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SEMI-ANNUAL STATUS REPORT NO. 3

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

Prepared by:

MACTEC

MACTEC Engineering and Consulting, Inc.
107 Audubon Road, Suite 301
Wakefield, Massachusetts 01880

Project No. 6100-08-0016/05B

December 29, 2008

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MACTEC

engineering and constructing a better tomorrow

December 31, 2008

Mr. James M. DiLorenzo
Remedial Project Manager
United States Environmental Protection Agency
Office of Site Remediation and Restoration
1 Congress Street, Suite 1100 (HB0)
Boston, Massachusetts, 02114-2023

Subject: Semi-Annual Status Report No. 3
June 2008 to November 2008
Olin Chemical Superfund Site, Wilmington, Massachusetts

Dear Mr. DiLorenzo:

On behalf of Olin Corporation, enclosed please find 5 hard copies and 10 electronic copies of the document titled*" Semi-Annual Status Report No. 3, Olin Chemical Superfund Site, 51 Eames Street, Wilmington, Massachusetts"*. This report is being submitted in accordance with the requirements specified in Sections 1.III.E and 2.II.C of the Final Statement of Work (SOW) for the Olin Chemical Superfund Site. The SOW is incorporated by reference into the Administrative Settlement Agreement and Order of Consent for Remedial Investigation and Feasibility Study for the Olin Chemical Superfund Site, Wilmington, Massachusetts (USEPA CERCLA Docket No. 01-2007-0102).

This document was prepared for the sole use of Olin Corporation and the United States Environmental Protection Agency, the only intended beneficiaries of our work. No other party shall rely on the information contained herein without prior written consent of MACTEC Engineering and Consulting Incorporated.

If you have any questions concerning this deliverable, please do not hesitate to contact Mr. Steve Morrow, Olin Corporation, at 423-336-4511.

Sincerely,

MACTEC Engineering and Consulting, Inc.

Peter H. Thompson
Project Manager

Michael J. Murphy
Senior Principal Scientist

cc: File
S. Morrow, Olin (1)

MACTEC Engineering and Consulting, Inc.
107 Audubon Road, Suite 301, Wakefield, Massachusetts 01880 • Phone: 781-245-6606 • Fax: 781-246-5060

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for Peter Thompson
Project Manager *with permission*

for Michael J. Murphy
Project Principal *with permission*

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GLOSSARY OF ACRONYMS

AS/SVE	air sparging/soil vapor extraction
BEHP	bis(2-ethylhexyl)phthalate
DAPL	dense aqueous phase liquid
IRS	Interim Response Steps
IRSWP	Interim Response Steps Work Plan
LNAPL	light non-aqueous phase liquid
MACTEC	MACTEC Engineering and Consulting, Inc.
MassDEP	Massachusetts Department of Environmental Protection
MCP	Massachusetts Contingency Plan
mg/L	Milligrams per Liter
MS/MSD	Matrix Spike/Matrix Spike Duplicate
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 April 2008 and September 2008 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 2nd and 3rd Quarters 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 2nd and 3rd quarter 2008 sampling events and the field data reports for those sampling events. The 2nd quarter field data report, which was initially transmitted as an appendix in SASR No. 2 is included in this report again for the reader's convenience and the completeness of this submittal. The next SASR (No. 4) will include the 4th quarter 2008 and 1st 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, MA. 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 in the off-PWD Area – which for this report period included continuing efforts on a DAPL Extraction Pilot Test Design.

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 to 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 scope of this SASR includes presentation of the results of surface water and groundwater sampling and analysis and a tabulation of water level data. For the Slurry Wall/Cap and Plant B, this SASR provides a tabulation of analytical data that has been validated to date for the sampling events within the monitoring period of the report, including the second and third quarter sampling events in 2008. 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 (April to September 2008). In addition, this report documents the field activities which are summarized in the field activity reports for each sampling event (including the second quarter 2008 and third quarter 2008 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 Second Quarter 2008 Sampling Event
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Appendix B – Data Validation Memorandums

B-1 Second Quarter 2008 Sampling Event
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Appendix C – Weir Monthly Inspection Reports: April 2008 – September 2008

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)

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 and surface water during the second quarter and third quarter 2008 sampling events. Groundwater level data for the second quarter and third quarter 2008 are presented in the field activity reports contained in **Appendices A-1 and A-2**. The data validation reports for the second quarter and third quarter 2008 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 April 2008 through September 2008 are attached in **Appendix C**.

2.1 GROUNDWATER

Groundwater sampling and analysis for the second quarter 2008 sampling event was completed on May 19-23, 2008. The third quarter 2008 sampling event was completed on August 25-27, 2008.

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

The sample locations, details of sampling, and the analytical program are contained in the field activity reports. Field activity reports for the first and second quarter 2008 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 for aluminum, chromium, ammonia, chloride, sulfate, and specific conductance.

Table 2-1 summarizes analytical results of samples collected during the second quarter 2008 groundwater sampling event. **Table 2-2** summarizes analytical results from the third quarter 2008 sampling event. Data validation memoranda from the second and third quarter 2008 sampling events are included in **Appendices B-1 and B-2**, respectively. The May 2008 and August 2008 data validation memos indicated that TestAmerica's results were interpreted as useable, with the exception noted below.

The May 2008 validation memo indicated that due to instrument problems, an alternative method was used for nitrate and nitrite analysis in surface water. Nitrite results were qualified rejected (R) due to >2X hold time; Additional data validation actions for useable data included:

- Consistent with data validation guidelines, the low concentrations of dissolved chromium in groundwater and surface water samples were qualified as non-detected (U) because there was also chromium reported in the associated method blanks;
- Sodium concentrations in surface water qualified estimated (J) in total and dissolved fractions;
- Results for sulfate and chloride in groundwater were outside the control limits and concentrations were qualified as estimated (J); and
- Results for ammonia were above the control limit of 50 and concentrations were qualified as estimated (J).

The August 2008 validation memo indicated nitrate was analyzed at a 10x dilution due to concentrations of chloride and sulfate. As a result, the detection limit for nitrate in all surface water samples was 0.1 milligrams per liter (mg/L).

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 second quarter 2008 and the third quarter 2008 sampling events.

The analytical results for metals and inorganics are within historical ranges and were, in general, consistent between both sampling events for wells common to each event. The concentrations of

filtered aluminum, filtered chromium, and ammonia in groundwater from GW-202D increased and is above the historical range. The concentration of chloride at this location is within the historical range. The concentration of chloride in GW-25 and GW-26 has declined from higher concentrations that were reported within the last several years (2005-2007).

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 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 consistent with prior data. 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 north to east during the measurement periods. 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) and in the Ephemeral drainage (GW-55S and GW-55D) during both monitoring 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.

2.2 SURFACE WATER

The second quarter 2008 and third quarter 2008 sampling events included collecting surface water samples from seven locations: ISCO1, ISCO2, ISCO3, PZ-16RR, PZ-17RR, PZ-18R, and SD-17. For each sampling event, QA/QC samples included a duplicate. Unfiltered samples were analyzed for aluminum, chromium, sodium, ammonia, chloride, nitrate, nitrite, sulfate, and specific conductance. In addition, filtered surface water samples were collected and analyzed for metals (aluminum, chromium, sodium). The sample locations, details of sampling and the analytical program are contained in the field activity reports. Field activity reports for the second and third

quarter 2008 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 second quarter 2008 surface water sampling event, and **Table 2-4** presents the analytical results for the third quarter 2008 surface water sampling event. **Appendix D-2** presents time series surface water concentration plots for aluminum, ammonia, chloride, chromium, and sulfate from the Upper South Ditch and Lower South Ditch areas. These plots include the data from the second quarter 2008 and third quarter 2008 sampling events. The second quarter 2008 and third quarter 2008 analytical results for aluminum, chromium, ammonia, chloride, sulfate, and specific conductance are consistent with past results. Data validation memoranda for the second and third quarter 2008 sampling events are included in **Appendix B**.

2.3 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 March 2008 to August 2008 and have been corrected for barometric pressure. The data acquisition frequency rate was reduced in June from every three minutes to three times a day to conserve memory since the devices memory were full in late May, prior to their recovery. A reprogramming error resulted in loss of data from the data loggers deployed in GW-76S and GW-10S for the June to August period.

Data plots indicate groundwater within and outside of the Containment Area responds to aerial recharge of the aquifer. **Figure E-2** indicates there is a significant lag time (5-6 days) in the water level response within the Containment Area following large precipitation events. Comparison of water levels in GW-35S and GW-CA-1 indicate outward flow through the equalization window from March through May. Comparison of these wells on **Figure E-2** indicates groundwater flow both in and out of the Containment Area through the equalization window in June and most of July, with a reversal in late July and flow outward through the equalization window after a major precipitation event. During periods of time when groundwater is flowing out of the equalization window, the groundwater outside the Containment Area is flowing in the opposite direction, around the Containment Area. These data are consistent with groundwater elevation data presented in **Figures 2-1 and 2-2**.

2.4 TEMPORARY CAP INSPECTIONS

Inspections of the temporary cap were conducted in June and August 2008 as part of the second and third quarter 2008 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**. Repairs completed in June 2008 remain in good condition as of August 2008. 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 at one location.

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 a repair tape, including all well penetrations and the wooden bollards that mark the edge of the slurry wall.

Ponded water was observed in different areas of the cap. 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. 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 the South Ditch. During the reporting period, it became apparent that the internal drain had become clogged due to the presence of vegetation and sand over the grate. On September 24, 2008, Olin, assisted by MACTEC, cleared away the sand, sediment and vegetation, and removed the grate to clear the drain and return it to its normal function.

Deterioration of the sand bags was observed during the inspections. This deterioration of the sand bags does not adversely affect their purpose which is to place weight on the cover to resist wind uplift forces. Olin is in the process of re-bagging and replacing deteriorated sand bags and has replaced over 300 bags within the past six months.

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 second quarter and third quarter 2008 sampling events. Groundwater level data for the second quarter and third quarter 2008 are presented in field activity reports contained in **Appendices A-1 and A-2**. The data validation reports for the second quarter and third quarter 2008 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 chorine. 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 (May 2008 – September 2008) are summarized in the tables and figures of this SASR.

3.1 GROUNDWATER

The second and third quarter 2008 sampling events included collecting a groundwater sample from monitoring well GW-16R. QA/QC samples included one duplicate and one MS and MSD collected during the second quarter 2008 sampling event.

The sample locations, details of sampling, and the analytical program are contained in the field activity reports. Field activity reports for the second and third quarter 2008 sampling events are contained in **Appendices A-1 and A-2**, respectively. Groundwater samples were analyzed for trimethylpentenes, NDPA, BEHP, volatile petroleum hydrocarbons (VPH), ammonia, iron and pH.

Table 3-2 presents analytical results from second quarter 2008 groundwater sampling event and **Table 3-3** summarizes analytical results from the third quarter 2008 sampling event. Data validation reports for the second and third quarter 2008 sampling events are included in **Appendix B**. The May 2008 and August 2008 data validation memos indicated that TestAmerica's results were interpreted as useable, with the exception noted below.

The May 2008 validation memo indicated that reported detections in groundwater for 2,2,4-trimethyl-2-pentene were qualified as estimated (J). Additional data validation actions for useable data included:

- Detections of BEHP were qualified as non-detected (U) because of detections in the method blank;
- High target concentrations of C5-C8 Aliphatics resulted in elevated reporting limits on non-detected target compounds; and
- The pH results were qualified rejected (R) due to >2X hold time.

The August validation memo indicated that the pH results for OC-GW-16R was qualified estimated (J) due to the >1X hold time.

The second and third quarter 2008 analytical results for trimethylpentenes, NDPA, BEHP, VPH, ammonia, iron and pH are consistent with past results, and detected concentrations tended to be lower in the third quarter 2008 sampling event compared to the second quarter 2008 sampling event.

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) to measure for separate phase product. The monthly water table elevation data are presented in **Tables 3-4 and 3-5** and in **Figures 3-1 through 3-6** for May 2008 through September 2008.

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, and 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 3-11** from May 2008 through September 2008. 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 monitoring well P5 and

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 3-3 and 3-4** for the May 2008 through September 2008 time period. The highest monthly amount of LNAPL recovered during this time period was 0.52 gallons in September 2008. The total LNAPL recovered for the May 2008 to September 2008 period was 2.86 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 3-12**. Groundwater levels relative to monthly LNAPL recovery have been plotted and summarized in **Figure 3-13**.

In general, monthly and cumulative LNAPL recovery data indicates an increasing trend since September 2005 along with an increase in groundwater elevation in monitoring wells IW-11 and IW-12 with the majority of recovered LNAPL coming from IW-11.

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 the bids will be solicited.

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. A Spill Prevention Contingency Plan will also be prepared to address spill release mitigation measures. The monitoring plan components will address the final design details for the extraction well, in addition to baseline and operational monitoring. The monitoring plan will incorporate details from the

Performance Monitoring Program that was submitted to Massachusetts Department of Environmental Protection (MassDEP) in December 2004, and which has been provided to USEPA. The monitoring plan components will be provided in early 2009, before the Pilot Test Operation, Maintenance and Monitoring Plan, to allow timely input from USEPA. Specific dates have not been established for these deliverables.

5.0 ADDITIONAL ACTIVITIES

Since the last SASR, Olin has submitted the following documents and other information requested by USEPA. In addition, two meetings and one conference call were held. Although some of these submittals and meetings pertain to the Draft RI/FS Project Operations Plan, and not the IRSWP, they are mentioned for completeness.

5.1 SUBMITTALS AND MEETINGS

July 28, 2008. Olin responded by letter to USEPA comments, dated July 14, 2008, that pertained to Olin's proposed final revisions to the Draft IRSWP. The comments were discussed in a meeting between Olin and USEPA on July 17, 2008. The meeting also discussed scoping items pertaining to the RI/FS Project Operations Plan (RI/FS Work Plan).

August 8, 2008. The Final IRSWP was submitted to USEPA. On August 6, 2008, USEPA provided to Olin a conditional approval of the Draft IRSWP, originally submitted on July 25, 2007. The conditional approval requested that the final document be submitted within 14 days of the date of the conditional approval letter.

October 3, 2008. Olin responded by letter to USEPA comments dated September 4, 2008, on USEPA's review of SASR No. 2. On October 15, 2008, a telephone conference call was held between Olin and USEPA. This call focused primarily on comments related to the conditional approval of the DAPL Pilot Design but also discussed Olin's response to USEPA General Comment 1 on SASR No. 2. That call resolved that SASR No. 3 would cover the second and third quarter 2008 sampling events, including all data validated for those events. SASR No. 4 will include the fourth quarter 2008 and first quarter 2009 sampling event, including all data validated for those events.

October 17, 2008. The Draft Project Operations Plan, which constitutes documents describing the RI/FS Work Plan, was submitted to USEPA on October 17, 2008. USEPA responded with a preliminary review letter dated November 17, 2008. A response to the initial comments contained in that letter is due to USEPA by January 30, 2009. A meeting was held with Olin and USEPA on November 20, 2008 to allow USEPA to present and discuss its initial comments.

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.

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 Second Quarter 2008 Groundwater Sampling
Semi-Annual Status Report No. 3
Olin Chemical Superfund Site
Wilmington, Massachusetts

Parameter	Frequency of Detection			Range of Reporting Limits for Non-Detects			Range of Detected Concentrations			Average of All Samples	OC-GW-10S GW-10S 5/21/2008	OC-GW-201S GW-201S 5/21/2008	OC-GW-202d GW-202D 5/20/2008	OC-GW-202s GW-202S 5/20/2008	OC-GW-202s DUP GW-202S 5/20/2008
Metals, Filtered (mg/L)															
Aluminum	20	/	22	0.1	:	0.1	0.0024	-	4.7	0.45	3.5	0.0035 J	4.7	0.1 U	0.1 U
Chromium	18	/	22	0.005	:	0.005	0.0015	-	0.44	0.028	0.005 U	0.014	0.44	0.0038 J	0.0037 J
Inorganics (mg/L)															
Chloride	22	/	22				1.3	-	340	62.4	7.1	42	340	68	69
Nitrogen, as Ammonia	22	/	22				0.48	-	320	67.7	1	65	320	81	87
Specific Conductance **(mS/cm)**	22	/	22				0.077	-	6.2	1.4	0.13	2.7	6.2	1.6	1.6
Sulfate	22	/	22				7.6	-	2200	502.2	44	1300	2200	610	610

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 Second Quarter 2008 Groundwater Sampling
Semi-Annual Status Report No. 3
Olin Chemical Superfund Site
Wilmington, Massachusetts

Parameter	OC-GW-24 GW-24 5/21/2008	OC-GW-25 GW-25 5/21/2008	OC-GW-26 GW-26 5/20/2008	OC-GW-34D GW-34D 5/22/2008	OC-GW-34SR GW-34SR 5/22/2008	OC-GW-35S GW-35S 5/21/2008	OC-GW-35S DUP GW-35S 5/21/2008	OC-GW-39 GW-39 5/20/2008	OC-GW-42s GW-42S 5/19/2008	OC-GW-55S GW-55S 5/23/2008
Metals, Filtered (mg/L)										
Aluminum	0.006 J	0.003 J	0.0036 J	0.0084 J	0.0024 J	0.032 J	0.034 J	0.035 J	0.53	0.61
Chromium	0.005 U	0.0043 J	0.015	0.014	0.005 U	0.017	0.016	0.005 U	0.014	0.0024 J
Inorganics (mg/L)										
Chloride	8.3	31	25	2.9	1.3	7.4	7.7	25	24	190 J
Nitrogen, as Ammonia	33	38	52	16	0.48	33	33	0.54	1.3	260
Specific Conductance **(mS/cm)**	0.4	0.6	0.62	0.23	0.077	1.2	1.2	0.6	0.21	3.5
Sulfate	74	140	180	53	7.6	430	420	250	13	1400 J

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 Second Quarter 2008 Groundwater Sampling
Semi-Annual Status Report No. 3
Olin Chemical Superfund Site
Wilmington, Massachusetts

Parameter	OC-GW-76S GW-76S 5/21/2008	OC-GW-78S GW-78S 5/23/2008	OC-GW-79S GW-79S 5/21/2008	OC-GW-CA-1 GW-CA1 5/21/2008	OC-PZ-16RR PZ-16RR 5/20/2008	OC-PZ-17RR PZ-17RR 5/20/2008	OC-PZ-18R PZ-18R 5/20/2008
Metals, Filtered (mg/L)							
Aluminum	0.13	0.052 J	0.016 J	0.014 J	0.0036 J	0.0048 J	0.0026 J
Chromium	0.0045 J	0.021	0.0082	0.0015 J	0.0055	0.0026 J	0.012
Inorganics (mg/L)							
Chloride	19	27 J	170	6.4	110	170	22
Nitrogen, as Ammonia	16	53	160	1.6	150	66	21
Specific Conductance **(mS/cm)**	0.32	1.2	3	0.57	1.9	1.1	1.3
Sulfate	77	530 J	1300	100	610	230	470

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 12/01/08
Checked by / Date: BJR 12/01/08

Table 2-2
Slurry Wall/Cap Analytical Results for Third Quarter 2008 Groundwater Sampling
Semi-Annual Status Report No. 3
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 GW-202D 8/25/2008	OC-GW-202S GW-202S 8/25/2008	OC-GW-25 GW-25 8/26/2008	OC-GW-78S GW-78S 8/26/2008	OC-GW-79S GW-79S 8/26/2008
Metals, Filtered (mg/L)									
Aluminum	8 / 9	0.1 : 0.1	0.003 - 8.4	0.95	8.4	0.0034 J	0.003 J	0.02 J	0.017 J
Chromium	5 / 9	0.005 : 0.0071	0.012 - 0.62	0.077	0.62	0.005 U	0.005 U	0.012	0.016
Inorganics (mg/L)									
Chloride	9 / 9		22 - 310	104.3	310	57	49	27	120
Nitrogen, as Ammonia	9 / 9		50 - 340	126.9	340	100	54	64	150
Specific Conductance **(mS/cm)**	9 / 9		0.69 - 4.8	2.0	4.8	1.6	0.69	1.3	2.6
Sulfate	9 / 9		120 - 2100	744.4	2100	590	140	550	1100

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

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

Parameter Name	OC-GW-79S DUP GW-79S 8/26/2008	OC-PZ-16RR PZ-16RR 8/26/2008	OC-PZ-17RR PZ-17RR 8/26/2008	OC-PZ-18R PZ-18R 8/26/2008
Metals, Filtered (mg/L)				
Aluminum	0.015 J	0.0033 J	0.1 U	0.0053 J
Chromium	0.016	0.0071 U	0.005 U	0.019
Inorganics (mg/L)				
Chloride	120	140	22	94
Nitrogen, as Ammonia	140	170	74	50
Specific Conductance **(mS/cm)**	2.6	2.2	1.4	0.81
Sulfate	1000	610	490	120

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 12/01/08
Checked by / Date: BJR 12/01/08

Table 2-3
Slurry Wall/Cap Analytical Results for Second Quarter 2008 Surface Water Sampling
Semi-Annual Status Report No. 3
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 ISCO1 5/22/2008	OC-ISCO-2 ISCO2 5/22/2008	OC-ISCO-3 ISCO3 5/22/2008	OC-PZ-16RR PZ-16RR 5/22/2008	OC-PZ-16RR DUP PZ-16RR 5/22/2008
Metals, Total (mg/L)									
Aluminum	8 / 8		0.12 - 7.6	4.0	0.13	7.6	6.1	4.9	5
Chromium	8 / 8		0.017 - 1.7	0.99	0.018	1.7	1.5	1.2	1.3
Sodium	8 / 8		78 - 160	133.4	89	150 J	160 J	150	150
Metals, Filtered (mg/L)									
Aluminum	8 / 8		0.017 - 0.34	0.083	0.017 J	0.041 J	0.34	0.039 J	0.043 J
Chromium	8 / 8		0.0051 - 0.2	0.062	0.0052	0.021	0.2	0.041	0.04
Sodium	8 / 8		93 - 180	147.1	93	170 J	180 J	160	160
Inorganics (mg/L)									
Chloride	8 / 8		130 - 280	228.8	130	240	210	280	280
Nitrite as N	3 / 3		0.044 - 0.047	0.046	0.044	R	R	R	R
Nitrate as N	8 / 8		0.14 - 4.6	2.7	0.14	2.6	1.2	4.4	4.4
Nitrogen, as Ammonia	8 / 8		24 - 88	53.5	42	88	83	24 J	55 J
Specific Conductance **(mS/cm)**	8 / 8		0.96 - 2.1	1.6	0.97	2	2.1	1.7	1.7
Sulfate	8 / 8		210 - 680	381.3	210	590	680	360	350

mg/L - milligrams/liter
mS/cm - milliSiemen/centimeter
J - value is estimated
R - result was rejected

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

Parameter Name	OC-PZ-17RR PZ-17RR 5/22/2008	OC-PZ-18R PZ-18R 5/22/2008	OC-SD-17 SD-17 5/22/2008
Metals, Total (mg/L)			
Aluminum	4.5	0.12	4
Chromium	1.2	0.017	1
Sodium	150	78 J	140 J
Metals, Filtered (mg/L)			
Aluminum	0.095 J	0.018 J	0.073 J
Chromium	0.1	0.0051	0.087
Sodium	160	94 J	160 J
Inorganics (mg/L)			
Chloride	280	130	280
Nitrite as N	R	0.047	0.047
Nitrate as N	4.6	0.15	4.3
Nitrogen, as Ammonia	54	36	46
Specific Conductance **(mS/cm)**	1.6	0.96	1.6
Sulfate	340	210	310

mg/L - milligrams/liter
mS/cm - milliSiemen/centimeter
J - value is estimated
R - result was rejected

Prepared by / Date: KJC 12/01/08
Checked by / Date: BJR 12/01/08

Table 2-4
Slurry Wall/Cap Analytical Results for Third Quarter 2008 Surface Water Sampling
Semi-Annual Status Report No. 3
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 ISCO-1 8/27/2008	OC-ISCO-2 ISCO-2 8/27/2008	OC-ISCO-3 ISCO-3 8/27/2008	OC-PZ-16RR PZ-16RR 8/27/2008	OC-PZ-17RR PZ-17RR 8/27/2008
Metals, Total (mg/L)									
Aluminum	8 / 8		0.094 - 7.8	2.7	0.094 J	3.5	0.77	7.8	4.1
Chromium	8 / 8		0.016 - 1.9	0.67	0.016	0.86	0.14	1.9	1.1
Sodium	8 / 8		92 - 230	136	92 J	230 J	110 J	140 J	160
Metals, Filtered (mg/L)									
Aluminum	8 / 8		0.011 - 0.13	0.046	0.011 J	0.13	0.057 J	0.071 J	0.028 J
Chromium	7 / 8	0.0066 : 0.0066	0.0072 - 0.088	0.031	0.0066 U	0.088	0.035	0.026	0.042
Sodium	8 / 8		110 - 260	157.5	110 J	260 J	160 J	170 J	170
Inorganics (mg/L)									
Chloride	8 / 8		120 - 240	180	130	240	170	210	220
Nitrate as N	8 / 8		0.12 - 6.8	2.6	0.13	0.75	0.72	5.8	6.7
Nitrite as N	0 / 8	0.01 : 0.1		0.039	0.01 U	0.1 U	0.1 U	0.1 U	0.1 U
Nitrogen, as Ammonia	8 / 8		39 - 180	73.9	56	180	110	39	40
Specific Conductance **(mS/cm)**	9 / 9		1.1 - 2.9	1.5	1.1	2.9	1.3	1.5	1.5
Sulfate	8 / 8		250 - 1100	372.5	270	1100	280	280	260

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 Third Quarter 2008 Surface Water Sampling
Semi-Annual Status Report No. 3
Olin Chemical Superfund Site
Wilmington, Massachusetts

Parameter Name	OC-PZ-18R PZ-18R 8/27/2008	OC-PZ-18R-DUP PZ-18R 8/27/2008	OC-SD-17 SD-17 8/27/2008
Metals, Total (mg/L)			
Aluminum	0.1	0.097 J	4.9
Chromium	0.017	0.017	1.3
Sodium	100	96 J	160
Metals, Filtered (mg/L)			
Aluminum	0.015 J	0.031 J	0.027 J
Chromium	0.0072	0.0088	0.04
Sodium	110	110 J	170
Inorganics (mg/L)			
Chloride	120	130	220
Nitrate as N	0.12	0.12	6.8
Nitrite as N	0.01 U	0.1 U	0.1 U
Nitrogen, as Ammonia	56	67	43
Specific Conductance **(mS/cm)**	1.1	1.1	1.4
Sulfate	270	270	250

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 12/01/08
Checked by / Date: BJR 12/01/08

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

Parameter	OC-INF 041608 4/16/2008	OC-EFF 041608 4/16/2008	OC-Inf 052108 5/21/2008	OC-Eff 052108 5/21/2008	OC-INF 061808 6/18/2008	OC-EFF 061808 6/18/2008	OC-Inf 071608 7/16/2008	OC-Eff 071608 7/16/2008	OC-Inf 082008 8/20/2008	OC-Eff 082008 8/20/2008	OC-inf 091708 9/17/2008	OC-eff 091708 9/17/2008
Volatile Organics (mg/L)												
1,1,1-Trichloroethane	0.005 U	0.001 U	0.005 U	0.001 U	0.005 U	0.001 U	0.001 U	0.001 U	0.005 U	0.001 U	0.005 U	0.001 U
1,1-Dichloroethane	0.005 U	0.001 U	0.005 U	0.001 U	0.005 U	0.001 U	0.001 U	0.001 U	0.005 U	0.001 U	0.005 U	0.001 U
2,4,4-Trimethyl-1-pentene	0.31	0.001 U	0.005 U	0.001 U	0.1	0.001 U	0.001 U	0.001 U	0.1	0.001 U	0.09	0.001 U
2,4,4-Trimethyl-2-Pentene	0.078	0.001 U	0.005 U	0.001 U	0.018	0.001 U	0.001 U	0.001 U	0.02	0.001 U	0.011	0.001 U
Acetone	0.25 U	0.05 U	0.25 UJ	0.05 UJ	0.25 U	0.05 U	0.05 U	0.05 U	0.25 U	0.05 U	0.25 U	0.05 U
Benzene	0.005 U	0.001 U	0.005 U	0.001 U	0.005 U	0.001 U	0.001 U	0.001 U	0.005 U	0.001 U	0.005 U	0.001 U
Cis-1,2-Dichloroethene	0.005 U	0.001 U	0.005 U	0.001 U	0.005 U	0.001 U	0.001 U	0.001 U	0.005 U	0.001 U	0.005 U	0.001 U
Ethyl benzene	0.005 U	0.001 U	0.005 U	0.001 U	0.005 U	0.001 U	0.001 U	0.001 U	0.005 U	0.001 U	0.005 U	0.001 U
Naphthalene	0.025 U	0.005 U	0.025 U	0.005 U	0.025 U	0.005 U	0.005 UJ	0.005 U	0.025 U	0.005 U	0.025 U	0.005 U
o-Xylene	0.005 U	0.001 U	0.005 U	0.001 U	0.005 U	0.001 U	0.001 U	0.001 U	0.005 U	0.001 U	0.005 U	0.001 U
Toluene	0.005 U	0.001 U	0.005 U	0.001 U	0.005 U	0.001 U	0.001 U	0.001 U	0.005 U	0.001 U	0.005 U	0.001 U
Trichloroethene	0.005 U	0.001 U	0.005 U	0.001 U	0.005 U	0.001 U	0.001 U	0.001 U	0.003 J	0.001 U	0.005 U	0.001 U
Xylene, m/p	0.01 U	0.002 U	0.01 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.01 U	0.002 U	0.01 U	0.002 U
Semivolatile Organics (mg/L)												
2,4,5-Trichlorophenol	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U
2,4,6-Trichlorophenol	0.0051 UJ	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U
2,4-Dichlorophenol	0.0051 UJ	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U
2,4-Dimethylphenol	0.0051 UJ	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U
2,4-Dinitrophenol	0.0051 UJ	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0008 J	0.0051 U	0.0051 U
2-Chlorophenol	0.0051 UJ	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U
2-Methylphenol	0.0051 UJ	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	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	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U
4,6-Dinitro-2-methylphenol	0.0051 UJ	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U
4-Chloro-3-methylphenol	0.0051 UJ	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U
4-Methylphenol							0.0051 U	0.0051 U	0.00022 J	0.0051 U	0.0051 U	0.0051 U
4-Nitrophenol	0.0051 UJ	0.0051 U	0.0051 UJ	0.0051 UJ	0.0051 UJ	0.0051 UJ	0.0051 UJ	0.0051 UJ	0.0051 UJ	0.0051 UJ	0.0051 U	0.0051 U
Acenaphthene	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Acenaphthylene	0.0003 U	0.0003 U	0.0003 U	0.0003 U	0.0003 U	0.0003 U	0.0003 U	0.0003 U	0.0003 U	0.0003 U	0.0003 U	0.0003 U
Anthracene	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Benzo(a)anthracene	0.0003 U	0.0003 U	0.0003 U	0.0003 U	0.0003 U	0.0003 U	0.0003 U	0.0003 U	0.0003 U	0.0003 U	0.00031	0.0003 U
Benzo(a)pyrene	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U
Benzo(b)fluoranthene	0.0003 U	0.0003 U	0.0003 U	0.0003 U	0.0003 U	0.0003 U	0.0003 U	0.0003 U	0.0003 U	0.0003 U	0.0003 U	0.0003 U
Benzo(ghi)perylene	0.00051 U	0.00051 U	0.00051 U	0.00051 U	0.00051 U	0.00051 U	0.00051 U	0.00051 U	0.00051 U	0.00051 U	0.00051 U	0.00051 U
Benzo(k)fluoranthene	0.0003 U	0.0003 U	0.0003 U	0.0003 U	0.0003 U	0.0003 U	0.0003 U	0.0003 U	0.0003 U	0.0003 U	0.0003 U	0.0003 U
Bis(2-Ethylhexyl)phthalate	0.013 J	0.0051 U	0.022	0.0051 U	0.011	0.002 U	0.026	0.002 U	0.012	0.002 U	0.017	0.002 U
Butylbenzylphthalate	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	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	0.001 U	0.001 U	0.001 U	0.001 U	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	0.00051 U	0.00051 U	0.00051 U	0.00051 U	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	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U

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

Parameter	OC-INF 041608 4/16/2008	OC-EFF 041608 4/16/2008	OC-Inf 052108 5/21/2008	OC-Eff 052108 5/21/2008	OC-INF 061808 6/18/2008	OC-EFF 061808 6/18/2008	OC-Inf 071608 7/16/2008	OC-Eff 071608 7/16/2008	OC-Inf 082008 8/20/2008	OC-Eff 082008 8/20/2008	OC-inf 091708 9/17/2008	OC-eff 091708 9/17/2008
Dimethylphthalate	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U
Di-n-butylphthalate	0.0051 U	0.0051 U	0.00092 J	0.00078 J	0.0011 J	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U
Di-n-octylphthalate	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.019	0.0051 U
Fluoranthene	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	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	0.001 U	0.001 U	0.001 U	0.001 U	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	0.00051 U	0.00051 U	0.00051 U	0.00051 U	0.00051 U	0.00051 U	0.00051 U	0.00051 U
m+p-Methylphenol	0.0051 UJ	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U						
Naphthalene	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Pentachlorophenol	0.00055 J	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.00072 J	0.001 U
Phenanthrene	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U
Phenol	0.0025 J	0.0051 UJ	0.00044 J	0.0051 UJ	0.0012 J	0.0051 UJ	0.00041 J	0.0051 UJ	0.0022 J	0.0051 UJ	0.0013 J	0.0051 UJ
Pyrene	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U	0.0051 U
Metals, Total (mg/L)												
Iron	6.6	0.016 J	4.2	0.04 J	7.5	0.021 J	3.7	0.033 J	5.9	0.032 J	5.6	0.1 U
Inorganics (mg/L)												
Chlorine	0.02 UJ	0.02 UJ	0.02 UJ	0.02 UJ	0.02 UJ	0.02 UJ	0.02 U	0.02 U	0.02 U	0.02	0.02 UJ	0.02 UJ
Nitrogen, as Ammonia	9.8	0.1 U	6.3	0.12	8.4	0.26	6.3	0.1	10	0.13	9.7	0.1 U
pH **(pH units)**	6.58 J	7.76 J	6.51 J	7.37 J	6.63 J	7.76 J	6.84 J	7.53 J	6.38 J	7.59 J	6.5 J	7.61 J
Phenolics, Total Recoverable	0.015	0.0066 U	0.0054 U	0.0068 U	0.0096	0.0076 U	0.012	0.0078 U	0.008 U	0.0076 U	0.0086	0.0098 U
Oil and Grease (mg/L)												
OIL AND GREASE	5 U	5 U	5.3 U	5.3 U	5.2 U	5.2 U	5.4 U	5.1 U	5.2 U	5.1 U	5 U	5 U

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

Prepared by / Date: KJC 12/16/08
Checked by / Date: CTM 12/16/08

Table 3-2
Plant B Analytical Results for Second Quarter 2008 Groundwater Sampling
Semi-Annual Status Report No. 3
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-16 GW-16 5/23/2008	OC-GW-16 DUP GW-16 5/23/2008
Volatile Organics (mg/L)						
2,4,4-Trimethyl-1-pentene	2 / 2		0.75 - 0.84	0.80	0.84	0.75
2,4,4-Trimethyl-2-Pentene	2 / 2		0.21 - 0.25	0.23	0.25 J	0.21 J
Semivolatile Organics (mg/L)						
Bis(2-Ethylhexyl)phthalate	0 / 2	0.0051 : 0.0051		0.0026	0.0051 U	0.0051 U
N-Nitrosodiphenylamine	2 / 2		0.57 - 0.58	0.58	0.57	0.58
Metals, Filtered (mg/L)						
Iron	2 / 2		4.9 - 5	5.0	5	4.9
Inorganics (mg/L)						
Nitrogen, as Ammonia	2 / 2		6.4 - 6.7	6.6	6.7	6.4
pH (s.u.)	0 / 0				R	R
Volatile Petroleum Hydrocarbons (mg/L)						
Benzene	0 / 2	0.025 : 0.025		0.013	0.025 U	0.025 U
Ethyl benzene	0 / 2	0.025 : 0.025		0.013	0.025 U	0.025 U
Methyl Tertbutyl Ether	0 / 2	0.025 : 0.025		0.013	0.025 U	0.025 U
Naphthalene	0 / 2	0.05 : 0.05		0.025	0.05 U	0.05 U
o-Xylene	0 / 2	0.025 : 0.025		0.013	0.025 U	0.025 U
Toluene	0 / 2	0.025 : 0.025		0.013	0.025 U	0.025 U
Xylene, m/p	0 / 2	0.05 : 0.05		0.025	0.05 U	0.05 U
C5-C8 Aliphatics	2 / 2		0.62 - 0.9	0.76	0.62	0.9
C5-C8 Aliphatics (unadj.)	2 / 2		0.62 - 0.9	0.76	0.62	0.9
C9-C10 Aromatics	0 / 2	0.5 : 0.5		0.25	0.5 U	0.5 U
C9-C12 Aliphatics	0 / 2	0.5 : 0.5		0.25	0.5 U	0.5 U
C9-C12 Aliphatics (unadj.)	0 / 2	0.5 : 0.5		0.25	0.5 U	0.5 U
Volatile Petroleum Hydrocarbons, Total	2 / 2		0.62 - 0.9	0.76	0.62	0.9

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

Prepared by / Date: KJC 12/01/08
Checked by / Date: BJR 12/01/08

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

Parameter Name	OC-GW-16R GW-16R 8/26/2008
Volatile Organics (mg/L)	
2,4,4-Trimethyl-1-pentene	0.52
2,4,4-Trimethyl-2-Pentene	0.11
Semivolatile Organics (mg/L)	
Bis(2-Ethylhexyl)phthalate	0.00046 J
N-Nitrosodiphenylamine	0.43
Metals, Total (mg/L)	
Iron	3.5
Metals, Filtered (mg/L)	
Iron	3.6
Inorganics (mg/L)	
pH **(s.u.)**	6.79 J
Nitrogen, as Ammonia	9
Volatile Petroleum Hydrocarbons (mg/L)	
Benzene	0.005 U
Ethyl benzene	0.005 U
Methyl Tertbutyl Ether	0.005 U
Naphthalene	0.01 U
o-Xylene	0.0069
Toluene	0.005 U
Xylene, m/p	0.01 U
C5-C8 Aliphatics	1.4
C5-C8 Aliphatics (unadj.)	1.4
C9-C10 Aromatics	0.11
C9-C12 Aliphatics	0.1 U
C9-C12 Aliphatics (unadj.)	0.12
Volatile Petroleum Hydrocarbons, Total	1.5

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

KJC 12/01/08
BJR 12/01/08

Table 3-4
Plant B Water Level and Product Recovery Data: April 2008 - June 2008 [1]
Semi-Annual Status Report No. 3
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	5/1/2008	5/30/2008	6/30/2008	5/1/2008	5/30/2008	6/30/2008	5/1/2008	5/30/2008	6/30/2008	feet	5/1/2008	5/30/2008	6/30/2008	5/1/2008	5/30/2008	6/30/2008
B-2	11.70	12.02	12.00	NPD	NPD	NPD	NA	NA	NA	90.48	78.78	78.46	78.48			
B-3	11.22	11.79	11.61	NPD	NPD	NPD	NA	NA	NA	90.32	79.10	78.53	78.71			
B-5R	11.11	11.71	11.90	NPD	NPD	NPD	NA	NA	NA	91.38	80.27	79.67	79.48			
B-7A	7.29	8.36	8.21	NPD	NPD	NPD	NA	NA	NA	88.81	81.52	80.45	80.60			
B-17	8.31	9.69	9.68	NPD	NPD	NPD	NA	NA	NA	91.55	83.24	81.86	81.87			
GW-13	11.35	11.85	11.74	NPD	NPD	NPD	NA	NA	NA	90.57	79.22	78.72	78.83			
GW-14	9.62	10.07	9.52	NPD	NPD	NPD	NA	NA	NA	88.70	79.08	78.63	79.18			
GW-15	7.85	8.19	9.08	NPD	NPD	NPD	NA	NA	NA	90.01	82.16	81.82	80.93			
GW-16R	9.88	11.16	11.10	NPD	NPD	NPD	NA	NA	NA	92.46	82.58	81.30	81.36			
GW-23	11.90	10.91	12.51	11.90	NPD	12.39	Trace	NA	0.12	91.04	79.15	80.13	78.64			
GW-52S	7.82	7.89	8.88	NPD	NPD	NPD	NA	NA	NA	87.95	80.13	80.06	79.07			
GW-100	11.73	12.05	11.99	NPD	NPD	NPD	NA	NA	NA	90.15	78.42	78.10	78.16			
GW-101	11.72	12.29	11.94	NPD	NPD	NPD	NA	NA	NA	90.14	78.42	77.85	78.20			
GW-102	10.43	11.01	10.73	NPD	NPD	NPD	NA	NA	NA	89.00	78.57	77.99	78.27			
IW-1	11.78	12.30	12.09	NPD	NPD	NPD	NA	NA	NA	90.71	78.93	78.41	78.62			
IW-2	13.11	13.45	13.13	NPD	NPD	13.12	NA	NA	0.01	90.53	77.42	77.08	77.41			
IW-3	11.94	12.05	12.14	NPD	NPD	12.13	NA	NA	0.01	90.76	78.82	78.71	78.63			
IW-6	10.92	11.29	11.21	NPD	NPD	NPD	NA	NA	NA	89.15	78.23	77.86	77.94			
IW-7	11.98	12.17	12.16	NPD	NPD	NPD	NA	NA	NA	90.10	78.12	77.93	77.94			
IW-8	11.83	12.00	11.95	NPD	NPD	NPD	NA	NA	NA	89.94	78.11	77.94	77.99			
IW-9	11.49	11.83	11.66	NPD	NPD	NPD	NA	NA	NA	89.78	78.29	77.95	78.12			
IW-10	11.91	12.31	12.16	NPD	NPD	NPD	NA	NA	NA	90.43	78.52	78.12	78.27			
IW-11	15.12	15.40	15.35	NPD	NPD	15.33	NA	NA	0.02	89.92	74.80	74.52	74.59	0.49	0.49	0.38
IW-12	13.62	13.83	13.71	NPD	NPD	13.70	NA	NA	0.01	90.31	76.69	76.48	76.61			
IW-13	17.35	17.61	17.49	NPD	NPD	17.48	NA	NA	0.01	89.90	72.55	72.29	72.42			
PID	11.92	12.27	12.11	NPD	NPD	NPD	NA	NA	NA	89.97	78.05	77.70	77.86			
P5	11.90	12.42	11.22	NPD	NPD	11.21	NA	NA	0.01	90.45	78.55	78.03	79.24			
12-IN	11.15	11.55	11.40	NPD	NPD	11.39	NA	NA	0.01	89.84	78.69	78.29	78.45			
											Recovered Product For Month			0.49	0.49	0.38

