mactec.com

To: Steve Morrow
From: Chris Ricardi
Date: May 27, 2009
Subject: 51 Eames Street Property Plant B Quarterly Groundwater February 2009

DATA VALIDATION REPORT
FEBRUARY 2009 PLANT B QUARTERLY GROUNDWATER
OLIN CHEMICAL SUPERFUND SITE
WILMINGTON, MASSACHUSETTS
TestAmerica Laboratories Data Set 360-21331-1

1.0 INTRODUCTION

A groundwater sample was collected from monitoring well GW-16R on February 24, 2009 as specified for Plant B monitoring quarterly sampling in the Interim Response Steps Work Plan (IRSWP) [MACTEC, 2007]. The sample was analyzed by TestAmerica Laboratories in Westfield, Massachusetts. Data were reported in sample delivery group (SDG) 360-21331-1. A summary of sample analyses included in this review is contained in Table 1. The sample reviewed in this report was analyzed for the following USEPA SW-846 (USEPA, 1996), USEPA wastewater (USEPA, 1993), Standard Methods (APHA, 1995), or Massachusetts Department of Environmental Protection (MA DEP, 2004a):

- Trimethylpentenes by Method 8260B
- Bis(2-ethylhexyl)phthalate and N-nitrosodiphenylamine (NDPA) by Method 8270C
- Volatile Petroleum Hydrocarbons (VPH) by MADEP MAVPH
- Dissolved Iron by Method 6010B
- General chemistry analyses for ammonia by EPA Method 350.1 (Lachat 10-107-06-1)
- pH by SM 4500 H+ B

The Olin Wilmington IRSWP and the MADEP Compendium of Quality Assurance and Quality Control Requirements and Performance Standards for Selected Analytical Methods Used in Support of Response Actions for the Massachusetts Contingency Plan (MCP) [MADEP, 2004b] were used as references during the review. The analytical package was reviewed using the Level 1 Data Quality Evaluation checklists that were developed for the Olin Wilmington annual and quarterly groundwater monitoring tasks. Final sample results are presented on data summaries in Table 2.

MACTEC

2.0 VOLATILE ORGANIC COMPOUNDS (VOC)

Target analytes include 2,4,4 trimethyl-1-pentene and 2,4,4 trimethyl-2-pentene reported by Method 8260B. Data were reviewed for the following parameters:

* Data Completeness
* Holding Time
* Blanks
* Surrogate Recovery
* Laboratory Control Sample
* Detection Limits
* Sample Result Verification/Electronic Evaluation Verification

* = indicates that criteria were met for this parameter

3.0 SEMIVOLATILE ORGANIC COMPOUNDS (SVOC)

Bis(2-ethylhexyl)phthalate and n-nitrosodiphenylamine (NDPA) were reported by Method 8270C. Data were reviewed for the following parameters:

* Data Completeness
* Holding Time
  Blanks
* Surrogate Recovery
* Laboratory Control Sample
* Detection Limits
* Sample Result Verification/Electronic Evaluation Verification

* = indicates that criteria were met for this parameter

Blanks

Bis(2-ethylhexyl)phthalate (5.3 µg/L) is reported in the method blank. An action limit (53 µg/L) was established at ten times the reported blank concentration for bis(2-ethylhexyl)phthalate. The result for bis(2-ethylhexyl)phthalate in sample OC-GW-16R is less than the action limit and was qualified non-detect (U) at the reporting limit.

MACTEC

4.0 VOLATILE PETROLEUM HYDROCARBONS (VPH)

Data were reviewed for the following parameters:

* Data Completeness
* Holding Time
* Blanks
* Surrogate Recovery
* Laboratory Control Sample
* Detection Limits
* Sample Result Verification/Electronic Evaluation Verification

* = indicates that criteria were met for this parameter

5.0 METALS (DISSOLVED IRON)

Data were reviewed for the following parameters:

* Data Completeness
* Holding Time
* Blanks
* Matrix Spike Analysis
* Laboratory Duplicate Analysis
* Laboratory Control Sample
* Detection Limits
* Sample Result Verification/Electronic Evaluation Verification

* = indicates that criteria were met for this parameter

MACTEC

6.0 GENERAL CHEMISTRY – Ammonia and pH

Data were reviewed for the following parameters:

* Data Completeness
  Holding Time
* Blanks
* Matrix Spike Analysis
* Laboratory Duplicate Analysis
* Laboratory Control Sample
* Detection Limits
* Sample Result Verification/Electronic Evaluation Verification

* = indicates that criteria were met for this parameter

Holding Times

The hold time for pH is immediately upon arrival at the lab. Sample OC-GW-16R was sampled and received at the laboratory on February 24th, 2009, and analyzed on February 25th, 2009. The pH result for sample OC-GW-16R was qualified estimated (J) in the final results.

Except for the validation actions noted above, the results are interpreted to be usable as reported by TestAmerica.

Chris Ricardi

5/27/09

Chris Ricardi, NRCC-EAC
Senior Chemist

Date

M J Murphy

5/27/09

Michael Murphy
Project Principal

Date

MACTEC

Reference:

American Public Health Association (APHA), 1995. "Standard Methods for Examination of Water and Wastewater"; 19th Edition; APHA, 1015 Fifteenth St., NW., Washington, D.C. 20005.

MACTEC Engineering and Consulting, Inc. (MACTEC), July 25, 2007. "Draft Interim Response Steps Work Plan"; Olin Chemical Superfund Site; 51 Eames Street, Wilmington, Massachusetts.

Massachusetts Department of Environmental Protection (MADEP), May, 2004a. "Method for the Determination of Volatile Petroleum Hydrocarbons (VPH)"; Division of Environmental Analysis; Office of Research and Standards; Bureau of Waste Site Cleanup; Revision 1.1.

MADEP, May, 2004b. "The Compendium of Quality Assurance and Quality Control Requirements and Performance Standards for Selected Analytical Methods Used in Support of Response Actions for the Massachusetts Contingency Plan (MCP)"; Bureau of Waste Site Cleanup; 1 Winter Street, Boston, Massachusetts 02108; WSC-CAM.

U.S. Environmental Protection Agency (USEPA), 1993. "Methods for Chemical Analysis and Water and Wastes (MCAWW)", EPA/600/4-79-020 (March 1983) with updates and supplements EPA/600/4-91-010 (June 1991), EPA/600/R-92-129 (August 1992) and EPA/600/R-93-100 (August 1993).

USEPA, December, 1996. "Test Methods for Evaluating Solid Waste"; Laboratory Manual Physical/Chemical Methods; Office of Solid Waste and Emergency Response; Washington, DC; SW-846; November 1986; Revision 4 -December 1996.

Table 1
Sample Summary - 360-21331
Data Validation Report
February 2009 Plant B Quarterly Groundwater
Olin Chemical Superfund Site
Wilmington, Massachusetts

Lab Sample ID	Location	Sample ID	Sample Date	SW846 8260B	SW846 8270C	SW846 6010B Filtered	QuickChem 10-107-06-1-B	pH A4500	MA DEP MAVPH
360-21331-1	GW-16R	OC-GW-16R	2/24/2009	2	2	1	1	2	13
360-21331-2	Trip Blank	OC-Trip Blank	2/24/2009	2					

Notes:
Number listed under method indicates number of target analytes reported.

Prepared by / Date: KJC 03/06/09
Checked by / Date: WDC 05/08/09

Table 2
Final Results Summary
360-21331 Plant B Quarterly Groundwater
Olin Chemical Superfund Site
Wilmington, Massachusetts

				GW-16R OC-GW-16R 02/24/09 FS 360-21331-1	
				final_result	final_qualifier
N	SW8260	2,4,4-Trimethyl-1-pentene	ug/l	1400	
N	SW8260	2,4,4-Trimethyl-2-Pentene	ug/l	440	
N	SW8270	Bis(2-Ethylhexyl)phthalate	ug/l	2	U
N	SW8270	N-Nitrosodiphenylamine	ug/l	330	
F	SW6010	Iron	ug/l	1400	
N	A4500	pH	PH UNITS	6.78	J
N	LACH_107_06_1_B	Nitrogen, as Ammonia	mg/l	4.7	
N	MAVPH	Benzene	ug/l	25	U
N	MAVPH	Ethyl benzene	ug/l	25	U
N	MAVPH	Methyl Tertbutyl Ether	ug/l	25	U
N	MAVPH	Naphthalene	ug/l	50	U
N	MAVPH	Toluene	ug/l	25	U
N	MAVPH	Xylene, m/p	ug/l	50	U
N	MAVPH	Xylene, o	ug/l	25	U
N	MAVPH	C5-C8 Aliphatics	ug/l	1700	
N	MAVPH	C5-C8 Aliphatics (unadj.)	ug/l	1700	
N	MAVPH	C9-C10 Aromatics	ug/l	500	U
N	MAVPH	C9-C12 Aliphatics	ug/l	500	U
N	MAVPH	C9-C12 Aliphatics (unadj.)	ug/l	500	U
N	MAVPH	Volatile Petroleum Hydrocarbc	ug/l	1700	

Table 2
Final Results Summary
360-21331 Plant B Quarterly Groundwater
Olin Chemical Superfund Site
Wilmington, Massachusetts

				TRIP BLANK	
				OC-Trip Blank	
				02/24/09	
				TB	
				360-21331-1	
				final_result	final_qualifier
N	SW8260	2,4,4-Trimethyl-1-pentene	ug/l	1	U
N	SW8260	2,4,4-Trimethyl-2-Pentene	ug/l	1	U

Notes:
N = normal
F = filtered
FS = field sample
U = not detected, value is the detection limit
J = value is estimated
ug/l = microgram per liter
mg/l = milligram per liter

Prepared by / Date: KJC 05/18/09
Checked by / Date: WDC 05/18/09

OLIN-WILMINGTON
LEVEL I DATA QUALITY EVALUATION
STANDARD OPERATING PROCEDURE AND CHECKLIST
VOLATILE ORGANICS BY METHOD SW8260B/624

Reviewer/Date [signature] 5/8/09
Sr. Review/Date [signature] ~~5/8/09~~
Lab Report # 360-21331-1
Project # 610709.0016.12
Chris Reandi 5/19/09

Note: The following analyses will be evaluated according to the "MADEP QA/QC Guidelines for **Sampling, Data Evaluation and Reporting Activities.**" MADEP, however, may not list QA/QC criteria for every chemical analysis. Where not defined by MADEP, criteria will default to values stipulated in the QAPP. Where the QAPP does not define criteria, QA/QC requirements will default to limits employed by the laboratory.

1.0 Laboratory Deliverable Requirements

1.1 Laboratory Information: Was all of the following provided in the laboratory report? **Yes** [✓] No [ ] N/A [ ] Comments:
Check items received.

☑ *Name of Laboratory* ☑ *Address* ☑ *Project ID* ☑ *Phone #* ☑ *Sample identification – Field and Laboratory*

Client Information: ☑ *Name* ☑ *Address* ☑ *Client Contact* *(IDs must be cross-referenced)*

ACTION: If no, contact lab for submission of missing or illegible information.

1.2 Laboratory Report Certification Statement ***Yes*** [✓] *No* [ ] *N/A* [ ] *Comments:*

Does the laboratory report include a completed Analytical Report Certification in the required format?

***ACTION**: If no, contact lab for submission of missing certification or certification with correct format.*

1.3 Laboratory Case Narrative: ***Yes*** [✓] *No* [ ] *N/A* [ ] *Comments:*

☑ *Narrative serves as an exception report for the project and method QA/QC performance.* ☐ *Narrative includes an explanation of each discrepancy on the Certification Statement.*

***ACTION**: If no, contact lab for submission of missing or illegible information.*

1.4 Chain of Custody (COC) copy present with all documentation completed? **Yes** [✓] No [ ] N/A [ ] Comments:

Does the laboratory report include completed Chain of Custody forms containing all samples in this SDG?

NOTE: Olin receives and maintains the *original* COC.

ACTION: If no, contact lab for submission of copy of completed COC.

1.5 Sample Receipt Information (*Cooler Receipt Form present?*):

Yes [✓] No [ ] N/A [ ] Comments:

Were each of the following tasks completed and recorded upon receipt of the sample(s) into the laboratory?

☑ Sample temperature confirmed: must be 1° – 10° C. (If samples were sent by courier and delivered on the same day as collection, temperature requirement does not apply).

☑ Container type noted ☑ Condition observed ☑ Field and lab IDs cross referenced

ACTION: If no, contact lab for submission of missing or incomplete documentation.

1.5.1 Were the correct bottles and preservatives used?

Yes [✓] No [ ] N/A [ ] Comments:

Water - 40 mL VOA vial/HCL to pH<2, cool to 4°C
Soil - 5 gram Encore™/cool to 4°C or 40 mL VOA vial with field preservation of sodium bisulfate (low-level) or methanol (high-level) or field preservation in water if soils are reactive to sodium bisulfate (i.e. alkaline conditions, excessive humic acid content, etc.)

ACTION: If no, inform senior chemist. Document justification for change in container/volume (if applicable); qualify both positive data and non-detect data (J) if cooler temperature exceeds 10°C. Rejection of data requires professional judgment

ACTION: If each VOA vial for a sample contains air bubbles or the VOA vial analyzed contained air bubbles, flag positives (J) and reject nondetects (R).

1.5.2 Were all samples delivered to the laboratory without breakage? Yes [✓] No [ ] N/A [ ] Comments:

1.5.3 Does the *Cooler Receipt Form* or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data? Yes [ ] **No** [✓] N/A [ ] Comments:

1.6 Sample Results Section: *Was the following information supplied in the laboratory report for each sample?* Yes [✓] No [ ] N/A [ ] Comments:

☑ Field ID and Lab ID ☑ Date and time collected ☑ Analyst Initials ☑ Dilution Factor ☑ % moisture or solids ☑ Reporting limits
☑ *Clean-up method* ☑ Analysis method ☑ Preparation method ☑ Date of preparation/extraction/digestion clean-up and analysis, where applicable
☑ Matrix ☑ Target analytes and concentrations ☑ Units (soils must be reported in dry weight)

ACTION: If no, contact lab for submission of missing or incomplete information.

1.7 QA/QC Information: Was the following information provided in the laboratory report for each sample batch? Yes [✓] No [ ] N/A [ ] Comments:

☑ Method blank results ☑ LCS recoveries ☐ MS/MSD recoveries and RPDs ☑ Surrogate recoveries

ACTION: If no, contact lab for submission of missing or incomplete information.

2.0 Holding Times

Have any technical holding times, determined from date of collection to date of analysis, been exceeded? Yes [ ] **No [✓]** N/A [ ] Comments:

For water samples, the holding time is 7 days (aromatics) from sampling for unpreserved samples and 14 days for preserved samples.

For soil samples, the holding time is 14 days from sampling if field preserved with sodium bisulfate/methanol/or water. If an Encore™ sampler was used, the lab must ***preserve*** the sample within 48 hours. Analytical holding time from time of preservation is 14 days.

NOTE: List samples that exceed hold time with # of days exceeded on checklist

ACTION: If technical holding times are exceeded, qualify all positive results (J) and non-detects (UJ). For water samples that are grossly exceeded (>2X hold time) reject (R) all non-detect results. For soil samples professional judgement will be used to determine if rejection is necessary.

3.0 Laboratory Method

3.1 Was the correct laboratory method used? **Yes [✓]** No [ ] N/A [ ] Comments:

Purge and Trap	Water: 5030B	Soil: 5035
Volatile Organics	8260B	

ACTION: If no, contact lab to provide justification for method change compared to the requested method. Contact senior chemist to inform Client of change or to request variance.

3.2 Are the practical quantitation limits the same as those specified by the **Yes [✓]** No [ ] N/A [ ] Comments:
☐ SOW ☑ QAPP ☐ Lab ☐ MADEP

Evaluate PQLs with respect to sample matrix, preparation, dilution, moisture, etc. If sample PQL is indeterminate, contact lab for explanation. Provide a listing of all samples with PQLs that are elevated due to dilution, sample matrix, or preparation factors.

3.3 Are the appropriate parameter results present for each sample in the SDG? **Yes** [✓] No [ ] N/A [ ] Comments:

NOTE: *The MADEP QA/QC Guidelines requires a minimum compound reporting list for volatile organic compounds. Determine target compound requirement and verify reporting list.*

3.4 Were Tentatively Identified Compounds (TICs) reported? **Yes** [ ] No [✓] N/A [ ] Comments:

***NOTE**: TICs are only required for samples with full MADEP target list. Determine if TICs are required. MADEP requires that all TICs be reported to the LCS. Per the MADEP guidance, TICs, which are identified as aliphatic hydrocarbons, do not have to be reported as TICs. However, these compounds must be evaluated as part of the health-based risk assessment approach (VPH/EPH).*

***ACTION**: Qualify reported TIC results as estimated and flag (NJ).*

3.5 If *dilutions were required, were dilution factors reported?* **Yes** [✓] No [ ] N/A [ ] Comments:

NOTE: *MADEP guidance states that if a diluted and an undiluted analysis is performed, the laboratory should report results for the lowest dilution within the valid calibration range for each analyte.*

ACTION: If no, contact the lab for submission.

4.0 Method Blanks

4.1 Are the Method Blank Summaries present? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, call the laboratory for submission of missing data.

4.2 Was a method blank analyzed for each analytical batch of 20 samples or less? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, document discrepancy in case narrative and contact lab for justification. Consult senior chemist for action needed.

4.3 Is the method blank less than the PQL? (See attached table for PQLs). **Yes [✓]** No [ ] N/A [ ] Comments:

NOTE: *MADEP allows common laboratory contaminants (acetone, methylene chloride and 2-butanone) to be present at concentrations < 5x the PQL.*

4.4 Do any method blanks have positive results for VOC parameters? Qualify data according to the following: Yes [ ] **No [✓]** N/A [ ] Comments:

For the common contaminants (methylene chloride, acetone, toluene, and 2-butanone):

If the sample concentration is < 10 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 10 × blank value, no qualification is needed.

For other VOC contaminants:

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

ACTION: If any blank has positive results, list all the concentrations detected and flagging level (flagging level = 10x or 5 × blank value) on the checklist. List all affected samples and their qualifiers.

5.0 Laboratory Control Standards

5.1 Was a laboratory control standard (LCS) run with each analytical batch of 20 samples or less? **Yes [✓]** No [ ] N/A [ ] Comments:

ACTION: If no, call laboratory for LCS form submittal. If data is not available, use professional judgment to determine qualification actions for data associated with that batch.

5.2 Is a LCS Summary Form present? **Yes [✓]** No [ ] N/A [ ] Comments:

ACTION: If no, contact lab for resubmission of missing data.

5.2 Is the recovery of any analyte outside of control limits? Yes [ ] **No [✓]** N/A [ ] Comments:

NOTE: *A full target, second source LCS is required by MADEP.*

NOTE: Use *MADEP guidelines list LCS recovery limits of 70-130.*

ACTION: If recovery is above the upper limit, qualify all positive sample results within the batch as (J). If recovery is below the lower limit but > 10%, qualify all positive and no-detect results within the batch as (J). If LCS recovery is <10%, non-detect results are rejected (R). Document qualified compounds and percent recoveries in the validation report.

5.4 Are 80% of LCS recoveries within laboratory control limits? **Yes [✓]** No [ ] N/A [ ] Comments:

ACTION: If 80% of LCS recoveries are not within limits, use professional judgment and consult Senior Chemist.

6.0 Matrix Spikes

Matrix spikes may be collected at different frequencies based on monthly, quarterly, or task specific schedules. Confirm spike requirements for each set with the senior chemist.

6.1 Were project-specific MS/MSDs collected? List project samples that were spiked. **Yes [ ]** No [✓] N/A [ ] Comments:

ACTION: If no, contact senior chemist to see if any were specified.

6.2 Is the MS/MSD Recovery Form present? **Yes [ ]** No [ ] N/A [✓] Comments:

ACTION: If no, contact lab for resubmission of missing data.

6.3 Were matrix spikes analyzed at the required frequency of 1 per 20 samples per matrix? **Yes [ ]** No [ ] N/A [✓] Comments:

ACTION: If any matrix spike data is missing, call lab for resubmission.

6.4 Are any VOC spike recoveries outside of the QC limits? Yes [ ] **No** [ ] N/A [✓] Comments:

NOTE: $\%R = \frac{(SSR-SR)}{SA} \times 100\%$ Where: SSR = Spiked sample result
SR = Sample result
SA = Spike added

NOTE: *A full target, second source MS/MSD is required by MADEP.*

NOTE: *MADEP guidelines list MS/MSD recovery limits as 70-130.*

NOTES: 1) If only one of the recoveries for an MS/MSD pair is outside of the control limits, no qualification is necessary. Use professional judgment for the MS/MSD flags.
2) If the MS/MSD was performed by the laboratory on a non-project sample, no qualification is required.

ACTION: MS/MSD flags only apply to the sample spiked. If the recoveries of the MS and MSD exceed the upper control limit, qualify positive results as estimated (J). If the recoveries of the MS and MSD are lower than the lower control limit, qualify both positive results and non-detects (J). If recovery is < 10%, reject non-detects (R).

6.5 Are any RPDs for MS/MSD recoveries outside of the QA/QC limits? Yes [ ] **No** [ ] N/A [✓] Comments:

NOTE: $RPD = \frac{S - D}{(S + D)/2} \times 100\%$ Where S = MS result
D = MSD result

NOTE: *MADEP guidelines list MS/MSD RPD limits for both water and soils as ≤ 20.*

ACTION: If the RPD exceeds the control limit, qualify positive results and non-detects (J).

7.0 Surrogate Recoveries

Were one or more VOC surrogate recoveries outside of laboratory limits for any Yes [ ] **No** [✓] N/A [ ] Comments:

sample or method blank? If yes, were samples re-analyzed?

NOTE: %R = QD x 100% Where: S = MS sample result
D = MSD sample result

NOTE: No qualification is required if two of the surrogates are within acceptable QC limits. If surrogate recoveries fail due to dilution, results are not flagged. Document on checklist and in the case narrative.

NOTE: *MADEP guidelines list surrogate limits for both water and soils as 70-130%. Surrogate recovery limits greater than ± 30% are allowed for difficult matrices (wastes, sludges, etc.) with appropriate analytical documentation.*

ACTION: If recoveries are >10%, but fail to meet quality control criteria: (1) For recoveries below the QC limit but >10%, qualify nondetects and positives (J), and (2) For recoveries above the QC limit, qualify only positives (J). If any surrogate recovery is <10% (unless the QC limits are below 10%, in which case, results are flagged as stated above), flag positives (J) and reject nondetects (R).

8.0 Sampling Accuracy

8.1 Were trip blanks shipped with VOC samples and analyzed?

Yes [✓] No [ ] N/A [ ] Comments:

NOTE: *MADEP requires trip blanks per the following frequency:*

	Soil/Sediment	*Aqueous*	*Drinking Water*
Option 1	*Not Required*	*Not Required*	*1 per cooler VOAs/VPH*
Option 3	*1 per 10 samples*	*1 per 10 samples*	*1 per 10 samples*

8.2 Do any trip blanks have positive results?

Yes [ ] **No [✓]** N/A [ ] Comments:

ACTION: Prepare a list of samples shipped in the same cooler as a contaminated blank.

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

The majority of ground water samples are collected directly from a tap, process stream, or with dedicated tubing. Rinse blanks will not be collected. **Yes [__]** No [✓] N/A [__] Comments:

8.3 Were rinsate blanks collected? Prior to evaluating rinsate blanks, obtain a list of the associated samples from the senior chemist.

***NOTE**: MADEP does not specify the collection of rinsate blanks.*

8.4 Do any rinsate blanks have positive results? Yes [__] **No [__]** N/A [✓] Comments:

ACTION: Evaluate rinsate results against blank results to determine if contaminant may be laboratory-, ambient-, or shipment-derived. If results are not lab-, ambient-, or shipment-related, qualify according to the table above (8.2).

9.0 Field Duplicates

9.1 Were field duplicate samples collected? Obtain a list of samples and their associated field duplicates. **Yes [__]** No [✓] N/A [__] Comments:

9.2 Were field duplicates collected per the required frequency? **Yes [__]** No [__] N/A [✓] Comments:

☐ SOW ☐ QAPP *(1 per 10)* ☐ *MADEP Option 1(1 per 20)*

☐ *MADEP Option 3 (1 per 10)*

9.3 Was the RPD ≤ 50% for soils or 30% for waters? Calculate the RPD for all results and attach to this review. **Yes [__]** No [__] N/A [✓] Comments:

ACTION: Qualify data (J) for both sample results if the RPD goal is exceeded.

10.0 Application of Validation Qualifiers

Was any of the data qualified? Yes [ ] **No [✓]** N/A [ ] Comments:

If so, apply data qualifiers directly to the DQE copy of laboratory report and **flag pages** for entry in database.

REFERENCES

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STL-Westfield, 2002. "Olin – General Chemistry Control Limits (Soil & Water)," Severn Trent Laboratories, Inc., 53 Southampton Road, Westfield, MA, 01085.

U.S. Environmental Protection Agency (USEPA), 1996. "Region 1 EPA-NE Data Validation Guidelines For Evaluating Environmental Analyses"; Quality Assurance Unit Staff; Office of Environmental Measurement and Evaluation; December 1996.

MADEP, 2001. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Massachusetts Quality Assurance / Quality Control (QA / QC Requirements," BWSC-CAM, Interim Final Draft, Revision No. 2, 5 October 2001.

MADEP, 2001. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Quality Assurance / Quality Control Guidelines for Sampling, Data Evaluation and reporting Activities, " BWSC-CAM, Section VII, Public Comment Draft, Revision No. 0, 21 December 2001.

OLIN-WILMINGTON
LEVEL I DATA QUALITY EVALUATION
STANDARD OPERATING PROCEDURE AND CHECKLIST
SEMI-VOLATILE ORGAINICS BY METHOD 8270C/625

Reviewer/Date 5/8/09
Sr. Review/Date Chris Ricardi 5/19/09
Lab Report # 360-21331-1
Project # 610709001G, 12

1.0 Laboratory Deliverable Requirements

1.1 Laboratory Information: Was all of the following provided in the laboratory report? **Yes** [✓] No [ ] N/A [ ] Comments:
Check items received.

☑ *Name of Laboratory* ☑ *Address* ☑ *Project ID* ☑ *Phone #* ☑ *Sample identification – Field and Laboratory*

Client Information: ☑ *Name* ☑ *Address* ☑ *Client Contact* *(IDs must be cross-referenced)*

ACTION: If no, contact lab for submission of missing or illegible information.

1.2 Laboratory Report Certification Statement ***Yes*** [✓] *No* [ ] *N/A* [ ] *Comments:*

Does the laboratory report include a completed Analytical Report Certification in the required format?

***ACTION**: If no, contact lab for submission of missing certification or certification with correct format.*

1.3 Laboratory Case Narrative: ***Yes*** [✓] *No* [ ] *N/A* [ ] *Comments:*

☑ *Narrative serves as an exception report for the project and method QA/QC performance.* ☐ *Narrative includes an explanation of each discrepancy on the Certification Statement.*

***ACTION**: If no, contact lab for submission of missing or illegible information.*

1.4 Chain of Custody (COC) copy present of completed COC? **Yes** [✓] No [ ] N/A [ ] Comments:

Does the laboratory report include a copy of the completed Chain of Custody forms containing all samples in this SDG?

NOTE: Olin receives and maintains the *original* COC.

ACTION: If no, contact lab for submission of missing completed *COC*.

1.5 Sample Receipt Information (*Cooler Receipt Form*): Were each of the following tasks completed and recorded upon receipt of the sample(s) into the laboratory? **Yes [✓]** No [ ] N/A [ ] Comments:

☑ Sample temperature confirmed: must be 1° – 10° C. (If samples were sent by courier and delivered on the same day as collection, temperature requirement does not apply).

☑ Container type noted ☑ Condition observed ☑ pH verified (where applicable) ☑ Field and lab IDs cross referenced

ACTION: If no, contact lab for submission of missing or incomplete documentation.

1.5.1 Were the correct bottles and preservatives used? **Yes [✓]** No [ ] N/A [ ] Comments:

Water - 1 Liter amber bottle/cool to 4°C
Soil - 8 oz soil jar/cool to 4°C

ACTION: If no, inform senior chemist. Document justification for change in container/volume (if applicable), qualify positive and non-detect data (J) if cooler temperature exceeds 10°C. Rejection of data requires professional judgment.

1.5.2 Were all samples delivered to the laboratory without breakage? **Yes [✓]** No [ ] N/A [ ] Comments:

1.5.3 Does the *Cooler Receipt Form* or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data? Yes [ ] **No [✓]** N/A [ ] Comments:

1.6 Sample Results Section: *Was the following information supplied in the laboratory report for each sample?* **Yes [✓]** No [ ] N/A [ ] Comments:

☑ Field ID and Lab ID ☑ *Date and time collected* ☑ Analyst Initials ☑ *Dilution Factor* ☑ % moisture or solids ☑ *Reporting limits*
☑ *Clean-up method* ☑ Analysis method ☑ *Preparation method* ☑ *Date of preparation/extraction/digestion clean-up and analysis, where applicable*
☑ Matrix ☑ Target analytes and concentrations ☑ Units (soils must be reported in dry weight)

ACTION: If no, contact lab for submission of missing or incomplete information.

1.7 QA/QC Information: Was the following information provided in the laboratory report for each sample batch? **Yes** [✓] No [ ] N/A [ ] Comments:

☑ Method blank results ☑ LCS recoveries ☐ MS/MSD recoveries and RPDs ☑ Surrogate recoveries

ACTION: If no, contact lab for submission of missing or incomplete information.

2.0 Holding Times Yes [ ] **No** [✓] N/A [ ] Comments:

Have any technical holding times, determined from date of collection to date of analysis, been exceeded?

NOTE: For water samples, the holding time is 7 days from sampling to extraction and 40 days from extraction to analysis. For soil samples, the holding time is 14 days from sampling to extraction and 40 days from extraction to analysis.

ACTION: If technical holding times are exceeded, qualify all positive results (J) and non-detects (UJ). For water samples that are grossly exceeded (>2X hold time) reject (R) all non-detect results. For soil samples professional judgement will be used to determine if rejection is necessary.

3.0 Laboratory Method **Yes** [✓] No [ ] N/A [ ] Comments:

3.1 Was the correct laboratory method used?

Water Extraction	3510C or *3520C*
Soil Extraction	*3540C* or 3550B
Semi-volatile Organics	8270C

ACTION: If no, contact project manager to inform Client of change; request variance from Client; contact laboratory to provide justification for method change compared to the requested method.

3.2 Are the practical quantitation limits the same as those specified by the ☐ SOW ☑ QAPP ☐ Lab? **Yes** [✓] No [ ] N/A [ ] Comments:

NOTE: *The QAPP and MADEP QA/QC Guidelines provides PQLs for semi-volatile organic compounds. Verify proper PQLs were used for each data set.*

ACTION: If no, evaluate change with respect to sample matrix, preparation, dilution, moisture, etc. If sample PQL is indeterminate, contact lab for explanation.

3.3 Are the appropriate parameter results present for each sample in the SDG? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, check Request for Analysis to verify if method was ordered and COC to verify that it was sent, and contact lab for resubmission of the missing data

3.4 Were Tentatively Identified Compounds (TICs) reported? **Yes** [ ] No [✓] N/A [ ] Comments:

NOTE *TICs are only required for samples with full MADEP target list. Determine if TICs are required. MADEP requires that all TICs be reported to the LCS. Per the MADEP guidance, TICs, which are identified as aliphatic hydrocarbons, do not have to be reported as TICs. However, these compounds must be evaluated as part of the health-based risk assessment approach (VPH/EPH).*

ACTION*: Qualify reported TIC results as estimated and flag (NJ).*

3.5 If *dilutions were required, were dilution factors reported?* **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact the lab for submission.

4.0 Method Blanks

4.1 Is the Method Blank Summary present? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, call the laboratory for submission of missing data.

4.2 For the analysis of SVOCs, has a method blank been analyzed for each analysis batch of field samples of 20 or less? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, document discrepancy in case narrative and contact lab for justification. Consult senior chemist for action needed.

4.3 Is the method blank less than the PQL?

Yes [ ] No [✓] N/A [ ] Comments:

NOTE: *MADEP allows common laboratory contaminants (such as phthalates) to be present at concentrations < 5x the PQL*

4.4 Do any method blanks have positive results for SVOC parameters? Qualify data according to the following:

Yes [✓] No [ ] N/A [ ] Comments:

Bis (2-ethylhexyl) phthalate (5.3 ug/L) reported in the method blank. Action limit established at 10x blank concentration. The result for Bis (2ethyl hexyl) phthalate in sample OC-GW-16R is less than the action limit and was qualified non-detect (U) at the reporting limit.

For the common contaminants (phthalates):

If the sample concentration is < 10 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 10 × blank value, no qualification is needed.

For other SVOC contaminants:

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

ACTION: For any blank with positive results, list all contaminants for each method blank, including the concentration detected and the flagging level (flagging level = 5x or 10x the blank value) and the associated samples and qualifiers.

5.0 Laboratory Control Standard

5.1 Was a laboratory control standard run with each analytical batch of 20 samples or less?

Yes [✓] No [ ] N/A [ ] Comments:

ACTION: Call laboratory for LCS form submittal. If data are not available, use professional judgment to determine the usability of sample results associated with that batch.

5.2 Is a LCS Summary Form present? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact lab for resubmission of missing data.

5.3 Is the recovery of any analyte outside of control limits? Yes [ ] **No** [✓] N/A [ ] Comments:

NOTE: *A full target, second source LCS is required by MADEP.*

NOTE: *MADEP guidelines list LCS recovery limits as 40-140 for base-neutral compounds and 30-130 for the acid compounds. The laboratory must identify analytes that routinely exceed these limits.*

ACTION: If recovery is above the upper limit, qualify all positive sample results within the batch as (J). If recovery is below the lower limit but > 10%, qualify all positive and no-detect results within the batch as (J). If LCS recovery is <10%, non-detect results are rejected (R).

5.4 Are 80% of LCS recoveries within laboratory control limits? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If 80% of LCS recoveries are not within limits, use professional judgment and consult Senior Chemist.

6.0 Matrix Spikes

Matrix spikes may be collected at different frequencies based on monthly, quarterly, or task specific schedules. Confirm spike requirements for each set with the senior chemist.

6.1 Were project specified MS/MSDs collected? List project samples that were spiked. **Yes** [ ] No [✓] N/A [ ] Comments:

ACTION: If no, contact senior chemist to see if any were specified.

6.2 Is the MS/MSD recovery form present? **Yes** [ ] No [ ] N/A [✓] Comments:

ACTION: If no, contact lab for resubmission of missing data.

6.3 Were matrix spikes analyzed at the required frequency of 1 per 20 samples per matrix? **Yes** [ ] No [ ] N/A [✓] Comments:

ACTION: If any matrix spike data are missing, call lab for resubmission.

6.4 Are any SVOC spike recoveries outside of the QC limits?

Yes [ ] **No** [ ] N/A [✓] Comments:

NOTE: $\%R = \frac{(SSR-SR)}{SA} \times 100\%$ Where: SSR = Spiked sample result
SR = Sample result
SA = Spike added

NOTE: *A full target, second source MS/MSD is required by MADEP.*

NOTE: *MADEP guidelines list MS/MSD recovery limits as 40-140 for base-neutral compounds and 30-130 for acid compounds.*

NOTES: 1) If only one of the recoveries for an MS/MSD pair is outside of the control limits, no qualification is necessary. Use professional judgment for the MS/MSD flags.
2) If the MS/MSD was performed by the laboratory on a non-project sample, no qualification is required.

ACTION: MS/MSD flags only apply to the sample spiked. If the recoveries of the MS and MSD exceed the upper control limit, qualify positive results as estimated (J). If the recoveries of the MS and MSD are lower than the lower control limit, qualify both positive results and non-detects (J). If LCS recovery is <10%, non-detect results are rejected (R).

6.5 Are any RPDs for MS/MSD recoveries outside of the QC limits? Yes [ ] **No** [ ] N/A [✓] Comments:

NOTE: $RPD = \frac{S-D}{(S+D)/2} \times 100\%$ Where: S = MS sample result
D = MSD sample result

NOTE: *MADEP guidelines list MS/MSD RPD limits for water as ≤ 20 and soils as ≤ 30.*

NOTE: Laboratory control limits apply when spiked sample results fall within the normal calibration range. If dilutions are required due to high sample concentrations, the data are evaluated, but no flags are applied.

ACTION: If the RPD exceeds the control limit, qualify positive results and non-detects (J).

7.0 Surrogate Recoveries

Were one or more SVOC surrogate recoveries outside of laboratory limits for any sample or method blank? If yes, were samples re-analyzed? Yes [✓] **No** [ ] N/A [ ] Comments:
The percent recovery for phenol-d5 (14) is less than the control limit. No further action required.

NOTE: %R = QD x 100% Where: S = MS sample result
D = MSD sample result

NOTE: *MADEP guidelines list surrogate limits for soils as 30-130% for all surrogates, and for water as 30-130% for base-neutrals and 15-110% for acid surrogates.*

NOTE: Qualify BNE results based upon BNE surrogates and AE results based upon AE surrogates.

Due to the concentration of target analyte, the sample was analyzed at a dilution where the surrogate, were diluted out. The initial analysis indicated acceptable surrogate recovery. No further action required.

ACTION: If recoveries are >10%, but 2 or more from any one fraction (acid or base-neutral) fail to meet QC criteria: (1) For recoveries below the QC limit, qualify non-detects and positives (J), and (2) For recoveries above the QC limit, qualify only positives (J). If any surrogate recovery is <10% (unless the lab QC limits are below

10%, in which case, results are flagged as stated above), flag positives (J) and reject non-detects (R).

8.0 Sampling Accuracy

The majority of ground water samples are collected directly from a tap, process stream, or with dedicated tubing. Rinse blanks will not be collected.

8.1 Were rinsate blanks collected? Prior to evaluating rinsate blanks, obtain a list of the associated samples from the project chemist. Yes [ ] **No [✓]** N/A [ ] Comments:

***NOTE**: MADEP does not specify the collection of rinsate blanks.*

8.2 Do any rinsate blanks have positive results? Yes [ ] **No [ ]** N/A [✓] Comments:

NOTE: For the common contaminants (phthalates), qualification is applied as indicated above using a 10x blank value in lieu of a 5x blank value.

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

9.0 Field Duplicates

9.1 Were field duplicate samples collected? Obtain a list of the samples and their associated field duplicates. Yes [ ] **No [✓]** N/A [ ] Comments:

9.2 Were field duplicates collected per the required frequency? **Yes [ ]** No [ ] N/A [✓] Comments:

☐ SOW ☐ QAPP ☐ *MADEP Option 1(1 per 20)* ☐ *MADEP Option 3 (1 per 10)*

9.3 Was the RPD ≤ 50% for soils or waters? Calculate the RPD for all results and **Yes [ ]** No [ ] N/A [✓] Comments:

attach to this review.

ACTION: RPD must be ≤50% for soil and water. Qualify data (J) for both sample results if the RPD exceeds 50%.

10.0 Application of Validation Qualifiers

Was any of the data qualified? Yes [✓] **No** [ ] N/A [ ] Comments:

If so, apply data qualifiers directly to the DQE copy of laboratory report and **flag pages** for entry in database.

REFERENCES

LAW, 1999, "Final Quality Assurance Project Plan, Olin Wilmington Property, 51 Eames Street, Wilmington, MA", LAW Engineering and Environmental Services, Kennesaw, GA 30144. August 1999.

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OLIN CORPORATION
LEVEL I DATA QUALITY EVALUATION
STANDARD OPERATING PROCEDURE AND CHECKLIST
VOLATILE PETROLEUM HYDROCARBONS BY METHOD MADEP

Reviewer/Date 5/8/09
Sr. Review/Date Chris Ricardi 5/19/09
Lab Report # 360-21331-1
Project # 61705.0016.12

1.0 Laboratory Deliverable Requirements

1.1 Laboratory Information: Was all of the following provided in the laboratory report? **Yes** [✓] No [ ] N/A [ ] Comments:
Check items received.

☑ *Name of Laboratory* ☑ *Certification ID #* ☑ *Address* ☑ *Project ID* ☑ *Phone #* ☑ *Sample identification – Field and Laboratory*

Client Information: ☑ *Name* ☑ *Address* ☑ *Client Contact* *(IDs must be cross-referenced)*

ACTION: If no, contact lab for submission of missing or illegible information.

1.2 Laboratory Report Certification Statement

Yes [✓] *No* [ ] *N/A* [ ] *Comments:*

Does the laboratory report include a completed Analytical Report Certification in the required format?

***ACTION**: If no, contact lab for submission of missing certification or certification with correct format.*

1.3 Laboratory Case Narrative:

Yes [✓] *No* [ ] *N/A* [ ] *Comments:*

☑ *Narrative serves as an exception report for the project and method QA/QC performance.* ☐ *Narrative includes an explanation of each discrepancy on the Certification Statement.*

***ACTION**: If no, contact lab for submission of missing or illegible information.*

1.4 Chain of Custody (COC)

Yes [✓] No [ ] N/A [ ] Comments:

Does the laboratory report include a copy of the completed Chain of Custody forms containing all samples in this SDG?

NOTE: Olin receives and maintains the *original* COC.

ACTION: If no, contact lab for submission of completed COC.

1.5 Sample Receipt Information (*Cooler Receipt Form*): Were each of the following tasks completed and recorded upon receipt of the sample(s) into the laboratory? **Yes [✓]** No [ ] N/A [ ] Comments:

☑ Sample temperature confirmed: must be 1° – 10° C. (If samples were sent by courier and delivered on the same day as collection, temperature requirement does not apply).

☑ Container type noted ☑ Condition observed ☑ Field and lab IDs cross referenced

ACTION: If no, contact lab for submission of missing or incomplete documentation.

1.5.1 Were the correct bottles and preservatives used? **Yes [✓]** No [ ] N/A [ ] Comments:

Water - 40 mL VOA vial/HCL to pH<2, cool to 4°C
Soil - 5 gram Encore™/cool to 4°C or 40 mL VOA vial with field preservation of sodium bisulfate (low-level) or methanol (high-level) or field preservation in water if soils are reactive to sodium bisulfate (i.e. alkaline conditions, excessive humic acid content, etc.)

ACTION: If no, inform senior chemist. Document justification for change in container/volume (if applicable); qualify both positive data and non-detect data (J) if cooler temperature exceeds 10°C. Rejection of data requires professional judgment

ACTION: If each VOA vial for a sample contains air bubbles or the VOA vial analyzed contained air bubbles, flag positives (J) and reject nondetects (R).

1.5.2 Were all samples delivered to the laboratory without breakage? **Yes [✓]** No [ ] N/A [ ] Comments:

1.5.3 Does the *Cooler Receipt Form* or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data? Yes [ ] **No [✓]** N/A [ ] Comments:

1.6 Sample Results Section: *Was the following information supplied in the laboratory report for each sample?* **Yes [✓]** No [ ] N/A [ ] Comments:

☑ Field ID and Lab ID ☑ *Date and time collected* ☑ Analyst Initials ☑ *Dilution Factor* ☑ % moisture or solids ☑ *Reporting limits*
☑ Analysis method ☑ *Preparation method* ☑ *Date of preparation/extraction/digestion clean-up and analysis, where applicable* ☑ Matrix ☑ Target analytes and concentrations ☑ Units (soils must be reported in dry weight)

ACTION: If no, contact lab for submission of missing or incomplete information.

1.7 QA/QC Information: Was the following information provided in the laboratory report for each sample batch? **Yes** [✓] No [ ] N/A [ ] Comments:

☑ Method blank results ☑ LCS recoveries ☐ MS/MSD recoveries and RPDs ☐ Surrogate recoveries

ACTION: If no, contact lab for submission of missing or incomplete information.

2.0 Holding Times

Have any technical holding times, determined from date of collection to date of analysis, been exceeded? Yes [ ] **No** [✓] N/A [ ] Comments:

For water samples, the holding time is 7 days from sampling for unpreserved samples and 14 days for preserved samples.

For soil samples, methanol preservation required with a holding time of 14 days. If an Encore™ sampler was used, the lab must ***preserve*** the sample within 48 hours. Analytical holding time from time of preservation is 14 days.

NOTE: List samples that exceed hold time with # of days exceeded on checklist

ACTION: If technical holding times are exceeded, qualify all positive results (J). Use professional judgment to reject (R) data for grossly exceeded.

3.0 Laboratory Method

3.1 Was the correct laboratory method used? **Yes** [✓] No [ ] N/A [ ] Comments:

Purge and Trap	Water: 5030B	Soil: 5035
Volatile Petroleum Hydrocarbons	MADEP VPH 98-1	

ACTION: If no, contact lab to provide justification for method change compared to the requested method. Contact senior chemist to inform Client of change or to request variance.

3.2 Are the practical quantitation limits the same as those specified by the ☐ SOW ☑ QAPP ☐ Lab ☐ MADEP — **Yes** [✓] No [ ] N/A [ ] Comments:

NOTE: *The MADEP QA/QC Guidelines provides PQLs for volatile petroleum hydrocarbons. See MADEP PQLs vs. the PQLs listed in the QAPP.*

ACTION: If no, evaluate change with respect to sample matrix, preparation, dilution, moisture, etc. If sample PQL is indeterminate, contact lab for explanation.

3.3 Are the appropriate parameter results present for each sample in the SDG? **Yes** [✓] No [ ] N/A [ ] Comments:

NOTE: *The MADEP QA/QC Guidelines requires a minimum compound reporting list for volatile organic compounds.*

3.4 If *dilutions were required, were dilution factors reported?* **Yes** [✓] No [ ] N/A [ ] Comments:

NOTE: *MADEP guidance states that if a diluted and an undiluted analysis is performed, the laboratory should report results for the lowest dilution within the valid calibration range for each analyte.*

ACTION: If no, contact the lab for submission.

4.0 Method Blanks

4.1 Are the Method Blank Summaries present? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, call the laboratory for submission of missing data.

4.2 Was a method blank analyzed for each analytical batch of 20 samples or less? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, document discrepancy in case narrative and contact lab for justification. Consult senior chemist for action needed.

4.3 Is the method blank less than the PQL? (See attached table for PQLs). **Yes [✓]** No [ ] N/A [ ] Comments:

4.4 Do any method blanks have positive results for VPH parameters? Qualify data according to the following: Yes [ ] **No [✓]** N/A [ ] Comments:

For VPH contaminants:

Review blank and sample chromatograms to evaluate the nature of the detection in the blank and associated samples. Use professional judgment. The following actions may be applied:

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed..

ACTION: If any blank has positive results, list all the concentrations detected and flagging level (flagging level = 10x or 5 × blank value) on the checklist. List all affected samples and their qualifiers.

5.0 Laboratory Control Standard

5.1 Was a laboratory control standard (LCS) run with each analytical batch of 20 samples or less? **Yes [✓]** No [ ] N/A [ ] Comments:

ACTION: Call laboratory for LCS form submittal. If data are not available, reject (R) data associated with that batch.

5.2 Is a LCS Summary Form present? **Yes [✓]** No [ ] N/A [ ] Comments:

ACTION: If no, contact lab for resubmission of missing data.

5.3 Is the recovery of any analyte outside of control limits? Yes [ ] **No [✓]** N/A [ ] Comments:

NOTE: *A full target, second source LCS is required by MADEP.*

NOTE: *MADEP guidelines list LCS recovery limits as 70-130 except for naphthalene. The laboratory must identify any other analytes that routinely exceed 70-130 percent.*

ACTION: If recovery is above the upper limit, qualify all positive sample results within the batch as (J). If recovery is below the lower limit but > 10%, qualify all positive and no-detect results within the batch as (J). If LCS recovery is <10%, positive and non-detect results are rejected (R) unless the QC limit for that compound is below 10% (flag as above).

5.4 Are 80% of LCS recoveries within laboratory control limits? **Yes [✓]** No [ ] N/A [ ] Comments:

ACTION: If 80% of LCS recoveries are not within limits, use professional judgment and consult Senior Chemist. If more than half of the recoveries are above control limits, qualify all positive results as (J). If more than half of the recoveries are below control limits, batch may require rejection and reanalysis

6.0 Matrix Spikes

6.1 Were project-specific MS/MSDs collected? List project samples that were spiked. **Yes [ ]** No [✓] N/A [ ] Comments:

ACTION: If no, contact senior chemist to see if any were specified.

6.2 Is the MS/MSD Recovery Form present? **Yes [ ]** No [ ] N/A [✓] Comments:

ACTION: If no, contact lab for resubmission of missing data.

6.3 Were matrix spikes analyzed at the required frequency of 1 per 20 samples per matrix? **Yes [ ]** No [ ] N/A [✓] Comments:

ACTION: If any matrix spike data are missing, call lab for resubmission.

6.4 Are any VPH spike recoveries outside of the QC limits? Yes [ ] **No** [ ] N/A [✓] Comments:

NOTE: $\%R = \frac{(SSR-SR)}{SA} \times 100\%$ Where: SSR = Spiked sample result, SR = Sample result, SA = Spike added

NOTE: *A full target, second source MS/MSD is required by MADEP.*

NOTE: *MADEP guidelines list MS/MSD recovery limits as 70-130 except for naphthalene.*

NOTES: 1) If only one of the recoveries for an MS/MSD pair is outside of the control limits, no qualification is necessary. Use professional judgment for the MS/MSD flags.
2) If the MS/MSD was performed by the laboratory on a non-project sample, no qualification is required.

ACTION: MS/MSD flags only apply to the sample spiked. If the recoveries of the MS and MSD exceed the upper control limit, qualify positive results as estimated (J). If the recoveries of the MS and MSD are lower than the lower control limit but > 30%, qualify both positive results and non-detects (J). If the MS/MSD recovery is < 30% and the sample is non-detect, the results are considered unusable and flagged (R).

ACTION: Laboratory control limits apply when spiked sample results fall within the normal calibration range. If dilutions are required due to high sample concentrations, the data is evaluated, but no flags are applied.

6.5 Are any RPDs for MS/MSD recoveries outside of the QC limits? Yes [ ] **No** [ ] N/A [✓] Comments:

NOTE: $RPD = \frac{S-D}{(S+D)/2} \times 100\%$ Where: S = MS sample result, D = MSD sample result

NOTE: *MADEP guidelines list MS/MSD RPD limits for both water and soils as ≤ 50.*

ACTION: If the RPD exceeds the control limit, qualify positive results and non-detects (J).

ACTION: Laboratory control limits apply when spiked sample results fall within the normal calibration range. If dilutions are required due to high sample concentrations, the data are evaluated, but no flags are applied.

7.0 Surrogate Recoveries

Were VPH surrogate recoveries outside of laboratory limits for any sample or method blank? If yes, were samples re-analyzed? Yes [ ] **No [✓]** N/A [ ] Comments:

NOTE: %R = QD x 100% Where: S = MS sample result
D = MSD sample result

NOTE: *MADEP guidelines list surrogate limits for both water and soils as 70-130% for both detectors.*

ACTION: If recoveries are >10%, but fail to meet QC criteria: (1) For recoveries below the QC limit, qualify non-detects and positives (J), and (2) For recoveries above the QC limit, qualify only positives (J). If any surrogate recovery is <10% (unless the QC limits are below 10%, in which case, results are flagged as stated above), flag positives (J) and reject nondetects (R).

NOTE: If surrogate recoveries fail due to dilution, results are not flagged. Document on checklist and in the case narrative.

8.0 Sampling Accuracy

8.1 Were trip blanks shipped with VOC samples and analyzed? **Yes [✓]** No [ ] N/A [ ] Comments:

NOTE: *MADEP requires trip blanks per the following frequency:*

	Soil/Sediment	*Aqueous*	*Drinking Water*
Option 1	*Not Required*	*Not Required*	*1 per cooler VOAs/VPH*
Option 3	*1 per 10 samples*	*1 per 10 samples*	*1 per 10 samples*

8.2 Do any trip blanks have positive results? Yes [ ] **No [✓]** N/A [ ] Comments:

ACTION: Prepare a list of samples shipped in the same cooler as the contaminated blank.

ACTION: Evaluate trip blank results against method blank results to determine if contaminant may be laboratory-derived. If results are not lab-related, qualify according to the table below.

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

8.3 Were ambient blanks shipped with VPH samples and analyzed? **Yes [__]** No [✓] N/A [__] Comments:

NOTE: *MADEP requires ambient (field) blanks per the following frequency:*

	Soil/Sediment	*Aqueous*	*Drinking Water*
Option 1	*Not Required*	*Not Required*	*Not Required*
Option 3	*1 per 10 samples*	*1 per 10 samples*	*1 per 10 samples*

8.4 Do any ambient blanks have positive results? Yes [__] **No [__]** N/A [✓] Comments:

ACTION: Prepare a list of samples associated with the contaminated blank (all collected from the site on that day).

ACTION: Evaluate ambient blank results against method and trip blank results to determine if contaminant may be laboratory- and/or shipment-derived. If results are not lab- and/or shipment-related, qualify according to the table above (8.2).

8.5 Were rinsate blanks collected? Prior to evaluating rinsate blanks, obtain a list of the associated samples from the senior chemist. **Yes [__]** No [✓] N/A [__] Comments:

***NOTE**: MADEP does not specify the collection of rinsate blanks.*

8.6 Do any rinsate blanks have positive results? Yes [__] **No [__]** N/A [✓] Comments:

ACTION: Evaluate rinsate results against blank results to determine if contaminant may be laboratory-, ambient-, or shipment-derived. If results are not lab-, ambient-, or shipment-related, qualify according to the table above (8.2).

9.0 Field Duplicates

9.1 Were field duplicate samples collected? Obtain a list of samples and their associated field duplicates. **Yes** [ ] No [✓] N/A [ ] Comments:

9.2 Were field duplicates collected per the required frequency? **Yes** [ ] No [ ] N/A [✓] Comments:

☐ SOW ☐ QAPP ☐ *MADEP Option 1(1 per 20)* ☐ *MADEP Option 3 (1 per 10)*

9.3 Was the RPD ≤ 50% for soils or waters? Calculate the RPD for all results and attach to this review. **Yes** [ ] No [ ] N/A [✓] Comments:

ACTION: RPD must be ≤50% for soil and water. Qualify data (J) for both sample results if the RPD exceeds 50%.

10.0 Application of Validation Qualifiers

Was any of the data qualified? **Yes** [ ] No [✓] N/A [ ] Comments:

If so, apply data qualifiers directly to the DQE copy of laboratory report and **flag pages** for entry in database.

REFERENCES

LAW, 1999, "Final Quality Assurance Project Plan, Olin Wilmington Property, 51 Eames Street, Wilmington, MA", LAW Engineering and Environmental Services, Kennesaw, GA 30144. August 1999.

Massachusetts Department of Environmental Protection (MADEP), 1998. "Method for the Determination of Volatile Petroleum Hydrocarbons (VPH)"; Division of Environmental Analysis; Office of Research and Standards; Bureau of Waste Site Cleanup; January 1998.

Version 1.2, Nov 2002

OLIN-WILMINGTON
LEVEL I DATA QUALITY EVALUATION
STANDARD OPERATING PROCEDURE AND CHECKLIST
ICP METALS BY METHOD 6010B/200.7

Reviewer/Date [signature] 5/29/09
Sr. Review/Date ~~[signature] 5/29/09~~ Chas Ricardi 6/19/09
Lab Report # 360-21331-1
Project # 610709006.12

dissolved iron

1.0 Laboratory Deliverable Requirements

1.1 Laboratory Information: Was all of the following provided in the laboratory report? **Yes** [✓] No [ ] N/A [ ] Comments:
Check items received.

☑ *Name of Laboratory* ☑ *Address* ☑ *Project ID* ☑ *Phone #* ☑ *Sample identification – Field and Laboratory*
Client Information: ☑ *Name* ☑ *Address* ☑ *Client Contact* *(IDs must be cross-referenced)*

ACTION: If no, contact lab for submission of missing or illegible information.

1.2 Laboratory Report Certification Statement ***Yes*** [✓] *No* [ ] *N/A* [ ] *Comments:*

Does the laboratory report include a completed Analytical Report Certification in the required format?

***ACTION**: If no, contact lab for submission of missing certification or certification with correct format.*

1.3 Laboratory Case Narrative: ***Yes*** [✓] *No* [ ] *N/A* [ ] *Comments:*

☑ *Narrative serves as an exception report for the project and method QA/QC performance.* ☐ *Narrative includes an explanation of each discrepancy on the*

Certification Statement.

***ACTION**: If no, contact lab for submission of missing or illegible information.*

1.4 Chain of Custody (COC) copy present with all documentation completed **Yes** [✓] No [ ] N/A [ ] Comments:

NOTE: Olin receives and maintains the *original COC.*

ACTION: If no, contact lab for submission of copy of completed *COC.*

1.5 Sample Receipt Information (*Cooler Receipt Form present?*): **Yes** [✓] No [ ] N/A [ ] Comments:

Were each of the following tasks completed and recorded upon receipt of the sample(s) into the laboratory?

☑ Sample temperature confirmed: must be 1° – 10° C. (If samples were sent by courier and delivered on the same day as collection, temperature requirement does not apply).

☑ Container type noted ☑ sample condition observed ☑ pH verified (where applicable) ☐ Field and lab IDs cross referenced

ACTION: If no, contact lab for submission of missing or incomplete documentation.

1.5.1 Were all samples delivered to the laboratory without breakage? **Yes** [✓] No [ ] N/A [ ] Comments:

1.5.2 Does the *Cooler Receipt Form* or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data? Yes [ ] **No** [✓] N/A [ ] Comments:

1.6 Sample Results Section: *Was each of the following requirements supplied in the laboratory report for each sample?* **Yes** [✓] No [ ] N/A [ ] Comments:

☑ Field ID and Lab ID ☑ *Date and time collected* ☑ Analyst Initials ☑ *Dilution Factor* ☐ % moisture or solids ☑ *Reporting limits*
☑ *Clean-up method* ☑ Analysis method ☑ *Preparation method* ☑ *Date of preparation/extraction/digestion clean-up and analysis, where applicable*
☑ Matrix ☑ Target analytes and concentrations ☑ Units (soils must be reported in dry weight)

ACTION: If no, contact lab for submission of missing or incomplete information.

1.7 QA/QC Information: Was each of the following information supplied in the laboratory report for each sample batch? **Yes** [✓] No [ ] N/A [ ] Comments:

☑ Method blank results ☑ LCS recoveries ☐ MS/MSD recoveries and RPDs ☐ Laboratory duplicate results (where applicable)

ACTION: If no, contact lab for submission of missing or incomplete information.

2.0 Holding Times

Have any technical holding times, determined from date of collection to date of analysis, been exceeded? Holding time for metals is 180 days from sample collection to analysis for both water and soil.

Yes [ ] **No [✓]** N/A [ ] Comments:

NOTE: List samples that exceed hold time with # of days exceeded on checklist

ACTION: If technical holding times are exceeded, qualify all positive results (J) and non-detects (UJ). If grossly exceeded (2X holding time) reject (R) all non-detect results.

3.0 Laboratory Method

3.1 Was the correct laboratory method used?

Yes [✓] No [ ] N/A [ ] Comments:

Water Digestion	3005A or 3010A or 3020A
Soil Digestion	3050B
Metals	6010B or 200.7

ACTION: If no, contact laboratory to provide justification for method change compared to the requested method. Contact senior chemist to inform Client of change and to request variance.

3.2 Are the practical quantitation limits the same as those specified by the ☐ SOW ☑ QAPP ☐ Lab ☐ MADEP

Yes [✓] No [ ] N/A [ ] Comments:

NOTE: *Verify that the reported metals match the target list specified on the COC.*

ACTION: If no, evaluate variation with respect to sample matrix, preparation, dilution, moisture, etc. If sample PQL is indeterminate, contact lab for explanation.

3.3 Are results present for each sample in the SDG? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, check Request for Analysis to verify if method was ordered and COC to verify that it was sent, and contact lab for resubmission of the missing data

3.4 If dilutions were required, were dilution factors reported? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact the lab for submission.

4.0 Method Blanks

4.1 Is the Method Blank Summary present? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, call the laboratory for submission of missing data.

4.2 Frequency of Analysis: Was a method blank analyzed for each digestion batch of < 20 field samples? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact laboratory for justification. Consult senior chemist for action needed. Narrate non-compliance.

4.3 Is the method blank less than the PQLs for all target elements? **Yes** [✓] No [ ] N/A [ ] Comments:

NOTE: *MADEP requires the method blank to be matrix matched and digested with the samples*

4.4 Do any method blanks have positive results for metals? Qualify data according to the following: Yes [ ] **No** [✓] N/A [ ] Comments:

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

ACTION: For any blank with positive results, list all contaminants for each method blank including the concentration detected and the flagging level (flagging level = 5x the blank value) and the associated samples and qualifiers.

5.0 Laboratory Control Standard

5.1 Was a laboratory control standard run with each analytical batch of 20 samples or less?

Yes [✓] No [ ] N/A [ ] Comments:

NOTE: *A full target, second source LCS is required by MADEP.*
ACTION: Call laboratory for LCS form submittal. If data are not available, use professional judgement to evaluate data accuracy associated with that batch.

5.2 Is a LCS Summary Form present?

Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact lab for resubmission of missing data.

5.3 Is the recovery of any analyte outside of MADEP control limits?

Yes [ ] **No** [✓] N/A [ ] Comments:

Sample Type	***MADEP % Rec***
Water	*80-120*
Soil	within Lab generated limits

ACTION: If recovery is above the upper limit, qualify all positive sample results within the batch as (J). If recovery is below the lower limit, qualify all positive and non-detects results within the batch as (J). If LCS recovery is <30%, positive and non-detect results are rejected (R).