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

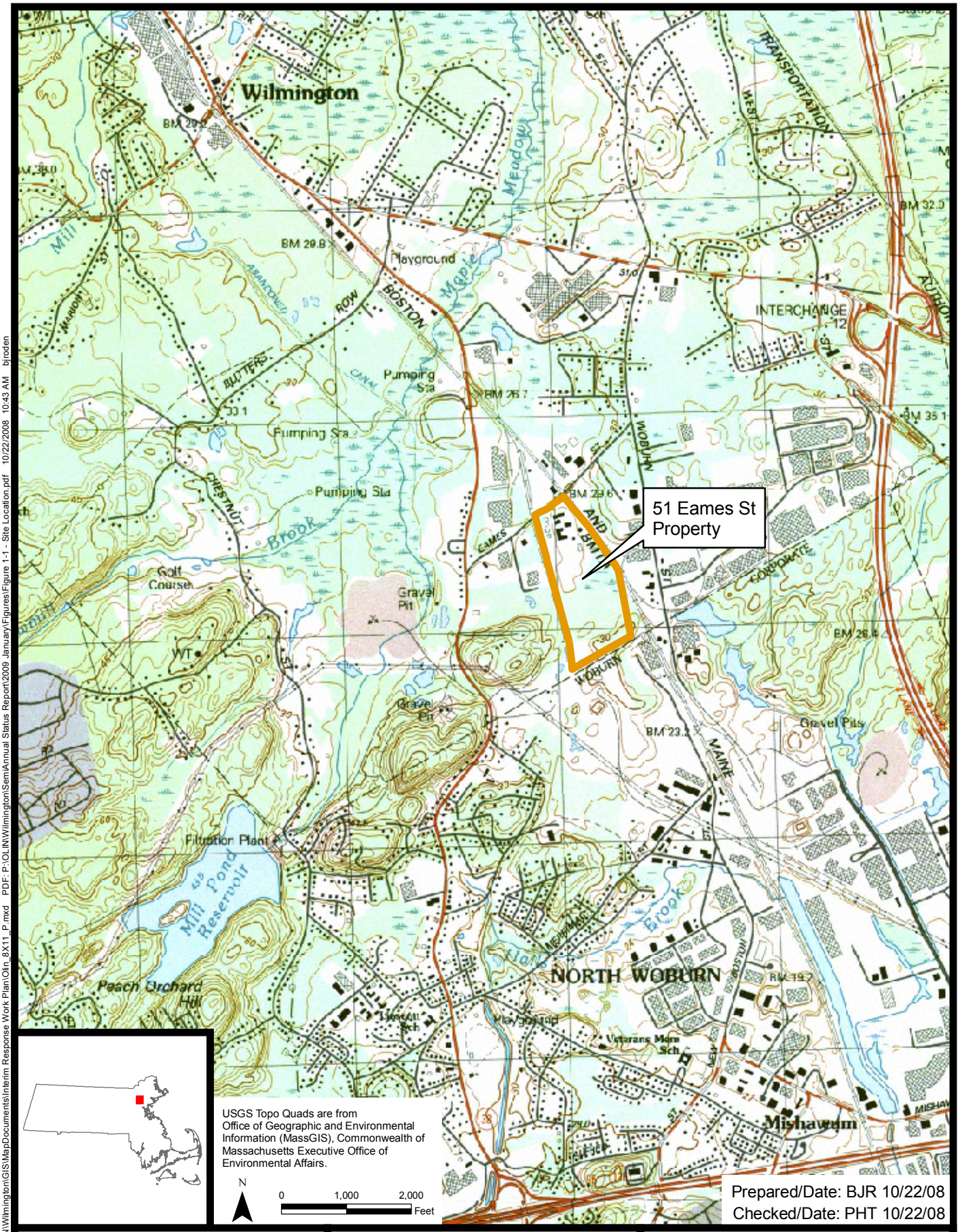
Table 3-5
Plant B Water Level and Product Recovery Data: July 2008 - September 2008 [1]
Semi-Annual Status Report No. 3
Olin Chemical Superfund Site
Wilmington, Massachusetts

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	7/31/2008	8/28/2008	9/30/2008	7/31/2008	8/28/2008	9/30/2008	7/31/2008	8/28/2008	9/30/2008	feet	7/31/2008	8/28/2008	9/30/2008	7/31/2008	8/28/2008	9/30/2008
B-2	11.64	12.19	11.63	NPD	NPD	NPD	NA	NA	NA	90.48	78.84	78.29	78.85			
B-3	10.98	11.93	11.51	NPD	NPD	NPD	NA	NA	NA	90.32	79.34	78.39	78.81			
B-5R	11.01	12.16	11.77	NPD	NPD	NPD	NA	NA	NA	91.38	80.37	79.22	79.61			
B-7A	7.21	8.54	7.56	NPD	NPD	NPD	NA	NA	NA	88.81	81.60	80.27	81.25			
B-17	8.65	10.14	8.99	NPD	NPD	NPD	NA	NA	NA	91.55	82.90	81.41	82.56			
GW-13	11.23	11.98	11.39	NPD	NPD	NPD	NA	NA	NA	90.57	79.34	78.59	79.18			
GW-14	8.53	9.86	9.46	NPD	NPD	NPD	NA	NA	NA	88.70	80.17	78.84	79.24			
GW-15	7.51	9.51	10.89	NPD	NPD	NPD	NA	NA	NA	90.01	82.50	80.50	79.12			
GW-16R	9.90	11.36	10.40	NPD	NPD	NPD	NA	NA	NA	92.46	82.56	81.10	82.06			
GW-23	12.22	12.81	12.20	12.20	12.79	12.19	0.02	0.02	0.01	91.04	78.84	78.25	78.85			
GW-52S	7.89	9.25	8.87	NPD	NPD	NPD	NA	NA	NA	87.95	80.06	78.70	79.08			
GW-100	11.66	12.04	11.73	NPD	NPD	NPD	NA	NA	NA	90.15	78.49	78.11	78.42			
GW-101	11.61	12.22	11.93	NPD	NPD	NPD	NA	NA	NA	90.14	78.53	77.92	78.21			
GW-102	10.37	11.00	10.64	NPD	NPD	NPD	NA	NA	NA	89.00	78.63	78.00	78.36			
IW-1	11.58	12.27	11.80	NPD	NPD	NPD	NA	NA	NA	90.71	79.13	78.44	78.91			
IW-2	12.79	13.32	12.82	12.78	13.31	12.82	0.01	0.01	Trace	90.53	77.75	77.22	77.72			
IW-3	11.67	12.05	11.57	11.66	12.05	11.56	0.01	Trace	0.01	90.76	79.10	78.72	79.20			
IW-6	10.88	11.34	10.87	NPD	NPD	NPD	NA	NA	NA	89.15	78.27	77.81	78.28			
IW-7	11.85	11.99	11.61	NPD	NPD	NPD	NA	NA	NA	90.10	78.25	78.11	78.49			
IW-8	11.62	11.96	11.37	NPD	NPD	NPD	NA	NA	NA	89.94	78.32	77.98	78.57			
IW-9	11.31	11.79	11.41	NPD	NPD	NPD	NA	NA	NA	89.78	78.47	77.99	78.37			
IW-10	11.85	12.35	11.86	NPD	NPD	NPD	NA	NA	NA	90.43	78.58	78.08	78.57			
IW-11	15.17	14.47	14.14	15.16	14.45	14.13	0.01	0.02	0.01	89.92	74.76	75.47	75.79	0.49	0.49	0.39
IW-12	13.49	13.54	13.17	13.48	13.53	13.17	0.01	0.01	Trace	90.31	76.83	76.78	77.15			
IW-13	17.23	18.65	18.17	17.22	18.64	18.16	0.01	0.01	0.01	89.90	72.68	71.26	71.74			0.13
PID	11.72	11.73	11.34	NPD	NPD	NPD	NA	NA	NA	89.97	78.25	78.24	78.63			
P5	11.03	12.41	12.02	11.02	NPD	NPD	0.01	NA	NA	90.45	79.43	78.04	78.43			
12-IN	10.92	11.51	10.91	10.92	11.50	10.90	Trace	0.01	0.01	89.84	78.93	78.34	78.94			
											Recovered Product For Month			0.49	0.49	0.52

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. 3

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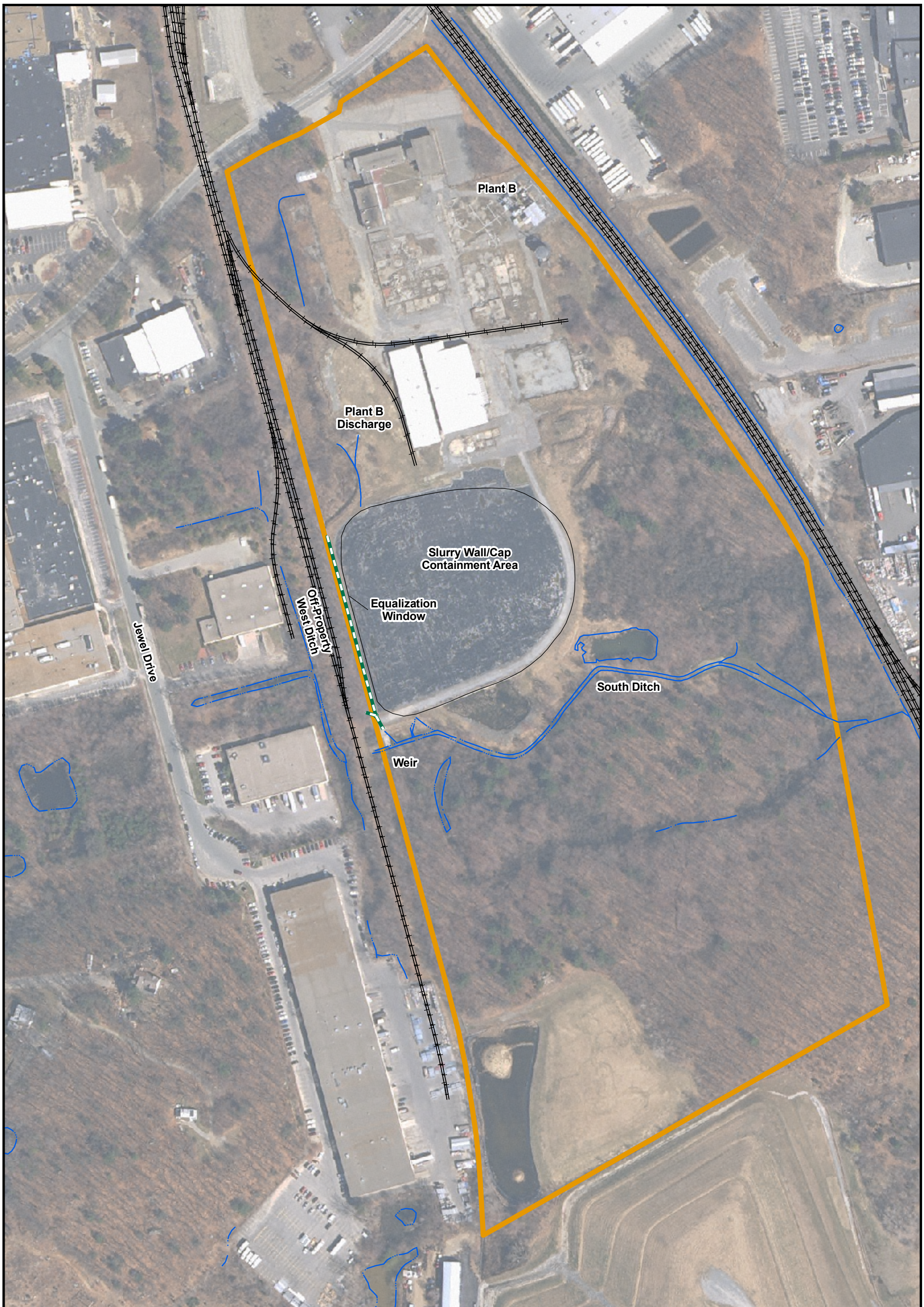

Legend

- 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. 3
Olin Chemical Superfund Site
Wilmington, Massachusetts

Prepared/Date: BJR 10/22/08 | Checked/Date: PHT 10/22/08

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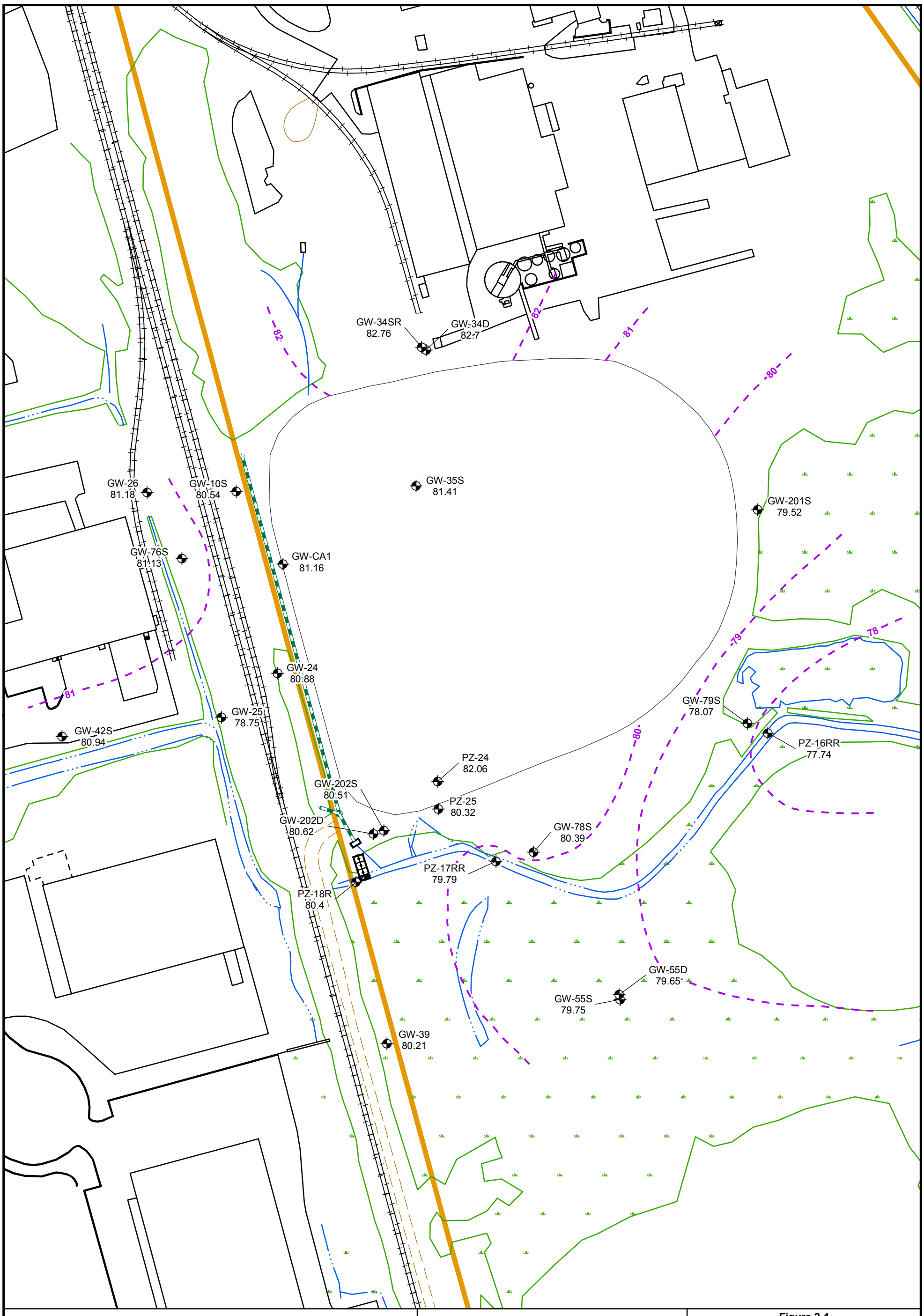

Legend

- Interpreted Groundwater Contour
- Site Boundary
- Wetland Boundary
- Paved Road
- Unpaved Road
- Railroad
- Structure
- Water
- Culvert
- Trail

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N

0 50 100 200 Feet

Figure 2-1
Slurry Wall / Cap Interpreted Water Level Contours - Second Quarter 2008
May 16, 2008
Semi-Annual Status Report No. 3
Olin Chemical Superfund Site
Wilmington, Massachusetts

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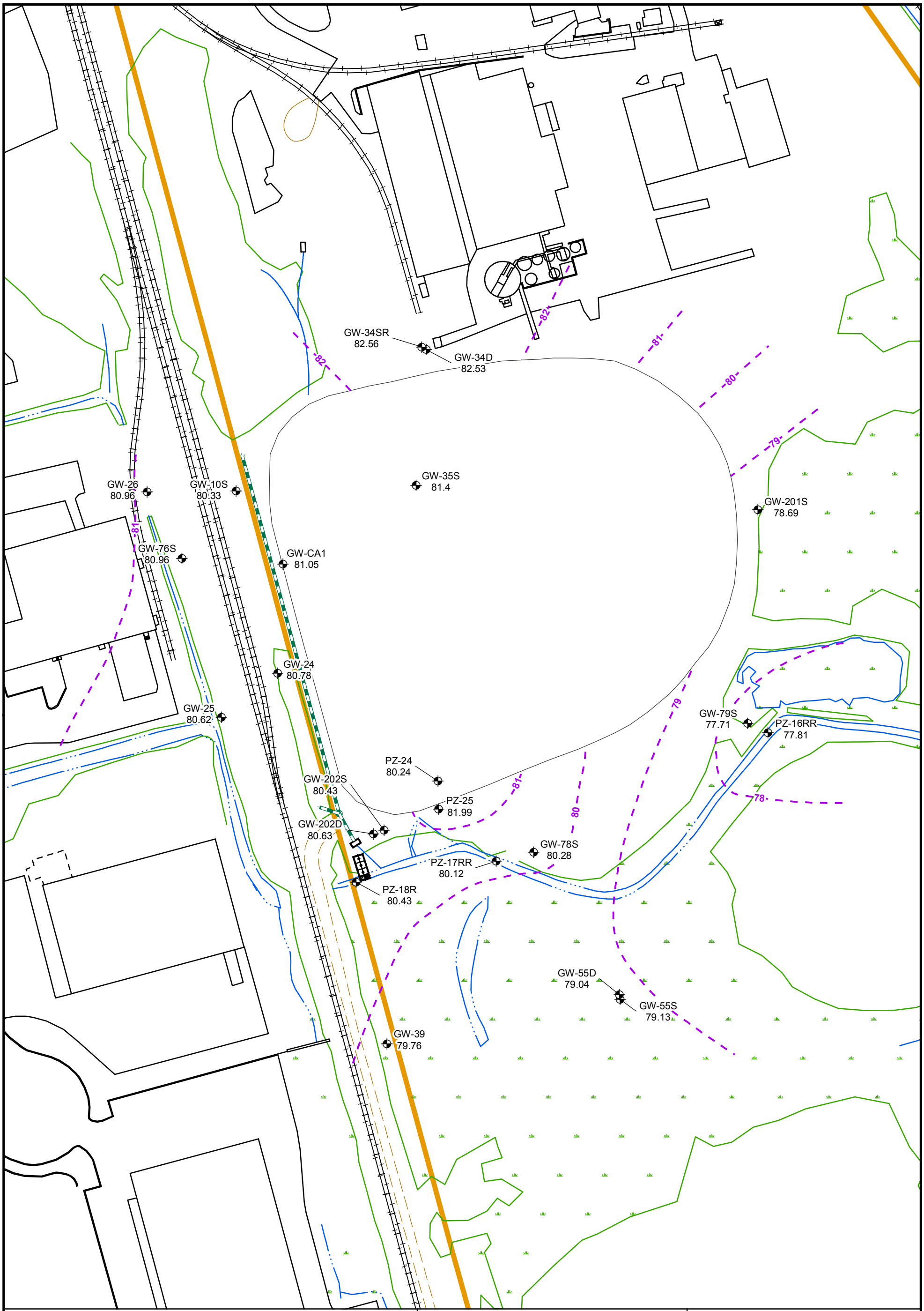
Document: P:\OLIN\Wilmington\GIS\MapDocuments\Interim Response Work Plan\Olin_IRWP2.mxd PDF: P:\OLIN\Wilmington\SemiAnnual Status Report\2009 January\Figures\Figure 2-1 - Slurry Wall Cap Interpreted Water Level Contours - Second Quarter 2008.pdf 10/28/2008 2:47 PM bjroden



Legend

- Interpreted Groundwater Contour
- Site Boundary
- Wetland Boundary
- Paved Road
- Unpaved Road
- Railroad
- Structure
- Water
- Culvert
- Trail

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N

0 50 100 200 Feet

Figure 2-2
Slurry Wall / Cap Interpreted Water Level Contours - Third Quarter 2008
August 25, 2008
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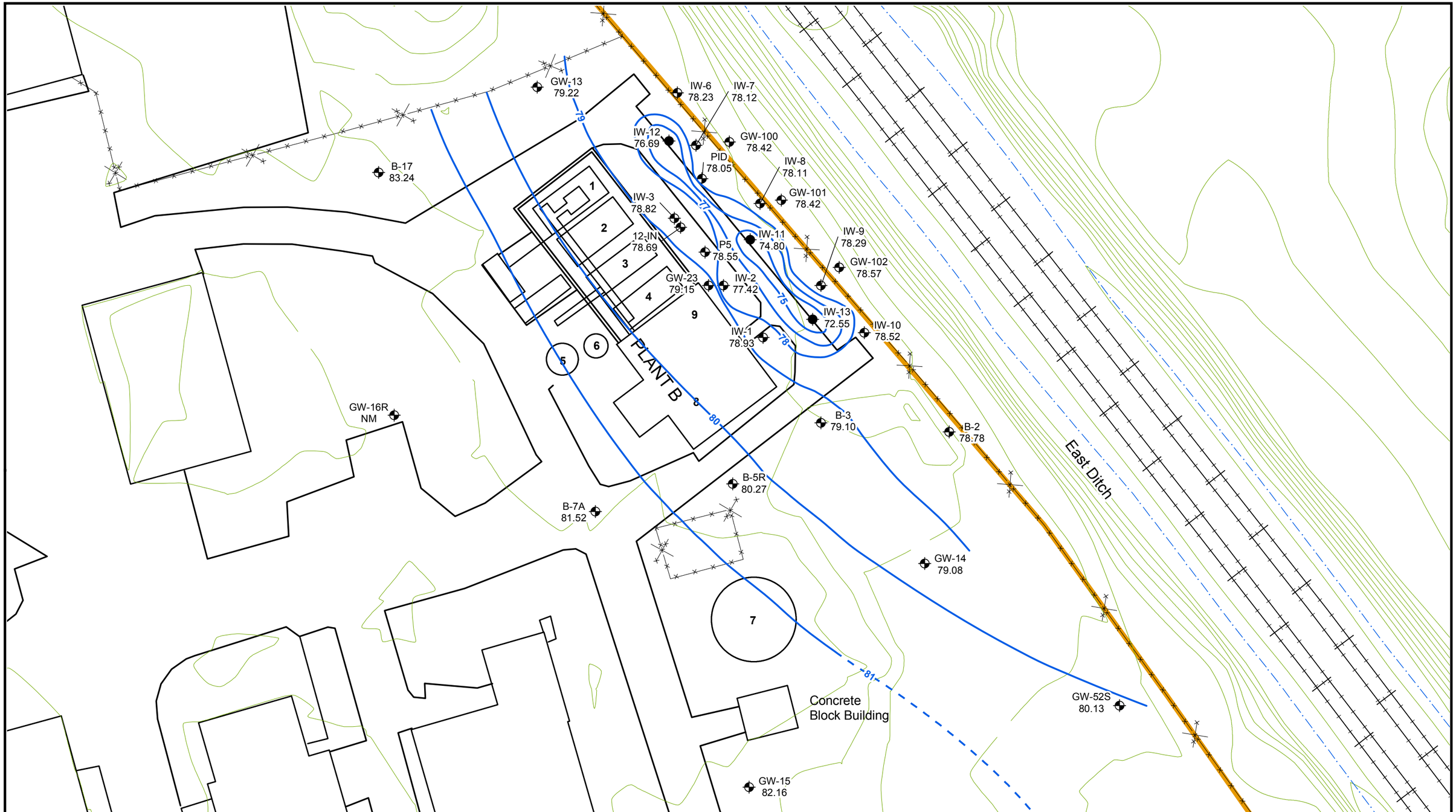
Olin Chemical Superfund Site
Wilmington, Massachusetts

Prepared/Date: BJR 10/28/08 | Checked/Date: PHT 10/28/08

Document: P:\OLIN\Wilmington\GIS\MapDocuments\Interim Response Work Plan\Olin_IRWP2.mxd PDF: P:\OLIN\Wilmington\SemiAnnual Status Report\2009 January\Figures\Figure 2-2 - Slurry Wall Cap Interpreted Water Level Contours - Third Quarter 2008.pdf 10/28/2008 2:47 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

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

NM - Not Measured

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N

0 15 30 60 Feet

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

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Olin Chemical Superfund Site
Wilmington, Massachusetts

Prepared/Date: BJR 10/28/08 | Checked/Date: PHT 10/28/08

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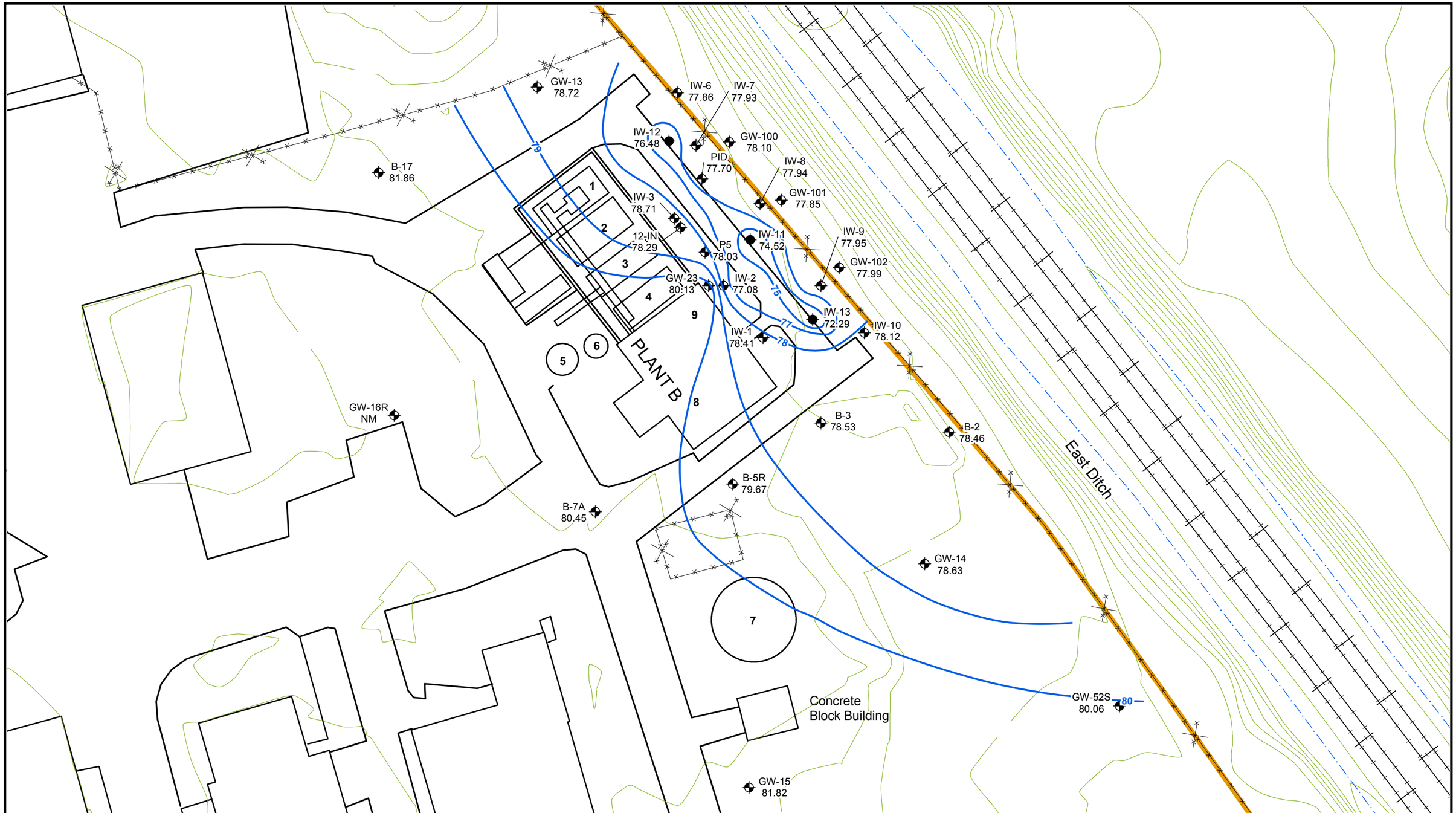

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Tank #5 - Pre-carbon hold tank
Tank #6 - Residence tank
Tank #7 - Raw water (pH adjusted)
Tank #8 - Pre-carbon transfer
Tank #9 - Day discharge to NPDES Outfall 002

Legend

- Interpreted Potentiometric Contour Line (FT/MSL)
- Recovery Well
- Monitoring Well
- Ditch
- Elevation Contours
- NM - Not Measured

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N

0 15 30 60 Feet

Figure 3-2
Plant B Interpreted Water Level Conditions
May 30, 2008

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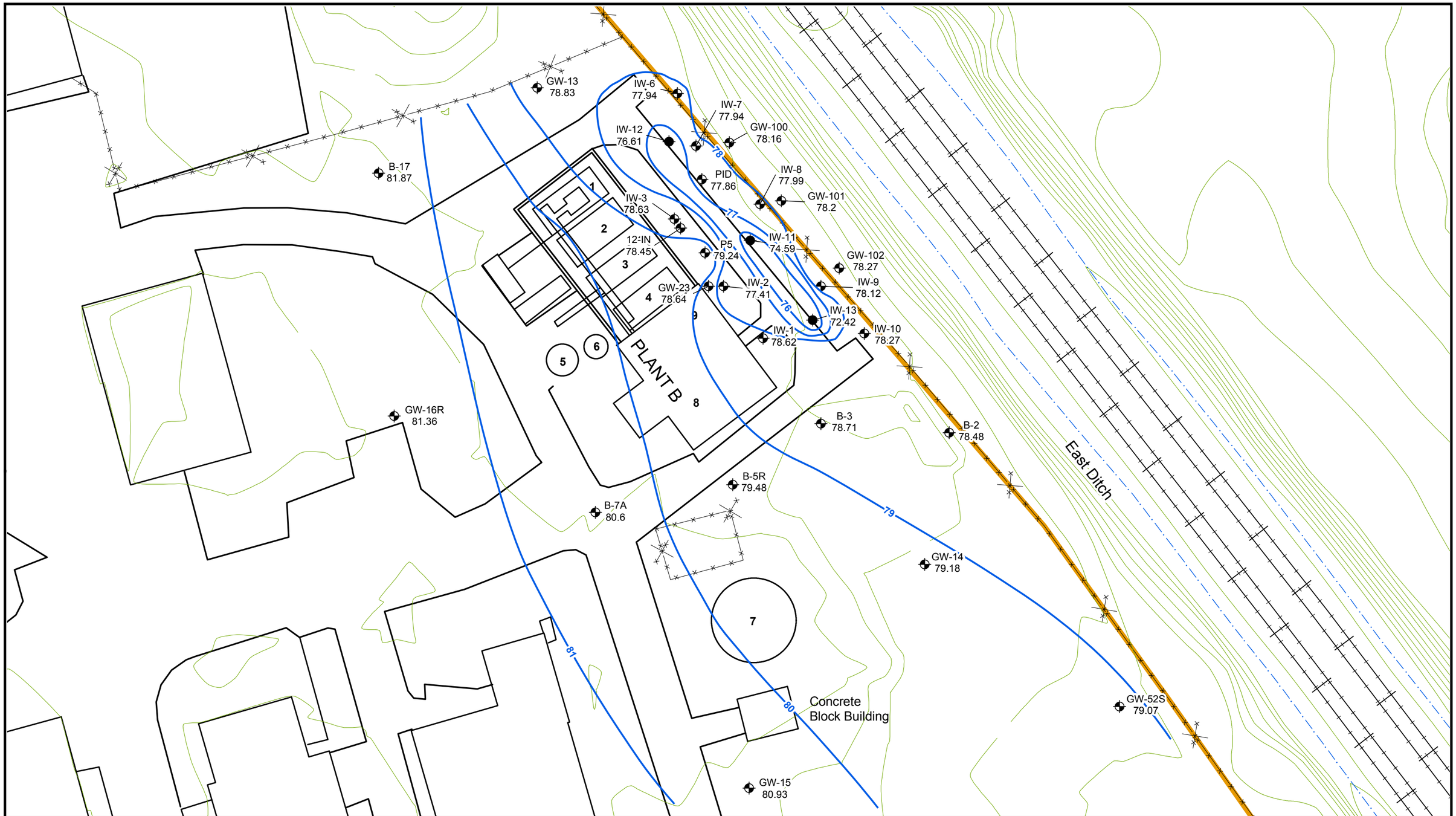

Tank #1 - Receives gravity overflow from Tank 2 and allows for further settling
Tank #2 - Caustic addition and initial iron drop-out
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Tank #5 - Pre-carbon hold tank
Tank #6 - Residence tank
Tank #7 - Raw water (pH adjusted)
Tank #8 - Pre-carbon transfer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

Legend

- Interpreted Potentiometric Contour Line (FT/MSL)
- Recovery Well
- Monitoring Well
- Ditch
- Elevation Contours
- NM - Not Measured

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N

0 15 30 60 Feet

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

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Wilmington, Massachusetts

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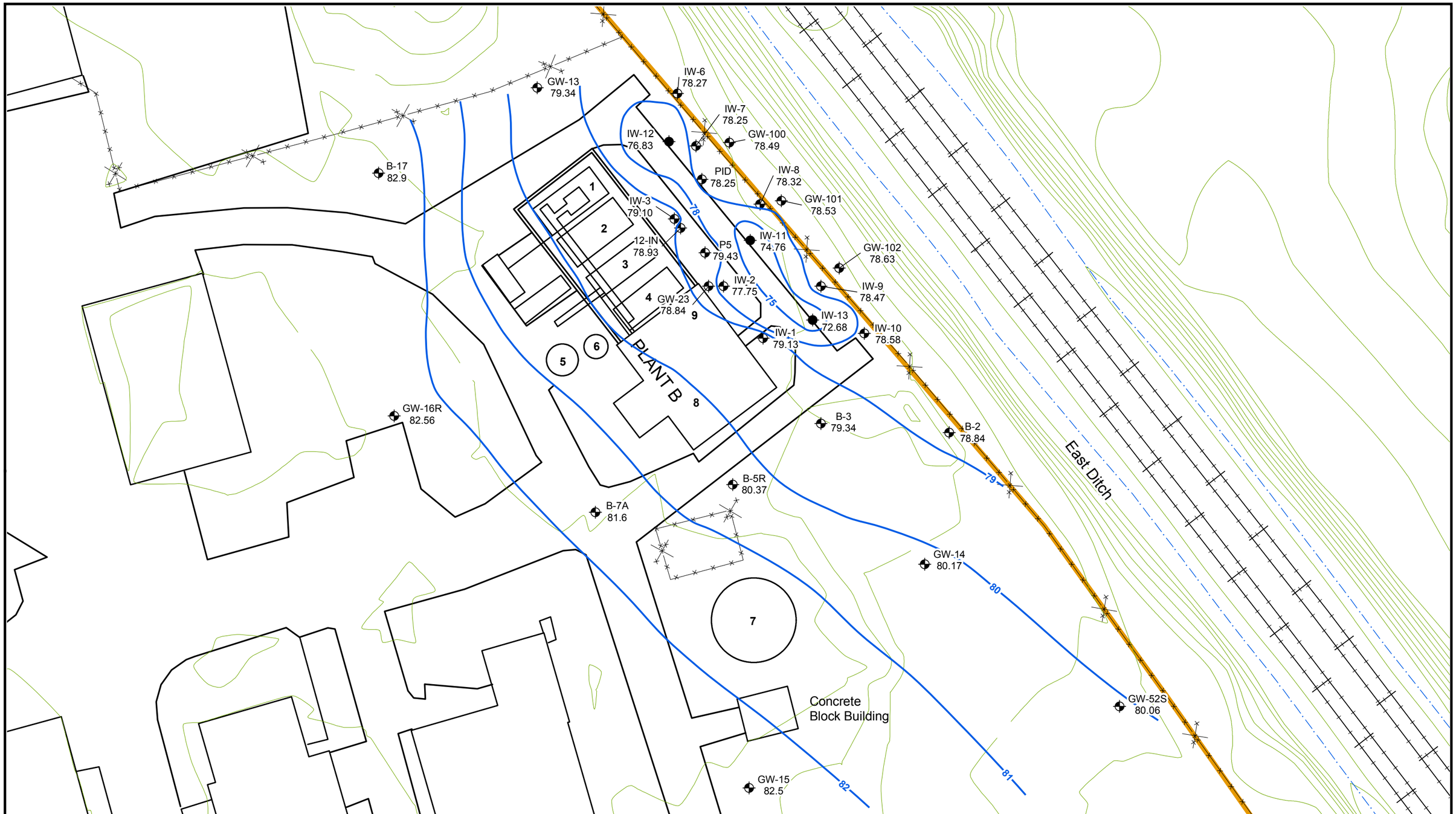

Tank #1 - Receives gravity overflow from Tank 2
and allows for further settling
Tank #2 - Caustic addition and initial iron drop-out
Tank #3 & #4 - Overnight holding tank for treated water
Tank #5 - Pre-carbon hold tank
Tank #6 - Residence tank
Tank #7 - Raw water (pH adjusted)
Tank #8 - Pre-carbon transfer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

Legend

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

NM - Not Measured

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N

0 15 30 60 Feet

Figure 3-4
Plant B Interpreted Water Level Conditions
July 31, 2008

Semi-Annual Status Report No. 3
Olin Chemical Superfund Site
Wilmington, Massachusetts

Prepared/Date: BJR 10/28/08 | Checked/Date: PHT 10/28/08

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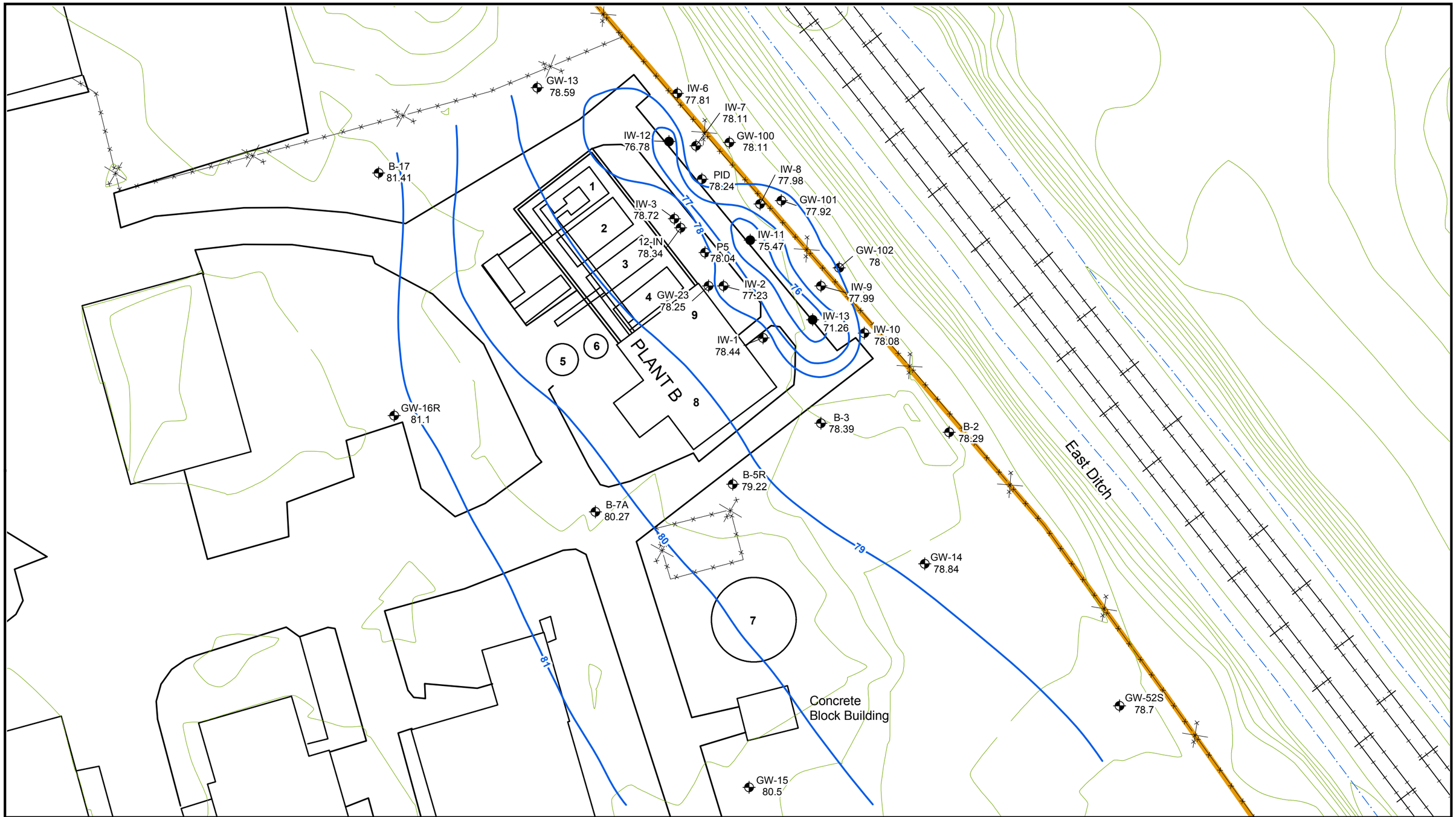

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Tank #5 - Pre-carbon hold tank
Tank #6 - Residence tank
Tank #7 - Raw water (pH adjusted)
Tank #8 - Pre-carbon transfer
Tank #9 - Day discharge to NPDES Outfall 002

Legend

- Interpreted Potentiometric Contour Line (FT/MSL)
- Recovery Well
- Monitoring Well
- Ditch
- Elevation Contours
- NM - Not Measured

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N

0 15 30 60 Feet

Figure 3-5
Plant B Interpreted Water Level Conditions
August 29, 2008

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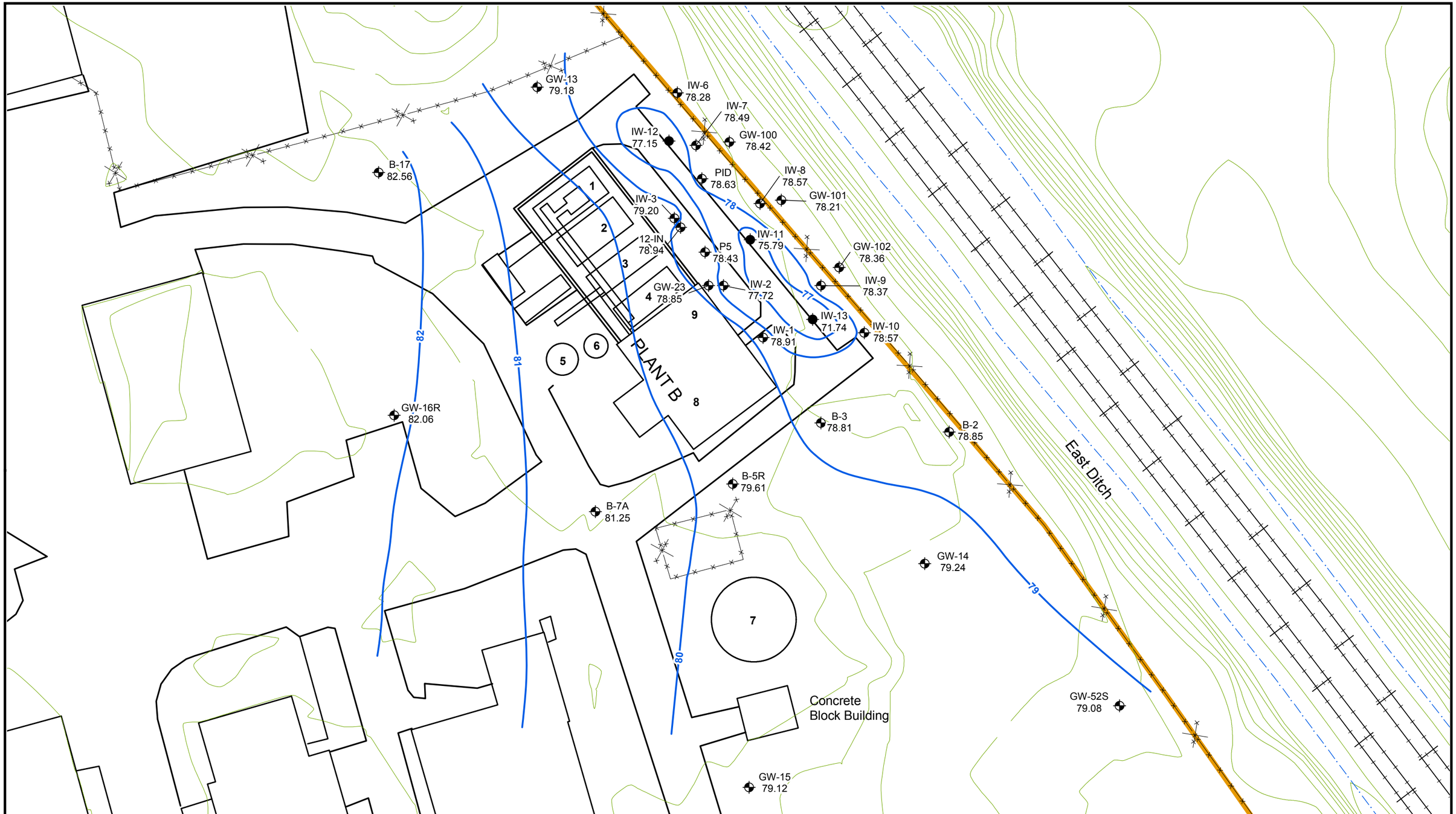

Tank #1 - Receives gravity overflow from Tank 2
and allows for further settling
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Tank #5 - Pre-carbon hold tank
Tank #6 - Residence tank
Tank #7 - Raw water (pH adjusted)
Tank #8 - Pre-carbon transfer
Tank #9 - Day discharge to NPDES Outfall 002