Comments:

6.0 Matrix Spikes

Matrix spikes may be collected at different frequencies based on monthly, quarterly, or task specific schedules. Confirm spike requirements for each set with the senior chemist.

6.1 Were project-specific MS/MSDs collected? List project samples that were spiked.

Yes [ ] No [✓] N/A [ ] Comments:

ACTION: If no, contact senior chemist to see if any were specified.

6.2 Is the Matrix Spike/Matrix Spike Duplicate Recovery Form present?

Yes [ ] No [ ] N/A [✓] Comments:

NOTE: *A full target, second source MS/MSD is required by MADEP.*
ACTION: If any matrix spike data are missing, call lab for resubmission.

6.3 Were matrix spikes analyzed as indicated on the COC and project schedule?

Yes [ ] No [ ] N/A [✓] Comments:

ACTION: If any matrix spike data are missing, call lab for resubmission. If none, no qualification is needed. Narrate non-compliance.

6.4 Are any metal spike recoveries outside of the QC limits?

Yes [ ] **No** [ ] N/A [✓] Comments:

Sample Type	***MADEP*** ***% Rec***	QAPP % Rec	Method
Water	*75-125*	N/A	6010B
Water	*N/A*	70-130	200.7
Soil	*75-125*	75-125	6010B

NOTE: $\%R = \frac{(SSR-SR)}{SA} \times 100\%$ Where: SSR = Spiked sample result, SR = Sample result, SA = Spike added

NOTE: If dilutions are required due to high sample concentrations (> 4X spike), the data are evaluated, but no flags are applied.

NOTE: If only one of the recoveries for an MS/MSD pair is outside of the control limits, no qualification is necessary. Use professional judgment for the MS/MSD flags.

ACTION: MS/MSD flags only apply to the sample spiked. If the recoveries of the MS and MSD exceed the upper control limit, qualify positive results as estimated (J). If the recoveries of the MS and MSD are lower than the lower control limit, qualify positive results and non-detects (J).

6.5 Are any RPDs for MS/MSD recoveries outside of the QC limits? Yes [ ] **No** [ ] N/A [✓] Comments:

NOTE: $RPD = \frac{S-D}{(S+D)/2} \times 100\%$ Where: S = MS sample result
D = MSD sample result

NOTE: If dilutions are required due to high sample concentrations, the data are evaluated, but no flags are applied.

ACTION: If the RPD exceeds the control limit, qualify positive results and non-detects (J).

7.0 Laboratory Duplicate

7.1 Was a laboratory duplicate sample analyzed? If so, is the Laboratory Duplicate Sample Form present? **Yes** [ ] No [✓] N/A [ ] Comments:

NOTE: *MADEP refers to this sample as a "matrix duplicate".*

ACTION: If not analyzed, qualification is not needed. If data is missing, contact laboratory for resubmission of report. Narrate non-compliance.

7.2 Is the RPD between the result for the laboratory duplicate sample and the result for the parent sample outside of the QA/QC limits? Yes [ ] **No** [ ] N/A [✓] Comments:

MADEP Laboratory Duplicate Sample RPD Criteria:	QAPP RPD
For aqueous results > 5× RL, RPD must be ± 20%	20
For aqueous results < 5× RL, RPD must be ≤ RL	20
For soil/sediment results > 5× RL, RPD must be ± 35%	20
For soil/sediment results < 5× RL, RPD must be ≤ 2× RL	20

ACTION: If the RPD exceeds the limits, qualify both positive results and non-detects as estimated and flag them J. Narrate non-compliance

8.0 Sampling Accuracy

The majority of ground water samples are collected directly from a tap, process stream, or with dedicated tubing. Rinse blanks will not be collected.

8.1 Were rinsate blanks collected? Prior to evaluating rinsate blanks, obtain a list of the associated samples from the senior chemist. **Yes [ ]** No [✓] N/A [ ] Comments:

8.2 Do any rinsate blanks have positive results? Yes [ ] **No [ ]** N/A [✓] Comments:

***NOTE**: MADEP does not require the collection of rinsate blanks.*

ACTION: Evaluate rinsate results against blank results to determine if contaminant may be laboratory-derived. If results are not lab-related, qualify according to below.

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

9.0 Field Duplicates

9.1 Were field duplicate samples collected? Obtain a list of samples and their associated field duplicates. Yes [ ] **No [✓]** N/A [ ] Comments:

9.2 Were field duplicates collected per the required frequency? **Yes** [ ] No [ ] N/A [✓] Comments:

SOW ☐ QAPP *(1 per 10)* ☐ *MADEP Option 1 (1 per 20)* ☐ *MADEP Option 3 (1 per 10)* ☐

9.3 Was the RPD ≤ 50% for soils or waters? Calculate the RPD for all results and attach to this review. **Yes** [ ] No [ ] N/A [✓] Comments:

ACTION: RPD must be ≤50% for soil and water. Qualify data (J) for both sample results if the RPD exceeds 50%.

10.0 Special QA/QC

10.1 Were both total and dissolved metals analysis performed? If so, the dissolved metal concentration should not exceed that of the total metal. Yes [ ] **No** [✓] N/A [ ] Comments:

ACTION: If results for both total and dissolved are ≥ 5x the PQL **and** the dissolved concentration is 10% higher than the total, flag both results as estimated (J). If total and dissolved concentrations are less than 5x the PQL **and** the **difference** exceeds 2x the PQL, flag both results as estimated (J)

10.0 Application of Validation Qualifiers

Was any of the data qualified? Yes [ ] **No** [✓] N/A [ ] Comments:

If so, apply data qualifiers directly to the DQE copy of laboratory report and **flag pages** for entry in database.

REFERENCES

LAW, 1999, "Final Quality Assurance Project Plan, Olin Wilmington Property, 51 Eames Street, Wilmington, MA", LAW Engineering and Environmental Services, Kennesaw, GA 30144. August 1999

U.S. Environmental Protection Agency (USEPA), 1989. "Region 1 Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses"; Hazardous Site Evaluation Division; February 1989.

MADEP, 2001. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Massachusetts Quality Assurance and Quality Control (QA/QC) Requirements." BWSC-CAM, Interim Final Draft, Revision No. 2, 5 October 2001.

MADEP, 2001. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Quality Assurance and Quality Control Guidelines for Sampling, Data Evaluation and Reporting Activities," BWSC-CAM, Section VII, Public Comment Draft, Revision No. 0, 21 December 2001.

OLIN-WILMINGTON
LEVEL I DATA QUALITY EVALUATION
STANDARD OPERATING PROCEDURE AND CHECKLIST
WET CHEMISTRY PARAMETERS BY VARIOUS METHODS

Reviewer/Date [illegible] 5/8/09
Sr. Review/Date Chris Ricardi 5/19/09
Lab Report # 360-21331-1
Project # 610709006.12

Ammonia, pH

Note: The following analyses will be evaluated according to the "MADEP QA/QC Guidelines for **Sampling, Data Evaluation and Reporting Activities.**" MADEP, however, may not list QA/QC criteria for every chemical analysis. Where not defined by MADEP, criteria will default to values stipulated in the QAPP. Where the QAPP does not define criteria, QA/QC requirements will default to limits employed by the laboratory.

1.0 Laboratory Deliverable Requirements

1.1 Laboratory Information: Was all of the following provided in the laboratory report? **Yes** [✓] No [ ] N/A [ ] Comments:
Check items received.

☐ ✓ *Name of Laboratory* ☑ ✓ *Address* ☑ ✓ *Project ID* ☐ ✓ *Phone #* ☑ ✓ *Sample identification – Field and Laboratory*
Client Information: ☑ *Name* ☑ *Address* ☑ ✓ *Client Contact* *(IDs must be cross-referenced)*

ACTION: If no, contact lab for submission of missing or illegible information.

1.2 Laboratory Report Certification Statement **Yes** [✓] No [ ] N/A [ ] Comments:

Does the laboratory report include a completed Analytical Report Certification in the required format?

***ACTION**: If no, contact lab for submission of missing certification or certification with correct format.*

1.3 Laboratory Case Narrative: **Yes** [✓] No [ ] N/A [ ] Comments:

☑ ✓ *Narrative serves as an exception report for the project and method QA/QC performance.* ☐ *Narrative includes an explanation of each discrepancy on the Certification Statement.*

***ACTION**: If no, contact lab for submission of missing or illegible information.*

1.4 Chain of Custody (COC) copy present with all documentation completed? **Yes** [✓] No [ ] N/A [ ] Comments:

Does the laboratory report include copies of Chain of Custody forms containing all samples in this SDG?

NOTE: Olin receives and maintains the *original* COC.

ACTION: If no, contact lab for submission of copy of missing completed COC.

1.5 Sample Receipt Information (*Cooler Receipt Form*): Were each of the following tasks completed and recorded upon receipt of the sample(s) into the laboratory?

Yes [✓] No [ ] N/A [ ] Comments:

☑ Sample temperature confirmed: must be 1° – 10° C. (If samples were sent by courier and delivered on the same day as collection, temperature requirement does not apply).

☑ Container type noted ☑ Condition observed ☑ pH verified (where applicable) ☑ Field and lab IDs cross referenced

ACTION: If no, contact lab for submission of missing or incomplete documentation.

1.5.1 Were the correct bottles and preservatives used?

Yes [✓] No [ ] N/A [ ] Comments:

Ammonia – 1 Liter polyethylene/H_2SO_4 to pH<2,cool to 4°C

Oil & Grease – 1 Liter glass/HCL or H2SO4 to pH<2,cool to 4°C

Alkalinity – 1 Liter polyethylene/cool to 4°C

Chemical Oxygen Demand – 50 mL polyethylene/H_2SO_4 to pH<2,cool to 4°C

Chloride, pH, sulfate, nitrate, nitrite - 50 mL polyethylene/cool to 4°C

Nitrate/nitrite - H2SO4 to pH<2,cool to 4°C

Organic Carbon – 500 mL amber glass bottle/HCl or H_2SO_4 to pH<2,cool to 4°C

Sulfide – 50 mL polyethylene/ZnAcetate + NaOH to pH>9, cool to 4°C

Phenolics - H_2SO_4 to pH<2,cool to 4°C

Specific conductance, TDS, TSS – 100 mL polyethylene/cool to 4°C

ACTION: If no, inform senior chemist. Document justification for change in container/volume (if applicable), qualify positive and non-detect data (J) data if cooler temperature exceeds 10°C. Rejection of data requires professional judgment

1.5.2 Were all samples delivered to the laboratory without breakage?

Yes [✓] No [ ] N/A [ ] Comments:

1.5.3 Does the *Cooler Receipt Form* or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data?

Yes [ ] No [✓] N/A [ ] Comments:

1.6 Sample Results Section: *Was the following information supplied in the laboratory report for each sample?* **Yes** [✓] No [ ] N/A [ ] Comments:

- [✓] Field ID and Lab ID
- [✓] Date and time collected
- [✓] Analyst Initials
- [✓] Dilution Factor
- [✓] % moisture or solids
- [✓] Reporting limits
- [✓] *Clean-up method*
- [✓] Analysis method
- [✓] Preparation method
- [✓] Date of preparation/extraction/digestion clean-up and analysis, where applicable
- [✓] Matrix
- [✓] Target analytes and concentrations
- [✓] Units (soils must be reported in dry weight)

ACTION: If no, contact lab for submission of missing or incomplete information.

1.7 QA/QC Information: Was the following information provided in the laboratory report for each sample batch? **Yes** [✓] No [ ] N/A [ ] Comments:

- [✓] Method blank results
- [✓] LCS recoveries
- [✓] MS/MSD recoveries and RPDs
- [✓] Laboratory duplicate results (where applicable)

ACTION: If no, contact lab for submission of missing or incomplete information.

2.0 Holding Times Yes [✓] **No** [ ] N/A [ ] Comments: The laboratory analyzed pH one day after technical hold time.

Have any technical holding times, determined from date of collection to date of analysis, been exceeded? The holding times are as follows:

✓ 28 days = ammonia, chemical oxygen demand, chloride, organic carbon, oil & grease, specific conductance, total organic carbon and sulfate

Alkalinity = 14 days | Sulfide, TDS, TSS = 7 days | X pH = analyze immediately | Nitrate nitrogen as N = 48 hrs

Nitrite nitrogen as N = 48 hrs | Nitrate + Nitrite as N = 28 days

NOTE: List samples that exceed hold time with # of days exceeded on checklist

ACTION: If technical holding times are exceeded qualify results (J). For water samples that are grossly exceeded (>2X hold time) reject (R) all non-detect results. Professional judgment used to qualify soils.

3.0 Laboratory Method **Yes** [✓] No [ ] N/A [ ] Comments:

3.1 Was the correct laboratory method used?

ACTION: If no, contact lab to provide justification for method change compared to the requested method. Contact senior chemist to inform Client of change or to request variance.

3.2 Are the practical quantitation limits the same as those specified by the ☑ QAPP/IRSWP ☐ Lab? **Yes** [✓] No [ ] N/A [ ] Comments:

Note: *The MADEP QA/QC Guidelines do not yet list PQLs for wet chemistry analyses, therefore all criteria will default to values stipulated in the QAPP*. Where the QAPP does not define criteria, QA/QC requirements default to limits employed by the lab**. Other criteria may also apply.*

Ammonia* ☑ = 0.1 mg/ L	Alkalinity** ☐ = 1 mg/L	Bicarbonate Alkalinity** ☐ = 1 mg/L	Carbonate Alkalinity** ☐ = 1 mg/L
Nitrate Nitrogen as N* ☐ = .05 mg/L	Nitrite Nitrogen as N* ☐ = .01 mg/L	Chloride* ☐ = 1 mg/L	Hardness * ☐ = 2 mg/L
Spec. Cond.** ☐ 3 umhos/cm	Total Organic Carbon** ☐ = 1 mg/L	Oil & Grease* ☐ = 5.5 mg/L	Sulfate (EPA 300.0)* ☐ = 2 mg/L
COD:* ✓ Low – 20 mg/L	COD* High - 50 mg/L ☐	TDS* ☐ = 10 mg/L	TSS* ☐ = 5 mg/L
pH* ☑ < 2 to > 12	Phenolic - 0.01 mg/L		

Other parameter(list) _____ PQL = _____ ☐ Source of PQL = _____

Other parameter(list) _____ PQL = _____ ☐ Source of PQL = _____

ACTION: If no, evaluate change with respect to sample matrix, preparation, dilution, moisture, etc. If sample PQL is indeterminate, contact lab for explanation.

3.3 Are the appropriate parameter results present for each sample in the SDG? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, check Request for Analysis to verify if method was ordered and COC to verify that it was sent, and contact lab for resubmission of the missing data

3.4 If *dilutions were required, were dilution factors reported?* **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact the lab for submission.

4.0 Method Blanks **Yes** [✓] No [ ] N/A [ ] Comments:

4.1 Are the Method Blank Summaries present?

ACTION: If no, call the laboratory for submission of missing data.

4.2 Was a method blank analyzed for each analysis batch of wet chemistry field samples of 20 or less? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, document discrepancy in case narrative and contact lab for justification. Consult senior chemist for action needed.

4.3 Is the method blank less than the PQL? (See Section 3.2 for PQLs). **Yes [✓]** No [ ] N/A [ ] Comments:

4.4 Do any method blanks have positive results for wet chemistry parameters? Qualify data according to the following: Yes [ ] **No [✓]** N/A [ ] Comments:

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

ACTION: If any blank has positive results, list all the concentrations detected and flagging level (flagging level = 5 × blank value) on the checklist. List all affected samples and their qualifiers.

5.0 Laboratory Control Standards

5.1 Was a laboratory control standard (LCS) run with each analytical batch of 20 samples or less? **Yes [✓]** No [ ] N/A [ ] Comments:

ACTION: If no, call laboratory for LCS form submittal. If data is not available, use professional judgment to determine qualification actions for data associated with the batch.

5.2 Is a LCS Summary Form present? **Yes [✓]** No [ ] N/A [ ] Comments:

ACTION: If no, contact lab for resubmission of missing data.

5.3 Is any wet chemistry analyte LCS recovery outside the control limits? Yes [ ] **No [✓]** N/A [ ] Comments:

LCS Limits:

Alkalinity** ☐ = 80-120%	Bicarbonate Alkalinity** ☐ = 80-120%	Carbonate Alkalinity** ☐ = 80-120%	Specific Conductivity *☐ = 80-120%
Total Organic Carbon** ☐ = 80-120%	TDS** ☐ = 80-120%	Oil & Grease* ☐ = 80-120%	Ammonia Nitrogen as N* ☑ = 80-120%
COD Low* ☐ = 80-120%	COD High* ☐ = 80-120%	Nitrate Nitrogen as N**☐ = 80-120%	Nitrite Nitrogen as N** ☐= 80-120%
Hardness* ☐ = 80-120%	Chloride* ☐ = 80-120%	Sulfate (EPA 300.0)* ☐ = 80-120%	pH* ☑ = 98-102% TSS* NA

Other parameter(list) _____ %R = _____ ☐ Rec Limits= _____

Other parameter(list) _____ %R = _____ ☐ Rec Limits = _____

(MADEP has not yet defined LCS recovery limits for wet chemistry analyses.)

ACTION: If recovery is above the upper limit, qualify all positive sample results within the batch as (J). If recovery is below the lower limit, qualify all positive and no-detect results within the batch as (J). If LCS recovery is <10%, non-detect results are rejected (R).

6.0 Matrix Spikes

Matrix spikes may be collected at different frequencies based on monthly, quarterly, or task specific schedules. Confirm spike requirements for each set with the senior chemist.

6.1 Were project-specific MS/MSDs analyzed? List project samples that were spiked.

Yes [__] No [✓] N/A [__] Comments:

ACTION: If no, contact senior chemist to see if any were specified.

6.2 Is the MS/MSD Recovery Form present?

Yes [__] No [__] N/A [✓] Comments:

ACTION: If no, contact lab for resubmission of missing data.

6.3 Were matrix spikes analyzed at the required frequency of 1 per 20 samples per matrix?

Yes [__] No [__] N/A [✓] Comments:

ACTION: If any matrix spike data is missing, call lab for resubmission.

6.4 Are any wet chemistry analyte spike recoveries outside of the QC limits?

Yes [__] **No** [__] N/A [✓] Comments:

NOTE: $\%R = \frac{(SSR-SR)}{SA} \times 100\%$ Where: SSR = Spiked sample result
SR = Sample result
SA = Spike added

MS/MSD Recovery Limits:

Alkalinity* = NA	Bicarbonate Alkalinity* = NA	Carbonate alkalinity* = NA	Ammonia* (LACHAT) ☐ = 75-125%
Chloride*(SM 4500 Cl) ☐= 75-125%	Specific Conductivity * = NA	Total Organic Carbon* = NA	TDS** = NA
Oil & Grease* = NA	COD Low* ☐ = 75-125%	COD High* ☐ = 75-125%	Nitrate Nitrogen as N** ☐ = 75-125%
Nitrite Nitrogen as N** ☐ = 75-125%	Hardness* ☐ = 75-125%	Sulfate (EPA 300.0)* ☐ = 75-125%	pH* = NA TSS* = NA

Other parameter(list) _____ % R = _____ ☐ Rec Limits = _____

* = Laboratory Limits ** = Olin QAPP Limits (*MADEP has not yet defined LCS recovery limits for wet chemistry analyses.*)

NOTES: 1) If only one of the recoveries for an MS/MSD pair is outside of the control limits, no qualification is necessary. Use professional judgment for the MS/MSD flags.
2) If the MS/MSD was performed by the laboratory on a non-project sample, no qualification is required.

ACTION: MS/MSD flags only apply to the sample spiked. Do not evaluate if sample concentration is > 4X spike. If the recoveries of the MS and MSD exceed the upper control limit, qualify positive results as estimated (J). If the recoveries of the MS and MSD are lower than the lower control limit but > 30%, qualify both positive results and non-detects (J). If the MS/MSD recovery is < 30% and the sample is non-detect, the results are considered unusable and flagged (R).

ACTION: Laboratory control limits apply when spiked sample results fall within the normal calibration range. If dilutions are required due to high sample concentrations, the data is evaluated, but no flags are applied.

6.5 Are any RPDs for MS/MSD recoveries outside of the QA/QC limits?

Yes [ ] **No** [ ] N/A [✓] Comments:

NOTE: $RPD = \frac{S-D}{(S+D)/2} \times 100\%$ Where S = MS result
D = MSD result

MS/MSD RPD Limits:

RPD ≤20

7.0 Laboratory Duplicate

Are the RPDs for the laboratory duplicates <20% unless otherwise specified below?

Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If the RPD is greater than specified limits, qualify all results for that analyte as estimated (J).

pH* ☑ = 3% Specific Conductivity *☐ = 5% TSS** ☐ = 6% TDS** ☐ = 6%

8.0 Sampling Accuracy

The majority of ground water samples are collected directly from a tap, process stream, or with dedicated tubing. Rinse blanks will not be collected.

8.1 Were rinsate blanks collected? Prior to evaluating rinsate blanks, obtain a list of the associated samples from the senior chemist. **Yes** [__] No [✓] N/A [__] Comments:

8.2 Do any rinsate blanks have positive results? Yes [__] **No** [__] N/A [✓] Comments:

ACTION: Evaluate rinsate results vs. blank results to determine if contaminant may be laboratory-derived. If not lab-related, qualify according to the table below.

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

***NOTE**: MADEP does not require the collection of rinsate blanks.*

9.0 Field Duplicates

9.1 Were field duplicate samples collected? Obtain a list of samples and their associated field duplicates. **Yes** [__] No [✓] N/A [__] Comments:

9.2 Were field duplicates collected per the required frequency? **Yes** [__] No [__] N/A [✓] Comments:

QAPP/IRSWP ☐ *MADEP Option 1(1 per 20)* ☐ *MADEP Option 3 (1 per 10)* ☐

9.3 Was the RPD ≤ 30% for waters ≤ 50% for soils? Calculate the RPD for results and attach to this review. **Yes** [__] No [__] N/A [✓] Comments:

ACTION:. Qualify data (J) for both sample results if the RPD exceeded.

Was any of the data qualified? Yes [✓] **No** [ ] N/A [ ] Comments:

If so, apply data qualifiers directly to the DQE copy of laboratory report and **flag pages** for entry in database.

REFERENCES:-

MACTEC, 2007. "Draft Interim Response Steps Work Plan"; Olin Chemical Superfund Site, 51 Eames Street, Wilmington, Massachusetts.; Project No. 6300-06-0010/41.1; July 25, 2007.

Massachusetts Department of Environmental Protection (MADEP), 2004. "The Compendium of Quality Assurance and Quality Control Requirements and Performance Standards for Selected Analytical Methods Used in Support of Response Actions for the Massachusetts Contingency Plan (MCP)"; Bureau of Waste Site Cleanup; 1 Winter Street, Boston, Massachusetts 02108; WSC-CAM; May 2004.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

Job Number: 360-21331-1

Job Description: Plant B

For:
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Attention: Mr. Steven Morrow

CHECKED FOR COMPLETENESS OF PARAMETERS ORDERED BY:

Approved for release.
Joe Chimi
Report Production Representative
3/6/09 9:47 AM

Designee for
Becky C Mason
Project Manager II
becky.mason@testamericainc.com
03/06/2009

The test results in this report meet all NELAP requirements for accredited parameters. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced except in full, and with written approval from the laboratory.
TestAmerica Westfield Certifications and Approvals: MADEP MA014, RIDOH57, CTDPH 0494, VT DECWSD, NH DES 2539, NELAP FL E87912 TOX, NELAP NJ MA008 TOX, NELAP NY 10843, NY DOH 10843.

Field sampling is performed under SOPs WE-FLD-001 and WE-FLD-002

TestAmerica Laboratories, Inc.
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ACCREDITED IN ACCORDANCE WITH nelac

Table of Contents

Cover Title Page 1
Report Narrative 3
Method Summary 11
Method / Analyst Summary 12
Sample Summary 13
Sample Results 14
Sample Datasheets 15
Data Qualifiers 18
QC Results 19
Qc Association Summary 20
Qc Reports 22
Sample Receipt Checklist 30
Client Chain of Custody 31

MADEP MCP Analytical Method Report Certification Form

Laboratory Name:	**TestAmerica Westfield**	Project #:	**360-21331-1**
Project Location:	**Plant B**	MADEP RTN[1]:	

This form provides certifications for the following data set:[list Laboratory Sample ID Number(s)]
360-21331-(1-2)

Sample Matrices: **Groundwater** Soil/Sediment Drinking Water Other:

MCP SW-846 Methods Used	8260B(x)	8151A ( )	8330 ( )	6010B ( )	7470A/1A ( )	Other ( )
	8270C( )	8081A ( )	VPH ( )	6020 ( )	9014M[2]/9012 ( )	
As specified in MADEP Compendium of Analytical Methods. (check all that apply)	8082 ( )	8021B ( )	EPH ( )	7000 S[3]( )	7196A ( )	

1 List Release Tracking Number (RTN), if known
2 M - SW-846 Method 9014 or MADEP Physiologically Available Cyanide (PAC) Method
3 S - SW-846 Methods 7000 Series List individual method and analyte.

An affirmative response to questions A, B, C and D is required for "Presumptive Certainty" status

A	Were all samples received by the laboratory in a condition consistent with that described on the Chain-of-Custody documentation for the data set?	Yes √		No[1]
B	Were all QA/QC procedures required for the specified analytical method(s) included in this report followed, including the requirement to note and discuss in a narrative QC data that did not meet appropriate performance standards or guidelines?	Yes √		No[1]
C	Does the analytical data included in this report meet all the requirements for "Presumptive Certainty", as described in Section 2.0 (a), (b), (c) and (d) of the MADEP document CAM VII A, " Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	Yes √	N/A	No[1]
D	**VPH and EPH methods only**: Was the VPH or EPH Method conducted without significant modifications (see Section 11.3 of respective Methods)?	Yes	N/A √	No[1]

A response to questions E and F below is required for "Presumptive Certainty" status

E	Were all QC performance standards and recommendations for the specified methods achieved?	Yes √		No[1]
F	Were results for all analyte-list compounds/elements for the specified method(s) reported?	Yes	N/A	No[1] √

[1] All Negative responses must be addressed in an attached Environmental Laboratory case narrative.

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.

Signature: Christine Reynolds **Position:** Quality Assurance Manager

Printed Name: Christine Reynolds **Date:** 3/6/09 9:28

The certification form has been electronically signed and approved. CAM VII A, Rev 3.2 April-04

MADEP MCP Analytical Method Report Certification Form

Laboratory Name:	**TestAmerica Westfield**	Project #:	**360-21331-1**
Project Location:	**Plant B**	MADEP RTN[1]:	

This form provides certifications for the following data set:[list Laboratory Sample ID Number(s)]
360-21331-1

Sample Matrices: **Groundwater** Soil/Sediment Drinking Water Other:

MCP SW-846 Methods Used	8260B( )	8151A ( )	8330 ( )	6010B ( )	7470A/1A ( )	Other ( )
	8270C( )	8081A ( )	VPH (**x**)	6020 ( )	9014M[2]/9012 ( )	
As specified in MADEP Compendium of Analytical Methods. (check all that apply)	8082 ( )	8021B ( )	EPH ( )	7000 S[3]( )	7196A ( )	

1 List Release Tracking Number (RTN), if known
2 M - SW-846 Method 9014 or MADEP Physiologically Available Cyanide (PAC) Method
3 S - SW-846 Methods 7000 Series List individual method and analyte.

An affirmative response to questions A, B, C and D is required for "Presumptive Certainty" status

A	Were all samples received by the laboratory in a condition consistent with that described on the Chain-of-Custody documentation for the data set?	Yes √		No[1]
B	Were all QA/QC procedures required for the specified analytical method(s) included in this report followed, including the requirement to note and discuss in a narrative QC data that did not meet appropriate performance standards or guidelines?	Yes √		No[1]
C	Does the analytical data included in this report meet all the requirements for "Presumptive Certainty", as described in Section 2.0 (a), (b), (c) and (d) of the MADEP document CAM VII A, " Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	Yes √	N/A	No[1]
D	**VPH and EPH methods only**: Was the VPH or EPH Method conducted without significant modifications (see Section 11.3 of respective Methods)?	Yes √	N/A	No[1]

A response to questions E and F below is required for "Presumptive Certainty" status

E	Were all QC performance standards and recommendations for the specified methods achieved?	Yes √		No[1]
F	Were results for all analyte-list compounds/elements for the specified method(s) reported?	Yes √	N/A	No[1]

[1] All Negative responses must be addressed in an attached Environmental Laboratory case narrative.

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.

Signature: Christine Lucinda Reynolds **Position:** Quality Assurance Manager

Printed Name: Christine Reynolds **Date:** 3/6/09 9:28

The certification form has been electronically signed and approved. CAM VII A, Rev 3.2 April-04

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

MADEP MA014
NY DOH 10843
RI DOH 57
CT DPH 0494
VT DECWSD

NELAP FL E87912 TOX
NELAP NJ MA008 TOX
NELAP NY 10843
NH DES 253901-A

TestAmerica Westfield
53 Southampton Rd,
Westfield, MA 01085
Tel:(413)572-4000
Fax:(413)572-3707

MADEP MCP Analytical Method Report Certification Form

Laboratory Name:	**TestAmerica Westfield**	Project #:	**360-21331-1**
Project Location:	**Plant B**	MADEP RTN[1]:	

This form provides certifications for the following data set:[list Laboratory Sample ID Number(s)]
360-21331-1

Sample Matrices:	**Groundwater**	Soil/Sediment	Drinking Water	Other:		
MCP SW-846 Methods Used	8260B( )	8151A ( )	8330 ( )	6010B ( )	7470A/1A ( )	Other ( )
	8270C(**x**)	8081A ( )	VPH ( )	6020 ( )	9014M[2]/9012 ( )	
As specified in MADEP Compendium of Analytical Methods. (check all that apply)	8082 ( )	8021B ( )	EPH ( )	7000 S[3]( )	7196A ( )	

1 List Release Tracking Number (RTN), if known
2 M - SW-846 Method 9014 or MADEP Physiologically Available Cyanide (PAC) Method
3 S - SW-846 Methods 7000 Series List individual method and analyte.

An affirmative response to questions A, B, C and D is required for "Presumptive Certainty" status

A	Were all samples received by the laboratory in a condition consistent with that described on the Chain-of-Custody documentation for the data set?	Yes √		No[1]
B	Were all QA/QC procedures required for the specified analytical method(s) included in this report followed, including the requirement to note and discuss in a narrative QC data that did not meet appropriate performance standards or guidelines?	Yes √		No[1]
C	Does the analytical data included in this report meet all the requirements for "Presumptive Certainty", as described in Section 2.0 (a), (b), (c) and (d) of the MADEP document CAM VII A, " Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	Yes √	N/A	No[1]
D	**VPH and EPH methods only:** Was the VPH or EPH Method conducted without significant modifications (see Section 11.3 of respective Methods)?	Yes	N/A √	No[1]

A response to questions E and F below is required for "Presumptive Certainty" status

E	Were all QC performance standards and recommendations for the specified methods achieved?	Yes		No[1] √
F	Were results for all analyte-list compounds/elements for the specified method(s) reported?	Yes	N/A	No[1] √

[1] All Negative responses must be addressed in an attached Environmental Laboratory case narrative.

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.

Signature: Christine Lucinda Reynolds **Position:** Quality Assurance Manager

Printed Name: Christine Reynolds **Date:** 3/6/09 9:28

The certification form has been electronically signed and approved.

CAM VII A, Rev 3.2 April-04

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Laboratory Name:	**TestAmerica Westfield**	Project #:	**360-21331-1**
Project Location:	**Plant B**	MADEP RTN[1]:	

This form provides certifications for the following data set:[list Laboratory Sample ID Number(s)]
360-21331-1

Sample Matrices: **Groundwater** Soil/Sediment Drinking Water Other:

MCP SW-846 Methods Used	8260B( )	8151A ( )	8330 ( )	6010B (x)	7470A/1A ( )	Other ( )
	8270C( )	8081A ( )	VPH ( )	6020 ( )	9014M[2]/9012 ( )	
As specified in MADEP Compendium of Analytical Methods. (check all that apply)	8082 ( )	8021B ( )	EPH ( )	7000 S[3]( )	7196A ( )	

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2 M - SW-846 Method 9014 or MADEP Physiologically Available Cyanide (PAC) Method
3 S - SW-846 Methods 7000 Series List individual method and analyte.

An affirmative response to questions A, B, C and D is required for "Presumptive Certainty" status

A	Were all samples received by the laboratory in a condition consistent with that described on the Chain-of-Custody documentation for the data set?	Yes √		No[1]
B	Were all QA/QC procedures required for the specified analytical method(s) included in this report followed, including the requirement to note and discuss in a narrative QC data that did not meet appropriate performance standards or guidelines?	Yes √		No[1]
C	Does the analytical data included in this report meet all the requirements for "Presumptive Certainty", as described in Section 2.0 (a), (b), (c) and (d) of the MADEP document CAM VII A, " Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	Yes √	N/A	No[1]
D	**VPH and EPH methods only**: Was the VPH or EPH Method conducted without significant modifications (see Section 11.3 of respective Methods)?	Yes	N/A √	No[1]

A response to questions E and F below is required for "Presumptive Certainty" status

E	Were all QC performance standards and recommendations for the specified methods achieved?	Yes √		No[1]
F	Were results for all analyte-list compounds/elements for the specified method(s) reported?	Yes	N/A	No[1] √

[1] All Negative responses must be addressed in an attached Environmental Laboratory case narrative.

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.

Signature: Christine Lucinda Reynolds **Position:** Quality Assurance Manager

Printed Name: Christine Reynolds **Date:** 3/6/09 9:28

The certification form has been electronically signed and approved. CAM VII A, Rev 3.2 April-04

MADEP MCP Analytical Method Report Certification Form

Laboratory Name:	**TestAmerica Westfield**	Project #:	**360-21331-1**
Project Location:	**Plant B**	MADEP RTN[1]:	

This form provides certifications for the following data set:[list Laboratory Sample ID Number(s)]
360-21331-1

Sample Matrices: **Groundwater** Soil/Sediment Drinking Water Other:

MCP SW-846 Methods Used	8260B( )	8151A ( )	8330 ( )	6010B ( )	7470A/1A ( )	Other (x)
	8270C( )	8081A ( )	VPH ( )	6020 ( )	9014M[2]/9012 ( )	
As specified in MADEP Compendium of Analytical Methods. (check all that apply)	8082 ( )	8021B ( )	EPH ( )	7000 S[3]( )	7196A ( )	

1 List Release Tracking Number (RTN), if known
2 M - SW-846 Method 9014 or MADEP Physiologically Available Cyanide (PAC) Method
3 S - SW-846 Methods 7000 Series List individual method and analyte.

An affirmative response to questions A, B, C and D is required for "Presumptive Certainty" status

A	Were all samples received by the laboratory in a condition consistent with that described on the Chain-of-Custody documentation for the data set?	Yes √		No[1]
B	Were all QA/QC procedures required for the specified analytical method(s) included in this report followed, including the requirement to note and discuss in a narrative QC data that did not meet appropriate performance standards or guidelines?	Yes √		No[1]
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D	**VPH and EPH methods only:** Was the VPH or EPH Method conducted without significant modifications (see Section 11.3 of respective Methods)?	Yes	N/A √	No[1]

A response to questions E and F below is required for "Presumptive Certainty" status

E	Were all QC performance standards and recommendations for the specified methods achieved?	Yes √		No[1]
F	Were results for all analyte-list compounds/elements for the specified method(s) reported?	Yes	N/A √	No[1]

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CASE NARRATIVE

Client: Olin Corporation

Project: Plant B

Report Number: 360-21331-1

This case narrative is in the form of an exception report, where only the anomalies related to this report, method specific performance and/or QA/QC issues are discussed. If there are no issues to report, this narrative will include a statement that documents that there are no relevant data issues as stipulated in the MCP reporting requirements.

In order to facilitate report review, a separate MCP Analytical Method Report Certification Form is included for each method requested.

It should be noted that samples with elevated Reporting Limits (RLs) as a result of a dilution may not be able to satisfy "MCP program" reporting limits in some cases if the "adjusted" RL is greater than the applicable MCP standards or criterion to which the concentration is being compared. Such increases in the RLs are an unavoidable but acceptable consequence of sample dilution that enables quantification of target analytes which exceed the calibration range.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

The samples were received on 02/24/2009; the samples arrived in good condition, properly preserved and on ice. The temperatures of the coolers at receipt were 4.0 and 5.0°C.

Note: All samples which require thermal preservation are considered acceptable if the arrival temperature is within 2C of the required temperature or method specified range. For samples with a specified temperature of 4C, samples with a temperature ranging from just above freezing temperature of water to 6C shall be acceptable. Samples that are hand delivered immediately following collection may not meet these criteria, however they will be deemed acceptable according to NELAC and MADEP standards, if there is evidence that the chilling process has begun, such as arrival on ice, etc.

MCP regulatory standard criteria were not specified for this report. Therefore, method reporting limits (RLs) were not assessed against any MCP standards as it may pertain to Question "E" on the Presumptive Certainty Certification Form (MADEP reference: WSC-CAM-AN-093008 - WSC-CAM Analytical Notes).

VOLATILE ORGANICS

Samples 360-21331-1 and 360-21331-2 were analyzed for volatile organics in accordance with EPA SW846 Method 8260B. The samples were analyzed on 03/03/2009.

All QA/QC procedures required to meet Presumptive Certainty for the specified analytical method were performed as per section B of the MADEP MCP analytical method report Certification form.

All QC performance standards and recommendations, which may affect Data Usability for this specific method, were achieved.

General method information:
Sample 360-21331-1(10X) required dilution prior to analysis. The reporting limits have been adjusted accordingly. Dilution was due to high target concentration.

At the request of the client, a non-MCP compound list was reported for this job.

VOLATILE PETROLEUM HYDROCARBONS

Sample 360-21331-1 was analyzed for volatile petroleum hydrocarbons in accordance with MADEP VPH. The sample was analyzed on 03/02/2009.

All QA/QC procedures required to meet Presumptive Certainty for the specified analytical method were performed as per section B of the MADEP MCP analytical method report Certification form.

All QC performance standards and recommendations, which may affect Data Usability for this specific method, were achieved.

General method information:
Sample 360-21331-1(5X) required dilution prior to analysis. The reporting limits have been adjusted accordingly. Dilution was due to foaming.

SEMIVOLATILE ORGANICS

Sample 360-21331-1 was analyzed for semivolatile organics in accordance with EPA SW846 Method 8270C LL. The sample was prepared and analyzed on 03/03/2009.

All QA/QC procedures required to meet Presumptive Certainty for the specified analytical method were performed as per section B of the MADEP MCP analytical method report Certification form.

All QC performance standards and recommendations, which may affect Data Usability for this specific method, were achieved with the exception of:

Bis(2-ethylhexyl) phthalate was detected in method blank MB 360-41655/1-A at a level exceeding the reporting limit. If the associated sample reported a result above the MDL and/or RL, the result has been "B" flagged. Refer to the QC report for details.

Phenol-d5 failed the surrogate recovery criteria low for 360-21331-1 (14% at 1X) and MB 360-41655/1-A MB (14%). Per method SOP, re-extraction is only required if two or more surrogates from any one fraction fail or any single surrogate falls below 10%.

Bis(2-ethylhexyl) phthalate exceeded the LCS rpd limit for LCSD 360-41655/3-A. Percent recoveries were within control limits. Refer to the QC report for details.

General method information:
Sample 360-21331-1(20X) required dilution prior to analysis. The reporting limits have been adjusted accordingly. Dilution was due to high target concentration. Consequently, all surrogates were diluted outside control limits.

At the request of the client, an abbreviated MCP compound list was reported for this job.

DISSOLVED METALS

Sample 360-21331-1 was analyzed for dissolved metals in accordance with EPA SW846 Method 6010B. The sample was analyzed on 02/25/2009.

All QA/QC procedures required to meet Presumptive Certainty for the specified analytical method were performed as per section B of the MADEP MCP analytical method report Certification form.

All QC performance standards and recommendations, which may affect Data Usability for this specific method, were achieved.

General method information:
At the request of the client, a non-MCP analyte list was reported for this job. Only Iron was requested.

The following reported methods are not listed in the MADEP Massachusetts Contingency Plan (MCP) Compendium of Analytical Methods (CAM), pursuant to the provisions of 310 CMR 40.0017(2).

AMMONIA

Sample 360-21331-1 was analyzed for ammonia in accordance with LACHAT 107-06-1B. The sample was prepared on 03/03/2009 and analyzed on 03/04/2009.

All QC performance standards and recommendations for this specific method were achieved.

PH

Sample 360-21331-1 was analyzed for pH in accordance with SM 4500 H+ B. The sample was analyzed on 02/25/2009.

All QC performance standards and recommendations for this specific method were achieved.

This case narrative is available in Word format upon request.

METHOD SUMMARY

Client: Olin Corporation

Job Number: 360-21331-1

Description	Lab Location	Method	Preparation Method
Matrix: Water			
Volatile Organic Compounds (Custom List)	TAL WFD	SW846 8260B	
Purge and Trap	TAL WFD		SW846 5030B
Massachusetts - Volatile Petroleum Hydrocarbons (GC)	TAL WFD	MA DEP MAVPH	
Purge and Trap	TAL WFD		SW846 5030B
Semivolatile Organic Compounds by GCMS - Low Levels	TAL WFD	SW846 8270C LL	
Liquid-Liquid Extraction (Separatory Funnel)	TAL WFD		SW846 3510C
Dissolved Metals	TAL WFD	SW846 6010B	
Sample Filtration, Field	TAL WFD		FIELD_FLTRD
Nitrogen Ammonia	TAL WFD	LACHAT L107-06-1B	
Distillation, Ammonia	TAL WFD		Distill/Ammonia
pH	TAL WFD	SM SM 4500 H+ B	

Lab References:

TAL WFD = TestAmerica Westfield

Method References:

LACHAT = LACHAT

MA DEP = Massachusetts Department Of Environmental Protection

SM = "Standard Methods For The Examination Of Water And Wastewater",

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

METHOD / ANALYST SUMMARY

Client: Olin Corporation

Job Number: 360-21331-1

Method	Analyst	Analyst ID
SW846 8260B	Tester, Carla	CT
SW846 8270C LL	Zuccala, Marissa	MZ
MA DEP MAVPH	Rouleau, Catherine M	CMR
SW846 6010B	Nasiatka, Ellen M	EMN
LACHAT L107-06-1B	Lalashius, Andrew L	ALL
SM SM 4500 H+ B	Emerich, Rich W	RWE

SAMPLE SUMMARY

Client: Olin Corporation

Job Number: 360-21331-1

Lab Sample ID	Client Sample ID	Client Matrix	Date/Time Sampled	Date/Time Received
360-21331-1	OC-GW-16R	Ground Water	02/24/2009 1325	02/24/2009 1620
360-21331-2TB	OC-Trip Blank	Water	02/24/2009 1325	02/24/2009 1620

SAMPLE RESULTS

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-21331-1

Client Sample ID: OC-GW-16R
Lab Sample ID: 360-21331-1

Date Sampled: 02/24/2009 1325
Date Received: 02/24/2009 1620
Client Matrix: Ground Water

Analyte	Result/Qualifier		Unit	MDL	RL	Dilution
Method: 8260B			Date Analyzed:		03/03/2009 1937	
Prep Method: 5030B			Date Prepared:		03/03/2009 1937	
2,4,4-Trimethyl-1-pentene	1400		ug/L	8.1	10	10
2,4,4-Trimethyl-2-pentene	440		ug/L	5.0	10	10
Surrogate					Acceptance Limits	
4-Bromofluorobenzene	105		%		70 - 130	
Dibromofluoromethane	106		%		70 - 130	
Toluene-d8 (Surr)	100		%		70 - 130	
Method: 8270C LL			Date Analyzed:		03/03/2009 0210	
Prep Method: 3510C			Date Prepared:		03/03/2009 1044	
Bis(2-ethylhexyl) phthalate	~~1.8~~ 2	~~J B~~	ug/L	0.42	2.0	1.0
Surrogate					Acceptance Limits	
2,4,6-Tribromophenol	72		%		15 - 110	
2-Fluorobiphenyl	70		%		30 - 130	
2-Fluorophenol	26		%		15 - 110	
Nitrobenzene-d5	85		%		30 - 130	
Phenol-d5	14	X	%		15 - 110	
Terphenyl-d14	66		%		30 - 130	
Method: 8270C LL			Date Analyzed:		03/03/2009 1629	
Prep Method: 3510C			Date Prepared:		03/03/2009 1044	
N-Nitrosodiphenylamine	330		ug/L	7.8	100	20
Surrogate					Acceptance Limits	
2,4,6-Tribromophenol	0	X D	%		15 - 110	
2-Fluorobiphenyl	0	X D	%		30 - 130	
2-Fluorophenol	0	X D	%		15 - 110	
Nitrobenzene-d5	0	X D	%		30 - 130	
Terphenyl-d14	0	X D	%		30 - 130	
Method: Dissolved-6010B			Date Analyzed:		02/25/2009 1128	
Iron	1400		ug/L	16	100	1.0

5/13/09

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-21331-1

Client Sample ID: OC-GW-16R
Lab Sample ID: 360-21331-1

Date Sampled: 02/24/2009 1325
Date Received: 02/24/2009 1620
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: MAVPH		Date Analyzed:		03/02/2009 2221	
Prep Method: 5030B		Date Prepared:		03/02/2009 2221	
Benzene	ND	ug/L	25	25	5.0
Ethylbenzene	ND	ug/L	25	25	5.0
m-Xylene & p-Xylene	ND	ug/L	50	50	5.0
Methyl tert-butyl ether	ND	ug/L	25	25	5.0
Naphthalene	ND	ug/L	50	50	5.0
o-Xylene	ND	ug/L	25	25	5.0
Toluene	ND	ug/L	25	25	5.0
C5-C8 Aliphatics (unadjusted)	1700	ug/L	500	500	5.0
C9-C12 Aliphatics (unadjusted)	ND	ug/L	500	500	5.0
C5-C8 Aliphatics (adjusted)	1700	ug/L	500	500	5.0
C9-C12 Aliphatics (adjusted)	ND	ug/L	500	500	5.0
C9-C10 Aromatics	ND	ug/L	500	500	5.0
Total VPH	1700	ug/L	500	500	5.0
Surrogate				Acceptance Limits	
2,5-Dibromotoluene (fid)	99	%		70 - 130	
2,5-Dibromotoluene (pid)	111	%		70 - 130	
Method: L107-06-1B		Date Analyzed:		03/04/2009 1728	
Prep Method: Distill/Ammonia		Date Prepared:		03/03/2009 1320	
Ammonia	4.7	mg/L	0.10	0.10	1.0
Method: SM 4500 H+ B		Date Analyzed:		02/25/2009 1020	
pH	6.74 J HF	SU	0.100	0.100	1.0

5/8/09

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-21331-1

Client Sample ID: OC-Trip Blank
Lab Sample ID: 360-21331-2

Date Sampled: 02/24/2009 1325
Date Received: 02/24/2009 1620
Client Matrix: Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: 8260B		Date Analyzed:		03/03/2009 1916	
Prep Method: 5030B		Date Prepared:		03/03/2009 1916	
2,4,4-Trimethyl-1-pentene	ND	ug/L	0.81	1.0	1.0
2,4,4-Trimethyl-2-pentene	ND	ug/L	0.50	1.0	1.0
Surrogate				Acceptance Limits	
4-Bromofluorobenzene	85	%		70 - 130	
Dibromofluoromethane	117	%		70 - 130	
Toluene-d8 (Surr)	99	%		70 - 130	

DATA REPORTING QUALIFIERS

Client: Olin Corporation

Job Number: 360-21331-1

Lab Section	Qualifier	Description
GC/MS Semi VOA		
	B	Compound was found in the blank and sample.
	J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
	*	RPD of the LCS and LCSD exceeds the control limits
	X	Surrogate exceeds the control limits
	D	Surrogate or matrix spike recoveries were not obtained because the extract was diluted for analysis; also compounds analyzed at a dilution may be flagged with a D.
General Chemistry		
	HF	Field parameter with a holding time of 15 minutes

QUALITY CONTROL RESULTS

Client: Olin Corporation

Job Number: 360-21331-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
GC/MS VOA					
Analysis Batch:360-41858					
LCS 360-41858/1	Lab Control Spike	T	Water	8260B	
LCSD 360-41858/2	Lab Control Spike Duplicate	T	Water	8260B	
MB 360-41858/3	Method Blank	T	Water	8260B	
360-21331-1	OC-GW-16R	T	Water	8260B	
360-21331-2TB	OC-Trip Blank	T	Water	8260B	

Report Basis
T = Total

GC/MS Semi VOA

Prep Batch: 360-41655					
LCS 360-41655/2-A	Lab Control Spike	T	Water	3510C	
LCSD 360-41655/3-A	Lab Control Spike Duplicate	T	Water	3510C	
MB 360-41655/1-A	Method Blank	T	Water	3510C	
360-21331-1	OC-GW-16R	T	Water	3510C	
Analysis Batch:360-41758					
LCS 360-41655/2-A	Lab Control Spike	T	Water	8270C LL	360-41655
LCSD 360-41655/3-A	Lab Control Spike Duplicate	T	Water	8270C LL	360-41655
MB 360-41655/1-A	Method Blank	T	Water	8270C LL	360-41655
360-21331-1	OC-GW-16R	T	Water	8270C LL	360-41655

Report Basis
T = Total

GC VOA

Analysis Batch:360-41795					
LCS 360-41795/1	Lab Control Spike	T	Water	MAVPH	
LCSD 360-41795/2	Lab Control Spike Duplicate	T	Water	MAVPH	
MB 360-41795/3	Method Blank	T	Water	MAVPH	
360-21331-1	OC-GW-16R	T	Water	MAVPH	

Report Basis
T = Total

Client: Olin Corporation

Job Number: 360-21331-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
Metals					
Analysis Batch:360-41632					
LCS 360-41632/1	Lab Control Spike	T	Water	6010B	
LCSD 360-41632/13	Lab Control Spike Duplicate	T	Water	6010B	
MB 360-41632/2	Method Blank	T	Water	6010B	
360-21331-1	OC-GW-16R	D	Water	6010B	

Report Basis
D = Dissolved
T = Total

General Chemistry

Analysis Batch:360-41621					
LCS 360-41621/2	Lab Control Spike	T	Water	SM 4500 H+ B	
360-21331-1	OC-GW-16R	T	Water	SM 4500 H+ B	
360-21331-1DU	Duplicate	T	Water	SM 4500 H+ B	
Prep Batch: 360-41845					
LCS 360-41845/2-A	Lab Control Spike	T	Water	Distill/Ammonia	
MB 360-41845/1-A	Method Blank	T	Water	Distill/Ammonia	
360-21331-1	OC-GW-16R	T	Water	Distill/Ammonia	
Analysis Batch:360-41860					
LCS 360-41845/2-A	Lab Control Spike	T	Water	L107-06-1B	360-41845
MB 360-41845/1-A	Method Blank	T	Water	L107-06-1B	360-41845
360-21331-1	OC-GW-16R	T	Water	L107-06-1B	360-41845

Report Basis
T = Total

Client: Olin Corporation

Job Number: 360-21331-1

Method Blank - Batch: 360-41858

Method: 8260B
Preparation: 5030B

Lab Sample ID: MB 360-41858/3
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 03/03/2009 1602
Date Prepared: 03/03/2009 1602

Analysis Batch: 360-41858
Prep Batch: N/A
Units: ug/L

Instrument ID: Agilent 7890/5975 GC/MS
Lab File ID: V02928.D
Initial Weight/Volume: 5 mL
Final Weight/Volume: 5 mL

Analyte	Result	Qual	MDL	RL
2,4,4-Trimethyl-1-pentene	ND		0.81	1.0
2,4,4-Trimethyl-2-pentene	ND		0.50	1.0

Surrogate	% Rec	Acceptance Limits
4-Bromofluorobenzene	92	70 - 130
Dibromofluoromethane	108	70 - 130
Toluene-d8 (Surr)	99	70 - 130

Lab Control Spike/
Lab Control Spike Duplicate Recovery Report - Batch: 360-41858

Method: 8260B
Preparation: 5030B

LCS Lab Sample ID: LCS 360-41858/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 03/03/2009 1458
Date Prepared: 03/03/2009 1458

Analysis Batch: 360-41858
Prep Batch: N/A
Units: ug/L

Instrument ID: Agilent 7890/5975 GC/MS
Lab File ID: V02925.D
Initial Weight/Volume: 5 mL
Final Weight/Volume: 5 mL

LCSD Lab Sample ID: LCSD 360-41858/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 03/03/2009 1520
Date Prepared: 03/03/2009 1520

Analysis Batch: 360-41858
Prep Batch: N/A
Units: ug/L

Instrument ID: Agilent 7890/5975 GC/MS
Lab File ID: V02926.D
Initial Weight/Volume: 5 mL
Final Weight/Volume: 5 mL

Analyte	% Rec. LCS	% Rec. LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
2,4,4-Trimethyl-1-pentene	115	110	70 - 130	4	25		
2,4,4-Trimethyl-2-pentene	116	113	70 - 130	2	25		

Surrogate	LCS % Rec	LCSD % Rec	Acceptance Limits
4-Bromofluorobenzene	101	104	70 - 130
Dibromofluoromethane	103	102	70 - 130
Toluene-d8 (Surr)	103	104	70 - 130

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-21331-1

Method Blank - Batch: 360-41655

Method: 8270C LL
Preparation: 3510C

Lab Sample ID: MB 360-41655/1-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 03/02/2009 2232
Date Prepared: 02/26/2009 0845

Analysis Batch: 360-41758
Prep Batch: 360-41655
Units: ug/L

Instrument ID: Agilent 6890/5973 GC/MS
Lab File ID: B94956.D
Initial Weight/Volume: 1000 mL
Final Weight/Volume: 1.0 mL
Injection Volume: 1.0 uL

Analyte	Result	Qual	MDL	RL
Bis(2-ethylhexyl) phthalate	5.3		0.41	2.0
N-Nitrosodiphenylamine	ND		0.38	5.0

Surrogate	% Rec		Acceptance Limits
2,4,6-Tribromophenol	51		15 - 110
2-Fluorobiphenyl	59		30 - 130
2-Fluorophenol	26		15 - 110
Nitrobenzene-d5	78		30 - 130
Phenol-d5	14	X	15 - 110
Terphenyl-d14	65		30 - 130

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-21331-1

Lab Control Spike/
Lab Control Spike Duplicate Recovery Report - Batch: 360-41655

Method: 8270C LL
Preparation: 3510C

LCS Lab Sample ID: LCS 360-41655/2-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 03/02/2009 2303
Date Prepared: 02/26/2009 0845

Analysis Batch: 360-41758
Prep Batch: 360-41655
Units: ug/L

Instrument ID: Agilent 6890/5973 GC/MS
Lab File ID: B94957.D
Initial Weight/Volume: 1000 mL
Final Weight/Volume: 1.0 mL
Injection Volume: 1.0 uL

LCSD Lab Sample ID: LCSD 360-41655/3-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 03/02/2009 2334
Date Prepared: 02/26/2009 0845

Analysis Batch: 360-41758
Prep Batch: 360-41655
Units: ug/L

Instrument ID: Agilent 6890/5973 GC/MS
Lab File ID: B94958.D
Initial Weight/Volume: 1000 mL
Final Weight/Volume: 1.0 mL
Injection Volume: 1.0 uL

Analyte	% Rec. LCS	% Rec. LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Bis(2-ethylhexyl) phthalate	98	126	40 - 140	25	20		*
N-Nitrosodiphenylamine	86	90	40 - 140	5	20		

Surrogate	LCS % Rec	LCSD % Rec	Acceptance Limits
2,4,6-Tribromophenol	69	71	15 - 110
2-Fluorobiphenyl	68	75	30 - 130
2-Fluorophenol	30	31	15 - 110
Nitrobenzene-d5	92	97	30 - 130
Phenol-d5	16	17	15 - 110
Terphenyl-d14	66	72	30 - 130

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-21331-1

Method Blank - Batch: 360-41795

Method: MAVPH
Preparation: 5030B

Lab Sample ID: MB 360-41795/3
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 03/02/2009 1440
Date Prepared: 03/02/2009 1440

Analysis Batch: 360-41795
Prep Batch: N/A
Units: ug/L

Instrument ID: HP 5890II GC w/ PID/FID
Lab File ID: G15897.D
Initial Weight/Volume: 5 mL
Final Weight/Volume: 5 mL
Injection Volume:
Column ID: PRIMARY

Analyte	Result	Qual	RL	RL
Benzene	ND		5.0	5.0
Ethylbenzene	ND		5.0	5.0
m-Xylene & p-Xylene	ND		10	10
Methyl tert-butyl ether	ND		5.0	5.0
Naphthalene	ND		10	10
o-Xylene	ND		5.0	5.0
Toluene	ND		5.0	5.0
C5-C8 Aliphatics (unadjusted)	ND		100	100
C9-C12 Aliphatics (unadjusted)	ND		100	100
C5-C8 Aliphatics (adjusted)	ND		100	100
C9-C12 Aliphatics (adjusted)	ND		100	100
C9-C10 Aromatics	ND		100	100
Total VPH	ND		100	100

Surrogate	% Rec	Acceptance Limits
2,5-Dibromotoluene (fid)	97	70 - 130
2,5-Dibromotoluene (pid)	110	70 - 130

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-21331-1

Lab Control Spike/
Lab Control Spike Duplicate Recovery Report - Batch: 360-41795

Method: MAVPH
Preparation: 5030B

LCS Lab Sample ID: LCS 360-41795/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 03/02/2009 1301
Date Prepared: 03/02/2009 1301

Analysis Batch: 360-41795
Prep Batch: N/A
Units: ug/L

Instrument ID: HP 5890II GC w/ PID/FID
Lab File ID: G15894.D
Initial Weight/Volume: 5 mL
Final Weight/Volume: 5 mL
Injection Volume:
Column ID: PRIMARY

LCSD Lab Sample ID: LCSD 360-41795/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 03/02/2009 1334
Date Prepared: 03/02/2009 1334

Analysis Batch: 360-41795
Prep Batch: N/A
Units: ug/L

Instrument ID: HP 5890II GC w/ PID/FID
Lab File ID: G15895.D
Initial Weight/Volume: 5 mL
Final Weight/Volume: 5 mL
Injection Volume:
Column ID: PRIMARY

Analyte	% Rec. LCS	% Rec. LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Benzene	98	106	70 - 130	8	25		
Ethylbenzene	98	106	70 - 130	8	25		
m-Xylene & p-Xylene	99	106	70 - 130	7	25		
Methyl tert-butyl ether	96	105	70 - 130	8	25		
Naphthalene	95	103	70 - 130	7	25		
o-Xylene	100	107	70 - 130	7	25		
Toluene	97	105	70 - 130	8	25		
C5-C8 Aliphatics (unadjusted)	107	118	70 - 130	9	25		
C9-C12 Aliphatics (unadjusted)	103	113	70 - 130	9	25		
C9-C10 Aromatics	106	115	70 - 130	8	25		

Surrogate	LCS % Rec	LCSD % Rec	Acceptance Limits
2,5-Dibromotoluene (fid)	95	92	70 - 130
2,5-Dibromotoluene (pid)	99	95	70 - 130

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-21331-1

Method Blank - Batch: 360-41632

Method: 6010B
Preparation: N/A

Lab Sample ID: MB 360-41632/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 02/25/2009 1044
Date Prepared: N/A

Analysis Batch: 360-41632
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 1.0 mL

Analyte	Result	Qual	MDL	RL
Iron	ND		16	100

Lab Control Spike/
Lab Control Spike Duplicate Recovery Report - Batch: 360-41632

Method: 6010B
Preparation: N/A

LCS Lab Sample ID: LCS 360-41632/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 02/25/2009 1041
Date Prepared: N/A

Analysis Batch: 360-41632
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 10 mL

LCSD Lab Sample ID: LCSD 360-41632/13
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 02/25/2009 1117
Date Prepared: N/A

Analysis Batch: 360-41632
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 10 mL

Analyte	% Rec. LCS	% Rec. LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Iron	98	98	80 - 120	1	20		

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-21331-1

Method Blank - Batch: 360-41845

Method: L107-06-1B
Preparation: Distill/Ammonia

Lab Sample ID: MB 360-41845/1-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 03/04/2009 1714
Date Prepared: 03/03/2009 1320

Analysis Batch: 360-41860
Prep Batch: 360-41845
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 50 mL

Analyte	Result	Qual	RL	RL
Ammonia	ND		0.10	0.10

Lab Control Spike - Batch: 360-41845

Method: L107-06-1B
Preparation: Distill/Ammonia

Lab Sample ID: LCS 360-41845/2-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 03/04/2009 1715
Date Prepared: 03/03/2009 1320

Analysis Batch: 360-41860
Prep Batch: 360-41845
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 50 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Ammonia	10.0	9.44	94	85 - 115	

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-21331-1

Lab Control Spike - Batch: 360-41621

Method: SM 4500 H+ B
Preparation: N/A

Lab Sample ID: LCS 360-41621/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 02/25/2009 0945
Date Prepared: N/A

Analysis Batch: 360-41621
Prep Batch: N/A
Units: SU

Instrument ID: MAN-TECH Ion Plus
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 1.0 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
pH	6.00	5.950	99	90 - 110	

Duplicate - Batch: 360-41621

Method: SM 4500 H+ B
Preparation: N/A

Lab Sample ID: 360-21331-1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 02/25/2009 1024
Date Prepared: N/A

Analysis Batch: 360-41621
Prep Batch: N/A
Units: SU

Instrument ID: MAN-TECH Ion Plus Autoti
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 1.0 mL

Analyte	Sample Result/Qual	Result	RPD	Limit	Qual
pH	6.74	6.780	1	20	

Calculations are performed before rounding to avoid round-off errors in calculated results.

Login Sample Receipt Check List

Client: Olin Corporation

Job Number: 360-21331-1

Login Number: 21331
Creator: Rinard, Kimberley A
List Number: 1

List Source: TestAmerica Westfield

Question	T / F/ NA	Comment
Radioactivity either was not measured or, if measured, is at or below background	N/A	
The cooler's custody seal, if present, is intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	4.0 C / 5.0 C
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	True	
If necessary, staff have been informed of any short hold time or quick TAT needs	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	

TestAmerica Laboratories, Inc.

Chain of Custody Form

TestAmerica

360 21331

•53 Southampton Road
Westfield, MA 01085
(P) 413-572-4000
(F) 413-572-3707

•149 Rangeway Road
N. Billerica, MA 01862
(P) 978-667-1400
(F) 978-667-7871

Client: Olin Chemical/MACTEC

Address: 51 Eames Street

Wilmington, MA 01887

Phone: Fax:

Project #: 6107090016 /04

Project Manager: Peter Thompson

Work ID: Plant B

Contact: David Chapman

Job#	Quote#	PO#

Requested Turn Around Time

10 Business Day (Std) XX | Rush TAT Requested:
15 Business Day ____ | 24 hrs ____ 72 hrs ____
Other ____ | 48 hrs ____ 5 Day ____

Regulatory Classification / Special Report Format

NPDES ____ Drinking Water ____ DEP Form(s) ____
RCRA ____ MCP GW1/S1 ____ MWRA Smart Rpt ____
Other ____ MCP QA/QC Rpt XX

Shaded areas for office use

Analysis Requested

Check analysis and specify method and analytes in comments section.
For example:
500-series for drinking water
600-series for waste water
8000-series for haz/solid waste
Use comments section to further define.

Comments (Special Instructions)

MCP case narrative

Sample Type Codes
WW-Wastewater DW-Drinking water SW-Surfacewater
LW-Labwater GW-Groundwater A-Air
S-Solid / Soil SL-Sludge O-Oil Z-Other

Sample ID	Sample Type	Sampler's Initials	Date Time Collected	Grab	Comp.	# Containers	Plastic(P) or Glass(G)	Preservative: NaHSO4/MeOH	HNO3 to pH <2	H2SO4 to pH <2	HCl to pH <2	NaOH to pH >12	NAOH/ZNAC	None / 4° C	8260	VPH	8270	Ammonia	Iron by 6010	pH	Other	Other	Other	Other	Other	Other	Other
OC-GW-16R	GW	DGK	2-24-09 13:25	X		12	VG		1	1	7			3	X	X	X	X	X	X							

8260 Compounds Only:
2,4,4 Trimethyl-1-pentene
2,4,4 Trimethyl-2-pentene

8270 Comounds Only:
NDPA
BEHP

Page 31 of 31

2/24/09

Sampled by (print): Daron Kurkjian

Signature:

Relinquished by: David Chapman Date: 2-24-09 Time: 14:

Received by: Date: 2/24/09 Time: 1440

Relinquished by: Date: 2/24/09 Time: 1620

Received by: Date: 2/24/09 Time: 1620

Method of shipment:

TestAmerica-Westfield

Cooler ? (Y) / N Samples Iced (Y) / N

Temp @ receipt: 4.0°C/5.0°C °C

Preservation/pH checked

By: Date: 2/24/09

White = Lab file Yellow = Report copy Pink = Customer copy
STL-8245 (1000)

Engineering and Consulting, Inc.
511 Congress Street
P.O. Box 7050
Portland, Maine 04112-7050
Telephone: 207/775-5401
Fax: 207/772-4762
Home Page: www.mactec.com

To: Steve Morrow
From: Chris Ricardi
Date: June 2, 2009
Subject: Interim Response Steps Work Plan Slurry Wall Monitoring Program 1Q09– February 2009

DATA VALIDATION REPORT
FEBRUARY 2009 SLURRY WALL SURFACE WATER AND GROUNDWATER
OLIN CHEMICAL SUPERFUND SITE
WILMINGTON, MASSACHUSETTS
TestAmerica Laboratories Data Sets 360-21330 and 360-21354

1.0 INTRODUCTION

Surface water and groundwater samples were collected from the Olin Chemical Superfund Site from February 24 to 25, 2009. Samples were analyzed by TestAmerica Laboratories in Westfield, Massachusetts. Data were reported in sample delivery groups (SDGs) 360-21330 and 360-21354. A summary of samples included in this review is contained in Table 1. Samples reviewed in this report were analyzed for the following USEPA SW-846 (USEPA, 1996), USEPA wastewater (USEPA, 1993), or Standard Methods (APHA, 1995):

- dissolved and total metals (aluminum, chromium, and sodium) by USEPA Method 6010B in surface water
- dissolved metals (aluminum and chromium) by USEPA Method 6010B in groundwater
- general chemistry analyses for ammonia by Method 350.1 (Lachat 10-107-06-1), chloride, sulfate, nitrate, and nitrite by Method 300, and specific conductance by SM18 SM 2510B

The Draft Interim Response Steps Work Plan (MACTEC, 2007) and the MADEP Compendium of Quality Assurance and Quality Control Requirements and Performance Standards for Selected Analytical Methods Used in Support of Response Actions for the Massachusetts Contingency Plan (MCP) [MADEP, 2004] were used as a reference during the review. Analytical packages were reviewed using the Level 1 Data Quality Evaluation checklists that were developed for the Olin Wilmington annual and quarterly groundwater monitoring tasks. Final sample results are presented on data summaries in Table 2.

2.0 METALS

Data were reviewed for the following parameters:

* Data Completeness
* Holding Time

Blanks

* Matrix Spike Analysis
* Laboratory Duplicate Analysis
* Field Duplicate Results
* Laboratory Control Sample
* Detection Limits

***** = indicates that criteria were met for this parameter

Blanks

Dissolved aluminum (6.1 µg/L) was reported in the method blank associated with all samples in SDG 360-21330. An action level (30.5 µg/L) was calculated at five times the blank concentration and compared to sample data. The low concentration detection of dissolved aluminum in sample OC-GW-25 was qualified non-detected (U) at the reporting limit.

The laboratory qualified sample results with a (B) when the analyte was detected in the sample and associated method blank. The (B) qualifier was removed from the final data set.

3.0 GENERAL CHEMISTRY – Ammonia, Chloride, Sulfate, Nitrate, Nitrite, and Specific Conductance

Data were reviewed for the following parameters:

* Data Completeness
* Holding Time
* Blanks
  Matrix Spike Analysis
* Laboratory Duplicate Analysis
* Laboratory Control Sample
* Detection limits

***** = indicates that criteria were met for this parameter

Matrix Spike Results

A chloride MS/MSD analysis was completed using sample OC-GW-202D. The chloride MS/MSD percent recoveries (70 and 66) are less than the lower project limit of 75. Results for chloride in all samples were qualified estimated (J) and are considered potentially biased low.

MACTEC

Except for the validation actions noted above, the results are interpreted to be usable as reported by TestAmerica.

Chris Ricardi

6/02/09

Chris Ricardi, NRCC-EAC
Senior Chemist

Date

Michael Murphy
Project Principal

6/2/09

Date

Reference:

American Public Health Association (APHA), 1995. "Standard Methods for Examination of Water and Wastewater"; 19th Edition; APHA, 1015 Fifteenth St., NW. Washington, D.C. 20005.

MACTEC, 2007. "Draft Interim Response Steps Work Plan"; Olin Chemical Superfund Site; 51 Eames Street, Wilmington, Massachusetts; July 25, 2007.

U.S. Environmental Protection Agency (USEPA), 1993. "Methods for Chemical Analysis and Water and Wastes (MCAWW)", EPA/600/4-79-020 (March 1983) with updates and supplements EPA/600/4-91-010 (June 1991), EPA/600/R-92-129 (August 1992) and EPA/600/R-93-100 (August 1993).

U.S. Environmental Protection Agency (USEPA), 1996. "Test Methods for Evaluating Solid Waste"; Laboratory Manual Physical/Chemical Methods; Office of Solid Waste and Emergency Response; Washington, DC; SW-846; November 1986; Revision 4 -December 1996.

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Home Page: www.mactec.com

Table 1 – FEBRUARY 2009 SLURRY WALL MONITORING PROGRAM

Lab Sample ID	Location	Sample ID	Sample Date	SW846 6010B Total	SW846 6010B Filtered	E350.1 (QuickChem 10-107-06-1-B)	SM 2510B	40CFR136A 300.0
Groundwater								
360-21330-8	GW-25	OC-GW-25	2/24/2009		2	1	1	2
360-21354-1	GW-202S	OC-GW-202S	2/25/2009		2	1	1	2
360-21354-2	PZ-18R	OC-PZ-18R	2/25/2009		2	1	1	2
360-21354-3	GW-79S	OC-GW-79S	2/25/2009		2	1	1	2
360-21354-4	PZ-17RR	OC-PZ-17RR	2/25/2009		2	1	1	2
360-21354-5	GW-202D	OC-GW-202D	2/25/2009		2	1	1	2
360-21354-6	GW-78S	OC-GW-78S	2/25/2009		2	1	1	2
Surface Water								
360-21330-1	ISCO3	OC-ISCO-3	2/24/2009	3	3	1	1	4
360-21330-2	ISCO2	OC-ISCO-2	2/24/2009	3	3	1	1	4
360-21330-3	PZ-16RR	OC-PZ-16RRSW	2/24/2009	3	3	1	1	4
360-21330-4	PZ-17RR	OC-PZ-17RRSW	2/24/2009	3	3	1	1	4
360-21330-5	SD-17	OC-SD-17	2/24/2009	3	3	1	1	4
360-21330-6	PZ-18R	OC-PZ-18RSW	2/24/2009	3	3	1	1	4
360-21330-7	ISCO1	OC-ISCO-1	2/24/2009	3	3	1	1	4

Notes:

Number listed under method indicates number of target analytes reported.

Prepared by/Date: KJC 03/17/09
Checked by/Date: WDC 5/19/09

Table 2
Final Results Summary - 360-21330 & 360-21354
February 2009 Slurry Wall / Cap Groundwater and Surface Water
Olin Chemical Superfund Site
Wilmington, Massachusetts

			Loc Name	GW-202D		GW-202S		GW-25		GW-78S		GW-79S	
			Field Sample ID	OC-GW-202D		OC-GW-202S		OC-GW-25		OC-GW-78S		OC-GW-79S	
			Field Sample Date	02/25/09		02/25/09		02/24/09		02/25/09		02/25/09	
			QC Code	FS		FS		FS		FS		FS	
			Lab Sample Delivery Group	360-21354-1		360-21354-1		360-21330-1		360-21354-1		360-21354-1	
Frac	**Method**	**Analyte**	**Units**	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
F	SW6010	Aluminum	ug/l	14000		100	U	100	U	7.7	J	18	J
F	SW6010	Chromium	ug/l	940		4.3	J	4.9	J	5.5		6.6	
N	E300	Chloride	mg/l	300	J	50	J	39	J	22	J	170	J
N	E300	Sulfate	mg/l	2000		500		140		620		1100	
N	LACH_107_06_1_B	Nitrogen, as Ammonia	mg/l	360		99		43		94		190	
N	SM2510B	LAB SPECIFIC CONDUCTANCE	umhos/cm	5100		1400		650		1340		3200	

Notes:
N = normal
F = filtered
FS = field sample
U = not detected, value is the detection limit
J = value is estimated
ug/l = microgram per liter
mg/l = milligram per liter
umhos/cm = micro reciprocal ohms per centimeter

Table 2
Final Results Summary - 360-21330 & 360-21354
February 2009 Slurry Wall / Cap Groundwater and Surface Water
Olin Chemical Superfund Site
Wilmington, Massachusetts

			Loc Name	PZ-17RR		PZ-18R	
			Field Sample ID	OC-PZ-17RR		OC-PZ-18R	
			Field Sample Date	02/25/09		02/25/09	
			QC Code	FS		FS	
			Lab Sample Delivery Group	360-21354-1		360-21354-1	
Frac	**Method**	**Analyte**	**Units**	Result	Qual	Result	Qual
F	SW6010	Aluminum	ug/l	4.6	J	4.6	J
F	SW6010	Chromium	ug/l	2.9	J	15	
N	E300	Chloride	mg/l	17	J	130	J
N	E300	Sulfate	mg/l	510		220	
N	LACH_107_06_1_B	Nitrogen, as Ammonia	mg/l	75		76	
N	SM2510B	LAB SPECIFIC CONDUCTANCI	umhos/cm	1400		1000	

Notes:

N = normal

F = filtered

FS = field sample

U = not detected, value is the detection limit

J = value is estimated

ug/l = microgram per liter

mg/l = milligram per liter

umhos/cm = micro reciprocal ohms per centimeter

Prepared by / Date: KJC 05/26/09

Checked by / Date: WDC 05/27/09

Table 2
Final Results Summary - 360-21330 & 360-21354
February 2009 Slurry Wall / Cap Groundwater and Surface Water
Olin Chemical Superfund Site
Wilmington, Massachusetts

			Loc Name	ISCO1		ISCO2		ISCO3		PZ-16RR		PZ-17RR	
			Field Sample ID	OC-ISCO-1		OC-ISCO-2		OC-ISCO-3		OC-PZ-16RRSW		OC-PZ-17RRSW	
			Field Sample Date	02/24/09		02/24/09		02/24/09		02/24/09		02/24/09	
			QC Code	FS		FS		FS		FS		FS	
			Lab Sample Delivery Group	360-21330-1		360-21330-1		360-21330-1		360-21330-1		360-21330-1	
Frac	**Method**	**Analyte**	**Units**	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
F	SW6010	Aluminum	ug/l	280		800		39	J	1300		2200	
F	SW6010	Chromium	ug/l	40		160		0.38	J	340		440	
F	SW6010	Sodium	ug/l	98000		100000		100000		120000		110000	
N	E300	Chloride	mg/l	140	J	120	J	200	J	150	J	140	J
N	E300	Nitrate as N	mg/l	0.4		0.81		1.1		0.49		0.48	
N	E300	Nitrite as N	mg/l	0.1	U	0.01	U	0.1	U	0.1	U	0.1	U
N	E300	Sulfate	mg/l	94		210		53		240		240	
N	LACH_107_06_1_B	Nitrogen, as Ammonia	mg/l	18		42		3.3		41		34	
N	SM2510B	LAB SPECIFIC CONDUCTANCE	umhos/cm	730		900		820		1000		1000	
T	SW6010	Aluminum	ug/l	350		1300		470		3000		3500	
T	SW6010	Chromium	ug/l	44		250		4.3	J	740		880	
T	SW6010	Sodium	ug/l	90000		91000		91000		110000		120000	

Notes:
N = normal
T = total (unfiltered)
F = filtered
FS = field sample
U = not detected, value is the detection limit
J = value is estimated
ug/l = microgram per liter
mg/l = milligram per liter
umhos/cm = micro reciprocal ohms per centimeter

Table 2
Final Results Summary - 360-21330 & 360-21354
February 2009 Slurry Wall / Cap Groundwater and Surface Water
Olin Chemical Superfund Site
Wilmington, Massachusetts

			Loc Name	PZ-18R		SD-17	
			Field Sample ID	OC-PZ-18RSW		OC-SD-17	
			Field Sample Date	02/24/09		02/24/09	
			QC Code	FS		FS	
			Lab Sample Delivery Group	360-21330-1		360-21330-1	
Frac	**Method**	**Analyte**	**Units**	Result	Qual	Result	Qual
F	SW6010	Aluminum	ug/l	230		1500	
F	SW6010	Chromium	ug/l	36		390	
F	SW6010	Sodium	ug/l	100000		130000	
N	E300	Chloride	mg/l	150	J	160	J
N	E300	Nitrate as N	mg/l	0.41		0.45	
N	E300	Nitrite as N	mg/l	0.1	U	0.1	U
N	E300	Sulfate	mg/l	91		240	
N	LACH_107_06_1_B	Nitrogen, as Ammonia	mg/l	17		37	
N	SM2510B	LAB SPECIFIC CONDUCTANCE	umhos/cm	740		1100	
T	SW6010	Aluminum	ug/l	370		3400	
T	SW6010	Chromium	ug/l	47		870	
T	SW6010	Sodium	ug/l	100000		120000	

Notes:

N = normal

T = total (unfiltered)

F = filtered

FS = field sample

U = not detected, value is the detection limit

J = value is estimated

ug/l = microgram per liter

mg/l = milligram per liter

umhos/cm = micro reciprocal ohms per centimeter

Prepared by / Date: KJC 05/26/09

Checked by / Date: CSR 05/27/09

OLIN-WILMINGTON
LEVEL I DATA QUALITY EVALUATION
STANDARD OPERATING PROCEDURE AND CHECKLIST
WET CHEMISTRY PARAMETERS BY VARIOUS METHODS

Reviewer/Date [signature] 5/10/09
Sr. Review/Date Chris Ricardi 5/27/09
Lab Report # 360-21330-1
Project # 4107.09.0016.12

ammonia, chloride, sulfate, Nitrate, nitrite,

Note: The following analyses will be evaluated according to the "MADEP QA/QC Guidelines for **Sampling, Data Evaluation and Reporting Activities.**" MADEP, however, may not list QA/QC criteria for every chemical analysis. Where not defined by MADEP, criteria will default to values stipulated in the QAPP. Where the QAPP does not define criteria, QA/QC requirements will default to limits employed by the laboratory.

1.0 Laboratory Deliverable Requirements

1.1 Laboratory Information: Was all of the following provided in the laboratory report? **Yes** [✓] No [ ] N/A [ ] Comments:
Check items received.

☑ *Name of Laboratory* ☑ *Address* ☑ *Project ID* ☑ *Phone #* ☑ *Sample identification – Field and Laboratory*
Client Information: ☑ *Name* ☑ *Address* ☑ *Client Contact* *(IDs must be cross-referenced)*

ACTION: If no, contact lab for submission of missing or illegible information.

1.2 Laboratory Report Certification Statement ***Yes*** [✓] *No* [ ] *N/A* [ ] *Comments:*

Does the laboratory report include a completed Analytical Report Certification in the required format?

***ACTION**: If no, contact lab for submission of missing certification or certification with correct format.*

1.3 Laboratory Case Narrative: ***Yes*** [✓] *No* [ ] *N/A* [ ] *Comments:*

☑ *Narrative serves as an exception report for the project and method QA/QC performance.* ☐ *Narrative includes an explanation of each discrepancy on the Certification Statement.*

***ACTION**: If no, contact lab for submission of missing or illegible information.*

1.4 Chain of Custody (COC) copy present with all documentation completed? **Yes** [✓] No [ ] N/A [ ] Comments:

Does the laboratory report include copies of Chain of Custody forms containing all samples in this SDG?

NOTE: Olin receives and maintains the *original* COC.

ACTION: If no, contact lab for submission of copy of missing completed COC.

1.5 Sample Receipt Information (*Cooler Receipt Form*): Were each of the following tasks completed and recorded upon receipt of the sample(s) into the laboratory?

Yes [✓] No [ ] N/A [ ] Comments:

☑ Sample temperature confirmed: must be 1° – 10° C. (If samples were sent by courier and delivered on the same day as collection, temperature requirement does not apply).

☑ Container type noted ☑ Condition observed ☑ pH verified (where applicable) ☑ Field and lab IDs cross referenced

ACTION: If no, contact lab for submission of missing or incomplete documentation.

1.5.1 Were the correct bottles and preservatives used? Yes [✓] No [ ] N/A [ ] Comments:

✓ Ammonia,– 1 Liter polyethylene/H_2SO_4 to pH<2,cool to 4°C

Oil & Grease – 1 Liter glass/HCL or H2SO4 to pH<2,cool to 4°C

Alkalinity – 1 Liter polyethylene/cool to 4°C

Chemical Oxygen Demand – 50 mL polyethylene/H_2SO_4 to pH<2,cool to 4°C

Chloride, pH, sulfate, nitrate, nitrite - 50 mL polyethylene/cool to 4°C

Nitrate/nitrite - H2SO4 to pH<2,cool to 4°C

Organic Carbon – 500 mL amber glass bottle/HCl or H_2SO_4 to pH<2,cool to 4°C

Sulfide – 50 mL polyethylene/ZnAcetate + NaOH to pH>9, cool to 4°C

Phenolics - H_2SO_4 to pH<2,cool to 4°C

Specific conductance, TDS, TSS – 100 mL polyethylene/cool to 4°C

ACTION: If no, inform senior chemist. Document justification for change in container/volume (if applicable), qualify positive and non-detect data (J) data if cooler temperature exceeds 10°C. Rejection of data requires professional judgment

1.5.2 Were all samples delivered to the laboratory without breakage? Yes [✓] No [ ] N/A [ ] Comments:

1.5.3 Does the *Cooler Receipt Form* or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data? Yes [ ] **No [✓]** N/A [ ] Comments:

1.6 Sample Results Section: *Was the following information supplied in the laboratory report for each sample?* Yes [✓] No [ ] N/A [ ] Comments:

- ☑ Field ID and Lab ID
- ☑ Date and time collected
- ☑ Analyst Initials
- ☑ Dilution Factor
- ☑ N/A % moisture or solids
- ☑ Reporting limits
- ☑ N/A *Clean-up method*
- ☑ Analysis method
- ☑ Preparation method
- ☑ Date of preparation/extraction/digestion clean-up and analysis, where applicable
- ☑ Matrix
- ☑ Target analytes and concentrations
- ☑ Units (soils must be reported in dry weight)

ACTION: If no, contact lab for submission of missing or incomplete information.

1.7 QA/QC Information: Was the following information provided in the laboratory report for each sample batch? Yes [✓] No [ ] N/A [ ] Comments:

- ☑ Method blank results
- ☑ LCS recoveries
- ☑ N/A MS/MSD recoveries and RPDs
- ☑ N/A Laboratory duplicate results (where applicable)

ACTION: If no, contact lab for submission of missing or incomplete information.

2.0 Holding Times Yes [ ] No [✓] N/A [ ] Comments:

Have any technical holding times, determined from date of collection to date of analysis, been exceeded? The holding times are as follows:

✓ 28 days = ammonia, chemical oxygen demand, chloride, organic carbon, oil & grease, specific conductance, total organic carbon and sulfate

Alkalinity = 14 days | Sulfide, TDS, TSS = 7 days | pH = analyze immediately | Nitrate nitrogen as N = 48 hrs

Nitrite nitrogen as N = 48 hrs | Nitrate + Nitrite as N = 28 days

NOTE: List samples that exceed hold time with # of days exceeded on checklist

ACTION: If technical holding times are exceeded qualify results (J). For water samples that are grossly exceeded (>2X hold time) reject (R) all non-detect results. Professional judgment used to qualify soils.

3.0 Laboratory Method Yes [✓] No [ ] N/A [ ] Comments:

3.1 Was the correct laboratory method used?

ACTION: If no, contact lab to provide justification for method change compared to the requested method. Contact senior chemist to inform Client of change or to request variance.

3.2 Are the practical quantitation limits the same as those specified by the ☑ QAPP/IRSWP ☐ Lab?

Yes [ ] No [✓] N/A [ ] Comments: The laboratory reporting limit for specific conductivity (1 umhos/cm) is lower than the specified limit of 3 umhos/cm. No further action required.

Note: *The MADEP QA/QC Guidelines do not yet list PQLs for wet chemistry analyses, therefore all criteria will default to values stipulated in the QAPP*. Where the QAPP does not define criteria, QA/QC requirements default to limits employed by the lab**. Other criteria may also apply.*

Ammonia* ☑ = 0.1 mg/ L	Alkalinity** ☐ = 1 mg/L	Bicarbonate Alkalinity** ☐ = 1 mg/L	Carbonate Alkalinity** ☐ = 1 mg/L
Nitrate Nitrogen as N* ☑ = .05 mg/L	Nitrite Nitrogen as N* ☑ = .01 mg/L	Chloride* ☑ = 1 mg/L	Hardness * ☐ = 2 mg/L
Spec. Cond.** ☒ 3 umhos/cm	Total Organic Carbon** ☐ = 1 mg/L	Oil & Grease* ☐ = 5.5 mg/L	Sulfate (EPA 300.0)* ☑ = 2 mg/L
COD:* Low – 20 mg/L	COD* High - 50 mg/L ☐	TDS* ☐ = 10 mg/L	TSS* ☐ = 5 mg/L
pH* ☐ < 2 to > 12	Phenolic - 0.01 mg/L		

Other parameter(list) _____ PQL = _____ ☐ Source of PQL = _____

Other parameter(list) _____ PQL = _____ ☐ Source of PQL = _____

ACTION: If no, evaluate change with respect to sample matrix, preparation, dilution, moisture, etc. If sample PQL is indeterminate, contact lab for explanation.

3.3 Are the appropriate parameter results present for each sample in the SDG? Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If no, check Request for Analysis to verify if method was ordered and COC to verify that it was sent, and contact lab for resubmission of the missing data

3.4 If *dilutions were required, were dilution factors reported?* Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact the lab for submission.

4.0 <u>Method Blanks</u> Yes [✓] No [ ] N/A [ ] Comments:

4.1 Are the Method Blank Summaries present?

ACTION: If no, call the laboratory for submission of missing data.

4.2 Was a method blank analyzed for each analysis batch of wet chemistry field samples of 20 or less? Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If no, document discrepancy in case narrative and contact lab for justification. Consult senior chemist for action needed.

4.3 Is the method blank less than the PQL? (See Section 3.2 for PQLs). **Yes [✓]** No [ ] N/A [ ] Comments:

4.4 Do any method blanks have positive results for wet chemistry parameters? Qualify data according to the following: Yes [ ] **No [✓]** N/A [ ] Comments:

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

ACTION: If any blank has positive results, list all the concentrations detected and flagging level (flagging level = 5 × blank value) on the checklist. List all affected samples and their qualifiers.

5.0 Laboratory Control Standards

5.1 Was a laboratory control standard (LCS) run with each analytical batch of 20 samples or less? **Yes [✓]** No [ ] N/A [ ] Comments:

ACTION: If no, call laboratory for LCS form submittal. If data is not available, use professional judgment to determine qualification actions for data associated with the batch.

5.2 Is a LCS Summary Form present? **Yes [✓]** No [ ] N/A [ ] Comments:

ACTION: If no, contact lab for resubmission of missing data.

5.3 Is any wet chemistry analyte LCS recovery outside the control limits? Yes [ ] **No [✓]** N/A [ ] Comments:

LCS Limits:

Alkalinity** ☐ = 80-120%	Bicarbonate Alkalinity** ☐ = 80-120%	Carbonate Alkalinity** ☐ = 80-120%	Specific Conductivity *☑ = 80-120%
Total Organic Carbon** ☐ = 80-120%	TDS** ☐ = 80-120%	Oil & Grease* ☐ = 80-120%	Ammonia Nitrogen as N* ☑ = 80-120%
COD Low* ☐ = 80-120%	COD High* ☐ = 80-120%	Nitrate Nitrogen as N** ☑ = 80-120%	Nitrite Nitrogen as N** ☑ = 80-120%
Hardness* ☐ = 80-120%	Chloride* ☑ = 80-120%	Sulfate (EPA 300.0)* ☑ = 80-120%	pH* ☐ = 98-102% TSS* NA

Other parameter(list) _____ %R = _____ ☐ Rec Limits= _____

Other parameter(list) _____ %R = _____ ☐ Rec Limits = _____

(MADEP has not yet defined LCS recovery limits for wet chemistry analyses.)

ACTION: If recovery is above the upper limit, qualify all positive sample results within the batch as (J). If recovery is below the lower limit, qualify all positive and no-detect results within the batch as (J). If LCS recovery is <10%, non-detect results are rejected (R).

6.0 Matrix Spikes

Matrix spikes may be collected at different frequencies based on monthly, quarterly, or task specific schedules. Confirm spike requirements for each set with the senior chemist.

6.1 Were project-specific MS/MSDs analyzed? List project samples that were spiked.

ACTION: If no, contact senior chemist to see if any were specified.

Yes [ ] No [✓] N/A [ ] Comments:

6.2 Is the MS/MSD Recovery Form present?

ACTION: If no, contact lab for resubmission of missing data.

Yes [ ] No [ ] N/A [✓] Comments:

6.3 Were matrix spikes analyzed at the required frequency of 1 per 20 samples per matrix?

ACTION: If any matrix spike data is missing, call lab for resubmission.

Yes [ ] No [ ] N/A [✓] Comments:

6.4 Are any wet chemistry analyte spike recoveries outside of the QC limits?

Yes [ ] **No** [ ] N/A [✓] Comments:

Note: The chloride MS/MSD percent recoveries (70 and 66), in SDG 360-21354, are less than the lower QC limit. All chloride results were qualified estimated (J) and are considered potentially biased low.

NOTE: $\%R = \frac{(SSR-SR)}{SA} \times 100\%$ Where: SSR = Spiked sample result
SR = Sample result
SA = Spike added

MS/MSD Recovery Limits:

Alkalinity* = NA	Bicarbonate Alkalinity* = NA	Carbonate alkalinity* = NA	Ammonia* (LACHAT) ☐ = 75-125%
Chloride*(SM 4500 Cl) ☐= 75-125%	Specific Conductivity * = NA	Total Organic Carbon* = NA	TDS** = NA
Oil & Grease* = NA	COD Low* ☐ = 75-125%	COD High* ☐ = 75-125%	Nitrate Nitrogen as N** ☐ = 75-125%
Nitrite Nitrogen as N** ☐ = 75-125%	Hardness* ☐ = 75-125%	Sulfate (EPA 300.0)* ☐ = 75-125%	pH* = NA TSS* = NA

Other parameter(list) _____ % R = _____ ☐ Rec Limits = _____

* = Laboratory Limits ** = Olin QAPP Limits (*MADEP has not yet defined LCS recovery limits for wet chemistry analyses.*)

NOTES: 1) If only one of the recoveries for an MS/MSD pair is outside of the control limits, no qualification is necessary. Use professional judgment for the MS/MSD flags.
2) If the MS/MSD was performed by the laboratory on a non-project sample, no qualification is required.

ACTION: MS/MSD flags only apply to the sample spiked. Do not evaluate if sample concentration is > 4X spike. If the recoveries of the MS and MSD exceed the upper control limit, qualify positive results as estimated (J). If the recoveries of the MS and MSD are lower than the lower control limit but > 30%, qualify both positive results and non-detects (J). If the MS/MSD recovery is < 30% and the sample is non-detect, the results are considered unusable and flagged (R).

ACTION: Laboratory control limits apply when spiked sample results fall within the normal calibration range. If dilutions are required due to high sample concentrations, the data is evaluated, but no flags are applied.

6.5 Are any RPDs for MS/MSD recoveries outside of the QA/QC limits?

Yes [ ] **No** [ ] N/A [✓] Comments:

NOTE: $RPD = \frac{S-D}{(S+D)/2} \times 100\%$ Where S = MS result
D = MSD result

MS/MSD RPD Limits:

RPD ≤20

7.0 Laboratory Duplicate

Are the RPDs for the laboratory duplicates <20% unless otherwise specified below?

Yes [ ] No [✓] N/A [✓] Comments:

ACTION: If the RPD is greater than specified limits, qualify all results for that analyte as estimated (J).

pH* ☐ = 3% Specific Conductivity *☐ = 5% TSS** ☐ = 6% TDS** ☐ = 6%

8.0 Sampling Accuracy

The majority of ground water samples are collected directly from a tap, process stream, or with dedicated tubing. Rinse blanks will not be collected.

8.1 Were rinsate blanks collected? Prior to evaluating rinsate blanks, obtain a list of the associated samples from the senior chemist. **Yes** [__] No [✓] N/A [__] Comments:

8.2 Do any rinsate blanks have positive results? Yes [__] **No** [__] N/A [✓] Comments:

ACTION: Evaluate rinsate results vs. blank results to determine if contaminant may be laboratory-derived. If not lab-related, qualify according to the table below.

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

NOTE: *MADEP does not require the collection of rinsate blanks.*

9.0 Field Duplicates

9.1 Were field duplicate samples collected? Obtain a list of samples and their associated field duplicates. **Yes** [__] No [✓] N/A [__] Comments:

9.2 Were field duplicates collected per the required frequency? **Yes** [__] No [__] N/A [✓] Comments:

QAPP/IRSWP ☐ *MADEP Option 1(1 per 20)* ☐ *MADEP Option 3 (1 per 10)* ☐

9.3 Was the RPD ≤ 30% for waters ≤ 50% for soils? Calculate the RPD for results and attach to this review. **Yes** [__] No [__] N/A [✓] Comments:

ACTION:. Qualify data (J) for both sample results if the RPD exceeded.

Was any of the data qualified? Yes [✓]* **No** [✓] N/A [ ] Comments:

If so, apply data qualifiers directly to the DQE copy of laboratory report and **flag pages** for entry in database.

* Refer to Matrix spikes section 6.4.

REFERENCES:-

MACTEC, 2007. "Draft Interim Response Steps Work Plan"; Olin Chemical Superfund Site, 51 Eames Street, Wilmington, Massachusetts.; Project No. 6300-06-0010/41.1; July 25, 2007.

Massachusetts Department of Environmental Protection (MADEP), 2004. "The Compendium of Quality Assurance and Quality Control Requirements and Performance Standards for Selected Analytical Methods Used in Support of Response Actions for the Massachusetts Contingency Plan (MCP)"; Bureau of Waste Site Cleanup; 1 Winter Street, Boston, Massachusetts 02108; WSC-CAM; May 2004.

OLIN-WILMINGTON
LEVEL I DATA QUALITY EVALUATION
STANDARD OPERATING PROCEDURE AND CHECKLIST
WET CHEMISTRY PARAMETERS BY VARIOUS METHODS

Reviewer/Date 5/19/09
Sr. Review/Date Chris Ricardi 5/27/09
Lab Report # 360-21354-1
Project # 610709001G.12

ammonia, chloride, sulfate

Note: The following analyses will be evaluated according to the "MADEP QA/QC Guidelines for **Sampling, Data Evaluation and Reporting Activities.**" MADEP, however, may not list QA/QC criteria for every chemical analysis. Where not defined by MADEP, criteria will default to values stipulated in the QAPP. Where the QAPP does not define criteria, QA/QC requirements will default to limits employed by the laboratory.

1.0 Laboratory Deliverable Requirements

1.1 Laboratory Information: Was all of the following provided in the laboratory report? **Yes** [✓] No [ ] N/A [ ] Comments:
Check items received.

☑ *Name of Laboratory* ☑ *Address* ☑ *Project ID* ☑ *Phone #* ☑ *Sample identification – Field and Laboratory*

Client Information: ☑ *Name* ☑ *Address* ☑ *Client Contact* *(IDs must be cross-referenced)*

ACTION: If no, contact lab for submission of missing or illegible information.

1.2 Laboratory Report Certification Statement ***Yes*** [✓] *No* [ ] *N/A* [ ] *Comments:*

Does the laboratory report include a completed Analytical Report Certification in the required format?

***ACTION**: If no, contact lab for submission of missing certification or certification with correct format.*

1.3 Laboratory Case Narrative: ***Yes*** [✓] *No* [ ] *N/A* [ ] *Comments:*

☑ *Narrative serves as an exception report for the project and method QA/QC performance.* ☐ *Narrative includes an explanation of each discrepancy on the Certification Statement.*

***ACTION**: If no, contact lab for submission of missing or illegible information.*

1.4 Chain of Custody (COC) copy present with all documentation completed? **Yes** [✓] No [ ] N/A [ ] Comments:

Does the laboratory report include copies of Chain of Custody forms containing all samples in this SDG?

NOTE: Olin receives and maintains the *original* COC.

ACTION: If no, contact lab for submission of copy of missing completed COC.

1.5 Sample Receipt Information (*Cooler Receipt Form*): Were each of the following tasks completed and recorded upon receipt of the sample(s) into the laboratory?

Yes [✓] No [ ] N/A [ ] Comments:

☑ Sample temperature confirmed: must be 1° – 10° C. (If samples were sent by courier and delivered on the same day as collection, temperature requirement does not apply).

☑ Container type noted ☑ Condition observed ☑ pH verified (where applicable) ☑ Field and lab IDs cross referenced

ACTION: If no, contact lab for submission of missing or incomplete documentation.

1.5.1 Were the correct bottles and preservatives used?

Yes [✓] No [ ] N/A [ ] Comments:

✓ Ammonia,– 1 Liter polyethylene/H_2SO_4 to pH<2,cool to 4°C

Oil & Grease – 1 Liter glass/HCL or H2SO4 to pH<2,cool to 4°C

Alkalinity – 1 Liter polyethylene/cool to 4°C

Chemical Oxygen Demand – 50 mL polyethylene/H_2SO_4 to pH<2,cool to 4°C

✓ Chloride, pH, sulfate, nitrate, nitrite - 50 mL polyethylene/cool to 4°C

Nitrate/nitrite - H2SO4 to pH<2,cool to 4°C

Organic Carbon – 500 mL amber glass bottle/HCl or H_2SO_4 to pH<2,cool to 4°C

Sulfide – 50 mL polyethylene/ZnAcetate + NaOH to pH>9, cool to 4°C

Phenolics - H_2SO_4 to pH<2,cool to 4°C

Specific conductance, TDS, TSS – 100 mL polyethylene/cool to 4°C

ACTION: If no, inform senior chemist. Document justification for change in container/volume (if applicable), qualify positive and non-detect data (J) data if cooler temperature exceeds 10°C. Rejection of data requires professional judgment

1.5.2 Were all samples delivered to the laboratory without breakage?

Yes [✓] No [ ] N/A [ ] Comments:

1.5.3 Does the *Cooler Receipt Form* or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data?

Yes [ ] No [✓] N/A [ ] Comments:

1.6 Sample Results Section: *Was the following information supplied in the laboratory report for each sample?* **Yes [✓]** No [ ] N/A [ ] Comments:

☑ Field ID and Lab ID ☑ Date and time collected ☑ Analyst Initials ☑ Dilution Factor ☑ % moisture or solids ☑ Reporting limits
☑ *Clean-up method* ☑ Analysis method ☑ Preparation method ☑ Date of preparation/extraction/digestion clean-up and analysis, where applicable
☑ Matrix ☑ Target analytes and concentrations ☑ Units (soils must be reported in dry weight)

ACTION: If no, contact lab for submission of missing or incomplete information.

1.7 QA/QC Information: Was the following information provided in the laboratory report for each sample batch? **Yes [✓]** No [ ] N/A [ ] Comments:

☑ Method blank results ☑ LCS recoveries ☑ MS/MSD recoveries and RPDs ☑ Laboratory duplicate results (where applicable)

ACTION: If no, contact lab for submission of missing or incomplete information.

2.0 Holding Times Yes [ ] **No [✓]** N/A [ ] Comments:

Have any technical holding times, determined from date of collection to date of analysis, been exceeded? The holding times are as follows:

✓ 28 days = ammonia, chemical oxygen demand, chloride, organic carbon, oil & grease, specific conductance, total organic carbon and sulfate

Alkalinity = 14 days | Sulfide, TDS, TSS = 7 days | pH = analyze immediately | Nitrate nitrogen as N = 48 hrs

Nitrite nitrogen as N = 48 hrs | Nitrate + Nitrite as N = 28 days

NOTE: List samples that exceed hold time with # of days exceeded on checklist

ACTION: If technical holding times are exceeded qualify results (J). For water samples that are grossly exceeded (>2X hold time) reject (R) all non-detect results. Professional judgment used to qualify soils.

3.0 Laboratory Method **Yes [✓]** No [ ] N/A [ ] Comments:

3.1 Was the correct laboratory method used?

ACTION: If no, contact lab to provide justification for method change compared to the requested method. Contact senior chemist to inform Client of change or to request variance.

3.2 Are the practical quantitation limits the same as those specified by the ☑ QAPP/IRSWP ☐ Lab?

Yes [ ] No [✓] N/A [ ] Comments: The laboratory reporting limit for specific conductivity (umhos/cm) is lower than the specified limit of 3 umhos/cm. No further action required.

Note: *The MADEP QA/QC Guidelines do not yet list PQLs for wet chemistry analyses, therefore all criteria will default to values stipulated in the QAPP*. Where the QAPP does not define criteria, QA/QC requirements default to limits employed by the lab**. Other criteria may also apply.*

Ammonia* ☑ = 0.1 mg/ L	Alkalinity** ☐ = 1 mg/L	Bicarbonate Alkalinity** ☐ = 1 mg/L	Carbonate Alkalinity** ☐ = 1 mg/L
Nitrate Nitrogen as N* ☐ = .05 mg/L	Nitrite Nitrogen as N* ☐ = .01 mg/L	Chloride* ☑ = 1 mg/L	Hardness * ☐ = 2 mg/L
Spec. Cond.** ☒ 3 umhos/cm	Total Organic Carbon** ☐ = 1 mg/L	Oil & Grease* ☐ = 5.5 mg/L	Sulfate (EPA 300.0)* ☑ = 2 mg/L
COD:* Low – 20 mg/L	COD* High - 50 mg/L ☐	TDS* ☐ = 10 mg/L	TSS* ☐ = 5 mg/L
pH* ☐ < 2 to > 12	Phenolic - 0.01 mg/L		

Other parameter(list) _____ PQL = _____ ☐ Source of PQL = _____

Other parameter(list) _____ PQL = _____ ☐ Source of PQL = _____

ACTION: If no, evaluate change with respect to sample matrix, preparation, dilution, moisture, etc. If sample PQL is indeterminate, contact lab for explanation.

3.3 Are the appropriate parameter results present for each sample in the SDG? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, check Request for Analysis to verify if method was ordered and COC to verify that it was sent, and contact lab for resubmission of the missing data

3.4 If *dilutions were required, were dilution factors reported?* **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact the lab for submission.

4.0 <u>Method Blanks</u> **Yes** [✓] No [ ] N/A [ ] Comments:

4.1 Are the Method Blank Summaries present?

ACTION: If no, call the laboratory for submission of missing data.

4.2 Was a method blank analyzed for each analysis batch of wet chemistry field samples of 20 or less? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, document discrepancy in case narrative and contact lab for justification. Consult senior chemist for action needed.

4.3 Is the method blank less than the PQL? (See Section 3.2 for PQLs). **Yes** [✓] No [ ] N/A [ ] Comments:

4.4 Do any method blanks have positive results for wet chemistry parameters? Qualify data according to the following: Yes [ ] **No** [✓] N/A [ ] Comments:

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

ACTION: If any blank has positive results, list all the concentrations detected and flagging level (flagging level = 5 × blank value) on the checklist. List all affected samples and their qualifiers.

5.0 Laboratory Control Standards

5.1 Was a laboratory control standard (LCS) run with each analytical batch of 20 samples or less? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, call laboratory for LCS form submittal. If data is not available, use professional judgment to determine qualification actions for data associated with the batch.

5.2 Is a LCS Summary Form present? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact lab for resubmission of missing data.

5.3 Is any wet chemistry analyte LCS recovery outside the control limits? Yes [ ] **No** [✓] N/A [ ] Comments:

LCS Limits:

Alkalinity** ☐ = 80-120%	Bicarbonate Alkalinity** ☐ = 80-120%	Carbonate Alkalinity** ☐ = 80-120%	Specific Conductivity *☑ = 80-120%
Total Organic Carbon** ☐ = 80-120%	TDS** ☐ = 80-120%	Oil & Grease* ☐ = 80-120%	Ammonia Nitrogen as N* ☑ = 80-120%
COD Low* ☐ = 80-120%	COD High* ☐ = 80-120%	Nitrate Nitrogen as N**☐ = 80-120%	Nitrite Nitrogen as N** ☐= 80-120%
Hardness* ☐ = 80-120%	Chloride* ☑ = 80-120%	Sulfate (EPA 300.0)* ☑ = 80-120%	pH* ☐ = 98-102% TSS* NA

Other parameter(list) _____ %R = _____ ☐ Rec Limits= _____

Other parameter(list) _____ %R = _____ ☐ Rec Limits = _____

(MADEP has not yet defined LCS recovery limits for wet chemistry analyses.)

ACTION: If recovery is above the upper limit, qualify all positive sample results within the batch as (J). If recovery is below the lower limit, qualify all positive and no-detect results within the batch as (J). If LCS recovery is <10%, non-detect results are rejected (R).

6.0 Matrix Spikes

Matrix spikes may be collected at different frequencies based on monthly, quarterly, or task specific schedules. Confirm spike requirements for each set with the senior chemist.

6.1 Were project-specific MS/MSDs analyzed? List project samples that were spiked.

ACTION: If no, contact senior chemist to see if any were specified.

Yes [✓] No [ ] N/A [ ] Comments: The laboratory performed a chloride and sulfate MS/MSD analysis on sample OC-GW-202D and an ammonia MS/MSD analysis on sample OC-PZ-18R.

6.2 Is the MS/MSD Recovery Form present?

ACTION: If no, contact lab for resubmission of missing data.

Yes [✓] No [ ] N/A [ ] Comments:

6.3 Were matrix spikes analyzed at the required frequency of 1 per 20 samples per matrix?

ACTION: If any matrix spike data is missing, call lab for resubmission.

Yes [✓] No [ ] N/A [ ] Comments:

6.4 Are any wet chemistry analyte spike recoveries outside of the QC limits?

Yes [✓] No [ ] N/A [ ] Comments: The chloride MS/MSD percent recoveries (70 and 66) are less than the lower QC limit of 75. Results for chloride were qualified estimated (J) and are considered potentially biased low. The ammonia MS/MSD percent recoveries (1 and -64) are less than the lower QC limit of 75. The unspiked sample concentration is greater than four times the spiking concentrations. No further action required.

NOTE: $\%R = \frac{(SSR-SR)}{SA} \times 100\%$ Where: SSR = Spiked sample result; SR = Sample result; SA = Spike added

MS/MSD Recovery Limits:

Alkalinity* = NA	Bicarbonate Alkalinity* = NA	Carbonate alkalinity* = NA	Ammonia* (LACHAT) ☒ = 75-125%
Chloride*(SM 4500 Cl) ☒ = 75-125%	Specific Conductivity * = NA	Total Organic Carbon* = NA	TDS** = NA
Oil & Grease* = NA	COD Low* ☐ = 75-125%	COD High* ☐ = 75-125%	Nitrate Nitrogen as N** ☐ = 75-125%
Nitrite Nitrogen as N** ☐ = 75-125%	Hardness* ☐ = 75-125%	Sulfate (EPA 300.0)* ☑ = 75-125%	pH* = NA TSS* = NA

Other parameter(list) _____ % R = _____ ☐ Rec Limits = _____

* = Laboratory Limits ** = Olin QAPP Limits *(MADEP has not yet defined LCS recovery limits for wet chemistry analyses.)*

NOTES: 1) If only one of the recoveries for an MS/MSD pair is outside of the control limits, no qualification is necessary. Use professional judgment for the MS/MSD flags.
2) If the MS/MSD was performed by the laboratory on a non-project sample, no qualification is required.

ACTION: MS/MSD flags only apply to the sample spiked. Do not evaluate if sample concentration is > 4X spike. If the recoveries of the MS and MSD exceed the upper control limit, qualify positive results as estimated (J). If the recoveries of the MS and MSD are lower than the lower control limit but > 30%, qualify both positive results and non-detects (J). If the MS/MSD recovery is < 30% and the sample is non-detect, the results are considered unusable and flagged (R).

ACTION: Laboratory control limits apply when spiked sample results fall within the normal calibration range. If dilutions are required due to high sample concentrations, the data is evaluated, but no flags are applied.

6.5 Are any RPDs for MS/MSD recoveries outside of the QA/QC limits?

NOTE: $RPD = \frac{S-D}{(S+D)/2} \times 100\%$ Where S = MS result, D = MSD result

Yes [☑] **No** [ ] N/A [ ] Comments: The ammonia MS/MSD RPD (195) is greater than the QC limit of 20. The unspiked, ammonia sample concentration is greater than four times the spiking concentration no further action required.

MS/MSD RPD Limits:

RPD ≤20

7.0 Laboratory Duplicate

Are the RPDs for the laboratory duplicates <20% unless otherwise specified below?

Yes [☑] No [ ] N/A [ ] Comments:

ACTION: If the RPD is greater than specified limits, qualify all results for that analyte as estimated (J).

pH* ☐ = 3% Specific Conductivity *☑ = 5% TSS** ☐ = 6% TDS** ☐ = 6%

8.0 Sampling Accuracy

The majority of ground water samples are collected directly from a tap, process stream, or with dedicated tubing. Rinse blanks will not be collected.

8.1 Were rinsate blanks collected? Prior to evaluating rinsate blanks, obtain a list of the associated samples from the senior chemist. **Yes** [ ] No [✓] N/A [ ] Comments:

8.2 Do any rinsate blanks have positive results? Yes [ ] **No** [ ] N/A [✓] Comments:

ACTION: Evaluate rinsate results vs. blank results to determine if contaminant may be laboratory-derived. If not lab-related, qualify according to the table below.

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

NOTE: *MADEP does not require the collection of rinsate blanks.*

9.0 Field Duplicates

9.1 Were field duplicate samples collected? Obtain a list of samples and their associated field duplicates. **Yes** [ ] No [✓] N/A [ ] Comments:

9.2 Were field duplicates collected per the required frequency? **Yes** [ ] No [ ] N/A [✓] Comments:

QAPP/IRSWP ☐ *MADEP Option 1(1 per 20)* ☐ *MADEP Option 3 (1 per 10)* ☐

9.3 Was the RPD ≤ 30% for waters ≤ 50% for soils? Calculate the RPD for results and attach to this review. **Yes** [ ] No [ ] N/A [✓] Comments:

ACTION:. Qualify data (J) for both sample results if the RPD exceeded.

Was any of the data qualified? Yes [✓] **No** [ ] N/A [ ] Comments:

If so, apply data qualifiers directly to the DQE copy of laboratory report and **flag pages** for entry in database.

REFERENCES:-

MACTEC, 2007. "Draft Interim Response Steps Work Plan"; Olin Chemical Superfund Site, 51 Eames Street, Wilmington, Massachusetts.; Project No. 6300-06-0010/41.1; July 25, 2007.

Massachusetts Department of Environmental Protection (MADEP), 2004. "The Compendium of Quality Assurance and Quality Control Requirements and Performance Standards for Selected Analytical Methods Used in Support of Response Actions for the Massachusetts Contingency Plan (MCP)"; Bureau of Waste Site Cleanup; 1 Winter Street, Boston, Massachusetts 02108; WSC-CAM; May 2004.

Version 1.2, Nov 2002

OLIN-WILMINGTON
LEVEL I DATA QUALITY EVALUATION
STANDARD OPERATING PROCEDURE AND CHECKLIST
ICP METALS BY METHOD 6010B/200.7

Reviewer/Date 5/13/09
Sr. Review/Date Chris Record 5/27/09
Lab Report # 360-21330-1
Project # 610709.0016.12

1.0 Laboratory Deliverable Requirements

1.1 Laboratory Information: Was all of the following provided in the laboratory report? **Yes** [✓] No [ ] N/A [ ] Comments:
Check items received.

☑ *Name of Laboratory* ☑ *Address* ☑ *Project ID* ☑ *Phone #* ☑ *Sample identification – Field and Laboratory*

Client Information: ☑ *Name* ☑ *Address* ☑ *Client Contact* *(IDs must be cross-referenced)*

ACTION: If no, contact lab for submission of missing or illegible information.

1.2 Laboratory Report Certification Statement **Yes** [✓] No [ ] N/A [ ] Comments:

Does the laboratory report include a completed Analytical Report Certification in the required format?

***ACTION**: If no, contact lab for submission of missing certification or certification with correct format.*

1.3 Laboratory Case Narrative: **Yes** [✓] No [ ] N/A [ ] Comments:

☑ *Narrative serves as an exception report for the project and method QA/QC performance.* ☐ *Narrative includes an explanation of each discrepancy on the*

Certification Statement.

***ACTION**: If no, contact lab for submission of missing or illegible information.*

1.4 Chain of Custody (COC) copy present with all documentation completed **Yes** [✓] No [ ] N/A [ ] Comments:

NOTE: Olin receives and maintains the *original COC.*

ACTION: If no, contact lab for submission of copy of completed *COC.*

1.5 Sample Receipt Information (*Cooler Receipt Form present?*): Yes [✓] No [ ] N/A [ ] Comments:

Were each of the following tasks completed and recorded upon receipt of the sample(s) into the laboratory?

☑ Sample temperature confirmed: must be 1° – 10° C. (If samples were sent by courier and delivered on the same day as collection, temperature requirement does not apply).

☑ Container type noted ☑ sample condition observed ☑ pH verified (where applicable) ☑ Field and lab IDs cross referenced

ACTION: If no, contact lab for submission of missing or incomplete documentation.

1.5.1 Were all samples delivered to the laboratory without breakage? Yes [✓] No [ ] N/A [ ] Comments:

1.5.2 Does the *Cooler Receipt Form* or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data? Yes [ ] **No [✓]** N/A [ ] Comments:

1.6 Sample Results Section: *Was each of the following requirements supplied in the laboratory report for each sample?* Yes [✓] No [ ] N/A [ ] Comments:

☑ Field ID and Lab ID ☑ *Date and time collected* ☑ Analyst Initials ☑ *Dilution Factor* ☐ % moisture or solids ☑ *Reporting limits*
☑ *Clean-up method* ☑ Analysis method ☑ *Preparation method* ☑ *Date of preparation/extraction/digestion clean-up and analysis, where applicable*
☑ Matrix ☑ Target analytes and concentrations ☑ Units (soils must be reported in dry weight)

ACTION: If no, contact lab for submission of missing or incomplete information.

1.7 QA/QC Information: Was each of the following information supplied in the laboratory report for each sample batch? Yes [✓] No [ ] N/A [ ] Comments:

☑ Method blank results ☑ LCS recoveries ☐ MS/MSD recoveries and RPDs ☑ Laboratory duplicate results (where applicable)

ACTION: If no, contact lab for submission of missing or incomplete information.

2.0 Holding Times

Have any technical holding times, determined from date of collection to date of analysis, been exceeded? Holding time for metals is 180 days from sample collection to analysis for both water and soil.

Yes [ ] **No [✓]** N/A [ ] Comments:

NOTE: List samples that exceed hold time with # of days exceeded on checklist

ACTION: If technical holding times are exceeded, qualify all positive results (J) and non-detects (UJ). If grossly exceeded (2X holding time) reject (R) all non-detect results.

3.0 Laboratory Method

3.1 Was the correct laboratory method used?

Yes [✓] No [ ] N/A [ ] Comments:

Water Digestion	3005A or 3010A or 3020A
Soil Digestion	3050B
Metals	6010B or 200.7

ACTION: If no, contact laboratory to provide justification for method change compared to the requested method. Contact senior chemist to inform Client of change and to request variance.

3.2 Are the practical quantitation limits the same as those specified by the ☐ SOW ☑ QAPP ☐ Lab ☐ MADEP

Yes [✓] No [ ] N/A [ ] Comments:

NOTE: *Verify that the reported metals match the target list specified on the COC.*

ACTION: If no, evaluate variation with respect to sample matrix, preparation, dilution, moisture, etc. If sample PQL is indeterminate, contact lab for explanation.

3.3 Are results present for each sample in the SDG? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, check Request for Analysis to verify if method was ordered and COC to verify that it was sent, and contact lab for resubmission of the missing data

3.4 If dilutions were required, were dilution factors reported? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact the lab for submission.

4.0 Method Blanks

4.1 Is the Method Blank Summary present? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, call the laboratory for submission of missing data.

4.2 Frequency of Analysis: Was a method blank analyzed for each digestion batch of < 20 field samples? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact laboratory for justification. Consult senior chemist for action needed. Narrate non-compliance.

4.3 Is the method blank less than the PQLs for all target elements? **Yes** [ ] No [✓] N/A [ ] Comments:

NOTE: *MADEP requires the method blank to be matrix matched and digested with the samples*

4.4 Do any method blanks have positive results for metals? Qualify data according to the following: Yes [✓] **No** [ ] N/A [ ] Comments: Aluminum is reported in the dissolved method blank (6.1 ug/L). An action limit was established at 5x the blank concentration for dissolved aluminum (30.5 ug/L). The result for dissolved aluminum in sample OC-GW-25 is less than the action limit and was qualified non-detect (U) at the reporting limit.

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

ACTION: For any blank with positive results, list all contaminants for each method blank including the concentration detected and the flagging level (flagging level = 5x the blank value) and the associated samples and qualifiers.

5.0 Laboratory Control Standard

5.1 Was a laboratory control standard run with each analytical batch of 20 samples or less? **Yes** [✓] No [ ] N/A [ ] Comments:

NOTE: *A full target, second source LCS is required by MADEP.*
ACTION: Call laboratory for LCS form submittal. If data are not available, use professional judgement to evaluate data accuracy associated with that batch.

5.2 Is a LCS Summary Form present? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact lab for resubmission of missing data.

5.3 Is the recovery of any analyte outside of MADEP control limits? Yes [ ] **No** [✓] N/A [ ] Comments:

Sample Type	***MADEP % Rec***
Water	*80-120*
Soil	within Lab generated limits

ACTION: If recovery is above the upper limit, qualify all positive sample results within the batch as (J). If recovery is below the lower limit, qualify all positive and non-detects results within the batch as (J). If LCS recovery is <30%, positive and non-detect results are rejected (R).

Comments:

6.0 Matrix Spikes

Matrix spikes may be collected at different frequencies based on monthly, quarterly, or task specific schedules. Confirm spike requirements for each set with the senior chemist.

6.1 Were project-specific MS/MSDs collected? List project samples that were spiked.

Yes [ ] No [✓] N/A [ ] Comments:

ACTION: If no, contact senior chemist to see if any were specified.

6.2 Is the Matrix Spike/Matrix Spike Duplicate Recovery Form present?

Yes [ ] No [ ] N/A [✓] Comments:

NOTE: *A full target, second source MS/MSD is required by MADEP.*
ACTION: If any matrix spike data are missing, call lab for resubmission.

6.3 Were matrix spikes analyzed as indicated on the COC and project schedule?

Yes [ ] No [ ] N/A [✓] Comments:

ACTION: If any matrix spike data are missing, call lab for resubmission. If none, no qualification is needed. Narrate non-compliance.

6.4 Are any metal spike recoveries outside of the QC limits?

Yes [ ] **No** [ ] N/A [✓] Comments:

Sample Type	***MADEP*** ***% Rec***	QAPP % Rec	Method
Water	*75-125*	N/A	6010B
Water	*N/A*	70-130	200.7
Soil	*75-125*	75-125	6010B

NOTE: $\%R = \frac{(SSR-SR)}{SA} \times 100\%$ Where: SSR = Spiked sample result, SR = Sample result, SA = Spike added

NOTE: If dilutions are required due to high sample concentrations (> 4X spike), the data are evaluated, but no flags are applied.

NOTE: If only one of the recoveries for an MS/MSD pair is outside of the control limits, no qualification is necessary. Use professional judgment for the MS/MSD flags.

ACTION: MS/MSD flags only apply to the sample spiked. If the recoveries of the MS and MSD exceed the upper control limit, qualify positive results as estimated (J). If the recoveries of the MS and MSD are lower than the lower control limit, qualify positive results and non-detects (J).

6.5 Are any RPDs for MS/MSD recoveries outside of the QC limits? Yes [ ] **No** [ ] N/A [✓] Comments:

NOTE: $RPD = \frac{S-D}{(S+D)/2} \times 100\%$ Where: S = MS sample result
D = MSD sample result

NOTE: If dilutions are required due to high sample concentrations, the data are evaluated, but no flags are applied.

ACTION: If the RPD exceeds the control limit, qualify positive results and non-detects (J).

7.0 Laboratory Duplicate

7.1 Was a laboratory duplicate sample analyzed? If so, is the Laboratory Duplicate Sample Form present? **Yes** [ ] No [✓] N/A [ ] Comments:

NOTE: *MADEP refers to this sample as a "matrix duplicate".*

ACTION: If not analyzed, qualification is not needed. If data is missing, contact laboratory for resubmission of report. Narrate non-compliance.

7.2 Is the RPD between the result for the laboratory duplicate sample and the result for the parent sample outside of the QA/QC limits? Yes [ ] **No** [ ] N/A [✓] Comments:

MADEP Laboratory Duplicate Sample RPD Criteria:	QAPP RPD
For aqueous results > 5× RL, RPD must be ± 20%	20
For aqueous results < 5× RL, RPD must be ≤ RL	20
For soil/sediment results > 5× RL, RPD must be ± 35%	20
For soil/sediment results < 5× RL, RPD must be ≤ 2× RL	20

ACTION: If the RPD exceeds the limits, qualify both positive results and non-detects as estimated and flag them J. Narrate non-compliance

8.0 Sampling Accuracy

The majority of ground water samples are collected directly from a tap, process stream, or with dedicated tubing. Rinse blanks will not be collected.

8.1 Were rinsate blanks collected? Prior to evaluating rinsate blanks, obtain a list of the associated samples from the senior chemist. **Yes [ ]** No [✓] N/A [ ] Comments:

8.2 Do any rinsate blanks have positive results? Yes [ ] **No [ ]** N/A [✓] Comments:

NOTE: *MADEP does not require the collection of rinsate blanks.*

ACTION: Evaluate rinsate results against blank results to determine if contaminant may be laboratory-derived. If results are not lab-related, qualify according to below.

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

9.0 Field Duplicates

9.1 Were field duplicate samples collected? Obtain a list of samples and their associated field duplicates. Yes [ ] **No [✓]** N/A [ ] Comments:

9.2 Were field duplicates collected per the required frequency? **Yes** [ ] No [ ] N/A [✓] Comments:

SOW ☐ QAPP *(1 per 10)* ☐ *MADEP Option 1 (1 per 20)* ☐ *MADEP Option 3 (1 per 10)* ☐

9.3 Was the RPD ≤ 50% for soils or waters? Calculate the RPD for all results and attach to this review. **Yes** [ ] No [ ] N/A [✓] Comments:

ACTION: RPD must be ≤50% for soil and water. Qualify data (J) for both sample results if the RPD exceeds 50%.