Legend

- Interpreted Potentiometric Contour Line (FT/MSL)
- Recovery Well
- Monitoring Well
- Ditch
- Elevation Contours
- NM - Not Measured

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N

0 15 30 60 Feet

Figure 3-6
Plant B Interpreted Water Level Conditions
September 30, 2008

Semi-Annual Status Report No. 3
Olin Chemical Superfund Site
Wilmington, Massachusetts

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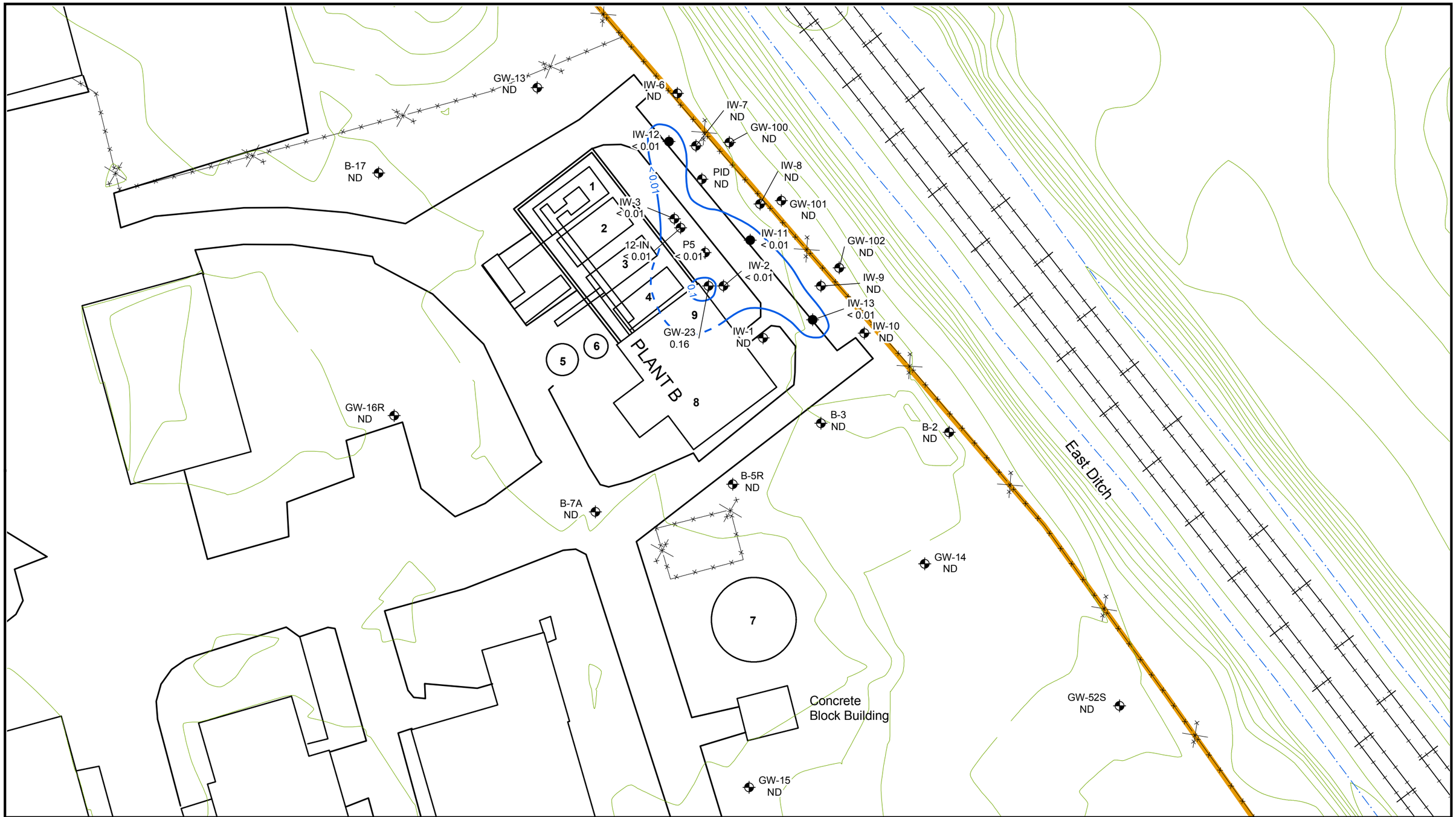

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Tank #5 - Pre-carbon hold tank
Tank #6 - Residence tank
Tank #7 - Raw water (pH adjusted)
Tank #8 - Pre-carbon transfer
Tank #9 - Day discharge to NPDES Outfall 002

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 3-7
Plant B Interpreted LNAPL Thickness Contours - May 16, 2008

Semi-Annual Status Report No. 3
Olin Chemical Superfund Site
Wilmington, Massachusetts

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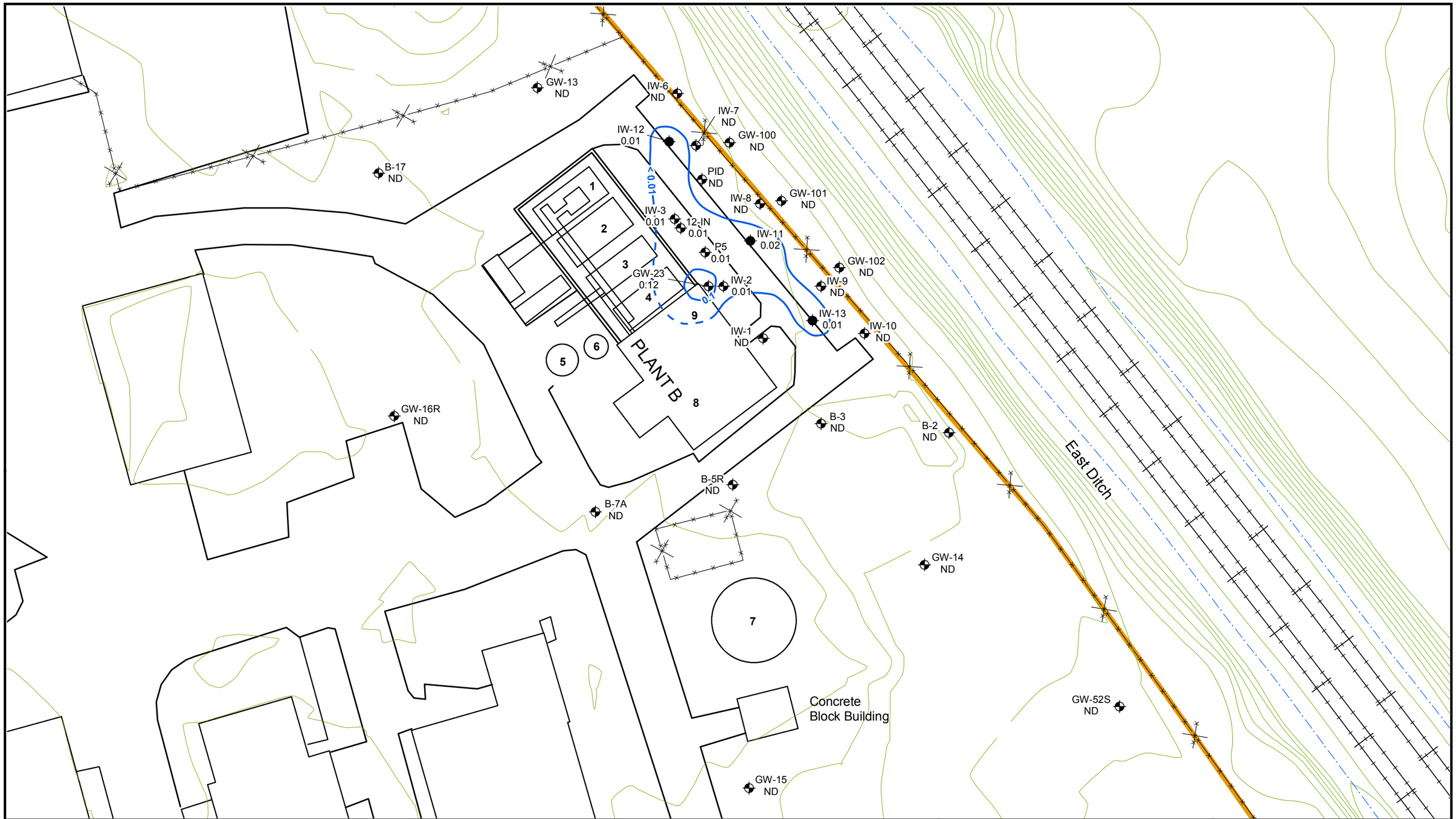

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Tank #2 - Caustic addition and initial iron drop-out
Tank #3 & #4 - Overnight holding tank for treated water
Tank #5 - Pre-carbon hold tank
Tank #6 - Residence tank
Tank #7 - Raw water (pH adjusted)
Tank #8 - Pre-carbon transfer
Tank #9 - Day discharge 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 - June 30, 2008

Semi-Annual Status Report No. 3
Olin Chemical Superfund Site
Wilmington, Massachusetts

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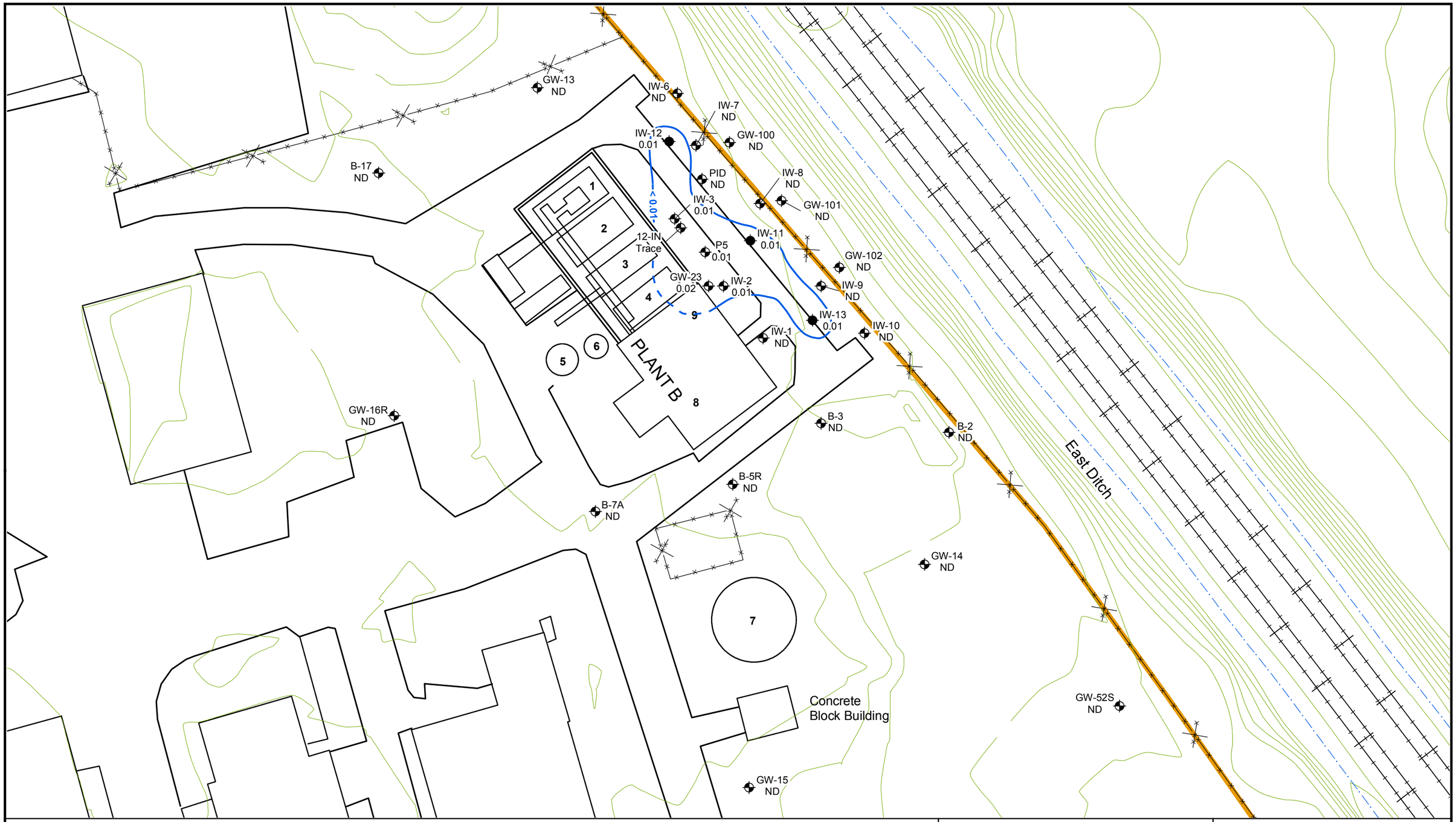

Tank #1 - Receives gravity overflow from Tank 2 and allows for further settling
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Tank #5 - Pre-carbon hold tank
Tank #6 - Residence tank
Tank #7 - Raw water (pH adjusted)
Tank #8 - Pre-carbon transfer
Tank #9 - Day discharge to NPDES Outfall 002

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 3-9
Plant B Interpreted LNAPL Thickness Contours - July 31, 2008

Semi-Annual Status Report No. 3
Olin Chemical Superfund Site
Wilmington, Massachusetts

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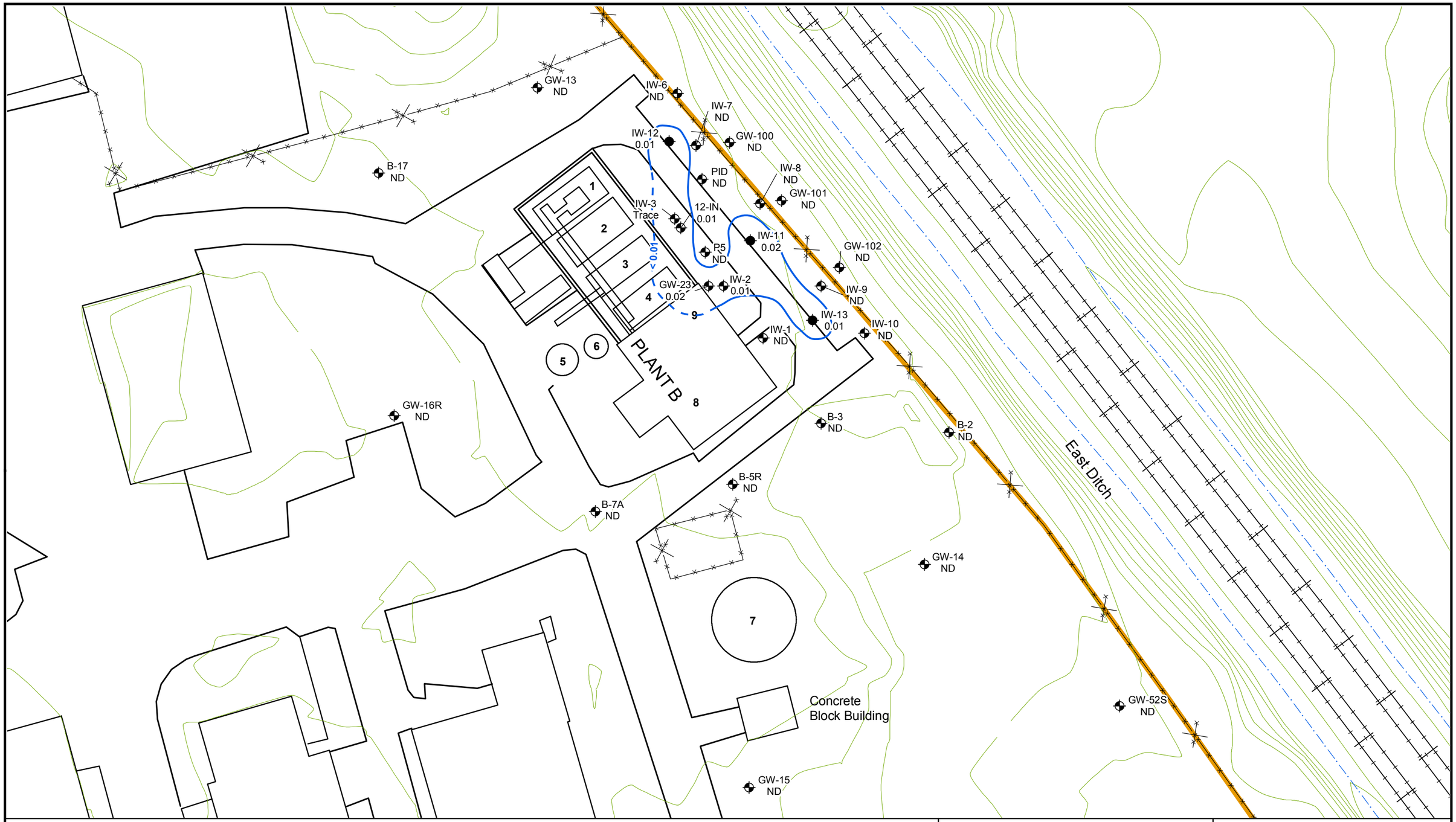

Tank #1 - Receives gravity overflow from Tank 2 and allows for further settling
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Tank #5 - Pre-carbon hold tank
Tank #6 - Residence tank
Tank #7 - Raw water (pH adjusted)
Tank #8 - Pre-carbon transfer
Tank #9 - Day discharge to NPDES Outfall 002

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 - August 29, 2008

Semi-Annual Status Report No. 3
Olin Chemical Superfund Site
Wilmington, Massachusetts

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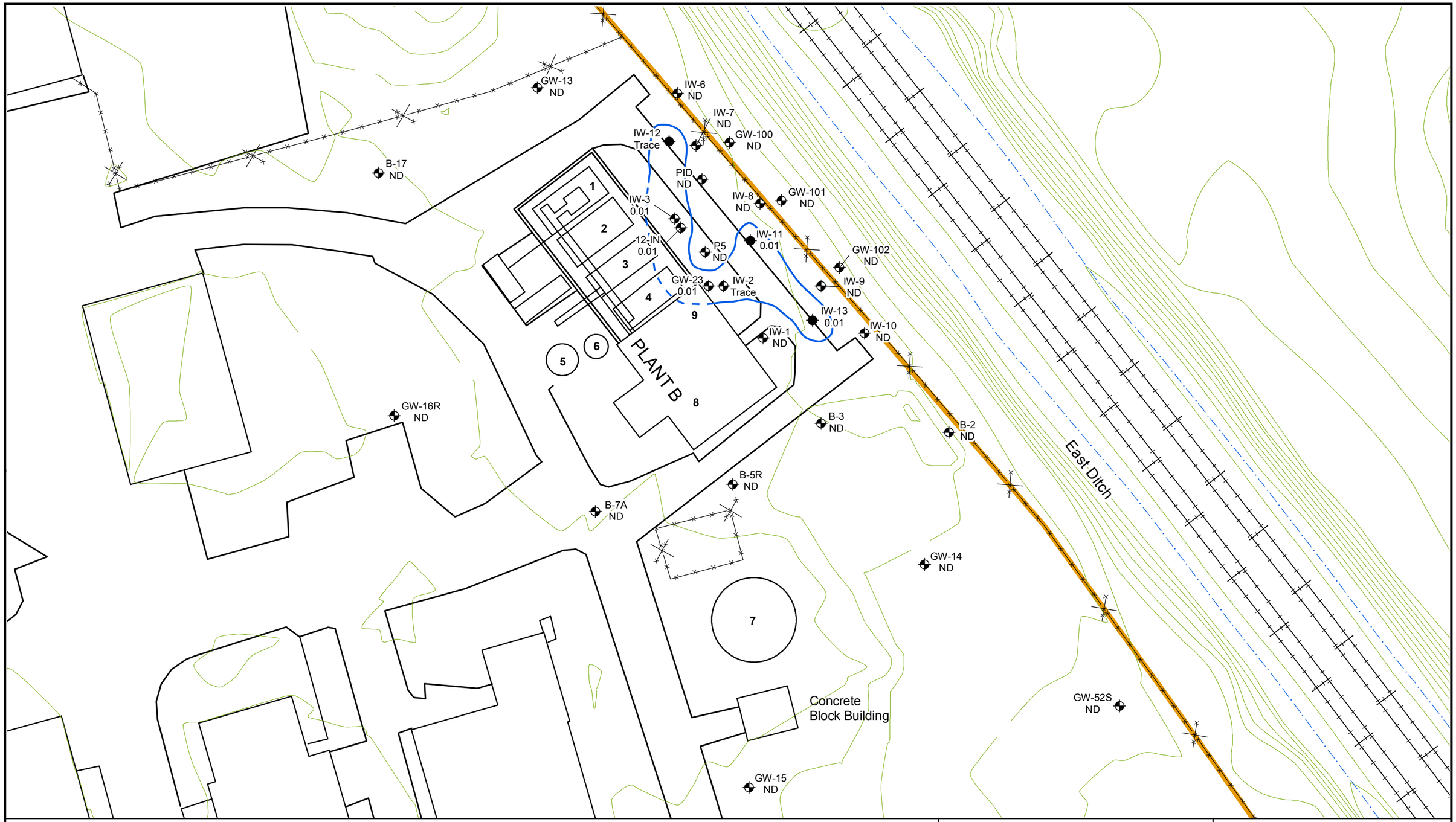

Tank #1 - Receives gravity overflow from Tank 2 and allows for further settling
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Tank #3 & #4 - Overnight holding tank for treated water
Tank #5 - Pre-carbon hold tank
Tank #6 - Residence tank
Tank #7 - Raw water (pH adjusted)
Tank #8 - Pre-carbon transfer
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 - September 30, 2008

Semi-Annual Status Report No. 3
Olin Chemical Superfund Site
Wilmington, Massachusetts

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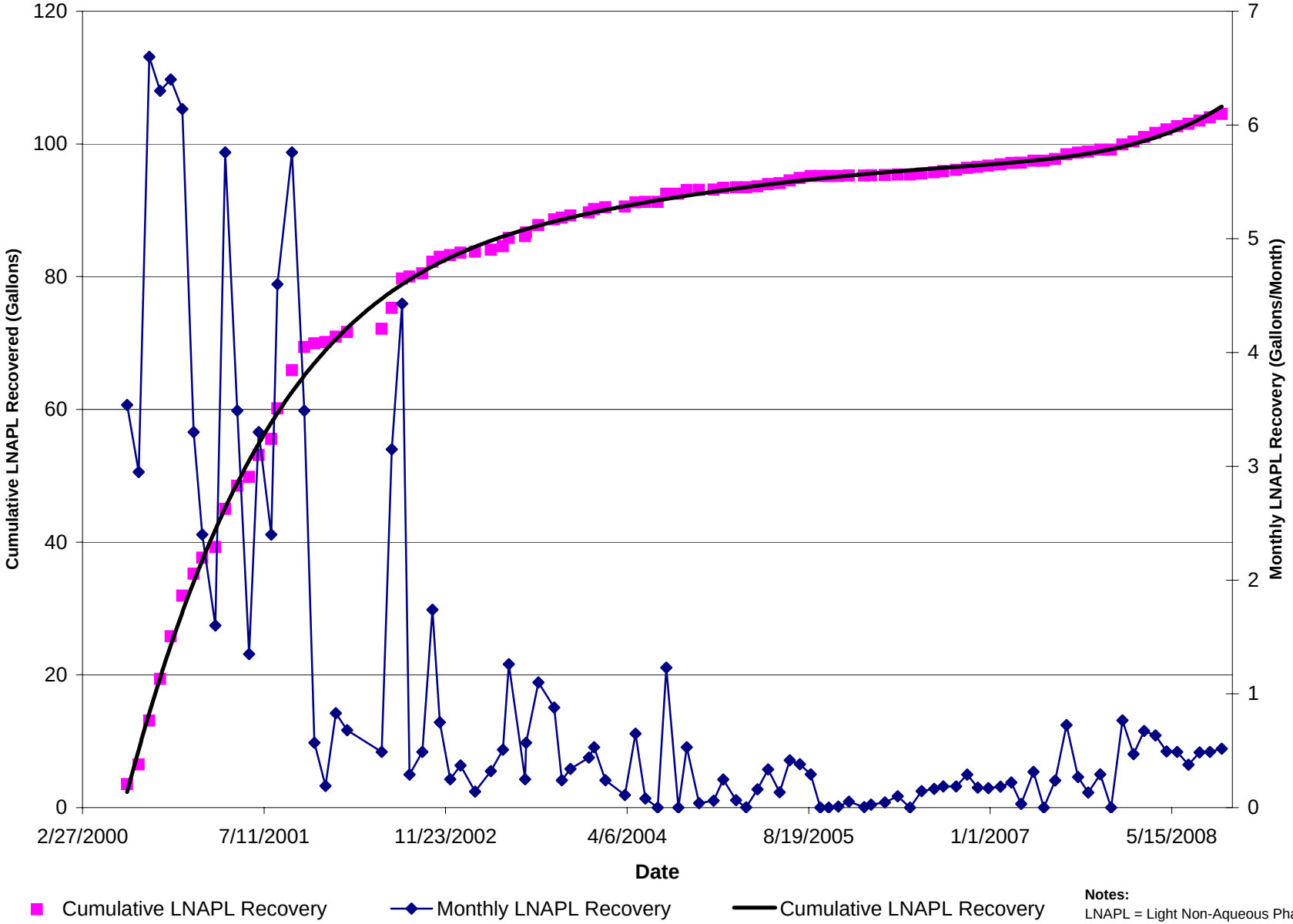
Figure 3-12
Monthly and Cumulative LNAPL Recovery
Semi-Annual Status Report No. 3
Olin Chemical Superfund Site
Wilmington, Massachusetts



Notes:
LNAPL = Light Non-Aqueous Phase Liquid

Prepared/Date: BJR 12/01/08
Checked/Date: PHT 12/02/08

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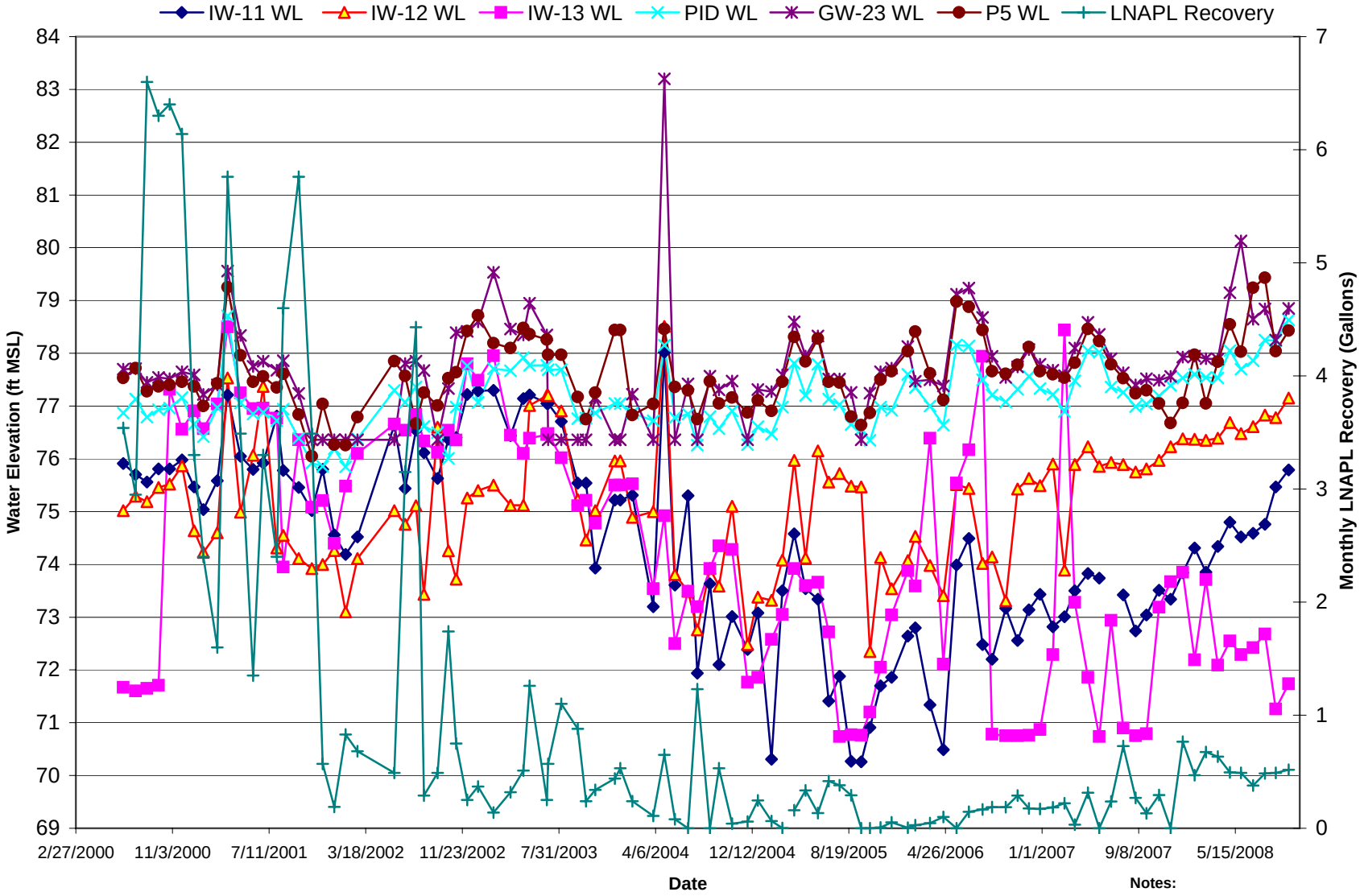
Monthy and Cumulative LNAPL Recovery Data Plot.xls

Figure 3-13
Water Levels (WL) and Monthly LNAPL Recovery
Semi-Annual Status Report No. 3
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, Figure3-13

APPENDIX A

Interim Response Steps Field Activity Reports

A-1 Second Quarter 2008 Sampling Event
A-2 Third Quarter 2008 Sampling Event

APPENDIX A

Interim Response Steps Field Activity Reports

A-1 Second Quarter 2008 Sampling Event

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

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

Prepared for:

Olin Corporation
Wilmington, Massachusetts

Prepared By:

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

MACTEC PROJECT NO. 6100080016.05A

June 13, 2008

6/13/08
Peter H. Thompson — Date
Project Manager

6/13/08
Michael J. Murphy — Date
Senior Principal Scientist

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GLOSSARY OF ACRONYMS

DO	Dissolved Oxygen
EPA	U.S. Environmental Protection Agency
IRSWP	Interim Response Steps Work Plan
LNAPL	Light Non-Aqueous Phase Liquid
MACTEC	MACTEC Engineering and Consulting, Inc.
MassDEP	Massachusetts Department of Environmental Protection
ORP	Oxidation/Reduction Potential
SC	Specific Conductivity
SOPs	Standard Operating Procedures
STL	Severn Trent Laboratories
UV	ultraviolet

1.0 INTRODUCTION

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

1.1.1 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 (EPA).

2.0 SLURRY WALL/CAP MONITORING PROGRAM

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

The Second Quarter 2008 groundwater and surface water monitoring program included groundwater sampling from three groundwater monitoring wells and three piezometers, the collection of surface water samples from seven locations within the South Ditch, and the collection of groundwater level measurements from 23 monitoring wells and piezometers. Groundwater and surface water sample identifiers are listed in **Table 1** and locations are depicted on **Figure 1**. Surface water and groundwater sampling was proposed in MACTEC's "Draft Interim Response Steps Work Plan" (IRSWP) dated July 25, 2007. The IRSWP contained recommendations for continued monitoring "in accordance with the requirements of the most recent Massachusetts Department of Environmental Protection (MassDEP) approved monitoring program until U.S. Environmental Protection Agency (EPA) approval of the IRSWP."

2.1 SCOPE OF WORK

The Slurry Wall/Cap Monitoring Program for this sampling event consists of: collecting groundwater level measurements from 20 monitoring wells and three piezometers in the vicinity of the South Ditch area; 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); 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 depicted in **Figure 1**.

2.1.1 Groundwater Level Measurement

On May 16, 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

From May 19 through May 23, 2008, MACTEC personnel sampled groundwater from 17 monitoring wells and three piezometers using the 1996 EPA low stress (low flow) groundwater sampling guidelines in accordance with the Standard Operating Procedures (SOPs) located in Appendix A of the Draft IRSWP.

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

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 water quality instrument 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 Draft IRSWP. 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 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 were transferred to TestAmerica of Westfield, Massachusetts (formerly Severn Trent Laboratories (STL)) 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 and containerized in a secured, 55-gallon drum.

2.1.3 Surface Water Sampling

On May 22, 2008, MACTEC personnel collected seven surface water samples (from locations identified as ISCO-1 through ISCO-3, PZ-16RR, PZ-17RR, PZ-18R, and SD-17), from downstream to upstream, along the South Ditch of the Site. Sample locations are shown in **Figure 1**. Before field activities began, a Horiba U-22 groundwater monitoring instrument and Hach turbidity meter were properly calibrated to monitor surface water quality at each location. The calibration record can be found in **Appendix A**.

At each of the seven field locations, surface water parameters (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 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**.

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 utilized to reduce the entrapment of floating or suspended sediment while also providing positive pressure for field filtering metals 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 Data Logger Data Download

Data loggers were 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 May 23, 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 August 2008. Downloaded data logger data is summarized in the Semi-annual Status Report dated June 2008.

2.1.5 Cap Inspection

The Second Quarter 2008 Temporary Cap Inspection at the Site was completed on June 5, 2008. The temporary cap is composed of ten large and three small scrim reinforced polyethylene sheets of 8 mil thickness (**Figure 1**). 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 June 5, 2008, 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 with only minor perforations (less than ½ inch) likely caused by animal activities and underlying rocks. The Temporary Cap surface contained sediment and water deposited in low lying areas. 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.
- Providing photo-documentation of typical cap conditions.
- Moved two new sandbags at one location.

2.1.5.2 Observations During This Inspection

- The scrim reinforced polyethylene cover remains flexible and has remaining service life.
- Sewn seams utilizing UV -resistant thread were intact.
- Most of the UV-resistant sandbags show moderate to severe signs of degradation. Wild seeding of some degraded sandbags has resulted in vegetation outgrowths from underneath and surrounding the bags. Plant roots do not appear to penetrate the underlying polyethylene sheet.

- The gravel ballast placed along the perimeter of the cap remains in place.
- Many of the pools of water supported rafts of vegetation, mainly grass which do not appear to deleteriously affect the cap.
- Cap internal drain grate appears overgrown with vegetation (Photo 3).
- Several UV-resistant sandbags have lost a sufficient amount of sand to warrant a recommendation for their replacement. (Photo 2).

2.1.5.3 Discussion

Overall, the Temporary Cap was observed to be in good condition. The general physical condition of the polyethylene 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 overgrown with vegetation.

Several UV-resistant sandbags are recommended for replacement (see Figure 1); 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. The sand has not migrated from the cover, and that weight with the additional weight of the small areas of ponded water, are adequate to protect the polyethylene sheet from wind uplift and related wind damage. New sandbags are currently being used to repair/replace degraded sandbags.

The polyethylene sheet has serviceable life remaining and will continue to perform its intended function until such time as the UV protection afforded by its carbon black content fails to protect the polymer from significant deterioration

2.1.5.4 Recommendations

Resealing around the monitoring wells and wooden posts (where needed), patching the two small perforations located in the cap (see Figure 1), replacing seven additional sandbags, and continued monitoring of the cap for future changes in condition is recommended. Inspection and removal of vegetation from the cap's internal drainage grate is also recommended (to facilitate drainage of

ponded water). All previous holes and perforations observed have been repaired with a repair tape. These repairs were generally observed to be in good condition and do not require resealing. It is recommended that the polyethylene tape with a mastic backing that is typically used on shrink wrap polyethylene covers (marine industry use) be tried as an alternative repair tape if current repairs fail permanently.

2.1.6 Limitations

Our professional services for this project have been performed in accordance with generally accepted engineering practices. No warranty, expressed or implied, is made.

3.0 PLANT B MONITORING PROGRAM

The Second Quarter 2008 Plant B monitoring program includes groundwater sampling at one monitoring well and gauging at 28 monitoring wells. Groundwater monitoring wells in the Plant B Monitoring Program are listed in **Table 7** and locations are depicted on **Figure 2**.

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

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 EPA low flow groundwater sampling at monitoring well GW-16R (which was replaced on April 25, 2008). Monitoring well locations are depicted in **Figure 2**.

3.1.1 Groundwater Level Measurements and Product Gauging

On May 16, 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 7**. The one staff gauge location in the East Ditch of the Plant B program could not be located.

3.1.2 Groundwater Sampling

On May 23, 2008, MACTEC personnel sampled groundwater from monitoring well GW-16R (which was replaced in April 2008) using the 1996 EPA low stress (low flow) groundwater sampling guidelines in accordance with the Standard Operating Procedures (SOPs) located in Appendix A of the Draft IRSWP. The monitoring well was developed on May 16, 2008 prior to

sampling. The monitoring well installation log and well development log is attached in Appendix D.

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

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 and turbidity was monitored using the Hach turbidity meter. Well purging continued until these field parameters stabilized as indicated in Appendix A of the Draft IRSWP. 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 bottles. The samples were placed on ice, and were transferred to TestAmerica of Westfield, Massachusetts (formerly Severn Trent Laboratories (STL)) 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
Slurry Wall/Cap Monitoring Program
Second Quarter 2008 Sampling Event
Olin Chemical Superfund Site
Wilmington, Massachusetts

Ground Water	Surface Water
GW-10S	ISCO1
GW-24	ISCO2
GW-25	ISCO3
GW-26	**PZ-16RR**
GW-34SR	PZ-17RR
GW-34D	PZ-18R
GW-35S	SD-17
GW-39	
GW-42S	
GW-43S*	
GW-55S	
GW-76S	
GW-78S	
GW-79S	
GW-201S	
GW-202S	
GW-202D	
GW-CA1	
PZ-16RR	
PZ-17RR	
PZ-18R	

Notes:
Bold - DUP and MS/MSD also collected
* - Monitoring well destroyed

Prepared by: DLC 6/6/08
Checked by: CTM 6/6/08

Table 2
Groundwater Elevations
Slurry Wall/Cap Monitoring Program
Second 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	8.56	80.54		5/16/2008
GW-24	83.43	2.55	80.88		5/16/2008
GW-25	85.97	7.22	78.75		5/16/2008
GW-26	84.93	3.75	81.18		5/16/2008
GW-34D	90.36	7.66	82.70		5/16/2008
GW-34SR	89.13	6.37	82.76		5/16/2008
GW-35S	88.51	7.10	81.41		5/16/2008
GW-39	83.64	3.43	80.21		5/16/2008
GW-42S	84.18	3.24	80.94		5/16/2008
GW-43S	-	-	-	Destroyed	-
GW-55S	81.70	1.95	79.75		5/16/2008
GW-55D	81.95	2.30	79.65		5/16/2008
GW-76S	88.45	7.32	81.13	TOC	5/16/2008
GW-78S	84.89	4.50	80.39		5/16/2008
GW-79S	81.54	3.47	78.07		5/16/2008
GW-201S	83.29	3.77	79.52		5/16/2008
GW-202S	86.97	6.46	80.51		5/16/2008
GW-202D	86.52	5.90	80.62		5/16/2008
GW-CA1	88.01	6.85	81.16		5/16/2008
PZ-16RR/IN	81.0	3.26	77.74		5/16/2008
PZ-16RR/OUT	81.0	DRY	---		---
PZ-17RR/IN	82.43	2.64	79.79		5/16/2008
PZ-17RR/OUT	82.43	3.47	78.96		5/16/2008
PZ-18R/IN	82.42	2.02	80.40		5/16/2008
PZ-18R/OUT	82.42	1.88	80.54		5/16/2008
PZ-24	89.43	7.37	82.06		5/16/2008
PZ-25	88.90	8.58	80.32		5/16/2008

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
TOC - Water level measurement taken from Top of Casing

Prepared by: DLC 6/3/08
Checked by: CTM 6/6/08

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

Monitoring Well Samples																	
Location	GW-10S	GW-24	GW-25	GW-26	GW-34D	GW-34SR	GW-35S	GW-39	GW-42S	GW-55S	GW-76S	GW-78S	GW-79S	GW-201S	GW-202S	GW-202D	GW-CA-1
Date	5/21/2008	5/21/2008	5/21/2008	5/20/2008	5/22/2008	5/22/2008	5/21/2008	5/20/2008	5/19/2008	5/23/2008	5/21/2008	5/23/2008	5/21/2008	5/21/2008	5/20/2008	5/20/2008	5/21/2008
Depth to Water (ft)	8.94	10.34	5.61	3.95	7.88	6.58	7.26	3.57	3.54	1.98	7.43	4.95	3.58	4.02	7.52	6.11	6.85
pH (standard units)	3.91	7.45	6.44	5.74	5.39	5.73	5.75	5.21	5.18	5.42	5.65	5.29	5.59	5.91	6.02	4.96	5.86
Conductivity (µS/cm)	107	328	494	1160	213	66	846	467	158	3900	269	1400	3460	3230	1940	5760	486
Dissolved oxygen (mg/L)	0.00	0.79	0.20	0.00	2.64	0.00	11.55	7.57	2.71	3.32	0.00	0.00	0.86	3.16	0.00	0.00	3.10
Temperature (ºCelcius)	9.8	10.3	10.4	12.0	11.0	10.7	12.8	11.2	10.9	9.2	10.3	10.3	10.80	11.1	11.6	12.4	12.4
Turbidity (NTU)	0.39	3.91	3.21	4.91	2.45	0.72	2.89	2.05	6.15	1.2	2.54	1.44	3.13	8.21	0.81	10.5	0.46
Redox (millivolts)	324	-134	-141	-61	135	73	-174	146	-186	57	106	113	-92	-26	83	103	50

Piezometer Samples			
Location	PZ-16RR	PZ-17RR	PZ-18R
Date	5/20/2008	5/20/2008	5/20/2008
Depth to Water (ft)	6.00	6.00	3.08
pH (standard units)	6.53	6.55	6.12
Conductivity (µS/cm)	2320	4550	1430
Dissolved oxygen (mg/L)	9.25	3.75	4.38
Temperature (ºCelcius)	12.3	15.2	13.1
Turbidity (NTU)	49.6	85.2	4.39
Redox (millivolts)	-203	-170	-158

Notes:
ft - feet
µS/cm - microSiemens per centimeter
mg/L - milligram per liter
NTU - Nephelometric Turbidity Units

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

Analyte	Analysis Method	Detection Limit	Units
Physical/Inorganic Parameters			
Ammonia-Nitrogen	10-107-06-1-K	0.1	mg/L
Chloride	EPA 300.0	1.0	mg/L
Specific Conductivity	SM18 2510B	1.0	µmhos/cm
Sulfate	EPA 300.0	20	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
µmhos/cm = µS/cm
µg/L - micrograms per liter

Prepared by: DLC 6/6/08
Checked by: CTM 6/6/08

Table 5
Final Field Parameters for Surface Water Sampling
Slurry Wall/Cap Monitoring Program
Second 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	5/22/2008	5/22/2008	5/22/2008	5/22/2008	5/22/2008	5/22/2008	5/22/2008
Depth of Water (ft)	0.9	0.6	0.4	0.5	0.6	1.3	0.45
pH (standard units)	5.84	5.18	5.56	5.72	5.40	5.40	5.94
Conductivity (µS/cm)	1220	2370	2550	2030	1940	768	1920
Dissolved oxygen (mg/L)	10.65	10.16	10.58	11.10	9.19	8.73	10.92
Temperature (ºC)	13.6	12.4	12.3	12.9	13.4	13.3	13.6
Turbidity (NTU)	<0.1	61.7	16.1	25.3	20.6	4.79	18.5
Redox (millivolts)	44	22	-64	21	11	66	3

Notes:
ft - feet
µS/cm - microSiemens per centimeter
mg/L - milligrams per liter
NTU - Nephelometric Turbidity Units

Prepared by: DLC 6/6/08
Checked by: CTM 6/6/08

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

Analyte	Analysis Method	Detection Limit	Units
Physical/Inorganic Parameters			
Ammonia-Nitrogen	10-107-06-1-K	0.5	mg/L
Nitrate	EPA 300.0	0.05	mg/L
Nitrite	EPA 300.0	0.10	mg/L
Chloride	EPA 300.0	10	mg/L
Specific Conductivity	SM18 2510B	1	µmhos/cm
Sulfate	EPA 300.0	20	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
µmhos/cm = µS/cm
µg/L - micrograms per liter