10.0 Special QA/QC

10.1 Were both total and dissolved metals analysis performed? If so, the dissolved metal concentration should not exceed that of the total metal. Yes [ ] **No** [✓] N/A [ ] Comments:

Dissolved metals results are less than, or within 10% greater than the total metals results.

ACTION: If results for both total and dissolved are ≥ 5x the PQL **and** the dissolved concentration is 10% higher than the total, flag both results as estimated (J). If total and dissolved concentrations are less than 5x the PQL **and** the **difference** exceeds 2x the PQL, flag both results as estimated (J)

10.0 Application of Validation Qualifiers

Was any of the data qualified?

Yes [✓] **No** [ ] N/A [ ] Comments:

If so, apply data qualifiers directly to the DQE copy of laboratory report and **flag pages** for entry in database.

REFERENCES

LAW, 1999, "Final Quality Assurance Project Plan, Olin Wilmington Property, 51 Eames Street, Wilmington, MA", LAW Engineering and Environmental Services, Kennesaw, GA 30144. August 1999

U.S. Environmental Protection Agency (USEPA), 1989. "Region 1 Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses"; Hazardous Site Evaluation Division; February 1989.

MADEP, 2001. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Massachusetts Quality Assurance and Quality Control (QA/QC) Requirements." BWSC-CAM, Interim Final Draft, Revision No. 2, 5 October 2001.

MADEP, 2001. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Quality Assurance and Quality Control Guidelines for Sampling, Data Evaluation and Reporting Activities," BWSC-CAM, Section VII, Public Comment Draft, Revision No. 0, 21 December 2001.

Version 1.2, Nov 2002

OLIN-WILMINGTON
LEVEL I DATA QUALITY EVALUATION
STANDARD OPERATING PROCEDURE AND CHECKLIST
ICP METALS BY METHOD 6010B/200.7

Reviewer/Date [signature] 5/18/09
Sr. Review/Date Chris Ricard 5/27/09
Lab Report # 360-21354-1
Project # 610709006,12

1.0 Laboratory Deliverable Requirements

1.1 Laboratory Information: Was all of the following provided in the laboratory report? **Yes** [✓] No [ ] N/A [ ] Comments:
Check items received.

☑ *Name of Laboratory* ☑ *Address* ☑ *Project ID* ☑ *Phone #* ☑ *Sample identification – Field and Laboratory*

Client Information: ☑ *Name* ☑ *Address* ☑ *Client Contact* *(IDs must be cross-referenced)*

ACTION: If no, contact lab for submission of missing or illegible information.

1.2 Laboratory Report Certification Statement ***Yes*** [✓] *No* [ ] *N/A* [ ] *Comments:*

Does the laboratory report include a completed Analytical Report Certification in the required format?

***ACTION**: If no, contact lab for submission of missing certification or certification with correct format.*

1.3 Laboratory Case Narrative: ***Yes*** [✓] *No* [ ] *N/A* [ ] *Comments:*

☑ *Narrative serves as an exception report for the project and method QA/QC performance.* ☐ *Narrative includes an explanation of each discrepancy on the*

Certification Statement.

***ACTION**: If no, contact lab for submission of missing or illegible information.*

1.4 Chain of Custody (COC) copy present with all documentation completed **Yes** [✓] No [ ] N/A [ ] Comments:

NOTE: Olin receives and maintains the *original COC.*

ACTION: If no, contact lab for submission of copy of completed *COC.*

1.5 Sample Receipt Information (*Cooler Receipt Form present?*): Yes [✓] No [ ] N/A [ ] Comments:

Were each of the following tasks completed and recorded upon receipt of the sample(s) into the laboratory?

☑ Sample temperature confirmed: must be 1° – 10° C. (If samples were sent by courier and delivered on the same day as collection, temperature requirement does not apply).

☑ Container type noted ☑ sample condition observed ☑ pH verified (where applicable) ☑ Field and lab IDs cross referenced

ACTION: If no, contact lab for submission of missing or incomplete documentation.

1.5.1 Were all samples delivered to the laboratory without breakage? Yes [✓] No [ ] N/A [ ] Comments:

1.5.2 Does the *Cooler Receipt Form* or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data? Yes [ ] **No [✓]** N/A [ ] Comments:

1.6 Sample Results Section: *Was each of the following requirements supplied in the laboratory report for each sample?* Yes [✓] No [ ] N/A [ ] Comments:

☑ Field ID and Lab ID ☑ *Date and time collected* ☑ Analyst Initials ☑ *Dilution Factor* ☐ % moisture or solids ☐ *Reporting limits*
☑ *Clean-up method* ☐ Analysis method ☐ *Preparation method* ☑ *Date of preparation/extraction/digestion clean-up and analysis, where applicable*
☑ Matrix ☑ Target analytes and concentrations ☑ Units (soils must be reported in dry weight)

ACTION: If no, contact lab for submission of missing or incomplete information.

1.7 QA/QC Information: Was each of the following information supplied in the laboratory report for each sample batch? Yes [✓] No [ ] N/A [ ] Comments:

☑ Method blank results ☑ LCS recoveries ☑ MS/MSD recoveries and RPDs ☑ Laboratory duplicate results (where applicable)

ACTION: If no, contact lab for submission of missing or incomplete information.

2.0 Holding Times

Have any technical holding times, determined from date of collection to date of analysis, been exceeded? Holding time for metals is 180 days from sample collection to analysis for both water and soil.

Yes [ ] **No [✓]** N/A [ ] Comments:

NOTE: List samples that exceed hold time with # of days exceeded on checklist

ACTION: If technical holding times are exceeded, qualify all positive results (J) and non-detects (UJ). If grossly exceeded (2X holding time) reject (R) all non-detect results.

3.0 Laboratory Method

3.1 Was the correct laboratory method used?

Yes [✓] No [ ] N/A [ ] Comments:

Water Digestion	3005A or 3010A or 3020A
Soil Digestion	3050B
Metals	6010B or 200.7

ACTION: If no, contact laboratory to provide justification for method change compared to the requested method. Contact senior chemist to inform Client of change and to request variance.

3.2 Are the practical quantitation limits the same as those specified by the ☐ SOW ☑ QAPP ☐ Lab ☐ MADEP

Yes [✓] No [ ] N/A [ ] Comments:

NOTE: *Verify that the reported metals match the target list specified on the COC.*

ACTION: If no, evaluate variation with respect to sample matrix, preparation, dilution, moisture, etc. If sample PQL is indeterminate, contact lab for explanation.

3.3 Are results present for each sample in the SDG? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, check Request for Analysis to verify if method was ordered and COC to verify that it was sent, and contact lab for resubmission of the missing data

3.4 If dilutions were required, were dilution factors reported? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact the lab for submission.

4.0 Method Blanks

4.1 Is the Method Blank Summary present? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, call the laboratory for submission of missing data.

4.2 Frequency of Analysis: Was a method blank analyzed for each digestion batch of < 20 field samples? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact laboratory for justification. Consult senior chemist for action needed. Narrate non-compliance.

4.3 Is the method blank less than the PQLs for all target elements? **Yes** [ ] No [✓] N/A [ ] Comments:

NOTE: *MADEP requires the method blank to be matrix matched and digested with the samples*

4.4 Do any method blanks have positive results for metals? Qualify data according to the following: Yes [✓] **No** [ ] N/A [ ] Comments: Dissolved chromium (0.24 µg/L) is reported in the method blank. An action limit was established at 5x the chromium conc. (1.2 µg/L). All dissolved chromium results are greater than the action limit, no further action

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

ACTION: For any blank with positive results, list all contaminants for each method blank including the concentration detected and the flagging level (flagging level = 5x the blank value) and the associated samples and qualifiers.

5.0 Laboratory Control Standard

5.1 Was a laboratory control standard run with each analytical batch of 20 samples or less?

Yes [✓] No [ ] N/A [ ] Comments:

NOTE: *A full target, second source LCS is required by MADEP.*
ACTION: Call laboratory for LCS form submittal. If data are not available, use professional judgement to evaluate data accuracy associated with that batch.

5.2 Is a LCS Summary Form present?

Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact lab for resubmission of missing data.

5.3 Is the recovery of any analyte outside of MADEP control limits?

Yes [ ] **No** [✓] N/A [ ] Comments:

Sample Type	***MADEP % Rec***
Water	*80-120*
Soil	within Lab generated limits

ACTION: If recovery is above the upper limit, qualify all positive sample results within the batch as (J). If recovery is below the lower limit, qualify all positive and non-detects results within the batch as (J). If LCS recovery is <30%, positive and non-detect results are rejected (R).

Comments:

6.0 Matrix Spikes

Matrix spikes may be collected at different frequencies based on monthly, quarterly, or task specific schedules. Confirm spike requirements for each set with the senior chemist.

6.1 Were project-specific MS/MSDs ~~collected~~ analyzed? List project samples that were spiked. ✓ 5/18/09

Yes [✓] No [ ] N/A [ ] Comments: The lab performed an aluminum and chromium MS analysis on sample OC-GW-2025. ✓ 5/18/09

ACTION: If no, contact senior chemist to see if any were specified.

6.2 Is the Matrix Spike/Matrix Spike Duplicate Recovery Form present?

Yes [✓] No [ ] N/A [ ] Comments:

NOTE: *A full target, second source MS/MSD is required by MADEP.*
ACTION: If any matrix spike data are missing, call lab for resubmission.

6.3 Were matrix spikes analyzed as indicated on the COC and project schedule?

Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If any matrix spike data are missing, call lab for resubmission. If none, no qualification is needed. Narrate non-compliance.

6.4 Are any metal spike recoveries outside of the QC limits?

Yes [ ] No [✓] N/A [ ] Comments:

Sample Type	***MADEP % Rec***	QAPP % Rec	Method
Water	*75-125*	N/A	6010B
Water	*N/A*	70-130	200.7
Soil	*75-125*	75-125	6010B

NOTE: $\%R = \frac{(SSR-SR)}{SA} \times 100\%$ Where: SSR = Spiked sample result, SR = Sample result, SA = Spike added

NOTE: If dilutions are required due to high sample concentrations (> 4X spike), the data are evaluated, but no flags are applied.

NOTE: If only one of the recoveries for an MS/MSD pair is outside of the control limits, no qualification is necessary. Use professional judgment for the MS/MSD flags.

ACTION: MS/MSD flags only apply to the sample spiked. If the recoveries of the MS and MSD exceed the upper control limit, qualify positive results as estimated (J). If the recoveries of the MS and MSD are lower than the lower control limit, qualify positive results and non-detects (J).

6.5 Are any RPDs for MS/MSD recoveries outside of the QC limits? Yes [ ] **No** [ ] N/A [✓] Comments: An MSD analysis was not performed.

NOTE: RPD = $\frac{S-D}{(S+D)/2}$ x 100% Where: S = MS sample result, D = MSD sample result

NOTE: If dilutions are required due to high sample concentrations, the data are evaluated, but no flags are applied.

ACTION: If the RPD exceeds the control limit, qualify positive results and non-detects (J).

7.0 Laboratory Duplicate

7.1 Was a laboratory duplicate sample analyzed? If so, is the Laboratory Duplicate Sample Form present? **Yes** [✓] No [ ] N/A [ ] Comments:

NOTE: *MADEP refers to this sample as a "matrix duplicate".*

ACTION: If not analyzed, qualification is not needed. If data is missing, contact laboratory for resubmission of report. Narrate non-compliance.

7.2 Is the RPD between the result for the laboratory duplicate sample and the result for the parent sample outside of the QA/QC limits? Yes [ ] **No** [✓] N/A [ ] Comments:

MADEP Laboratory Duplicate Sample RPD Criteria:	QAPP RPD
For aqueous results > 5× RL, RPD must be ± 20%	20
For aqueous results < 5× RL, RPD must be ≤ RL	20
For soil/sediment results > 5× RL, RPD must be ± 35%	20
For soil/sediment results < 5× RL, RPD must be ≤ 2× RL	20

ACTION: If the RPD exceeds the limits, qualify both positive results and non-detects as estimated and flag them J. Narrate non-compliance

8.0 Sampling Accuracy

The majority of ground water samples are collected directly from a tap, process stream, or with dedicated tubing. Rinse blanks will not be collected.

8.1 Were rinsate blanks collected? Prior to evaluating rinsate blanks, obtain a list of the associated samples from the senior chemist. **Yes [ ]** No [✓] N/A [ ] Comments:

8.2 Do any rinsate blanks have positive results? Yes [ ] **No [ ]** N/A [✓] Comments:

***NOTE:** MADEP does not require the collection of rinsate blanks.*

ACTION: Evaluate rinsate results against blank results to determine if contaminant may be laboratory-derived. If results are not lab-related, qualify according to below.

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

9.0 Field Duplicates

9.1 Were field duplicate samples collected? Obtain a list of samples and their associated field duplicates. Yes [ ] **No [✓]** N/A [ ] Comments:

9.2 Were field duplicates collected per the required frequency? **Yes** [ ] No [ ] N/A [✓] Comments:

SOW ☐ QAPP *(1 per 10)* ☐ *MADEP Option 1 (1 per 20)* ☐ *MADEP Option 3 (1 per 10)* ☐

9.3 Was the RPD ≤ 50% for soils or waters? Calculate the RPD for all results and attach to this review. **Yes** [ ] No [ ] N/A [✓] Comments:

ACTION: RPD must be ≤50% for soil and water. Qualify data (J) for both sample results if the RPD exceeds 50%.

10.0 Special QA/QC

10.1 Were both total and dissolved metals analysis performed? If so, the dissolved metal concentration should not exceed that of the total metal. Yes [ ] **No** [✓] N/A [ ] Comments:

ACTION: If results for both total and dissolved are ≥ 5x the PQL **and** the dissolved concentration is 10% higher than the total, flag both results as estimated (J). If total and dissolved concentrations are less than 5x the PQL **and** the **difference** exceeds 2x the PQL, flag both results as estimated (J)

10.0 Application of Validation Qualifiers

Was any of the data qualified? Yes [ ] No [✓] N/A [ ] Comments:

If so, apply data qualifiers directly to the DQE copy of laboratory report and **flag pages** for entry in database.

REFERENCES

LAW, 1999, "Final Quality Assurance Project Plan, Olin Wilmington Property, 51 Eames Street, Wilmington, MA", LAW Engineering and Environmental Services, Kennesaw, GA 30144. August 1999

U.S. Environmental Protection Agency (USEPA), 1989. "Region 1 Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses"; Hazardous Site Evaluation Division; February 1989.

MADEP, 2001. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Massachusetts Quality Assurance and Quality Control (QA/QC) Requirements." BWSC-CAM, Interim Final Draft, Revision No. 2, 5 October 2001.

MADEP, 2001. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Quality Assurance and Quality Control Guidelines for Sampling, Data Evaluation and Reporting Activities," BWSC-CAM, Section VII, Public Comment Draft, Revision No. 0, 21 December 2001.

FILE COPY

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

Job Number: 360-21330-1

Job Description: Slurry Wall/Cap

For:
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Attention: Mr. Steven Morrow

CHECKED FOR COMPLETENESS
OF PARAMETERS ORDERED BY:

Approved for release.
Joe Chimi
Report Production Representative
3/6/09 8:49 AM

Designee for
Becky C Mason
Project Manager II
becky.mason@testamericainc.com
03/06/2009

The test results in this report meet all NELAP requirements for accredited parameters. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced except in full, and with written approval from the laboratory.
TestAmerica Westfield Certifications and Approvals: MADEP MA014, RIDOH57, CTDPH 0494, VT DECWSD, NH DES 2539, NELAP FL E87912 TOX, NELAP NJ MA008 TOX, NELAP NY 10843, NY DOH 10843.

Field sampling is performed under SOPs WE-FLD-001 and WE-FLD-002

TestAmerica Laboratories, Inc.
TestAmerica Westfield Westfield Executive Park, 53 Southampton Road, Westfield, MA 01085
Tel (413) 572-4000 Fax (413) 572-3707 www.testamericainc.com

ACCREDITED IN ACCORDANCE WITH nelac

Table of Contents

Cover Title Page 1
Report Narrative 3
Method Summary 7
Method / Analyst Summary 8
Sample Summary 9
Sample Results 10
Sample Datasheets 11
Data Qualifiers 27
QC Results 28
Qc Association Summary 29
Qc Reports 32
Sample Receipt Checklist 38
Client Chain of Custody 39

MADEP MCP Analytical Method Report Certification Form

Laboratory Name:	**TestAmerica Westfield**	Project #:	**360-21330-1**
Project Location:	**Slurry Wall/Cap**	MADEP RTN[1]:	

This form provides certifications for the following data set:[list Laboratory Sample ID Number(s)]
360-21330-(1-8)

Sample Matrices: **Groundwater** Soil/Sediment Drinking Water **Other:**

MCP SW-846 Methods Used	8260B( )	8151A ( )	8330 ( )	6010B (**x**)	7470A/1A ( )	Other ( )
	8270C( )	8081A ( )	VPH ( )	6020 ( )	9014M[2]/9012 ( )	
As specified in MADEP Compendium of Analytical Methods. (check all that apply)	8082 ( )	8021B ( )	EPH ( )	7000 S[3]( )	7196A ( )	

1 List Release Tracking Number (RTN), if known
2 M - SW-846 Method 9014 or MADEP Physiologically Available Cyanide (PAC) Method
3 S - SW-846 Methods 7000 Series List individual method and analyte.

An affirmative response to questions A, B, C and D is required for "Presumptive Certainty" status

A	Were all samples received by the laboratory in a condition consistent with that described on the Chain-of-Custody documentation for the data set?	Yes √		No[1]
B	Were all QA/QC procedures required for the specified analytical method(s) included in this report followed, including the requirement to note and discuss in a narrative QC data that did not meet appropriate performance standards or guidelines?	Yes √		No[1]
C	Does the analytical data included in this report meet all the requirements for "Presumptive Certainty", as described in Section 2.0 (a), (b), (c) and (d) of the MADEP document CAM VII A, " Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	Yes √	N/A	No[1]
D	**VPH and EPH methods only:** Was the VPH or EPH Method conducted without significant modifications (see Section 11.3 of respective Methods)?	Yes	N/A √	No[1]

A response to questions E and F below is required for "Presumptive Certainty" status

E	Were all QC performance standards and recommendations for the specified methods achieved?	Yes √		No[1]
F	Were results for all analyte-list compounds/elements for the specified method(s) reported?	Yes	N/A	No[1] √

[1] All Negative responses must be addressed in an attached Environmental Laboratory case narrative.

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.

Signature: Christine Lucinda Reynolds **Position:** Quality Assurance Manager

Printed Name: Christine Reynolds **Date:** 3/6/09 8:38

The certification form has been electronically signed and approved. CAM VII A, Rev 3.2 April-04

MADEP MCP Analytical Method Report Certification Form

Laboratory Name:	**TestAmerica Westfield**	Project #:	**360-21330-1**
Project Location:	**Slurry Wall/Cap**	MADEP RTN[1]:	

This form provides certifications for the following data set:[list Laboratory Sample ID Number(s)]
360-21330-(1-8)

Sample Matrices: **Groundwater** Soil/Sediment Drinking Water **Other:**

MCP SW-846 Methods Used	8260B( )	8151A ( )	8330 ( )	6010B ( )	7470A/1A ( )	Other (**x**)
	8270C( )	8081A ( )	VPH ( )	6020 ( )	9014M[2]/9012 ( )	
As specified in MADEP Compendium of Analytical Methods. (check all that apply)	8082 ( )	8021B ( )	EPH ( )	7000 S[3]( )	7196A ( )	

1 List Release Tracking Number (RTN), if known
2 M - SW-846 Method 9014 or MADEP Physiologically Available Cyanide (PAC) Method
3 S - SW-846 Methods 7000 Series List individual method and analyte.

An affirmative response to questions A, B, C and D is required for "Presumptive Certainty" status

A	Were all samples received by the laboratory in a condition consistent with that described on the Chain-of-Custody documentation for the data set?	Yes √		No[1]
B	Were all QA/QC procedures required for the specified analytical method(s) included in this report followed, including the requirement to note and discuss in a narrative QC data that did not meet appropriate performance standards or guidelines?	Yes √		No[1]
C	Does the analytical data included in this report meet all the requirements for "Presumptive Certainty", as described in Section 2.0 (a), (b), (c) and (d) of the MADEP document CAM VII A, " Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	Yes	N/A √	No[1]
D	**VPH and EPH methods only:** Was the VPH or EPH Method conducted without significant modifications (see Section 11.3 of respective Methods)?	Yes	N/A √	No[1]

A response to questions E and F below is required for "Presumptive Certainty" status

E	Were all QC performance standards and recommendations for the specified methods achieved?	Yes √		No[1]
F	Were results for all analyte-list compounds/elements for the specified method(s) reported?	Yes	N/A √	No[1]

[1] All Negative responses must be addressed in an attached Environmental Laboratory case narrative.

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.

Signature: Christine Lucinta Reynolds **Position:** Quality Assurance Manager

Printed Name: Christine Reynolds **Date:** 3/6/09 8:38

The certification form has been electronically signed and approved. CAM VII A, Rev 3.2 April-04

CASE NARRATIVE

Client: Olin Corporation

Project: Slurry Wall/Cap

Report Number: 360-21330-1

This case narrative is in the form of an exception report, where only the anomalies related to this report, method specific performance and/or QA/QC issues are discussed. If there are no issues to report, this narrative will include a statement that documents that there are no relevant data issues as stipulated in the MCP reporting requirements.

In order to facilitate report review, a separate MCP Analytical Method Report Certification Form is included for each method requested.

It should be noted that samples with elevated Reporting Limits (RLs) as a result of a dilution may not be able to satisfy "MCP program" reporting limits in some cases if the "adjusted" RL is greater than the applicable MCP standards or criterion to which the concentration is being compared. Such increases in the RLs are an unavoidable but acceptable consequence of sample dilution that enables quantification of target analytes which exceed the calibration range.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

The samples were received on 02/24/2009; the samples arrived in good condition, properly preserved and on ice. The temperatures of the coolers at receipt were 4.0 and 5.0ºC.

Note: All samples which require thermal preservation are considered acceptable if the arrival temperature is within 2C of the required temperature or method specified range. For samples with a specified temperature of 4C, samples with a temperature ranging from just above freezing temperature of water to 6C shall be acceptable. Samples that are hand delivered immediately following collection may not meet these criteria, however they will be deemed acceptable according to NELAC and MADEP standards, if there is evidence that the chilling process has begun, such as arrival on ice, etc.

MCP regulatory standard criteria were not specified for this report. Therefore, method reporting limits (RLs) were not assessed against any MCP standards as it may pertain to Question "E" on the Presumptive Certainty Certification Form (MADEP reference: WSC-CAM-AN-093008 - WSC-CAM Analytical Notes).

DISSOLVED METALS

Samples 360-21330-1 through 360-21330-8 were analyzed for dissolved metals in accordance with EPA SW846 Method 6010B. The samples were analyzed on 02/25/2009.

All QA/QC procedures required to meet Presumptive Certainty for the specified analytical method were performed as per section B of the MADEP MCP analytical method report Certification form.

All QC performance standards and recommendations, which may affect Data Usability for this specific method, were achieved.

General method information:
At the request of the client, an abbreviated/modified MCP analyte list was reported for this job.

TOTAL METALS

Samples 360-21330-1 through 360-21330-7 were analyzed for total metals in accordance with EPA SW846 Method 6010B. The samples were prepared and analyzed on 02/25/2009.

All QA/QC procedures required to meet Presumptive Certainty for the specified analytical method were performed as per section B of the MADEP MCP analytical method report Certification form.

All QC performance standards and recommendations, which may affect Data Usability for this specific method, were achieved.

General method information:
Aluminum was detected in method blank MB 360-41607/1-A at a level that was above the method detection limit but below the reporting limit. The value should be considered an estimate, and has been flagged "J". If the associated sample reported a result above the MDL and/or RL, the result has been "B" flagged. Refer to the QC report for details.

At the request of the client, an abbreviated/modified MCP analyte list was reported for this job.

The following reported methods not listed in the MADEP Massachusetts Contingency Plan (MCP) Compendium of Analytical Methods (CAM), pursuant to the provisions of 310 CMR 40.0017(2).

ANIONS

Samples 360-21330-1 through 360-21330-8 were analyzed for anions in accordance with EPA Method 300.0. The samples were analyzed on 02/25/2009.

All QC performance standards and recommendations for this specific method were achieved.

Samples 360-21330-1 through 360-21330-8(10X) required dilution prior to analysis. The reporting limits have been adjusted accordingly. Dilutions were due to high target concentration. For some samples, Nitrite is reported at a 10X dilution due to the high Chloride concentration.

AMMONIA

Samples 360-21330-1 through 360-21330-8 were analyzed for ammonia in accordance with LACHAT 107-06-1B. The samples were prepared on 03/03/2009 and analyzed on 03/04/2009.

All QC performance standards and recommendations for this specific method were achieved.

Samples 360-21330-2 through 360-21330-5(5X) and 360-21330-8(10X) required dilution prior to analysis. The reporting limits have been adjusted accordingly. Dilutions were due to high concentration.

SPECIFIC CONDUCTANCE (CONDUCTIVITY)

Samples 360-21330-1 through 360-21330-8 were analyzed for Specific Conductance (Conductivity) in accordance with SM 2510B. The samples were analyzed on 02/25/2009.

All QC performance standards and recommendations for this specific method were achieved.

This case narrative is available in Word format upon request.

METHOD SUMMARY

Client: Olin Corporation Job Number: 360-21330-1

Description	Lab Location	Method	Preparation Method
Matrix: Water			
Dissolved Metals	TAL WFD	SW846 6010B	
Total Metals	TAL WFD	SW846 6010B	
Sample Filtration, Field	TAL WFD		FIELD_FLTRD
Preparation, Total Metals	TAL WFD		SW846 3010A
Chloride & Sulfate	TAL WFD	40CFR136A 300.0	
Nitrate & Nitrite	TAL WFD	40CFR136A 300.0	
Nitrogen Ammonia	TAL WFD	LACHAT L107-06-1B	
Distillation, Ammonia	TAL WFD		Distill/Ammonia
Conductivity, Specific Conductance	TAL WFD	SM SM 2510B	

Lab References:

TAL WFD = TestAmerica Westfield

Method References:

40CFR136A = "Methods for Organic Chemical Analysis of Municipal Industrial Wastewater", 40CFR, Part 136, Appendix A, October 26, 1984 and subsequent revisions.

LACHAT = LACHAT

SM = "Standard Methods For The Examination Of Water And Wastewater",

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

METHOD / ANALYST SUMMARY

Client: Olin Corporation

Job Number: 360-21330-1

Method	Analyst	Analyst ID
SW846 6010B	Nasiatka, Ellen M	EMN
40CFR136A 300.0	Lalashius, Andrew L	ALL
LACHAT L107-06-1B	Lalashius, Andrew L	ALL
SM SM 2510B	Emerich, Rich W	RWE

SAMPLE SUMMARY

Client: Olin Corporation Job Number: 360-21330-1

Lab Sample ID	Client Sample ID	Client Matrix	Date/Time Sampled	Date/Time Received
360-21330-1	OC-ISCO-3	Water	02/24/2009 0835	02/24/2009 1620
360-21330-2	OC-ISCO-2	Water	02/24/2009 0900	02/24/2009 1620
360-21330-3	OC-PZ-16RRSW	Water	02/24/2009 0905	02/24/2009 1620
360-21330-4	OC-PZ-17RRSW	Water	02/24/2009 0930	02/24/2009 1620
360-21330-5	OC-SD-17	Water	02/24/2009 0940	02/24/2009 1620
360-21330-6	OC-PZ-18RSW	Water	02/24/2009 0955	02/24/2009 1620
360-21330-7	OC-ISCO-1	Water	02/24/2009 1005	02/24/2009 1620
360-21330-8	OC-GW-25	Ground Water	02/24/2009 1330	02/24/2009 1620

SAMPLE RESULTS

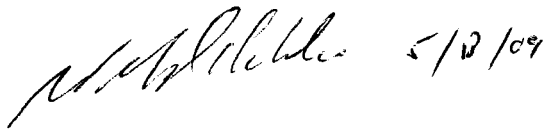
Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-21330-1

Client Sample ID: OC-ISCO-3
Lab Sample ID: 360-21330-1

Date Sampled: 02/24/2009 0835
Date Received: 02/24/2009 1620
Client Matrix: Water

Analyte	Result/Qualifier		Unit	MDL	RL	Dilution
Method: Dissolved-6010B			Date Analyzed:		02/25/2009 1100	
Aluminum	39	J	ug/L	2.2	100	1.0
Chromium	0.38	J	ug/L	0.17	5.0	1.0
Sodium	100000		ug/L	65	2000	1.0
Method: 6010B			Date Analyzed:		02/25/2009 1349	
Prep Method: 3010A			Date Prepared:		02/25/2009 0747	
Aluminum	470	~~B~~	ug/L	2.2	100	1.0
Chromium	4.3	J	ug/L	0.17	5.0	1.0
Sodium	91000		ug/L	65	2000	1.0



Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-21330-1

Client Sample ID: OC-ISCO-3
Lab Sample ID: 360-21330-1

Date Sampled: 02/24/2009 0835
Date Received: 02/24/2009 1620
Client Matrix: Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 300.0		Date Analyzed:	02/25/2009 1740		
Sulfate	53	mg/L	2.0	2.0	1.0
Nitrate as N	1.1	mg/L	0.050	0.050	1.0
Method: 300.0		Date Analyzed:	02/25/2009 1755		
Chloride	200 J	mg/L	10	10	10
Nitrite as N	ND	mg/L	0.10	0.10	10
Method: L107-06-1B		Date Analyzed:	03/04/2009 1719		
Prep Method: Distill/Ammonia		Date Prepared:	03/03/2009 1320		
Ammonia	3.3	mg/L	0.10	0.10	1.0
Method: SM 2510B		Date Analyzed:	02/25/2009 1028		
Specific Conductance	820	umhos/cm	1.0	1.0	1.0

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Job Number: 360-21330-1

Client Sample ID: OC-ISCO-2
Lab Sample ID: 360-21330-2

Date Sampled: 02/24/2009 0900
Date Received: 02/24/2009 1620
Client Matrix: Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B		Date Analyzed:	02/25/2009 1102		
Aluminum	800	ug/L	2.2	100	1.0
Chromium	160	ug/L	0.17	5.0	1.0
Sodium	100000	ug/L	65	2000	1.0
Method: 6010B		Date Analyzed:	02/25/2009 1353		
Prep Method: 3010A		Date Prepared:	02/25/2009 0747		
Aluminum	1300 B	ug/L	2.2	100	1.0
Chromium	250	ug/L	0.17	5.0	1.0
Sodium	91000	ug/L	65	2000	1.0

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Job Number: 360-21330-1

Client Sample ID: OC-ISCO-2
Lab Sample ID: 360-21330-2

Date Sampled: 02/24/2009 0900
Date Received: 02/24/2009 1620
Client Matrix: Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 300.0		Date Analyzed:	02/25/2009 1810		
Nitrate as N	0.81	mg/L	0.050	0.050	1.0
Nitrite as N	ND	mg/L	0.010	0.010	1.0
Method: 300.0		Date Analyzed:	02/25/2009 1825		
Sulfate	210	mg/L	20	20	10
Chloride	120 J	mg/L	10	10	10
Method: L107-06-1B		Date Analyzed:	03/04/2009 1733		
Prep Method: Distill/Ammonia		Date Prepared:	03/03/2009 1320		
Ammonia	42	mg/L	0.50	0.50	5.0
Method: SM 2510B		Date Analyzed:	02/25/2009 1029		
Specific Conductance	900	umhos/cm	1.0	1.0	1.0

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Job Number: 360-21330-1

Client Sample ID: OC-PZ-16RRSW
Lab Sample ID: 360-21330-3

Date Sampled: 02/24/2009 0905
Date Received: 02/24/2009 1620
Client Matrix: Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B		Date Analyzed:	02/25/2009 1105		
Aluminum	1300	ug/L	2.2	100	1.0
Chromium	340	ug/L	0.17	5.0	1.0
Sodium	120000	ug/L	65	2000	1.0
Method: 6010B		Date Analyzed:	02/25/2009 1356		
Prep Method: 3010A		Date Prepared:	02/25/2009 0747		
Aluminum	3000 ~~B~~	ug/L	2.2	100	1.0
Chromium	740	ug/L	0.17	5.0	1.0
Sodium	110000	ug/L	65	2000	1.0

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Job Number: 360-21330-1

Client Sample ID: OC-PZ-16RRSW
Lab Sample ID: 360-21330-3

Date Sampled: 02/24/2009 0905
Date Received: 02/24/2009 1620
Client Matrix: Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 300.0		Date Analyzed:	02/25/2009 1841		
Nitrate as N	0.49	mg/L	0.050	0.050	1.0
Method: 300.0		Date Analyzed:	02/25/2009 1856		
Sulfate	240	mg/L	20	20	10
Chloride	150 J	mg/L	10	10	10
Nitrite as N	ND	mg/L	0.10	0.10	10
Method: L107-06-1B		Date Analyzed:	03/04/2009 1734		
Prep Method: Distill/Ammonia		Date Prepared:	03/03/2009 1320		
Ammonia	41	mg/L	0.50	0.50	5.0
Method: SM 2510B		Date Analyzed:	02/25/2009 1031		
Specific Conductance	1000	umhos/cm	1.0	1.0	1.0

5/19/09

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Job Number: 360-21330-1

Client Sample ID: OC-PZ-17RRSW
Lab Sample ID: 360-21330-4

Date Sampled: 02/24/2009 0930
Date Received: 02/24/2009 1620
Client Matrix: Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B		Date Analyzed:		02/25/2009 1108	
Aluminum	2200	ug/L	2.2	100	1.0
Chromium	440	ug/L	0.17	5.0	1.0
Sodium	110000	ug/L	65	2000	1.0
Method: 6010B		Date Analyzed:		02/25/2009 1404	
Prep Method: 3010A		Date Prepared:		02/25/2009 0747	
Aluminum	3500 ~~B~~	ug/L	2.2	100	1.0
Chromium	880	ug/L	0.17	5.0	1.0
Sodium	120000	ug/L	65	2000	1.0

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Job Number: 360-21330-1

Client Sample ID: OC-PZ-17RRSW
Lab Sample ID: 360-21330-4

Date Sampled: 02/24/2009 0930
Date Received: 02/24/2009 1620
Client Matrix: Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 300.0		Date Analyzed:	02/25/2009 1941		
Nitrate as N	0.48	mg/L	0.050	0.050	1.0
Method: 300.0		Date Analyzed:	02/25/2009 1956		
Sulfate	240	mg/L	20	20	10
Chloride	140 J	mg/L	10	10	10
Nitrite as N	ND	mg/L	0.10	0.10	10
Method: L107-06-1B		Date Analyzed:	03/04/2009 1735		
Prep Method: Distill/Ammonia		Date Prepared:	03/03/2009 1320		
Ammonia	34	mg/L	0.50	0.50	5.0
Method: SM 2510B		Date Analyzed:	02/25/2009 1032		
Specific Conductance	1000	umhos/cm	1.0	1.0	1.0

5/19/09

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Job Number: 360-21330-1

Client Sample ID: OC-SD-17
Lab Sample ID: 360-21330-5

Date Sampled: 02/24/2009 0940
Date Received: 02/24/2009 1620
Client Matrix: Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B		Date Analyzed:	02/25/2009 1111		
Aluminum	1500	ug/L	2.2	100	1.0
Chromium	390	ug/L	0.17	5.0	1.0
Sodium	130000	ug/L	65	2000	1.0
Method: 6010B		Date Analyzed:	02/25/2009 1407		
Prep Method: 3010A		Date Prepared:	02/25/2009 0747		
Aluminum	3400 ~~B~~	ug/L	2.2	100	1.0
Chromium	870	ug/L	0.17	5.0	1.0
Sodium	120000	ug/L	65	2000	1.0

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Job Number: 360-21330-1

Client Sample ID: OC-SD-17
Lab Sample ID: 360-21330-5

Date Sampled: 02/24/2009 0940
Date Received: 02/24/2009 1620
Client Matrix: Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 300.0		Date Analyzed:	02/25/2009 2011		
Nitrate as N	0.45	mg/L	0.050	0.050	1.0
Method: 300.0		Date Analyzed:	02/25/2009 2026		
Sulfate	240	mg/L	20	20	10
Chloride	160 J	mg/L	10	10	10
Nitrite as N	ND	mg/L	0.10	0.10	10
Method: L107-06-1B		Date Analyzed:	03/04/2009 1738		
Prep Method: Distill/Ammonia		Date Prepared:	03/03/2009 1320		
Ammonia	37	mg/L	0.50	0.50	5.0
Method: SM 2510B		Date Analyzed:	02/25/2009 1034		
Specific Conductance	1100	umhos/cm	1.0	1.0	1.0

5/11/09

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Job Number: 360-21330-1

Client Sample ID: OC-PZ-18RSW
Lab Sample ID: 360-21330-6

Date Sampled: 02/24/2009 0955
Date Received: 02/24/2009 1620
Client Matrix: Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B		Date Analyzed:	02/25/2009 1114		
Aluminum	230	ug/L	2.2	100	1.0
Chromium	36	ug/L	0.17	5.0	1.0
Sodium	100000	ug/L	65	2000	1.0
Method: 6010B		Date Analyzed:	02/25/2009 1410		
Prep Method: 3010A		Date Prepared:	02/25/2009 0747		
Aluminum	370 ~~B~~	ug/L	2.2	100	1.0
Chromium	47	ug/L	0.17	5.0	1.0
Sodium	100000	ug/L	65	2000	1.0

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Job Number: 360-21330-1

Client Sample ID: OC-PZ-18RSW
Lab Sample ID: 360-21330-6

Date Sampled: 02/24/2009 0955
Date Received: 02/24/2009 1620
Client Matrix: Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 300.0		Date Analyzed:	02/25/2009 2041		
Sulfate	91	mg/L	2.0	2.0	1.0
Nitrate as N	0.41	mg/L	0.050	0.050	1.0
Method: 300.0		Date Analyzed:	02/25/2009 2056		
Chloride	150 J	mg/L	10	10	10
Nitrite as N	ND	mg/L	0.10	0.10	10
Method: L107-06-1B		Date Analyzed:	03/04/2009 1725		
Prep Method: Distill/Ammonia		Date Prepared:	03/03/2009 1320		
Ammonia	17	mg/L	0.10	0.10	1.0
Method: SM 2510B		Date Analyzed:	02/25/2009 1035		
Specific Conductance	740	umhos/cm	1.0	1.0	1.0

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Job Number: 360-21330-1

Client Sample ID: OC-ISCO-1
Lab Sample ID: 360-21330-7

Date Sampled: 02/24/2009 1005
Date Received: 02/24/2009 1620
Client Matrix: Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B		Date Analyzed:	02/25/2009 1123		
Aluminum	280	ug/L	2.2	100	1.0
Chromium	40	ug/L	0.17	5.0	1.0
Sodium	98000	ug/L	65	2000	1.0
Method: 6010B		Date Analyzed:	02/25/2009 1413		
Prep Method: 3010A		Date Prepared:	02/25/2009 0747		
Aluminum	350 ~~B~~	ug/L	2.2	100	1.0
Chromium	44	ug/L	0.17	5.0	1.0
Sodium	90000	ug/L	65	2000	1.0

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Job Number: 360-21330-1

Client Sample ID: OC-ISCO-1
Lab Sample ID: 360-21330-7

Date Sampled: 02/24/2009 1005
Date Received: 02/24/2009 1620
Client Matrix: Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 300.0		Date Analyzed:	02/25/2009 2111		
Sulfate	94	mg/L	2.0	2.0	1.0
Nitrate as N	0.40	mg/L	0.050	0.050	1.0
Method: 300.0		Date Analyzed:	02/25/2009 2126		
Chloride	140 J	mg/L	10	10	10
Nitrite as N	ND	mg/L	0.10	0.10	10
Method: L107-06-1B		Date Analyzed:	03/04/2009 1726		
Prep Method: Distill/Ammonia		Date Prepared:	03/03/2009 1320		
Ammonia	18	mg/L	0.10	0.10	1.0
Method: SM 2510B		Date Analyzed:	02/25/2009 1037		
Specific Conductance	730	umhos/cm	1.0	1.0	1.0

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Job Number: 360-21330-1

Client Sample ID: OC-GW-25
Lab Sample ID: 360-21330-8

Date Sampled: 02/24/2009 1330
Date Received: 02/24/2009 1620
Client Matrix: Ground Water

Analyte	Result/Qualifier		Unit	MDL	RL	Dilution
Method: Dissolved-6010B	100 U		Date Analyzed:	02/25/2009 1126		
Aluminum	~~7.4~~	~~J~~	ug/L	2.2	100	1.0
Chromium	4.9	J	ug/L	0.17	5.0	1.0

5/18/09

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Job Number: 360-21330-1

Client Sample ID: OC-GW-25
Lab Sample ID: 360-21330-8

Date Sampled: 02/24/2009 1330
Date Received: 02/24/2009 1620
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 300.0		Date Analyzed:		02/25/2009 2157	
Sulfate	140 J	mg/L	20	20	10
Chloride	39	mg/L	10	10	10
Method: L107-06-1B		Date Analyzed:		03/04/2009 1739	
Prep Method: Distill/Ammonia		Date Prepared:		03/03/2009 1320	
Ammonia	43	mg/L	1.0	1.0	10
Method: SM 2510B		Date Analyzed:		02/25/2009 1038	
Specific Conductance	650	umhos/cm	1.0	1.0	1.0

DATA REPORTING QUALIFIERS

Client: Olin Corporation Job Number: 360-21330-1

Lab Section	Qualifier	Description
Metals		
	B	Compound was found in the blank and sample.
	J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

QUALITY CONTROL RESULTS

Client: Olin Corporation Job Number: 360-21330-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
Metals					
Prep Batch: 360-41607					
LCS 360-41607/2-A	Lab Control Spike	T	Water	3010A	
LCSD 360-41607/3-A	Lab Control Spike Duplicate	T	Water	3010A	
MB 360-41607/1-A	Method Blank	T	Water	3010A	
360-21330-1	OC-ISCO-3	T	Water	3010A	
360-21330-2	OC-ISCO-2	T	Water	3010A	
360-21330-3	OC-PZ-16RRSW	T	Water	3010A	
360-21330-4	OC-PZ-17RRSW	T	Water	3010A	
360-21330-5	OC-SD-17	T	Water	3010A	
360-21330-6	OC-PZ-18RSW	T	Water	3010A	
360-21330-7	OC-ISCO-1	T	Water	3010A	
Analysis Batch:360-41632					
LCS 360-41632/1	Lab Control Spike	T	Water	6010B	
LCSD 360-41632/13	Lab Control Spike Duplicate	T	Water	6010B	
MB 360-41632/2	Method Blank	T	Water	6010B	
360-21330-1	OC-ISCO-3	D	Water	6010B	
360-21330-2	OC-ISCO-2	D	Water	6010B	
360-21330-3	OC-PZ-16RRSW	D	Water	6010B	
360-21330-4	OC-PZ-17RRSW	D	Water	6010B	
360-21330-5	OC-SD-17	D	Water	6010B	
360-21330-6	OC-PZ-18RSW	D	Water	6010B	
360-21330-7	OC-ISCO-1	D	Water	6010B	
360-21330-8	OC-GW-25	D	Water	6010B	
Analysis Batch:360-41641					
LCS 360-41607/2-A	Lab Control Spike	T	Water	6010B	360-41607
LCSD 360-41607/3-A	Lab Control Spike Duplicate	T	Water	6010B	360-41607
MB 360-41607/1-A	Method Blank	T	Water	6010B	360-41607
360-21330-1	OC-ISCO-3	T	Water	6010B	360-41607
360-21330-2	OC-ISCO-2	T	Water	6010B	360-41607
360-21330-3	OC-PZ-16RRSW	T	Water	6010B	360-41607
360-21330-4	OC-PZ-17RRSW	T	Water	6010B	360-41607
360-21330-5	OC-SD-17	T	Water	6010B	360-41607
360-21330-6	OC-PZ-18RSW	T	Water	6010B	360-41607
360-21330-7	OC-ISCO-1	T	Water	6010B	360-41607

Report Basis
D = Dissolved
T = Total

Client: Olin Corporation Job Number: 360-21330-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
General Chemistry					
Analysis Batch:360-41620					
LCS 360-41620/1	Lab Control Spike	T	Water	SM 2510B	
MB 360-41620/4	Method Blank	T	Water	SM 2510B	
360-21330-1	OC-ISCO-3	T	Water	SM 2510B	
360-21330-2	OC-ISCO-2	T	Water	SM 2510B	
360-21330-3	OC-PZ-16RRSW	T	Water	SM 2510B	
360-21330-4	OC-PZ-17RRSW	T	Water	SM 2510B	
360-21330-5	OC-SD-17	T	Water	SM 2510B	
360-21330-6	OC-PZ-18RSW	T	Water	SM 2510B	
360-21330-7	OC-ISCO-1	T	Water	SM 2510B	
360-21330-8	OC-GW-25	T	Water	SM 2510B	
Analysis Batch:360-41671					
LCS 360-41671/2	Lab Control Spike	T	Water	300.0	
MB 360-41671/1	Method Blank	T	Water	300.0	
360-21330-1	OC-ISCO-3	T	Water	300.0	
360-21330-2	OC-ISCO-2	T	Water	300.0	
360-21330-3	OC-PZ-16RRSW	T	Water	300.0	
360-21330-4	OC-PZ-17RRSW	T	Water	300.0	
360-21330-5	OC-SD-17	T	Water	300.0	
360-21330-6	OC-PZ-18RSW	T	Water	300.0	
360-21330-7	OC-ISCO-1	T	Water	300.0	
Analysis Batch:360-41672					
LCS 360-41672/2	Lab Control Spike	T	Water	300.0	
MB 360-41672/1	Method Blank	T	Water	300.0	
360-21330-1	OC-ISCO-3	T	Water	300.0	
360-21330-2	OC-ISCO-2	T	Water	300.0	
360-21330-3	OC-PZ-16RRSW	T	Water	300.0	
360-21330-4	OC-PZ-17RRSW	T	Water	300.0	
360-21330-5	OC-SD-17	T	Water	300.0	
360-21330-6	OC-PZ-18RSW	T	Water	300.0	
360-21330-7	OC-ISCO-1	T	Water	300.0	
360-21330-8	OC-GW-25	T	Water	300.0	
Prep Batch: 360-41845					
LCS 360-41845/2-A	Lab Control Spike	T	Water	Distill/Ammonia	
MB 360-41845/1-A	Method Blank	T	Water	Distill/Ammonia	
360-21330-1	OC-ISCO-3	T	Water	Distill/Ammonia	
360-21330-2	OC-ISCO-2	T	Water	Distill/Ammonia	
360-21330-3	OC-PZ-16RRSW	T	Water	Distill/Ammonia	
360-21330-4	OC-PZ-17RRSW	T	Water	Distill/Ammonia	
360-21330-5	OC-SD-17	T	Water	Distill/Ammonia	
360-21330-6	OC-PZ-18RSW	T	Water	Distill/Ammonia	
360-21330-7	OC-ISCO-1	T	Water	Distill/Ammonia	
360-21330-8	OC-GW-25	T	Water	Distill/Ammonia	

Client: Olin Corporation Job Number: 360-21330-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
General Chemistry					
Analysis Batch:360-41860					
LCS 360-41845/2-A	Lab Control Spike	T	Water	L107-06-1B	360-41845
MB 360-41845/1-A	Method Blank	T	Water	L107-06-1B	360-41845
360-21330-1	OC-ISCO-3	T	Water	L107-06-1B	360-41845
360-21330-2	OC-ISCO-2	T	Water	L107-06-1B	360-41845
360-21330-3	OC-PZ-16RRSW	T	Water	L107-06-1B	360-41845
360-21330-4	OC-PZ-17RRSW	T	Water	L107-06-1B	360-41845
360-21330-5	OC-SD-17	T	Water	L107-06-1B	360-41845
360-21330-6	OC-PZ-18RSW	T	Water	L107-06-1B	360-41845
360-21330-7	OC-ISCO-1	T	Water	L107-06-1B	360-41845
360-21330-8	OC-GW-25	T	Water	L107-06-1B	360-41845

Report Basis
T = Total

Client: Olin Corporation

Job Number: 360-21330-1

Method Blank - Batch: 360-41607

Method: 6010B
Preparation: 3010A Dissolved.

Lab Sample ID: MB 360-41607/1-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 02/25/2009 1303
Date Prepared: 02/25/2009 0747

Analysis Batch: 360-41641
Prep Batch: 360-41607
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume: 50 mL
Final Weight/Volume: 50 mL

Analyte	Result	Qual	MDL	RL
Aluminum	6.1	J	2.2	100
Chromium	ND		0.17	5.0
Sodium	ND		65	2000

Lab Control Spike/
Lab Control Spike Duplicate Recovery Report - Batch: 360-41607

Method: 6010B
Preparation: 3010A

LCS Lab Sample ID: LCS 360-41607/2-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 02/25/2009 1306
Date Prepared: 02/25/2009 0747

Analysis Batch: 360-41641
Prep Batch: 360-41607
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume: 50 mL
Final Weight/Volume: 50 mL

LCSD Lab Sample ID: LCSD 360-41607/3-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 02/25/2009 1309
Date Prepared: 02/25/2009 0747

Analysis Batch: 360-41641
Prep Batch: 360-41607
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume: 50 mL
Final Weight/Volume: 50 mL

Analyte	% Rec. LCS	% Rec. LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Aluminum	98	101	80 - 120	3	20		
Chromium	99	102	80 - 120	3	20		
Sodium	95 ✓	98 ✓	80 - 120	3	20		

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-21330-1

Method Blank - Batch: 360-41632

Method: 6010B
Preparation: N/A

Lab Sample ID: MB 360-41632/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 02/25/2009 1044
Date Prepared: N/A

Analysis Batch: 360-41632
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 1.0 mL

Analyte	Result	Qual	MDL	RL
Aluminum	ND		2.2	100
Chromium	ND		0.17	5.0
Sodium	ND		65	2000

Lab Control Spike/
Lab Control Spike Duplicate Recovery Report - Batch: 360-41632

Method: 6010B
Preparation: N/A

LCS Lab Sample ID: LCS 360-41632/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 02/25/2009 1041
Date Prepared: N/A

Analysis Batch: 360-41632
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 10 mL

LCSD Lab Sample ID: LCSD 360-41632/13
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 02/25/2009 1117
Date Prepared: N/A

Analysis Batch: 360-41632
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 10 mL

Analyte	% Rec. LCS	% Rec. LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Aluminum	98	98	80 - 120	0	20		
Chromium	98	98	80 - 120	0	20		
Sodium	98	97	80 - 120	1	20		

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-21330-1

Method Blank - Batch: 360-41671

Method: 300.0
Preparation: N/A

Lab Sample ID: MB 360-41671/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 02/25/2009 1609
Date Prepared: N/A

Analysis Batch: 360-41671
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 1.0 mL

Analyte	Result	Qual	RL	RL
Nitrate as N	ND		0.050	0.050
Nitrite as N	ND		0.010	0.010

Lab Control Spike - Batch: 360-41671

Method: 300.0
Preparation: N/A

Lab Sample ID: LCS 360-41671/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 02/25/2009 1625
Date Prepared: N/A

Analysis Batch: 360-41671
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 1.0 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Nitrate as N	4.00	4.14	103	85 - 115	
Nitrite as N	4.00	4.04	101	85 - 115	

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-21330-1

Method Blank - Batch: 360-41672

Method: 300.0
Preparation: N/A

Lab Sample ID: MB 360-41672/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 02/25/2009 1609
Date Prepared: N/A

Analysis Batch: 360-41672
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 1.0 mL

Analyte	Result	Qual	RL	RL
Sulfate	ND		2.0	2.0
Chloride	ND		1.0	1.0

Lab Control Spike - Batch: 360-41672

Method: 300.0
Preparation: N/A

Lab Sample ID: LCS 360-41672/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 02/25/2009 1625
Date Prepared: N/A

Analysis Batch: 360-41672
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 1.0 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Sulfate	80.0	82.2	103	85 - 115	
Chloride	40.0	40.4	101	85 - 115	

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-21330-1

Method Blank - Batch: 360-41845

Method: L107-06-1B
Preparation: Distill/Ammonia

Lab Sample ID: MB 360-41845/1-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 03/04/2009 1714
Date Prepared: 03/03/2009 1320

Analysis Batch: 360-41860
Prep Batch: 360-41845
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 50 mL

Analyte	Result	Qual	RL	RL
Ammonia	ND		0.10	0.10

Lab Control Spike - Batch: 360-41845

Method: L107-06-1B
Preparation: Distill/Ammonia

Lab Sample ID: LCS 360-41845/2-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 03/04/2009 1715
Date Prepared: 03/03/2009 1320

Analysis Batch: 360-41860
Prep Batch: 360-41845
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 50 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Ammonia	10.0	9.44	94	85 - 115	

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-21330-1

Method Blank - Batch: 360-41620

Method: SM 2510B
Preparation: N/A

Lab Sample ID: MB 360-41620/4
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 02/25/2009 0956
Date Prepared: N/A

Analysis Batch: 360-41620
Prep Batch: N/A
Units: umhos/cm

Instrument ID: MAN-TECH Ion Plus
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 1.0 mL

Analyte	Result	Qual	RL	RL
Specific Conductance	ND		1.0	1.0

Lab Control Spike - Batch: 360-41620

Method: SM 2510B
Preparation: N/A

Lab Sample ID: LCS 360-41620/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 02/25/2009 0931
Date Prepared: N/A

Analysis Batch: 360-41620
Prep Batch: N/A
Units: umhos/cm

Instrument ID: MAN-TECH Ion Plus
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 1.0 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Specific Conductance	1420	1440	101	85 - 115	

Calculations are performed before rounding to avoid round-off errors in calculated results.

Login Sample Receipt Check List

Client: Olin Corporation

Job Number: 360-21330-1

Login Number: 21330
List Source: TestAmerica Westfield
Creator: Rinard, Kimberley A
List Number: 1

Question	T / F/ NA	Comment
Radioactivity either was not measured or, if measured, is at or below background	N/A	
The cooler's custody seal, if present, is intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	4.0 C / 5.0 C
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	N/A	
If necessary, staff have been informed of any short hold time or quick TAT needs	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	

TestAmerica Laboratories, Inc.
Chain of Custody Form

TestAmerica

•53 Southampton Road
Westfield, MA 01085
(P) 413-572-4000
(F) 413-572-3707

•149 Rangeway Road
N. Billerica, MA 01862
(P) 978-667-1400
(F) 978-667-7871

Client: Olin Chemical/MACTEC
Address: 51 Eames Street
Wilmington, MA 01887
Phone: Fax:

Project #: 6107090016 / 04
Project Manager: Peter Thompson
Work ID: ~~PCMP~~ Slurry Wall/Cap
Contact: David Chapman

Job# 360-21330 | Quote# | PO#

Shaded areas for office use

Analysis Requested
Check analysis and specify method and analytes in comments section.
For example:
500-series for drinking water
600-series for waste water
8000-series for haz/solid waste
Use comments section to further define.

Comments
(Special Instructions)

MCP case narrative

Dissolved metals are field filtered.

Groundwater Metals: Dissolved Al/Cr

Surfacewater Metals: Dissolved/Total Al/Cr/Na

Requested Turn Around Time
10 Business Day (Std) XX
15 Business Day
Other
Rush TAT Requested: 24 hrs 72 hrs 48 hrs 5 Day

Regulatory Classification / Special Report Format
NPDES Drinking Water DEP Form(s)
RCRA MCP GW1/S1 MWRA Smart Rpt
Other MCP QA/QC Rpt XX

Sample Type Codes
WW-Wastewater DW-Drinking water SW-Surfacewater
LW-Labwater GW-Groundwater A-Air
S-Solid / Soil SL-Sludge O-Oil Z-Other

Sample ID	Sample Type	Sampler's Initials	Date / Time Collected	Grab	Comp.	# Containers	Plastic(P) or Glass(G)	Preservative: NaHSO4/MeOH	HNO3 to pH <2	H2SO4 to pH <2	HCl to pH <2	NaOH to pH >12	NAOH/ZNAC	None / 4° C	Ammonia-Nitrogen	Chloride, Sulfate	Specific Conductivity	Nitrate, Nitrite	Groundwater metals	Surfacewater metals	Sediment: Al/Cr/Fe	Other	Other	Other	Other	Other	Other
OC-ISCO-3	SW	DLC DGK	2-24-09 8:35	X		4	P		X	X				X	X	X	X	X		X						
OC-ISCO-2	SW	DLC DGK	2-24-09 9:00	X		4	P		X	X				X	X	X	X	X		X						
OC-PZ-16RRSW	SW	DLC DGK	2-24-09 9:05	X		4	P		X	X				X	X	X	X	X		X						
OC-PZ-17RRSW	SW	DLC DGK	2-24-09 9:30	X		4	P		X	X				X	X	X	X	X		X						
OC-~~PZ~~ SD-17 (DUP)	SW	DLC DGK	2-24-09 9:40	X		4	P		X	X				X	X	X	X	X		X						
OC-PZ-18RSW	SW	DLC DGK	2-24-09 9:55	X		4	P		X	X				X	X	X	X	X		X						
OC-ISCO-1	SW	DLC DGK	2-24-09 10:05	X		4	P		X	X				X	X	X	X	X		X						
OC-GW-25	GW	DLC	2-24-09 13:30	X		3	P		X	X				X	X	X	X		X								
																						2/24/2009				
																						2/24/2009				

Sampled by (print): David Chapman / Daren Kurlejian
Signature:

Relinquished by: David Chapman Date: 2-24-09 Time: 14:
Received by: Jerry Date: 2/24/09 Time: 1440

Relinquished by: Jerry Date: 2/24/09 Time: 1620
Received by: Date: 2/24/2009 Time: 1620

Method of shipment:

TestAmerica-Westfield

Cooler? Y / N Samples Iced? Y / N
Temp @ receipt: 4.0/5.0 °C
Preservation/pH checked
By: Date: 2/24/2009

White = Lab file Yellow = Report copy Pink = Customer copy
STL-8245 (1000)

FILE COPY

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

Job Number: 360-21354-1
Job Description: Slurry Wall/Cap

CHECKED FOR COMPLETENESS OF PARAMETERS ORDERED BY:

For:
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441
Attention: Mr. Steven Morrow

Approved for release.
Joe Chimi
Report Production Representative
3/11/09 3:13 PM

Designee for
Becky C Mason
Project Manager II
becky.mason@testamericainc.com
03/11/2009

The test results in this report meet all NELAP requirements for accredited parameters. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced except in full, and with written approval from the laboratory.
TestAmerica Westfield Certifications and Approvals: MADEP MA014, RIDOH57, CTDPH 0494, VT DECWSD, NH DES 2539, NELAP FL E87912 TOX, NELAP NJ MA008 TOX, NELAP NY 10843, NY DOH 10843.

Field sampling is performed under SOPs WE-FLD-001 and WE-FLD-002

TestAmerica Laboratories, Inc.
TestAmerica Westfield Westfield Executive Park, 53 Southampton Road, Westfield, MA 01085
Tel (413) 572-4000 Fax (413) 572-3707 www.testamericainc.com

ACCREDITED IN ACCORDANCE WITH nelac

Table of Contents

Cover Title Page 1
Report Narrative 3
Method Summary 7
Method / Analyst Summary 8
Sample Summary 9
Sample Results 10
Sample Datasheets 11
Data Qualifiers 23
QC Results 24
Qc Association Summary 25
Qc Reports 28
Sample Receipt Checklist 38
Client Chain of Custody 39

MADEP MCP Analytical Method Report Certification Form

Laboratory Name:	**TestAmerica Westfield**	Project #:	**360-21354-1**
Project Location:	**Slurry Wall/Cap**	MADEP RTN[1]:	

This form provides certifications for the following data set:[list Laboratory Sample ID Number(s)]
360-21354-(1-6)

Sample Matrices: **Groundwater** Soil/Sediment Drinking Water Other:

MCP SW-846 Methods Used	8260B( )	8151A ( )	8330 ( )	6010B (**x**)	7470A/1A ( )	Other ( )
	8270C( )	8081A ( )	VPH ( )	6020 ( )	9014M[2]/9012 ( )	
As specified in MADEP Compendium of Analytical Methods. (check all that apply)	8082 ( )	8021B ( )	EPH ( )	7000 S[3]( )	7196A ( )	

1 List Release Tracking Number (RTN), if known
2 M - SW-846 Method 9014 or MADEP Physiologically Available Cyanide (PAC) Method
3 S - SW-846 Methods 7000 Series List individual method and analyte.

An affirmative response to questions A, B, C and D is required for "Presumptive Certainty" status

A	Were all samples received by the laboratory in a condition consistent with that described on the Chain-of-Custody documentation for the data set?	Yes √		No[1]
B	Were all QA/QC procedures required for the specified analytical method(s) included in this report followed, including the requirement to note and discuss in a narrative QC data that did not meet appropriate performance standards or guidelines?	Yes √		No[1]
C	Does the analytical data included in this report meet all the requirements for "Presumptive Certainty", as described in Section 2.0 (a), (b), (c) and (d) of the MADEP document CAM VII A, " Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	Yes √	N/A	No[1]
D	**VPH and EPH methods only:** Was the VPH or EPH Method conducted without significant modifications (see Section 11.3 of respective Methods)?	Yes	N/A √	No[1]

A response to questions E and F below is required for "Presumptive Certainty" status

E	Were all QC performance standards and recommendations for the specified methods achieved?	Yes √		No[1]
F	Were results for all analyte-list compounds/elements for the specified method(s) reported?	Yes	N/A	No[1] √

[1] All Negative responses must be addressed in an attached Environmental Laboratory case narrative.

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.

Signature: Christine Lucinda Reynolds **Position:** Quality Assurance Manager

Printed Name: Christine Reynolds **Date:** 3/11/09 15:03

The certification form has been electronically signed and approved. CAM VII A, Rev 3.2 April-04

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

MADEP MA014
NY DOH 10843
RI DOH 57
CT DPH 0494
VT DECWSD

NELAP FL E87912 TOX
NELAP NJ MA008 TOX
NELAP NY 10843
NH DES 253901-A

TestAmerica Westfield
53 Southampton Rd,
Westfield, MA 01085
Tel:(413)572-4000
Fax:(413)572-3707

MADEP MCP Analytical Method Report Certification Form

Laboratory Name:	**TestAmerica Westfield**	Project #:	**360-21354-1**
Project Location:	**Slurry Wall/Cap**	MADEP RTN[1]:	

This form provides certifications for the following data set:[list Laboratory Sample ID Number(s)]
360-21354-(1-6)

Sample Matrices: **Groundwater** Soil/Sediment Drinking Water Other:

MCP SW-846 Methods Used	8260B( )	8151A ( )	8330 ( )	6010B ( )	7470A/1A ( )	Other (**x**)
	8270C( )	8081A ( )	VPH ( )	6020 ( )	9014M[2]/9012 ( )	
As specified in MADEP Compendium of Analytical Methods. (check all that apply)	8082 ( )	8021B ( )	EPH ( )	7000 S[3]( )	7196A ( )	

1 List Release Tracking Number (RTN), if known
2 M - SW-846 Method 9014 or MADEP Physiologically Available Cyanide (PAC) Method
3 S - SW-846 Methods 7000 Series List individual method and analyte.

An affirmative response to questions A, B, C and D is required for "Presumptive Certainty" status

A	Were all samples received by the laboratory in a condition consistent with that described on the Chain-of-Custody documentation for the data set?	Yes √		No[1]
B	Were all QA/QC procedures required for the specified analytical method(s) included in this report followed, including the requirement to note and discuss in a narrative QC data that did not meet appropriate performance standards or guidelines?	Yes √		No[1]
C	Does the analytical data included in this report meet all the requirements for "Presumptive Certainty", as described in Section 2.0 (a), (b), (c) and (d) of the MADEP document CAM VII A, " Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	Yes	N/A √	No[1]
D	**VPH and EPH methods only:** Was the VPH or EPH Method conducted without significant modifications (see Section 11.3 of respective Methods)?	Yes	N/A √	No[1]

A response to questions E and F below is required for "Presumptive Certainty" status

E	Were all QC performance standards and recommendations for the specified methods achieved?	Yes		No[1] √
F	Were results for all analyte-list compounds/elements for the specified method(s) reported?	Yes	N/A √	No[1]

[1] All Negative responses must be addressed in an attached Environmental Laboratory case narrative.

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.

Signature: Christine Lucinta Reynolds **Position:** Quality Assurance Manager

Printed Name: Christine Reynolds **Date:** 3/11/09 15:03

The certification form has been electronically signed and approved. CAM VII A, Rev 3.2 April-04

CASE NARRATIVE

Client: Olin Corporation

Project: Slurry Wall/Cap

Report Number: 360-21354-1

This case narrative is in the form of an exception report, where only the anomalies related to this report, method specific performance and/or QA/QC issues are discussed. If there are no issues to report, this narrative will include a statement that documents that there are no relevant data issues as stipulated in the MCP reporting requirements.

In order to facilitate report review, a separate MCP Analytical Method Report Certification Form is included for each method requested.

It should be noted that samples with elevated Reporting Limits (RLs) as a result of a dilution may not be able to satisfy "MCP program" reporting limits in some cases if the "adjusted" RL is greater than the applicable MCP standards or criterion to which the concentration is being compared. Such increases in the RLs are an unavoidable but acceptable consequence of sample dilution that enables quantification of target analytes which exceed the calibration range.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

The samples were received on 02/26/2009; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 2.2ºC.

Note: All samples which require thermal preservation are considered acceptable if the arrival temperature is within 2C of the required temperature or method specified range. For samples with a specified temperature of 4C, samples with a temperature ranging from just above freezing temperature of water to 6C shall be acceptable. Samples that are hand delivered immediately following collection may not meet these criteria, however they will be deemed acceptable according to NELAC and MADEP standards, if there is evidence that the chilling process has begun, such as arrival on ice, etc.

MCP regulatory standard criteria were not specified for this report. Therefore, method reporting limits (RLs) were not assessed against any MCP standards as it may pertain to Question "E" on the Presumptive Certainty Certification Form (MADEP reference: WSC-CAM-AN-093008 - WSC-CAM Analytical Notes).

DISSOLVED METALS

Samples 360-21354-1 through 360-21354-6 were analyzed for dissolved metals in accordance with EPA SW846 Method 6010B. The samples were analyzed on 02/27/2009.

All QA/QC procedures required to meet Presumptive Certainty for the specified analytical method were performed as per section B of the MADEP MCP analytical method report Certification form.

All QC performance standards and recommendations, which may affect Data Usability for this specific method, were achieved.

General method information:
Chromium was detected in method blank MB 360-41739/2 at a level that was above the method detection limit but below the reporting limit. The value should be considered an estimate, and has been flagged "J". If the associated sample reported a result above the MDL and/or RL, the result has been "B" flagged. Refer to the QC report for details.

At the request of the client, an abbreviated/modified MCP analyte list was reported for this job.

The following reported methods are not listed in the MADEP Massachusetts Contingency Plan (MCP) Compendium of Analytical Methods (CAM), pursuant to the provisions of 310 CMR 40.0017(2).

ANIONS

Samples 360-21354-1 through 360-21354-6 were analyzed for anions in accordance with EPA Method 300.0. The samples were analyzed on 03/09/2009 and 03/10/2009.

All QC performance standards and recommendations for this specific method were achieved with the exception of:

Chloride failed the MS/MSD recovery criteria low for the matrix spike and matrix spike duplicate of sample 360-21354-5. The associated LCS recovered within control limits. Refer to the QC report for details.

Samples 360-21354-1 through 360-21354-5(10X), 360-21354-5(20X) and 360-21354-6(10X) required dilution prior to analysis. The reporting limits have been adjusted accordingly. Dilutions were due to high target concentration.

AMMONIA

Samples 360-21354-1 through 360-21354-6 were analyzed for ammonia in accordance with LACHAT 107-06-1B. The samples were prepared on 03/03/2009 and 03/05/2009 and analyzed on 03/04/2009 and 03/06/2009.

All QC performance standards and recommendations for this specific method were achieved with the exception of:

Ammonia failed the MS/MSD recovery criteria low for the matrix spike and matrix spike duplicate of sample 360-21354-2. The associated LCS recovered within control limits. Refer to the QC report for details.

Samples 360-21354-1(10X), 360-21354-2(10X), 360-21354-3(20X), 360-21354-4(10X), 360-21354-5(20X) and 360-21354-6(10X) required dilution prior to analysis. The reporting limits have been adjusted accordingly. Dilutions were due to high concentration.

SPECIFIC CONDUCTANCE (CONDUCTIVITY)

Samples 360-21354-1 through 360-21354-6 were analyzed for Specific Conductance (Conductivity) in accordance with SM 2510B. The samples were analyzed on 03/02/2009.

All QC performance standards and recommendations for this specific method were achieved.

This case narrative is available in Word format upon request.

METHOD SUMMARY

Client: Olin Corporation Job Number: 360-21354-1

Description	Lab Location	Method	Preparation Method
Matrix: Water			
Dissolved Metals	TAL WFD	SW846 6010B	
Sample Filtration, Field	TAL WFD		FIELD_FLTRD
Chloride & Sulfate	TAL WFD	40CFR136A 300.0	
Nitrogen Ammonia	TAL WFD	LACHAT L107-06-1B	
Distillation, Ammonia	TAL WFD		Distill/Ammonia
Conductivity, Specific Conductance	TAL WFD	SM SM 2510B	

Lab References:

TAL WFD = TestAmerica Westfield

Method References:

40CFR136A = "Methods for Organic Chemical Analysis of Municipal Industrial Wastewater", 40CFR, Part 136, Appendix A, October 26, 1984 and subsequent revisions.

LACHAT = LACHAT

SM = "Standard Methods For The Examination Of Water And Wastewater",

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

METHOD / ANALYST SUMMARY

Client: Olin Corporation

Job Number: 360-21354-1

Method	Analyst	Analyst ID
SW846 6010B	Nasiatka, Ellen M	EMN
40CFR136A 300.0	Lalashius, Andrew L	ALL
LACHAT L107-06-1B	Lalashius, Andrew L	ALL
SM SM 2510B	Emerich, Rich W	RWE

SAMPLE SUMMARY

Client: Olin Corporation Job Number: 360-21354-1

Lab Sample ID	Client Sample ID	Client Matrix	Date/Time Sampled	Date/Time Received
360-21354-1	OC-GW-202S	Ground Water	02/25/2009 0910	02/26/2009 1650
360-21354-2	OC-PZ-18R	Ground Water	02/25/2009 1030	02/26/2009 1650
360-21354-3	OC-GW-79S	Ground Water	02/25/2009 1140	02/26/2009 1650
360-21354-4	OC-PZ-17RR	Ground Water	02/25/2009 1030	02/26/2009 1650
360-21354-5	OC-GW-202D	Ground Water	02/25/2009 0915	02/26/2009 1650
360-21354-6	OC-GW-78S	Ground Water	02/25/2009 1155	02/26/2009 1650

SAMPLE RESULTS

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-21354-1

Client Sample ID: OC-GW-202S
Lab Sample ID: 360-21354-1

Date Sampled: 02/25/2009 0910
Date Received: 02/26/2009 1650
Client Matrix: Ground Water

Analyte	Result/Qualifier		Unit	MDL	RL	Dilution
Method: Dissolved-6010B			Date Analyzed:	02/27/2009 1449		
Aluminum	ND		ug/L	2.2	100	1.0
Chromium	4.3	J B	ug/L	0.17	5.0	1.0

5/19/09

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Job Number: 360-21354-1

Client Sample ID: OC-GW-202S
Lab Sample ID: 360-21354-1

Date Sampled: 02/25/2009 0910
Date Received: 02/26/2009 1650
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 300.0		Date Analyzed:		03/09/2009 2059	
Sulfate	500	mg/L	20	20	10
Chloride	50 J	mg/L	10	10	10
Method: L107-06-1B		Date Analyzed:		03/04/2009 1740	
Prep Method: Distill/Ammonia		Date Prepared:		03/03/2009 1320	
Ammonia	99	mg/L	1.0	1.0	10
Method: SM 2510B		Date Analyzed:		03/02/2009 1200	
Specific Conductance	1400	umhos/cm	1.0	1.0	1.0

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Job Number: 360-21354-1

Client Sample ID: OC-PZ-18R
Lab Sample ID: 360-21354-2

Date Sampled: 02/25/2009 1030
Date Received: 02/26/2009 1650
Client Matrix: Ground Water

Analyte	Result/Qualifier		Unit	MDL	RL	Dilution
Method: Dissolved-6010B			Date Analyzed:	02/27/2009 1507		
Aluminum	4.6	J	ug/L	2.2	100	1.0
Chromium	15	~~B~~	ug/L	0.17	5.0	1.0

5/19/09

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Job Number: 360-21354-1

Client Sample ID: OC-PZ-18R
Lab Sample ID: 360-21354-2

Date Sampled: 02/25/2009 1030
Date Received: 02/26/2009 1650
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 300.0		Date Analyzed:		03/09/2009 2129	
Sulfate	220	mg/L	20	20	10
Chloride	130 J	mg/L	10	10	10
Method: L107-06-1B		Date Analyzed:		03/06/2009 1331	
Prep Method: Distill/Ammonia		Date Prepared:		03/05/2009 1145	
Ammonia	76	mg/L	1.0	1.0	10
Method: SM 2510B		Date Analyzed:		03/02/2009 1202	
Specific Conductance	1000	umhos/cm	1.0	1.0	1.0

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Job Number: 360-21354-1

Client Sample ID: OC-GW-79S
Lab Sample ID: 360-21354-3

Date Sampled: 02/25/2009 1140
Date Received: 02/26/2009 1650
Client Matrix: Ground Water

Analyte	Result/Qualifier		Unit	MDL	RL	Dilution
Method: Dissolved-6010B			Date Analyzed:	02/27/2009 1510		
Aluminum	18	J	ug/L	2.2	100	1.0
Chromium	6.6	~~B~~	ug/L	0.17	5.0	1.0

5/19/09

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Job Number: 360-21354-1

Client Sample ID: OC-GW-79S
Lab Sample ID: 360-21354-3

Date Sampled: 02/25/2009 1140
Date Received: 02/26/2009 1650
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 300.0		Date Analyzed:		03/09/2009 2159	
Sulfate	1100	mg/L	20	20	10
Chloride	170 J	mg/L	10	10	10
Method: L107-06-1B		Date Analyzed:		03/06/2009 1333	
Prep Method: Distill/Ammonia		Date Prepared:		03/05/2009 1145	
Ammonia	190	mg/L	2.0	2.0	20
Method: SM 2510B		Date Analyzed:		03/02/2009 1203	
Specific Conductance	3200	umhos/cm	1.0	1.0	1.0

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Job Number: 360-21354-1

Client Sample ID: OC-PZ-17RR
Lab Sample ID: 360-21354-4

Date Sampled: 02/25/2009 1030
Date Received: 02/26/2009 1650
Client Matrix: Ground Water

Analyte	Result/Qualifier		Unit	MDL	RL	Dilution
Method: Dissolved-6010B			Date Analyzed:		02/27/2009 1513	
Aluminum	4.6	J	ug/L	2.2	100	1.0
Chromium	2.9	J B	ug/L	0.17	5.0	1.0

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Job Number: 360-21354-1

Client Sample ID: OC-PZ-17RR
Lab Sample ID: 360-21354-4

Date Sampled: 02/25/2009 1030
Date Received: 02/26/2009 1650
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 300.0		Date Analyzed:		03/09/2009 2214	
Chloride	17 J	mg/L	1.0	1.0	1.0
Method: 300.0		Date Analyzed:		03/09/2009 2229	
Sulfate	510	mg/L	20	20	10
Method: L107-06-1B		Date Analyzed:		03/06/2009 1334	
Prep Method: Distill/Ammonia		Date Prepared:		03/05/2009 1145	
Ammonia	75	mg/L	1.0	1.0	10
Method: SM 2510B		Date Analyzed:		03/02/2009 1205	
Specific Conductance	1400	umhos/cm	1.0	1.0	1.0

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Job Number: 360-21354-1

Client Sample ID: OC-GW-202D
Lab Sample ID: 360-21354-5

Date Sampled: 02/25/2009 0915
Date Received: 02/26/2009 1650
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B		Date Analyzed:		02/27/2009 1516	
Aluminum	14000	ug/L	2.2	100	1.0
Chromium	940 B	ug/L	0.17	5.0	1.0

5/19/09

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Job Number: 360-21354-1

Client Sample ID: OC-GW-202D
Lab Sample ID: 360-21354-5

Date Sampled: 02/25/2009 0915
Date Received: 02/26/2009 1650
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 300.0		Date Analyzed:		03/10/2009 0000	
Chloride	300 J	mg/L	10	10	10
Method: 300.0		Date Analyzed:		03/10/2009 1647	
Sulfate	2000	mg/L	40	40	20
Method: L107-06-1B		Date Analyzed:		03/06/2009 1335	
Prep Method: Distill/Ammonia		Date Prepared:		03/05/2009 1145	
Ammonia	360	mg/L	2.0	2.0	20
Method: SM 2510B		Date Analyzed:		03/02/2009 1206	
Specific Conductance	5100	umhos/cm	1.0	1.0	1.0

5/19/09

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Job Number: 360-21354-1

Client Sample ID: OC-GW-78S
Lab Sample ID: 360-21354-6

Date Sampled: 02/25/2009 1155
Date Received: 02/26/2009 1650
Client Matrix: Ground Water

Analyte	Result/Qualifier		Unit	MDL	RL	Dilution
Method: Dissolved-6010B			Date Analyzed:	02/27/2009 1519		
Aluminum	7.7	J	ug/L	2.2	100	1.0
Chromium	5.5	~~B~~	ug/L	0.17	5.0	1.0

5/19/09

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Job Number: 360-21354-1

Client Sample ID: OC-GW-78S
Lab Sample ID: 360-21354-6

Date Sampled: 02/25/2009 1155
Date Received: 02/26/2009 1650
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 300.0		Date Analyzed:		03/10/2009 0045	
Chloride	22 J	mg/L	1.0	1.0	1.0
Method: 300.0		Date Analyzed:		03/10/2009 0100	
Sulfate	620	mg/L	20	20	10
Method: L107-06-1B		Date Analyzed:		03/06/2009 1336	
Prep Method: Distill/Ammonia		Date Prepared:		03/05/2009 1145	
Ammonia	94	mg/L	1.0	1.0	10
Method: SM 2510B		Date Analyzed:		03/02/2009 1208	
Specific Conductance	1300	umhos/cm	1.0	1.0	1.0

5/19/09

DATA REPORTING QUALIFIERS

Client: Olin Corporation Job Number: 360-21354-1

Lab Section	Qualifier	Description
Metals		
	B	Compound was found in the blank and sample.
	J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
General Chemistry		
	F	MS or MSD exceeds the control limits
	4	MS, MSD: The analyte present in the original sample is 4 times greater than the matrix spike concentration; therefore, control limits are not applicable.

QUALITY CONTROL RESULTS

Client: Olin Corporation Job Number: 360-21354-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
Metals					
Analysis Batch:360-41739					
LCS 360-41739/1	Lab Control Spike	T	Water	6010B	
LCSD 360-41739/7	Lab Control Spike Duplicate	T	Water	6010B	
MB 360-41739/2	Method Blank	T	Water	6010B	
360-21354-1	OC-GW-202S	D	Water	6010B	
360-21354-1DU	Duplicate	D	Water	6010B	
360-21354-1MS	Matrix Spike	D	Water	6010B	
360-21354-2	OC-PZ-18R	D	Water	6010B	
360-21354-3	OC-GW-79S	D	Water	6010B	
360-21354-4	OC-PZ-17RR	D	Water	6010B	
360-21354-5	OC-GW-202D	D	Water	6010B	
360-21354-6	OC-GW-78S	D	Water	6010B	

Report Basis
D = Dissolved
T = Total

Client: Olin Corporation Job Number: 360-21354-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
General Chemistry					
Analysis Batch:360-41761					
LCS 360-41761/1	Lab Control Spike	T	Water	SM 2510B	
MB 360-41761/12	Method Blank	T	Water	SM 2510B	
360-21354-1	OC-GW-202S	T	Water	SM 2510B	
360-21354-2	OC-PZ-18R	T	Water	SM 2510B	
360-21354-3	OC-GW-79S	T	Water	SM 2510B	
360-21354-4	OC-PZ-17RR	T	Water	SM 2510B	
360-21354-5	OC-GW-202D	T	Water	SM 2510B	
360-21354-6	OC-GW-78S	T	Water	SM 2510B	
360-21354-6DU	Duplicate	T	Water	SM 2510B	
Prep Batch: 360-41845					
LCS 360-41845/2-A	Lab Control Spike	T	Water	Distill/Ammonia	
MB 360-41845/1-A	Method Blank	T	Water	Distill/Ammonia	
360-21354-1	OC-GW-202S	T	Water	Distill/Ammonia	
Analysis Batch:360-41860					
LCS 360-41845/2-A	Lab Control Spike	T	Water	L107-06-1B	360-41845
MB 360-41845/1-A	Method Blank	T	Water	L107-06-1B	360-41845
360-21354-1	OC-GW-202S	T	Water	L107-06-1B	360-41845
Prep Batch: 360-41915					
LCS 360-41915/2-A	Lab Control Spike	T	Water	Distill/Ammonia	
MB 360-41915/1-A	Method Blank	T	Water	Distill/Ammonia	
360-21354-2	OC-PZ-18R	T	Water	Distill/Ammonia	
360-21354-2MS	Matrix Spike	T	Water	Distill/Ammonia	
360-21354-2MSD	Matrix Spike Duplicate	T	Water	Distill/Ammonia	
360-21354-3	OC-GW-79S	T	Water	Distill/Ammonia	
360-21354-4	OC-PZ-17RR	T	Water	Distill/Ammonia	
360-21354-5	OC-GW-202D	T	Water	Distill/Ammonia	
360-21354-6	OC-GW-78S	T	Water	Distill/Ammonia	
Analysis Batch:360-41958					
LCS 360-41915/2-A	Lab Control Spike	T	Water	L107-06-1B	360-41915
MB 360-41915/1-A	Method Blank	T	Water	L107-06-1B	360-41915
360-21354-2	OC-PZ-18R	T	Water	L107-06-1B	360-41915
360-21354-2MS	Matrix Spike	T	Water	L107-06-1B	360-41915
360-21354-2MSD	Matrix Spike Duplicate	T	Water	L107-06-1B	360-41915
360-21354-3	OC-GW-79S	T	Water	L107-06-1B	360-41915
360-21354-4	OC-PZ-17RR	T	Water	L107-06-1B	360-41915
360-21354-5	OC-GW-202D	T	Water	L107-06-1B	360-41915
360-21354-6	OC-GW-78S	T	Water	L107-06-1B	360-41915

Client: Olin Corporation Job Number: 360-21354-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
General Chemistry					
Analysis Batch:360-42066					
LCS 360-42066/2	Lab Control Spike	T	Water	300.0	
MB 360-42066/1	Method Blank	T	Water	300.0	
360-21354-1	OC-GW-202S	T	Water	300.0	
360-21354-2	OC-PZ-18R	T	Water	300.0	
360-21354-3	OC-GW-79S	T	Water	300.0	
360-21354-4	OC-PZ-17RR	T	Water	300.0	
Analysis Batch:360-42067					
LCS 360-42067/2	Lab Control Spike	T	Water	300.0	
MB 360-42067/1	Method Blank	T	Water	300.0	
360-21354-5	OC-GW-202D	T	Water	300.0	
360-21354-5MS	Matrix Spike	T	Water	300.0	
360-21354-5MSD	Matrix Spike Duplicate	T	Water	300.0	
360-21354-6	OC-GW-78S	T	Water	300.0	
Analysis Batch:360-42070					
LCS 360-42070/2	Lab Control Spike	T	Water	300.0	
MB 360-42070/1	Method Blank	T	Water	300.0	
360-21354-5	OC-GW-202D	T	Water	300.0	
360-21354-5MS	Matrix Spike	T	Water	300.0	
360-21354-5MSD	Matrix Spike Duplicate	T	Water	300.0	

Report Basis
T = Total

Client: Olin Corporation

Job Number: 360-21354-1

Method Blank - Batch: 360-41739

Method: 6010B
Preparation: N/A

dissolved ~~total~~ 2/26/09

Lab Sample ID: MB 360-41739/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 02/27/2009 1429
Date Prepared: N/A

Analysis Batch: 360-41739
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 1.0 mL

Analyte	Result	Qual	MDL	RL
Aluminum	ND		2.2	100
Chromium	0.24	J	0.17	5.0

Lab Control Spike/
Lab Control Spike Duplicate Recovery Report - Batch: 360-41739

Method: 6010B
Preparation: N/A

LCS Lab Sample ID: LCS 360-41739/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 02/27/2009 1426
Date Prepared: N/A

Analysis Batch: 360-41739
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 10 mL

LCSD Lab Sample ID: LCSD 360-41739/7
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 02/27/2009 1501
Date Prepared: N/A

Analysis Batch: 360-41739
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 10 mL

Analyte	% Rec. LCS	% Rec. LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Aluminum	98	97	80 - 120	1	20		
Chromium	99	98	80 - 120	1	20		

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-21354-1

Matrix Spike - Batch: 360-41739

Method: 6010B
Preparation: N/A

Lab Sample ID: 360-21354-1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 02/27/2009 1455
Date Prepared: N/A

Analysis Batch: 360-41739
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 10 mL

Analyte	Sample Result/Qual	Spike Amount	Result	% Rec.	Limit	Qual
Aluminum	ND	5000	4700	94	75 - 125	
Chromium	4.3 J	1000	931	93	75 - 125	

Duplicate - Batch: 360-41739

Method: 6010B
Preparation: N/A

Lab Sample ID: 360-21354-1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 02/27/2009 1452
Date Prepared: N/A

Analysis Batch: 360-41739
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 1.0 mL

Analyte	Sample Result/Qual	Result	RPD	Limit	Qual
Aluminum	ND	ND	NC	20	
Chromium	4.3 J	4.24	1	20	J

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-21354-1

Method Blank - Batch: 360-42066

Method: 300.0
Preparation: N/A

Lab Sample ID: MB 360-42066/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 03/09/2009 1641
Date Prepared: N/A

Analysis Batch: 360-42066
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 1.0 mL

Analyte	Result	Qual	RL	RL
Sulfate	ND		2.0	2.0
Chloride	ND		1.0	1.0

Lab Control Spike - Batch: 360-42066

Method: 300.0
Preparation: N/A

Lab Sample ID: LCS 360-42066/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 03/09/2009 1656
Date Prepared: N/A

Analysis Batch: 360-42066
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 1.0 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Sulfate	80.0	80.2	100	85 - 115	
Chloride	40.0	40.1	100	85 - 115	

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-21354-1

Method Blank - Batch: 360-42067

Method: 300.0
Preparation: N/A

Lab Sample ID: MB 360-42067/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 03/09/2009 2315
Date Prepared: N/A

Analysis Batch: 360-42067
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 1.0 mL

Analyte	Result	Qual	RL	RL
Sulfate	ND		2.0	2.0
Chloride	ND		1.0	1.0

Lab Control Spike - Batch: 360-42067

Method: 300.0
Preparation: N/A

Lab Sample ID: LCS 360-42067/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 03/09/2009 2330
Date Prepared: N/A

Analysis Batch: 360-42067
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 1.0 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Sulfate	80.0	80.4	100	85 - 115	
Chloride	40.0	40.1	100	85 - 115	

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-21354-1

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 360-42067

Method: 300.0
Preparation: N/A

MS Lab Sample ID:	360-21354-5	Analysis Batch: 360-42067	Instrument ID: No Equipment Assigned
Client Matrix:	Water	Prep Batch: N/A	Lab File ID: N/A
Dilution:	10		Initial Weight/Volume: 1.0 mL
Date Analyzed:	03/10/2009 0015		Final Weight/Volume: 10 mL
Date Prepared:	N/A		

MSD Lab Sample ID:	360-21354-5	Analysis Batch: 360-42067	Instrument ID: No Equipment Assigned
Client Matrix:	Water	Prep Batch: N/A	Lab File ID: N/A
Dilution:	10		Initial Weight/Volume: 1.0 mL
Date Analyzed:	03/10/2009 0030		Final Weight/Volume: 10 mL
Date Prepared:	N/A		

	% Rec.						
Analyte	MS	MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Chloride	70	66	75 - 125	5.9	20	F	F

5/13/09

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-21354-1

Method Blank - Batch: 360-42070

Method: 300.0
Preparation: N/A

Lab Sample ID: MB 360-42070/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 03/10/2009 1617
Date Prepared: N/A

Analysis Batch: 360-42070
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 1.0 mL

Analyte	Result	Qual	RL	RL
Sulfate	ND		2.0	2.0
Chloride	ND		1.0	1.0

Lab Control Spike - Batch: 360-42070

Method: 300.0
Preparation: N/A

Lab Sample ID: LCS 360-42070/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 03/10/2009 1632
Date Prepared: N/A

Analysis Batch: 360-42070
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 1.0 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Sulfate	80.0	79.3	99	85 - 115	
Chloride	40.0	39.8	99	85 - 115	

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-21354-1

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 360-42070

Method: 300.0
Preparation: N/A

MS Lab Sample ID:	360-21354-5	Analysis Batch:	360-42070	Instrument ID:	No Equipment Assigned
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	N/A
Dilution:	20			Initial Weight/Volume:	1.0 mL
Date Analyzed:	03/10/2009 1702			Final Weight/Volume:	10 mL
Date Prepared:	N/A				

MSD Lab Sample ID:	360-21354-5	Analysis Batch:	360-42070	Instrument ID:	No Equipment Assigned
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	N/A
Dilution:	20			Initial Weight/Volume:	1.0 mL
Date Analyzed:	03/10/2009 1717			Final Weight/Volume:	10 mL
Date Prepared:	N/A				

	% Rec.						
Analyte	MS	MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Sulfate	80	78	75 - 125	0 2.5	20	4	4

5/12/09

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-21354-1

Method Blank - Batch: 360-41845

Method: L107-06-1B
Preparation: Distill/Ammonia

Lab Sample ID: MB 360-41845/1-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 03/04/2009 1714
Date Prepared: 03/03/2009 1320

Analysis Batch: 360-41860
Prep Batch: 360-41845
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 50 mL

Analyte	Result	Qual	RL	RL
Ammonia	ND		0.10	0.10

Lab Control Spike - Batch: 360-41845

Method: L107-06-1B
Preparation: Distill/Ammonia

Lab Sample ID: LCS 360-41845/2-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 03/04/2009 1715
Date Prepared: 03/03/2009 1320

Analysis Batch: 360-41860
Prep Batch: 360-41845
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 50 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Ammonia	10.0	9.44	94	85 - 115	

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-21354-1

Method Blank - Batch: 360-41915

Method: L107-06-1B
Preparation: Distill/Ammonia

Lab Sample ID: MB 360-41915/1-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 03/06/2009 1307
Date Prepared: 03/05/2009 1145

Analysis Batch: 360-41958
Prep Batch: 360-41915
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 50 mL

Analyte	Result	Qual	RL	RL
Ammonia	ND		0.10	0.10

Lab Control Spike - Batch: 360-41915

Method: L107-06-1B
Preparation: Distill/Ammonia

Lab Sample ID: LCS 360-41915/2-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 03/06/2009 1308
Date Prepared: 03/05/2009 1145

Analysis Batch: 360-41958
Prep Batch: 360-41915
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 50 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Ammonia	10.0	9.20	92	85 - 115	

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 360-41915

Method: L107-06-1B
Preparation: Distill/Ammonia

MS Lab Sample ID: 360-21354-2
Client Matrix: Water
Dilution: 10
Date Analyzed: 03/06/2009 1332
Date Prepared: 03/05/2009 1145

Analysis Batch: 360-41958
Prep Batch: 360-41915

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 50 mL

MSD Lab Sample ID: 360-21354-2
Client Matrix: Water
Dilution: 10
Date Analyzed: 03/06/2009 1332
Date Prepared: 03/05/2009 1145

Analysis Batch: 360-41958
Prep Batch: 360-41915

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 50 mL

Analyte	% Rec. MS	% Rec. MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Ammonia	1	-86	75 - 125	~~12~~ 195	20	4	4

5/15/09

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-21354-1

Method Blank - Batch: 360-41761

Method: SM 2510B
Preparation: N/A

Lab Sample ID: MB 360-41761/12
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 03/02/2009 1212
Date Prepared: N/A

Analysis Batch: 360-41761
Prep Batch: N/A
Units: umhos/cm

Instrument ID: MAN-TECH Ion Plus
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 1.0 mL

Analyte	Result	Qual	RL	RL
Specific Conductance	ND		1.0	1.0

Lab Control Spike - Batch: 360-41761

Method: SM 2510B
Preparation: N/A

Lab Sample ID: LCS 360-41761/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 03/02/2009 1156
Date Prepared: N/A

Analysis Batch: 360-41761
Prep Batch: N/A
Units: umhos/cm

Instrument ID: MAN-TECH Ion Plus
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 1.0 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Specific Conductance	1420	1410	99	85 - 115	

Duplicate - Batch: 360-41761

Method: SM 2510B
Preparation: N/A

Lab Sample ID: 360-21354-6
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 03/02/2009 1209
Date Prepared: N/A

Analysis Batch: 360-41761
Prep Batch: N/A
Units: umhos/cm

Instrument ID: MAN-TECH Ion Plus Autoti
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 1.0 mL

Analyte	Sample Result/Qual	Result	RPD	Limit	Qual
Specific Conductance	1300	1340	~~0~~ 3.0	20	

5/19/09

Calculations are performed before rounding to avoid round-off errors in calculated results.

Login Sample Receipt Check List

Client: Olin Corporation

Job Number: 360-21354-1

Login Number: 21354
List Source: TestAmerica Westfield
Creator: Rinard, Kimberley A
List Number: 1

Question	T / F/ NA	Comment
Radioactivity either was not measured or, if measured, is at or below background	N/A	
The cooler's custody seal, if present, is intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	2.2 C
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	N/A	
If necessary, staff have been informed of any short hold time or quick TAT needs	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	

TestAmerica Laboratories, Inc.

Chain of Custody Form

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

360 21354

•53 Southampton Road
Westfield, MA 01085
(P) 413-572-4000
(F) 413-572-3707

•149 Rangeway Road
N. Billerica, MA 01862
(P) 978-667-1400
(F) 978-667-7871

Client: Olin Chemical/MACTEC
Address: 51 Eames Street
Wilmington, MA 01887
Phone: Fax:

Project #: 61079001C / 04
Project Manager: PETER THOMPSON
Work ID: ~~PCMP~~ Slurry Wall/Cap
Contact: David Chapman

Job#	Quote#	PO#

Requested Turn Around Time
10 Business Day (Std) XX | Rush TAT Requested:
15 Business Day | 24 hrs | 72 hrs
Other | 48 hrs | 5 Day

Regulatory Classification / Special Report Format
NPDES | Drinking Water | DEP Form(s)
RCRA | MCP GW1/S1 | MWRA Smart Rpt
Other | MCP QA/QC Rpt XX

Shaded areas for office use

Analysis Requested
Check analysis and specify method and analytes in comments section.
For example:
500-series for drinking water
600-series for waste water
8000-series for haz/solid waste
Use comments section to further define.

Comments
(Special Instructions)

MCP case narrative

DO NOT RUN NITRATE

Dissolved metals are field filtered.

Groundwater Metals: Dissolved Al/Cr

Surfacewater Metals: Dissolved/Total Al/Cr/Na

Sample Type Codes
WW-Wastewater DW-Drinking water SW-Surfacewater
LW-Labwater GW-Groundwater A-Air
S-Solid / Soil SL-Sludge O-Oil Z-Other

Sample ID	Sample Type	Sampler's Initials	Date / Time Collected	Grab	Comp.	# Containers	Plastic(P) or Glass(G)	Preservative: NaHSO4/MeOH	HNO3 to pH <2	H2SO4 to pH <2	HCl to pH <2	NaOH to pH >12	NAOH/ZNAC	None / 4° C	Ammonia-Nitrogen	Chloride, Sulfate	Specific Conductivity	~~Nitrate, Nitrite~~ DLR	Groundwater metals	Surfacewater metals	Sediment: Al/Cr/Fe	Other	Other	Other	Other	Other	Other
OC-GW-202S	GW	DLC DLH	2/25/09 0910	X		3	P	X	X					X	X	X	X	X	X							
OC-PZ-18R		DLC DLH	2/25/09 1030	X		3	P	X	X					X	X	X	X		X							
OC-GW-795		DLC DLH	2/25/09 1140	X		3	P	X	X					X	X	X	X		X							
OC-PZ-17RR		DLC DLH	2/25/09 1030	X		3	P	X	X					X	X	X	X		X							
OC-GW-202D		DLC DLH	2/25/09 9:15	X		3	P	X	X					X	X	X	X		X							
OC-GW-785		DLC DLH	2/25/09 11:55	X		3	P	X	X					X	X	X	X		X							

2/25/09

Sampled by (print): DARON KURKJIAN/DAVID CHAPMAN
Signature:

Relinquished by:	Date:	Time:	Received by:	Date:	Time:
David Chapman	2/26/09	1245		2/26/09	1245
	2/26/09	1650		2/26/09	1650

Method of shipment:

TestAmerica-Westfield

Cooler ? Y / N Samples Iced? Y / N
Temp @ receipt: 2.2°C °C
Preservation/pH checked
By: KM Date: 2/26/09

White = Lab file Yellow = Report copy Pink = Customer copy
STL-8245 (1000)

APPENDIX C

Weir Monthly Inspection Reports
October 2008 – March 2009

MACTEC
engineering and constructing a better tomorrow

December 1, 2008

Wilmington Conservation Commission
Town Hall
121 Glen Road
Wilmington, MA 01887
Attn: Winifred McGowan

RE: Olin Corporation – DEP File #344-419
Weir Inspection Reports
MACTEC Project No. 6100080016.16

Dear Commission:

This letter documents the weekly weir inspections carried out at the Olin Property in Wilmington, Massachusetts by MACTEC Engineering and Consulting, Inc. (MACTEC) and Olin Corporation. The weekly weir inspection reports for the month of October 2008 are attached. An inspection was conducted on October 3; however the inspection sheet was misfiled and is not included in this report. MACTEC conducted an inspection on Friday, October 31, 2008.

West Ditch Off-Property

Station A contained low levels of clear-colored standing water for the month with leaves visible on the bottom. Station B had tannic colored water throughout the month with ice covering the water during one inspection.

Weir

The water at Station D had a tannic color during all of the inspections of the month. The bottom was not visible during any of the inspections.

Flow was observed from the weir outlet pipe throughout the month, ranging from low flow to medium flow. At the weir area, the water was observed to be lightly cloudy during two of the inspections, and was observed to have a dark tannic color for two inspections. White scum or foam was observed on the surface of the water during two inspections.

MACTEC Engineering and Consulting, Inc.
107 Audubon Road, Bldg. 2, Suite 301 • Wakefield, MA 01880 • Phone: 781.245.6606 • Fax: 781.246.5060
www.mactec.com

South Ditch Downstream of the Weir

Station E and Station F, located along the South Ditch, had low flow volumes throughout the month. The water at Stations E and F was observed to be clear with the exception of the final inspection of the month when it was observed to be slightly cloudy. A brown and rust coloring was observed on the bottom of the stream during all of the inspections. The vegetation at Station G, the delta area, has begun to senesce and die back due to the approach of winter. Therefore, the water at Station G has become visible.

Wetland Areas South of the South Ditch

Station H and Station I tended to have mostly saturated soil with some standing water. During one of the inspections the stations were covered with ice.

Wildlife

During one inspection an osprey was observed eating a snake. Also, animal tracks were visible in the frost on the footbridge near the weir area during one inspection.

Please feel free to contact either of the undersigned at 781-245-6606 with any questions.

Sincerely,
MACTEC Engineering and Consulting, Inc.

Tony Rodolakis
Senior Scientist

Michael J. Murphy
Project Principal

Attachments

cc: Mr. Steve Morrow, Olin Corp.
Mr. Brian Guichard, Olin Corp.
Mr. Jim DiLorenzo, EPA
Mr. Joe Coyne, MassDEP – Boston (Electronic)
MACTEC Project File [P:\OLIN\Wilmington\South Ditch\Monthly Inspections\October 2008\October 2008 South Ditch Inspection.doc]

Olin Corporation

Wilmington Site

Interim Action Plan

South and West Ditch Precipitate Inspection Report

Date 10/10/2008 Time 14:00 Inspectors Leroy Johnson

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Station A has a low level of clear water with leaves on the bottom. Station B has a tannic colored water. Vegetation covering 1/2 of the water area.
	Station A		x	
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Tannic colored water cannot see the bottom.
	Station D		x	
Weir - Downstream				Stations E & F have a low flow of clear water. The bottom is brown and rust colored. The vegetation at Station G is beginning to die for the winter, a visible stream flow can be seen.
	Station E	x		
	Station F	x		
	Station G		x	
Unnamed Ditch				Stations H and I both have muddy soil with some grassy areas.
	Station H		x	
	Station I		x	
Supplemental Inspection Locations (designate station location on page 2 of 2)				
Staff Gauge Level				

Condition of Weir / Haybale Barriers: There isno flow from the outlet pipe at this time and a low flow from the weir area. The main area is slightly cloudy with a brown and beige colored bottom.

The Haybale line has a low flow of clear water.

Noticed one Osprey eating a snake on the roadway near the weir area.

Olin Corporation

Wilmington Site

Interim Action Plan

South and West Ditch Precipitate Inspection Report

Date 10/17/2008 Time 8:00 Inspectors Leroy Johnson

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Station A has a very low level of clear water with leaves on the top. Station B has a tannic colored water with leaves on top.
	Station A		x	
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Tannic colored water cannot see the bottom.
	Station D		x	
Weir - Downstream				Stations E & F have a very low flow of clear water. The bottom is brown and rust colored. The vegetation at Station G has almost completely died back for the winter.
	Station E	x		
	Station F	x		
	Station G		x	
Unnamed Ditch				Stations H is mostly muddy soil with a little free standing water. Station I is just muddy soil. vegetation at both areas is dead for the winter.
	Station H		x	
	Station I		x	
Supplemental Inspection Locations (designate station location on page 2 of 2)				
Staff Gauge Level				

Condition of Weir / Haybale Barriers: There is no flow from the outlet pipe at this time and a low flow from the weir area. The main area has dark tannic water. There were several bubbling events noticed.

The Haybale line has a low flow of clear water.

Olin Corporation

Wilmington Site

Interim Action Plan

South and West Ditch Precipitate Inspection Report

Date 10/24/2008 Time 8:00 Inspectors Brian Guichard

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Station A has a low level of clear water with leaves on the top and bottom. Station B has a tannic colored water with leaves on top.
	Station A		x	
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Tannic colored water cannot see the bottom, the water surface is clear.
	Station D		x	
Weir - Downstream				Stations E & F have a very low flow of clear water. The bottom is brown and rust colored. The vegetation at Station G has completely died back for the winter.
	Station E	x		
	Station F	x		
	Station G		x	
Unnamed Ditch				Stations H and I are muddy soil with leaves on the surface. The vetetation at station G has died back for the winter.
	Station H		x	
	Station I		x	
Supplemental Inspection Locations (designate station location on page 2 of 2)				
Staff Gauge Level				

Condition of Weir / Haybale Barriers: There is no flow from the outlet pipe and a low flow from the weir area. The main area has dark tannic water with some small areas of white scum on the water surface. There were several bubbling events noticed.

The Haybale line has a low flow of clear water.

Note: there were several animal tracks in the frost on the foot bridge near the Weir area from more than one animal.

Olin Corporation
Wilmington Site
Interim Action Plan
South and West Ditch Precipitate Inspection Report

Date: 10/31/08 **Time:** 8:30 **Inspectors:** Brian Roden
Brian Guichard

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Station A has clear water with some leaves
	Station A		x	on top and leaves visible on bottom
	Station B		x	Station B has light ice and leaves on top
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Light ice covering, tannic colored
	Station D		x	cannot see bottom
Weir - Downstream				Stations E&F have slightly cloudy water, low water
	Station E	x		level, with light occasional foaming, rust
	Station F	x		coloring on bottom. Water is visible at Station G,
	Station G		x	vegetation has began to die back.
Unnamed Ditch				
	Station H		x	Ice covering standing water
	Station I		x	Standing water, low level
Supplemental Inspection Locations (designate station location on page 2 of 2)				
Staff Gauge Level				

Condition of Weir / Haybale Barriers: There is a low flow from the plant B discharge pipe and a low to medium flow from the weir outlet pipe. There is a small area of white foam/scum on the surface of the water. The water is lightly cloudy.

There is a low to medium flow of clear water through the haybale line. There is light foaming after the haybale line.

MACTEC
engineering and constructing a better tomorrow

December 18, 2008

Wilmington Conservation Commission
Town Hall
121 Glen Road
Wilmington, MA 01887
Attn: Winifred McGowan

RE: Olin Corporation – DEP File #344-419
Weir Inspection Report – November 2008
MACTEC Project No. 6100080016.16

Dear Commission:

This letter documents the weekly weir inspections carried out at the Olin Property in Wilmington, Massachusetts by MACTEC Engineering and Consulting, Inc. (MACTEC) and Olin Corporation. The weekly weir inspection reports for the month of November 2008 are attached. Due to the Thanksgiving holiday, the inspection schedule was compressed; thus there were only 3 inspections for the month of November 2008. MACTEC conducted an inspection on Tuesday, November 26, 2008.

West Ditch Off-Property

Station A and Station B both contained a low level of water. Leaves were observable on the bottom of the ditch for the entire month, and also on the top of the water at the beginning of the month. Station A had clear water for the entire month while Station B had tannic water colored for most of the month.

Weir

Station D had tannic colored water throughout the month. The bottom was not visible for most of the month, but was visible during the last inspection.

The flow conditions from the weir outlet pipe fluctuated throughout the month, from no flow at the beginning of the month to moderate flow for the rest of the month. During the last inspection, green tinted-water and a thin cloud of flocculent were observed in the water column immediately downstream of the weir.

MACTEC Engineering and Consulting, Inc.
107 Audubon Road, Bldg. 2, Suite 301 • Wakefield, MA 01880 • Phone: 781.245.6606 • Fax: 781.246.5060
www.mactec.com

South Ditch Downstream of the Weir

Stations E and F, located along the South Ditch, had a medium flow of clear water with a visible brown and rust colored bottom. Station G, the delta area, was flooded during the last two inspections of the month.

The hay bale line had a low to moderate volume of flow throughout the month.

Wetland Areas South of the South Ditch

Station H and Station I both had freestanding water present throughout the month. A thin layer of ice was observed at the end of the month.

Wildlife

Chickadees were observed near the South Ditch during the third inspection of the month.

Please feel free to call at 781-245-6606 with any questions.

Sincerely,
MACTEC Engineering and Consulting, Inc.

Tony Rodolakis
Senior Scientist

Michael J. Murphy
Project Principal

Attachments

cc: Mr. Steve Morrow, Olin Corp.
Mr. Brian Guichard, Olin Corp.
Mr. Jim DiLorenzo, EPA
Mr. Joe Coyne, MassDEP – Boston (Electronic)
MACTEC Project File
[P:\6300060010 - OLIN Wilmington 2007\4.0 Project Deliverables\4.1 Reports\Weir Inspection Reports\NOV08 Weir Inspection Report.doc]

Olin Corporation

Wilmington Site

Interim Action Plan

South and West Ditch Precipitate Inspection Report

Date 11/7/2008 Time 11:00 Inspectors Leroy Johnson

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Station A has a low level of clear water with leaves on the top and bottom. Station B has a tannic colored water with leaves on top.
	Station A		x	
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	Filled in
Weir - Upstream				Tannic colored water cannot see the bottom, the water surface is clear.
	Station D		x	
Weir - Downstream				Stations E & F have a low flow of clear water. The bottom is brown and rust colored. The vegetation at Station G has completely died back for the winter.
	Station E	x		
	Station F	x		
	Station G		x	
Unnamed Ditch				Stations H and I both have standing water with leaves on the surface. The vetetation at station G has died for the winter a small stream in now visible.
	Station H		x	
	Station I		x	
Supplemental Inspection Locations (designate station location on page 2 of 2)				
Staff Gauge Level				

Condition of Weir / Haybale Barriers: There is no flow from the outlet pipe and a medium flow from the weir area. The main area has dark tannic water with some fallen leaves on the water surface.

The Haybale line has a low flow of clear water.

Olin Corporation

Wilmington Site

Interim Action Plan

South and West Ditch Precipitate Inspection Report

Date 11/14/2008 Time 9:15 Inspectors Leroy Johnson

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Station A has a low level of clear water with leaves on the top and bottom. Station B has a tannic colored water. The leaves have setteled to the bottom.
	Station A		x	
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	Filled in
Weir - Upstream				Tannic colored water cannot see the bottom, the water surface is clear.
	Station D		x	
Weir - Downstream				Stations E & F have a medium flow of clear water. The bottom is brown and rust colored. Station G is mostly flooded at this time with a visible stream through the center.
	Station E	x		
	Station F	x		
	Station G		x	
Unnamed Ditch				Stations H and I both have free standing water.
	Station H		x	
	Station I		x	
Supplemental Inspection Locations (designate station location on page 2 of 2)				
Staff Gauge Level				

Condition of Weir / Haybale Barriers: There is medium flow from the outlet pipe and the weir area. The main area is mostly clear with a lightly cloudy area near the center.

The Haybale line has a medim flow of clear water.

Olin Corporation
Wilmington Site
Interim Action Plan
South and West Ditch Precipitate Inspection Report

Date: 11/26/2008 **Time:** 11:30 **Inspectors:** Tony Rodolakis, Sarah Bell

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				
	Station A		X	Stations A and B have a low level of clear water,
	Station B		X	with leaves on the bottom.
West Ditch Foot Bridge				**Filled in**
	Station C		X	
Weir - Upstream				Tannic colored water. Leaves and rocks visible
	Station D		X	on bottom.
Weir - Downstream				
	Station E	X		Stations E and F have a medium flow of clear
	Station F	X		water. The bottom is visible and brown.
	Station G		X	Station G has a medium flow of clear water with a
				visible bottom. The delta area is flooded with
				1-2 inches of standing water.
Unnamed Ditch				
	Station H		X	Stations H and I both have standing water,
	Station I		X	approximately 2 inches deep and covered with ice.
Supplemental Inspection Locations (designate station location on page 2 of 2)				
Staff Gauge Level				

Condition of Weir / Haybale Barriers: There is a moderate flow from the outlet pipe and from the weir area. Green-tinted water and a thin cloud of flocculent are visible in the water column below the weir.

There is water flowing over the check-dams.

Chickadees were seen along the South Ditch.

MACTEC
engineering and constructing a better tomorrow

January 29, 2009

Wilmington Conservation Commission
Town Hall
121 Glen Road
Wilmington, MA 01887
Attn: Winifred McGowan

RE: Olin Corporation – DEP File #344-419
Weir Inspection Report – December 2008
MACTEC Project No. 6107-09-0016.04

Dear Commission:

This letter documents the weekly weir inspections carried out at the Olin Property in Wilmington, Massachusetts by MACTEC Engineering and Consulting, Inc. (MACTEC) and Olin Corporation. The weekly weir inspection reports for the month of December 2008 are attached. MACTEC conducted an inspection on Wednesday, December 24, 2008.

West Ditch Off-Property

Station A had clear water and a water level that ranged from low to high during the first three inspections of the month. Station B contained tannic-colored water that ranged from moderate to high water levels. By the final inspection, the water at both stations had frozen over and was covered with snow.

Weir

Station D had clear water for most of the month. The water level ranged from a moderate to high level throughout the month. By the final inspection, the water was frozen over and covered with snow.

The flow conditions from the weir outlet pipe fluctuated throughout the month, from low to high. The water was clear for most of the month.

MACTEC Engineering and Consulting, Inc.
107 Audubon Road, Bldg. 2, Suite 301 • Wakefield, MA 01880 • Phone: 781.245.6606 • Fax: 781.246.5060
www.mactec.com

South Ditch Downstream of the Weir

Stations E and F, located along the South Ditch, had clear water that fluctuated from a moderate to high flow and the bottom was visibly brown and rust-colored for most of the month. Station G, the delta area, was flooded. By the final inspection, all locations downstream of the weir were frozen over and covered with snow.

The hay bale line had a moderate to heavy volume of flow throughout the month.

Wetland Areas South of the South Ditch

Station H and Station I both had standing water present throughout the month. Some icy areas were noted at the beginning of the month. By the end of the month, the water had frozen over and was covered with snow.

Wildlife

Deer, squirrel, and rabbit tracks were visible in the snow during the last monthly inspection.

Please feel free to call at 781-245-6606 with any questions.

Sincerely,
MACTEC Engineering and Consulting, Inc.

Tony Rodolakis
Senior Scientist

Michael J. Murphy
Project Principal

Attachments

cc: Mr. Steve Morrow, Olin Corp.
Mr. Brian Guichard, Olin Corp.
Mr. Jim DiLorenzo, EPA
Mr. Joe Coyne, MassDEP – Boston (Electronic)
MACTEC Project File
[P:\6100080016 - OLIN Wilmington 2008\4.0 Project Deliverables\4.1 Reports\Weir Inspection Reports\November 2008 Weir Inspection Report]

Olin Corporation
Wilmington Site
Interim Action Plan
South and West Ditch Precipitate Inspection Report

Date 12/5/2008 Time 8:15 Inspectors Leroy Johnson

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Station A has a low level of clear water with leaves on the bottom. Station B has a tannic colored water with a thin layer of ice on the surface.
	Station A		x	
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Station D has a tannic colored water, the surface is clear.
	Station D		x	
Weir - Downstream				Stations E & F have a medium flow of clear water. The bottom is brown and rust colored. Station G is mostly flooded at present with a visible stream flowing through the center.
	Station E	x		
	Station F	x		
	Station G		x	
Unnamed Ditch				Stations H & I are both flooded, Station I has some icy areas.
	Station H		x	
	Station I		x	
Supplemental Inspection Locations (designate station location on page 2 of 2)				
Staff Gauge Level				

Condition of Weir / Haybale Barriers: There is no flow from the outlet pipe and a moderate flow from the weir area. The main area is clear with a thin layer of ice on the surface.

The Haybale line has a medium flow of clear water.

Olin Corporation

Wilmington Site

Interim Action Plan

South and West Ditch Precipitate Inspection Report

Date 12/12/2008 Time 10:00 Inspectors Leroy Johnson

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Stn A has a high level of clear water. The planks used to cross the stream have washed away. Stn B has a high level of tannic colored water.
	Station A		x	
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Station D has a high level of clear water.
	Station D		x	
Weir - Downstream				Stations E & F have a high flow of clear water. The bottom is brown and rust colored. Station G is completely flooded at this time.
	Station E	x		
	Station F	x		
	Station G		x	
Unnamed Ditch				Stations H and I both flooded.
	Station H		x	
	Station I		x	
Supplemental Inspection Locations (designate station location on page 2 of 2)				
Staff Gauge Level				

Condition of Weir / Haybale Barriers: There is a heavy flow of clear water from the outlet pipe and the weir area. The main area is clear.

The Haybale line has a heavy flow of clear water.

Olin Corporation

Wilmington Site

Interim Action Plan

South and West Ditch Precipitate Inspection Report

Date 12/19/2008 Time 9:00 Inspectors Leroy Johnson

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Stn A has a low level of clear water.
	Station A		x	Stn B has a moderate level of tannic colored water.
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Station D has a high level of clear water.
	Station D		x	
Weir - Downstream				Stations E & F have a moderate flow of clear water.
	Station E	x		The bottom is brown and rust colored.
	Station F	x		Station G is flooded and iced over.
	Station G		x	
Unnamed Ditch				Stations H and I are both flooded and iced over.
	Station H		x	
	Station I		x	
Supplemental Inspection Locations (designate station location on page 2 of 2)				
Staff Gauge Level				

Condition of Weir / Haybale Barriers: There is a light flow of clear water from the outlet pipe and the weir area.The main area is slightly murky and partially frozen over.

The Haybale line has a medium flow of clear water.

Olin Corporation
Wilmington Site
Interim Action Plan
South and West Ditch Precipitate Inspection Report

Date: 12/24/2008 **Time:** 7:00 **Inspectors:** T. Rodolakis

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				
	Station A		X	Station A & B are frozen over and covered with
	Station B		X	snow.
West Ditch Foot Bridge				**Filled in**
	Station C			
Weir - Upstream				
	Station D		X	Station D is frozen over and covered with snow.
Weir - Downstream				
	Station E		X	Stations E, F, & G are frozen over and
	Station F		X	covered with snow.
	Station G		X	
Unnamed Ditch				
	Station H		X	Stations H&I are frozen over and covered
	Station I		X	with snow.
Supplemental Inspection Locations (designate station location on page 2 of 2)				
Staff Gauge Level				

Condition of Weir / Haybale Barriers: There is a low flow from the outlet pipe. The main area at the weir is mostly frozen and covered with snow. Where the water is not frozen, the bottom appears tan and water is clear. Deer, squirrel, and rabbit tracks were visible in the snow.

MACTEC
engineering and constructing a better tomorrow

February 16, 2009

Wilmington Conservation Commission
Town Hall
121 Glen Road
Wilmington, MA 01887
Attn: Winifred McGowan

RE: Olin Corporation – DEP File #344-419
Weir Inspection Report – January 2009
MACTEC Project No. 6107-09-0016.04

Dear Commission:

This letter documents the weekly weir inspections carried out at the Olin Property in Wilmington, Massachusetts by MACTEC Engineering and Consulting, Inc. (MACTEC) and Olin Corporation. The weekly weir inspection reports for the month of January 2009 are attached. MACTEC conducted an inspection on Friday, January 30, 2009.

West Ditch Off-Property

Station A was frozen over with a low level of clear ice during all of the inspections. Station B was frozen over and covered with snow during all the inspections.

Weir

The water at Station D was frozen over and covered with snow during all of the inspections.

The flow conditions from the weir outlet pipe fluctuated throughout the month, from low to no flow. The water in the weir area was mostly frozen during all inspections. Clear water was observed in areas without ice during all the inspections. During the final inspection of the month, brown substrate was also visible.

MACTEC Engineering and Consulting, Inc.
107 Audubon Road, Bldg. 2, Suite 301 • Wakefield, MA 01880 • Phone: 781.245.6606 • Fax: 781.246.5060
www.mactec.com

South Ditch Downstream of the Weir

Stations E and F, located along the South Ditch, were partially frozen during all of the inspections. Stations E and F had a low to medium flow of water throughout the month. Station G, the delta area, was frozen over during all of the inspections.

The water in the area of the haybale line was frozen for most of the month. During the final inspection the haybale line was partially frozen and a low flow of clear water was visible.

Wetland Areas South of the South Ditch

Station H and Station I both were covered with ice and snow during all of the inspections.

Wildlife

Chickadees were observed during the last monthly inspection. Also, animal tracks were observed near Station E and animal scat was observed near Station G during the last inspection.

Please feel free to call at 781-245-6606 with any questions.

Sincerely,
MACTEC Engineering and Consulting, Inc.

Tony Rodolakis
Senior Scientist

Michael J. Murphy
Project Principal

Attachments

cc: Mr. Steve Morrow, Olin Corp.
Mr. Brian Guichard, Olin Corp.
Mr. Jim DiLorenzo, EPA
Mr. Joe Coyne, MassDEP – Boston (Electronic)
MACTEC Project File
[P:\6107090016 - Olin Wilmington CSS 2009\4.0 Project Deliverables\4.1 Reports\Weir Inspections\Jan 2009.doc]

Olin Corporation

Wilmington Site

Interim Action Plan

South and West Ditch Precipitate Inspection Report

Date 1/9/2009 Time 13:30 Inspectors Leroy Johnson

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Stn A is mostly frozen over with a low level of clear water. Stn B is frozen over.
	Station A		x	
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Station D is frozen over.
	Station D		x	
Weir - Downstream				Stations E & F are partially frozen over with some small sections of a low flow of clear water. Station G is iced over.
	Station E	x		
	Station F	x		
	Station G		x	
Unnamed Ditch				Stations H and I are both snow covered.
	Station H		x	
	Station I		x	
Supplemental Inspection Locations (designate station location on page 2 of 2)				
Staff Gauge Level				

Condition of Weir / Haybale Barriers: There is a light flow of clear water from the weir area.

The main area is mostly frozen over with a small area of clear water in the middle.

The Haybale line is frozen over.

Olin Corporation
Wilmington Site
Interim Action Plan
South and West Ditch Precipitate Inspection Report

Date 1/16/2009 Time 13:40 Inspectors Leroy Johnson

Station		Precipitate Observation Yes	Precipitate Observation No	Other Observations
Offsite Fenced Ditch System				Stn A is frozen over with a low level of clear water. Stn B is frozen over and snow covered.
	Station A		x	
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Station D is frozen over.
	Station D		x	
Weir - Downstream				Stations E & F are mostly frozen over with some small sections of a low flow of clear water. Station G is frozen over.
	Station E	x		
	Station F	x		
	Station G		x	
Unnamed Ditch				Stations H and I are both snow covered.
	Station H		x	
	Station I		x	
Supplemental Inspection Locations (designate station location on page 2 of 2)				
Staff Gauge Level				

Condition of Weir / Haybale Barriers: There is a light flow of clear water from the weir area.

The main area is frozen over with a small area of clear water near the weir outlet.

The Haybale line is frozen over.

Olin Corporation

Wilmington Site

Interim Action Plan

South and West Ditch Precipitate Inspection Report

Date 1/23/2009 Time 11:00 Inspectors Leroy Johnson

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Stn A is frozen over with a low level of clear water. Stn B is frozen over and snow covered.
	Station A		x	
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Station D is frozen over.
	Station D		x	
Weir - Downstream				Stations E & F are mostly frozen over. Some small sections have a medium flow of clear water. Station G is frozen over.
	Station E	x		
	Station F	x		
	Station G		x	
Unnamed Ditch				Stations H and I are both snow covered.
	Station H		x	
	Station I		x	
Supplemental Inspection Locations (designate station location on page 2 of 2)				
Staff Gauge Level				

Condition of Weir / Haybale Barriers: There is a light flow of clear water from the weir area and a medium flow from the outlet pipe. The main area is mostly frozen over.

The Haybale line is frozen over.