Prepared by: DLC 6/6/08
Checked by: CTM 6/6/08

Table 7
Groundwater Elevations
Plant B Monitoring Program
Second 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	11.96	NPD	NA	78.52	5/16/2008
B-3	90.32	11.65	NPD	NA	78.67	5/16/2008
B-5R	91.38	11.70	NPD	NA	79.68	5/16/2008
B-7A	88.81	7.94	NPD	NA	80.87	5/16/2008
B-17	91.55	9.16	NPD	NA	82.39	5/16/2008
GW-13	90.57	11.62	NPD	NA	78.95	5/16/2008
GW-14	88.70	9.21	NPD	NA	79.49	5/16/2008
GW-15	90.01	8.15	NPD	NA	81.86	5/16/2008
GW-16	91.21	10.60	NPD	NA	80.61	5/16/2008
GW-23	91.04	12.95	12.79	0.16	78.24	5/16/2008
GW-52S	87.95	8.42	NPD	NA	79.53	5/16/2008
GW-100	90.15	11.90	NPD	NA	78.25	5/16/2008
GW-101	90.14	12.16	NPD	NA	77.98	5/16/2008
GW-102	89.00	10.88	NPD	NA	78.12	5/16/2008
IW-1	90.71	12.06	NPD	NA	78.65	5/16/2008
IW-2	90.53	13.30	13.29	<0.01	77.23	5/16/2008
IW-3	90.76	12.26	12.25	<0.01	78.50	5/16/2008
IW-6	89.15	11.13	NPD	NA	78.02	5/16/2008
IW-7	90.10	12.20	NPD	NA	77.90	5/16/2008
IW-8	89.94	12.03	NPD	NA	77.91	5/16/2008
IW-9	89.78	11.75	NPD	NA	78.03	5/16/2008
IW-10	90.43	12.18	NPD	NA	78.25	5/16/2008
IW-11	89.92	15.64	15.63	<0.01	74.28	5/16/2008
IW-12	90.31	13.83	13.82	<0.01	76.48	5/16/2008
IW-13	89.90	17.33	17.32	<0.01	72.57	5/16/2008
PID	89.97	12.19	NPD	NA	77.78	5/16/2008
P5	90.45	12.36	12.35	<0.01	78.09	5/16/2008
12-IN	89.84	11.40	11.39	<0.01	78.44	5/16/2008
SG	79.25	---	---	NA	NA	NA

Notes:

Prepared by: DLC 6/3/08
Checked by: CTM 6/6/08

(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
Dry - Water not present
SG - Staff gauge missing

Table 8
Final Field Parameters for Groundwater Sampling
Plant B Monitoring Program
Second Quarter 2008 Sampling Event
Olin Chemical Superfund Site
Wilmington, Massachusetts

Quarterly Plant B Monitoring Wells	
Location	GW-16R
Date	5/23/2008
Depth to Water (ft)	10.95
pH (standard units)	5.46
Conductivity (µS/cm)	236
Dissolved oxygen (mg/L)	0.97
Temperature (ºCelcius)	12.1
Turbidity (NTU)	5.97
Redox (millivolts)	-86

Notes:
ft - feet
µS/cm - microSiemens per centimeter
mg/L - milligrams per liter
NTU - Nephelometric Turbidity Units

Prepared by: DLC 6/6/08
Checked by: CTM 6/6/08

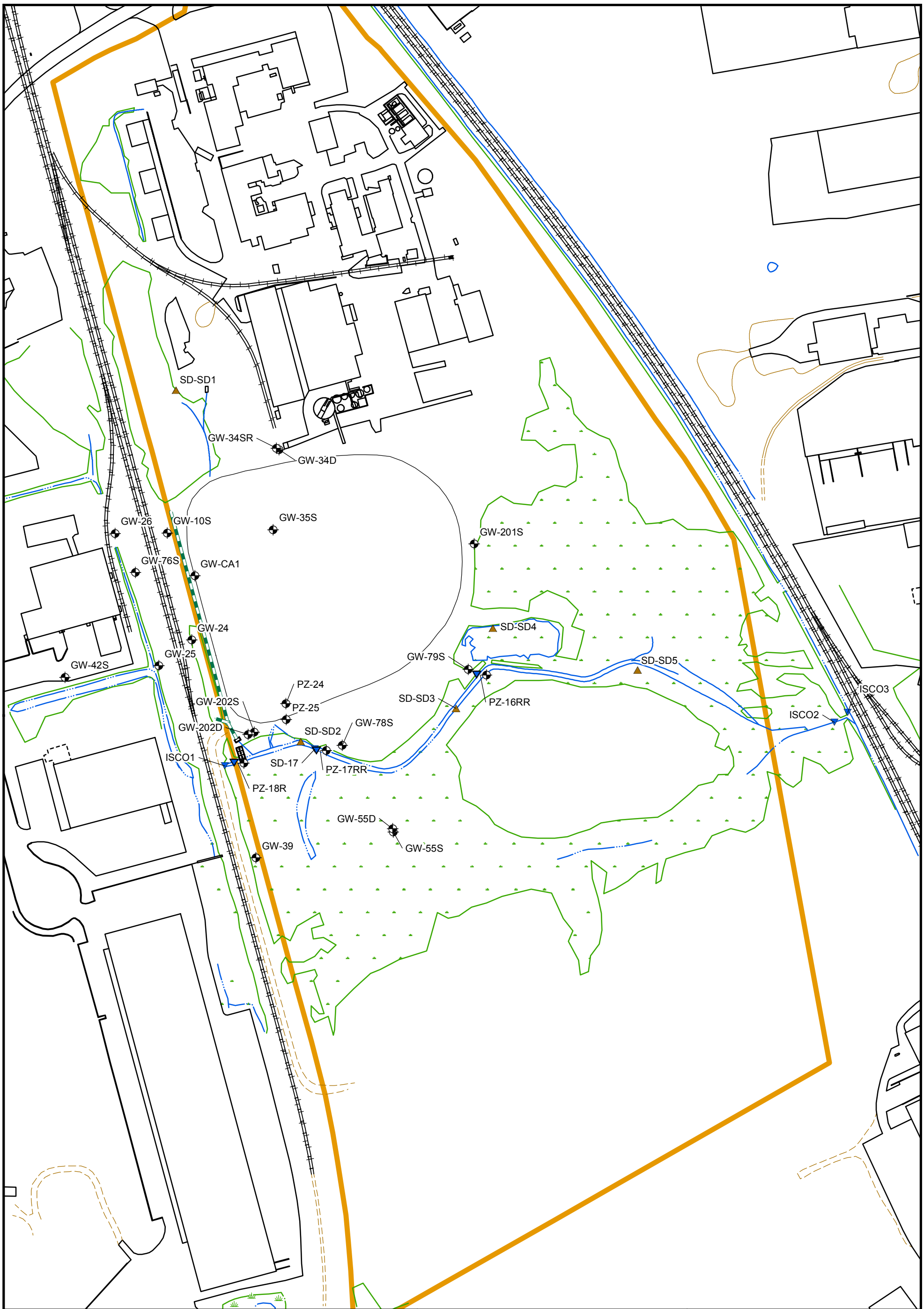
Table 9
Groundwater Laboratory Analytical Program
Plant B Monitoring Program
Second Quarter 2008 Sampling Event
Olin Chemical Superfund Site
Wilmington, Massachusetts

Analyte	Analysis Method	Detection Limit	Units
Volatile organic compounds (VOC)			
2,4,4-Trimethyl-1-pentene	SW846 8260B	10	µg/L
2,4,4-Trimethyl-2-pentene	SW846 8260B	10	µg/L
Semivolatile organic compounds (SVOC)			
N-nitrosodiphenylamine	SW846 8270C	250	µg/L
bis(2-ethylhexyl)phthalate	SW846 8270C	5.1	µg/L
Volatile Petroleum Hydrocarbons (VPH)			
C5-C8 Aliphatics	MA VPH	500	µg/L
C9-C12 Aliphatics	MA VPH	500	µg/L
C9-C10 Aromatics	MA VPH	500	µg/L
C5-C8 Aliphatics, Unadjusted	MA VPH	500	µg/L
C9-C12 Aliphatics, Unadjusted	MA VPH	500	µg/L
C9-C10 Aromatics, Unadjusted	MA VPH	500	µg/L
Methyl-tert-butyl-ether (MTBE)	MA VPH	25	µg/L
Benzene	MA VPH	25	µg/L
Ethylbenzene	MA VPH	25	µg/L
m,p-Xylene	MA VPH	50	µg/L
o-Xylene	MA VPH	25	µg/L
Naphthalene	MA VPH	50	µg/L
Physical/Inorganic Parameters			
Ammonia-Nitrogen	10-107-06-1-K	0.10	mg/L
pH	SM 4500 H+ B	0.100	SU
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 6/6/08
Checked by: CTM 6/6/08

FIGURES



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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107 Audubon Road Suite 301
Wakefield, MA 01880

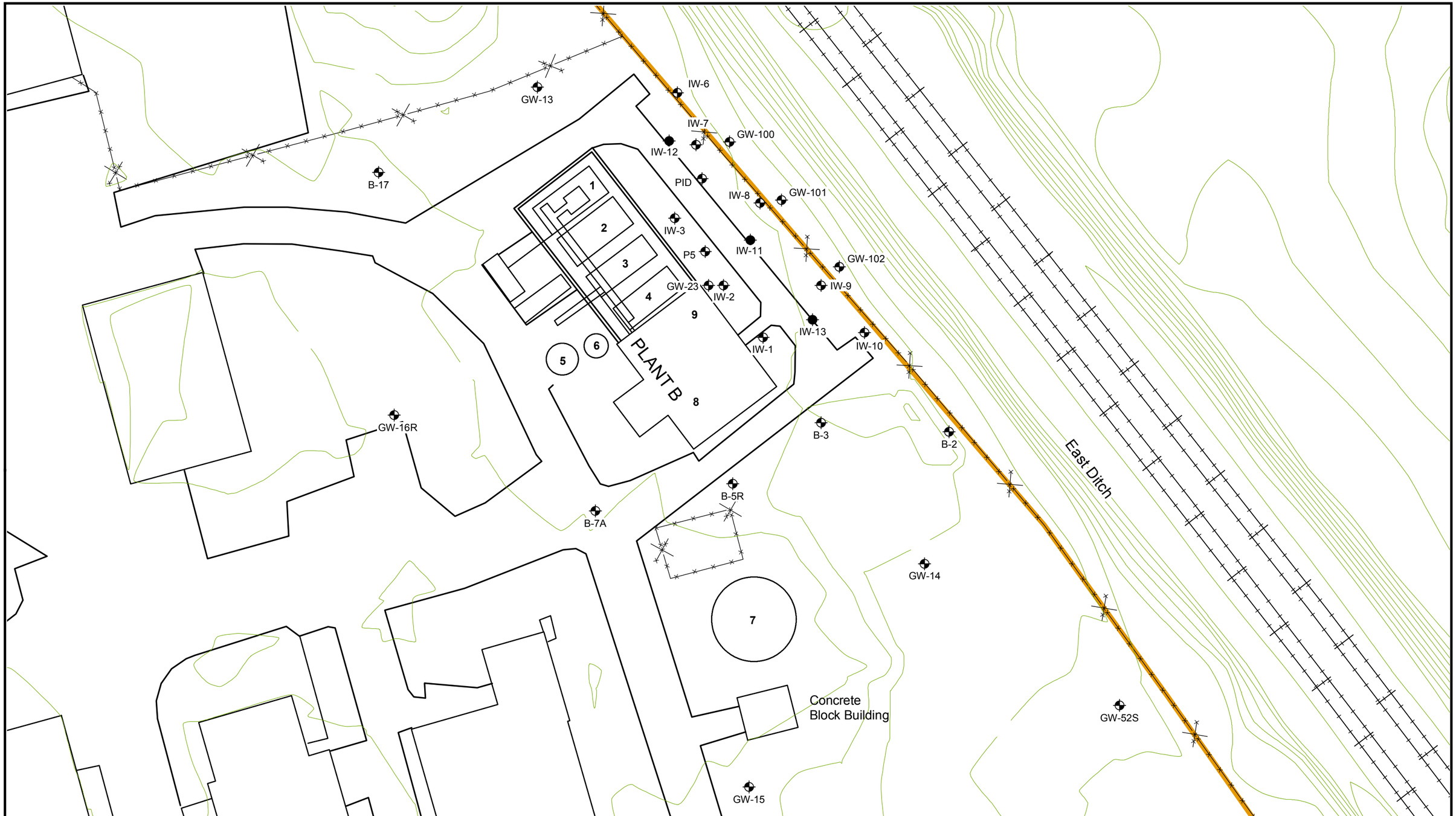
N

0 85 170 340 Feet

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

Prepared/Date: BJR 06/10/08 | Checked/Date: CTM 06/10/08

Document: P:\OLIN\Wilmington\GIS\MapDocuments\Interim Response Work Plan\Olin_IRWP2.mxd PDF: P:\OLIN\Wilmington\2008 Quarterly Sampling\March Quarterly Sampling\Report\Figure 1 - SWC Sampling Locations.pdf 06/10/2008 9:26 AM 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

Note:
GW-16R was installed in April 2008.

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107 Audubon Road Suite 301
Wakefield, MA 01880

N

0 15 30 60 Feet

Figure 2
Plant B Monitoring Program
Sampling Locations
Interim Response Steps Field Activity Report
Olin Chemical Superfund Site
Wilmington, Massachusetts

Prepared/Date: BJR 06/13/08 | Checked/Date: CTM 06/13/08

Document: P:\OLIN\Wilmington\GIS\MapDocuments\Interim Response Work Plan\Olin_PlantB_11X17_LS.mxd PDF: P:\OLIN\Wilmington\2008 Quarterly Sampling\May Quarterly&Semi Annual Sampling\Report\Figure 2 - Plant B Monitoring Program Sampling Locations.pdf 06/13/2008 1:39 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	GW-10S	ROUND NO.	2
SAMPLE ID	GW-10S	SITE TYPE	Superfund	DATE	5/21/2008
TIME	START 10:40 END 11:40	JOB NUMBER	6100-08-0016.04	BOTTLE TIME	11:40

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID:

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: 8.61 FT.

WELL DEPTH (TOR): 10 FT.

PID AMBIENT AIR: <0.1 PPM

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 8.94 FT.

SCREEN LENGTH: 5 FT.

PID WELL MOUTH: <0.1 PPM

WELL INTEGRITY:

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

DRAWDOWN VOLUME: 0.054 FT.
(initial - final x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED: 0.017

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%)	SAMPLE DEPTH	COMMENTS
11:15	8.94	200	11.5	105	4.18	2.58	4.52	251	9.0	
11:20	8.94	200	10.0	123	3.98	0.00	0.71	303	9.0	
11:25	8.94	200	9.6	110	3.93	0.00	0.48	319	9.0	
11:30	8.94	200	9.5	108	3.92	0.00	0.52	323	9.0	
11:35	8.94	200	9.8	107	3.91	0.00	0.39	324	9.0	
11:40	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

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

for Tom Hanlon

SIGNATURE: Tom Hanlon

LOCATION SKETCH

MACTEC

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	SAMPLE ID	GW-16R	ROUND NO.	2
SAMPLE ID	GW-16R	SITE TYPE	Superfund	DATE	5/23/2008
TIME	START 9:10 END 11:05	JOB NUMBER	6100-08-0016.04	BOTTLE TIME	9:50

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): _____ FT.

PROTECTIVE CASING / WELL DIFFERENCE: _____ FT.

INITIAL DEPTH TO WATER: 10.93 FT.

WELL DEPTH (TOR): 17.41 FT.

PID AMBIENT AIR: <0.1 PPM

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 10.95 FT.

SCREEN LENGTH: 5 FT.

PID WELL MOUTH: <0.1 PPM

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: 8.36 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%)	SAMPLE DEPTH	COMMENTS
9:21	10.95	275	12.3	303	5.32	2.91	21.6	-25	17.0	
9:24	10.95	275	12.2	336	5.32	1.92	17.3	-32	17.0	
9:27	10.95	275	12.1	350	5.32	1.52	15.9	-51	17.0	
9:30	10.95	275	12.0	302	5.34	1.36	18.0	-57	17.0	
9:33	10.95	275	12.0	251	5.36	1.43	17.2	-61	17.0	
9:36	10.95	275	12.0	236	5.38	1.30	17.1	-66	17.0	
9:41	10.95	275	12.1	236	5.43	0.99	6.49	-80	17.0	
9:46	10.95	275	12.1	236	5.44	0.97	6.29	-83	17.0	
9:49	10.95	275	12.1	236	5.46	0.97	5.97	-86	17.0	
9:50	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

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] Dissolved Fe	DIS. 6010B	HNO3 / 4 DEG. C	1 X 500 mL	[X] 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: 7.0

NOTES

SIGNATURE: David Chapman

LOCATION SKETCH

MACTEC

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	SAMPLE ID	GW-24	ROUND NO.	2
SAMPLE ID	GW-24	SITE TYPE	Superfund	DATE	5/21/2008
TIME	START 14:00 END 14:50	JOB NUMBER	6100-08-0016.04	BOTTLE TIME	14:50

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID:

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: 4.96 FT.

WELL DEPTH (TOR): 12.12 FT.

PID AMBIENT AIR: <0.1 PPM

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 10.34 FT.

SCREEN LENGTH: FT.

PID WELL MOUTH: <0.1 PPM

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

DRAWDOWN VOLUME: 0.88 FT.
(initial - final x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED: 0.38

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 2.31 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%)	SAMPLE DEPTH	COMMENTS
14:21	10.34	175	10.2	334	7.51	0.09	41.2	-155	11.5	
14:26	10.34	175	10.4	331	7.47	0.65	15.1	-149	11.5	
14:31	10.34	175	10.4	330	7.46	0.77	7.35	-147	11.5	
14:36	10.34	175	10.3	329	7.45	0.80	3.51	-143	11.5	
14:41	10.34	175	10.3	329	7.45	0.84	3.30	-138	11.5	
14:46	10.34	175	10.3	328	7.45	0.79	3.91	-134	11.5	
14:50	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

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: 2.25

LOCATION SKETCH

NOTES

for Tom Hanlon

SIGNATURE: Tom Hanlon

MACTEC

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	SAMPLE ID	GW-25	ROUND NO.	2
SAMPLE ID	GW-25	SITE TYPE	Superfund	DATE	5/21/2008
TIME	START 12:50 END 13:35	JOB NUMBER	6100-08-0016.04	BOTTLE TIME	13:35

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID:

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: 5.28 FT.

WELL DEPTH (TOR): 14.69 FT.

PID AMBIENT AIR: <0.1 PPM

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 5.61 FT.

SCREEN LENGTH: FT.

PID WELL MOUTH: <0.1 PPM

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

DRAWDOWN VOLUME: 0.054 FT.
(initial - final x 0.16 (2-inch) or x 0.65 (4-inch))

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED: 0.023

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. (µS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)	TURBIDITY (NTU) (10%) (0-2)	ORP/Eh (mV) (10%)	SAMPLE DEPTH	COMMENTS
12:58	5.61	200	10.5	531	6.16	5.03	4.42	-201	14.0	
13:03	5.61	200	10.3	517	6.55	2.89	7.20	-173	14.0	
13:08	5.61	200	10.2	515	6.53	1.20	5.26	-163	14.0	
13:13	5.61	200	10.2	508	6.49	0.68	5.23	-155	14.0	
13:18	5.61	200	10.2	499	6.45	0.31	3.83	-147	14.0	
13:23	5.61	200	10.3	499	6.44	0.20	3.19	-146	14.0	
13:28	5.61	200	10.3	497	6.44	0.21	2.59	-143	14.0	
13:33	5.61	200	10.4	494	6.44	0.20	3.21	-141	14.0	
13:35	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

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: 2.3

LOCATION SKETCH

NOTES

for Tom Hanlon

SIGNATURE: Tom Hanlon

MACTEC

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	SAMPLE ID	GW-26	ROUND NO.	2
SAMPLE ID	GW-26	SITE TYPE	Superfund	DATE	5/20/2008
TIME	START 13:00 END 13:50	JOB NUMBER	6100-08-0016.04	BOTTLE TIME	13:50

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID:

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: 3.85 FT.

WELL DEPTH (TOR): 7.05 FT.

PID AMBIENT AIR: <0.1 PPM

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 3.95 FT.

SCREEN LENGTH: --- FT.

PID WELL MOUTH: <0.1 PPM

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

DRAWDOWN VOLUME: 0.0163 FT.
(initial - final x 0.16 (2-inch) or x 0.65 (4-inch))

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED: 0.004

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%)	SAMPLE DEPTH	COMMENTS
13:15	3.95	300	12.1	958	5.84	2.58	5.67	-49	6.9	
13:20	3.95	300	11.9	1200	5.79	0.00	22.3	-42	6.9	
13:25	3.95	300	11.8	1030	5.77	0.00	13.8	-44	6.9	
13:30	3.95	300	11.8	1120	5.76	0.00	10.8	-50	6.9	
13:35	3.95	300	11.8	1140	5.75	0.00	5.36	-57	6.9	
13:40	3.95	300	11.9	1120	5.74	0.00	4.15	-59	6.9	
13:45	3.95	300	12.0	1160	5.74	0.00	4.91	-61	6.9	
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

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: 3.8

LOCATION SKETCH

NOTES

For Tom Hanlon

SIGNATURE: Tom Hanlon

MACTEC

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	SAMPLE ID	GW-34SR	ROUND NO.	2
SAMPLE ID	GW-34SR	SITE TYPE	Superfund	DATE	5/22/2008
TIME	START 13:30 END 14:20	JOB NUMBER	6100-08-0016.04	BOTTLE TIME	14:20

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID:

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: 6.57 FT.

WELL DEPTH (TOR): 15 FT.

PID AMBIENT AIR: <0.1 PPM

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 6.58 FT.

SCREEN LENGTH: 10 FT.

PID WELL MOUTH: <0.1 PPM

WELL INTEGRITY:

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

DRAWDOWN VOLUME: 0.00163 FT.
(initial - final x 0.16 (2-inch) or x 0.65 (4-inch))

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED: 0.00035

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. (µS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)	TURBIDITY (NTU) (10%) (0-2)	ORP/Eh (mV) (10%)	SAMPLE DEPTH	COMMENTS
13:40	6.58	350	10.5	79	5.57	1.17	16.8	132	14.8	
13:45	6.58	350	10.7	78	5.61	0.47	9.7	117	14.8	
14:05	6.58	350	10.6	71	5.72	0.00	6.32	74	14.8	
14:10	6.58	350	10.6	67	5.73	0.00	0.86	78	14.8	
14:15	6.58	350	10.7	66	5.73	0.00	0.72	73	14.8	
14:20	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: 4.55

LOCATION SKETCH

NOTES

for Tom Hanlon

SIGNATURE: Tom Hanlon

MACTEC

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	SAMPLE ID	GW-34D	ROUND NO.	2
SAMPLE ID	GW-34D	SITE TYPE	Superfund	DATE	5/22/2008
TIME	START 13:20 END 13:55	JOB NUMBER	6100-08-0016.04	BOTTLE TIME	13:50

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID:

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: 7.88 FT.

WELL DEPTH (TOR): 34.97 FT.

PID AMBIENT AIR: <0.1 PPM

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 7.88 FT.

SCREEN LENGTH: 10 FT.

PID WELL MOUTH: <0.1 PPM

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: 2.31 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%)	SAMPLE DEPTH	COMMENTS
13:30	7.88	250	12.4	195	5.34	6.91	3.02	152	34.8	
13:33	7.88	250	11.4	261	5.39	4.98	2.97	146	34.8	
13:36	7.88	250	11.3	232	5.38	4.15	2.90	143	34.8	
13:39	7.88	250	11.2	220	5.38	3.62	2.83	140	34.8	
13:42	7.88	250	11.1	205	5.38	2.80	2.65	138	34.8	
13:45	7.88	250	11.0	213	5.39	2.64	2.45	135	34.8	
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

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: 2.25

NOTES

SIGNATURE: David Chapman

LOCATION SKETCH

MACTEC

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	SAMPLE ID	GW-35S	ROUND NO.	2
SAMPLE ID	GW-35S	SITE TYPE	Superfund	DATE	5/21/2008
TIME	START 10:45 END 11:15	JOB NUMBER	6100-08-0016.04	BOTTLE TIME	11:05

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): _____ FT.

PROTECTIVE CASING / WELL DIFFERENCE: _____ FT.

INITIAL DEPTH TO WATER: 7.23 FT.

WELL DEPTH (TOR): 19.77 FT.

PID AMBIENT AIR: <0.1 PPM

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 7.26 FT.

SCREEN LENGTH: 10 FT.

PID WELL MOUTH: <0.1 PPM

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

DRAWDOWN VOLUME: 0.0049 FT.
(initial - final x 0.16 (2-inch) or x 0.65 (4-inch))

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED: 0.0021

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. (µS/cm) (3%)	pH (units) (+/- 0.1	DISS. O2 (mg/L) (10%)	TURBIDITY (NTU) (10%) (0-2)	ORP/Eh (mV) (10%)	SAMPLE DEPTH	COMMENTS
10:48	7.26	300	12.5	846	5.82	13.32	8.42	-135	19.6	
10:51	7.26	300	12.8	844	5.79	12.31	5.14	-154	19.6	
10:54	7.26	300	12.8	831	5.77	11.83	3.89	-159	19.6	
10:56	7.26	300	12.8	840	5.77	11.72	2.60	-168	19.6	
10:59	7.26	300	12.8	843	5.76	11.68	2.67	-170	19.6	
11:02	7.26	300	12.8	846	5.75	11.55	2.89	-174	19.6	
11:05	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: 2.25

LOCATION SKETCH

NOTES

Odor from purge water

Duplicate, MS and MSD collected.

IDs: GW-35SDUP, GW-35SMS and GW-35SMSD

SIGNATURE: David Chapman

MACTEC

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	SAMPLE ID	GW-39	ROUND NO.	2
SAMPLE ID	GW-39	SITE TYPE	Superfund	DATE	5/20/2008
TIME	START 13:30 END 14:15	JOB NUMBER	6100-08-0016.04	BOTTLE TIME	14:05

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID:

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: 3.45 FT.

WELL DEPTH (TOR): 14.4 FT.

PID AMBIENT AIR: <0.1 PPM

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 3.57 FT.

SCREEN LENGTH: 10 FT.

PID WELL MOUTH: <0.1 PPM

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

DRAWDOWN VOLUME: 0.0196 FT.
(initial - final x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED: 0.0055

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%)	SAMPLE DEPTH	COMMENTS
13:40	3.57	300	10.0	657	5.32	9.33	4.83	106	14.3	
13:45	3.57	300	10.5	471	5.33	8.84	1.94	114	14.3	
13:50	3.57	300	10.4	453	5.27	8.48	2.31	123	14.3	
13:53	3.57	300	10.9	458	5.25	7.92	2.48	129	14.3	
13:56	3.57	300	11.4	461	5.21	7.77	2.67	136	14.3	
13:59	3.57	300	11.4	464	5.21	7.60	2.08	141	14.3	
14:02	3.57	300	11.2	467	5.21	7.57	2.05	146	14.3	
14:05	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: 3.4

NOTES

SIGNATURE: David Chapman

LOCATION SKETCH

MACTEC

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	SAMPLE ID	GW-42S	ROUND NO.	2
SAMPLE ID	GW-42S	SITE TYPE	Superfund	DATE	5/19/2008
TIME	START 10:15 END 11:25	JOB NUMBER	6100-08-0016.04	BOTTLE TIME	11:18

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID:

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

PROTECTIVE CASING STICKUP (FROM GROUND): FT.

PROTECTIVE CASING / WELL DIFFERENCE: 0.25 FT.

INITIAL DEPTH TO WATER: 3.24 FT.

WELL DEPTH (TOR): 18.5 FT.

PID AMBIENT AIR: <0.1 PPM

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 3.54 FT.

SCREEN LENGTH: 10 FT.

PID WELL MOUTH: <0.1 PPM

WELL INTEGRITY:

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

DRAWDOWN VOLUME: 0.049 FT.
(initial - final x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED: 0.013

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 3.70 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%)	SAMPLE DEPTH	COMMENTS
10:35	3.34	200	11.6	257	5.23	1.79	56.2	-178	18	
10:40	3.34	200	11.5	254	5.25	1.08	41.2	-183	18	
10:45	3.34	200	11.4	222	5.21	0.48	17.3	-188	18	
10:50	3.34	200	11.3	185	5.19	0.52	12.1	-186	18	
10:55	3.34	200	11.3	174	5.18	1.05	9.18	-184	18	
11:00	3.34	200	11.2	168	5.18	1.31	7.13	-184	18	
11:05	3.34	200	11.3	158	5.17	3.06	5.73	-180	18	
11:10	3.34	200	11.4	158	5.18	2.57	4.92	-186	18	
11:13	3.34	200	11.1	159	5.17	2.64	6.79	-187	18	
11:16	3.34	200	10.9	158	5.18	2.71	6.15	-186	18	
11:18	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: 3.60

LOCATION SKETCH

NOTES

for Tom Hanlon

SIGNATURE: Tom Hanlon

MACTEC

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	SAMPLE ID	GW-55S	ROUND NO.	2
SAMPLE ID	GW-55S	SITE TYPE	Superfund	DATE	5/23/2008
TIME	START 9:05 END 9:55	JOB NUMBER	6100-08-0016.04	BOTTLE TIME	9:48

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID:

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: 1.97 FT.

WELL DEPTH (TOR): 10.1 FT.

PID AMBIENT AIR: <0.1 PPM

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 1.98 FT.

SCREEN LENGTH: 5 FT.

PID WELL MOUTH: <0.1 PPM

WELL INTEGRITY:

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

DRAWDOWN VOLUME: 0.0016 FT.
(initial - final x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED: 0.000471

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 3.4 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%)	SAMPLE DEPTH	COMMENTS
9:13	1.98	300	9.3	4150	5.30	1.44	12.7	85	7.1	
9:18	1.98	300	9.2	4120	5.38	3.56	14.3	74	7.1	
9:23	1.98	300	9.3	4020	5.40	3.49	8.41	68	7.1	
9:28	1.98	300	9.3	3970	5.40	3.39	5.76	65	7.1	
9:33	1.98	300	9.2	3980	5.40	3.35	3.48	63	7.1	
9:36	1.98	300	9.2	3940	5.40	3.33	2.47	62	7.1	
9:39	1.98	300	9.2	3930	5.41	3.33	1.77	59	7.1	
9:42	1.98	300	9.2	3930	5.41	3.33	1.29	59	7.1	
9:45	1.98	300	9.2	3900	5.42	3.32	1.20	57	7.1	
9:48	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: 3.5

LOCATION SKETCH

NOTES

for Mark Maggiore

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	GW-76S	ROUND NO.	2
SAMPLE ID	GW-76S	SITE TYPE	Superfund	DATE	5/21/2008
TIME	START 9:40 END 10:25	JOB NUMBER	6100-08-0016.04	BOTTLE TIME	10:25

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID:

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: 7.38 FT.

WELL DEPTH (TOR): 13 FT.

PID AMBIENT AIR: <0.1 PPM

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 7.43 FT.

SCREEN LENGTH: 10 FT.

PID WELL MOUTH: <0.1 PPM

WELL INTEGRITY:

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

DRAWDOWN VOLUME: 0.0082 FT.
(initial - final x 0.16 (2-inch) or x 0.65 (4-inch))

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED: 0.0023

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%)	SAMPLE DEPTH	COMMENTS
9:50	7.43	300	10.9	332	5.67	0.00	19.8	77	12.8	
9:55	7.43	300	10.4	348	5.66	0.00	10.1	90	12.8	
10:00	7.43	300	10.3	296	5.66	0.00	7.95	93	12.8	
10:05	7.43	300	10.3	283	5.66	0.00	4.90	98	12.8	
10:10	7.43	300	10.4	275	5.65	0.00	3.00	102	12.8	
10:15	7.43	300	10.4	272	5.65	0.00	2.10	105	12.8	
10:20	7.43	300	10.3	269	5.65	0.00	2.54	106	12.8	
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

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: 3.6

LOCATION SKETCH

NOTES

for Tom Hanlon

SIGNATURE: Tom Hanlon

MACTEC

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	SAMPLE ID	GW-78S	ROUND NO.	2
SAMPLE ID	GW-78S	SITE TYPE	Superfund	DATE	5/23/2008
TIME	START 10:53 END 11:45	JOB NUMBER	6100-08-0016.04	BOTTLE TIME	11:30

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID:

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: 4.95 FT.

WELL DEPTH (TOR): 10.1 FT.

PID AMBIENT AIR: <0.1 PPM

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 4.95 FT.

SCREEN LENGTH: 10 FT.

PID WELL MOUTH: <0.1 PPM

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: 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%)	SAMPLE DEPTH	COMMENTS
11:00	4.95	295	10.5	2000	5.26	0.00	43.0	116	10	Pump on at 10:53 w/ Horiba
10:05	4.95	295	10.5	1490	5.28	0.00	17.7	116	10	
11:10	4.95	295	10.5	1450	5.28	0.00	11.5	118	10	
11:15	4.95	295	10.3	1420	5.29	0.00	4.24	116	10	
11:20	4.95	295	10.3	1400	5.25	0.00	1.60	114	10	
11:23	4.95	295	10.4	1400	5.29	0.00	1.53	113	10	
11:26	4.95	295	10.3	1400	5.29	0.00	1.44	113	10	
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

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: 3.0

LOCATION SKETCH

NOTES

for Mark Maggiore

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	GW-79S	ROUND NO.	2
SAMPLE ID	GW-79S	SITE TYPE	Superfund	DATE	5/21/2008
TIME	START 12:55 END 13:55	JOB NUMBER	6100-08-0016.04	BOTTLE TIME	13:45

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID:

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: 3.54 FT.

WELL DEPTH (TOR): 11.47 FT.

PID AMBIENT AIR: <0.1 PPM

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 3.58 FT.

SCREEN LENGTH: 10 FT.

PID WELL MOUTH: <0.1 PPM

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

DRAWDOWN VOLUME: 0.0065 FT.
(initial - final x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED: 0.0016

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%)	SAMPLE DEPTH	COMMENTS
13:03	3.58	250	10.2	3690	5.61	2.76	10.3	-84	11.3	
13:06	3.58	250	9.9	3700	5.59	2.88	14.3	-83	11.3	
13:09	3.58	250	9.9	3680	5.58	2.18	8.63	-84	11.3	
13:12	3.58	250	10.0	3640	5.58	1.83	9.05	-84	11.3	
13:15	3.58	250	9.3	3630	5.57	1.68	10.2	-84	11.3	
13:18	3.58	250	8.7	3610	5.57	1.28	11.1	-84	11.3	
13:23	3.58	250	9.7	3600	5.58	1.28	6.05	-85	11.3	
13:30	3.58	250	10.4	3510	5.58	0.92	3.34	-87	11.3	
13:40	3.58	250	10.6	3470	5.58	0.81	3.10	-91	11.3	
13:43	3.58	250	10.8	3460	5.59	0.86	3.13	-92	11.3	
13:45	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

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: 3.9

LOCATION SKETCH

NOTES Odor noted in purge water

SIGNATURE: David Chapman

MACTEC

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	SAMPLE ID	GW-201S	ROUND NO.	2
SAMPLE ID	GW-201S	SITE TYPE	Superfund	DATE	5/21/2008
TIME	START 12:03 END 12:40	JOB NUMBER	6100-08-0016.04	BOTTLE TIME	12:35

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID:

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: 3.97 FT.

WELL DEPTH (TOR): 15.15 FT.

PID AMBIENT AIR: <0.1 PPM

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 4.02 FT.

SCREEN LENGTH: 10 FT.

PID WELL, MOUTH: <0.1 PPM

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

DRAWDOWN VOLUME: 0.0082 FT.
(initial - final x 0.16 (2-inch) or x 0.65 (4-inch))

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED: 0.0028

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 2.93 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%)	SAMPLE DEPTH	COMMENTS
12:08	4.02	300	11.4	3780	6.06	9.89	51.3	-33	15.1	
12:13	4.02	300	11.2	3220	5.95	3.74	20.0	-33	15.1	
12:18	4.02	300	11.1	3210	5.93	3.20	9.04	-31	15.1	
12:23	4.02	300	11.1	3210	5.91	3.21	7.37	-30	15.1	
12:26	4.02	300	11.0	3220	5.91	3.17	7.23	-29	15.1	
12:29	4.02	300	11.0	3240	5.91	3.10	7.74	-27	15.1	
12:32	4.02	300	11.1	3230	5.91	3.16	8.21	-26	15.1	
12:35	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

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: 2.85

LOCATION SKETCH

NOTES

for Tom Hanlon

SIGNATURE: Tom Hanlon

MACTEC

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	SAMPLE ID	GW-202S	ROUND NO.	2
SAMPLE ID	GW-202S	SITE TYPE	Superfund	DATE	5/20/2008
TIME	START 9:45 END 10:15	JOB NUMBER	6100-08-0016.04	BOTTLE TIME	10:05

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: FT.

INITIAL DEPTH TO WATER: 7.52 FT.

WELL DEPTH (TOR): 11.3 FT.

PID AMBIENT AIR: <0.1 PPM

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 7.52 FT.

SCREEN LENGTH: 8 FT.

PID WELL MOUTH: <0.1 PPM

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: 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%)	SAMPLE DEPTH	COMMENTS
9:45	7.52	400	11.6	1950	6.09	0.00	2.13	114	11.0	
9:50	7.52	400	11.6	1950	6.02	0.00	1.10	102	11.0	
9:55	7.52	400	11.6	1930	6.03	0.00	0.69	89	11.0	
9:58	7.52	400	11.6	1940	6.02	0.00	0.73	82	11.0	
10:01	7.52	400	11.6	1940	6.02	0.00	0.81	83	11.0	
10:05	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: 3

LOCATION SKETCH

NOTES Duplicate Collected

ID: GW202S-DUP

for Tom Hanlon

SIGNATURE: Tom Hanlon

MACTEC

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	SAMPLE ID	GW-202D	ROUND NO.	2
SAMPLE ID	GW-202D	SITE TYPE	Superfund	DATE	5/20/2008
TIME	START 10:30 END 11:45	JOB NUMBER	6100-08-0016.04	BOTTLE TIME	11:45

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID:

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: 5.90 FT.

WELL DEPTH (TOR): 20.6 FT.

PID AMBIENT AIR: <0.1 PPM

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 6.11 FT.

SCREEN LENGTH: 10 FT.

PID WELL MOUTH: <0.1 PPM

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

DRAWDOWN VOLUME: 0.34 FT.
(initial - final x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED: 0.082

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 4.16 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%)	SAMPLE DEPTH	COMMENTS
10:55	6.11	350	12.6	9110	4.72	0.00	67.6	116	19.9	
11:00	6.11	350	12.9	7820	4.95	0.00	13.8	103	19.9	
11:05	6.11	350	12.6	6350	4.97	0.05	41.2	102	19.9	
11:10	6.11	350	12.4	6050	4.97	0.93	85.5	100	19.9	
11:15	6.11	350	12.3	6160	4.96	0.60	20.1	101	19.9	
11:20	6.11	350	12.4	6010	4.95	1.81	10.5	101	19.9	
11:25	6.11	350	12.4	5670	4.96	0.60	13.8	102	19.9	
11:30	6.11	350	12.3	5780	4.95	0.00	11.5	102	19.9	
11:35	6.11	350	12.3	5630	4.96	0.00	11.3	103	19.9	
11:40	6.11	350	12.4	5760	4.96	0.00	10.5	103	19.9	
11:45	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

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

LOCATION SKETCH

NOTES

for Tom Hanlon

SIGNATURE: Tom Hanlon

MACTEC

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	SAMPLE ID	GW-CA-1	ROUND NO.	2
SAMPLE ID	GW-CA-1	SITE TYPE	Superfund	DATE	5/21/2008
TIME	START 9:20 END 10:15	JOB NUMBER	6100-08-0016.04	BOTTLE TIME	10:05

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID:

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: 6.80 FT.

WELL DEPTH (TOR): 9.48 FT.

PID AMBIENT AIR: <0.1 PPM

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 6.85 FT.

SCREEN LENGTH: 5 FT.

PID WELL MOUTH: <0.1 PPM

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

DRAWDOWN VOLUME: 0.00815 FT.
(initial - final x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED: 0.0022

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 3.63 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%)	SAMPLE DEPTH	COMMENTS
9:25	6.82	250	12.8	564	5.80	4.61	4.90	13	9.00	
9:28	6.84	250	12.5	785	5.83	3.54	2.88	16	9.00	
9:31	6.85	250	12.5	792	5.82	3.40	2.44	27	9.00	
9:34	6.85	250	12.4	742	5.82	3.46	1.65	31	9.00	
9:37	6.85	250	12.4	684	5.83	3.44	0.73	36	9.00	
9:42	6.85	250	12.4	605	5.84	3.35	0.81	39	9.00	
9:47	6.85	250	12.3	550	5.85	3.24	0.45	44	9.00	
9:52	6.85	250	12.3	496	5.86	3.13	0.48	47	9.00	
9:55	6.85	250	12.3	487	5.87	3.12	0.49	49	9.00	
9:58	6.85	250	12.4	486	5.86	3.10	0.46	50	9.00	
10:05	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: 3.50

LOCATION SKETCH

NOTES

Odor from purge water

SIGNATURE: David Chapman

MACTEC

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	SAMPLE ID	PZ-16RR	ROUND NO.	2
SAMPLE ID	PZ-16RR	SITE TYPE	Superfund	DATE	5/20/2008
TIME	START 9:18 END 10:30	JOB NUMBER	6100-08-0016.04	BOTTLE TIME	10:00

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID:

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: 2.41 FT.

WELL DEPTH (TOR): 6.05 FT.

PID AMBIENT AIR: <0.1 PPM

WELL DIAMETER: 1 IN.

FINAL DEPTH TO WATER: 6.00 FT.

SCREEN LENGTH: 0.5 FT.

PID WELL MOUTH: <0.1 PPM

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: 1

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 0.59 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%)	SAMPLE DEPTH	COMMENTS
9:21	6.00	200	11.7	2200	7.86	7.39	112	-337	6.0	Purge dry, reading, wait for recharge
9:35	6.00	200	11.8	2140	6.96	4.41	58.4	-285	6.0	
9:50	6.00	200	12.3	2320	6.53	9.25	49.6	-203	6.0	
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

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: 0.4

NOTES Due to drawdown, will purge well dry, take reading, wait for recharge, then repeat.

Odor

SIGNATURE: David Chapman

LOCATION SKETCH

MACTEC

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	SAMPLE ID	PZ-17RR	ROUND NO.	2
SAMPLE ID	PZ-17RR	SITE TYPE	Superfund	DATE	5/20/2008
TIME	START 10:40 END 11:30	JOB NUMBER	6100-08-0016.04	BOTTLE TIME	11:15

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID:

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: 2.31 FT.

WELL DEPTH (TOR): 6.05 FT.

PID AMBIENT AIR: <0.1 PPM

WELL DIAMETER: 1 IN.

FINAL DEPTH TO WATER: 6.00 FT.

SCREEN LENGTH: 0.5 FT.

PID WELL MOUTH: <0.1 PPM

WELL INTEGRITY:

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

DRAWDOWN VOLUME: 0.61 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: 0.61 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%)	SAMPLE DEPTH	COMMENTS
10:45	6.00	200	14.3	871	6.87	5.10	267	-261	6.0	Purge dry, reading, wait for recharge
11:05	6.00	200	15.2	1620	6.62	6.08	163	-209	6.0	
11:10	6.00	200	15.2	4550	6.55	3.75	85.2	-170	6.0	
11:15	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: 0.5

NOTES Due to drawdown, will purge well dry, take reading, wait for recharge, then repeat.

Odor

SIGNATURE: David Chapman

LOCATION SKETCH

MACTEC

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	SAMPLE ID	PZ-18R	ROUND NO.	2
SAMPLE ID	PZ-18R	SITE TYPE	Superfund	DATE	5/20/2008
TIME	START 12:00 END 13:10	JOB NUMBER	6100-08-0016.04	BOTTLE TIME	13:00

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID:

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: 2.08 FT.

WELL DEPTH (TOR): 6.05 FT.

PID AMBIENT AIR: <0.1 PPM

WELL DIAMETER: 1 IN.

FINAL DEPTH TO WATER: 3.08 FT.

SCREEN LENGTH: 0.5 FT.