Olin Corporation
Wilmington Site
Interim Action Plan
South and West Ditch Precipitate Inspection Report

Date: 1/30/2009 Time: 8:30 Inspectors: Brian Roden

Station		Precipitate Observation Yes	Precipitate Observation No	Other Observations
Offsite Fenced Ditch System				Station A is mostly frozen over with clear ice
	Station A		X	and has a low level of water.
	Station B		X	Station B is frozen over and covered with snow.
West Ditch Foot Bridge				**Filled in**
	Station C			
Weir - Upstream				
	Station D		X	Station D is frozen over and covered with snow.
Weir - Downstream				Stations E & F are partially frozen. Both stations
	Station E	X		had a low level of water with small areas of
	Station F	X		foaming and a brown color on the bottom.
	Station G		X	Station G was covered with ice and snow.
Unnamed Ditch				
	Station H		X	Stations H&I are frozen over and covered
	Station I		X	with snow.
Supplemental Inspection Locations (designate station location on page 2 of 2)				
Staff Gauge Level				

Condition of Weir / Haybale Barriers: There is a low flow of water from the Plant B discharge pipe and no flow from the weir outlet pipe. The majority of the weir area is frozen with clear ice. A brown or rust color is visible on the bottom in areas where ice was not present.

The haybale line was mostly covered with snow and ice. A small area of clear water was visible.

Chickadees were observed. Animal tracks were observed in the area of Station E. Animal scat was observed in the area of Station G.

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April 14, 2009

Wilmington Conservation Commission
Town Hall
121 Glen Road
Wilmington, MA 01887
Attn: Winifred McGowan

RE: Olin Corporation – DEP File #344-419
Weir Inspection Report – February 2009
MACTEC Project No. 6107-09-0016.04

Dear Commission:

This letter documents the weekly weir inspections carried out at the Olin Property in Wilmington, Massachusetts by MACTEC Engineering and Consulting, Inc. (MACTEC) and Olin Corporation. The weekly weir inspection reports for the month of February 2009 are attached. MACTEC conducted an inspection on Friday, February 27, 2009.

West Ditch Off-Property

The water at Station A was completely frozen for the first inspection of the month and had some ice during the last two inspections. The water at Station A was clear during all inspections and water levels ranged from low to moderate. Station B was frozen over and covered with snow during all the inspections.

Weir

The water at Station D was completely frozen over and covered with snow during two of the inspections. During the second inspection the water was clear to lightly tannic colored. During the final inspection the water was partially frozen with clear water on the edges.

The flow conditions from the weir outlet pipe fluctuated throughout the month, from light flow to high flow. The water in the weir area was mostly frozen during the first inspection. During the three other inspections the water in the weir area was lightly cloudy near the center area and a rust or brown color was observed on the bottom.

South Ditch Downstream of the Weir

Stations E and F, located along the South Ditch, were frozen during the first inspection. During the three other inspections there was a moderate flow with a rust or brown color visible on the bottom. During the final inspection the water was lightly cloudy, the water was clear for the other three inspections. Station G, the delta area, was frozen over during the first inspection. During the other three inspections, Station G had a moderate flow of clear water through the center.

The water in the area of the haybale line was frozen for the first inspection of the month. During the other three inspections the haybale line had a moderate flow of clear water.

Wetland Areas South of the South Ditch

Station H and Station I both were covered with ice and snow during all of the inspections.

Wildlife

Bird species observed during the final inspection of the month included; robin, goldfinch, chickadee, junco, and sparrow. Two tadpoles were observed in the weir area during the last inspection. Animal tracks were observed in the snow in the vicinity of the weir area and near Station G.

Please feel free to call at 781-245-6606 with any questions.

Sincerely,
MACTEC Engineering and Consulting, Inc.

Tony Rodolakis
Senior Scientist

Michael J. Murphy
Project Principal

Attachments

cc: Mr. Steve Morrow, Olin Corp.
Mr. Brian Guichard, Olin Corp.
Mr. Jim DiLorenzo, EPA
Mr. Joe Coyne, MassDEP – Boston (Electronic)
MACTEC Project File
[P:\OLIN\Wilmington\South Ditch\Monthly Inspections\2009\February 2009\February 2009 Weir Inspection Report.doc]

Olin Corporation

Wilmington Site

Interim Action Plan

South and West Ditch Precipitate Inspection Report

Date 2/6/2009 Time 10:00 Inspectors Leroy Johnson

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Stn A is frozen over with a low level of clear water. Stn B is frozen over and snow covered.
	Station A		x	
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Station D is frozen over.
	Station D		x	
Weir - Downstream				Stations E & F are mostly frozen over. Some small sections have a low flow of clear water. Station G is frozen over.
	Station E	x		
	Station F	x		
	Station G		x	
Unnamed Ditch				Stations H and I are both snow covered.
	Station H		x	
	Station I		x	
Supplemental Inspection Locations (designate station location on page 2 of 2)				
Staff Gauge Level				

Condition of Weir / Haybale Barriers: There is a light flow of clear water from the weir area. The main area is mostly frozen over except for near the weir outlet pipe.

The Haybale line is frozen over.

Olin Corporation
Wilmington Site
Interim Action Plan
South and West Ditch Precipitate Inspection Report

Date 2/13/2009 Time 9:45 Inspectors Brian Guichard

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Stn A has a moderate level of clear water, all the snow and ice has melted. Stn B is still frozen over.
	Station A		x	
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Station D is partially frozen over, with a moderate level of clear to lightly tannic water.
	Station D		x	
Weir - Downstream				Stations E & F are completely thawed at this time. There is a moderate flow of clear water. The bottom is brown and rust colored. Station G has a moderate flow of clear water through the center.
	Station E	x		
	Station F	x		
	Station G		x	
Unnamed Ditch				Stations H and I are both still frozen over and snow covered.
	Station H		x	
	Station I		x	
Supplemental Inspection Locations (designate station location on page 2 of 2)				
Staff Gauge Level				

Condition of Weir / Haybale Barriers: There is a high flow of clear water from the weir area. The main area is completely thawed. There is a slightly higher than normal level of clear water with a noticeable rust and brown colored precipitate on the bottom and a small lightly cloudy area near the center.

The Haybale line has a moderate flow of clear water.

Olin Corporation
Wilmington Site
Interim Action Plan
South and West Ditch Precipitate Inspection Report

Date 2/120/2009 Time 9:45 Inspectors Leroy Johnson

Station		Precipitate Observation Yes	Precipitate Observation No	Other Observations
Offsite Fenced Ditch System				Stn A has a moderate level of clear water and is partially covered with ice again. Stn B is still frozen over.
	Station A		x	
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Station D is frozen over.
	Station D		x	
Weir - Downstream				Stations E & F are completely thawed at this time. There is a moderate flow of clear water. The bottom is brown and rust colored. Station G has a moderate flow of clear water through the center.
	Station E	x		
	Station F	x		
	Station G		x	
Unnamed Ditch				Stations H and I are both still frozen over and snow covered.
	Station H		x	
	Station I		x	
Supplemental Inspection Locations (designate station location on page 2 of 2)				
Staff Gauge Level				

Condition of Weir / Haybale Barriers: There is a moderate flow of clear water from the weir area. The main area is partially frozen over. There is a normal level of clear water with a brown and rust colored precipitate on the bottom and a small lightly cloudy area near the center.

The Haybale line has a moderate flow of clear water and is partially frozen over.

Olin Corporation
Wilmington Site
Interim Action Plan
South and West Ditch Precipitate Inspection Report

Date: 2/27/2009 **Time:** 10:30 **Inspectors:** Brian Roden

Station		Precipitate Observation Yes	Precipitate Observation No	Other Observations
Offsite Fenced Ditch System				Station A moderate level of clear water with some thin ice. Station B is mostly covered with clear ice, water on the edge is not frozen.
	Station A		X	
	Station B		X	
West Ditch Foot Bridge				**Filled in**
	Station C			
Weir - Upstream				Station D has some thin ice with clear water on edges, leaves and rocks are visible on the bottom
	Station D		X	
Weir - Downstream				Stations E and F have a moderate flow of lightly cloudy water, occasional foaming with brown rust color bottom. Station G is partially covered with snow, clear water is visible in the center
	Station E	X		
	Station F	X		
	Station G		X	
Unnamed Ditch				
	Station H		X	Stations H and I are covered with snow and ice
	Station I		X	
Supplemental Inspection Locations (designate station location on page 2 of 2)				
Staff Gauge Level				

Condition of Weir / Haybale Barriers: There is a moderate flow from the weir outlet pipe and no flow from the Plant B outlet pipe. The weir area has a medium level of slightly cloudy water. A rust/brown color is visible on the bottom. Two tadpoles were observed in the weir area.

The haybale line had a medium flow of clear water with some foaming after the haybale line.

Animal tracks were oberved in the snow in the vicinity of the weir area and by Station G. Birds species obversed include, robins, goldfinch, chickadee, junco, sparrow.

MACTEC

engineering and constructing a better tomorrow

April 14, 2009

Wilmington Conservation Commission
Town Hall
121 Glen Road
Wilmington, MA 01887
Attn: Winifred McGowan

RE: Olin Corporation – DEP File #344-419
Weir Inspection Report – March 2009
MACTEC Project No. 6107-09-0016.04

Dear Commission:

This letter documents the weekly weir inspections carried out at the Olin Property in Wilmington, Massachusetts by MACTEC Engineering and Consulting, Inc. (MACTEC) and Olin Corporation. The weekly weir inspection reports for the month of March 2009 are attached. MACTEC conducted an inspection on Friday, March 27, 2009.

West Ditch Off-Property

The water at Station A was clear during all inspections and water levels ranged from low to moderate. Leaves were noted at the bottom of Station A for the last two inspections of the month. Station B was frozen over for the first two inspections and had a moderate level of water for the last two inspections.

Weir

The water at Station D was partially frozen with a moderate level of lightly tannic-colored water for the first two inspections. During the third inspection, Station D had a moderate level of clear water with decaying leaves on the bottom. During the final inspection there was a high level of clear water with brown sediment on the bottom.

MACTEC Engineering and Consulting, Inc.
Audubon Road, Bldg 2, Suite 301 • Wakefield, MA 01880 • Phone: 781.245.6606 • Fax: 781.246.5060
www.mactec.com

The flow conditions from the weir outlet pipe fluctuated throughout the month, from no flow to moderate flow. The water in the weir area was partially frozen during the first two inspections. Water levels in the weir area ranged from moderate to high. During the first inspection the water in the weir area was lightly cloudy near the center area, and during the last two inspections of the month, a thin layer of foam was noted on the water surface. For all the inspections, a rust or brown colored precipitate was observed on the bottom.

South Ditch Downstream of the Weir

Stations E and F, located along the South Ditch, were completely thawed all month. During the inspections there was a low to moderate flow of clear water with a rust or brown color visible on the bottom and along the stream edges. During the third inspection, foaming was observed after each check dam. Station G, the delta area, had clear water flowing through the center during all inspections; water flow fluctuated from heavy during the first inspection, low during the next two inspections, and was flooded during the last inspection.

The water in the area of the haybale line was partially frozen for the first half of the month. Water flow ranged from heavy to low throughout the month. Foaming in the haybale area was noted during the third inspection.

Wetland Areas South of the South Ditch

Station H and Station I both were covered with ice and snow during the first half of the month, and Station I was still partially frozen by the third inspection. During the last half of the month, both stations were flooded with clear, standing water.

Wildlife

During the third inspection, dog and deer prints were observed in the remaining areas of snow. Bird species observed during the final inspection of the month included: robin, red-wing blackbird, crow, mallard ducks, and killdeer. Predaceous diving beetles were observed in the weir area as well.

Please feel free to call at 781-245-6606 with any questions.

Sincerely,
MACTEC Engineering and Consulting, Inc.

Tony Rodolakis
Senior Scientist

Michael J. Murphy
Project Principal

Attachments

cc: Mr. Steve Morrow, Olin Corp.
Mr. Brian Guichard, Olin Corp.
Mr. Jim DiLorenzo, EPA
Mr. Joe Coyne, MassDEP – Boston (Electronic)
MACTEC Project File
[P:\6107090016 - Olin Wilmington CSS 2009\4.0 Project Deliverables\4.1 Reports\Weir Inspections\March 2009.doc]

Olin Corporation

Wilmington Site

Interim Action Plan

South and West Ditch Precipitate Inspection Report

Date 3/6/2009 Time 10:30 Inspectors Leroy Johnson

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Stn A has a moderate level of clear water. Most of the snow and ice has melted. Stn B is still frozen over.
	Station A		x	
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	Filled in
Weir - Upstream				Station D is patrially thawed and has a moderate level of lightly tannic water.
	Station D		x	
Weir - Downstream				Stations E & F are completely thawed at this time. There is a moderate flow of clear water. The bottom is brown and rust colored. Station G has a heavy flow of clear water through the center.
	Station E	x		
	Station F	x		
	Station G		x	
Unnamed Ditch				Stations H and I are both still frozen over and snow covered.
	Station H		x	
	Station I		x	
Supplemental Inspection Locations (designate station location on page 2 of 2)				
Staff Gauge Level				

Condition of Weir / Haybale Barriers: There is a moderate flow of clear water from the weir and a low flow from the outlet pipe. The main area is still partially frozen. There is a normal level of clear water with a brown and rust colored precipitate on the bottom and a small lightly cloudy area near the center.

The Haybale line has a heavy flow of clear water and is partially frozen over.

Olin Corporation
Wilmington Site
Interim Action Plan
South and West Ditch Precipitate Inspection Report

Date 3/13/2009 Time 9:45 Inspectors Leroy Johnson

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Stn A has a moderate level of clear water.
	Station A		x	Stn B is still frozen over
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	Filled in
Weir - Upstream				Station D is patrially thawed and has a moderate
	Station D		x	level of lightly tannic water
Weir - Downstream				Stations E & F are completely thawed at this time.
	Station E	x		There is a moderate flow of clear water. The bottom
	Station F	x		is brown and rust colored. Station G has a low flow
	Station G		x	of clear water through the center.
Unnamed Ditch				Stations H and I are both still frozen over.
	Station H		x	
	Station I		x	
Supplemental Inspection Locations (designate station location on page 2 of 2)				
Staff Gauge Level				

Condition of Weir / Haybale Barriers: There is a moderate flow of clear water from the weir and no flow from the outlet pipe. The main area is still partially frozen. There is a normal level of clear water with a brown and rust colored precipitate on the bottom.

The Haybale line has a low flow of clear water and is lightly frozen over.

Noticed dog and deer prints in the remaining areas of snow.

Olin Corporation
Wilmington Site
Interim Action Plan
South and West Ditch Precipitate Inspection Report

Date 3/20/2009 Time 9:30 Inspectors Brian Guichard

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Stn A has a low level of clear water with decaying leaves on the bottom. Stn B has a normal level of clear water with leaves on the bottom.
	Station A		x	
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	Filled in
Weir - Upstream				Station D has a normal level of clear water with decaying leaves on the bottom.
	Station D	x		
Weir - Downstream				Stations E & F have a low flow of clear water. The stream bottom is beige and rust colored with some mild foaming after each check dam. Station G has a low flow of clear water through the center.
	Station E	x		
	Station F	x		
	Station G	x		
Unnamed Ditch				Stations H and I are both flooded and Station I has a thin layer of ice still remaining on the water surface.
	Station H		x	
	Station I		x	
Supplemental Inspection Locations (designate station location on page 2 of 2)				
Staff Gauge Level				

Condition of Weir / Haybale Barriers: There is a low flow of clear water from the weir area and no flow from the outlet pipe. The main area has a normal level of clear water with a beige and rust colored precipitate on the bottom and a thin layer of scum on the water surface. Noticed one bubbling event.

The Haybale line has a low flow of clear water with some light foaming in the area.

Olin Corporation
Wilmington Site
Interim Action Plan
South and West Ditch Precipitate Inspection Report

Date: 3/27/2009 **Time:** 8:00 **Inspectors:** Tony Rodolakis

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Station A has a moderate level of water with leaves on the bottom. Station B has a moderate level of water.
	Station A		X	
	Station B		X	
West Ditch Foot Bridge				Filled in
	Station C			
Weir - Upstream				High level of clear water with brown sediment on bottom.
	Station D		X	
Weir - Downstream				E and F have moderate flow of clear water with brown precipitate on the stream edges. Station G is flooded with clear water flowing through the center channel.
	Station E	X		
	Station F	X		
	Station G		X	
Unnamed Ditch				
	Station H		X	H and I are flooded with approximately 2" of clear standing water.
	Station I		X	
Supplemental Inspection Locations (designate station location on page 2 of 2)				
Staff Gauge Level				

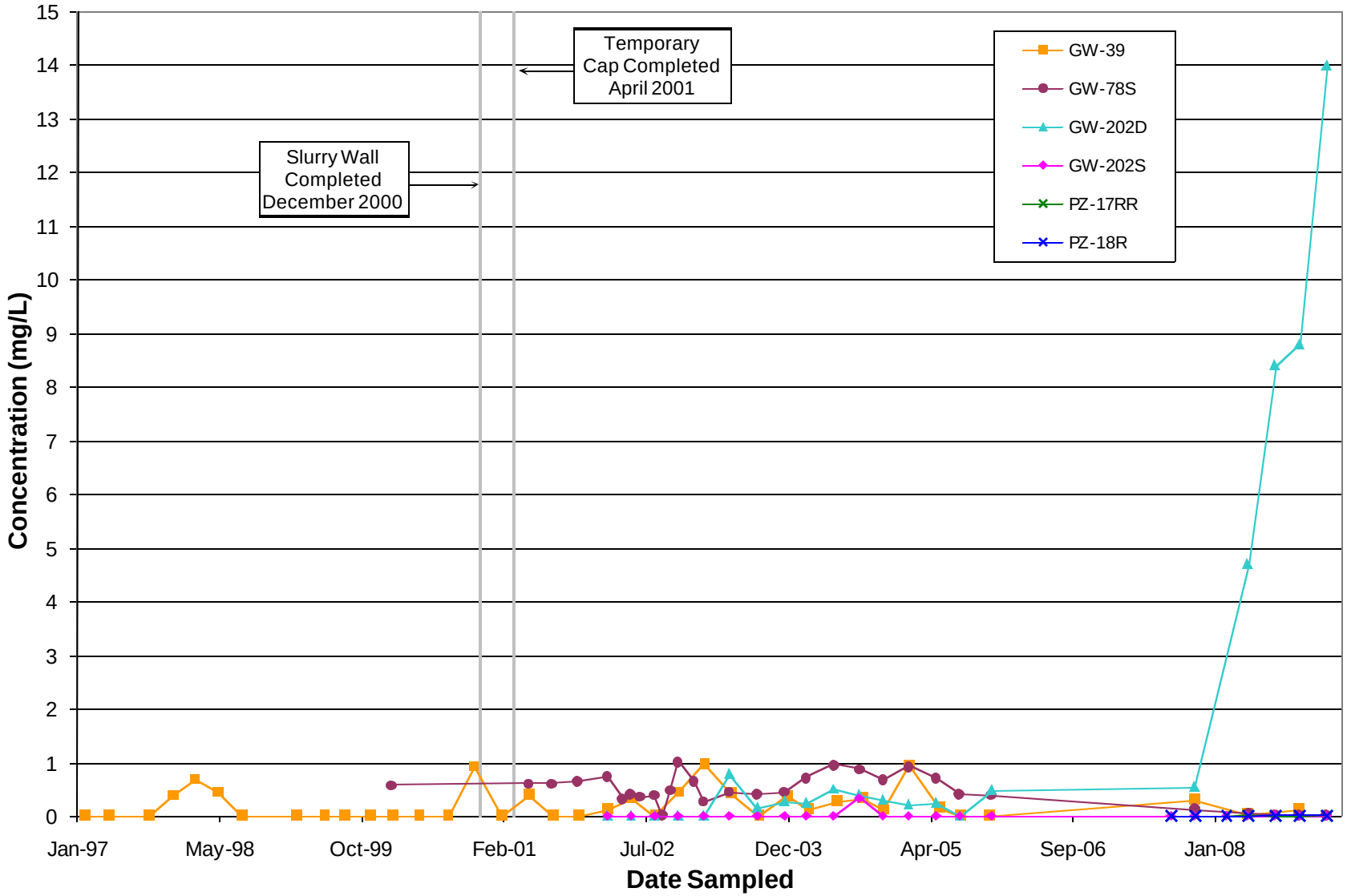
Condition of Weir / Haybale Barriers: There is a moderate flow of water from the outlet pipe. The main area has a high volume of water and is clear, with a beige-colered precipitate on the bottom. There is foam on the water surface. Observed predaceous diving beetles in the main area.

Birds observed: Robin, red-wing blackbird, crow, mallards, killdeer.

APPENDIX D

Slurry Wall/Cap Groundwater, Surface Water, and Sediment Quality Time Series Plots

D-1 Groundwater (Aluminum, Ammonia, Chloride, Chromium, Sulfate)
D-2 Surface Water (Aluminum, Ammonia, Chloride, Chromium, Sulfate)
D-3 Sediment (Aluminum, Chromium, Iron)



Semi-Annual Status Report No. 4
Olin Wilmington Superfund Site
Wilmington, Massachusetts

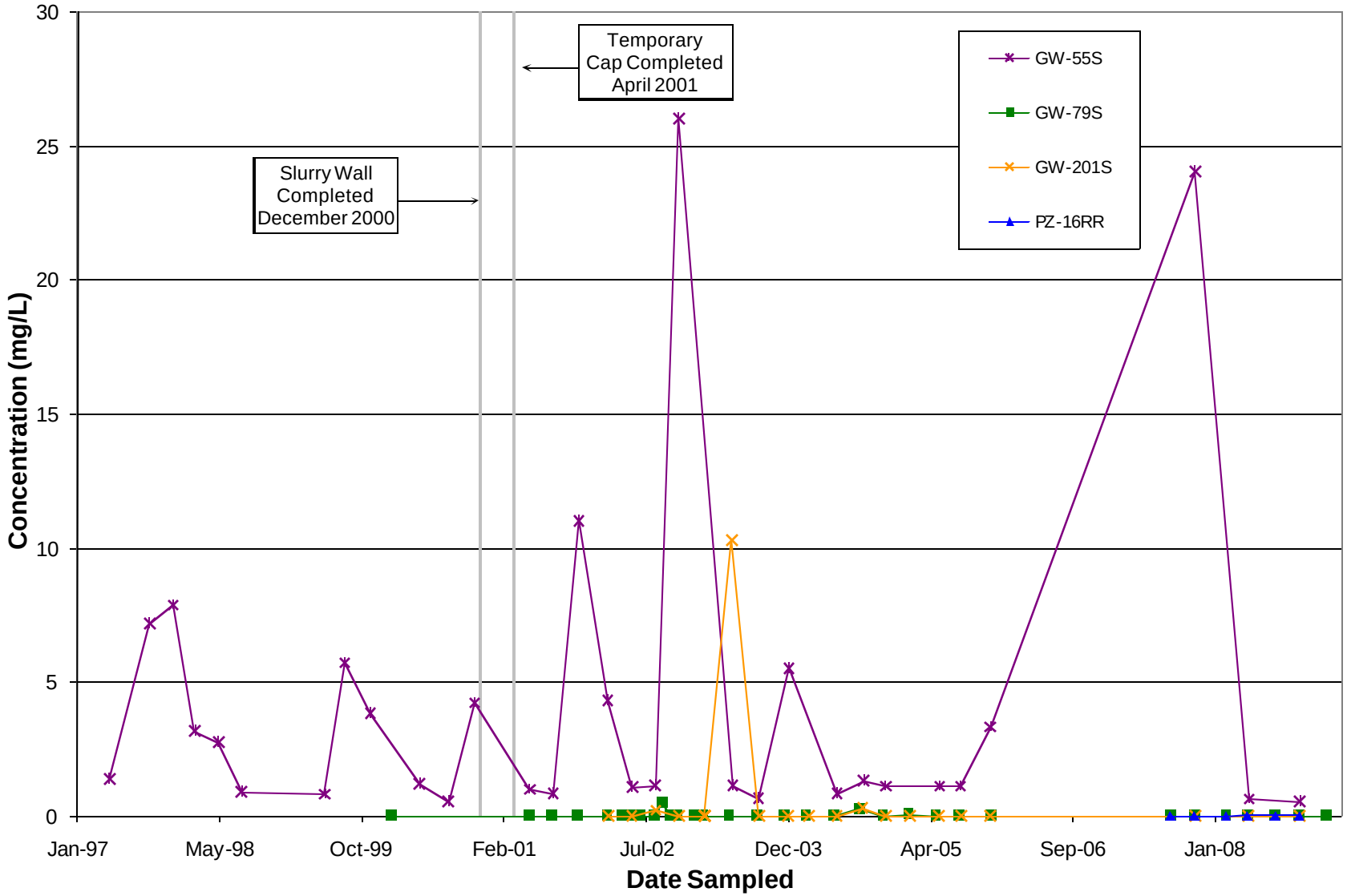
MACTEC

Filtered Aluminum in Groundwater South of Containment Structure

Figure D-1.1

P:\OLIN\Wilmington\SemiAnnual Status Report\2009 July\Appendix D\
Time Series Plots DAPL constituents.xls, Aluminum GW S

Prepared by: BJR
Checked by: MH



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Olin Wilmington Superfund Site
Wilmington, Massachusetts

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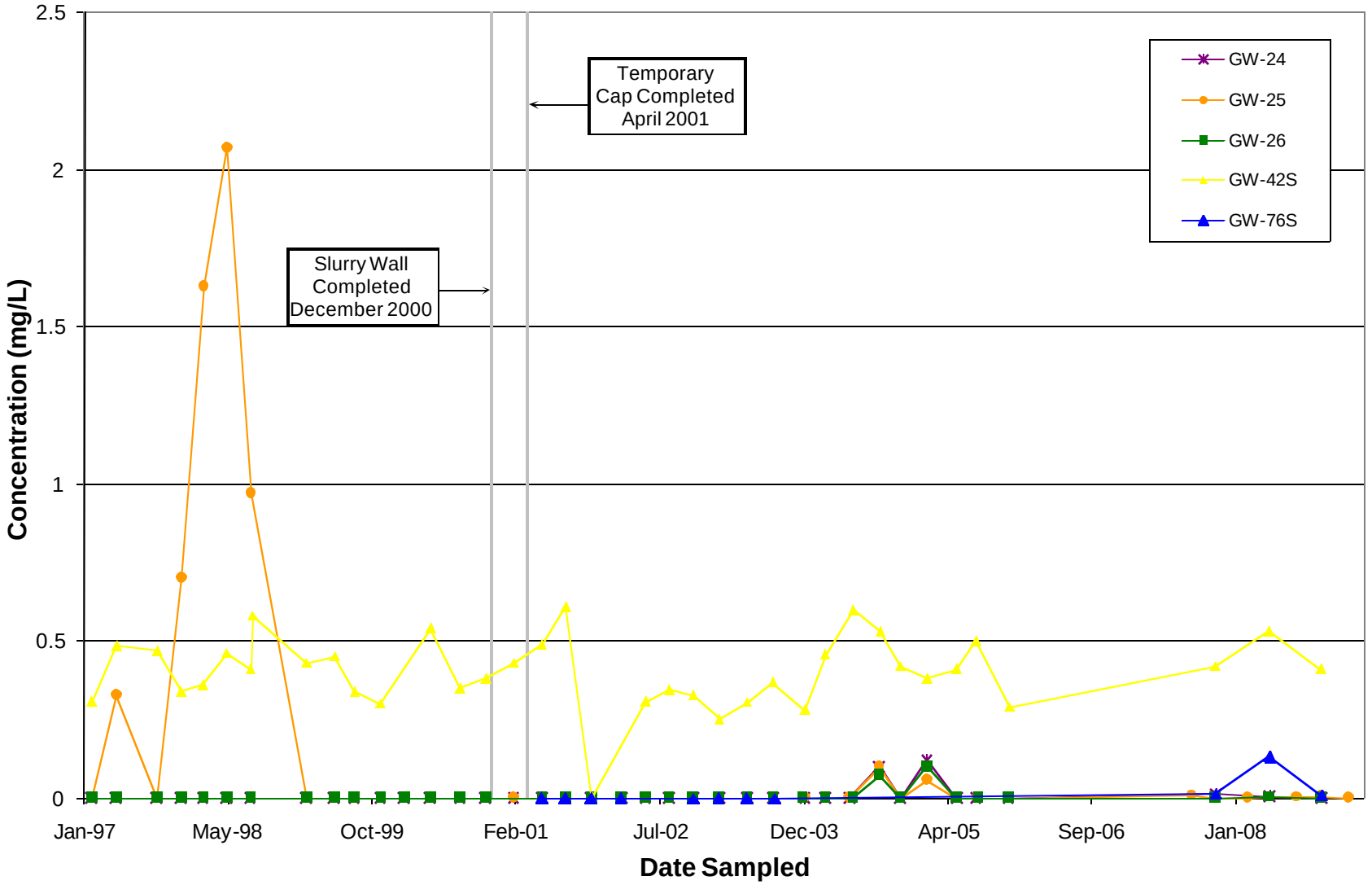
Filtered Aluminum in Groundwater
Southeast of Containment Structure

Figure D-1.2

P:\OLIN\Wilmington\SemiAnnual Status Report\2009 July\Appendix D\
Time Series Plots DAPL constituents.xls, Aluminum GW SE

Prepared by: BJR
Checked by: MH



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Wilmington, Massachusetts

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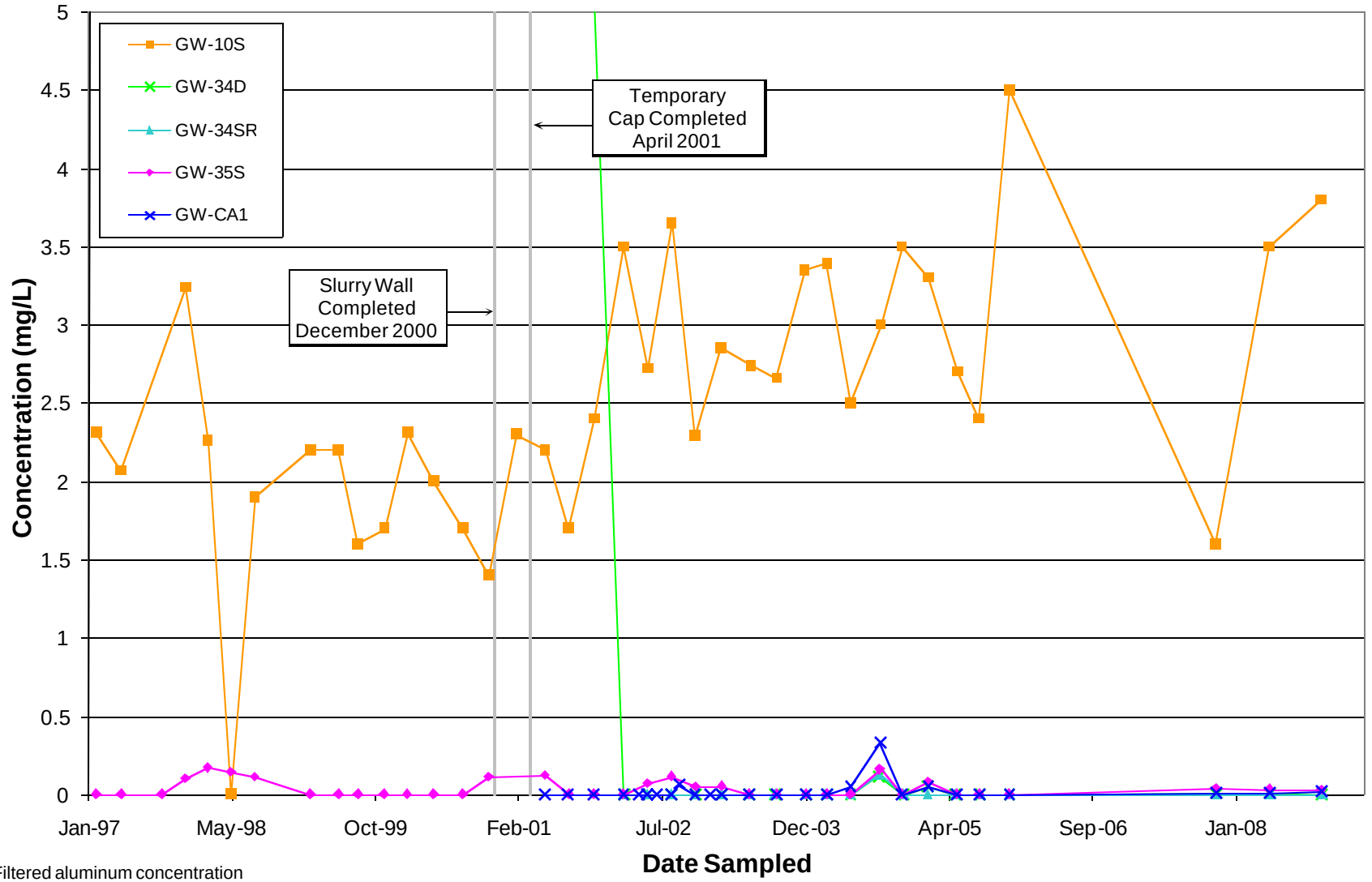
Filtered Aluminum in Groundwater West of Containment Structure

Figure D-1.3

P:\OLIN\Wilmington\SemiAnnual Status Report\2009 July\Appendix D\
Time Series Plots DAPL constituents.xls, Aluminum GW W

Prepared by: BJR
Checked by: MH



Filtered aluminum concentration
of 38 mg/L detected at GW-34D on 1/19/00 not shown.

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Olin Wilmington Superfund Site
Wilmington, Massachusetts

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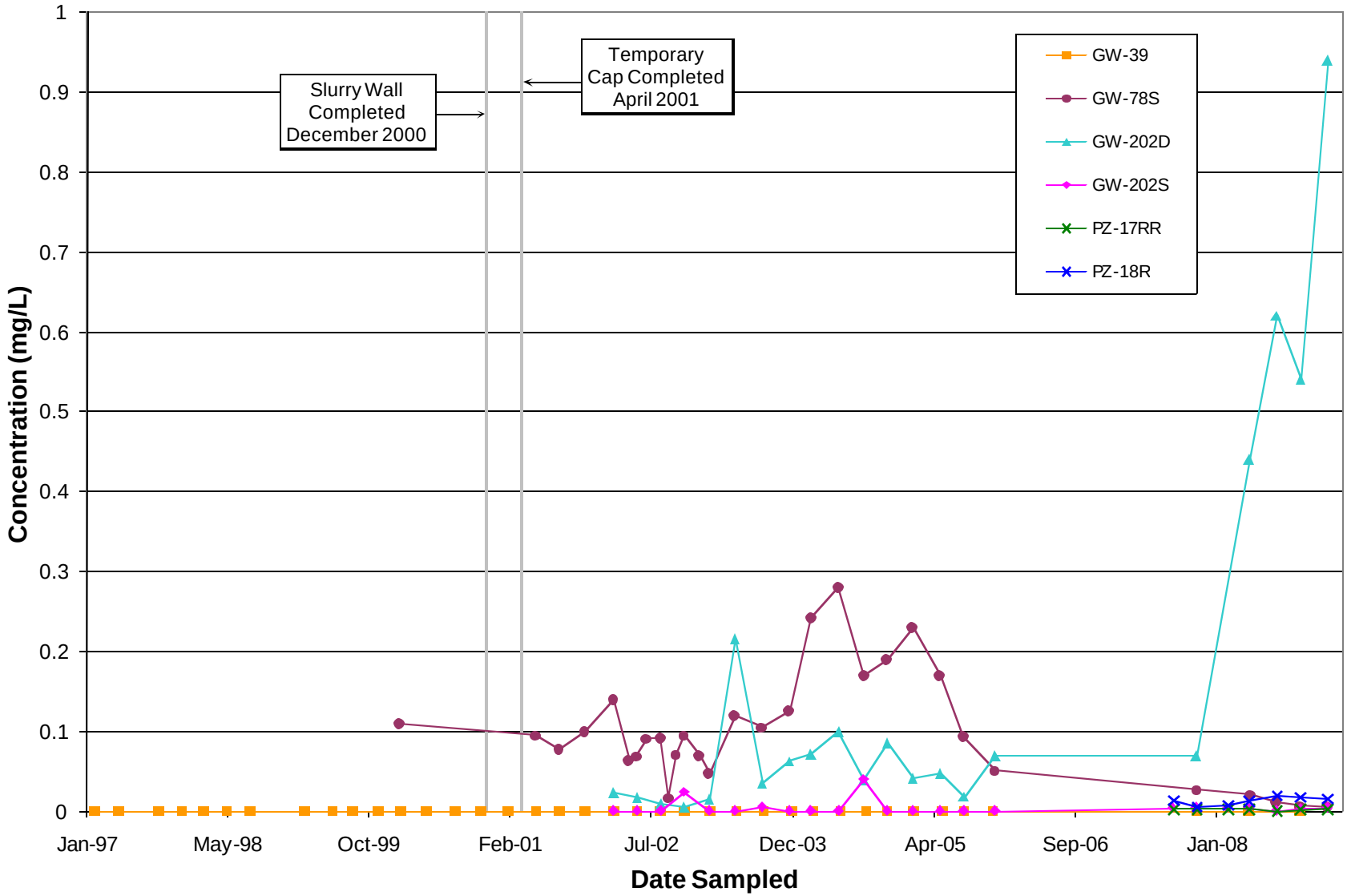
Filtered Aluminum in Groundwater North of Containment Structure

Figure D-1.4

P:\OLIN\Wilmington\SemiAnnual Status Report\2009 July\Appendix D\
Time Series Plots DAPL constituents.xls, Aluminum GW N

Prepared by: BJR
Checked by: MH



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Olin Wilmington Superfund Site
Wilmington, Massachusetts

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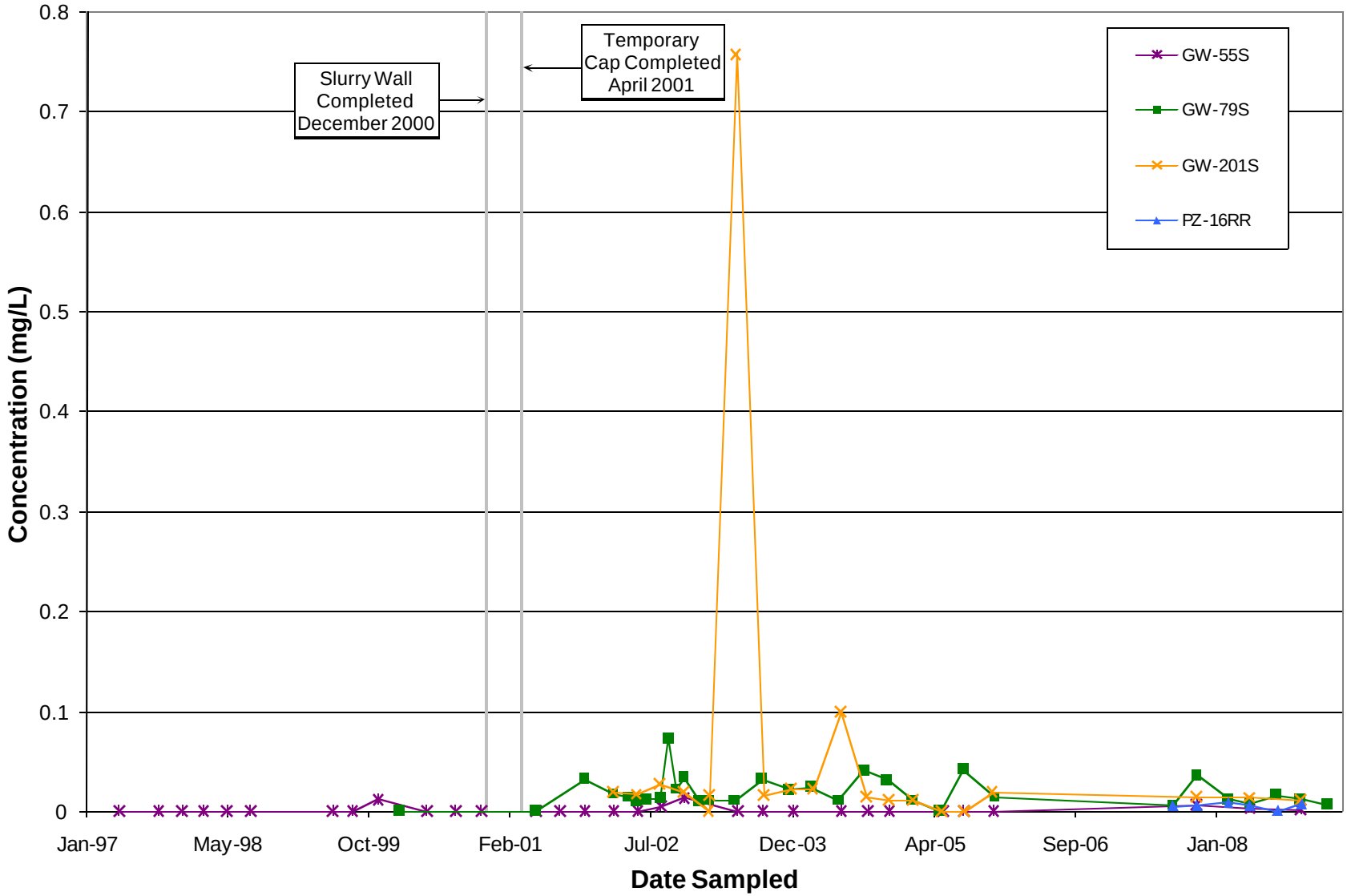
Filtered Chromium in Groundwater South of Containment Structure

Figure D-1.5

Prepared by: BJR
Checked by: MH

P:\OLIN\Wilmington\SemiAnnual Status Report\2009 July\Appendix D\
Time Series Plots DAPL constituents.xls, Dissolved Chromium GW S



Semi-Annual Status Report No. 4
Olin Wilmington Superfund Site
Wilmington, Massachusetts

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Filtered Chromium in Groundwater
Southeast of Containment Structure

Figure D-1.6

Prepared by: BJR
Checked by: MH

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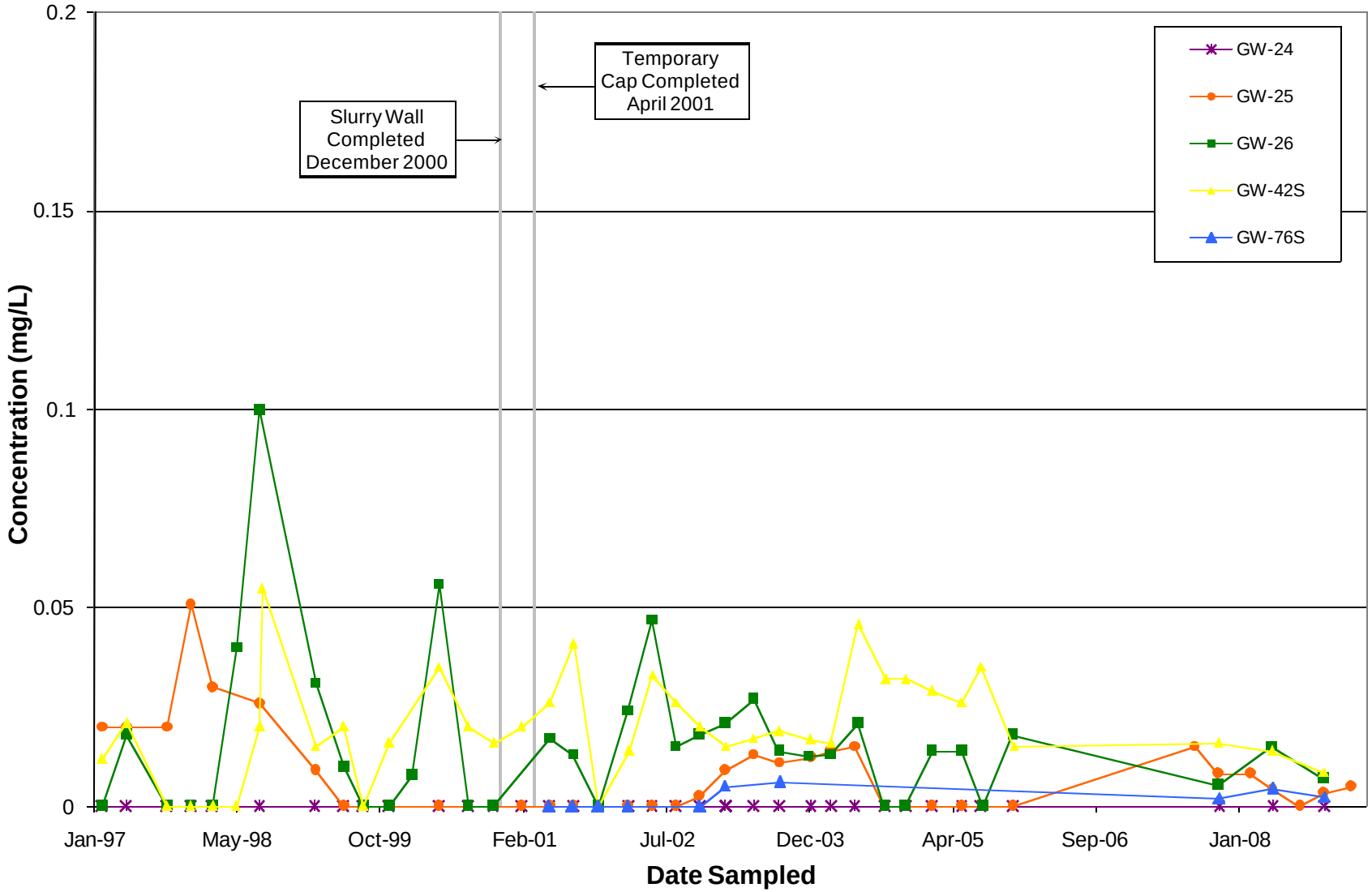
Time Series Plots DAPL constituents.xls, Dissolved Chromium GW SE



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Olin Wilmington Superfund Site
Wilmington, Massachusetts

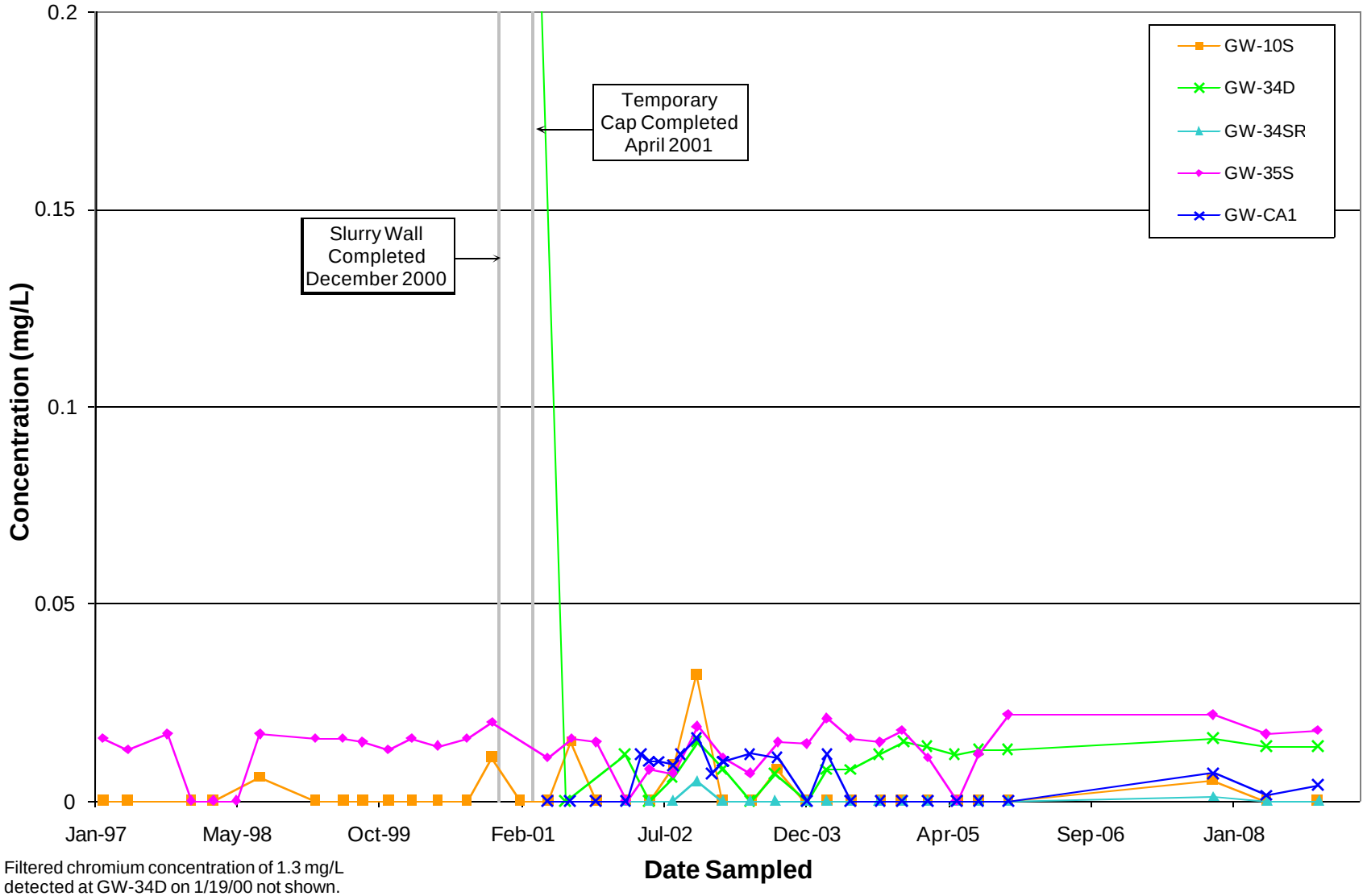
MACTEC

Filtered Chromium in Groundwater
West of Containment Structure

Figure D-1.7

Prepared by: BJR
Checked by: MH

P:\OLIN\Wilmington\SemiAnnual Status Report\2009 July\Appendix D\
Time Series Plots DAPL constituents.xls, Dissolved Chromium GW W



Filtered chromium concentration of 1.3 mg/L detected at GW-34D on 1/19/00 not shown.

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Olin Wilmington Superfund Site
Wilmington, Massachusetts

MACTEC

Filtered Chromium in Groundwater
North of Containment Structure

Figure D-1.8

Prepared by: BJR
Checked by: MH

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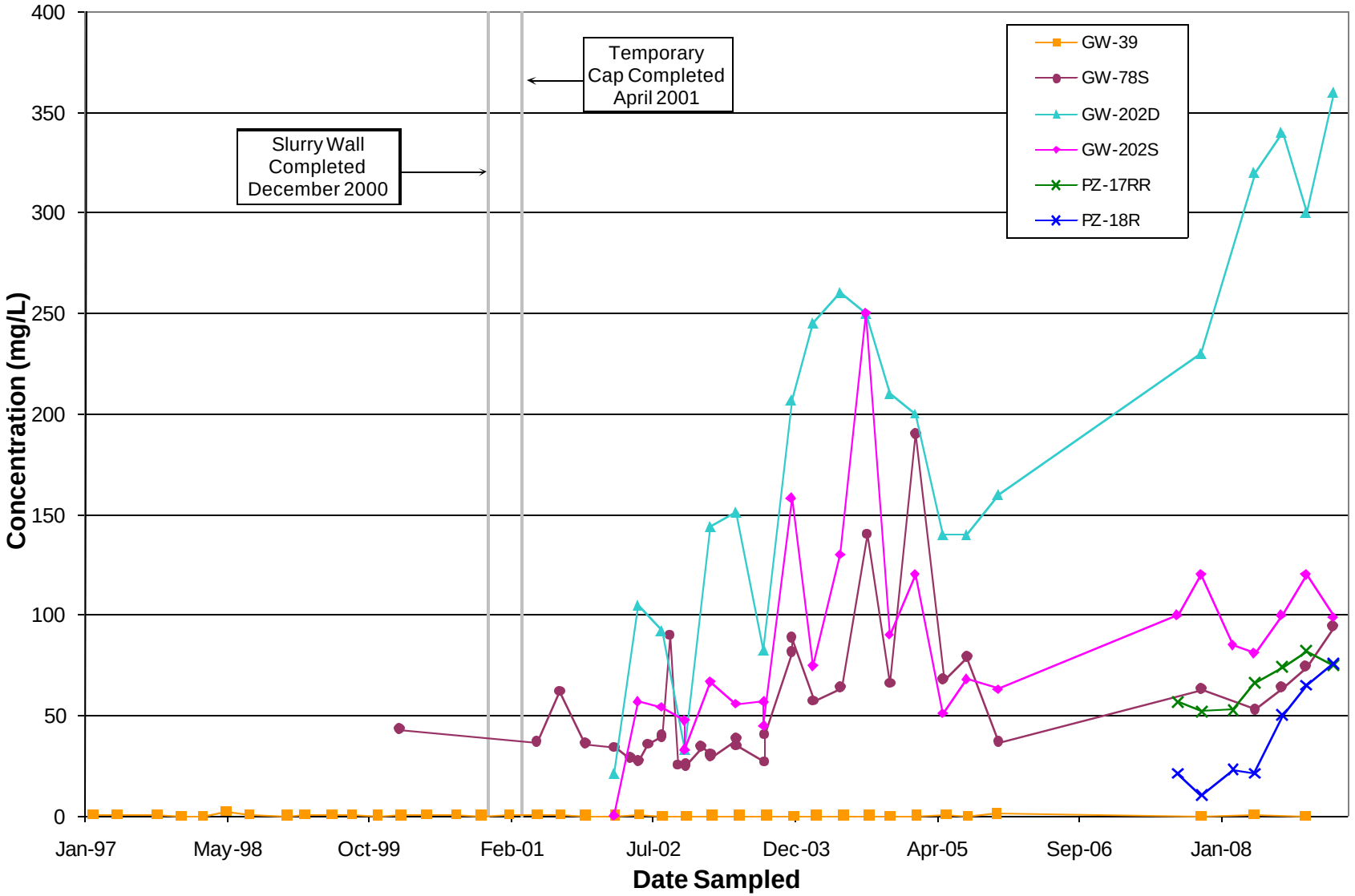
Time Series Plots DAPL constituents.xls, Dissolved Chromium GW N



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Olin Wilmington Superfund Site
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Ammonia in Groundwater South of Containment Structure

Figure D-1.9

Prepared by: BJR
Checked by: MH

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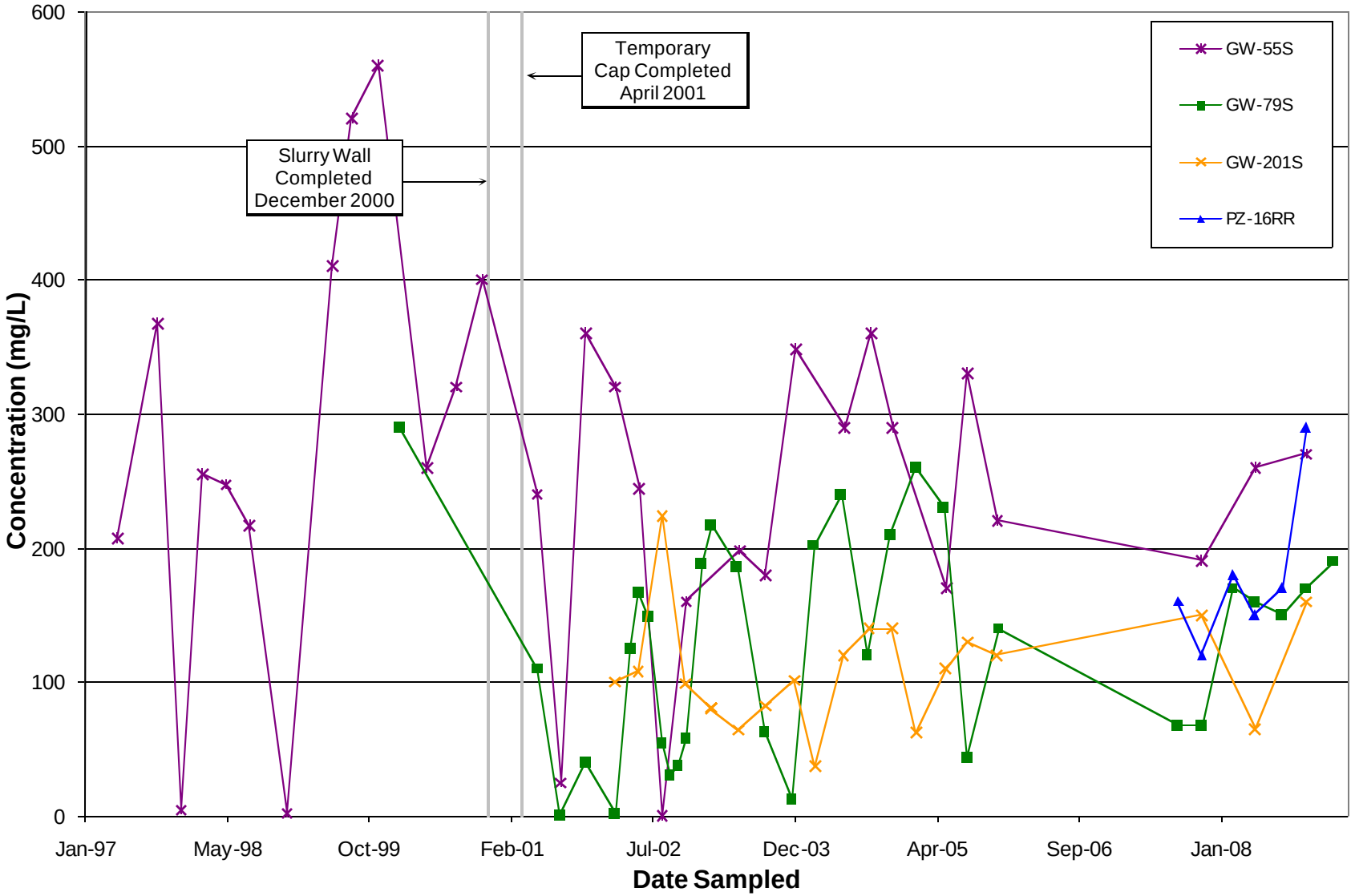
Time Series Plots DAPL constituents.xls, Ammonia GW S



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Olin Wilmington Superfund Site
Wilmington, Massachusetts

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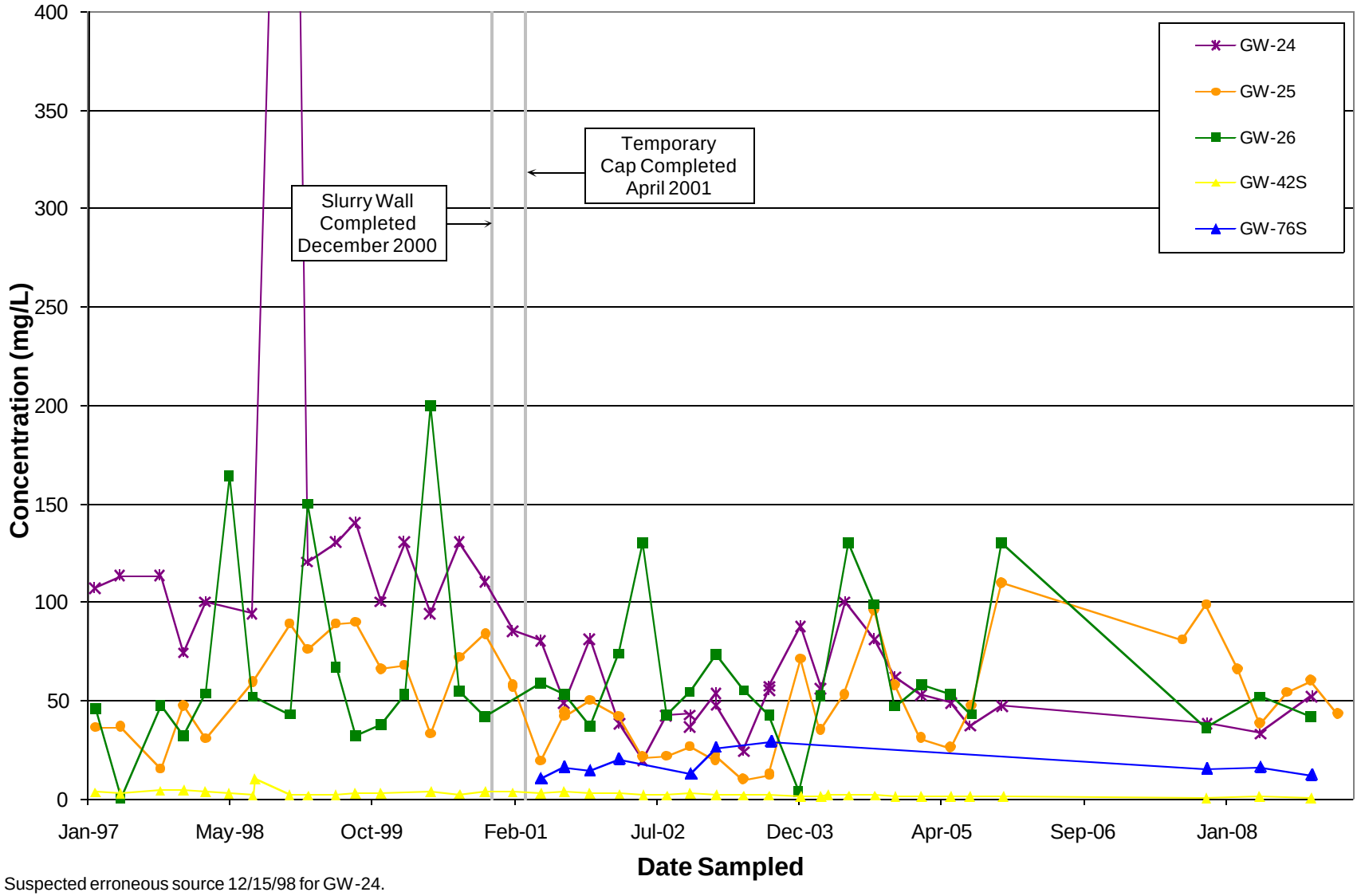
Ammonia in Groundwater Southeast of Containment Structure

Figure D-1.10

P:\OLIN\Wilmington\SemiAnnual Status Report\2009 July\Appendix D\
Time Series Plots DAPL constituents.xls, Ammonia GW SE

Prepared by: BJR
Checked by: MH

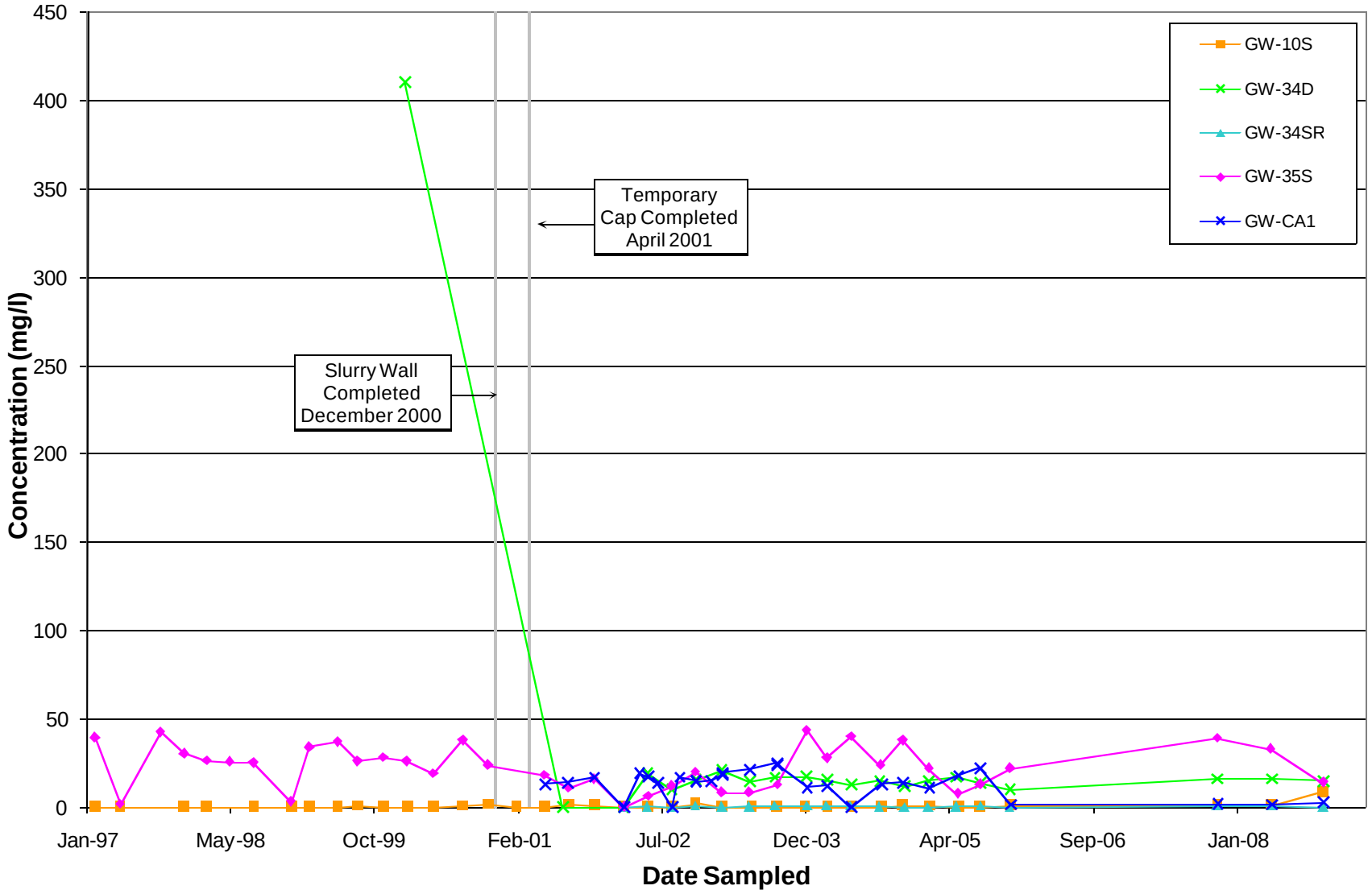


Suspected erroneous source 12/15/98 for GW-24.