PID WELL MOUTH: <0.1 PPM

WELL INTEGRITY:

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

DRAWDOWN VOLUME: 0.041 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: 5.55 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%)	SAMPLE DEPTH	COMMENTS
12:03	2.10	300	13.1	922	6.25	6.91	86.2	-179	6.0	
12:08	3.05	300	13.1	1370	6.20	3.10	73.6	-178	6.0	
12:13	3.07	300	13.2	1390	6.20	4.09	60.0	-176	6.0	
12:18	3.07	300	13.1	1460	6.18	4.45	25.7	-172	6.0	
12:23	3.08	300	13.1	1470	6.17	4.43	14.4	-170	6.0	
12:28	3.08	300	13.1	1480	6.16	4.42	12.6	-169	6.0	
12:33	3.08	300	13.1	1500	6.15	4.41	10.3	-166	6.0	
12:43	3.08	300	12.9	1430	6.13	4.42	6.95	-160	6.0	
12:48	3.08	300	13.0	1420	6.12	4.39	4.43	-157	6.0	
12:53	3.08	300	13.1	1430	6.12	4.38	4.48	-158	6.0	
12:56							4.39			
13:00										

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: 5.2

NOTES

SIGNATURE: David Chapman

LOCATION SKETCH

MACTEC

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - SURFACE WATER/ SEDIMENT SAMPLING

PROJECT: OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA
JOB NUMBER: 6100-08-0016.04
DATE: 5/22/2008

FIELD SAMPLE NUMBER: PZ-16RR
ACTIVITY TIME: START 9:55 END 10:10
BOTTLE TIME: 10:05

QC SAMPLES COLLECTED: PZ-16RRDUP

SURFACE WATER DATA

WATER DEPTH AT LOCATION: 0.5 FT
SPEC. COND: 2,030 µS/cm
DEPTH OF SAMPLE FROM SURFACE: 0.3 FT
D.O.: 11.10 mg/L
TEMPERATURE: 12.9 DEG C
SALINITY: --- %
TURBIDITY: 25.3 NTU
ORP: 21 mV
PH: 5.72 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 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: [signature] / David Chapman

RECEIVED BY: _____

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - SURFACE WATER/ SEDIMENT SAMPLING

PROJECT: OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA
JOB NUMBER: 6100-08-0016.04
DATE: 5/22/2008

FIELD SAMPLE NUMBER: PZ-17RR
ACTIVITY TIME: START 10:20 END 10:30
BOTTLE TIME: 10:25

QC SAMPLES COLLECTED:

SURFACE WATER DATA

WATER DEPTH AT LOCATION: 0.6 FT
SPEC. COND: 1,940 µS/cm
DEPTH OF SAMPLE FROM SURFACE: 0.2 FT
D.O.: 9.19 mg/L
TEMPERATURE: 13.4 DEG C
SALINITY: --- %
TURBIDITY: 20.6 NTU
ORP: 11 mV
PH: 5.40 UNITS

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

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

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 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: David Chapman

RECEIVED BY:

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - SURFACE WATER/ SEDIMENT SAMPLING

PROJECT: OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA
JOB NUMBER: 6100-08-0016.04
DATE: 5/22/2008

FIELD SAMPLE NUMBER: PZ-18R
ACTIVITY TIME: START 11:20 END 11:30
BOTTLE TIME: 11:25

QC SAMPLES COLLECTED:

SURFACE WATER DATA

WATER DEPTH AT LOCATION: 1.3 FT
SPEC. COND: 768 µS/cm
DEPTH OF SAMPLE FROM SURFACE: 0.3 FT
D.O.: 8.73 mg/L
TEMPERATURE: 13.3 DEG C
SALINITY: --- %
TURBIDITY: 4.79 NTU
ORP: 66 mV
PH: 5.40 UNITS

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

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

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 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: David Chapman

RECEIVED BY:

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - SURFACE WATER/ SEDIMENT SAMPLING

PROJECT: OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA
JOB NUMBER: 6100-08-0016.04
DATE: 5/22/2008
FIELD SAMPLE NUMBER: SD-17
ACTIVITY TIME: START 10:37 END 10:45
BOTTLE TIME: 10:40
QC SAMPLES COLLECTED:

SURFACE WATER DATA

WATER DEPTH AT LOCATION: 0.45 FT
SPEC. COND: 1,920 µS/cm
DEPTH OF SAMPLE FROM SURFACE: 0.2 FT
D.O.: 10.92 mg/L
TEMPERATURE: 13.6 DEG C
SALINITY: --- %
TURBIDITY: 18.5 NTU
ORP: 3 mV
PH: 5.94 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 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: David Chapman

RECEIVED BY:

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - SURFACE WATER/ SEDIMENT SAMPLING

PROJECT: OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA
JOB NUMBER: 6100-08-0016.04
DATE: 5/22/2008

FIELD SAMPLE NUMBER: ISCO-1
ACTIVITY TIME: START 10:55 END 11:05
BOTTLE TIME: 11:00

QC SAMPLES COLLECTED:

SURFACE WATER DATA

WATER DEPTH AT LOCATION: 0.9 FT
SPEC. COND: 1,220 µS/cm
DEPTH OF SAMPLE FROM SURFACE: 0.2 FT
D.O.: 10.65 mg/L
TEMPERATURE: 13.6 DEG C
SALINITY: --- %
TURBIDITY: <0.1 NTU
ORP: 44 mV
PH: 5.84 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 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: David Chapman

RECEIVED BY:

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - SURFACE WATER/ SEDIMENT SAMPLING

PROJECT: OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA
JOB NUMBER: 6100-08-0016.04
DATE: 5/22/2008

FIELD SAMPLE NUMBER: ISCO-2
ACTIVITY TIME: START 9:25 END 9:35
BOTTLE TIME: 9:30

QC SAMPLES COLLECTED:

SURFACE WATER DATA

WATER DEPTH AT LOCATION: 0.6 FT
SPEC. COND: 2,370 µS/cm
DEPTH OF SAMPLE FROM SURFACE: 0.3 FT
D.O.: 10.16 mg/L
TEMPERATURE: 12.4 DEG C
SALINITY: --- %
TURBIDITY: 61.7 NTU
ORP: 22 mV
PH: 5.18 UNITS

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

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

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 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: David Chapman

RECEIVED BY:

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - SURFACE WATER/ SEDIMENT SAMPLING

PROJECT: OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA
JOB NUMBER: 6100-08-0016.04
DATE: 5/22/2008
FIELD SAMPLE NUMBER: ISCO-3
ACTIVITY TIME: START 9:07 END 9:20
BOTTLE TIME: 9:15
QC SAMPLES COLLECTED:

SURFACE WATER DATA

WATER DEPTH AT LOCATION: 0.4 FT
SPEC. COND: 2,550 µS/cm
DEPTH OF SAMPLE FROM SURFACE: 0.2 FT
D.O.: 10.58 mg/L
TEMPERATURE: 12.3 DEG C
SALINITY: --- %
TURBIDITY: 16.1 NTU
ORP: -64 mV
PH: 5.56 UNITS

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

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

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 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: David Chapman

RECEIVED BY:

MACTEC ENGINEERING AND CONSULTING

FIELD INSTRUMENTATION CALIBRATION RECORD

PROJECT: Olin Chemical Superfund Site | DATE: 5/16/2008

CREW ID OR TASK ID: Second Quarter 04 (PCMP GW) | JOB NUMBER: 6100-08-0016

SAMPLER SIGNATURE: David Chapman

EQUIPMENT CALIBRATION	CALIBRATION INFORMATION					ACCEPTANCE
	STANDARD VALUE		METER VALUE			CRITERIA **
HORIBA MODEL NO. _____	pH	_____ units	pH	_____ units		+/- 10% of standard
UNIT ID NO _____	Sp. Conductivity	_____ mS/cm	Sp. Conductivity	_____ mS/cm		+/- 10% of standard
	Redox	_____ mV	Redox	_____ mV		see note 1
	DO	_____ mg/L *	DO	_____ mg/L		+/- 10% of standard
	Thermometer Temperature	_____ deg. C	Temperature	_____ deg. C		+/- 2.0 deg. C
TURBIDITY METER TYPE _____		_____ NTU		_____ NTU		within 0.3 NTU of
MODEL NO. _____		_____ NTU		_____ NTU		the standard
UNIT ID NO. _____		_____ NTU		_____ NTU		+/- 10% of standard
		_____ NTU		_____ NTU		
PHOTOIONIZATION						
METER TYPE Mini RAE	Background: 0 ppmv	Zero Air: 0 ppmv	Meter	0.1	ppmv	within 5 ppmv of Zero
MODEL NO. 2000 PID	Span Gas	100 ppmv	Meter	98.6	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:	_____
Trip Blank Water Source:	_____	_____	Lot Numbers pH	_____
Sample Preservatives Source:	Lab Provided	_____	mV	_____
Disposable Filter Type:	0.45 micron field filter	_____	Sp. Cond.	_____
Other	_____	_____	Turb.	_____

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: 5/20/2008

CREW ID OR TASK ID: Second Quarter 04 (PCMP GW) | JOB NUMBER: 6100-08-0016

SAMPLER SIGNATURE: David Chapman

EQUIPMENT CALIBRATION

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 NO M015-08	Sp. Conductivity	4.49	mS/cm	4.50	mS/cm	+/- 10% of standard
	Redox	230	mV	249	mV	see note 1
	DO	N/A	mg/L *	11.07	mg/L	+/- 10% of standard
	Thermometer Temperature	N/A	deg. C	---	deg. C	+/- 2.0 deg. C
TURBIDITY METER TYPE Hach		<0.1	NTU	0.19	NTU	within 0.3 NTU of
MODEL NO. 2100P		20	NTU	16.9	NTU	the standard
UNIT ID NO. M024-17		100	NTU	98.1	NTU	+/- 10% of standard
		800	NTU	801	NTU	

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
Deionized Water Source:		
Trip Blank Water Source:		
Sample Preservatives Source:	Lab Provided	
Disposable Filter Type:	0.45 micron field filter	
Other		

Calibration Fluids/ Standard Source: Auto Cal

Lot Numbers: pH 5907; mV 5907; Sp. Cond. 5907; Turb. 8079-8082

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: 5/20/2008

CREW ID OR TASK ID: Second Quarter 04 (PCMP GW) | JOB NUMBER: 6100-08-0016

SAMPLER SIGNATURE: Tom Hanlon / [illegible] for Tom Hanlon

EQUIPMENT CALIBRATION

EQUIPMENT CALIBRATION		CALIBRATION INFORMATION: STANDARD VALUE		METER VALUE		ACCEPTANCE CRITERIA **
HORIBA MODEL NO. U-22	pH	4.00	units	3.98	units	+/- 10% of standard
UNIT ID NO M015-11	Sp. Conductivity	4.49	mS/cm	4.62	mS/cm	+/- 10% of standard
	Redox	230	mV	240	mV	see note 1
	DO	N/A	mg/L *	---	mg/L	+/- 10% of standard
	Thermometer Temperature	N/A	deg. C	---	deg. C	+/- 2.0 deg. C
TURBIDITY METER TYPE Hach		<0.1	NTU	0.0	NTU	within 0.3 NTU of
MODEL NO. 2100P		20	NTU	19.9	NTU	the standard
UNIT ID NO. M024-17		100	NTU	99.2	NTU	+/- 10% of standard
		800	NTU	792	NTU	

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
Deionized Water Source:		
Trip Blank Water Source:		
Sample Preservatives Source:	Lab Provided	
Disposable Filter Type:	0.45 micron field filter	
Other		

Calibration Fluids/ Standard Source: Auto Cal

Lot Numbers: pH 5907; mV 5907; Sp. Cond. 5907; Turb. 8079-8082

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: 5/21/2008

CREW ID OR TASK ID: Second Quarter 04 (PCMP GW) | 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	3.99	units		+/- 10% of standard
UNIT ID NO M015-11	Sp. Conductivity	4.49	mS/cm	Sp. Conductivity	4.49	mS/cm		+/- 10% of standard
	Redox	230	mV	Redox	220	mV		see note 1
	DO	N/A	mg/L *	DO	---	mg/L		+/- 10% of standard
	Thermometer Temperature	N/A	deg. C	Temperature	---	deg. C		+/- 2.0 deg. C
TURBIDITY METER TYPE Hach		<0.1	NTU		0.29	NTU		within 0.3 NTU of
MODEL NO. 2100P		20	NTU		20.4	NTU		the standard
UNIT ID NO. M024-03		100	NTU		104	NTU		+/- 10% of standard
		800	NTU		806	NTU		
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
Deionized Water Source:		
Trip Blank Water Source:		
Sample Preservatives Source:	Lab Provided	
Disposable Filter Type:	0.45 micron field filter	
Other		

Calibration Fluids/
Standard Source: Auto Cal
Lot Numbers pH 5907
mV 5907
Sp. Cond. 5907
Turb. 8079-8082

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: 5/21/2008

CREW ID OR TASK ID: Second Quarter 04 (PCMP GW) | 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	3.96	units	+/- 10% of standard
UNIT ID NO M015-08	Sp. Conductivity	4.49	mS/cm	4.43	mS/cm	+/- 10% of standard
	Redox	230	mV	226	mV	see note 1
	DO	N/A	mg/L *	---	mg/L	+/- 10% of standard
	Thermometer Temperature	N/A	deg. C	---	deg. C	+/- 2.0 deg. C
TURBIDITY METER TYPE Hach		<0.1	NTU	0.08	NTU	within 0.3 NTU of
MODEL NO. 2100P		20	NTU	20.4	NTU	the standard
UNIT ID NO. M024-17		100	NTU	97.5	NTU	+/- 10% of standard
		800	NTU	796	NTU	

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
Deionized Water Source:		
Trip Blank Water Source:		
Sample Preservatives Source:	Lab Provided	
Disposable Filter Type:	0.45 micron field filter	
Other		

Calibration Fluids/ Standard Source: Auto Cal

Lot Numbers: pH 5907; mV 5907; Sp. Cond. 5907; Turb. 8079-8082

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: 5/22/2008

CREW ID OR TASK ID: Second Quarter 04 (PCMP GW) | JOB NUMBER: 6100-08-0016

SAMPLER SIGNATURE: David Chapman

EQUIPMENT CALIBRATION

EQUIPMENT CALIBRATION		CALIBRATION INFORMATION: STANDARD VALUE		METER VALUE		ACCEPTANCE CRITERIA **
HORIBA MODEL NO. U-22	pH	4.00	units	3.97	units	+/- 10% of standard
UNIT ID NO M015-08	Sp. Conductivity	4.49	mS/cm	4.51	mS/cm	+/- 10% of standard
	Redox	240	mV	238	mV	see note 1
	DO	N/A	mg/L *	---	mg/L	+/- 10% of standard
	Thermometer Temperature	N/A	deg. C	---	deg. C	+/- 2.0 deg. C
TURBIDITY METER TYPE Hach		<0.1	NTU	0.24	NTU	within 0.3 NTU of
MODEL NO. 2100P		20	NTU	20.3	NTU	the standard
UNIT ID NO. M024-17		100	NTU	100	NTU	+/- 10% of standard
		800	NTU	795	NTU	

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
Deionized Water Source:		
Trip Blank Water Source:		
Sample Preservatives Source:	Lab Provided	
Disposable Filter Type:	0.45 micron field filter	
Other		

Calibration Fluids/ Standard Source: Auto Cal

Lot Numbers: pH 5907; mV 5907; Sp. Cond. 5907; Turb. 8079-8082

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: 5/22/2008

CREW ID OR TASK ID: Second Quarter 04 (PCMP GW) | 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	3.98	units		+/- 10% of standard
UNIT ID NO M015-11	Sp. Conductivity	4.49	mS/cm	Sp. Conductivity	4.48	mS/cm		+/- 10% of standard
	Redox	230	mV	Redox	240	mV		see note 1
	DO	N/A	mg/L *	DO	---	mg/L		+/- 10% of standard
	Thermometer Temperature	N/A	deg. C	Temperature	---	deg. C		+/- 2.0 deg. C
TURBIDITY METER TYPE Hach		<0.1	NTU		0.3	NTU		within 0.3 NTU of
MODEL NO. 2100P		20	NTU		20.8	NTU		the standard
UNIT ID NO. M024-03		100	NTU		103	NTU		+/- 10% of standard
		800	NTU		823	NTU		
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
Deionized Water Source:		
Trip Blank Water Source:		
Sample Preservatives Source:	Lab Provided	
Disposable Filter Type:	0.45 micron field filter	
Other		

Calibration Fluids/

Standard Source: Auto Cal

Lot Numbers pH 5907

mV 5907

Sp. Cond. 5907

Turb. 8079-8082

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: 5/23/2008

CREW ID OR TASK ID: Second Quarter 04 (PCMP GW) | JOB NUMBER: 6100-08-0016

SAMPLER SIGNATURE: Mark Maggiore / [signature] for Mark Maggiore

EQUIPMENT CALIBRATION

EQUIPMENT CALIBRATION		CALIBRATION INFORMATION: STANDARD VALUE		METER VALUE		ACCEPTANCE CRITERIA **
HORIBA MODEL NO. U-22	pH	4.00	units	4.00	units	+/- 10% of standard
UNIT ID NO M015-11	Sp. Conductivity	4.49	mS/cm	4.52	mS/cm	+/- 10% of standard
	Redox	230	mV	257	mV	see note 1
	DO	N/A	mg/L *	6.72	mg/L	+/- 10% of standard
	Thermometer Temperature	N/A	deg. C	12.8	deg. C	+/- 2.0 deg. C
TURBIDITY METER TYPE Hach		<0.1	NTU	0.39	NTU	within 0.3 NTU of
MODEL NO. 2100P			NTU		NTU	the standard
UNIT ID NO. M024-17			NTU		NTU	+/- 10% of standard
		800	NTU	803	NTU	

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
Deionized Water Source:		
Trip Blank Water Source:		
Sample Preservatives Source:	Lab Provided	
Disposable Filter Type:	0.45 micron field filter	
Other		

Calibration Fluids/ Standard Source: Auto Cal

Lot Numbers pH 5907

mV 5907

Sp. Cond. 5907

Turb. 8079-8082

NOTES: DO reading is flashing error 6 periodically

Turbidity low reading slightly off standard.

* = 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: 5/23/2008

CREW ID OR TASK ID: Second Quarter 04 (PCMP GW) | JOB NUMBER: 6100-08-0016

SAMPLER SIGNATURE: David Chapman

EQUIPMENT CALIBRATION

EQUIPMENT CALIBRATION	CALIBRATION INFORMATION						ACCEPTANCE
		STANDARD VALUE			METER VALUE		CRITERIA **
HORIBA MODEL NO. U-22	pH	4.00	units	pH	3.99	units	+/- 10% of standard
UNIT ID NO M015-08	Sp. Conductivity	4.49	mS/cm	Sp. Conductivity	4.51	mS/cm	+/- 10% of standard
	Redox	230	mV	Redox	237	mV	see note 1
	DO	N/A	mg/L *	DO	10.80	mg/L	+/- 10% of standard
	Thermometer Temperature	N/A	deg. C	Temperature	---	deg. C	+/- 2.0 deg. C
TURBIDITY METER TYPE Hach		<0.1	NTU		0.48	NTU	within 0.3 NTU of
MODEL NO. 2100P		20	NTU		22.1	NTU	the standard
UNIT ID NO. M024-03		100	NTU		108	NTU	+/- 10% of standard
		800	NTU		822	NTU	
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
Deionized Water Source:		
Trip Blank Water Source:		
Sample Preservatives Source:	Lab Provided	
Disposable Filter Type:	0.45 micron field filter	
Other		

Calibration Fluids/ Standard Source: Auto Cal

Lot Numbers pH 5907

mV 5907

Sp. Cond. 5907

Turb. 8079-8082

NOTES: Turbidity low reading slightly off standard.

* = 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

[illegible] 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 #: C1000[illegible]
Project Manager: [illegible]
Work ID: PCMP
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

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 Total Cr	Other	Other Total	Other	Other	Other
GW-42 I	GW	DLC	5/19/08	X		6	P		X	X				X	X							X	X	X			
GW-42 S	GW	TRH	5/19/08	X		3	P		X	X				X	X	X	X		X								
GW-202-SA	GW	TRH	5/20/08 1005	X		3	P		X	X				X	X	X	X		X								
GW-202-S DUP	GW	TRH	5/20/08 1005	X		3	P		X	X				X	X	X	X		X								
GW-202 I	GW	TRH	5/20/08 1145	X		3	P		X	X				X	X	X	X		X								
PZ-16RR	GW	DLC	5/20/08 10:00	X		3	P		X	X				X	X	X	X		X								
PZ-17RR	GW	DLC	5/20/08 11:15	X		3	P		X	X				X	X	X	X		X								
PZ-18R	GW	DLC	5/20/08 13:00	X		3	P		X	X				X	X	X	X		X								
~~P~~ GW-39	GW	DLC	5/20/08 14:05	X		3	P		X	X				X	X	X	X		X								
GW-26	GW	DLC TRH	5/20/08 13:50	X		3	P		X	X				X	X	X	X		X								

Sampled by (print): David Chapman / Tom Horton
Signature: [signature]

Relinquished by:	Date:	Time:	Received by:	Date:	Time:
David Chapman	5/20/08	1500	[signature]	5/20/08	1500

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
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Westfield, MA 01085
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(F) 413-572-3707

145 [illegible] Road
N. Billerica, MA 01862
(P) 978-667-1400
(F) 978-667-7871

Job#	Quote#	PO#

Client: Olin Chemical/MACTEC
Address: 51 Eames Street
Wilmington, MA 01887
Phone: Fax:

Project #: G10008 0016
Project Manager: [illegible]
Work ID: PCMP
Contact: David Chapman

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)	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
GW-CA-1	GW	DLC	5/21/08 10:25	X		3	P		X	X				X	X	X	X		X								
GW 355	GW	DLC	5/21/08 11:05	X		3	P		X	X				X	X	X	X		X								
GW-201	GW	DLC	5/21/08 15:35	X		3	P		X	X				X	X	X	X		X								
GW-795	GW	DLC	5/21/08 [illegible]	X		3	P		X	X				X	X	X	X		X								
GW 355 DUP	GW	DLC	5/21/08 11:05	X		3	P		X	X				X	X	X	X		X								
GW-76	GW	TRH	[illegible] 10:25	X		3	P		X	X				X	X	X	X		X								
GW-10		TRH	[illegible] 11:10	X		3	P		X	X				X	X	X	X		X								
GW-25		TRH	[illegible] 12:35	X		3	P		X	X				X	X	X	X		X								
GW-24		TRH	[illegible] 14:45	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 / Tom Hanlon
Signature:

Relinquished by:	Date:	Time:	Received by:	Date:	Time:
Thomas Hanlon	5/22/08	1550	[illegible]	05/22/08	1550
Relinquished by:	Date:	Time:	Received by:	Date:	Time:

Method of shipment:

TestAmerica-Westfield

Cooler? Y / N Samples Iced? Y / N
Temp @ receipt: 5.1 °C
Preservation/pH checked
By: Date:

White = Lab file Yellow = Report copy Pink = Customer copy
STL-8245 (1000)

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Chain of Custody Form

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(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 #: 61000E0016
Project Manager: Peter Thompson
Work ID: PCMP
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 Condutivity	Nitrate, Nitrite	Groundwater metals	Surfacewater metals	Sediment: Al/Cr/Fe	Other	Other	Other	Other	Other	Other
ISCC-3	SW	DLC TRH	5/22/08 9:15	X		4	P		X	X				X	X	X	X	X		X							
ISCC-2	SW	DLC TRH	5/22/08 9:30	X		4	P		X	X				X	X	X	X	X		X							
PZ-16RR	SW	DLC TRH	5/22/08 10 05	X		4	P		X	X				X	X	X	X	X		X							
PZ-16RRDUP	SW	DLC TRH	5/22/08 10 05	X		4	P		X	X				X	X	X	X	X		X							
PZ-17RR	SW	DLC TRH	5/22/08 10 25	X		4	P		X	X				X	X	X	X	X		X							
SD-17	SW	DLC TRH	5/22/08 10:40	X		4	P		X	X				X	X	X	X	X		X							
ISCC-1	SW	DLC TRH	5/22/08 11 00	X		4	P		X	X				X	X	X	X	X		X							
PZ-18R	SW	DLC TRH	5/22/08 11 00	X		4	P		X	X				X	X	X	X	X		X							
GW-34D	GW	DLC	5/22/08 13 50	X		3	P		X	X				X	X	X	X		X								
GW-34SR	GW	TRH	5/22/08 14 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 / Tom Hanlon
Signature:

Relinquished by: Thomas Hanlon Date: 5/22/08 Time: 1550
Received by: Date: 05/22/08 Time: 1550

Relinquished by: Date: Time:
Received by: Date: Time:

Method of shipment:

TestAmerica-Westfield

Cooler ? Y / N Samples Iced? Y / N
Temp @ receipt: 5.1 °C
Preservation/pH checked
By: Date:

White = Lab file Yellow = Report copy Pink = Customer copy
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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: Plant B
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	8260	VPH	8270	Ammonia	Iron by 6010	pH	Other	Other	Other	Other	Other	Other	Other
GW-16	GW		5/23/08 9:50	X		12	V G		1	1	7			3	X	X	X	X	X	X							
GW-16 DUP	GW		5/23/08 9:50	X		12	V G		1	1	7			3	X	X	X	X	X	X							
GW-16 MS	GW		5/23/08 9:50	X		12	V G		1	1	7			3	X	X	X	X	X	X							
GW-16MSD	GW		5/23/08 9:50	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): David Chapman
Signature:

Relinquished by:	Date:	Time:	Received by:	Date:	Time:
Mark Maggione	5/23/08	15:13	[signature]	05/23/08	1513
Relinquished by:	Date:	Time:	Received by:	Date:	Time:

Method of shipment:

TestAmerica-Westfield

Cooler? Y / N Samples Iced? Y / N
Temp @ receipt: 14.7 °C
Preservation/pH checked
By: Date:

White = Lab file Yellow = Report copy Pink = Customer copy
STL-8245 (1000)

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Chain of Custody Form

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•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
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

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
GW-55S	GW	MAM	5/23/05 11:40	X		3	P		X	X				X	X	X	X		X								
GW-78S	GW	MAM	5/23/05 11:30	X		3	P		X	X				X	X	X	X		X								

Sampled by (print): Mark Maggiore
Signature:

Relinquished by:	Date:	Time:	Received by:	Date:	Time:
Mark Maggiore	5/23/05	1513	[signature]	05/23/05	1513
Relinquished by:	Date:	Time:	Received by:	Date:	Time:

Method of shipment:

TestAmerica-Westfield

Cooler ? Y / N Samples Iced? Y / N
Temp @ receipt: 14.7 °C
Preservation/pH checked
By: Date:

White = Lab file Yellow = Report copy Pink = Customer copy
STL-8245 (1000)

APPENDIX C

Second Quarter 2008
Temporary Cap Inspection Figure 1 and Photo Log

Legend

- Seam
- Monitoring Well

R-# = Previous repair
W-# = Water pooling
S-# = Sandbag recommended for replacement (7)
P-# = Perferation (2)

MACTEC

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

N

0 30 60 120 Feet

Figure 1
Seam Locations in the Temporary Cap
Interim Response Steps Field Activity Report
Second Quarter 2008 Sampling Event
Olin Chemical Superfund Site
Wilmington, Massachusetts

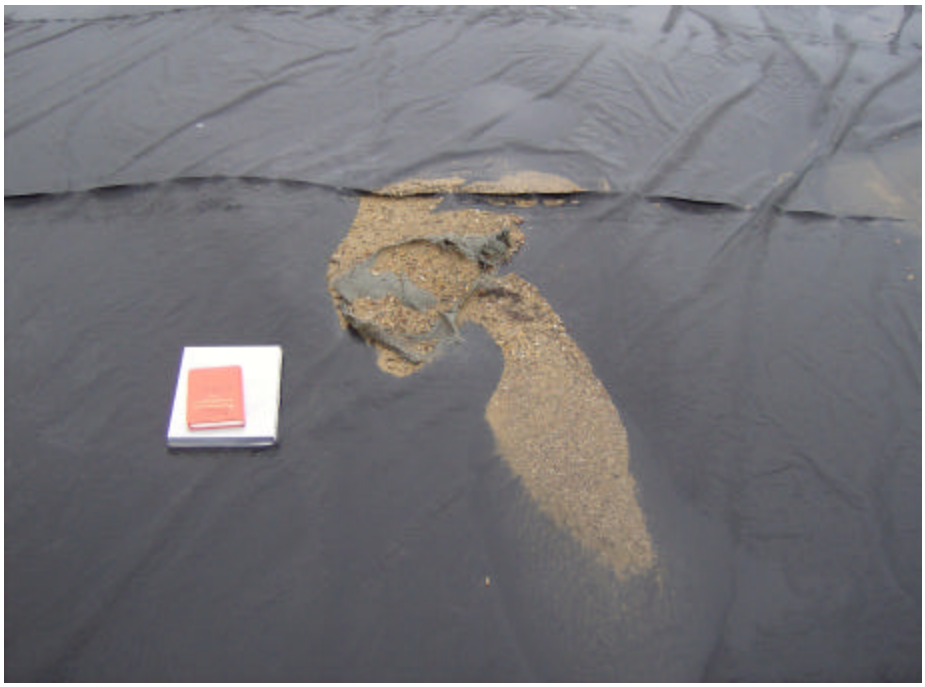
Prepared by BJR | Checked by DLC

Document: P:\OLIN\Wilmington\GIS\MapDocuments\Olin_11X17_LS.mxd PDF: P:\OLIN\Wilmington\2008 Quarterly Sampling\May Quarterly&Semi Annual Sampling\Report\Figure 1 - Cap Seams.pdf 06/13/2008 1:33 PM bjroden

Photo 1: Typical repair patch with new sandbag.

1

Photo 2: Sandbag recommended for replacement.



2

Photo 3: Cap drainage grate with ponding water.

3

Photo 4: Repairs at bases of wells and new sandbags.

4

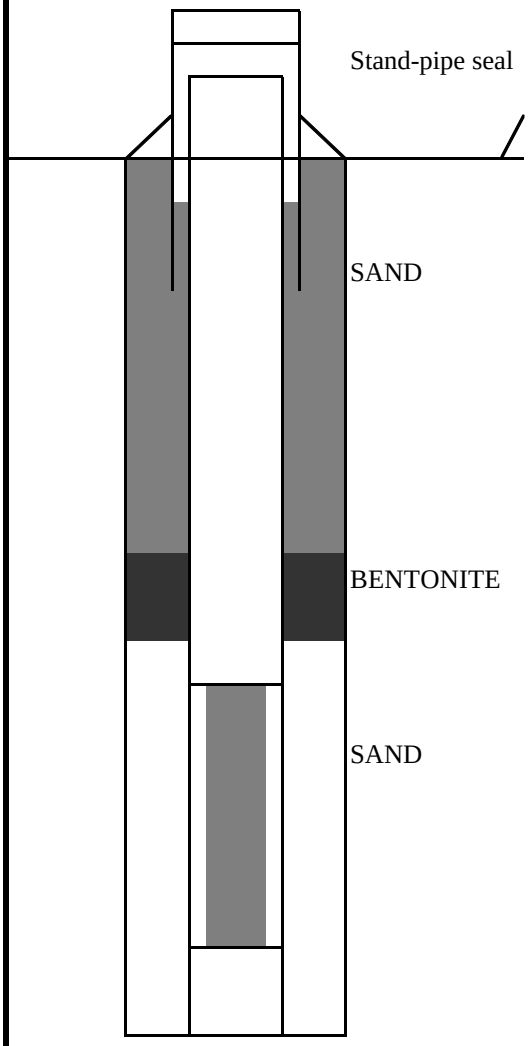
APPENDIX D

GW-16R Monitoring Well Installation Log and Well Development Log

MACTEC

MONITORING WELL DIAGRAM

Project Name:	OLIN Chemical Superfund Site	**Boring No:**	GW-16R
Date Installed:	4/25/2008	**Contractor:**	Boart Longyear
Project No.:	6100080016.04	**Drilling Method:**	Mini-Sonic Drill Rig
Field Geologist:	CTM	**Development Method:**	Geo-pump



Stick-up of Casing Above Ground Surface:	2.72 feet
Type of Surface Seal/Other Protection:	Concrete (0-2 feet)
Type of Surface Casing:	Stand-pipe
ID of Surface Casing:	N/A
Diameter of Borehole:	4 ½-inch
Riser Pipe ID:	2-inch
Type of Riser Pipe:	Sch. 40 PVC
Type of Backfill:	Sand (2 - 4 feet below grade)
Depth of Top Seal:	4 - 6 feet below grade
Type of Seal:	Bentonite
Depth of Top of Sand:	6 feet below grade
Depth of Top of Screen:	10 feet below grade
Type of Screen:	Sch. 40 PVC: 10-slot (0.01-inch)
Slot Size x Length:	0.10-inch x 5-feet
ID of Screen:	2-inch
Type of Sandpack:	Sand
Depth of Bottom of Screen:	15.0 feet
Depth of Sediment Sump with Plug:	N/A
Depth of Bottom of Borehole:	15.0 feet

MACTEC

WELL DEVELOPMENT REPORT

MACTEC DLC/MAM	CLIENT: Olin	WELL #: GW-16R

PROJECT : Olin Chemical
LOCATION: Wilmington, MA

DATE: 5/16/2008
PROJECT NO. : 6100080016

DRILLING METHOD (s): Mini-Sonic Drill Rig
PUMP METHOD (s): Geo-pump
SURGE METHOD (s): N/A
INSTALLATION DATE: 4/25/2008

INSPECTOR: N/A
CONTRACTOR: Boart Longyear
CREW: John, Bill
START DEVELOPMENT DATE: 5/16/2008
END DEVELOPMENT DATE: 5/16/2008

WATER DEPTH (TOC): 10.60 ft
WELL DIA. (ID CASING): 2 in
BORING DIAMETER: 4.5 in

INSTALLED POW DEPTH(TOC): 17.0 ft
MEASURED POW DEPTH(TOC): 17.19 ft
SILT THICKNESS: 0.01 ft
POW AFTER DEVELOPMENT: 17.20 ft

DIAMETER FACTORS (GAL/FT):

DIAMETER (IN):	2	3	4	5	6	7	8	9	10	11	12
GALLONS/ FT:	0.163	0.367	0.654	1.02	1.47	2.00	2.61	3.30	4.08	4.93	5.87

STANDING VOLUME INSIDE WELL = WATER COLUMN X WELL DIAMETER FACTOR = 6.59 GAL. = A

STANDING WATER IN ANNULAR SPACE =
WATER COL. BELOW SEAL(ft) X (BORING DIAM. FACTOR - WELL DIAM. FACTOR) X 0.3 = 0.97 GAL. = B

SINGLE STANDING WATER VOLUME = A + B = ... 7.56 GAL. = C

MINIMUM VOLUME TO BE REMOVED = 5 X C ..... 37.8 GALS.

ACTIVITY	START TIME	END TIME	ELAPSED TIME	GALLONS REMOVED	pH	CONDUCTIVITY	TEMP	COLOR	OTHER
Purge	15:30	16:25	55	5.8				Clear	
TOTALS/FINAL									

COMMENTS: Water purged using geo-pump. Tubing moved/water column disturbed to remove silt. Purging finished when water was visibly clear.

WELL #: GW-16R

APPENDIX A

Interim Response Steps Field Activity Reports

A-2 Third Quarter 2008 Sampling Event

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

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

Prepared for:

Olin Corporation
Wilmington, Massachusetts

Prepared By:

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

MACTEC PROJECT NO. 6100080016.05B

October 27, 2008

10-27-08		10-27-08	
Peter H. Thompson Project Manager	Date	Michael J. Murphy Senior Principal Scientist	Date

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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 Third 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 Third Quarter 2008 Temporary Cap Inspection Photo Log

GLOSSARY OF ACRONYMS

DO	Dissolved Oxygen
EPA	U.S. Environmental Protection Agency
IRSWP	Interim Response Steps Work Plan
LNAPL	Light Non-Aqueous Phase Liquid
MACTEC	MACTEC Engineering and Consulting, Inc.
MassDEP	Massachusetts Department of Environmental Protection
ORP	Oxidation/Reduction Potential
SC	Specific Conductivity
SOPs	Standard Operating Procedures
STL	Severn Trent Laboratories
UV	ultraviolet

1.0 INTRODUCTION

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

1.1.1 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 (EPA).

2.0 SLURRY WALL/CAP MONITORING PROGRAM

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

The Third Quarter 2008 groundwater and surface water monitoring program included groundwater sampling from five groundwater monitoring wells and three piezometers, the collection of surface water samples from seven locations within the South Ditch, and the collection of groundwater level measurements from 22 monitoring wells and piezometers. Groundwater and surface water sample identifiers are listed in **Table 1** and locations are depicted on **Figure 1**. The surface water and groundwater sampling program is further described the Final Interim Response Steps Work Plan (IRSWP) (MACTEC 2008) dated August 8, 2008, which has been approved by the U.S. Environmental Protection Agency (EPA).

2.1 SCOPE OF WORK

The Slurry Wall/Cap Monitoring Program for this sampling event consists of: collecting groundwater level measurements from 19 monitoring wells and three piezometers in the vicinity of the South Ditch area; groundwater sampling from five monitoring wells (GW-25, GW-78S, GW-79S, GW-202S, GW-202D) and three piezometers (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 depicted in **Figure 1**.

2.1.1 Groundwater Level Measurement

On August 25, 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 22 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 August 25th and 26th, 2008, MACTEC personnel sampled groundwater from five monitoring wells and three piezometers using the 1996 EPA 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 using the standard calibration solutions. The field instrument calibration records are contained in **Appendix A**. No readings were noted outside the manufacturer supplied calibration.

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. 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 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 were 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 August 27, 2008, MACTEC personnel collected seven surface water samples (from locations identified as ISCO-1, ISCO-2, ISCO-3, PZ-16RR, PZ-17RR, PZ-18R, and SD-17), from downstream to upstream, along the South Ditch. Sample locations are shown in **Figure 1**. Before field 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 parameters (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 fraction 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 utilized to reduce the entrapment of floating or suspended sediment while also providing positive pressure for field filtering metals through the 0.45-micron pore diameter filter for dissolved metal analysis.

Total fraction 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 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 August 25, 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 November 2008. Downloaded data logger data is summarized in the Semi-annual Status Report dated January 2, 2009.

2.1.5 Cap Inspection

The Third Quarter 2008 Temporary Cap Inspection at the Site was completed on August 27, 2008. 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 August 27, 2008, 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 with only minor perforations (less than ½ inch). The Temporary Cap surface contained some sediment, water deposited in low lying areas and vegetation growing above the cap material in some locations. 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 hasn't 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.
- Sewn seams utilizing UV -resistant thread are intact and do not show signs of deterioration.

- Many of the UV-resistant sandbags show moderate to severe signs of degradation. Olin has a instituted a replacement program for deteriorated sand bags. 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.
- Many of the pools of water supported rafts of vegetation, mainly grass which do not deleteriously affect the cap.
- Patches of vegetation are growing above the cap surface, but do not appear to have affected polyethylene sheet. (Photo 1).
- The Temporary Cap internal drain grate is overgrown with vegetation (Photo 3).
- Several UV-resistant sandbags have lost a sufficient amount of sand to warrant a recommendation for their replacement. (Photo 2). 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 overgrown with 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 above 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

2.1.5.4 Recommendations

Patching the one small perforation located in the cap (see Figure 2, Photo 4), replacing 19 additional sandbag locations, and continued cap monitoring for future changes in condition is recommended. Inspection and removal of vegetation from the cap's internal drainage grate is also recommended (to facilitate drainage of ponded water). All previous holes and perforations observed have been repaired with a repair tape. These repairs were generally observed to be in good condition and do not require resealing. It is recommended that the polyethylene tape with a mastic backing that is typically used on shrink wrap polyethylene covers (marine industry use) be tried as an alternative repair tape if current repairs fail prematurely.

2.1.6 Limitations

Our professional services for this project have been performed in accordance with generally accepted engineering practices. No warranty, expressed or implied, is made.

3.0 PLANT B MONITORING PROGRAM

The Third Quarter 2008 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 depicted on **Figure 3**.

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

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 EPA low flow (low stress) groundwater sampling at monitoring well GW-16R (which was replaced on April 25, 2008). Monitoring well locations are depicted in **Figure 3**.

3.1.1 Groundwater Level Measurements and Product Gauging

On August 25, 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 7**.

3.1.2 Groundwater Sampling

On August 26, 2008, MACTEC personnel sampled groundwater from monitoring well GW-16R (which was replaced in April 2008) using the 1996 EPA 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 using the standard calibration solutions. The field instrument calibration records are contained in **Appendix A**. No readings were noted outside the manufacturer supplied calibration.

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. 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 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 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
Slurry Wall/Cap and Plant B Monitoring Program
Third Quarter 2008 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:
Bold - DUP collected
* - Plant B Monitoring Well

Prepared by: CTM 09/12/08
Checked by: DLC 11/03/08

Table 2
Groundwater Elevations
Slurry Wall/Cap Monitoring Program
Third 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	8.77	80.33		8/25/2008
GW-24	83.43	2.65	80.78		8/25/2008
GW-25	85.97	5.35	80.62		8/25/2008
GW-26	84.93	3.97	80.96		8/25/2008
GW-34D	90.36	7.83	82.53		8/25/2008
GW-34SR	89.13	6.57	82.56		8/25/2008
GW-35S	88.51	7.11	81.40		8/25/2008
GW-39	83.64	3.88	79.76		8/25/2008
GW-42S	84.18	NG	---	Not gauged	8/25/2008
GW-43S	-	-	-	Destroyed	-
GW-55S	81.70	2.57	79.13		8/25/2008
GW-55D	81.95	2.91	79.04		8/25/2008
GW-76S	88.45	7.49	80.96	TOC	8/25/2008
GW-78S	84.89	4.61	80.28		8/25/2008
GW-79S	81.54	3.83	77.71		8/25/2008
GW-201S	83.29	4.60	78.69		8/25/2008
GW-202S	86.97	6.54	80.43		8/25/2008
GW-202D	86.52	5.89	80.63		8/25/2008
GW-CA1	88.01	6.96	81.05		8/25/2008
PZ-16RR/IN	81.0	3.19	77.81		8/25/2008
PZ-16RR/OUT	81.0	3.05	77.95		8/25/2008
PZ-17RR/IN	82.43	2.31	80.12		8/25/2008
PZ-17RR/OUT	82.43	3.45	78.98		8/25/2008
PZ-18R/IN	82.42	1.99	80.43		8/25/2008
PZ-18R/OUT	82.42	1.91	80.51		8/25/2008
PZ-24	89.43	7.44	81.99		8/25/2008
PZ-25	88.90	8.66	80.24		8/25/2008

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
TOC - Water level measurement taken from Top of Casing
NG - Not gauged

Prepared by: CTM 09/12/08
Checked by: DLC 11/03/08

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

Monitoring Well Samples					
Location	GW-25	GW-78S	GW-79S	GW-202S	GW-202D
Date	8/26/2008	8/26/2008	8/26/2008	8/25/2008	8/25/2008
Depth to Water (ft)	5.36	4.66	3.91	6.54	5.98
pH (standard units)	6.33	5.39	5.62	5.72	5.09
Conductivity (µS/cm)	120	1290	2860	1680	4970
Dissolved Oxygen (mg/L)	>0.1	1.99	1.99	2.04	14.82
Temperature (°C)	> 60	15.4	17.1	16.0	14.4
Turbidity (NTUS)	1.26	1.91	1.43	2.60	19.10
Redox (millivolts)	-120	117	-127	131	173

Piezometer Samples			
Location	PZ-16RR	PZ-17RR	PZ-18R
Date	8/26/2008	8/26/2008	8/26/2008
Depth to Water (ft)	3.07	2.32	2.02
pH (standard units)	7.41	7.57	7.16
Conductivity (µS/cm)	2570	1730	776
Dissolved Oxygen (mg/L)	17.55	15.91	10.01
Temperature (°Celcius)	16.44	18.46	17.39
Turbidity (NTU)	23.8	15.5	3.81
Redox (millivolts)	-151	-118	-134

Notes:
ft - feet
µS/cm - microSiemens per centimeter
mg/L - milligrams per liter
NTU - Nephelometric Turbidity Units

Prepared by: CTM 09/15/08
Checked by: DLC 11/03/08

Table 4
Groundwater Laboratory Analytical Program
Slurry Wall/Cap Monitoring Program
Third 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 11/04/08
Checked by: KJC 11/05/08

Table 5
Final Field Parameters for Surface Water Sampling
Slurry Wall/Cap Monitoring Program
Third 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	8/27/2008	8/27/2008	8/27/2008	8/27/2008	8/27/2008	8/27/2008	8/27/2008
Depth of Water (ft)	1.0	0.4	0.5	0.5	0.7	1.5	0.6
pH (standard units)	6.56	6.36	5.79	6.63	6.59	6.94	6.68
Conductivity (µS/cm)	1540	2190	271	1900	1860	1550	1840
Dissolved oxygen (mg/L)	>20	>20	>20	>20	>20	>20	>20
Temperature (°Celcius)	17.99	15.07	15.14	16.98	17.93	17.21	18.05
Turbidity (NTU)	14.1	41.2	8.66	68	26.9	8.95	27.0
Redox (millivolts)	132	0.0	-33	-13	-13	112	-14

Notes:
ft - feet
µS/cm - microSiemens per centimeter
mg/L - milligrams per liter
NTU - Nephelometric Turbidity Units

Prepared by: CTM 09/12/08
Checked by: DLC 11/03/08

Table 6
Surface Water Analytical Program
Slurry Wall/Cap Monitoring Program
Third 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 11/04/08
Checked by: KJC 11/05/08

Table 7
Groundwater Elevations
Plant B Monitoring Program
Third 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	11.99	NPD	NA	78.49	8/25/2008
B-3	90.32	11.51	NPD	NA	78.81	8/25/2008
B-5R	91.38	11.78	NPD	NA	79.60	8/25/2008
B-7A	88.81	8.15	NPD	NA	80.66	8/25/2008
B-17	91.55	9.64	NPD	NA	81.91	8/25/2008
GW-13	90.57	11.78	NPD	NA	78.79	8/25/2008
GW-14	88.70	9.56	NPD	NA	79.14	8/25/2008
GW-15	90.01	9.06	NPD	NA	80.95	8/25/2008
GW-16R	92.46	10.91	NPD	NA	81.55	8/25/2008
GW-23	91.04	12.75	12.58	0.17	78.45	8/25/2008
GW-52S	87.95	8.97	NPD	NA	78.98	8/25/2008
GW-100	90.15	11.88	NPD	NA	78.27	8/25/2008
GW-101	90.14	12.00	NPD	NA	78.14	8/25/2008
GW-102	89.00	10.80	NPD	NA	78.20	8/25/2008
IW-1	90.71	12.03	NPD	NA	78.68	8/25/2008
IW-2	90.53	13.09	13.08	<0.01	77.44	8/25/2008
IW-3	90.76	11.94	11.93	<0.01	78.82	8/25/2008
IW-6	89.15	11.11	NPD	NA	78.04	8/25/2008
IW-7	90.10	12.08	NPD	NA	78.02	8/25/2008
IW-8	89.94	11.86	NPD	NA	78.08	8/25/2008
IW-9	89.78	11.61	NPD	NA	78.17	8/25/2008
IW-10	90.43	12.16	NPD	NA	78.27	8/25/2008
IW-11	89.92	13.35	13.33	0.02	76.59	8/25/2008
IW-12	90.31	13.69	13.68	0.01	76.63	8/25/2008
IW-13	89.90	17.21	17.20	<0.01	72.69	8/25/2008
PID	89.97	12.08	12.07	<0.01	77.89	8/25/2008
P5	90.45	12.12	12.11	<0.01	78.33	8/25/2008
12-IN	89.84	11.25	11.24	<0.01	78.59	8/25/2008
SG	79.25	---	---	NA	NA	NA

Prepared by: CTM 09/12/08
Checked by: DLC 11/03/08

Notes:
(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
SG - Staff gauge missing

Table 8
Final Field Parameters for Groundwater Sampling
Plant B Monitoring Program
Third Quarter 2008 Sampling Event
Olin Chemical Superfund Site
Wilmington, Massachusetts

Quarterly Plant B Monitoring Wells	
Location	GW-16R
Date	8/26/2008
Depth to Water (ft)	10.99
pH (standard units)	6.53
Conductivity (µS/cm)	291
Dissolved oxygen (mg/L)	10.76
Temperature (°Celcius)	17.87
Turbidity (NTU)	3.28
Redox (millivolts)	-24

Notes:
ft - feet
µS/cm - microSiemens per centimeter
mg/L - milligrams per liter
NTU - Nephelometric Turbidity Units

Prepared by: CTM 09/15/08
Checked by: DLC 11/03/08

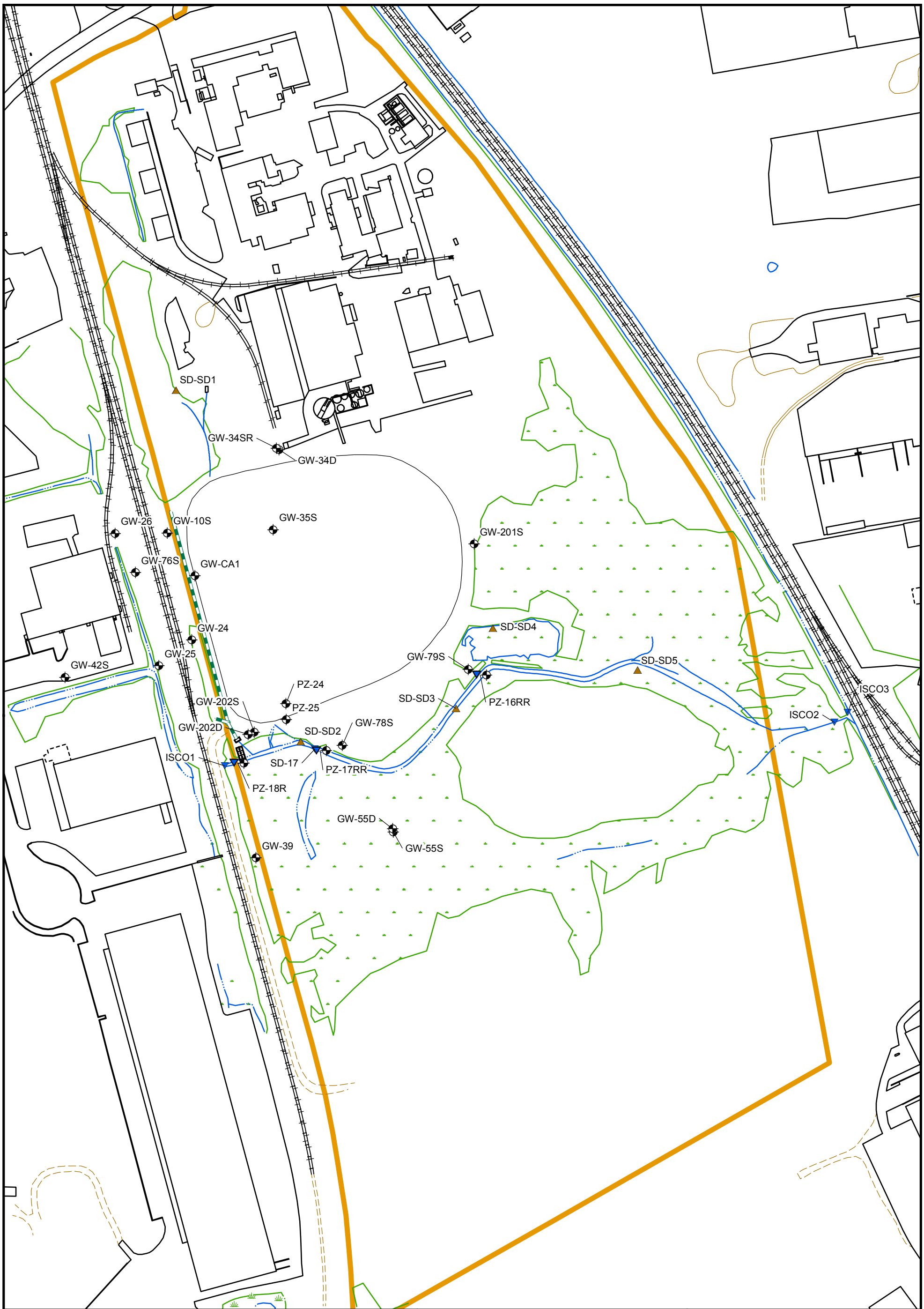
Table 9
Groundwater Laboratory Analytical Program
Plant B Monitoring Program
Third Quarter 2008 Sampling Event
Olin Chemical Superfund Site
Wilmington, Massachusetts

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 11/04/08
Checked by: KJC 11/05/08

FIGURES



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

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

N

0 85 170 340 Feet

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

Prepared/Date: BJR 06/10/08 | Checked/Date: CTM 06/10/08

Document: P:\OLIN\Wilmington\GIS\MapDocuments\Interim Response Work Plan\Olin_IRWP2.mxd PDF: P:\OLIN\Wilmington\2008 Quarterly Sampling\March Quarterly Sampling\Report\Figure 1 - SWC Sampling Locations.pdf 06/10/2008 9:26 AM bjroden

Legend

- Monitoring Well
- Seam

R-# = Previous repair
W-# = Water pooling
S-# = Sandbag recommended for replacement
P-# = Perferation

MACTEC

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

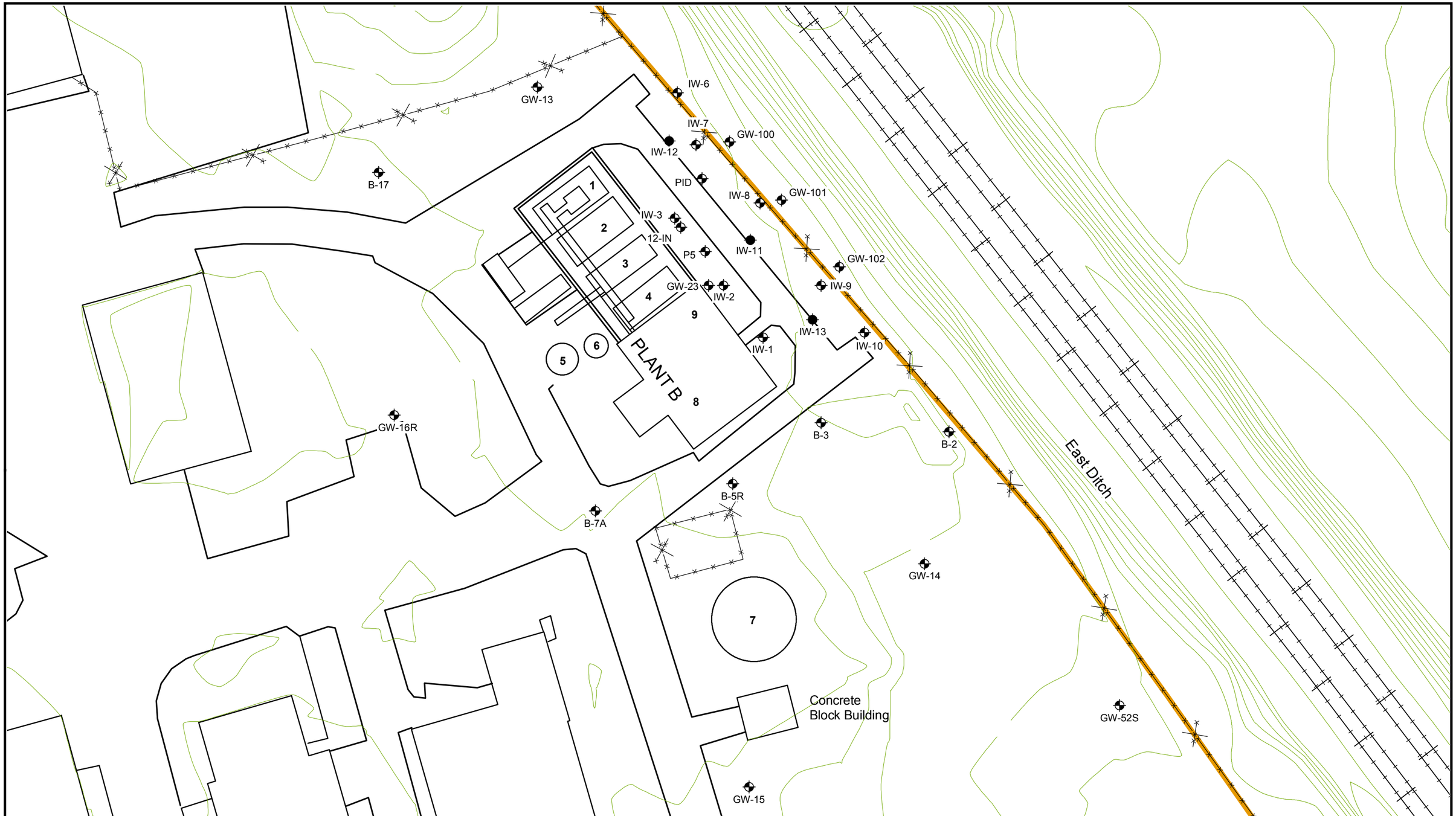
N

0 30 60 120 Feet

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

Prepared by BJR | Checked by CTM

Document: P:\OLIN\Wilmington\GIS\MapDocuments\Olin_11X17_LS.mxd PDF: P:\OLIN\Wilmington\2008 Quarterly Sampling\August Quarterly\Report\Figures\Figure 2 - Third Quarter 2008 Temporary Cap Inspection Observations.pdf 09/17/2008 4:25 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

MACTEC

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

N

0 15 30 60 Feet

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

Prepared/Date: BJR 10/28/08 | Checked/Date: CTM 10/28/08

Document: P:\OLIN\Wilmington\GIS\MapDocuments\Interim Response Work Plan\Olin_PlantB_11X17_LS.mxd PDF: P:\OLIN\Wilmington\2008 Quarterly Sampling\August Quarterly\Report\Figures\Figure 3 - Plant B Monitoring Program Sampling Locations.pdf 12/02/2008 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	GW-16R	ROUND NO.	3
SAMPLE ID	GW-16R	SITE TYPE	Superfund	DATE	8/26/2008
TIME	START 13:50 END 15:20	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): N/A FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 10.99 FT.

WELL DEPTH (TOR): 17.18 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 11.62 FT.

SCREEN LENGTH: "See Survey" FT.

PID WELL MOUTH: N/A PPM

DRAWDOWN VOLUME: 0.101 FT.
(initial - final x 0.16 (2-inch) or x 0.65 (4-inch))

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED: 0.022

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 4.68 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.

WELL INTEGRITY:

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

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 unit)	DISS. O2 (mg/L) (10%)	TURBIDITY (NTU) (10%) (0-2)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH	COMMENTS
14:02	11.62	200	17.61	295	6.57	19.89	41.30	-24	15.5	
14:07	11.62	200	17.65	292	6.55	17.99	36.20	-20	15.5	
14:12	11.62	200	17.77	290	6.53	15.87	28.30	-16	15.5	
14:17	11.62	200	17.71	290	6.52	14.69	17.30	-16	15.5	
14:22	11.62	200	17.59	291	6.51	13.78	12.00	-17	15.5	
14:27	11.62	200	17.63	291	6.51	12.56	9.70	-19	15.5	
14:30	11.62	200	17.71	291	6.51	12.09	8.65	-20	15.5	
14:33	11.62	200	17.67	291	6.51	11.92	6.27	-20	15.5	
14:36	11.62	200	17.67	291	6.51	10.06	3.55	-22	15.5	
14:49	11.62	200	17.88	291	6.52	10.66	3.38	-23	15.5	
14:52	11.62	200	17.87	291	6.53	10.76	3.28	-24	15.5	
14:55	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
[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: 4.68

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	GW-25	ROUND NO.	3
SAMPLE ID	GW-25	SITE TYPE	Superfund	DATE	8/26/2008
TIME	START 12:35 END 13:20	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): N/A FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 5.36 FT.

WELL DEPTH (TOR): 14.45 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 5.38 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: 0.0013

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 2.63 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 unit)	DISS. O2 (mg/L) (10%)	TURBIDITY (NTU) (10%) (0-2)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH	COMMENTS
12:45	5.38	225	> 60	159	6.38	< 1	1.88	-162	13.0	Temperature Reading Inaccurate
12:50	5.38	225	> 60	161	6.34	< 1	1.22	-151	13.0	
12:55	5.38	225	> 60	122	6.37	< 1	1.57	-134	13.0	
13:00	5.38	225	> 60	121	6.36	< 1	1.26	-127	13.0	
13:05	5.38	225	> 60	121	6.35	< 1	1.19	-123	13.0	
13:10	5.38	225	> 60	120	6.33	< 1	1.26	-120	13.0	
13:15	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: 2.63

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	GW-78S	ROUND NO.	3
SAMPLE ID	GW-78S	SITE TYPE	Superfund	DATE	8/26/2008
TIME	START 10:40 END 11:40	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): N/A FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 4.66 FT.

WELL DEPTH (TOR): 10.14 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 4.70 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: 0.0066 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: 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 unit)	DISS. O2 (mg/L) (10%)	TURBIDITY (NTU) (10%) (0-2)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH	COMMENTS
10:45	4.87	200	15.80	1380	5.41	4.74	88.10	109	8.0	
10:50	4.87	200	16.90	1360	5.39	2.73	60.10	116	8.0	
10:55	4.87	200	15.50	1330	5.39	2.48	35.60	119	8.0	
11:00	4.87	200	15.70	1320	5.39	2.18	11.20	121	8.0	
11:05	4.87	200	15.80	1320	5.39	2.15	7.30	120	8.0	
11:10	4.87	200	15.70	1310	5.39	2.05	3.16	119	8.0	
11:15	4.87	200	15.70	1310	5.40	1.98	1.95	119	8.0	
11:20	4.87	200	15.40	1290	5.40	2.08	1.88	118	8.0	
11:25	4.87	200	15.40	1290	5.39	1.99	1.91	117	8.0	
11:30	Sample Collected									

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

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 3.12

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	GW-79S	ROUND NO.	3
SAMPLE ID	GW-79S	SITE TYPE	Superfund	DATE	8/26/2008
TIME	START 8:50 END 9:50	JOB NUMBER	6100-08-0016.04	BOTTLE TIME	9:40

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: GW-79S DUP

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

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

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 3.91 FT.

WELL DEPTH (TOR): 11.23 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 4.12 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: 0.034 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: 3.12 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 unit)	DISS. O2 (mg/L) (10%)	TURBIDITY (NTU) (10%) (0-2)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH	COMMENTS
9:00	3.93	200	16.60	2890	5.66	1.71	8.61	-103	10.0	
9:05	3.94	200	16.40	2980	5.61	1.80	5.36	-108	10.0	
9:10	4.11	200	16.30	3110	5.58	1.88	4.55	-111	10.0	
9:15	4.12	200	16.30	3008	5.58	1.84	3.80	-116	10.0	
9:20	4.12	200	18.20	3060	5.58	1.77	3.75	-119	10.0	
9:25	4.12	200	16.70	2960	5.60	1.91	1.53	-122	10.0	
9:30	4.12	200	17.10	2890	5.61	1.96	1.41	-125	10.0	
9:35	4.12	200	17.10	2860	5.62	1.99	1.43	-127	10.0	
9:40	Sample Collected									Dup 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: 3.12

NOTES

Dup Collected

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	GW-202S	ROUND NO.	3
SAMPLE ID	GW-202S	SITE TYPE	Superfund	DATE	8/25/2008
TIME	START 15:10 END 15:45	JOB NUMBER	6100-08-0016.04	BOTTLE TIME	15:45

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): 1.8 FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 6.54 FT.

WELL DEPTH (TOR): 13.35 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 6.54 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 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: 1.14 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 unit)	DISS. O2 (mg/L) (10%)	TURBIDITY (NTU) (10%) (0-2)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH	COMMENTS
15:10	Pump On	125								
15:18	6.54	125	17.1	1680	5.78	3.26	14.20	133	10.0	
15:23	6.54	125	16.9	1680	5.74	3.59	14.50	127	10.0	
15:28	6.54	125	16.3	1680	5.73	2.61	8.14	128	10.0	
15:33	6.54	125	16.2	1680	5.71	2.09	3.84	130	10.0	
15:36	6.54	125	16.1	1680	5.71	2.05	3.27	130	10.0	
15:39	6.54	125	16.1	1680	5.73	2.04	2.55	130	10.0	
15:42	6.54	125	16.0	1680	5.72	2.04	2.60	131	10.0	
15:45	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: 1.14

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	GW-202D	ROUND NO.	3
SAMPLE ID	GW-202D	SITE TYPE	Superfund	DATE	8/25/2008
TIME	START 15:20 END 16:10	JOB NUMBER	6100-08-0016.04	BOTTLE TIME	16:05

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: N/A FT.

INITIAL DEPTH TO WATER: 5.98 FT.

WELL DEPTH (TOR): 23.89 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 2 IN.

FINAL DEPTH TO WATER: 6.12 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: 0.022 FT.
(initial - final x 0.16 (2-inch) or x 0.65 (4-inch))

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED: 0.005

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 4.55 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 unit)	DISS. O2 (mg/L) (10%)	TURBIDITY (NTU) (10%) (0-2)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH	COMMENTS
15:25	6.11	350	14.79	7020	5.04	> 20	79.20	164	22.0	
15:30	6.12	350	14.36	5130	5.04	19.10	42.90	167	22.0	
15:35	6.12	350	14.30	5030	5.02	17.44	33.90	169	22.0	
15:40	6.12	350	14.26	4900	5.02	16.01	22.50	170	22.0	
15:45	6.12	350	14.30	4920	5.03	14.97	18.10	171	22.0	
15:50	6.12	350	14.21	4910	5.04	14.71	19.00	172	22.0	
15:55	6.12	350	14.29	4920	5.07	14.90	19.70	173	22.0	
15:58	6.12	350	14.39	4970	5.09	14.82	19.10	173	22.0	
16:05	Sample Collected									

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

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: 4.55

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	PZ-16RR	ROUND NO.	3
SAMPLE ID	PZ-16RR	SITE TYPE	Superfund	DATE	8/26/2008
TIME	START 8:46 END 9:15	JOB NUMBER	6100-08-0016.04	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): 2.92 FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 3.07 FT.

WELL DEPTH (TOR): 6.02 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: 0.121 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: 0.36 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 unit)	DISS. O2 (mg/L) (10%)	TURBIDITY (NTU) (10%) (0-2)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH	COMMENTS
8:46	Pump On									
8:48	-	-	16.94	2340	8.47	19.99	136	-221	6.02	
8:49	Well Dry									
8:57	-	-	16.49	2540	7.55	17.72	18.4	-164	6.02	
8:59	Well Dry									
9:07	-	-	16.44	2570	7.41	17.55	23.80	-151	6.02	
9:15	Sample Collected									

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

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: 0.36

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	PZ-17RR	ROUND NO.	3
SAMPLE ID	PZ-17RR	SITE TYPE	Superfund	DATE	8/26/2008
TIME	START 10:38 END 11:15	JOB NUMBER	6100-08-0016.04	BOTTLE TIME	11:15

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): 3.67 FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 2.32 FT.

WELL DEPTH (TOR): 6.02 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: 0.15 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: 0.46 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 unit)	DISS. O2 (mg/L) (10%)	TURBIDITY (NTU) (10%) (0-2)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH	COMMENTS
10:38	Pump On									
10:42	-	-	17.63	1450	8.77	19.10	244	-242	6.02	
10:43	Well Dry									
10:49	-	-	18.35	1790	7.62	17.59	63.7	-129	6.02	
10:51	Well Dry									
11:00	-	-	18.46	1730	7.57	15.91	15.50	-118	6.02	
11:15	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: 0.46

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	PZ-18R	ROUND NO.	3
SAMPLE ID	PZ-18R	SITE TYPE	Superfund	DATE	8/26/2008
TIME	START 12:00 END 12:50	JOB NUMBER	6100-08-0016.04	BOTTLE TIME	12:40

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): 3.15 FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 2.02 FT.

WELL DEPTH (TOR): 6.22 FT.

PID AMBIENT AIR: N/A PPM

WELL DIAMETER: 1 IN.

FINAL DEPTH TO WATER: 2.06 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: 0.0016 FT.
(initial - final x 0.16 (2-inch) or x 0.65 (4-inch))

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED: 0.0028

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 3.90 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 unit)	DISS. O2 (mg/L) (10%)	TURBIDITY (NTU) (10%) (0-2)	ORP/Eh (mV) (+/- 10 mV)	SAMPLE DEPTH	COMMENTS
12:00	Pump On									
12:10	2.06	300	17.31	796	7.45	15.93	28.20	-170	6.0	
12:15	2.06	300	17.40	779	7.28	13.92	22.30	-151	6.0	
12:20	2.06	300	17.34	779	7.22	12.16	8.23	-149	6.0	
12:25	2.06	300	17.35	776	7.20	11.35	4.58	-140	6.0	
12:30	2.06	300	17.34	777	7.18	10.64	3.32	-137	6.0	
12:33	2.06	300	17.34	776	7.17	10.33	3.52	-135	6.0	
12:36	2.06	300	17.39	776	7.16	10.01	3.55	-134	6.0	
12:40	Sample Collected									

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

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: 3.9

NOTES

SIGNATURE:

LOCATION SKETCH

MACTEC

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - SURFACE WATER/ SEDIMENT SAMPLING

PROJECT: OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA
JOB NUMBER: 6100-08-0016.04
DATE: 8/27/2008

FIELD SAMPLE NUMBER: ISCO-1
ACTIVITY TIME: START 10:45 END 10:55
BOTTLE TIME: 10:50

QC SAMPLES COLLECTED: NA

SURFACE WATER DATA

WATER DEPTH AT LOCATION: 1.0 FT
SPEC. COND: 1,540 µS/cm
DEPTH OF SAMPLE FROM SURFACE: 0.5 FT
D.O.: < 20 mg/L
TEMPERATURE: 17.99 DEG C
SALINITY: < 0.1 %
TURBIDITY: 14.1 NTU
ORP: 132 mV
PH: 6.56 UNITS

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

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

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
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:

RECEIVED BY:

Created By: CTM 9/12/08
Checked By:

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - SURFACE WATER/ SEDIMENT SAMPLING

PROJECT: OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA
JOB NUMBER: 6100-08-0016.04
DATE: 8/27/2008

FIELD SAMPLE NUMBER: ISCO-2
ACTIVITY TIME: START 9:20 END 9:30
BOTTLE TIME: 9:25

QC SAMPLES COLLECTED: NA

SURFACE WATER DATA

WATER DEPTH AT LOCATION: 0.4 FT
SPEC. COND: 2,190 µS/cm
DEPTH OF SAMPLE FROM SURFACE: 0.2 FT
D.O.: < 20 mg/L
TEMPERATURE: 15.07 DEG C
SALINITY: < 0.1 %
TURBIDITY: 41.2 NTU
ORP: 0 mV
PH: 6.36 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 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:

RECEIVED BY:

Created By: CTM 9/12/08
Checked By:

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - SURFACE WATER/ SEDIMENT SAMPLING

PROJECT: OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA
JOB NUMBER: 6100-08-0016.04
DATE: 8/27/2008
FIELD SAMPLE NUMBER: ISCO-3
ACTIVITY TIME: START 9:05 END 9:15
BOTTLE TIME: 9:10
QC SAMPLES COLLECTED: NA

SURFACE WATER DATA

WATER DEPTH AT LOCATION: 0.5 FT
SPEC. COND: 271 µS/cm
DEPTH OF SAMPLE FROM SURFACE: 0.3 FT
D.O.: < 20 mg/L
TEMPERATURE: 15.14 DEG C
SALINITY: < 0.1 %
TURBIDITY: 8.66 NTU
ORP: -33 mV
PH: 5.79 UNITS

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

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

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 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:

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Created By: CTM 9/12/08
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MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - SURFACE WATER/ SEDIMENT SAMPLING

PROJECT: OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA
JOB NUMBER: 6100-08-0016.04
DATE: 8/27/2008

FIELD SAMPLE NUMBER: PZ-16RR
ACTIVITY TIME: START 9:45 END 9:55
BOTTLE TIME: 9:50

QC SAMPLES COLLECTED: NA

SURFACE WATER DATA

WATER DEPTH AT LOCATION: 0.5 FT
SPEC. COND: 1,900 µS/cm
DEPTH OF SAMPLE FROM SURFACE: 0.3 FT
D.O.: < 20 mg/L
TEMPERATURE: 16.98 DEG C
SALINITY: < 0.1 %
TURBIDITY: 68 NTU
ORP: -13 mV
PH: 6.63 UNITS

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

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

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
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:

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MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - SURFACE WATER/ SEDIMENT SAMPLING

PROJECT: OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA
JOB NUMBER: 6100-08-0016.04
DATE: 8/27/2008
FIELD SAMPLE NUMBER: PZ-17RR
ACTIVITY TIME: START 10:08 END 10:15
BOTTLE TIME: 10:10
QC SAMPLES COLLECTED: NA

SURFACE WATER DATA

WATER DEPTH AT LOCATION: 0.7 FT
SPEC. COND: 1,860 µS/cm
DEPTH OF SAMPLE FROM SURFACE: 0.3 FT
D.O.: < 20 mg/L
TEMPERATURE: 17.93 DEG C
SALINITY: < 0.1 %
TURBIDITY: 26.9 NTU
ORP: -13 mV
PH: 6.59 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
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: _____

RECEIVED BY: _____

Created By: CTM 9/12/08
Checked By:

MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - SURFACE WATER/ SEDIMENT SAMPLING

PROJECT: OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA
JOB NUMBER: 6100-08-0016.04
DATE: 8/27/2008
FIELD SAMPLE NUMBER: PZ-18R
ACTIVITY TIME: START 10:35 END 10:42
BOTTLE TIME: 10:37
QC SAMPLES COLLECTED: PZ-18R DUP

SURFACE WATER DATA

WATER DEPTH AT LOCATION: 1.5 FT
SPEC. COND: 1,550 µS/cm
DEPTH OF SAMPLE FROM SURFACE: 0.75 FT
D.O.: < 20 mg/L
TEMPERATURE: 17.21 DEG C
SALINITY: < 0.1 %
TURBIDITY: 8.95 NTU
ORP: 112 mV
PH: 6.94 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
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

Dup Collected

SIGNATURE: _____

RECEIVED BY: _____

Created By: CTM 9/12/08
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MACTEC ENGINEERING AND CONSULTING, INC.

FIELD DATA RECORD - SURFACE WATER/ SEDIMENT SAMPLING

PROJECT: OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA
JOB NUMBER: 6100-08-0016.04
DATE: 8/27/2008

FIELD SAMPLE NUMBER: SD-17
ACTIVITY TIME: START 10:20 END 10:30
BOTTLE TIME: 10:25

QC SAMPLES COLLECTED: NA

SURFACE WATER DATA

WATER DEPTH AT LOCATION: 0.6 FT
SPEC. COND: 1,840 µS/cm
DEPTH OF SAMPLE FROM SURFACE: 0.3 FT
D.O.: < 20 mg/L
TEMPERATURE: 18.05 DEG C
SALINITY: < 0.1 %
TURBIDITY: 27 NTU
ORP: -14 mV
PH: 6.68 UNITS

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

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

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
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: _____

RECEIVED BY: _____

Created By: CTM 9/12/08
Checked By:

MACTEC ENGINEERING AND CONSULTING

FIELD INSTRUMENTATION CALIBRATION RECORD

PROJECT **Olin Chemical Superfund Site** DATE **8/25/2008**

CREW ID OR TASK ID **Third Quarter 2008 (GW - 4300)** JOB NUMBER **6100-08-0016**

SAMPLER SIGNATURE David Chapman/ Mark Maggiore

EQUIPMENT CALIBRATION

		CALIBRATION INFORMATION					ACCEPTANCE
		STANDARD VALUE			METER VALUE		CRITERIA **
HORIBA MODEL NO. U-22	pH	4.00	units	pH	4.01	units	+/- 10% of standard
UNIT ID NO MO95-08	Sp. Conductivity	4.49	mS/cm	Sp. Conductivity	4.51	mS/cm	+/- 10% of standard
	Redox	-	mV	Redox	263	mV	see note 1
	DO	-	mg/L *	DO	8.23	mg/L	+/- 10% of standard
	Thermometer Temperature	-	deg. C	Temperature	27.9	deg. C	+/- 2.0 deg. C
TURBIDITY METER TYPE Hach		<0.1	NTU		0.24	NTU	within 0.3 NTU of
MODEL NO. 2100P		20	NTU		20.0	NTU	the standard
UNIT ID NO. MO24-16		100	NTU		97.8	NTU	+/- 10% of standard
		800	NTU		786	NTU	
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		
Deionized Water Source:	Bottled DI		Calibration Fluids/ Standard Source:	Auto-Cal Solution (2/8/09)
Trip Blank Water Source:	Lab Provided		Lot Numbers pH	6141
Sample Preservatives Source:	Lab Provided		mV	6141
Disposable Filter Type:	0.45 micron Field Filter		Sp. Cond.	6141
Other			Turb.	Cal Set

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 **8/25/2008**

CREW ID OR TASK ID **Third Quarter 2008 (GW - 4300)** JOB NUMBER **6100-08-0016**

SAMPLER SIGNATURE David Chapman/ Mark Maggiore

EQUIPMENT CALIBRATION

CALIBRATION INFORMATION

		STANDARD VALUE		METER VALUE		ACCEPTANCE CRITERIA **
HORIBA MODEL NO. U-22	pH	4.00	units	4.04	units	+/- 10% of standard
UNIT ID NO MO15-04	Sp. Conductivity	4.49	mS/cm	4.48	mS/cm	+/- 10% of standard
	Redox	-	mV	187	mV	see note 1
	DO	-	mg/L *	7.84	mg/L	+/- 10% of standard
	Thermometer Temperature	-	deg. C	28.79	deg. C	+/- 2.0 deg. C
TURBIDITY METER TYPE Hach		<0.1	NTU	0.30	NTU	within 0.3 NTU of
MODEL NO. 2100P		20	NTU	19.9	NTU	the standard
UNIT ID NO. MO24-13		100	NTU	99.3	NTU	+/- 10% of standard
		800	NTU	791	NTU	
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
Deionized Water Source:	Bottled DI	
Trip Blank Water Source:	Lab Provided	
Sample Preservatives Source:	Lab Provided	
Disposable Filter Type:	0.45 micron Field Filter	
Other		

Calibration Fluids/ Standard Source: Auto-Cal Solution (2/8/09)

Lot Numbers pH 6141

mV 6141

Sp. Cond. 6141

Turb. Cal Set 13

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 **8/26/2008**

CREW ID OR TASK ID **Third Quarter 2008 (GW - 4300)** JOB NUMBER **6100-08-0016**

SAMPLER SIGNATURE David Chapman/ Mark Maggiore

EQUIPMENT CALIBRATION

		CALIBRATION INFORMATION					ACCEPTANCE
		STANDARD VALUE		METER VALUE			CRITERIA **
HORIBA MODEL NO. U-22	pH	4.00	units	pH	4.12	units	+/- 10% of standard
UNIT ID NO MO15-08	Sp. Conductivity	4.49	mS/cm	Sp. Conductivity	4.49	mS/cm	+/- 10% of standard
	Redox	-	mV	Redox	249	mV	see note 1
	DO	-	mg/L *	DO	9.21	mg/L	+/- 10% of standard
	Thermometer Temperature	-	deg. C	Temperature	19.8	deg. C	+/- 2.0 deg. C
TURBIDITY METER TYPE Hach		<0.1	NTU		0.22	NTU	within 0.3 NTU of
MODEL NO. 2100P		20	NTU		20.3	NTU	the standard
UNIT ID NO. MO24-16		100	NTU		101	NTU	+/- 10% of standard
		800	NTU		793	NTU	
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
Deionized Water Source:	Bottled DI	
Trip Blank Water Source:	Lab Provided	
Sample Preservatives Source:	Lab Provided	
Disposable Filter Type:	0.45 micron Field Filter	
Other		

Calibration Fluids/

Standard Source: Auto-Cal Solution (2/8/09)

Lot Numbers pH 6141

mV 6141

Sp. Cond. 6141

Turb. Cal Set 13

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 **8/26/2008**

CREW ID OR TASK ID **Third Quarter 2008 (GW - 4300)** JOB NUMBER **6100-08-0016**

SAMPLER SIGNATURE David Chapman/ Mark Maggiore

EQUIPMENT CALIBRATION

CALIBRATION INFORMATION

		STANDARD VALUE		METER VALUE		ACCEPTANCE CRITERIA **
HORIBA MODEL NO. U-22	pH	4.00	units	pH 3.99	units	+/- 10% of standard
UNIT ID NO MO15-04	Sp. Conductivity	4.49	mS/cm	Sp. Conductivity 4.49	mS/cm	+/- 10% of standard
	Redox	-	mV	Redox 212	mV	see note 1
	DO	-	mg/L *	DO 9.21	mg/L	+/- 10% of standard
	Thermometer Temperature	-	deg. C	Temperature 19.75	deg. C	+/- 2.0 deg. C
TURBIDITY METER TYPE Hach		<0.1	NTU	0.17	NTU	within 0.3 NTU of
MODEL NO. 2100P		20	NTU	20.4	NTU	the standard
UNIT ID NO. MO24-13		100	NTU	100	NTU	+/- 10% of standard
		800	NTU	792	NTU	
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
Deionized Water Source:	Bottled DI	
Trip Blank Water Source:	Lab Provided	
Sample Preservatives Source:	Lab Provided	
Disposable Filter Type:	0.45 micron Field Filter	
Other		

Calibration Fluids/ Standard Source: Auto-Cal Solution (2/8/09)

Lot Numbers pH 6141

mV 6141

Sp. Cond. 6141

Turb. Cal Set 13

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 **8/27/2008**

CREW ID OR TASK ID **Third Quarter 2008 (SW - 4300)** JOB NUMBER **6100-08-0016**

SAMPLER SIGNATURE David Chapman/ Mark Maggiore

EQUIPMENT CALIBRATION

		CALIBRATION INFORMATION					ACCEPTANCE
		STANDARD VALUE			METER VALUE		CRITERIA **
HORIBA MODEL NO. U-22	pH	4.00	units	pH	3.99	units	+/- 10% of standard
UNIT ID NO MO15-04	Sp. Conductivity	4.49	mS/cm	Sp. Conductivity	4.47	mS/cm	+/- 10% of standard
	Redox	-	mV	Redox	249	mV	see note 1
	DO	-	mg/L *	DO	9.29	mg/L	+/- 10% of standard
	Thermometer Temperature	-	deg. C	Temperature	18.99	deg. C	+/- 2.0 deg. C
TURBIDITY METER TYPE Hach		<0.1	NTU		0.26	NTU	within 0.3 NTU of
MODEL NO. 2100P		20	NTU		21.3	NTU	the standard
UNIT ID NO. MO24-16		100	NTU		100	NTU	+/- 10% of standard
		800	NTU		794	NTU	
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
Deionized Water Source:	Bottled DI	
Trip Blank Water Source:	Lab Provided	
Sample Preservatives Source:	Lab Provided	
Disposable Filter Type:	0.45 micron Field Filter	
Other		

Calibration Fluids/ Standard Source: Auto-Cal Solution (2/8/09)

Lot Numbers pH 6141

mV 6141

Sp. Cond. 6141

Turb. Cal Set 13

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

[illegible]thamp
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
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

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
GW-78S	GW	DLC	8-26-08 11:30	X		3	P		X	X				X	X	X	X		X								
GW-79S	GW	DLC	8-26-08 9:40	X		3	P		X	X				X	X	X	X		X								
GW-25	GW	DLC	8-26-08 13:15	X		3	P		X	X				X	X	X	X		X								
GW-79S DUP	GW	DLC	8-26-08 9:40	X		3	P		X	X				X	X	X	X		X								
GW-202D	GW	DLC	8-25-08 16:05	X		3	P		X	X				X	X	X	X		X								
GW-202S	GW	MAM	8-25-08 15:45	X		3	P		X	X				X	X	X	X		X								
PZ-18R	GW	MAM	8-26-08 12:40	X		3	P		X	X				X	X	X	X		X								
PZ-17RR	GW	MAM	8-26-08	X		3	P		X	X				X	X	X	X		X								
PZ-16RR	GW	MAM	8-26-08 9:15	X		3	P		X	X				X	X	X	X		X								

Sampled by (print): David Chapman / Mark Maggiore
Signature: [signature]

Relinquished by:	Date:	Time:	Received by:	Date:	Time:
David Chapman	8/27/08	1430	[signature]	8/27/08	1430

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

...on Road
Westfield, MA 01085
(P) 413-572-4000
(F) 413-572-3707
STL-WESTFIELD

•149 Rangeway Road
N. Billerica, MA 01862
(P) 978-667-1400
(F) 978-667-7871
STL-BILLERICA

Job#	Quote#	PO#

Client: Olin Chemical/MACTEC
Address: 51 Eames Street
Wilmington, MA 01887
Phone: Fax:

Project #: 61CCC8CC16
Project Manager: Peter Thompson
Work ID: Plant B
Contact: David Chapman

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 Diss. Fe	Other	Other	Other	Other	Other	Other
GW-16R	GW	DLC	8-26-08 14:55			13	V		2																		
							G			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

Dissolved Fe
Sampled.
(Field Filtered)

Sampled by (print): David Chapman
Signature: [signature]

Relinquished by:	Date:	Time:	Received by:	Date:	Time:
David Chapman	8-27-08	1430	[signature]	8/27/08	1430

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

Southampton Road
Westfield, MA 01085
(P) 413-572-4000
(F) 413-572-3707

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 #: 61000E0216
Project Manager: Peter Thompson
Work ID: PCMP
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)	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
1SCC-3	SW	MAM	8-27-08 9:10	X		4	P		X	X				X	X	X	X	X		X							
1SCC-2	SW	DLC	8-27-08 9:25	X		4	P		X	X				X	X	X	X	X		X							
PZ-16RR	SW	MAM	8-27-08 9:50	X		4	P		X	X				X	X	X	X	X		X							
PZ-17RR	SW	MAM	8-27-08 10:10	X		4	P		X	X				X	X	X	X	X		X							
SD-17	SW	DLC	8-27-08 10:25	X		4	P		X	X				X	X	X	X	X		X							
PZ-18R	SW	MAM	8-27-08 10:37	X		4	P		X	X				X	X	X	X	X		X							
PZ-18R-DUP	SW	MAM	8-27-08	X		4	P		X	X				X	X	X	X	X		X							
1SCC-1	SW	DLC	8-27-08	X		4	P		X	X				X	X	X	X	X		X							

Dissolved metals are field filtered.

Groundwater Metals: Dissolved Al/Cr

Surfacewater Metals: Dissolved/Total Al/Cr/Na

SHORT HOLD TIME FOR NITRATE/NITRIT SAMPLES

Sampled by (print): David Chapman / Mark Maggiore
Signature:

Relinquished by: David Chapman Date: 8/27/08 Time: 1430
Received by: Date: 8/27/08 Time: 1430

Relinquished by: Date: Time:
Received by: Date: Time:

Method of shipment:

TestAmerica-Westfield

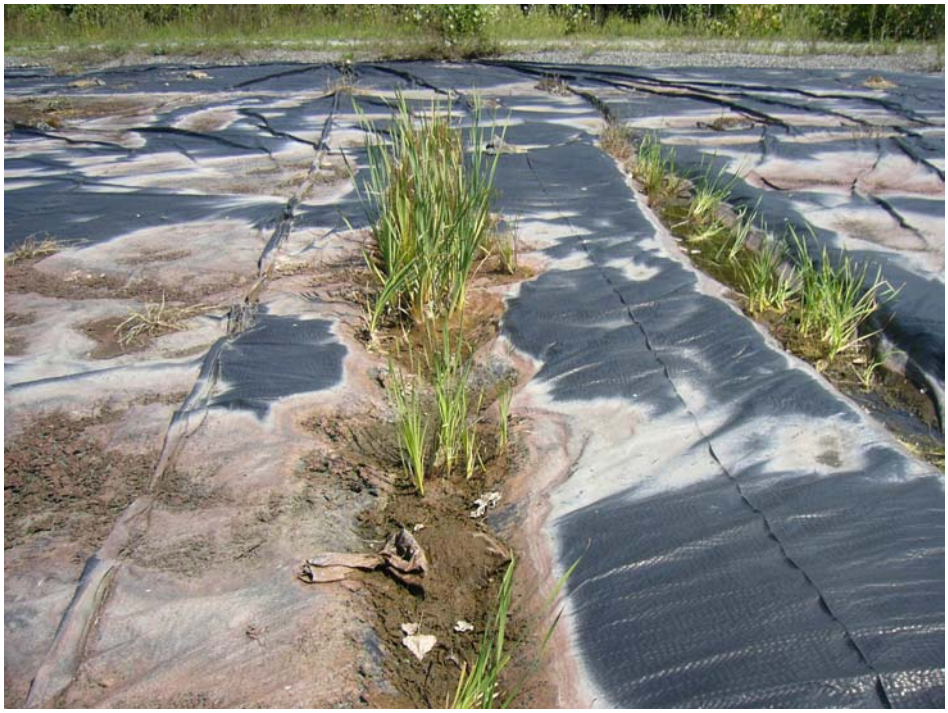
Cooler ? Y / N Samples Iced? Y / N
Temp @ receipt: °C
Preservation/pH checked
By: Date:

White = Lab file Yellow = Report copy Pink = Customer copy
STL-8245 (1000)

APPENDIX C

Third Quarter 2008
Temporary Cap Inspection Photo Log

Photo 1: Vegetation growing on cap.



1

Photo 2: Sandbag recommended for replacement.

2

Photo 3: Cap drainage grate blocked by vegetation.

3

Photo 4: Small perforation in cap material.

4

APPENDIX B

Data Validation Memorandum

B-1 Second Quarter 2008 Sampling Event
B-2 Third Quarter 2008 Sampling Event

APPENDIX B

Data Validation Memorandum

B-1 Second Quarter 2008 Sampling Event

MACTEC Engineering and Consulting, Inc.
107 Audubon Road, Building 2, Suite 301
Wakefield, Massachusetts 01880
Phone No.: (781) 245-6606
FAX No. : (781) 246-5060

FILE COPY

TRANSMITTAL LETTER

To: Stephen G. Morrow, P.E.	Date: July 10, 2008
Olin Corporation	Client: Olin
3855 North Ocoee Street	Project: 51 Eames Street, Wilmington, MA
Suite 200	
Cleveland, Tennessee 37312	MACTEC PN: 6300-08-0016/15A
	Delivery: U.S.P.S.