Semi-Annual Status Report No. 4 Olin Wilmington Superfund Site Wilmington, Massachusetts	MACTEC	Ammonia in Groundwater West of Containment Structure Figure D-1.11

P:\OLIN\Wilmington\SemiAnnual Status Report\2009 July\Appendix D\
Time Series Plots DAPL constituents.xls, Ammonia GW W

Prepared by: BJR
Checked by: MH



Semi-Annual Status Report No. 4
Olin Wilmington Superfund Site
Wilmington, Massachusetts

MACTEC

Ammonia in Groundwater North of Containment Structure

Figure D-1.12

Prepared by: BJR
Checked by: MH

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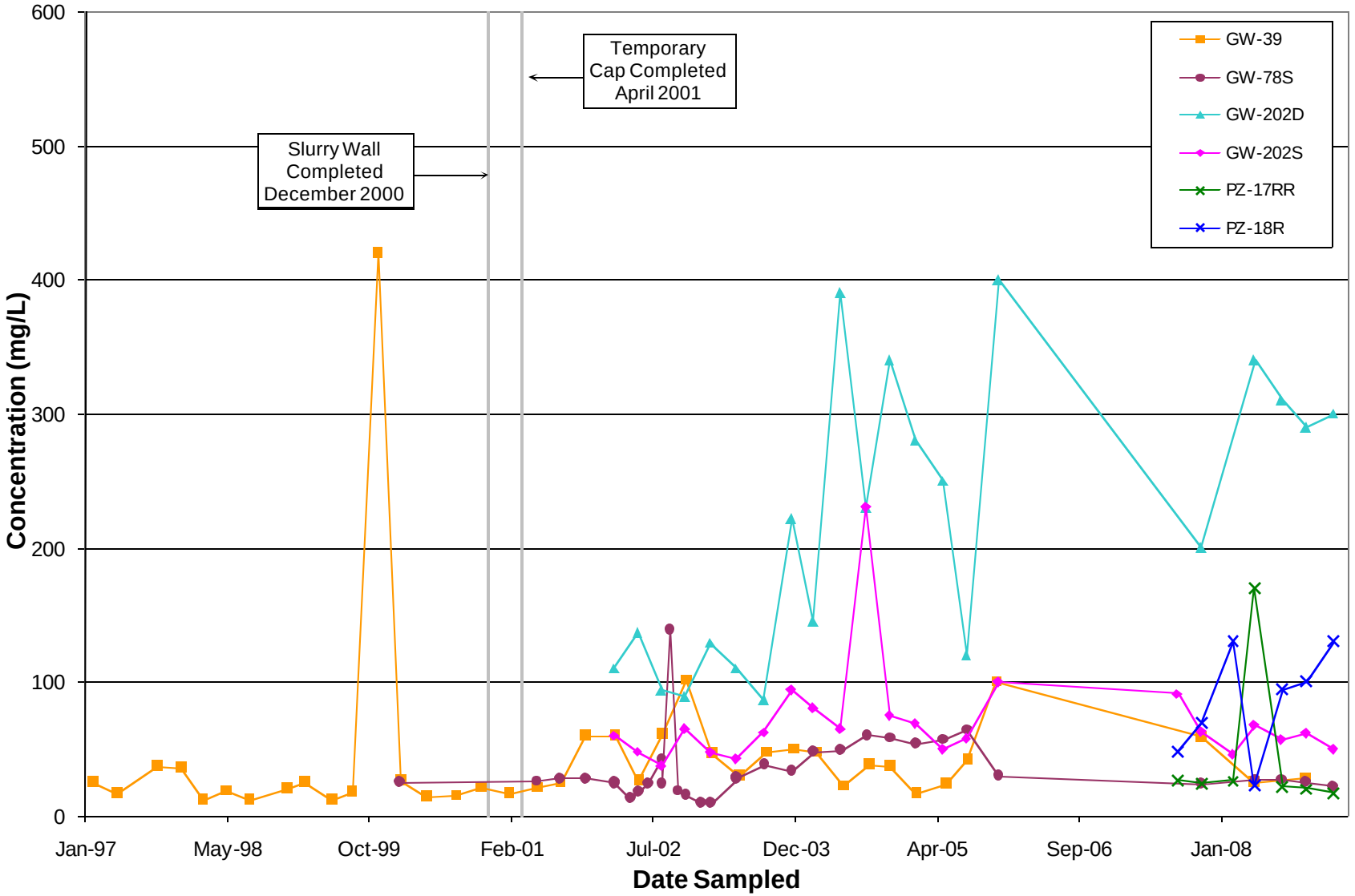
Time Series Plots DAPL constituents.xls, Ammonia GW N



Semi-Annual Status Report No. 4
Olin Wilmington Superfund Site
Wilmington, Massachusetts

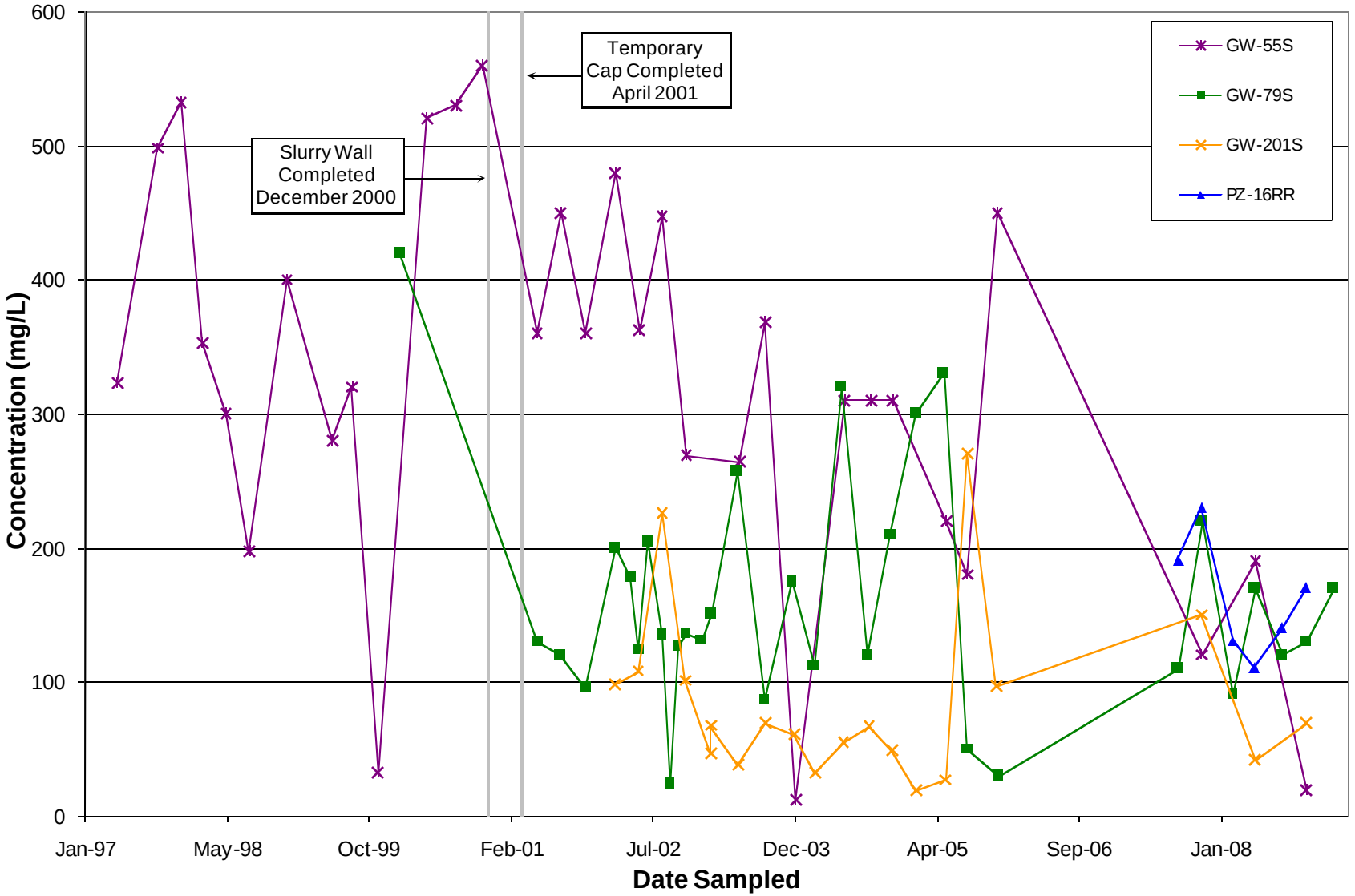
MACTEC

Chloride in Groundwater South of Containment Structure

Figure D-1.13

P:\OLIN\Wilmington\SemiAnnual Status Report\2009 July\Appendix D\
Time Series Plots DAPL constituents.xls, Chloride GW S

Prepared by: BJR
Checked by: MH



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Olin Wilmington Superfund Site
Wilmington, Massachusetts

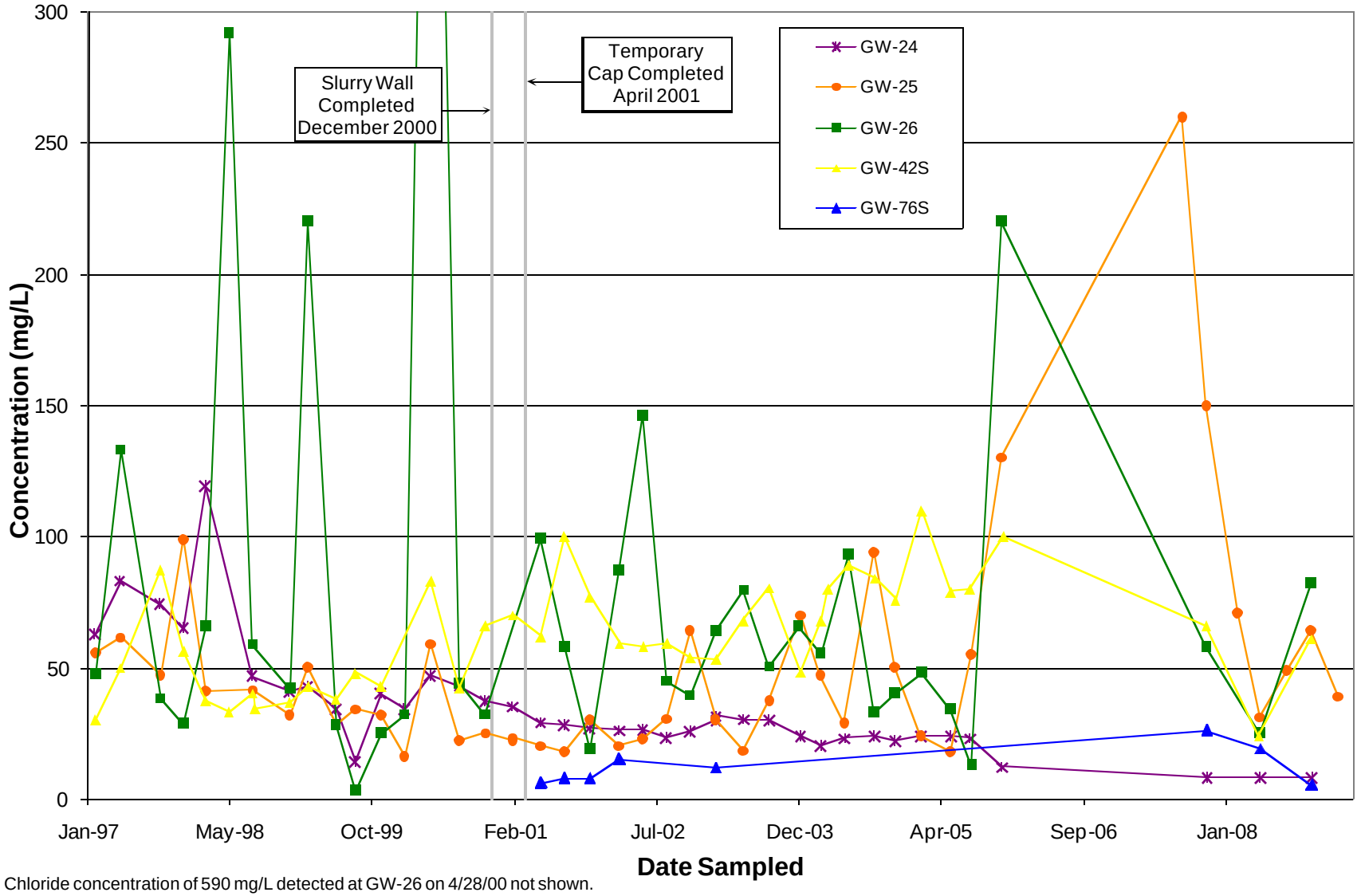
MACTEC

Chloride in Groundwater Southeast of Containment Structure

Figure D-1.14

Prepared by: BJR
Checked by: MH

P:\OLIN\Wilmington\SemiAnnual Status Report\2009 July\Appendix D\
Time Series Plots DAPL constituents.xls, Chloride GW SE

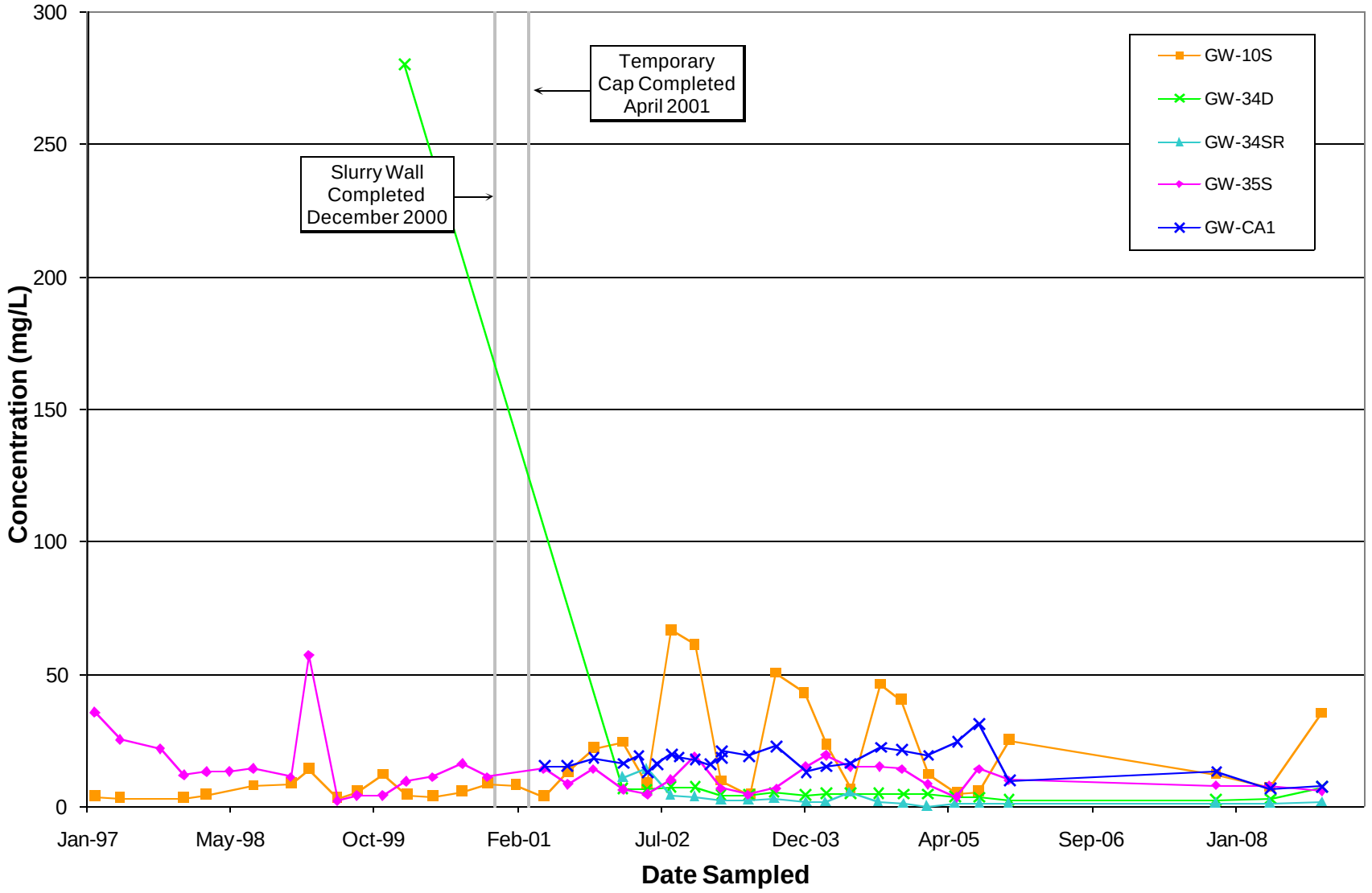


Chloride concentration of 590 mg/L detected at GW-26 on 4/28/00 not shown.

Semi-Annual Status Report No. 4 Olin Wilmington Superfund Site Wilmington, Massachusetts	MACTEC	Chloride in Groundwater West of Containment Structure Figure D-1.15

Prepared by: BJR
Checked by: MH

P:\OLIN\Wilmington\SemiAnnual Status Report\2009 July\Appendix D\
Time Series Plots DAPL constituents.xls, Chloride GW W



Semi-Annual Status Report No. 4
Olin Wilmington Superfund Site
Wilmington, Massachusetts

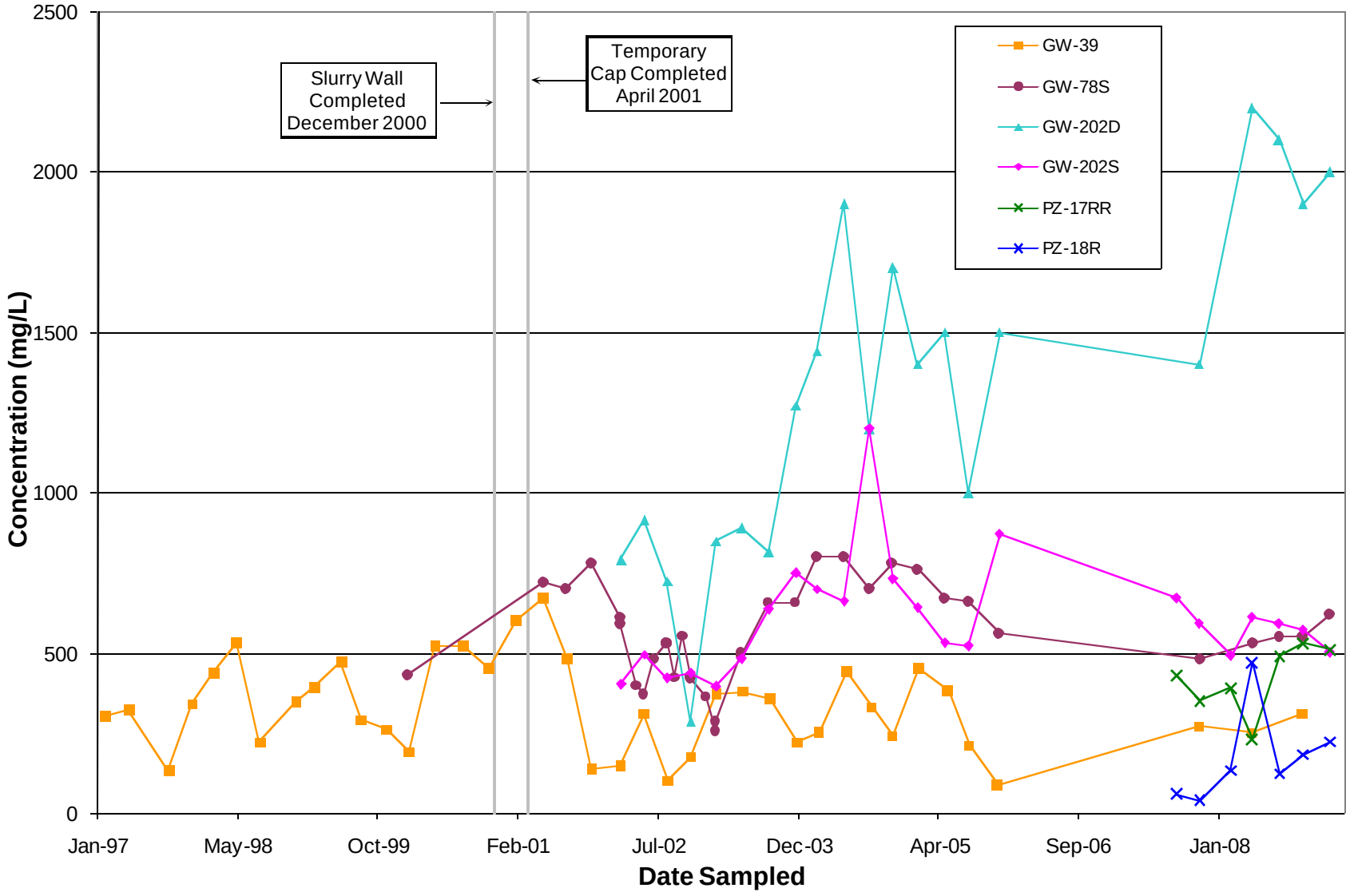
MACTEC

Chloride in Groundwater North of Containment Structure

Figure D-1.16

Prepared by: BJR
Checked by: MH

P:\OLIN\Wilmington\SemiAnnual Status Report\2009 July\Appendix D\
Time Series Plots DAPL constituents.xls, Chloride GW N



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Olin Wilmington Superfund Site
Wilmington, Massachusetts

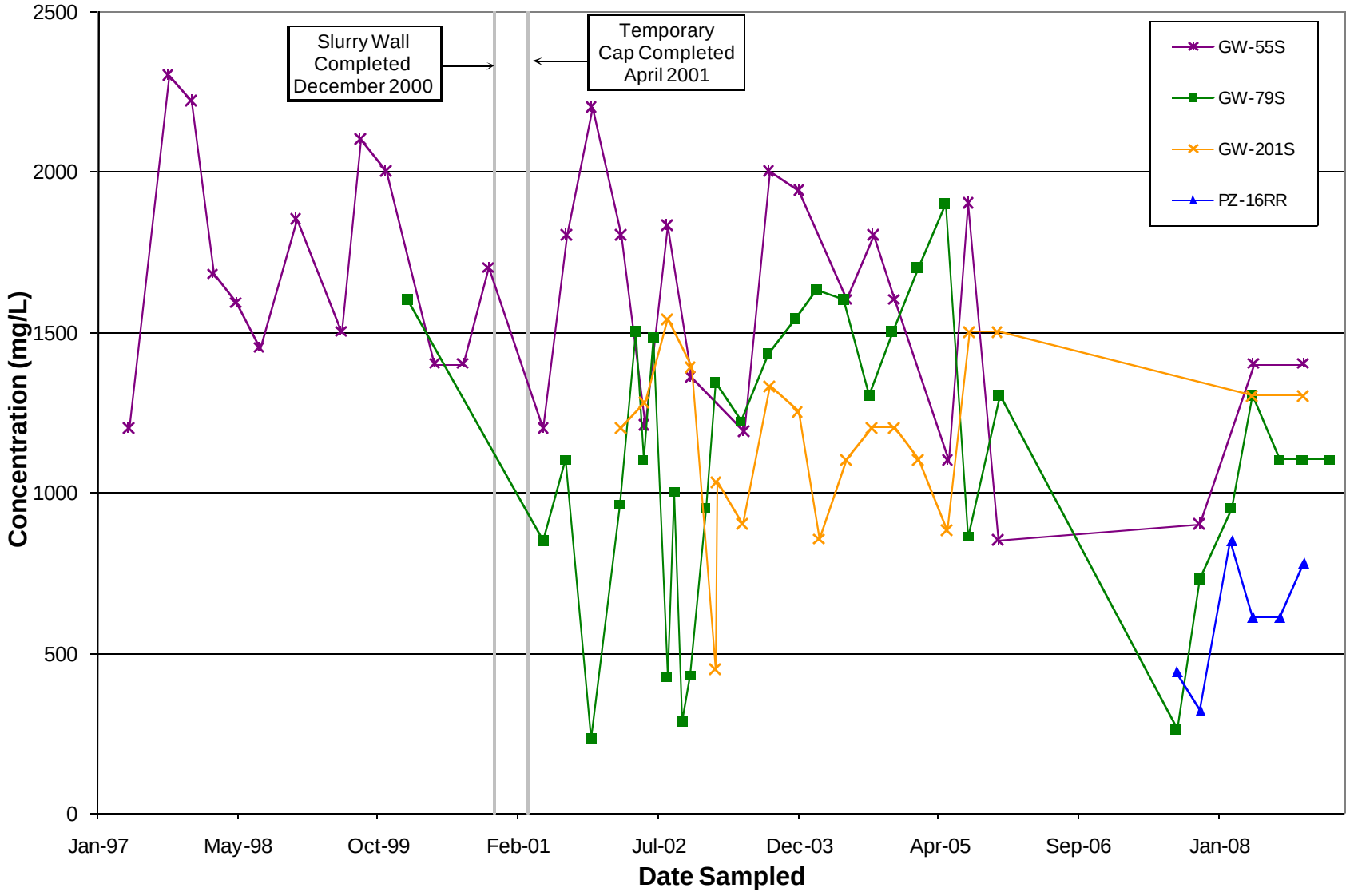
MACTEC

Sulfate in Groundwater South of Containment Structure

Figure D-1.17

P:\OLIN\Wilmington\SemiAnnual Status Report\2009 July\Appendix D\
Time Series Plots DAPL constituents.xls, Sulfate GW S

Prepared by: BJR
Checked by: MH



Semi-Annual Status Report No. 4
Olin Wilmington Superfund Site
Wilmington, Massachusetts

MACTEC

Sulfate in Groundwater Southeast of Containment Structure

Figure D-1.18

Prepared by: BJR
Checked by: MH

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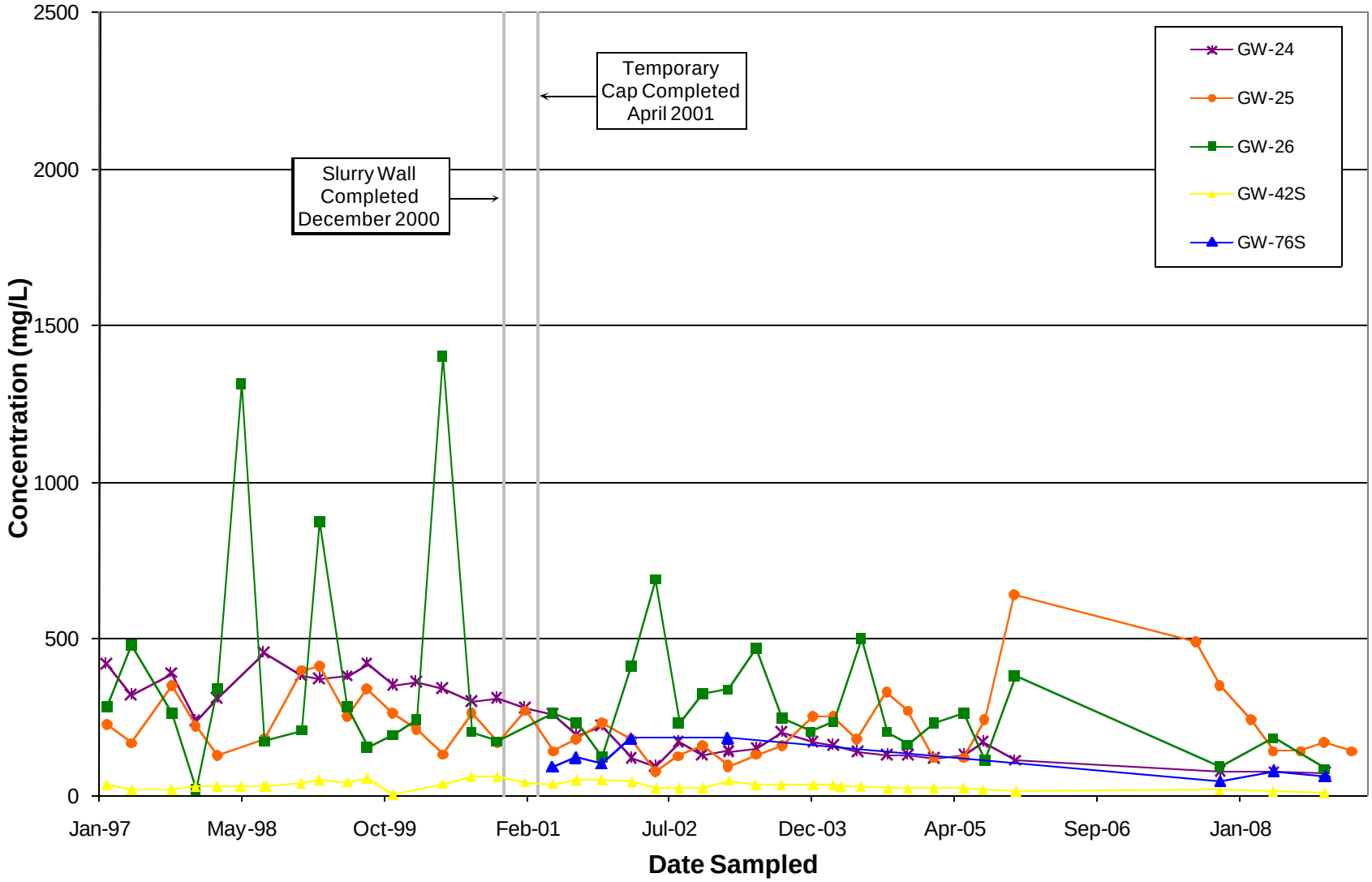
Time Series Plots DAPL constituents.xls, Sulfate GW SE



Semi-Annual Status Report No. 4
Olin Wilmington Superfund Site
Wilmington, Massachusetts

MACTEC

Sulfate in Groundwater West of Containment Structure

Figure D-1.19

Prepared by: BJR
Checked by: MH

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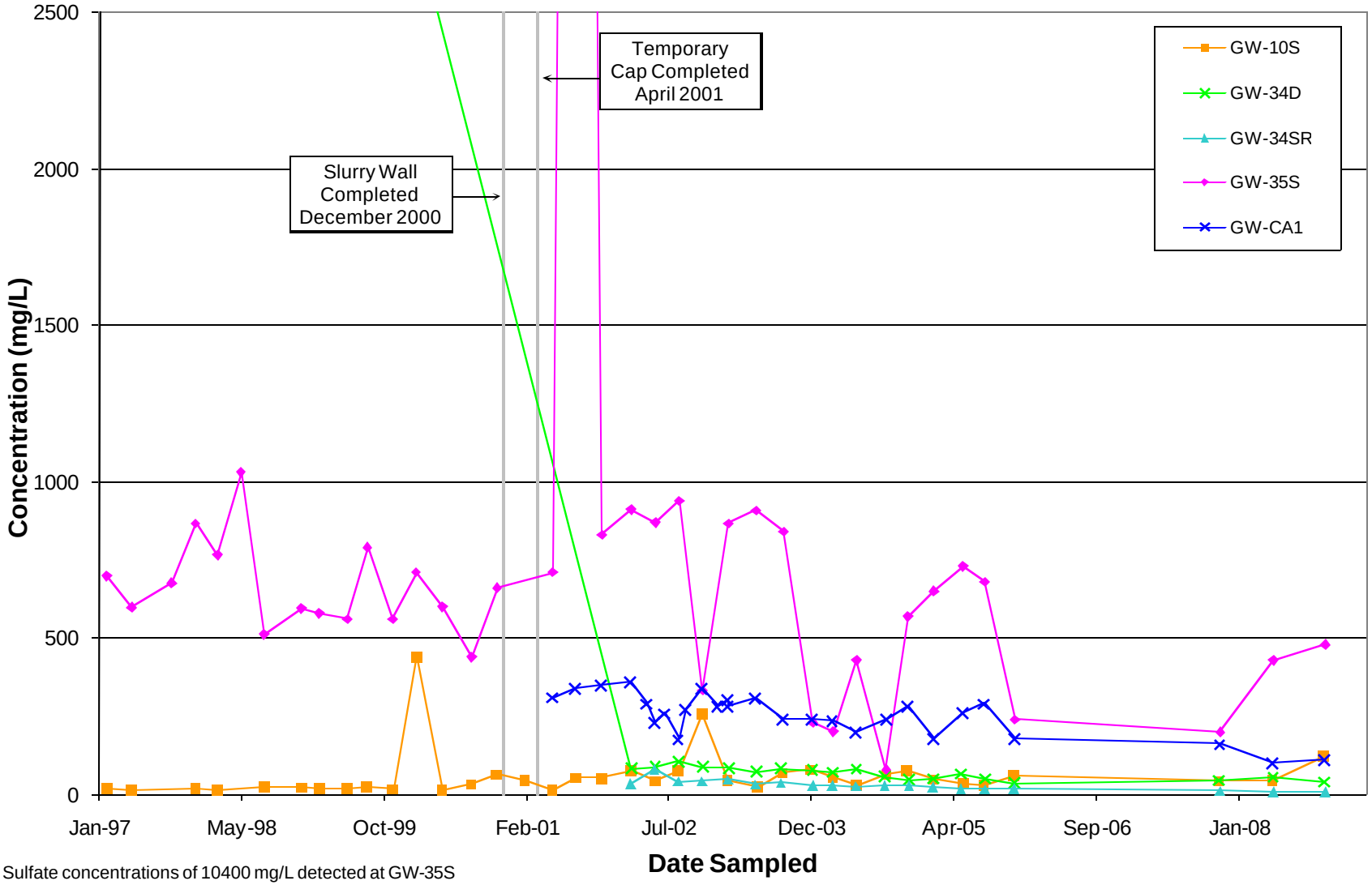
Time Series Plots DAPL constituents.xls, Sulfate GW W



Sulfate concentrations of 10400 mg/L detected at GW-35S on 8/17/01 and 2800 mg/L detected at GW-34D on 1/19/00 not shown.

Semi-Annual Status Report No. 4 Olin Wilmington Superfund Site Wilmington, Massachusetts	MACTEC	Sulfate in Groundwater North of Containment Structure Figure D-1.20

Prepared by: BJR
Checked by: MH

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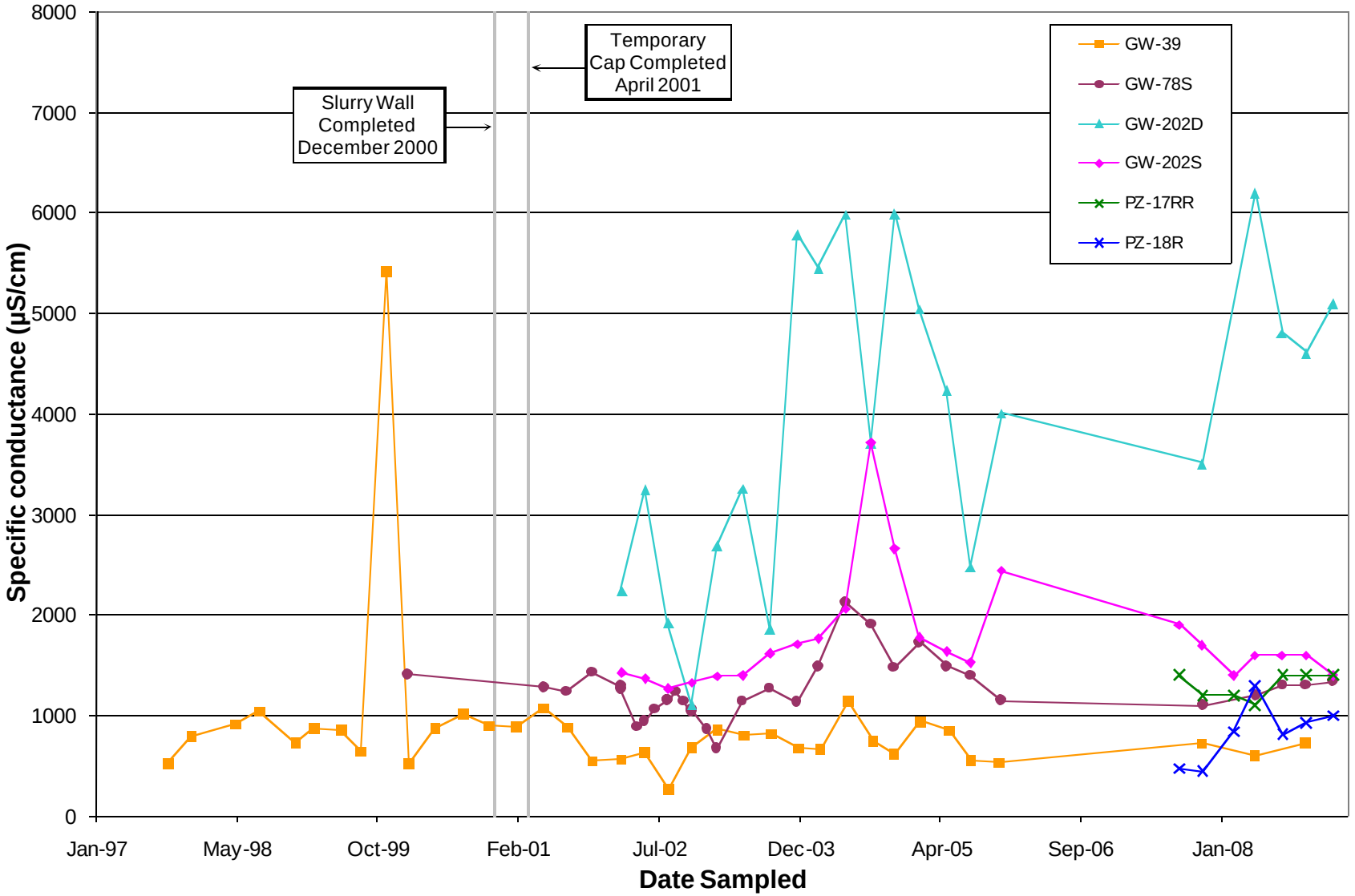
Time Series Plots DAPL constituents.xls, Sulfate GW N



Semi-Annual Status Report No. 4
Olin Wilmington Superfund Site
Wilmington, Massachusetts

MACTEC

Specific Conductance in Groundwater
South of Containment Structure

Figure D-1.21

Prepared by: BJR
Checked by: MH

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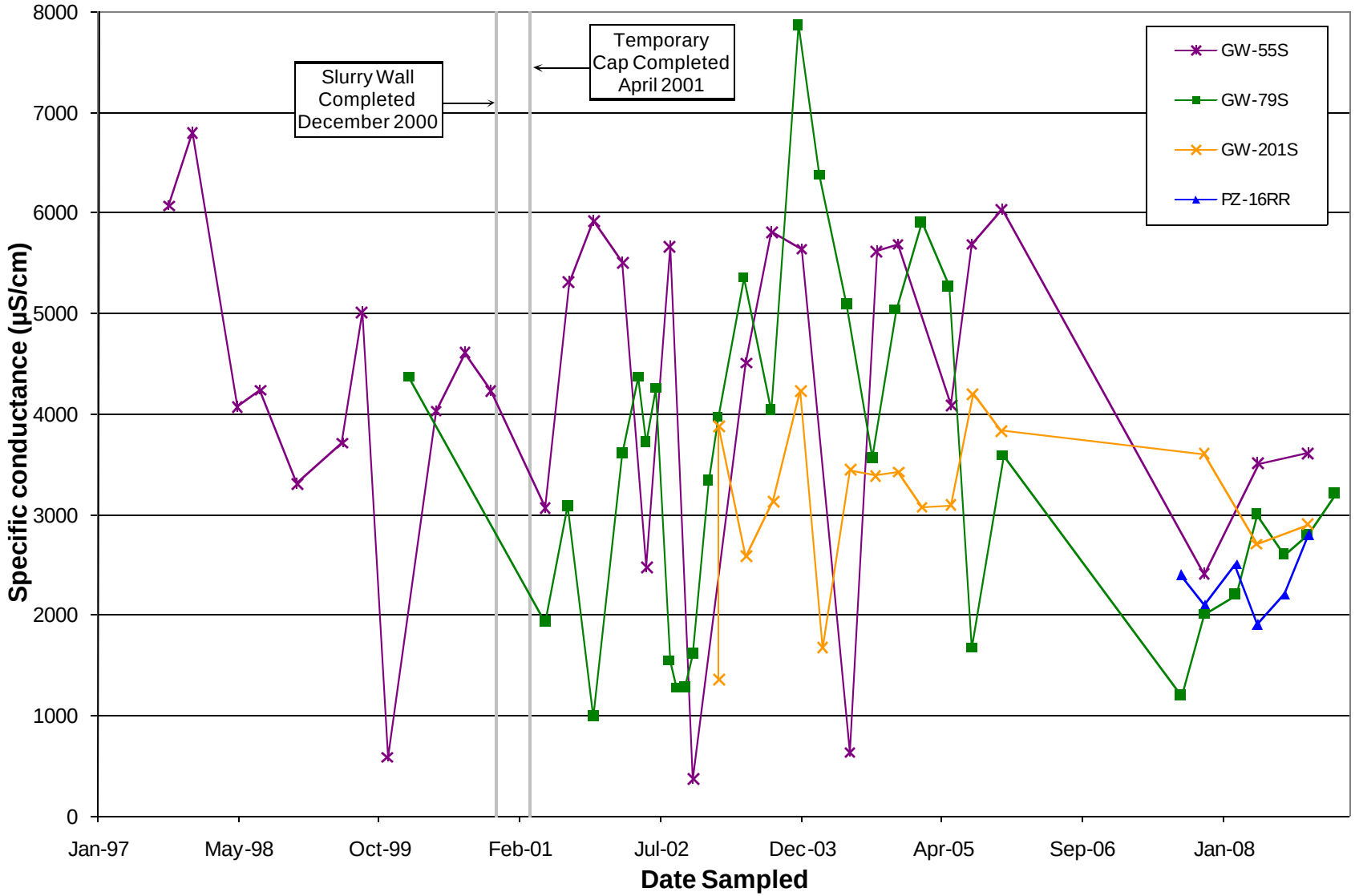
Time Series Plots DAPL constituents.xls, Specific Conductance GW S



Semi-Annual Status Report No. 4
Olin Wilmington Superfund Site
Wilmington, Massachusetts

MACTEC

Specific Conductance in Groundwater
Southeast of Containment Structure

Figure D-1.22

Prepared by: BJR
Checked by: MH

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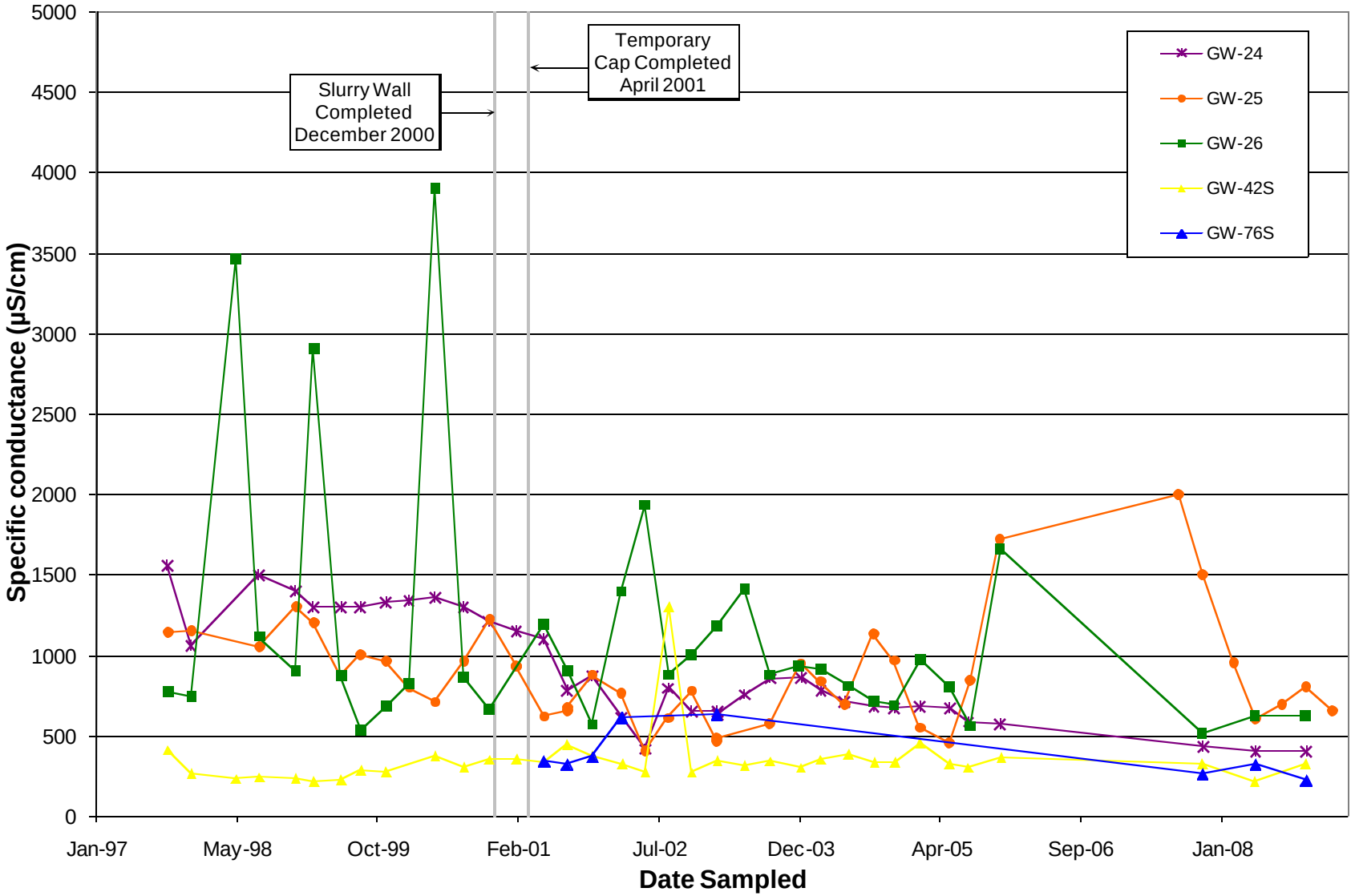
Time Series Plots DAPL constituents.xls, Specific Conductance GW SE



Semi-Annual Status Report No. 4
Olin Wilmington Superfund Site
Wilmington, Massachusetts

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Specific Conductance in Groundwater
West of Containment Structure

Figure D-1.23

Prepared by: BJR
Checked by: MH

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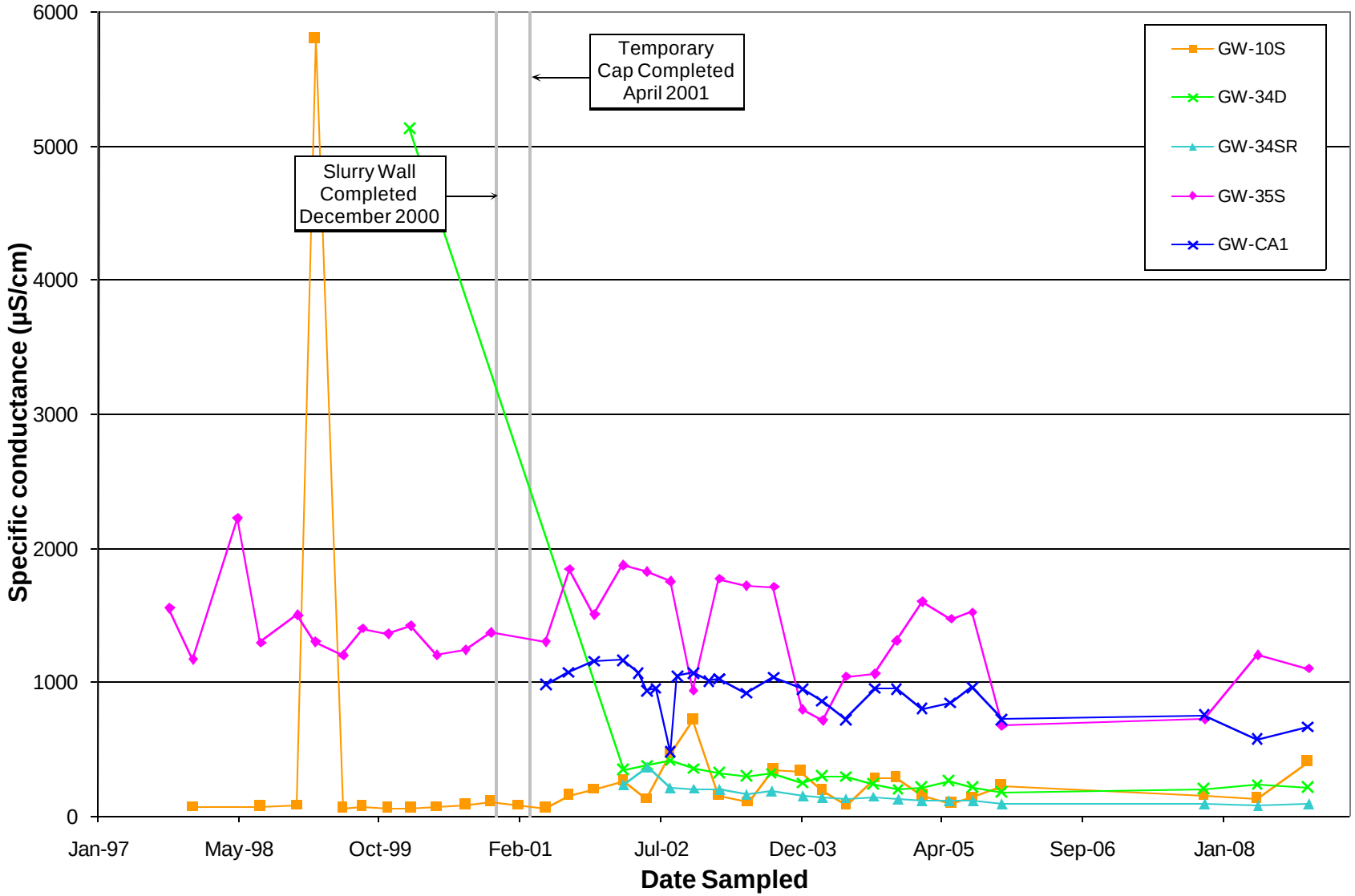
Time Series Plots DAPL constituents.xls, Specific Conductance GW W



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Olin Wilmington Superfund Site
Wilmington, Massachusetts

MACTEC

Specific Conductance in Groundwater
North of Containment Structure

Figure D-1.24

Prepared by: BJR
Checked by: MH

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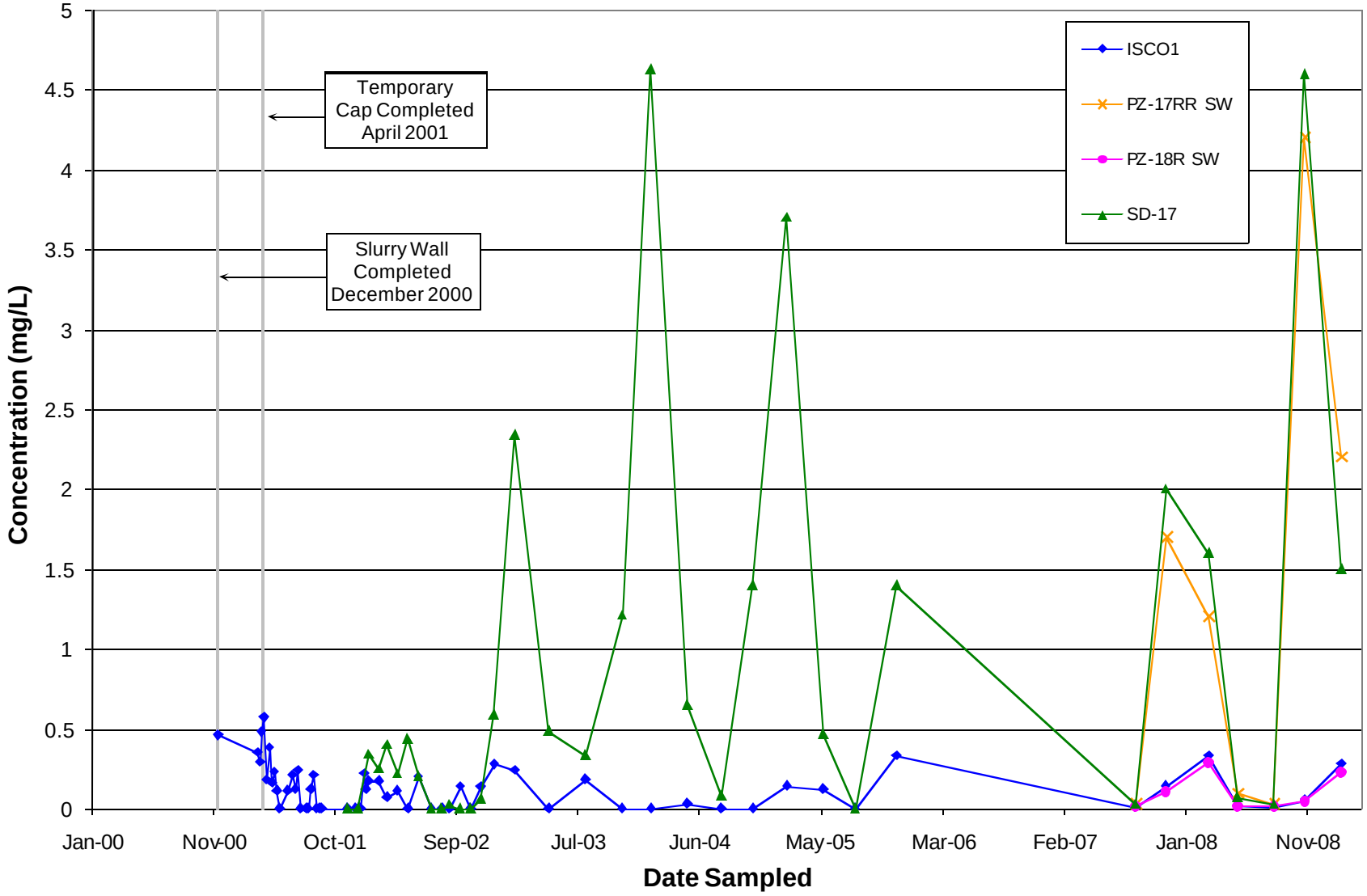
Time Series Plots DAPL constituents.xls, Specific Conductance GW N



Semi-Annual Status Report No. 4
Olin Wilmington Superfund Site
Wilmington, Massachusetts

MACTEC

Filtered Aluminum in Surface Water in the Upper South Ditch

Figure D-2.1

Prepared by: BJR
Checked by: MH

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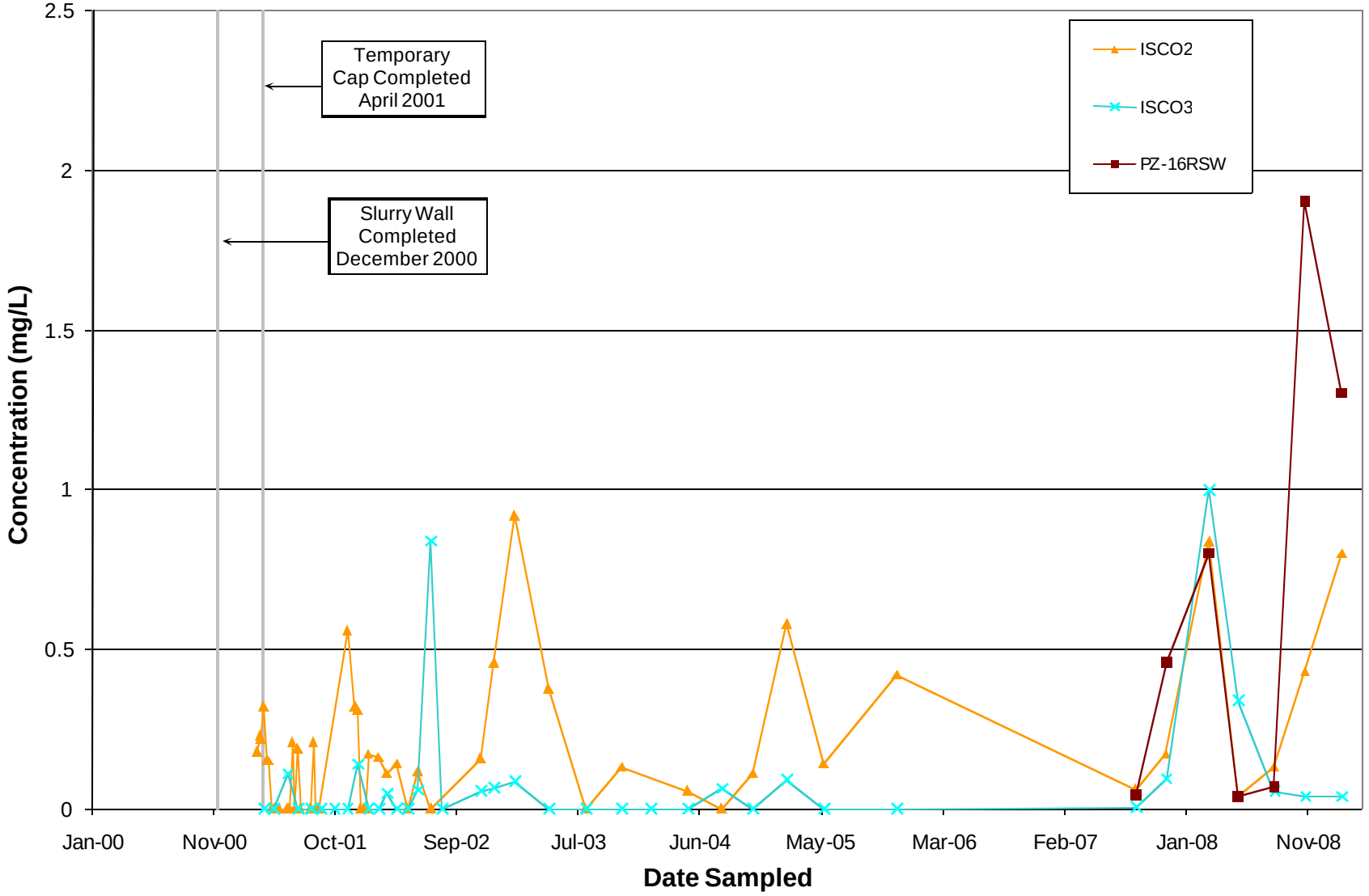
Time Series Plots DAPL constituents.xls, Aluminum SW UpperSD