☒ information ☐ purchasing
☐ estimating ☐ construction
☐ comments and/or approval ☐ see remarks

REMARKS: Enclosed please find the following data validation summary reports for the Olin Chemical Superfund Site, Wilmington, Massachusetts.

Prepared By: Annette Savastano

Number	Revision No.	No. of Copies	Title or Description
1	-	1	Data Validation Report, May 2008 Monthly Plant B RGP, Olin Chemical Superfund Site, Wilmington, Massachusetts, TestAmerica Laboratories Data Set 360-16666-1
2	-	1	Data Validation Report, May 2008 Plant B Quarterly Groundwater, Olin Chemical Superfund Site, Wilmington, Massachusetts, TestAmerica Laboratories Data Set 360-16737-1
3	-	1	Data Validation Report, May 2008 SW/C Surface Water and Groundwater, Olin Chemical Superfund Site, Wilmington, Massachusetts, TestAmerica Laboratories Data Sets 360-16640-1, 360-16696-1, and 360-16742-1

DISTRIBUTION: T = TRANSMITTAL LETTER; C = COPY OF DOCUMENT

	T	C		T	C
Brian Guichard, Olin Wilmington	X	X			
MACTEC Project File	X	X			

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

To: Steve Morrow
From: Chris Ricardi
Date: July 9, 2008
Subject: 51 Eames Street Property Plant B Quarterly Groundwater May 2008

DATA VALIDATION REPORT
MAY 2008 PLANT B QUARTERLY GROUNDWATER
OLIN CHEMICAL SUPERFUND SITE
WILMINGTON, MASSACHUSETTS
TestAmerica Laboratories Data Set 360-16737-1

1.0 INTRODUCTION

Groundwater samples were collected from monitoring well GW-16 on May 23, 2008 as specified for Plant B monitoring quarterly sampling in the Interim Response Step Work Plan (IRSWP). Samples were analyzed by TestAmerica Laboratories in Westfield, Massachusetts. Data were reported in sample delivery group (SDG) 360-16737-1. 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), 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 MA DEP MAVPH
- Dissolved Iron by Method 6010B
- General chemistry analyses for ammonia by EPA Method 350.1 (Lachat 10-107-06-1) and 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 a 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)

Trimethylpentenes were reported by Method 8260B.
Data were reviewed for the following parameters:

* Data Completeness
* Holding Time
* Blanks
* Surrogate Recovery

* Laboratory Control Sample
  Matrix Spike/Matrix Spike Duplicate
* Field Duplicate
* Detection Limits
* Sample Result Verification/Electronic Evaluation Verification

* = indicates that criteria were met for this parameter

Matrix Spike/Matrix Spike Duplicate

Percent recoveries for 2,4,4-trimethyl-2-pentene (60, 62) in the matrix spike/matrix spike duplicate (MS/MSD) associated with both samples were below the control limits of 70-130. Reported detections of 2,4,4-trimethyl-2-pentene in OC-GW-16 and OC-GW-16DUP were qualified as estimated (J) and may represent potential low biases.

3.0 SEMIVOLATILE ORGANIC COMPOUNDS (SVOC)

Bis(2-ethylhexyl)phthalateand 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
* Matrix Spike/Matrix Spike Duplicate
* Detection Limits
* Sample Result Verification/Electronic Evaluation Verification

* = indicates that criteria were met for this parameter

Blanks

Bis(2-Ethylhexyl)phthalate (0.55 µg/L) was reported in the method blank associated with both samples. An action level was calculated at ten times the blank concentration and compared to sample data. Low level detections of bis(2-ethylhexyl)phthalate in OC-GW-16 and OC-GW-16DUP were raised to the reporting limit and qualified as non-detected (U) based on detection in the method blank.

4.0 VOLATILE PETROLEUM HYDROCARBONS (VPH)

Data were reviewed for the following parameters:

* Data Completeness
* Holding Time
* Blanks
* Surrogate Recovery
* Laboratory Control Sample

* Matrix Spike/Matrix Spike Duplicate
  Detection Limits
* Sample Result Verification/Electronic Evaluation Verification

* = indicates that criteria were met for this parameter

Detection Limits

Samples OC-GW-16 and OC-GW-16DUP were analyzed at 5X dilutions due to high target concentrations of C5-C8 Aliphatics (620 µg/L and 900 µg/L, respectively). Target compounds that were not detected have elevated reporting limits.

5.0 DISSOLVED METAL (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

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. Samples OC-GW-16 and OC-GW-16DUP were sampled and received at the lab on May 23, 2008. Samples were analyzed for pH on May 28, 2008. Because the analysis was completed after the holding times were grossly exceeded (>2X hold time) pH results for both samples were qualified rejected (R) in the final results.

Except for the validation actions noted above, the results are interpreted to be usable as reported by TestAmerica.

Chris Ricardi

7/09/08

Chris Ricardi, NRCC-EAC
Senior Chemist

Date

M J Murphy

7/9/08

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, 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), 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; May 2004.

Massachusetts Department of Environmental Protection (MADEP), 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; May 2004.

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.

Table 1
Sample Summary - 360-16737
Data Validation Report
May 2008 Plant B Quarterly Groundwater
Olin Chemical Superfund Site
Wilmington, Massachusetts

Lab Sample ID	Location	Sample ID	Sample Date	SW846 8260B	SW846 8270C	SW846 6010B	QuickChem 10 107-06-1-K	SM 4500 H+ B	MA DEP MAVPH
360-16737-1	GW-16	OC-GW-16	5/23/2008	2	2	1	1	1	13
360-16737-2	GW-16	OC-GW-16 DUP	5/23/2008	2	2	1	1	1	13
360-16737-5	Trip Blank	Trip Blank	5/23/2008	2					13

Notes:
Number listed under method indicates number of target analytes reported.

Prepared by / Date: KJC 07/08/08
Checked by / Date: CSR 07/08/08

Table 2
Final Results Summary
360-16737 Plant B Quarterly Groundwater
Olin Chemical Superfund Site
Wilmington, Massachusetts

			Loc Name	GW-16		GW-16	
			Field Sample Id	OC-GW-16		OC-GW-16 DUP	
			Field Sample Date	05/23/08		05/23/08	
			QC Code	FS		FD	
			Lab Sample Delivery Group	360-16737		360-16737	
Frac	Method	Analyte	Units	Final Result	Final Qual	Final Result	Final Qual
N	SW846 8260B	2,4,4-Trimethyl-1-Pentene	ug/L	840		750	
N	SW846 8260B	2,4,4-Trimethyl-2-Pentene	ug/L	250	J	210	J
N	SW846 8270C	bis(2-EthylHexyl)phthalate	ug/L	5.1	U	5.1	U
N	SW846 8270C	N-Nitrosodiphenylamine	ug/L	570		580	
F	SW846 6010B	Iron, Filtered	mg/L	5		4.9	
N	QuickChem 10-107-06-1-K	Nitrogen, Ammonia	mg/L	6.7		6.4	
N	SM SM 4500 H+ B	pH	SU		R		R
N	MA DEP MAVPH	Benzene	ug/L	25	U	25	U
N	MA DEP MAVPH	Ethylbenzene	ug/L	25	U	25	U
N	MA DEP MAVPH	m,p-Xylene	ug/L	50	U	50	U
N	MA DEP MAVPH	Methyl-t-butyl ether (MTBE)	ug/L	25	U	25	U
N	MA DEP MAVPH	Naphthalene	ug/L	50	U	50	U
N	MA DEP MAVPH	o-Xylene	ug/L	25	U	25	U
N	MA DEP MAVPH	Toluene	ug/L	25	U	25	U
N	MA DEP MAVPH	C5-C8 Aliphatics (FID)	ug/L	620		900	
N	MA DEP MAVPH	C5-C8 Aliphatics, Unadjusted	ug/L	620		900	
N	MA DEP MAVPH	C9-C10 Aromatics (PID)	ug/L	500	U	500	U
N	MA DEP MAVPH	C9-C12 Aliphatics (FID)	ug/L	500	U	500	U
N	MA DEP MAVPH	C9-C12 Aliphatics, Unadjusted	ug/L	500	U	500	U
N	MA DEP MAVPH	VPH Concentration (Total)	ug/L	620		900	

Table 2
Final Results Summary
360-16737 Plant B Quarterly Groundwater
Olin Chemical Superfund Site
Wilmington, Massachusetts

			Loc Name	TRIP BLANK	
			Field Sample Id	Trip Blank	
			Field Sample Date	05/23/08	
			QC Code	TB	
			Lab Sample Delivery Group	360-16737	
Frac	Method	Analyte	Units	Final Result	Final Qual
N	SW846 8260B	2,4,4-Trimethyl-1-Pentene	ug/L	1	U
N	SW846 8260B	2,4,4-Trimethyl-2-Pentene	ug/L	1	U
N	MA DEP MAVPH	Benzene	ug/L	5	U
N	MA DEP MAVPH	Ethylbenzene	ug/L	5	U
N	MA DEP MAVPH	m,p-Xylene	ug/L	10	U
N	MA DEP MAVPH	Methyl-t-butyl ether (MTBE)	ug/L	5	U
N	MA DEP MAVPH	Naphthalene	ug/L	10	U
N	MA DEP MAVPH	o-Xylene	ug/L	5	U
N	MA DEP MAVPH	Toluene	ug/L	5	U
N	MA DEP MAVPH	C5-C8 Aliphatics (FID)	ug/L	100	U
N	MA DEP MAVPH	C5-C8 Aliphatics, Unadjusted	ug/L	100	U
N	MA DEP MAVPH	C9-C10 Aromatics (PID)	ug/L	100	U
N	MA DEP MAVPH	C9-C12 Aliphatics (FID)	ug/L	100	U
N	MA DEP MAVPH	C9-C12 Aliphatics, Unadjusted	ug/L	100	U
N	MA DEP MAVPH	VPH Concentration (Total)	ug/L	100	U

Notes:
N = normal
F = dissolved (filtered)
FS = field sample
FD = field duplicate
TB = trip blank

Prepared by / Date: KJC 07/08/08
Checked by / Date: CSR 07/08/08

JR 6/23/08

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

Job Number: 360-16737-1

Job Description: Plant B

For:
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Attention: Mr. Steven Morrow

Joseph A. Chiesa Jr.

Designee for
Becky C Mason
Project Manager II
becky.mason@testamericainc.com
06/05/2008

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 253903-A, NELAP FL E87912 TOX, NELAP NJ MA008 TOX, NELAP NY 10843, NY DOH 10843.

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

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MADEP MCP Analytical Method Report Certification Form

Laboratory Name:	**TestAmerica Westfield**	Project #:	**360-16737-1**
Project Location:	**Plant B**	MADEP RTN[1]:	

This form provides certifications for the following data set:[list Laboratory Sample ID Number(s)]
360-16737-(1-2, 5)

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: [signature] **Position:** Laboratory Director

Printed Name: Steven C. Hartmann **Date:** 6/5/08 15:46

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 #:	**360-16737-1**
Project Location:	**Plant B**	MADEP RTN[1]:	

This form provides certifications for the following data set:[list Laboratory Sample ID Number(s)]
360-16737-(1-2, 5)

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.

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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: Steven Hartmann **Position:** Laboratory Director

Printed Name: Steven C. Hartmann **Date:** 6/5/08 15:46

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 #:	**360-16737-1**
Project Location:	**Plant B**	MADEP RTN[1]:	

This form provides certifications for the following data set:[list Laboratory Sample ID Number(s)]
360-16737-(1-2)

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: [signature] **Position:** Laboratory Director

Printed Name: Steven C. Hartmann **Date:** 6/5/08 15:46

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 #:	**360-16737-1**
Project Location:	**Plant B**	MADEP RTN[1]:	

This form provides certifications for the following data set:[list Laboratory Sample ID Number(s)]
360-16737-(1-2)

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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: [signature] **Position:** Laboratory Director

Printed Name: Steven C. Hartmann **Date:** 6/5/08 15:46

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 #:	**360-16737-1**
Project Location:	**Plant B**	MADEP RTN[1]:	

This form provides certifications for the following data set:[list Laboratory Sample ID Number(s)]
360-16737-(1-2)

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: Steven Hartmann **Position:** Laboratory Director

Printed Name: Steven C. Hartmann **Date:** 6/5/08 15:46

The certification form has been electronically signed and approved. CAM VII A, Rev 3.2 April-04

CASE NARRATIVE

Client: Olin Corporation

Project: Plant B

Report Number: 360-16737-1

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 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 05/23/2008; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 14.7°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.

VOLATILE ORGANICS

Samples 360-16737-1, 360-16737-2 and 360-16737-5 were analyzed for volatile organics in accordance with EPA SW846 Method 8260B. The samples were analyzed on 05/30/2008.

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:

2,4,4-Trimethyl-1-pentene and 2,4,4-Trimethyl-2-pentene failed the MS/MSD recovery criteria low for the matrix spike and matrix spike duplicate of sample 360-16737-1. The associated LCS and LCSD recovered within control limits. Refer to the QC report for details.

General method information:
Samples 360-16737-1 and 360-16737-2(10X) 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 360-16737-1, 360-16737-2 and 360-16737-5 were analyzed for volatile petroleum hydrocarbons in accordance with MADEP VPH. The samples were analyzed on 05/28/2008.

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:

C5-C8 Aliphatics (unadjusted) failed the MS/MSD recovery criteria high for the matrix spike duplicate of sample 360-16737-1. The associated LCS and LCSD recovered within control limits. Refer to the QC report for details.

General method information:
Samples 360-16737-1 and 360-16737-2(5X) required dilution prior to analysis. The reporting limits have been adjusted accordingly. Dilutions were due to foaming.

SEMIVOLATILE ORGANICS

Samples 360-16737-1 and 360-16737-2 were analyzed for semivolatile organics in accordance with EPA SW846 Method 8270C. The samples were prepared on 05/29/2008 and analyzed on 06/02/2008 and 06/03/2008.

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 MB 360-32500/1-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%.

N-Nitrosodiphenylamine failed the MS/MSD recovery criteria low for the matrix spike duplicate of sample 360-16737-1. The associated LCS and LCSD recovered within control limits. Refer to the QC report for details.

General method information:
Bis(2-ethylhexyl) phthalate was detected in method blank MB 360-32500/1-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.

Samples 360-16737-1 and 360-16737-2(50X) required dilution prior to analysis. The reporting limits have been adjusted accordingly. Dilutions were due to high target concentration. Consequently, for the 50X dilutions, 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

Samples 360-16737-1 and 360-16737-2 were analyzed for dissolved metals in accordance with EPA SW846 Method 6010B. The samples were analyzed on 05/28/2008.

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 360-16737-1 and 360-16737-2 were analyzed for ammonia in accordance with LACHAT 10-107-06-1. The samples were prepared on 06/04/2008 and analyzed on 06/05/2008.

All QC performance standards and recommendations for this specific method were achieved.

PH

Samples 360-16737-1 and 360-16737-2 were analyzed for pH in accordance with SM 4500 H+ B. The samples were analyzed on 05/28/2008.

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: 360-16737-1

Description	Lab Location	Method	Preparation Method
Matrix: Water			
Volatile Organic Compounds (Custom List)	TAL WFD	SW846 8260B	
Purge-and-Trap	TAL WFD		SW846 5030B
MADEP - Volatile Petroleum Hydrocarbons	TAL WFD	MA DEP MAVPH	
Purge-and-Trap	TAL WFD		SW846 5030B
Semivolatile Organic Compounds by GCMS - Low Levels	TAL WFD	SW846 8270C	
Separatory Funnel Liquid-Liquid Extraction	TAL WFD		SW846 3510C
Dissolved Metals	TAL WFD	SW846 6010B	
Sample Filtration performed in the Field	TAL WFD		FIELD_FLTRD
Lachat Ammonia	TAL WFD	QuickChem 10-107-06-1-K	
Distillation/Ammonia	TAL WFD		Distill/Ammonia
pH	TAL WFD	SM SM 4500 H+ B	

Lab References:

TAL WFD = TestAmerica Westfield

Method References:

MA DEP = Massachusetts Department Of Environmental Protection

QuickChem = Lachat Instruments

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: 360-16737-1

Method	Analyst	Analyst ID
SW846 8260B	Tester, Carla	CT
SW846 8270C	Sullivan, Pat J	PJS
MA DEP MAVPH	Rouleau, Catherine M	CMR
SW846 6010B	Balicki, Charles W	CWB
QuickChem 10-107-06-1-K	Lalashius, Andrew L	ALL
SM SM 4500 H+ B	Emerich, Rich W	RWE

SAMPLE SUMMARY

Client: Olin Corporation

Job Number: 360-16737-1

Lab Sample ID	Client Sample ID	Client Matrix	Date/Time Sampled	Date/Time Received
360-16737-1	OC-GW-16	Ground Water	05/23/2008 0950	05/23/2008 1513
360-16737-1MS	OC-GW-16 MS	Ground Water	05/23/2008 0950	05/23/2008 1513
360-16737-1MSD	OC-GW-16 MSD	Ground Water	05/23/2008 0950	05/23/2008 1513
360-16737-2	OC-GW-16 DUP	Ground Water	05/23/2008 0950	05/23/2008 1513
360-16737-5TB	Trip Blank	Water	05/23/2008 0950	05/23/2008 1513

SAMPLE RESULTS

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-16737-1

Client Sample ID: OC-GW-16
Lab Sample ID: 360-16737-1

Date Sampled: 05/23/2008 0950
Date Received: 05/23/2008 1513
Client Matrix: Ground Water

Analyte	Result/Qualifier		Unit	MDL	RL	Dilution
Method: 8260B			Date Analyzed:		05/30/2008 0236	
Prep Method: 5030B			Date Prepared:		05/30/2008 0236	
2,4,4-Trimethyl-1-pentene	840		ug/L	8.1	10	10
2,4,4-Trimethyl-2-pentene	250 J		ug/L	5.0	10	10
Surrogate					Acceptance Limits	
4-Bromofluorobenzene	104		%		70 - 130	
Dibromofluoromethane	108		%		70 - 130	
Toluene-d8 (Surr)	97		%		70 - 130	
Method: 8270C			Date Analyzed:		06/02/2008 1729	
Prep Method: 3510C			Date Prepared:		05/29/2008 1215	
Bis(2-ethylhexyl) phthalate	5.1 u ~~0.91~~	~~J B~~	ug/L	0.42	5.1	1.0
Surrogate					Acceptance Limits	
2,4,6-Tribromophenol	88		%		15 - 110	
2-Fluorobiphenyl	74		%		30 - 130	
2-Fluorophenol	26		%		15 - 110	
Nitrobenzene-d5	74		%		30 - 130	
Phenol-d5	17		%		15 - 110	
Terphenyl-d14	99		%		30 - 130	
Method: 8270C			Date Analyzed:		06/03/2008 1647	
Prep Method: 3510C			Date Prepared:		05/29/2008 1215	
N-Nitrosodiphenylamine	570		ug/L	19	250	50
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:		05/28/2008 1146	
Iron	5000		ug/L	16	100	1.0

JR 6/19/08

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-16737-1

Client Sample ID: OC-GW-16
Lab Sample ID: 360-16737-1

Date Sampled: 05/23/2008 0950
Date Received: 05/23/2008 1513
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: MAVPH		Date Analyzed:		05/28/2008 2136	
Prep Method: 5030B		Date Prepared:		05/28/2008 2136	
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)	620 J	ug/L	500	500	5.0
C9-C12 Aliphatics (unadjusted)	ND	ug/L	500	500	5.0
C5-C8 Aliphatics (adjusted)	620 J	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	620 J	ug/L	500	500	5.0
Surrogate				Acceptance Limits	
2,5-Dibromotoluene (fid)	94	%		70 - 130	
2,5-Dibromotoluene (pid)	117	%		70 - 130	
Method: 10-107-06-1-K		Date Analyzed:		06/05/2008 1019	
Prep Method: Distill/Ammonia		Date Prepared:		06/04/2008 1511	
Ammonia	6.7	mg/L	0.10	0.10	1.0
Method: SM 4500 H+ B		Date Analyzed:		05/28/2008 1032	
pH	R 6.60 J ~~HF~~	SU	0.100	0.100	1.0

*2x HT

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-16737-1

Client Sample ID: OC-GW-16 DUP
Lab Sample ID: 360-16737-2

Date Sampled: 05/23/2008 0950
Date Received: 05/23/2008 1513
Client Matrix: Ground Water

Analyte	Result/Qualifier		Unit	MDL	RL	Dilution
Method: 8260B			Date Analyzed:		05/30/2008 0303	
Prep Method: 5030B			Date Prepared:		05/30/2008 0303	
2,4,4-Trimethyl-1-pentene	750		ug/L	8.1	10	10
2,4,4-Trimethyl-2-pentene	210	J	ug/L	5.0	10	10
Surrogate					Acceptance Limits	
4-Bromofluorobenzene	104		%		70 - 130	
Dibromofluoromethane	107		%		70 - 130	
Toluene-d8 (Surr)	97		%		70 - 130	
Method: 8270C			Date Analyzed:		06/02/2008 1855	
Prep Method: 3510C			Date Prepared:		05/29/2008 1215	
Bis(2-ethylhexyl) phthalate	5.1 U ~~0.68~~	~~J B~~	ug/L	0.42	5.1	1.0
Surrogate					Acceptance Limits	
2,4,6-Tribromophenol	89		%		15 - 110	
2-Fluorobiphenyl	67		%		30 - 130	
2-Fluorophenol	28		%		15 - 110	
Nitrobenzene-d5	74		%		30 - 130	
Phenol-d5	16		%		15 - 110	
Terphenyl-d14	100		%		30 - 130	
Method: 8270C			Date Analyzed:		06/03/2008 1716	
Prep Method: 3510C			Date Prepared:		05/29/2008 1215	
N-Nitrosodiphenylamine	580		ug/L	19	250	50
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:		05/28/2008 1202	
Iron	4900		ug/L	16	100	1.0

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Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-16737-1

Client Sample ID: OC-GW-16 DUP
Lab Sample ID: 360-16737-2

Date Sampled: 05/23/2008 0950
Date Received: 05/23/2008 1513
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: MAVPH		Date Analyzed:		05/28/2008 2210	
Prep Method: 5030B		Date Prepared:		05/28/2008 2210	
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)	900 J	ug/L	500	500	5.0
C9-C12 Aliphatics (unadjusted)	ND	ug/L	500	500	5.0
C5-C8 Aliphatics (adjusted)	900 J	ug/L	500	500	5.0
C9-C12 Aliphatics (adjusted)	ND gr 6/19/08	ug/L	500	500	5.0
C9-C10 Aromatics	ND	ug/L	500	500	5.0
Total VPH	900 J	ug/L	500	500	5.0
Surrogate				Acceptance Limits	
2,5-Dibromotoluene (fid)	93	%		70 - 130	
2,5-Dibromotoluene (pid)	117	%		70 - 130	
Method: 10-107-06-1-K		Date Analyzed:		06/05/2008 1022	
Prep Method: Distill/Ammonia		Date Prepared:		06/04/2008 1511	
Ammonia	6.4	mg/L	0.10	0.10	1.0
Method: SM 4500 H+ B		Date Analyzed:		05/28/2008 1040 > 2x HT	
pH	R 6.68 J ~~HF~~	SU	0.100	0.100	1.0

gr 6/19/08

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-16737-1

Client Sample ID: Trip Blank
Lab Sample ID: 360-16737-5

Date Sampled: 05/23/2008 0950
Date Received: 05/23/2008 1513
Client Matrix: Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: 8260B		Date Analyzed:		05/30/2008 0331	
Prep Method: 5030B		Date Prepared:		05/30/2008 0331	
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	106	%		70 - 130	
Toluene-d8 (Surr)	97	%		70 - 130	

6/19/08

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-16737-1

Client Sample ID: Trip Blank
Lab Sample ID: 360-16737-5

Date Sampled: 05/23/2008 0950
Date Received: 05/23/2008 1513
Client Matrix: Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: MAVPH		Date Analyzed:		05/28/2008 2104	
Prep Method: 5030B		Date Prepared:		05/28/2008 2104	
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)	93	%		70 - 130	
2,5-Dibromotoluene (pid)	117	%		70 - 130	

DATA REPORTING QUALIFIERS

Client: Olin Corporation

Job Number: 360-16737-1

Lab Section	Qualifier	Description
GC/MS VOA		
	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.
GC/MS Semi VOA		
	B	Compound was found in the blank and sample.
	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.
	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.
GC VOA		
	F	MS or MSD exceeds the control limits
General Chemistry		
	HF	Field parameter with a holding time of 15 minutes

QUALITY CONTROL RESULTS

Client: Olin Corporation

Job Number: 360-16737-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
GC/MS VOA					
Analysis Batch:360-32557					
LCS 360-32557/1	Lab Control Spike	T	Water	8260B	
LCSD 360-32557/2	Lab Control Spike Duplicate	T	Water	8260B	
MB 360-32557/3	Method Blank	T	Water	8260B	
360-16737-1	OC-GW-16	T	Water	8260B	
360-16737-1MS	Matrix Spike	T	Water	8260B	
360-16737-1MSD	Matrix Spike Duplicate	T	Water	8260B	
360-16737-2	OC-GW-16 DUP	T	Water	8260B	
360-16737-5TB	Trip Blank	T	Water	8260B	

Report Basis
T = Total

GC/MS Semi VOA					
Prep Batch: 360-32500					
LCS 360-32500/2-A	Lab Control Spike	T	Water	3510C	
LCSD 360-32500/3-A	Lab Control Spike Duplicate	T	Water	3510C	
MB 360-32500/1-A	Method Blank	T	Water	3510C	
360-16737-1	OC-GW-16	T	Water	3510C	
360-16737-1MS	Matrix Spike	T	Water	3510C	
360-16737-1MSD	Matrix Spike Duplicate	T	Water	3510C	
360-16737-2	OC-GW-16 DUP	T	Water	3510C	
Analysis Batch:360-32652					
LCS 360-32500/2-A	Lab Control Spike	T	Water	8270C	360-32500
LCSD 360-32500/3-A	Lab Control Spike Duplicate	T	Water	8270C	360-32500
MB 360-32500/1-A	Method Blank	T	Water	8270C	360-32500
360-16737-1	OC-GW-16	T	Water	8270C	360-32500
360-16737-1MS	Matrix Spike	T	Water	8270C	360-32500
360-16737-1MSD	Matrix Spike Duplicate	T	Water	8270C	360-32500
360-16737-2	OC-GW-16 DUP	T	Water	8270C	360-32500

Report Basis
T = Total

Client: Olin Corporation

Job Number: 360-16737-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
GC VOA					
Analysis Batch:360-32483					
LCS 360-32483/1	Lab Control Spike	T	Water	MAVPH	
LCSD 360-32483/2	Lab Control Spike Duplicate	T	Water	MAVPH	
MB 360-32483/5	Method Blank	T	Water	MAVPH	
360-16737-1	OC-GW-16	T	Water	MAVPH	
360-16737-1MS	Matrix Spike	T	Water	MAVPH	
360-16737-1MSD	Matrix Spike Duplicate	T	Water	MAVPH	
360-16737-2	OC-GW-16 DUP	T	Water	MAVPH	
360-16737-5TB	Trip Blank	T	Water	MAVPH	

Report Basis
T = Total

Metals					
Analysis Batch:360-32444					
LCS 360-32444/13	Lab Control Spike	T	Water	6010B	
LCSD 360-32444/25	Lab Control Spike Duplicate	T	Water	6010B	
MB 360-32444/14	Method Blank	T	Water	6010B	
360-16737-1	OC-GW-16	D	Water	6010B	
360-16737-1MS	Matrix Spike	D	Water	6010B	
360-16737-1MSD	Matrix Spike Duplicate	D	Water	6010B	
360-16737-2	OC-GW-16 DUP	D	Water	6010B	

Report Basis
D = Dissolved
T = Total

Client: Olin Corporation

Job Number: 360-16737-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
General Chemistry					
Analysis Batch:360-32446					
LCS 360-32446/1	Lab Control Spike	T	Water	SM 4500 H+ B	
360-16737-1	OC-GW-16	T	Water	SM 4500 H+ B	
360-16737-1DU	Duplicate	T	Water	SM 4500 H+ B	
360-16737-2	OC-GW-16 DUP	T	Water	SM 4500 H+ B	
Prep Batch: 360-32720					
LCS 360-32720/2-A	Lab Control Spike	T	Water	Distill/Ammonia	
MB 360-32720/1-A	Method Blank	T	Water	Distill/Ammonia	
360-16737-1	OC-GW-16	T	Water	Distill/Ammonia	
360-16737-1MS	Matrix Spike	T	Water	Distill/Ammonia	
360-16737-1MSD	Matrix Spike Duplicate	T	Water	Distill/Ammonia	
360-16737-2	OC-GW-16 DUP	T	Water	Distill/Ammonia	
Analysis Batch:360-32754					
LCS 360-32720/2-A	Lab Control Spike	T	Water	10-107-06-1-K	360-32720
MB 360-32720/1-A	Method Blank	T	Water	10-107-06-1-K	360-32720
360-16737-1	OC-GW-16	T	Water	10-107-06-1-K	360-32720
360-16737-1MS	Matrix Spike	T	Water	10-107-06-1-K	360-32720
360-16737-1MSD	Matrix Spike Duplicate	T	Water	10-107-06-1-K	360-32720
360-16737-2	OC-GW-16 DUP	T	Water	10-107-06-1-K	360-32720

Report Basis
T = Total

Client: Olin Corporation

Job Number: 360-16737-1

Method Blank - Batch: 360-32557

Method: 8260B
Preparation: 5030B

Lab Sample ID: MB 360-32557/3
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 05/29/2008 2321
Date Prepared: 05/29/2008 2321

Analysis Batch: 360-32557
Prep Batch: N/A
Units: ug/L

Instrument ID: HP 5890/5972 GC/MS
Lab File ID: V38016.D
Initial Weight/Volume: 25 mL
Final Weight/Volume: 25 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	105	70 - 130
Dibromofluoromethane	106	70 - 130
Toluene-d8 (Surr)	96	70 - 130

Lab Control Spike/
Lab Control Spike Duplicate Recovery Report - Batch: 360-32557

Method: 8260B
Preparation: 5030B

LCS Lab Sample ID: LCS 360-32557/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 05/29/2008 2157
Date Prepared: 05/29/2008 2157

Analysis Batch: 360-32557
Prep Batch: N/A
Units: ug/L

Instrument ID: HP 5890/5972 GC/MS
Lab File ID: V38013.D
Initial Weight/Volume: 25 mL
Final Weight/Volume: 25 mL

LCSD Lab Sample ID: LCSD 360-32557/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 05/29/2008 2225
Date Prepared: 05/29/2008 2225

Analysis Batch: 360-32557
Prep Batch: N/A
Units: ug/L

Instrument ID: HP 5890/5972 GC/MS
Lab File ID: V38014.D
Initial Weight/Volume: 25 mL
Final Weight/Volume: 25 mL

Analyte	% Rec. LCS	% Rec. LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
2,4,4-Trimethyl-1-pentene	118	120	70 - 130	2	25		
2,4,4-Trimethyl-2-pentene	108	107	70 - 130	1	25		

Surrogate	LCS % Rec	LCSD % Rec	Acceptance Limits
4-Bromofluorobenzene	99	99	70 - 130
Dibromofluoromethane	104	102	70 - 130
Toluene-d8 (Surr)	101	100	70 - 130

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-16737-1

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 360-32557

Method: 8260B
Preparation: 5030B

MS Lab Sample ID:	360-16737-1	Analysis Batch: 360-32557	Instrument ID: HP 5890/5972 GC/MS
Client Matrix:	Water	Prep Batch: N/A	Lab File ID: V38035.D
Dilution:	10		Initial Weight/Volume: 25 mL
Date Analyzed:	05/30/2008 0809		Final Weight/Volume: 25 mL
Date Prepared:	05/30/2008 0809		

MSD Lab Sample ID:	360-16737-1	Analysis Batch: 360-32557	Instrument ID: HP 5890/5972 GC/MS
Client Matrix:	Water	Prep Batch: N/A	Lab File ID: V38036.D
Dilution:	10		Initial Weight/Volume: 25 mL
Date Analyzed:	05/30/2008 0837		Final Weight/Volume: 25 mL
Date Prepared:	05/30/2008 0837		

	% Rec.						
Analyte	MS	MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
2,4,4-Trimethyl-1-pentene	-16	-2	70 - 130	3	30	4	4
2,4,4-Trimethyl-2-pentene	60	62	70 - 130	1	30	F	F

Surrogate	MS % Rec	MSD % Rec	Acceptance Limits
4-Bromofluorobenzene	100	98	70 - 130
Dibromofluoromethane	104	105	70 - 130
Toluene-d8 (Surr)	99	98	70 - 130

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-16737-1

Method Blank - Batch: 360-32500

Method: 8270C
Preparation: 3510C

Lab Sample ID: MB 360-32500/1-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 06/02/2008 1603
Date Prepared: 05/29/2008 1215

Analysis Batch: 360-32652
Prep Batch: 360-32500
Units: ug/L

Instrument ID: Agilent 6890/5973 GC/MS
Lab File ID: B8284.D
Initial Weight/Volume: 1000 mL
Final Weight/Volume: 1.0 mL
Injection Volume:

Analyte	Result	Qual	MDL	RL
Bis(2-ethylhexyl) phthalate	0.55	J	0.41	5.0
N-Nitrosodiphenylamine	ND		0.39	5.0

Surrogate	% Rec		Acceptance Limits
2,4,6-Tribromophenol	54		15 - 110
2-Fluorobiphenyl	66		30 - 130
2-Fluorophenol	28		15 - 110
Nitrobenzene-d5	59		30 - 130
Phenol-d5	14	X N/A;	15 - 110
Terphenyl-d14	89		30 - 130

reported B/N fraction only

6/19/08

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-16737-1

Lab Control Spike/
Lab Control Spike Duplicate Recovery Report - Batch: 360-32500

Method: 8270C
Preparation: 3510C

LCS Lab Sample ID: LCS 360-32500/2-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 06/02/2008 1632
Date Prepared: 05/29/2008 1215

Analysis Batch: 360-32652
Prep Batch: 360-32500
Units: ug/L

Instrument ID: Agilent 6890/5973 GC/MS
Lab File ID: B8285.D
Initial Weight/Volume: 1000 mL
Final Weight/Volume: 1.0 mL
Injection Volume:

LCSD Lab Sample ID: LCSD 360-32500/3-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 06/02/2008 1700
Date Prepared: 05/29/2008 1215

Analysis Batch: 360-32652
Prep Batch: 360-32500
Units: ug/L

Instrument ID: Agilent 6890/5973 GC/MS
Lab File ID: B8286.D
Initial Weight/Volume: 1000 mL
Final Weight/Volume: 1.0 mL
Injection Volume:

Analyte	% Rec. LCS	% Rec. LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Bis(2-ethylhexyl) phthalate	94	103	40 - 140	9	20		
N-Nitrosodiphenylamine	81	96	40 - 140	16	20		

Surrogate	LCS % Rec	LCSD % Rec	Acceptance Limits
2,4,6-Tribromophenol	67	76	15 - 110
2-Fluorobiphenyl	64	74	30 - 130
2-Fluorophenol	27	31	15 - 110
Nitrobenzene-d5	64	78	30 - 130
Phenol-d5	18	21	15 - 110
Terphenyl-d14	90	91	30 - 130

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-16737-1

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 360-32500

Method: 8270C
Preparation: 3510C

MS Lab Sample ID:	360-16737-1	Analysis Batch: 360-32652	Instrument ID: Agilent 6890/5973 GC/MS
Client Matrix:	Water	Prep Batch: 360-32500	Lab File ID: B8288.D
Dilution:	1.0		Initial Weight/Volume: 990 mL
Date Analyzed:	06/02/2008 1757		Final Weight/Volume: 1.0 mL
Date Prepared:	05/29/2008 1215		Injection Volume:

MSD Lab Sample ID:	360-16737-1	Analysis Batch: 360-32652	Instrument ID: Agilent 6890/5973 GC/MS
Client Matrix:	Water	Prep Batch: 360-32500	Lab File ID: B8289.D
Dilution:	1.0		Initial Weight/Volume: 990 mL
Date Analyzed:	06/02/2008 1826		Final Weight/Volume: 1.0 mL
Date Prepared:	05/29/2008 1215		Injection Volume:

Analyte	% Rec. MS	% Rec. MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Bis(2-ethylhexyl) phthalate	95	100	40 - 140	5	20	B	B
N-Nitrosodiphenylamine	114	-22	40 - 140	4	20	4	4

Surrogate	MS % Rec	MSD % Rec	Acceptance Limits
2,4,6-Tribromophenol	92	97	15 - 110
2-Fluorobiphenyl	71	73	30 - 130
2-Fluorophenol	26	28	15 - 110
Nitrobenzene-d5	73	77	30 - 130
Phenol-d5	19	21	15 - 110
Terphenyl-d14	97	105	30 - 130

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-16737-1

Method Blank - Batch: 360-32483

Method: MAVPH
Preparation: 5030B

Lab Sample ID: MB 360-32483/5
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 05/28/2008 1957
Date Prepared: 05/28/2008 1957

Analysis Batch: 360-32483
Prep Batch: N/A
Units: ug/L

Instrument ID: HP 5890II GC w/ PID/FID
Lab File ID: G12667.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)	93	70 - 130
2,5-Dibromotoluene (pid)	114	70 - 130

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-16737-1

Lab Control Spike/
Lab Control Spike Duplicate Recovery Report - Batch: 360-32483

Method: MAVPH
Preparation: 5030B

LCS Lab Sample ID: LCS 360-32483/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 05/28/2008 1606
Date Prepared: 05/28/2008 1606

Analysis Batch: 360-32483
Prep Batch: N/A
Units: ug/L

Instrument ID: HP 5890II GC w/ PID/FID
Lab File ID: G12660.D
Initial Weight/Volume: 5 mL
Final Weight/Volume: 5 mL
Injection Volume:
Column ID: PRIMARY

LCSD Lab Sample ID: LCSD 360-32483/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 05/28/2008 1639
Date Prepared: 05/28/2008 1639

Analysis Batch: 360-32483
Prep Batch: N/A
Units: ug/L

Instrument ID: HP 5890II GC w/ PID/FID
Lab File ID: G12661.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	112	109	70 - 130	3	25		
Ethylbenzene	113	110	70 - 130	3	25		
m-Xylene & p-Xylene	117	114	70 - 130	3	25		
Methyl tert-butyl ether	102	101	70 - 130	1	25		
Naphthalene	88	87	70 - 130	0	25		
o-Xylene	114	111	70 - 130	2	25		
Toluene	113	110	70 - 130	3	25		
C5-C8 Aliphatics (unadjusted)	106	102	70 - 130	4	25		
C9-C12 Aliphatics (unadjusted)	98	95	70 - 130	3	25		
C9-C10 Aromatics	99	95	70 - 130	4	25		

Surrogate	LCS % Rec	LCSD % Rec	Acceptance Limits
2,5-Dibromotoluene (fid)	93	94	70 - 130
2,5-Dibromotoluene (pid)	93	93	70 - 130

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-16737-1

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 360-32483

Method: MAVPH
Preparation: 5030B

MS Lab Sample ID:	360-16737-1	Analysis Batch: 360-32483	Instrument ID: HP 5890II GC w/ PID/FID
Client Matrix:	Water	Prep Batch: N/A	Lab File ID: G12664.D
Dilution:	5.0		Initial Weight/Volume: 5 mL
Date Analyzed:	05/28/2008 1818		Final Weight/Volume: 5 mL
Date Prepared:	05/28/2008 1818		Injection Volume:
			Column ID: PRIMARY

MSD Lab Sample ID:	360-16737-1	Analysis Batch: 360-32483	Instrument ID: HP 5890II GC w/ PID/FID
Client Matrix:	Water	Prep Batch: N/A	Lab File ID: G12665.D
Dilution:	5.0		Initial Weight/Volume: 5 mL
Date Analyzed:	05/28/2008 1851		Final Weight/Volume: 5 mL
Date Prepared:	05/28/2008 1851		Injection Volume:
			Column ID: PRIMARY

Analyte	% Rec. MS	% Rec. MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Benzene	108	108	70 - 130	1	50		
Ethylbenzene	108	110	70 - 130	1	50		
m-Xylene & p-Xylene	111	112	70 - 130	1	50		
Methyl tert-butyl ether	97	100	70 - 130	3	50		
Naphthalene	83	89	70 - 130	8	50		
o-Xylene	109	111	70 - 130	1	50		
Toluene	107	108	70 - 130	1	50		
C5-C8 Aliphatics (unadjusted)	127	131	70 - 130	3	50		F
C9-C12 Aliphatics (unadjusted)	97	98	70 - 130	1	50		
C9-C10 Aromatics	99	99	70 - 130	0	50		

Surrogate	MS % Rec	MSD % Rec	Acceptance Limits
2,5-Dibromotoluene (fid)	91	94	70 - 130
2,5-Dibromotoluene (pid)	90	93	70 - 130

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-16737-1

Method Blank - Batch: 360-32444

Method: 6010B
Preparation: N/A

Lab Sample ID: MB 360-32444/14
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 05/28/2008 1016
Date Prepared: N/A

Analysis Batch: 360-32444
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: 360-32444

Method: 6010B
Preparation: N/A

LCS Lab Sample ID: LCS 360-32444/13
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 05/28/2008 1013
Date Prepared: N/A

Analysis Batch: 360-32444
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 360-32444/25
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 05/28/2008 1120
Date Prepared: N/A

Analysis Batch: 360-32444
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
Iron	101	100	80 - 120	0	20		

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-16737-1

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 360-32444

Method: 6010B
Preparation: N/A

MS Lab Sample ID:	360-16737-1	Analysis Batch: 360-32444	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:	05/28/2008 1149		Final Weight/Volume: 10 mL
Date Prepared:	N/A		

MSD Lab Sample ID:	360-16737-1	Analysis Batch: 360-32444	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:	05/28/2008 1157		Final Weight/Volume: 10 mL
Date Prepared:	N/A		

	% Rec.						
Analyte	MS	MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Iron	90	90	75 - 125	0	20		

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-16737-1

Method Blank - Batch: 360-32720

Method: 10-107-06-1-K
Preparation: Distill/Ammonia

Lab Sample ID: MB 360-32720/1-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 06/05/2008 1017
Date Prepared: 06/04/2008 1511

Analysis Batch: 360-32754
Prep Batch: 360-32720
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: 360-32720

Method: 10-107-06-1-K
Preparation: Distill/Ammonia

Lab Sample ID: LCS 360-32720/2-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 06/05/2008 1018
Date Prepared: 06/04/2008 1511

Analysis Batch: 360-32754
Prep Batch: 360-32720
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	8.65	87	85 - 115	

Matrix Spike/ Matrix Spike Duplicate Recovery Report - Batch: 360-32720

Method: 10-107-06-1-K
Preparation: Distill/Ammonia

MS Lab Sample ID: 360-16737-1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 06/05/2008 1020
Date Prepared: 06/04/2008 1511

Analysis Batch: 360-32754
Prep Batch: 360-32720

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: 360-16737-1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 06/05/2008 1021
Date Prepared: 06/04/2008 1511

Analysis Batch: 360-32754
Prep Batch: 360-32720

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	87	88	75 - 125	1	20		

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-16737-1

Lab Control Spike - Batch: 360-32446

Method: SM 4500 H+ B
Preparation: N/A

Lab Sample ID: LCS 360-32446/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 05/28/2008 1010
Date Prepared: N/A

Analysis Batch: 360-32446
Prep Batch: N/A
Units: SU

Instrument ID: MAN-TECH Ion Plus
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 1.0 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
pH	6.00	5.940	99	90 - 110	

Duplicate - Batch: 360-32446

Method: SM 4500 H+ B
Preparation: N/A

Lab Sample ID: 360-16737-1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 05/28/2008 1036
Date Prepared: N/A

Analysis Batch: 360-32446
Prep Batch: N/A
Units: SU

Instrument ID: MAN-TECH Ion Plus Autoti
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 1.0 mL

Analyte	Sample Result/Qual	Result	RPD	Limit	Qual
pH	6.60	6.650	1	20	

Calculations are performed before rounding to avoid round-off errors in calculated results.