Semi-Annual Status Report No. 4
Olin Wilmington Superfund Site
Wilmington, Massachusetts

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Filtered Aluminum in Surface Water in the Lower South Ditch

Figure D-2.2

Prepared by: BJR
Checked by: MH

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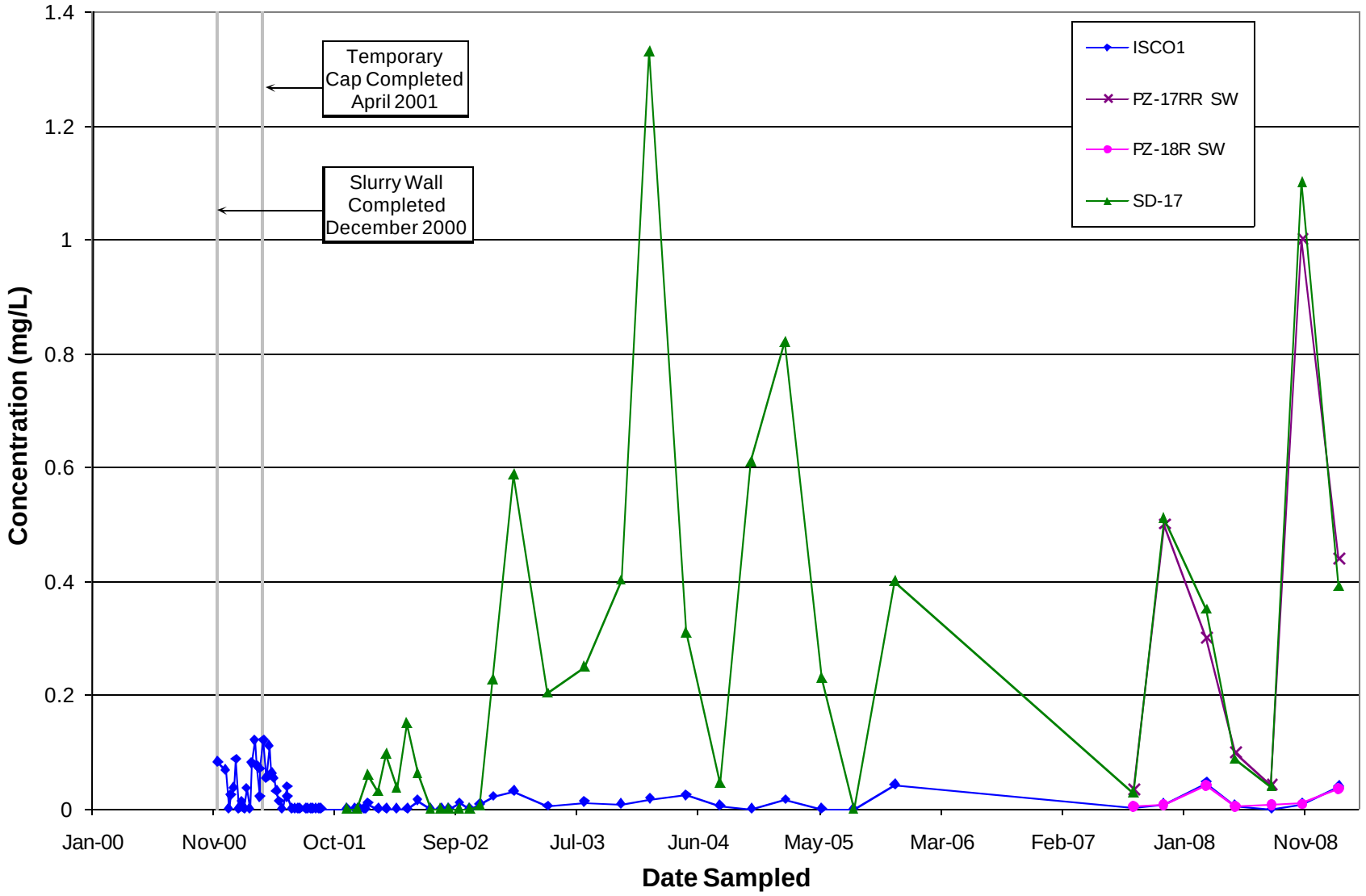
Time Series Plots DAPL constituents.xls, Aluminum SW LowerSD



Semi-Annual Status Report No. 4
Olin Wilmington Superfund Site
Wilmington, Massachusetts

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Filtered Chromium in Surface Water in the Upper South Ditch

Figure D-2.3

Prepared by: BJR
Checked by: MH

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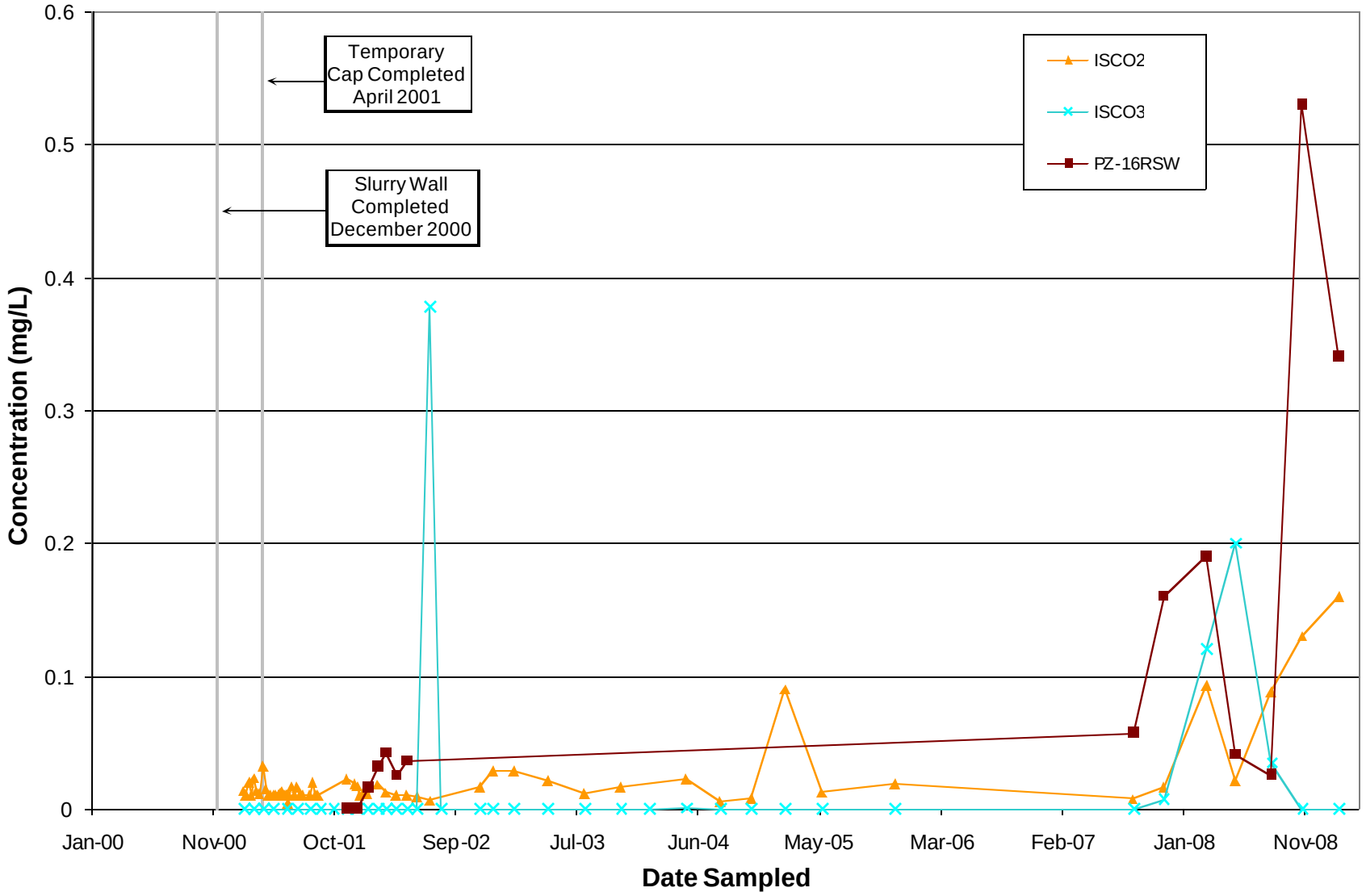
Time Series Plots DAPL constituents.xls, Dissolved Chromium SW UpperSD



Semi-Annual Status Report No. 4
Olin Wilmington Superfund Site
Wilmington, Massachusetts

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Filtered Chromium in Surface Water in the Lower South Ditch

Figure D-2.4

Prepared by: BJR
Checked by: MH

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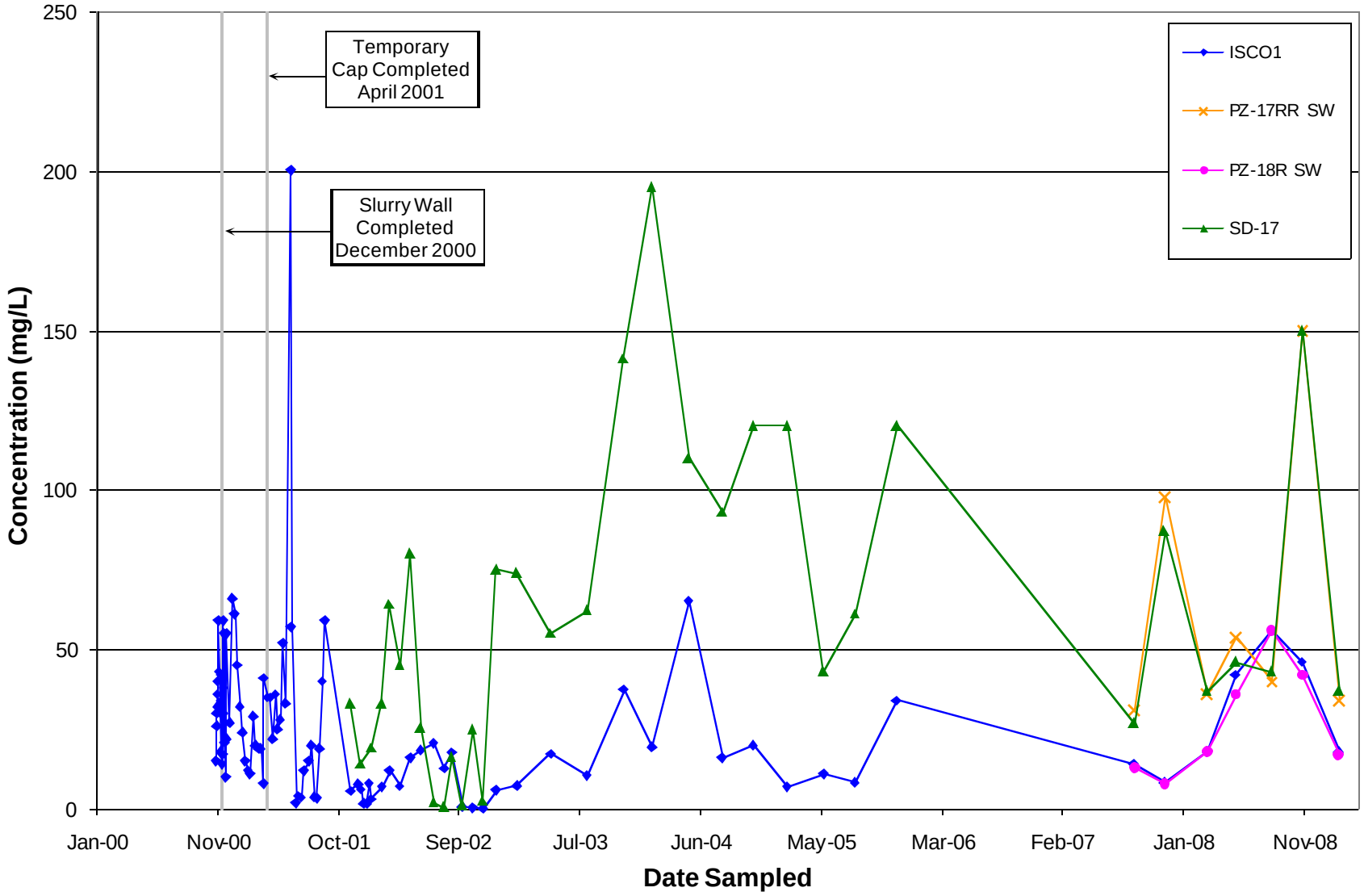
Time Series Plots DAPL constituents.xls, Dissolved Chromium SW LowerSD



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Olin Wilmington Superfund Site
Wilmington, Massachusetts

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Ammonia in Surface Water in the Upper South Ditch

Figure D-2.5

Prepared by: BJR
Checked by: MH

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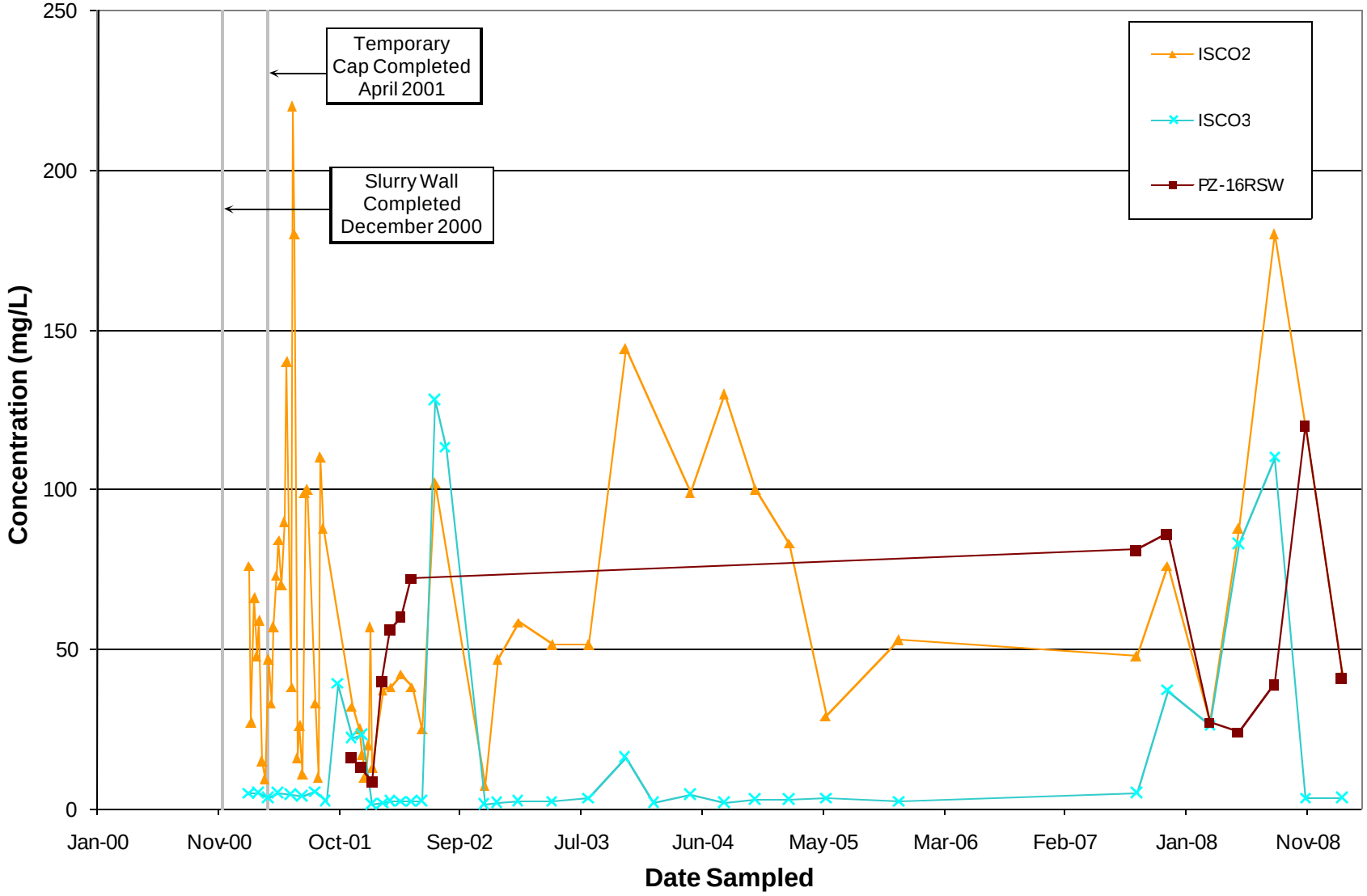
Time Series Plots DAPL constituents.xls, Ammonia SW UpperSD



Semi-Annual Status Report No. 4
Olin Wilmington Superfund Site
Wilmington, Massachusetts

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Ammonia in Surface Water in the Lower South Ditch

Figure D-2.6

Prepared by: BJR
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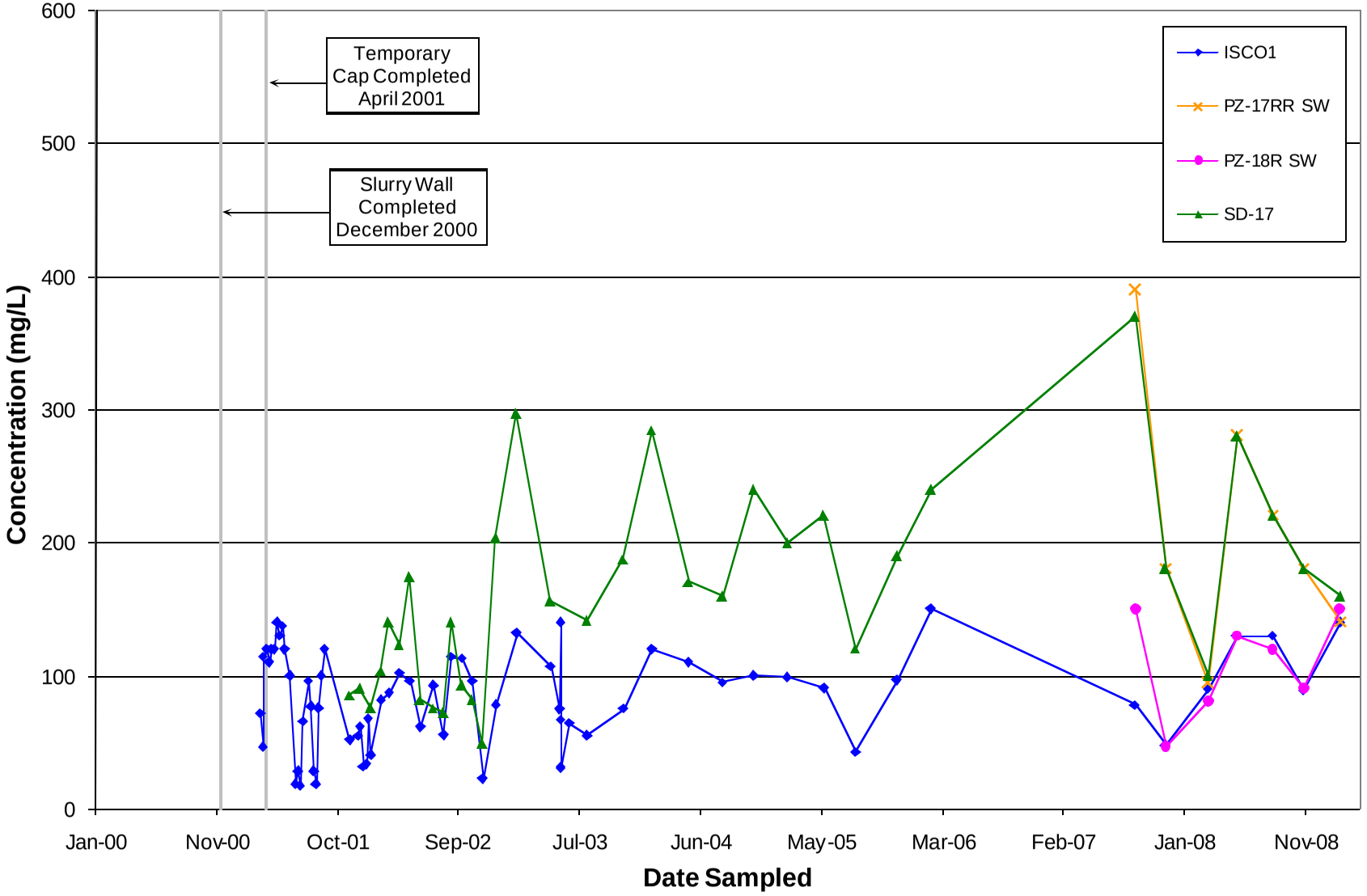
Time Series Plots DAPL constituents.xls, Ammonia SW LowerSD



Semi-Annual Status Report No. 4
Olin Wilmington Superfund Site
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Chloride in Surface Water in the Upper South Ditch

Figure D-2.7

Prepared by: BJR
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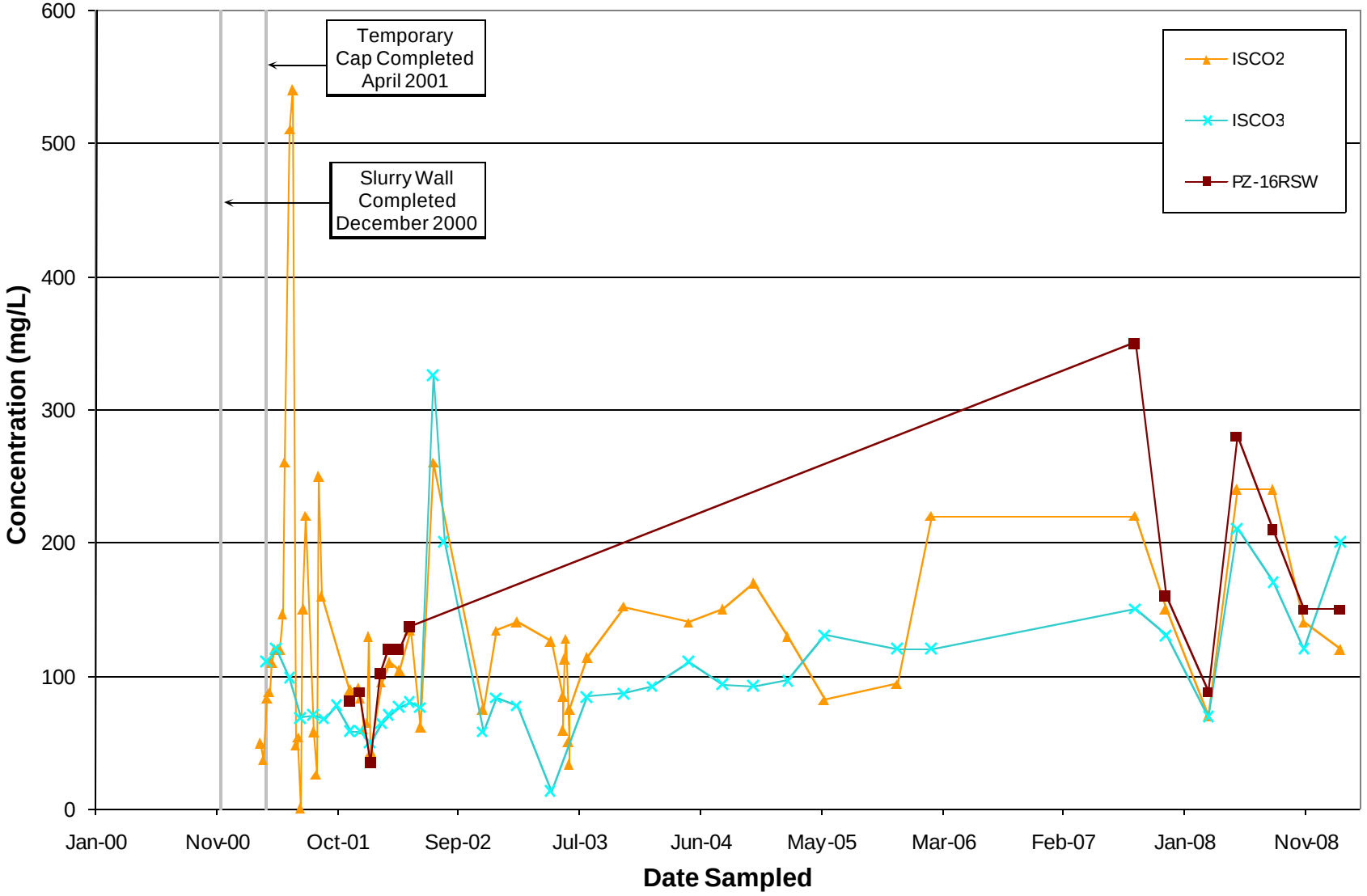
Time Series Plots DAPL constituents.xls, Chloride SW UpperSD



Semi-Annual Status Report No. 4
Olin Wilmington Superfund Site
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Chloride in Surface Water in the Lower South Ditch

Figure D-2.8

Prepared by: BJR
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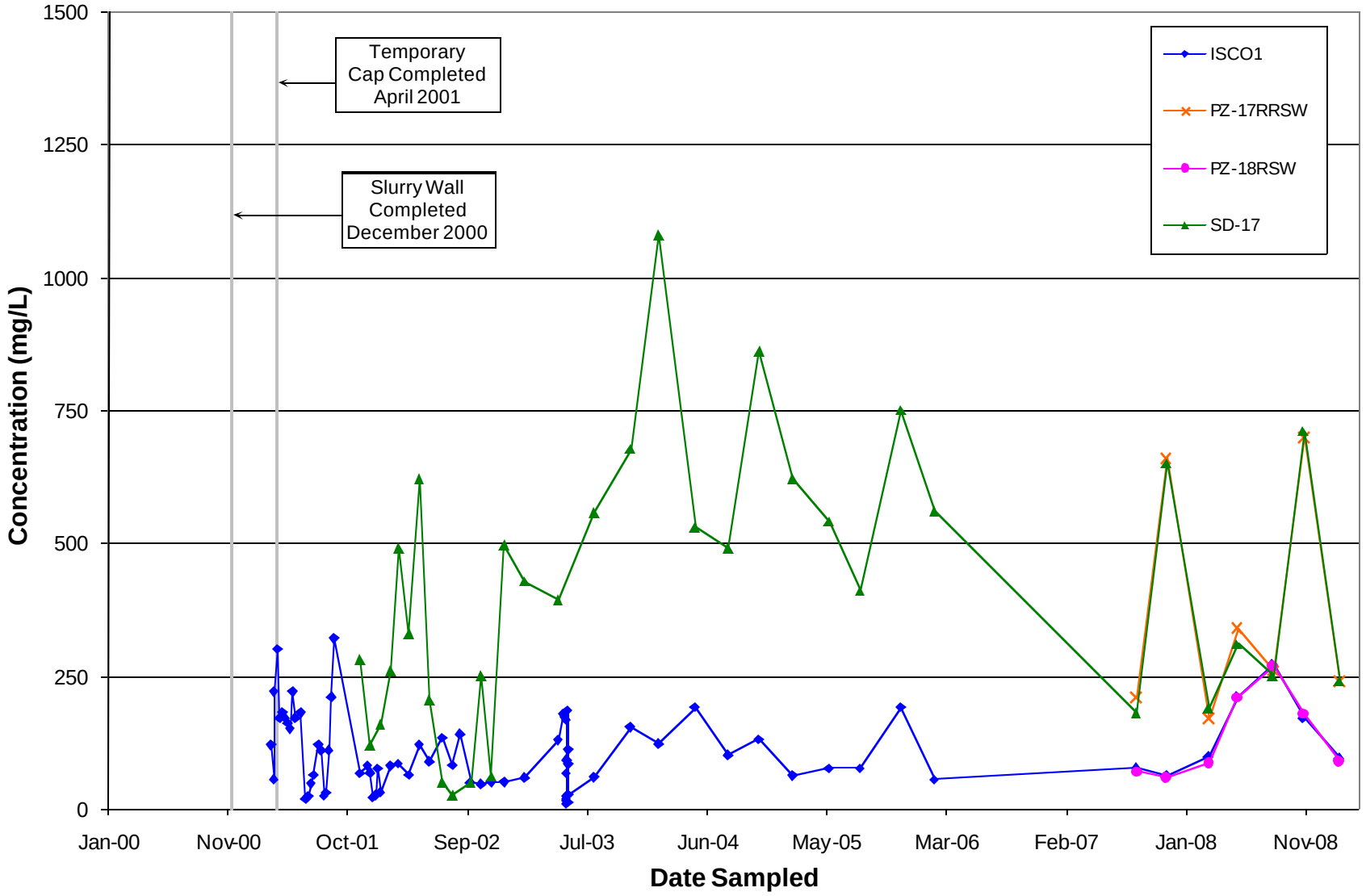
Time Series Plots DAPL constituents.xls, Chloride SW LowerSD



Semi-Annual Status Report No. 4
Olin Wilmington Superfund Site
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Sulfate in Surface Water in the Upper South Ditch

Figure D-2.9

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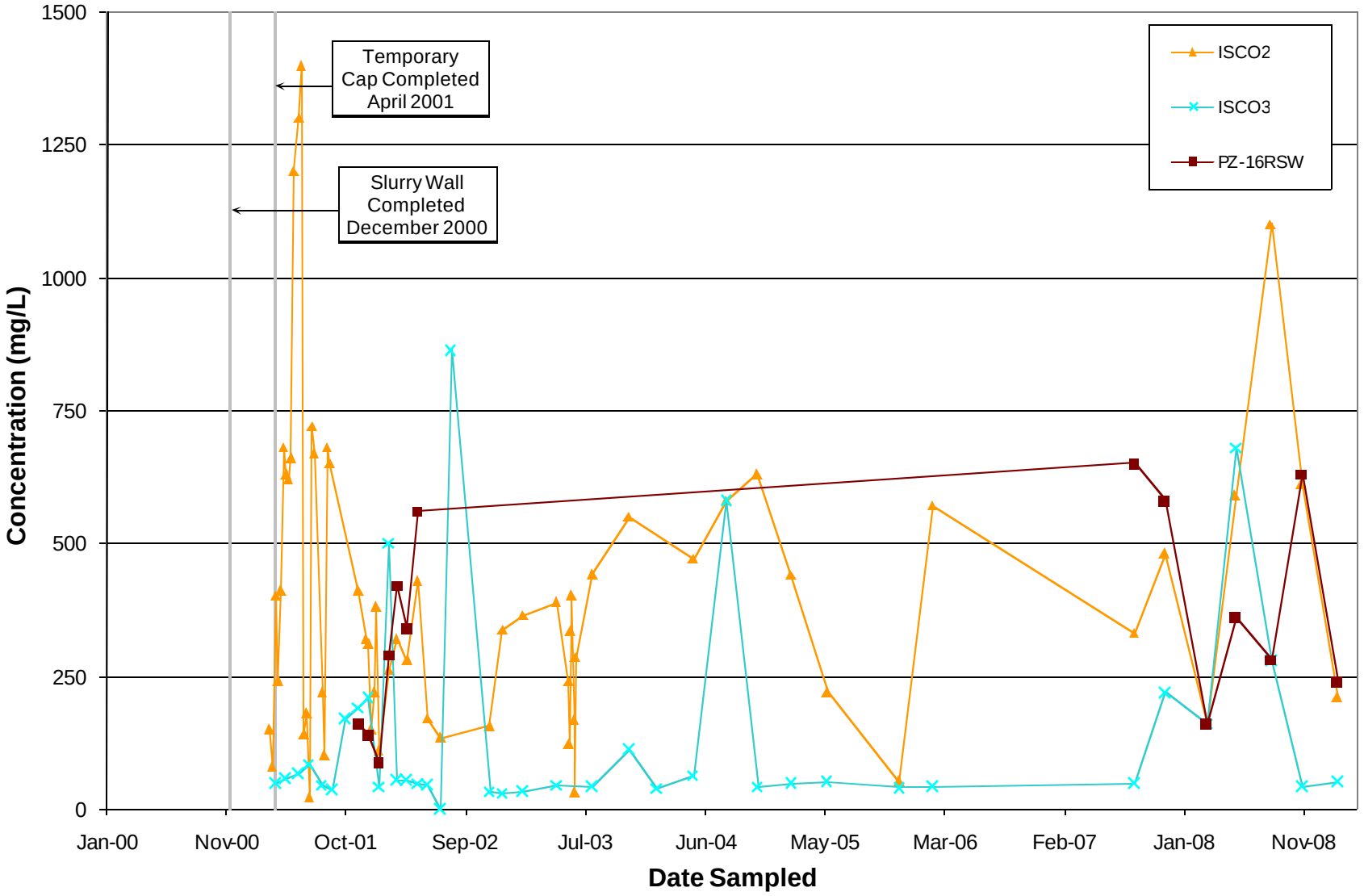
Time Series Plots DAPL constituents.xls, Sulfate SW UpperSD



Semi-Annual Status Report No. 4
Olin Wilmington Superfund Site
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Sulfate in Surface Water in the Lower South Ditch

Figure D-2.10

Prepared by: BJR
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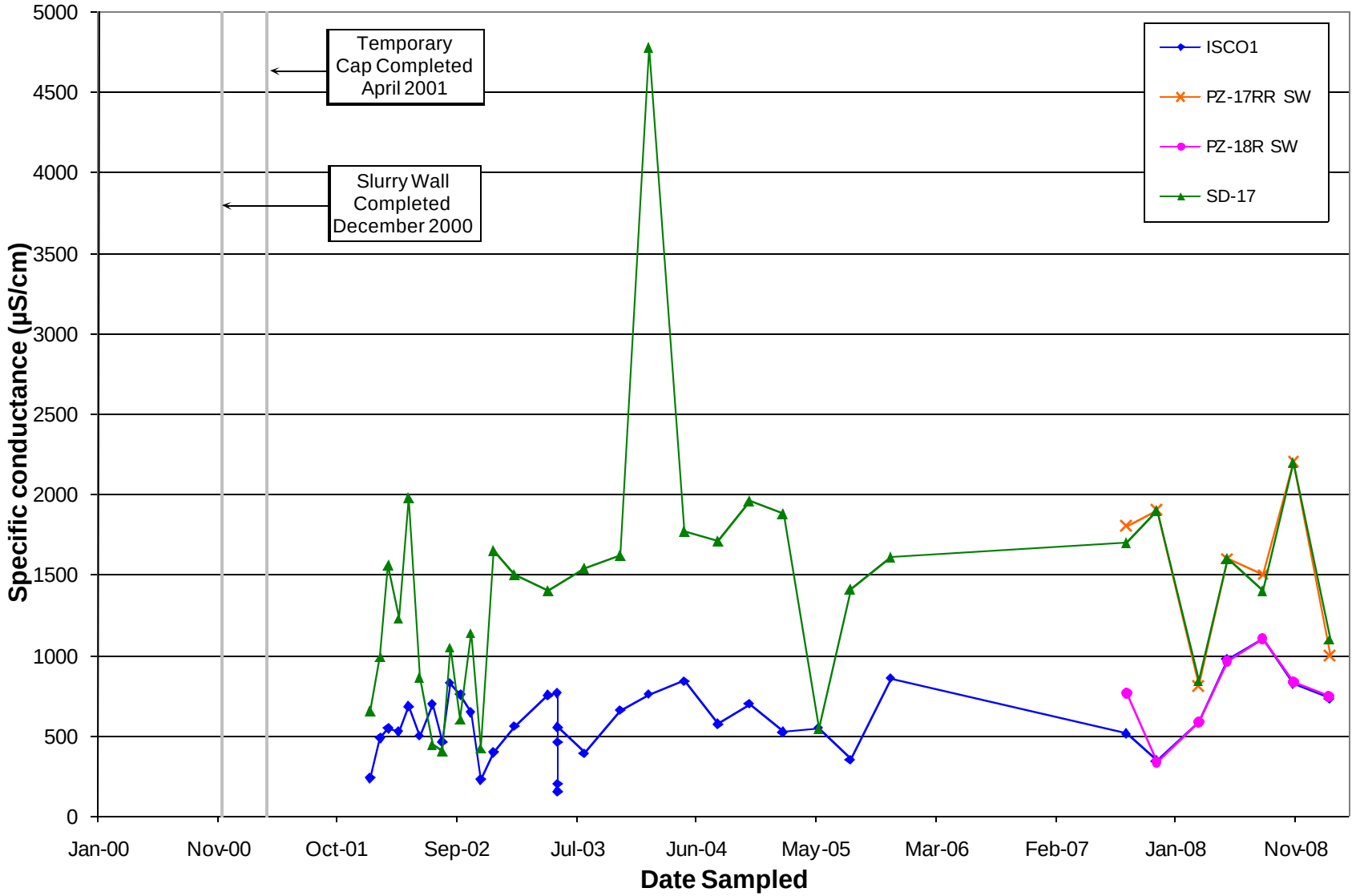
Time Series Plots DAPL constituents.xls, Sulfate SW LowerSD



Semi-Annual Status Report No. 4
Olin Wilmington Superfund Site
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Specific Conductance in Surface Water in the Upper South Ditch

Figure D-2.11

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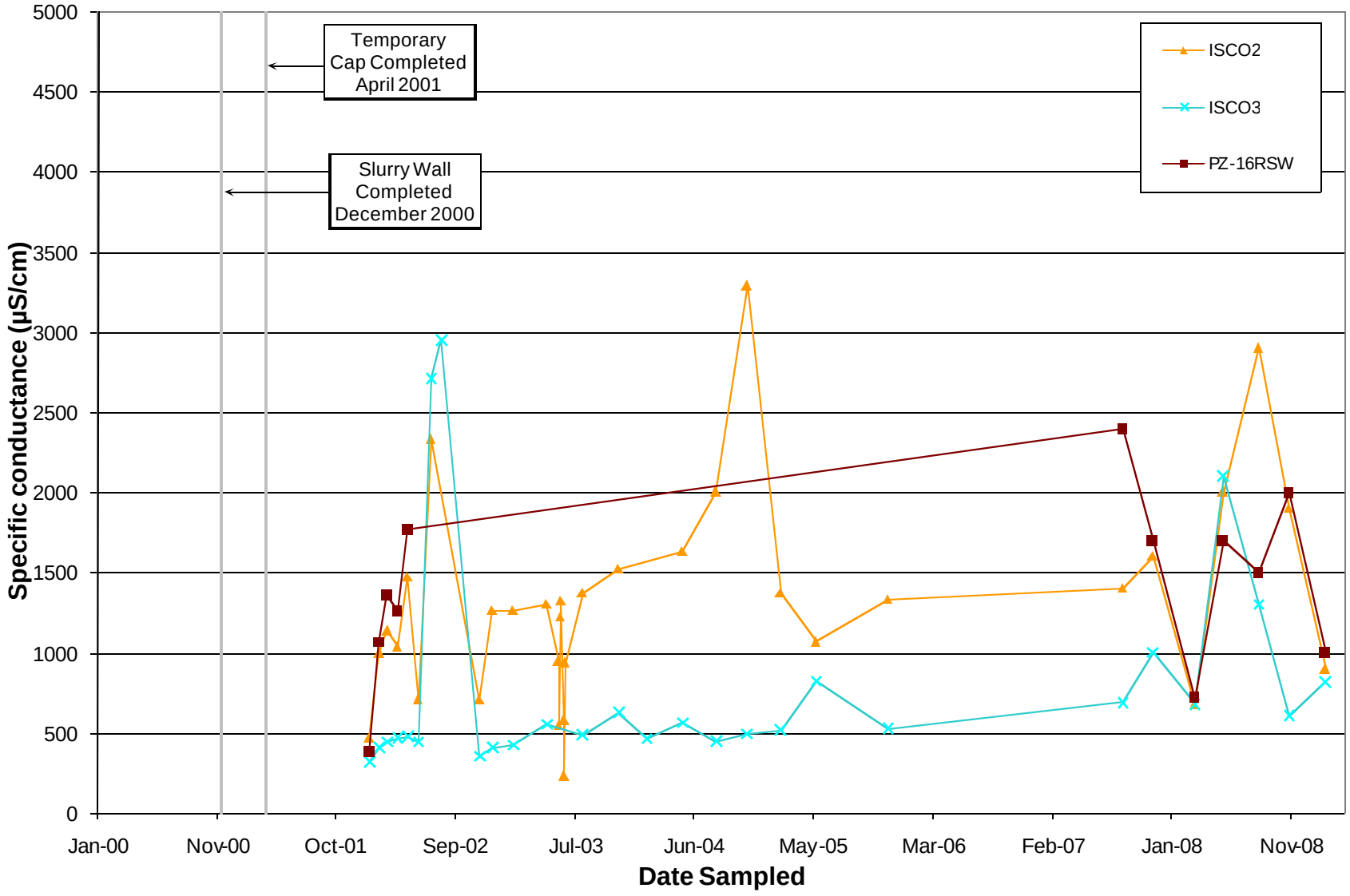
Time Series Plots DAPL constituents.xls, Specific Conductance SW UpperSD



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Olin Wilmington Superfund Site
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Specific Conductance in Surface Water in the Lower South Ditch

Figure D-2.12

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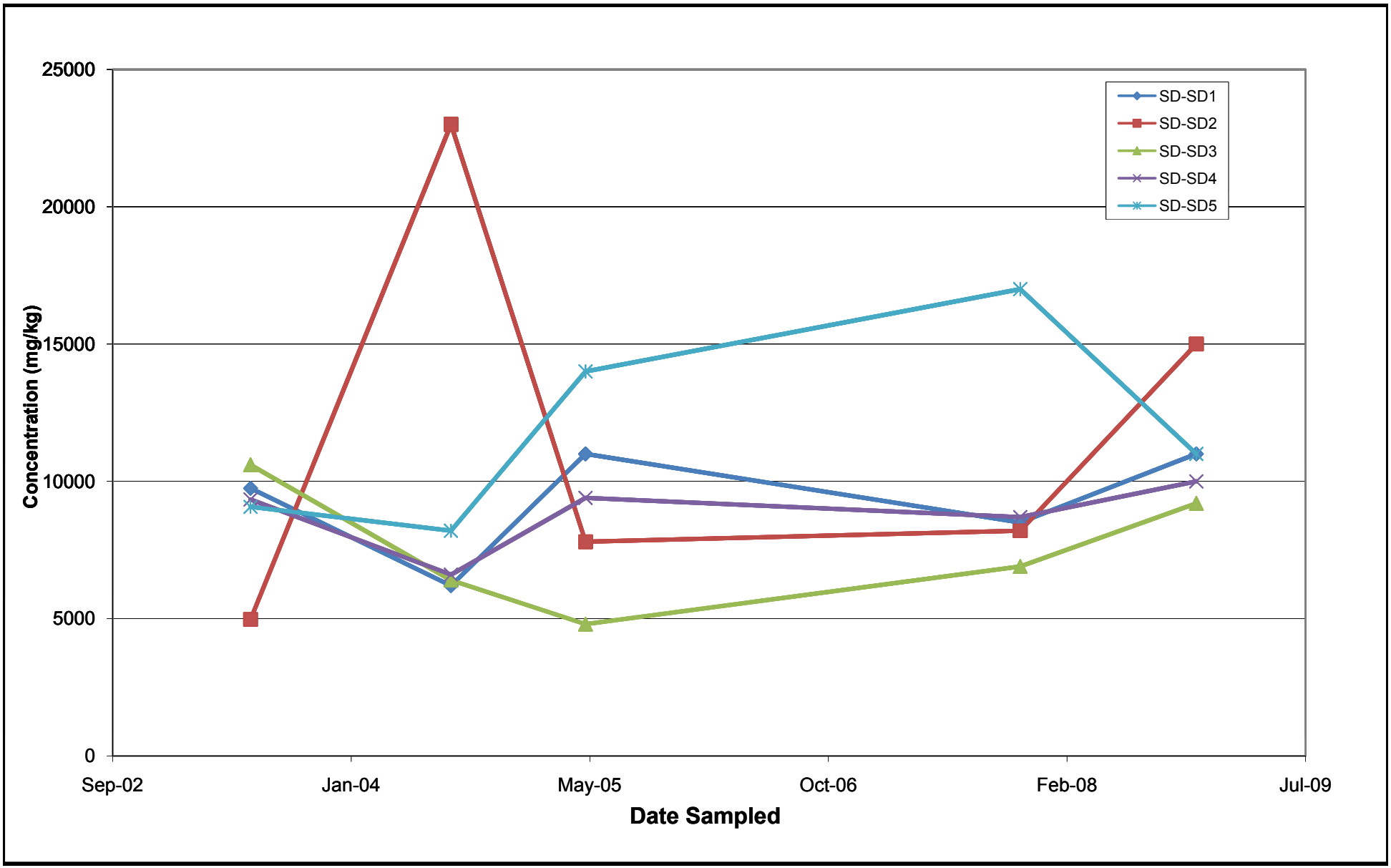
Time Series Plots DAPL constituents.xls, Specific Conductance SW LowerSD



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Olin Wilmington Superfund Site
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Aluminum Concentrations in Shallow Sediment (0-0.5 feet)

Figure D-3.1

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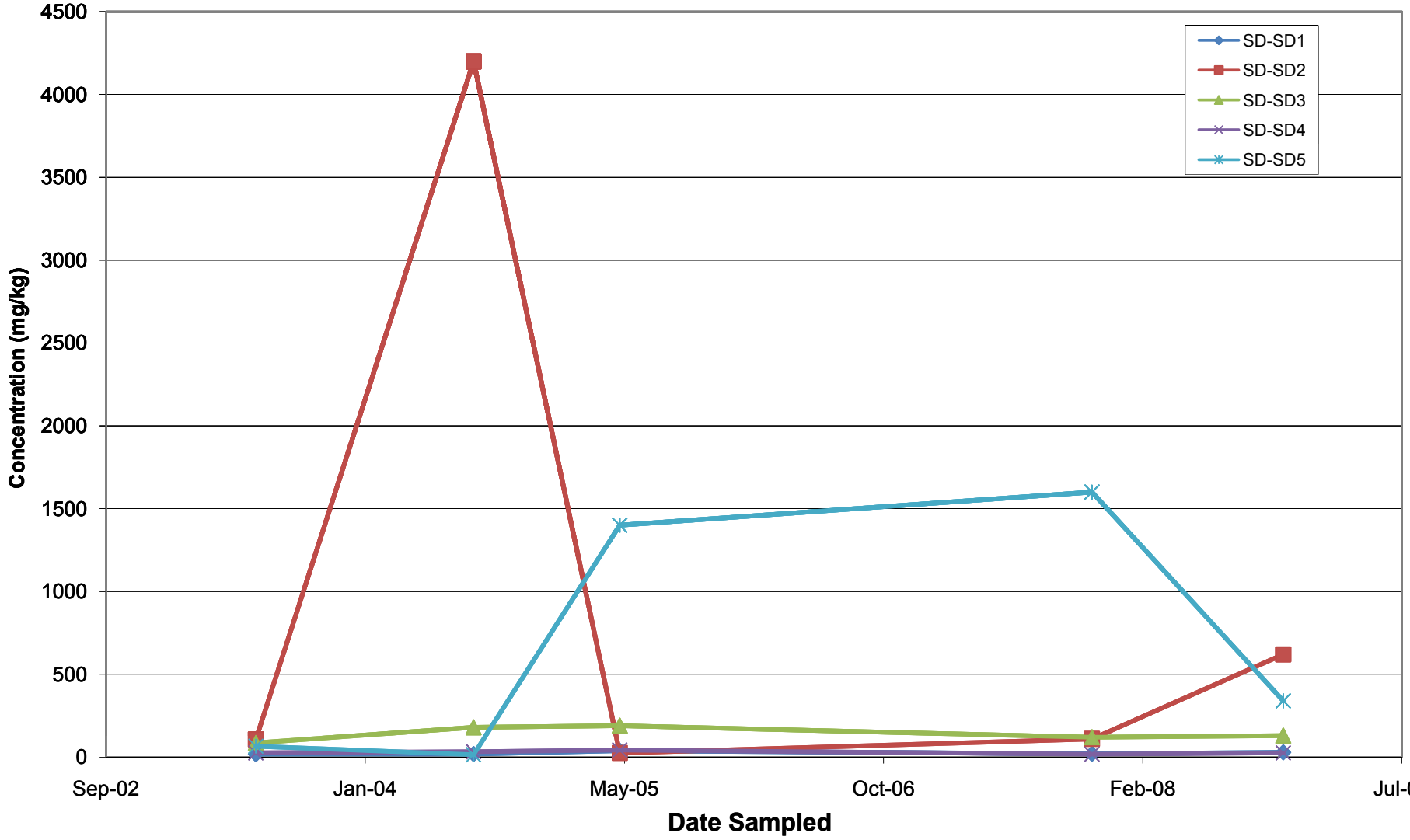
SD-XTAB-IRSWPfive.xls, Sed-Aluminum

Prepared by: MH
Checked by: BJR



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Chromium Concentrations in Shallow Sediment (0-0.5 feet)

Figure D-3.2

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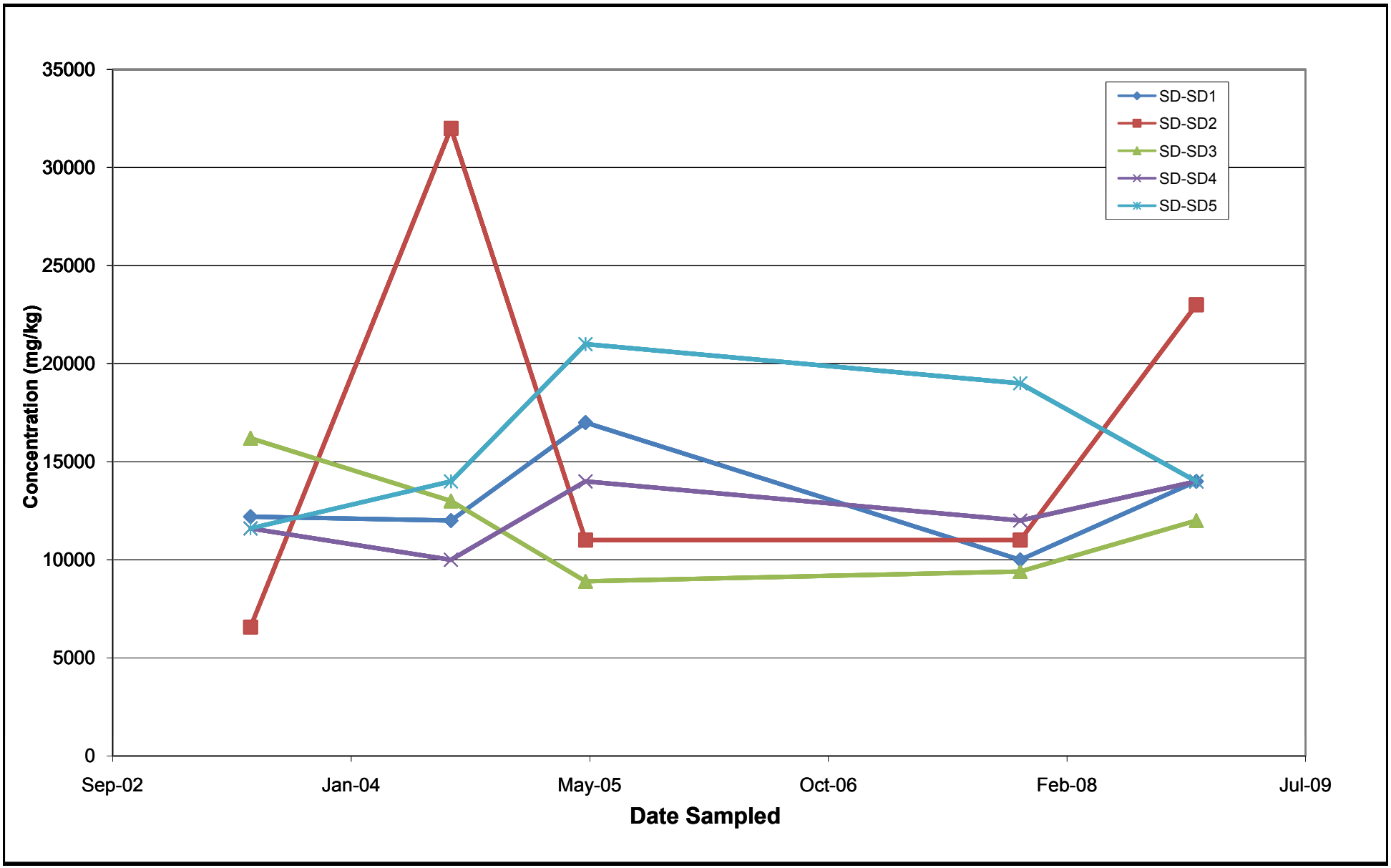
SD-XTAB-IRSWPfive.xls, Sed-Chromium

Prepared by: MH
Checked by: BJR



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Iron Concentrations in Shallow Sediment
(0-0.5 feet)

Figure D-3.3

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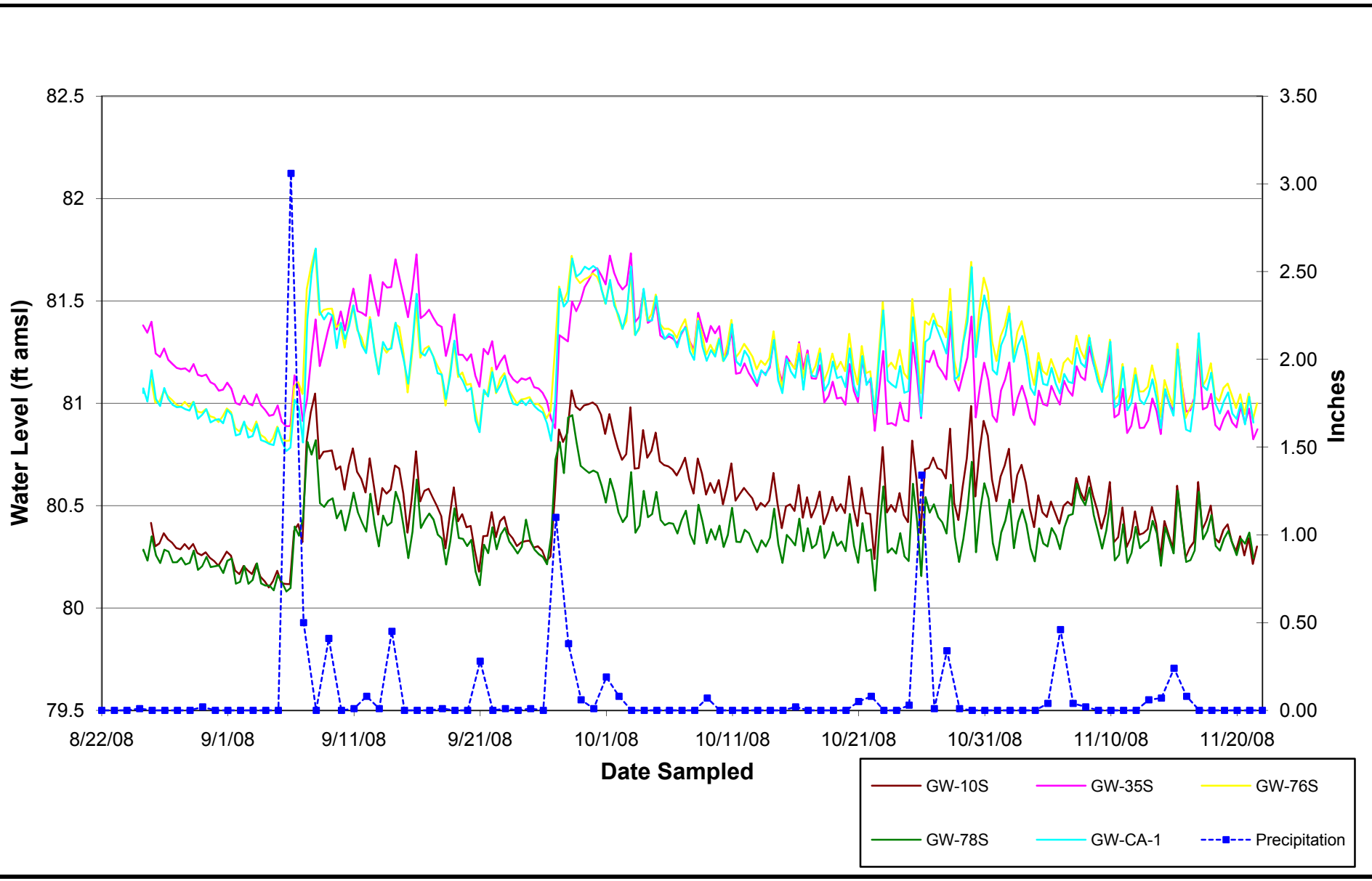
SD-XTAB-IRSWPfive.xls, Sed-Iron

Prepared by: MH
Checked by: BJR

APPENDIX E

Slurry Wall/Cap Data Logger Water Level Plots



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Groundwater Elevation (Corrected for Barometric Pressure) and Precipitation - 4th Quarter 2008

Figure E-1

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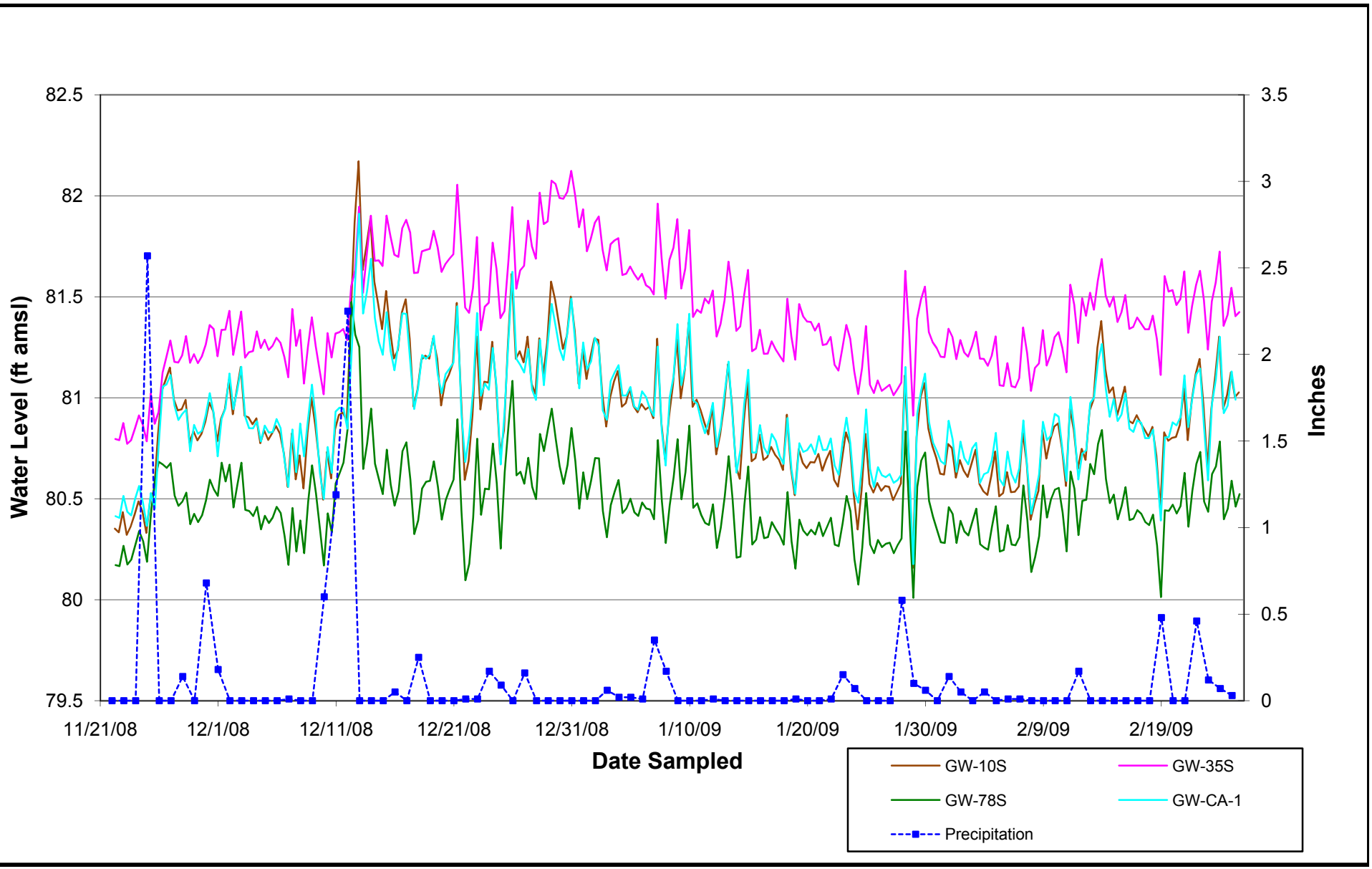
Data Logger Corrections.xls4th Quarter Fig

Prepared by: BJR
Checked by: PHT



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Groundwater Elevation (Corrected for Barometric Pressure) and Precipitation - 1st Quarter 2009

Figure E-2

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Data Logger Corrections.xls1st Quarter Fig

Prepared by: BJR
Checked by: PHT