VPH SAMPLE INFORMATION DATA

SAMPLE INFORMATION

Sample ID: 16737-1 Batch# **32483**

Matrix	[x] Aqueous	[ ] Soil	[ ] Sediment	[ ] Other	
Containers	[x] Satisfactory	[ ] Broken	[ ] Leaking:		
Sample Preservatives	Aqueous (acid Preserved)	[ ] N/A	[x] pH<2	[ ] pH>2	Comment:
	Aqueous (TSP Preserved)	[x] N/A	[ ] pH<11	[ ] pH>11	Comment:
	Soil or Sediment	[x] 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	[x] Received on Ice	[ ] Received at 4°C ± 2°C	[x] Other: 1.3°C		

Sample ID: 16737-1 MS Batch# **32483**

Matrix	[x] Aqueous	[ ] Soil	[ ] Sediment	[ ] Other	
Containers	[x] Satisfactory	[ ] Broken	[ ] Leaking:		
Sample Preservatives	Aqueous (acid Preserved)	[ ] N/A	[x] pH<2	[ ] pH>2	Comment:
	Aqueous (TSP Preserved)	[x] N/A	[ ] pH<11	[ ] pH>11	Comment:
	Soil or Sediment	[x] 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	[x] Received on Ice	[ ] Received at 4°C ± 2°C	[x] Other: 1.3°C		

Sample ID: 16737-1 MSD Batch# **32483**

Matrix	[x] Aqueous	[ ] Soil	[ ] Sediment	[ ] Other	
Containers	[x] Satisfactory	[ ] Broken	[ ] Leaking:		
Sample Preservatives	Aqueous (acid Preserved)	[ ] N/A	[x] pH<2	[ ] pH>2	Comment:
	Aqueous (TSP Preserved)	[x] N/A	[ ] pH<11	[ ] pH>11	Comment:
	Soil or Sediment	[x] 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	[x] Received on Ice	[ ] Received at 4°C ± 2°C	[x] Other: 1.3°C		

VPH SAMPLE INFORMATION DATA

SAMPLE INFORMATION

Sample ID: 16737-2 Batch# **32483**

Matrix	[x] Aqueous	[ ] Soil	[ ] Sediment	[ ] Other	
Containers	[x] Satisfactory	[ ] Broken	[ ] Leaking:		
Sample Preservatives	Aqueous (acid Preserved)	[ ] N/A	[x] pH<2	[ ] pH>2	Comment:
	Aqueous (TSP Preserved)	[x] N/A	[ ] pH<11	[ ] pH>11	Comment:
	Soil or Sediment	[x] N/A [ ] Samples NOT preserved in Methanol or air-tight container			g Soil/sediment mL Methanol
		[ ] Samples rec'd in Methanol: [ ] covering soil/sediment [ ] not covering soil/sediment			[ ] 1:1 +/-25%
		[ ] Samples received in air-tight container:			[ ] Other:
Temperature	[x] Received on Ice	[ ] Received at 4°C ± 2°C	[x] Other: 1.3°C		

Sample ID: 16737-5 Batch# **32483**

Matrix	[x] Aqueous	[ ] Soil	[ ] Sediment	[ ] Other	
Containers	[x] Satisfactory	[ ] Broken	[ ] Leaking:		
Sample Preservatives	Aqueous (acid Preserved)	[ ] N/A	[x] pH<2	[ ] pH>2	Comment:
	Aqueous (TSP Preserved)	[x] N/A	[ ] pH<11	[ ] pH>11	Comment:
	Soil or Sediment	[x] N/A [ ] Samples NOT preserved in Methanol or air-tight container			g Soil/sediment mL Methanol
		[ ] Samples rec'd in Methanol: [ ] covering soil/sediment [ ] not covering soil/sediment			[ ] 1:1 +/-25%
		[ ] Samples received in air-tight container:			[ ] Other:
Temperature	[x] Received on Ice	[ ] Received at 4°C ± 2°C	[x] Other: 1.3°C		

Login Sample Receipt Check List

Client: Olin Corporation

Job Number: 360-16737-1

Login Number: 16737
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.	False	(in Billerica) 14.7 C, (in Westfield) 1.3 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 #: 6100080016
Project Manager: Peter Thompson
Work ID: Plant B
Contact: David Chapman

Job# 360-1637 | 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	8260	VPH	8270	Ammonia	Iron by 6010	pH	Other	Other	Other	Other	Other	Other	Other	Other
GW-16	GW		5/23/08 9:50	X		12	V G		1	1	7			3	X	X	X	X	X	X								
GW-16 DUP	GW		5/23/08 9:50	X		12	V G		1	1	7			3	X	X	X	X	X	X								
GW-16 MS	GW		5/23/08 9:50	X		12	V G		1	1	7			3	X	X	X	X	X	X								
GW-16MSD	GW		5/23/08 9:50	X		12	V G		1	1	7			3	X	X	X	X	X	X								

5/27/08

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
Signature:

Relinquished by: Mark Massione Date: 5/23/08 Time: 15:13
Received by: Date: 05/23/08 Time: 1513

Relinquished by: Date: 5/27/08 Time: 1345
Received by: Jerry Cash Date: 5/27/08 Time: 1345

Method of shipment: Jerry Cash 5/27/08 1630
TestAmerica-Westfield 5/27/08 1630

Cooler Y N Samples Iced Y N
Temp @ receipt: 14.7 °C
1.3°C COOLER/ICE
Preservation/pH checked
By: Date: 5/27/08

White = Lab file Yellow = Report copy Pink = Customer copy
STL-8245 (1000)

OLIN-WILMINGTON
LEVEL I DATA QUALITY EVALUATION
STANDARD OPERATING PROCEDURE AND CHECKLIST
VOLATILE ORGANICS BY METHOD SW8260B/624

Reviewer/Date Julie Ricardi 6/16/08
Sr. Review/Date Chris Ricardi 6/30/08
Lab Report # 360 - 16737 - 1
Project # 6100080016

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?*):

"Log In Sample Receipt Checklist"

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

* Cooler temp (Billerica) noted as 14.7°C, otherwise (Westfield) 1.3°C. Samples arrived on same day as collection ∴ it is likely the chilling process had begun per narrative but cooler had not yet reached 2-6°C. No action taken based on professional judgment.

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 p.12
☑ 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

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 <u>Method Blanks</u>

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. OC-GW-16 MS/MSD
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: $\%R_{SA} = \frac{(SSR-SR)}{} \times 100\%$ Where: SSR = Spiked sample result; SR = Sample result

SA = Spike added

OC-GW-16 MS/MSD:

RPDs OK; 2,4,4-Trimethyl-1 pentene native conc (-16%, -2%) is > 4x spike conc ∴ no qual; 2,4,4-Trimethyl-2-pentene (60%, 62%) SRs below 70-130 control limits

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: J/UJ 2,4,4-Trimethyl-2-pentene in 6/19/08 in OC-GW-16 and OC-GW-16 DUP.

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**

OC-GW-16 / OC-GW-16DUP

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.

See MS/MSD eval, p. 7

JR 6/19/08

REFERENCES

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OLIN-WILMINGTON
LEVEL I DATA QUALITY EVALUATION
STANDARD OPERATING PROCEDURE AND CHECKLIST
SEMI-VOLATILE ORGAINICS BY METHOD 8270C/625

Reviewer/Date Julie Ricardi 6/19/08
Sr. Review/Date Chris Ricardi 6/30/08
Lab Report # 360-16737-1
Project # 6100080016

1.0 Laboratory Deliverable Requirements

1.1 Laboratory Information: Was all of the following provided in the laboratory report? Check items received. **Yes** [✓] No [ ] N/A [ ] Comments:

☑ *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

* See comments on VOC checklist p. 2

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 P.12 ☑ *Dilution Factor* N/A ☐ % 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:

MB 360-32500 i
BEHP @ 0.55 J ug/L
Action: (4) BEHP @ PQL in OC-GW-16 & OC-GW-16 Dup

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.

OC-GW-16 / OC-GW-16DUP MS/MSD

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:

N-nitrosodiphenylamine 114%/-22%, however spiked conc < 25% native concentration ∴ no quals applied to sample results.

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).

JR 6/19/08

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:

All in control; surrogates for n-nitrosodiphenyl amine were diluted out w/ 50x dilutions in both OC-GW-16 & OC-GW-16DUP.

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

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

OC-GW-16 / OC-GW-16DUP

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.

BEHP qual'd (U) @ RLs for OC-GW-16 and OC-GW-16 DUP.

JM 6/19/06

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OLIN CORPORATION
LEVEL I DATA QUALITY EVALUATION
STANDARD OPERATING PROCEDURE AND CHECKLIST
VOLATILE PETROLEUM HYDROCARBONS BY METHOD MADEP

Reviewer/Date Julie Ricardi 6/19/08
Sr. Review/Date Chris Ricardi 6/30/08
Lab Report # 360-16737-1
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* ☑ *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

* See comments on VOC checklist.

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 (p.12) ☑ *Dilution Factor* ☑ % moisture or solids (N/A) ☑ *Reporting limits*

☑ Analysis method ☑ *Preparation method* ☑ *Date of preparation/extraction/digestion clean-up and analysis, where applicable* ☑ Matrix ☑ Target analytes an 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. OC-GW-16 MS/MSD

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? **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:

C_5-C_8 Aliphatics 127% (131%)
No quals based on prof. judgment; see Note 1) below.

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

OC-GW-16 / OC-GW-16 Dup

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.

OLIN-WILMINGTON
LEVEL I DATA QUALITY EVALUATION
STANDARD OPERATING PROCEDURE AND CHECKLIST
ICP METALS BY METHOD 6010B/200.7

Fe only

Reviewer/Date Julie Ricardi 6/19/08
Sr. Review/Date Chrs Ricardi 6/30/08
Lab Report # 360-16737-1
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*

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

* See comments on VOC checklist

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* N/A ☐ % 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 N/A ☐ 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.

OC-GW-16/OC-GW-16MS/MSD

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 MS/MSD; RPD = 0

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

OC-GW-16 / OC-GW-16DUP

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 Julie Ricardi 6/19/08
Sr. Review/Date Chris Ricardi 6/24/08
Lab Report # 360-16737-1
Project # 6100080016

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.

* See comments in VOC check list

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 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 - 50 mL polyethylene/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
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 P.12 ☑ Dilution Factor ☐ % moisture or solids N/A ☑ 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) N/A

ACTION: If no, contact lab for submission of missing or incomplete information.

2.0 Holding Times Yes [✓] No [✓] N/A [ ] Comments: 6/23/08

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

pH analyzed 5/28/08, collected 5/23/08

NOTE: List samples that exceed hold time with # of days exceeded on checklist

Action: J both results

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.

Reject (R)

3.0 Laboratory Method Yes [✓] No [ ] N/A [ ] Comments:

3.1 Was the correct laboratory method used?

Ammonia = LACHAT 10-107-06-1
pH = SM 4500 H+ B

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? **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* ☐ = 3 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			

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**☐ = 85-115%	Nitrite Nitrogen as N** ☐= 75-120%
Hardness* ☐ = 85-115%	Chloride* ☐ = 80-120%	Sulfate (EPA 300.0)* ☐ = 75-125%	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.

OC-GW-16/OC-GW-16DUP

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? **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: $\%R_{SA} = \frac{(SSR-SR)}{} \times 100\%$ 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) ☑ = 74-125%
Chloride*(SM 4500 Cl) ☐= 77-116%	Specific Conductivity * = NA	Total Organic Carbon* = NA	TDS** = NA
Oil & Grease* = NA	COD Low* ☐ = 61-142%	COD High* ☐ = 92-109%	Nitrate Nitrogen as N** ☐ = 75-119%
Nitrite Nitrogen as N** ☐ = 68-136%	Hardness* ☐ = 70-130%	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:

Alkalinity* = NA	Bicarbonate Alkalinity* = NA	Carbonate alkalinity* = NA	Ammonia** (LACHAT) ☑ = 8%
Chloride**(SM 4500 Cl) ☐ = 15%	Specific Conductivity * = NA	Total Organic Carbon* = NA	TDS** = NA Total Organic Carbon* = NA
COD Low** ☐ = 14%	COD High** ☐ = 16%	Nitrate Nitrogen as N** ☐ 16%	Nitrite Nitrogen as N** ☐ = 16%
Oil & Grease* = NA	Hardness* = NA	Sulfate (EPA 300.0)* ☐ = 10%	pH* = NA TSS* = NA

Other parameter(list) _____ RPD = _____ ☐ RPD limit = _____

Other parameter(list) _____ RPD = _____ ☐ RPD limit = _____

* = Laboratory Limits ** = Olin QAPP Limits

(*MADEP has not yet defined LCS recovery limits for wet chemistry analyses.*)

7.0 Laboratory Duplicate

OL-GW-16 (pH)

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).

Alkalinity* = 4%	Bicarbonate Alkalinity* = 4%	Carbonate alkalinity* = 4%	Oil & Grease* ☐ = 20%
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**

OC-GW-16 / OC-GW-16DUP

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%.

Was any of the data qualified? Yes [ ] **No** [✓] N/A [ ] Comments: gr 6/23/08

If so, apply data qualifiers directly to the DQE copy of laboratory report and **flag pages** for entry in database.

Reject (R) both results for pH because analysis occurred 5 days after collection

gr 6/23/08

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.

APPENDIX B

Data Validation Memorandum

B-2 Third Quarter 2008 Sampling Event

MACTEC Engineering and Consulting, Inc.
107 Audubon Road, Building 2, Suite 301
Wakefield, Massachusetts 01880
Phone No.: (781) 245-6606
FAX No. : (781) 246-5060

FILE COPY

TRANSMITTAL LETTER

To: Stephen G. Morrow, P.E.	Date: November 6, 2008
Olin Corporation	Client: Olin
3855 North Ocoee Street	Project: 51 Eames Street, Wilmington, MA
Suite 200	
Cleveland, Tennessee 37312	MACTEC PN: 6100-08-0016/15A
	Delivery: U.S.P.S.

☒ information ☐ purchasing
☐ estimating ☐ construction
☐ comments and/or approval ☐ see remarks

REMARKS: Enclosed please find the following data validation summary reports for the Olin Chemical Superfund Site, Wilmington, Massachusetts.

Prepared By: Annette Savastano AMS

Number	Revision No.	No. of Copies	Title or Description
1	-	1	Data Validation Report, August 2008 SW/C Surface Water and Groundwater Olin Chemical Superfund Site, Wilmington, Massachusetts, TestAmerica Laboratories Data Sets 360-18434-1 and 360-18435-1
2	-	1	Data Validation Report, August 2008 Monthly Plant B RGP, Olin Chemical Superfund Site, Wilmington, Massachusetts, TestAmerica Laboratories Data Set 360-18325-1

DISTRIBUTION: T = TRANSMITTAL LETTER; C = COPY OF DOCUMENT

	T	C		T	C
Brian Guichard, Olin Wilmington	X	X			
MACTEC Project File	X	X			

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: November 6, 2008
Subject: Interim Response Steps Work Plan Slurry Wall/Cap Monitoring Program 3Q08 – August 2008

DATA VALIDATION REPORT
AUGUST 2008 SW/C SURFACE WATER AND GROUNDWATER
OLIN CHEMICAL SUPERFUND SITE
WILMINGTON, MASSACHUSETTS
TestAmerica Laboratories Data Sets 360-18434-1 and 360-18435-1

1.0 INTRODUCTION

Surface water and groundwater samples were collected from the Olin Chemical Superfund Site on August 26 and August 27, 2008. Samples were analyzed by TestAmerica Laboratories in Westfield, Massachusetts. Data were reported in sample delivery groups (SDGs) 360-18434-1 and 360-18435-1. 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):

- 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.

The laboratory sample receiving report 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 (0.23 µg/L) was reported in the method blank associated with all groundwater samples and surface water sample OC-ISCO-1. Action levels were calculated at five times the blank concentrations and compared to sample data. Low concentration detections of dissolved chromium in samples OC-GW-25, OC-GW-202S, OC-PZ-17RR, OC-PZ-16RR, and OC-ISCO-1 qualified as non-detected (U).

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-1, OC-ISCO-2, OC-ISCO-3, OC-PZ16RR, and OC-PZ-18R-DUP. 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

No additional data qualification was completed for general chemistry parameters.

Sample Results Verification

Reporting limits for nitrite in a subset of analytes are elevated above the detection limit of 0.01 mg/L identified in the Draft Interim Response Steps Work Plan (MACTEC, 2007). Samples OC-ISCO-2, OC-ISCO-3, OC-SD-17, OC-PZ-16RR, OC-PZ-17RR, and OC-PZ-18R-DUP were analyzed at a 10X dilution due to concentrations of chloride and sulfate. The detection limit for all surface water samples was 0.1 mg/L.

Except for the validation actions noted above, the results are interpreted to be usable as reported by TestAmerica.

Chris Ricardi

Chris Ricardi, NRCC-EAC
Senior Chemist

November 6, 2008
Date

M J Murphy

Michael J. Murphy
Project Principal

11/6/08
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; 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.

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.

Table 1
Sample Summary - 360-18434 & 360-18435
Data Validation Report
August 2008 Slurry Wall / Cap Surface Water and Groundwater
Olin Chemical Superfund Site
Wilmington, Massachusetts

Lab Sample ID	Location	Sample ID	Sample Date	SW846 6010B Total	SW846 6010B Filtered	E350.1 (QuickChem 10-107-06-1-K)	SM 2510B	40CFR136A 300.0
Groundwater								
360-18435-1	GW-78S	OC-GW-78S	8/26/2008		2	1	1	2
360-18435-2	GW-79S	OC-GW-79S	8/26/2008		2	1	1	2
360-18435-3	GW-25	OC-GW-25	8/26/2008		2	1	1	2
360-18435-4	GW-79S	OC-GW-79S DUP	8/26/2008		2	1	1	2
360-18435-5	GW-202D	OC-GW-202D	8/25/2008		2	1	1	2
360-18435-6	GW-202S	OC-GW-202S	8/25/2008		2	1	1	2
360-18435-7	PZ-18R	OC-PZ-18R	8/26/2008		2	1	1	2
360-18435-8	PZ-17RR	OC-PZ-17RR	8/26/2008		2	1	1	2
360-18435-9	PZ-16RR	OC-PZ-16RR	8/26/2008		2	1	1	2
Surface Water								
360-18434-1	ISCO3	OC-ISCO-3	8/27/2008	3	3	1	1	4
360-18434-2	ISCO2	OC-ISCO-2	8/27/2008	3	3	1	1	4
360-18434-3	PZ-16RR	OC-PZ-16RR	8/27/2008	3	3	1	1	4
360-18434-4	PZ-17RR	OC-PZ-17RR	8/27/2008	3	3	1	1	4
360-18434-5	SD-17	OC-SD-17	8/27/2008	3	3	1	1	4
360-18434-6	PZ-18R	OC-PZ-18R	8/27/2008	3	3	1	1	4
360-18434-7	PZ-18R	OC-PZ-18R-DUP	8/27/2008	3	3	1	1	4
360-18434-8	ISCO1	OC-ISCO-1	8/27/2008	3	3	1	1	4

Notes:
Number listed under method indicates number of target analytes reported.

Prepared by / Date: KJC 09/10/08
Checked by / Date: CSR 10/22/08

Table 2
Final Results Summary - 360-18434 & 360-18435
August 2008 Slurry Wall / Cap Surface Water and Groundater
Olin Chemical Superfund Site
Wilmington, Massachusetts

			Location	GW-202D		GW-202S		GW-25		GW-78S		GW-79S		GW-
			COC Sample	OC-GW-202D		OC-GW-202S		OC-GW-25		OC-GW-78S		OC-GW-79S		OC-GW-7
			Date Sampled	08/25/08		08/25/08		08/26/08		08/26/08		08/26/08		08/2
			Sample Type	FS		FS		FS		FS		FS		FI
			Report Number	360-18435-1		360-18435-1		360-18435-1		360-18435-1		360-18435-1		360-18
Fracti	**Analysis Meth**	**Parameter Name**	**Units**	Final Result	Final Qual	Final Result	Final Qual	Final Result	Final Qual	Final Result	Final Qual	Final Result	Final Qual	Final Result
D	SW6010	Aluminum	ug/l	8400		3.4	J	3	J	20	J	17	J	15
D	SW6010	Chromium	ug/l	620		5	U	5	U	12		16		16
N	E300	Chloride	mg/l	310		57		49		27		120		120
N	E300	Sulfate	mg/l	2100		590		140		550		1100		1000
N	E350.1	Nitrogen, as Ammonia	mg/l	340		100		54		64		150		140
N	SM2510B	Specific Conductance	umhos/cm	4800		1600		690		1300		2600		2600

Table 2
Final Results Summary - 360-18434 & 360-18435
August 2008 Slurry Wall / Cap Surface Water and Groundater
Olin Chemical Superfund Site
Wilmington, Massachusetts

			Location	79S		PZ-16RR		PZ-17RR		PZ-18R		
			COC Sample	79S DUP		OC-PZ-16RR		OC-PZ-17RR		OC-PZ-18R		
			Date Sampled	6/08		08/26/08		08/26/08		08/26/08		
			Sample Type	D		FS		FS		FS		
			Report Number	435-1		360-18435-1		360-18435-1		360-18435-1		
Fracti	**Analysis Meth**	**Parameter Name**	**Units**	Final Qual		Final Result	Final Qual	Final Result	Final Qual	Final Result	Final Qual	
D	SW6010	Aluminum	ug/l	J		3.3	J	100	U	5.3	J	
D	SW6010	Chromium	ug/l			7.1	U	5	U	19		
N	E300	Chloride	mg/l			140		22		94		
N	E300	Sulfate	mg/l			610		490		120		
N	E350.1	Nitrogen, as Ammonia	mg/l			170		74		50		
N	SM2510B	Specific Conductance	umhos/cm			2200		1400		810		

Table 2
Final Results Summary - 360-18434 & 360-18435
August 2008 Slurry Wall / Cap Surface Water and Groundater
Olin Chemical Superfund Site
Wilmington, Massachusetts

			Location	ISCO1		ISCO2		ISCO3		PZ-16RR		PZ-17RR		PZ-1
			COC Sample	OC-ISCO-1		OC-ISCO-2		OC-ISCO-3		OC-PZ-16RR		OC-PZ-17RR		OC-PZ
			Date Sampled	08/27/08		08/27/08		08/27/08		08/27/08		08/27/08		08/2
			Sample Type	FS		FS		FS		FS		FS		FS
			Report Number	360-18434-1		360-18434-1		360-18434-1		360-18434-1		360-18434-1		360-18
Fracti	**Analysis Meth**	**Parameter Name**	**Units**	Final Result	Final Qual	Final Result	Final Qual	Final Result	Final Qual	Final Result	Final Qual	Final Result	Final Qual	Final Result
T	SW6010	Aluminum	ug/l	94	J	3500		770		7800		4100		100
T	SW6010	Chromium	ug/l	16		860		140		1900		1100		17
T	SW6010	Sodium	ug/l	92000	J	230000	J	110000	J	140000	J	160000		100000
D	SW6010	Aluminum	ug/l	11	J	130		57	J	71	J	28	J	15
D	SW6010	Chromium	ug/l	6.6	U	88		35		26		42		7.2
D	SW6010	Sodium	ug/l	110000	J	260000	J	160000	J	170000	J	170000		110000
N	E300	Chloride	mg/l	130		240		170		210		220		120
N	E300	Nitrate as N	mg/l	0.13		0.75		0.72		5.8		6.7		0.12
N	E300	Nitrite as N	mg/l	0.01	U	0.1	U	0.1	U	0.1	U	0.1	U	0.01
N	E300	Sulfate	mg/l	270		1100		280		280		260		270
N	E350.1	Nitrogen, as Ammonia	mg/l	56		180		110		39		40		56
N	SM2510B	Specific Conductance	umhos/cm	1100		2900		1300		1500		1500		1100

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

Table 2
Final Results Summary - 360-18434 & 360-18435
August 2008 Slurry Wall / Cap Surface Water and Groundater
Olin Chemical Superfund Site
Wilmington, Massachusetts

			Location	18R	PZ-18R		SD-17	
			COC Sample	Z-18R	OC-PZ-18R-DUP		OC-SD-17	
			Date Sampled	7/08	08/27/08		08/27/08	
			Sample Type	S	FD		FS	
			Report Number	434-1	360-18434-1		360-18434-1	
Fracti	**Analysis Meth**	**Parameter Name**	**Units**	Final Qual	Final Result	Final Qual	Final Result	Final Qual
T	SW6010	Aluminum	ug/l		97	J	4900	
T	SW6010	Chromium	ug/l		17		1300	
T	SW6010	Sodium	ug/l		96000	J	160000	
D	SW6010	Aluminum	ug/l	J	31	J	27	J
D	SW6010	Chromium	ug/l		8.8		40	
D	SW6010	Sodium	ug/l		110000	J	170000	
N	E300	Chloride	mg/l		130		220	
N	E300	Nitrate as N	mg/l		0.12		6.8	
N	E300	Nitrite as N	mg/l	U	0.1	U	0.1	U
N	E300	Sulfate	mg/l		270		250	
N	E350.1	Nitrogen, as Ammonia	mg/l		67		43	
N	SM2510B	Specific Conductance	umhos/cm		1100		1400	

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

Prepared by / Date: KJC 10/30/08
Checked by / Date: SEB 10/31/08

FILE COPY

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

Job Number: 360-18434-1

Job Description: PCMP Surface waters

For:
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Attention: Mr. Steven Morrow

CHECKED FOR COMPLETENESS OF PARAMETERS ORDERED BY:

Designee for
Becky C Mason
Project Manager II
becky.mason@testamericainc.com
09/05/2008

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

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

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MADEP MCP Analytical Method Report Certification Form

Laboratory Name:	**TestAmerica Westfield**	Project #:	**360-18434-1**
Project Location:	**PCMP**	MADEP RTN[1]:	

This form provides certifications for the following data set:[list Laboratory Sample ID Number(s)]
360-18434-(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: [signature] **Position:** Laboratory Director

Printed Name: Steven C. Hartmann **Date:** 9/5/08 10:50

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 #:	**360-18434-1**
Project Location:	**PCMP**	MADEP RTN[1]:	

This form provides certifications for the following data set:[list Laboratory Sample ID Number(s)]
360-18434-(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:** 9/5/08 10:50

The certification form has been electronically signed and approved. CAM VII A, Rev 3.2 April-04

CASE NARRATIVE

Client: Olin Corporation

Project: PCMP Surface waters

Report Number: 360-18434-1

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 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 08/27/2008; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 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.

DISSOLVED METALS

Samples 360-18434-1 through 360-18434-8 were analyzed for dissolved metals in accordance with EPA SW846 Method 6010B. The samples were analyzed on 08/28/2008.

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 high for the matrix spike of sample 360-18434-8. The associated LCS and LCSD recovered within control limits. Refer to the QC report for details.

General method information:
Chromium was detected in method blank MB 360-35684/2 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 360-18434-1 through 360-18434-8 were analyzed for total metals in accordance with EPA SW846 Method 6010B. The samples were prepared on 09/03/2008 and analyzed on 09/04/2008.

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, 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).

AMMONIA

Samples 360-18434-1 through 360-18434-8 were analyzed for ammonia in accordance with LACHAT 10-107-06-1. The samples were prepared and analyzed on 09/03/2008.

All QC performance standards and recommendations for this specific method were achieved.

Samples 360-18434-1(10X), 360-18434-2(10X), 360-18434-3 through 360-18434-5(5X), 360-18434-6(10X), 360-18434-7 and 360-18434-8(5X) required dilution prior to analysis. The reporting limits have been adjusted accordingly. Dilutions were due to high concentration.

ANIONS

Samples 360-18434-1 through 360-18434-8 were analyzed for anions in accordance with EPA Method 300.0. The samples were analyzed on 08/28/2008.

All QC performance standards and recommendations for this specific method were achieved.

Samples 360-18434-1 through 360-18434-8(10X) required dilution prior to analysis. The reporting limits have been adjusted accordingly. Dilutions were due to high target concentration.

SPECIFIC CONDUCTANCE (CONDUCTIVITY)

Samples 360-18434-1 through 360-18434-8 were analyzed for Specific Conductance (Conductivity) in accordance with SM 2510B. The samples were analyzed on 08/28/2008.

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: 360-18434-1

Description	Lab Location	Method	Preparation Method
Matrix: Water			
Total Metals	TAL WFD	SW846 6010B	
Dissolved Metals	TAL WFD	SW846 6010B	
Preparation, Total Metals	TAL WFD		SW846 3010A
Sample Filtration performed in the Field	TAL WFD		FIELD_FLTRD
Lachat Ammonia	TAL WFD	QuickChem 10-107-06-1-K	
Distillation/Ammonia	TAL WFD		Distill/Ammonia
Chloride & Sulfate	TAL WFD	40CFR136A 300.0	
Nitrate & Nitrite	TAL WFD	40CFR136A 300.0	
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.

QuickChem = Lachat Instruments

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: 360-18434-1

Method	Analyst	Analyst ID
SW846 6010B	Nasiatka, Ellen M	EMN
SW846 6010B	Smith, Tim J	TJS
QuickChem 10-107-06-1-K	Lalashius, Andrew L	ALL
40CFR136A 300.0	Lalashius, Andrew L	ALL
SM SM 2510B	Emerich, Rich W	RWE

SAMPLE SUMMARY

Client: Olin Corporation

Job Number: 360-18434-1

Lab Sample ID	Client Sample ID	Client Matrix	Date/Time Sampled	Date/Time Received
360-18434-1	OC-ISCO-3	Water	08/27/2008 0910	08/27/2008 1615
360-18434-2	OC-ISCO-2	Water	08/27/2008 0925	08/27/2008 1615
360-18434-3	OC-PZ-16RR	Water	08/27/2008 0950	08/27/2008 1615
360-18434-4	OC-PZ-17RR	Water	08/27/2008 1010	08/27/2008 1615
360-18434-5	OC-SD-17	Water	08/27/2008 1025	08/27/2008 1615
360-18434-6	OC-PZ-18R	Water	08/27/2008 1037	08/27/2008 1615
360-18434-7	OC-PZ-18R-DUP	Water	08/27/2008 1200	08/27/2008 1615
360-18434-8	OC-ISCO-1	Water	08/27/2008 1200	08/27/2008 1615

SAMPLE RESULTS

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-18434-1

Client Sample ID: OC-ISCO-3
Lab Sample ID: 360-18434-1

Date Sampled: 08/27/2008 0910
Date Received: 08/27/2008 1615
Client Matrix: Water

Analyte	Result/Qualifier		Unit	MDL	RL	Dilution
Method: Dissolved-6010B			Date Analyzed:	08/28/2008 1232		
Aluminum	57	J	ug/L	2.2	100	1.0
Chromium	35		ug/L	0.17	5.0	1.0
Sodium	160000	J	ug/L	65	2000	1.0
Method: 6010B			Date Analyzed:	09/04/2008 1431		
Prep Method: 3010A			Date Prepared:	09/03/2008 1204		
Aluminum	770		ug/L	2.2	100	1.0
Chromium	140		ug/L	0.17	5.0	1.0
Sodium	110000	J	ug/L	65	2000	1.0

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-18434-1

Client Sample ID: OC-ISCO-3
Lab Sample ID: 360-18434-1

Date Sampled: 08/27/2008 0910
Date Received: 08/27/2008 1615
Client Matrix: Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 10-107-06-1-K		Date Analyzed:	09/03/2008 1029		
Prep Method: Distill/Ammonia		Date Prepared:	09/03/2008 0848		
Ammonia	110	mg/L	1.0	1.0	10
Method: 300.0		Date Analyzed:	08/28/2008 1002		
Nitrate as N	0.72	mg/L	0.050	0.050	1.0
Method: 300.0		Date Analyzed:	08/28/2008 1017		
Sulfate	280	mg/L	20	20	10
Chloride	170	mg/L	10	10	10
Nitrite as N	ND	mg/L	0.10	0.10	10
Method: SM 2510B		Date Analyzed:	08/28/2008 1113		
Specific Conductance	1300	umhos/cm	1.0	1.0	1.0

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-18434-1

Client Sample ID: OC-ISCO-2
Lab Sample ID: 360-18434-2

Date Sampled: 08/27/2008 0925
Date Received: 08/27/2008 1615
Client Matrix: Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B		Date Analyzed:	08/28/2008 1241		
Aluminum	130	ug/L	2.2	100	1.0
Chromium	88	ug/L	0.17	5.0	1.0
Sodium	260000 J	ug/L	65	2000	1.0
Method: 6010B		Date Analyzed:	09/04/2008 1434		
Prep Method: 3010A		Date Prepared:	09/03/2008 1204		
Aluminum	3500	ug/L	2.2	100	1.0
Chromium	860	ug/L	0.17	5.0	1.0
Sodium	230000 J	ug/L	65	2000	1.0

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-18434-1

Client Sample ID: OC-ISCO-2
Lab Sample ID: 360-18434-2

Date Sampled: 08/27/2008 0925
Date Received: 08/27/2008 1615
Client Matrix: Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 10-107-06-1-K		Date Analyzed:	09/03/2008 1030		
Prep Method: Distill/Ammonia		Date Prepared:	09/03/2008 0848		
Ammonia	180	mg/L	1.0	1.0	10
Method: 300.0		Date Analyzed:	08/28/2008 1102		
Nitrate as N	0.75	mg/L	0.050	0.050	1.0
Method: 300.0		Date Analyzed:	08/28/2008 1117		
Sulfate	1100	mg/L	20	20	10
Chloride	240	mg/L	10	10	10
Nitrite as N	ND	mg/L	0.10	0.10	10
Method: SM 2510B		Date Analyzed:	08/28/2008 1116		
Specific Conductance	2900	umhos/cm	1.0	1.0	1.0

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-18434-1

Client Sample ID: OC-PZ-16RR
Lab Sample ID: 360-18434-3

Date Sampled: 08/27/2008 0950
Date Received: 08/27/2008 1615
Client Matrix: Water

Analyte	Result/Qualifier		Unit	MDL	RL	Dilution
Method: Dissolved-6010B			Date Analyzed:		08/28/2008 1244	
Aluminum	71	J	ug/L	2.2	100	1.0
Chromium	26		ug/L	0.17	5.0	1.0
Sodium	170000	J	ug/L	65	2000	1.0
Method: 6010B			Date Analyzed:		09/04/2008 1437	
Prep Method: 3010A			Date Prepared:		09/03/2008 1204	
Aluminum	7800		ug/L	2.2	100	1.0
Chromium	1900		ug/L	0.17	5.0	1.0
Sodium	140000	J	ug/L	65	2000	1.0

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-18434-1

Client Sample ID: OC-PZ-16RR
Lab Sample ID: 360-18434-3

Date Sampled: 08/27/2008 0950
Date Received: 08/27/2008 1615
Client Matrix: Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 10-107-06-1-K		Date Analyzed:		09/03/2008 1031	
Prep Method: Distill/Ammonia		Date Prepared:		09/03/2008 0848	
Ammonia	39	mg/L	0.50	0.50	5.0
Method: 300.0		Date Analyzed:		08/28/2008 1147	
Sulfate	280	mg/L	20	20	10
Nitrate as N	5.8	mg/L	0.50	0.50	10
Chloride	210	mg/L	10	10	10
Nitrite as N	ND	mg/L	0.10	0.10	10
Method: SM 2510B		Date Analyzed:		08/28/2008 1118	
Specific Conductance	1500	umhos/cm	1.0	1.0	1.0

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-18434-1

Client Sample ID: OC-PZ-17RR
Lab Sample ID: 360-18434-4

Date Sampled: 08/27/2008 1010
Date Received: 08/27/2008 1615
Client Matrix: Water

Analyte	Result/Qualifier		Unit	MDL	RL	Dilution
Method: Dissolved-6010B			Date Analyzed:	08/28/2008 1247		
Aluminum	28	J	ug/L	2.2	100	1.0
Chromium	42		ug/L	0.17	5.0	1.0
Sodium	170000		ug/L	65	2000	1.0
Method: 6010B			Date Analyzed:	09/04/2008 1440		
Prep Method: 3010A			Date Prepared:	09/03/2008 1204		
Aluminum	4100		ug/L	2.2	100	1.0
Chromium	1100		ug/L	0.17	5.0	1.0
Sodium	160000		ug/L	65	2000	1.0

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-18434-1

Client Sample ID: OC-PZ-17RR
Lab Sample ID: 360-18434-4

Date Sampled: 08/27/2008 1010
Date Received: 08/27/2008 1615
Client Matrix: Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 10-107-06-1-K		Date Analyzed:	09/03/2008 1032		
Prep Method: Distill/Ammonia		Date Prepared:	09/03/2008 0848		
Ammonia	40	mg/L	0.50	0.50	5.0
Method: 300.0		Date Analyzed:	08/28/2008 1218		
Sulfate	260	mg/L	20	20	10
Nitrate as N	6.7	mg/L	0.50	0.50	10
Chloride	220	mg/L	10	10	10
Nitrite as N	ND	mg/L	0.10	0.10	10
Method: SM 2510B		Date Analyzed:	08/28/2008 1119		
Specific Conductance	1500	umhos/cm	1.0	1.0	1.0

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-18434-1

Client Sample ID: OC-SD-17
Lab Sample ID: 360-18434-5

Date Sampled: 08/27/2008 1025
Date Received: 08/27/2008 1615
Client Matrix: Water

Analyte	Result/Qualifier		Unit	MDL	RL	Dilution
Method: Dissolved-6010B			Date Analyzed:	08/28/2008 1250		
Aluminum	27	J	ug/L	2.2	100	1.0
Chromium	40		ug/L	0.17	5.0	1.0
Sodium	170000		ug/L	65	2000	1.0
Method: 6010B			Date Analyzed:	09/04/2008 1443		
Prep Method: 3010A			Date Prepared:	09/03/2008 1204		
Aluminum	4900		ug/L	2.2	100	1.0
Chromium	1300		ug/L	0.17	5.0	1.0
Sodium	160000		ug/L	65	2000	1.0

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Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-18434-1

Client Sample ID: OC-SD-17
Lab Sample ID: 360-18434-5

Date Sampled: 08/27/2008 1025
Date Received: 08/27/2008 1615
Client Matrix: Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 10-107-06-1-K		Date Analyzed:		09/03/2008 1033	
Prep Method: Distill/Ammonia		Date Prepared:		09/03/2008 0848	
Ammonia	43	mg/L	0.50	0.50	5.0
Method: 300.0		Date Analyzed:		08/28/2008 1318	
Sulfate	250	mg/L	20	20	10
Nitrate as N	6.8	mg/L	0.50	0.50	10
Chloride	220	mg/L	10	10	10
Nitrite as N	ND	mg/L	0.10	0.10	10
Method: SM 2510B		Date Analyzed:		08/28/2008 1121	
Specific Conductance	1400	umhos/cm	1.0	1.0	1.0

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-18434-1

Client Sample ID: OC-PZ-18R
Lab Sample ID: 360-18434-6

Date Sampled: 08/27/2008 1037
Date Received: 08/27/2008 1615
Client Matrix: Water

Analyte	Result/Qualifier		Unit	MDL	RL	Dilution
Method: Dissolved-6010B			Date Analyzed:	08/28/2008 1253		
Aluminum	15	J	ug/L	2.2	100	1.0
Chromium	7.2		ug/L	0.17	5.0	1.0
Sodium	110000		ug/L	65	2000	1.0
Method: 6010B			Date Analyzed:	09/04/2008 1446		
Prep Method: 3010A			Date Prepared:	09/03/2008 1204		
Aluminum	100		ug/L	2.2	100	1.0
Chromium	17		ug/L	0.17	5.0	1.0
Sodium	100000		ug/L	65	2000	1.0

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Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-18434-1

Client Sample ID: OC-PZ-18R
Lab Sample ID: 360-18434-6

Date Sampled: 08/27/2008 1037
Date Received: 08/27/2008 1615
Client Matrix: Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 10-107-06-1-K		Date Analyzed:	09/03/2008 1034		
Prep Method: Distill/Ammonia		Date Prepared:	09/03/2008 0848		
Ammonia	56	mg/L	1.0	1.0	10
Method: 300.0		Date Analyzed:	08/28/2008 1333		
Nitrate as N	0.12	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:	08/28/2008 1348		
Sulfate	270	mg/L	20	20	10
Chloride	120	mg/L	10	10	10
Method: SM 2510B		Date Analyzed:	08/28/2008 1122		
Specific Conductance	1100	umhos/cm	1.0	1.0	1.0

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Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-18434-1

Client Sample ID: OC-PZ-18R-DUP
Lab Sample ID: 360-18434-7

Date Sampled: 08/27/2008 1200
Date Received: 08/27/2008 1615
Client Matrix: Water

Analyte	Result/Qualifier		Unit	MDL	RL	Dilution
Method: Dissolved-6010B			Date Analyzed:		08/28/2008 1256	
Aluminum	31	J	ug/L	2.2	100	1.0
Chromium	8.8		ug/L	0.17	5.0	1.0
Sodium	110000	J	ug/L	65	2000	1.0
Method: 6010B			Date Analyzed:		09/04/2008 1449	
Prep Method: 3010A			Date Prepared:		09/03/2008 1204	
Aluminum	97	J	ug/L	2.2	100	1.0
Chromium	17		ug/L	0.17	5.0	1.0
Sodium	96000	J	ug/L	65	2000	1.0

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-18434-1

Client Sample ID: OC-PZ-18R-DUP
Lab Sample ID: 360-18434-7

Date Sampled: 08/27/2008 1200
Date Received: 08/27/2008 1615
Client Matrix: Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 10-107-06-1-K		Date Analyzed:	09/03/2008 1035		
Prep Method: Distill/Ammonia		Date Prepared:	09/03/2008 0848		
Ammonia	67	mg/L	0.50	0.50	5.0
Method: 300.0		Date Analyzed:	08/28/2008 1403		
Nitrate as N	0.12	mg/L	0.050	0.050	1.0
Method: 300.0		Date Analyzed:	08/28/2008 1418		
Sulfate	270	mg/L	20	20	10
Chloride	130	mg/L	10	10	10
Nitrite as N	ND	mg/L	0.10	0.10	10
Method: SM 2510B		Date Analyzed:	08/28/2008 1124		
Specific Conductance	1100	umhos/cm	1.0	1.0	1.0

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-18434-1

Client Sample ID: OC-ISCO-1
Lab Sample ID: 360-18434-8

Date Sampled: 08/27/2008 1200
Date Received: 08/27/2008 1615
Client Matrix: Water

Analyte	Result/Qualifier		Unit	MDL	RL	Dilution
Method: Dissolved-6010B			Date Analyzed:		08/28/2008 1300	
Aluminum	11	J	ug/L	2.2	100	1.0
Chromium	6.6	~~B~~ U	ug/L	0.17	5.0	1.0
Sodium	110000 J		ug/L	65	2000	1.0
Method: 6010B			Date Analyzed:		09/04/2008 1452	
Prep Method: 3010A			Date Prepared:		09/03/2008 1204	
Aluminum	94	J	ug/L	2.2	100	1.0
Chromium	16		ug/L	0.17	5.0	1.0
Sodium	92000 J		ug/L	65	2000	1.0

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-18434-1

Client Sample ID: OC-ISCO-1
Lab Sample ID: 360-18434-8

Date Sampled: 08/27/2008 1200
Date Received: 08/27/2008 1615
Client Matrix: Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 10-107-06-1-K		Date Analyzed:	09/03/2008 1036		
Prep Method: Distill/Ammonia		Date Prepared:	09/03/2008 0848		
Ammonia	56	mg/L	0.50	0.50	5.0
Method: 300.0		Date Analyzed:	08/28/2008 1434		
Nitrate as N	0.13	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:	08/28/2008 1449		
Sulfate	270	mg/L	20	20	10
Chloride	130	mg/L	10	10	10
Method: SM 2510B		Date Analyzed:	08/28/2008 1125		
Specific Conductance	1100	umhos/cm	1.0	1.0	1.0

DATA REPORTING QUALIFIERS

Client: Olin Corporation

Job Number: 360-18434-1

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: 360-18434-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
Metals					
Analysis Batch:360-35673					
LCS 360-35673/1	Lab Control Spike	T	Water	6010B	
LCSD 360-35673/10	Lab Control Spike Duplicate	T	Water	6010B	
MB 360-35673/2	Method Blank	T	Water	6010B	
360-18434-1	OC-ISCO-3	D	Water	6010B	
360-18434-2	OC-ISCO-2	D	Water	6010B	
360-18434-3	OC-PZ-16RR	D	Water	6010B	
360-18434-4	OC-PZ-17RR	D	Water	6010B	
360-18434-5	OC-SD-17	D	Water	6010B	
360-18434-6	OC-PZ-18R	D	Water	6010B	
360-18434-7	OC-PZ-18R-DUP	D	Water	6010B	
Analysis Batch:360-35684					
LCS 360-35684/1	Lab Control Spike	T	Water	6010B	
LCSD 360-35684/7	Lab Control Spike Duplicate	T	Water	6010B	
MB 360-35684/2	Method Blank	T	Water	6010B	
360-18434-8	OC-ISCO-1	D	Water	6010B	
360-18434-8DU	Duplicate	D	Water	6010B	
360-18434-8MS	Matrix Spike	D	Water	6010B	
Prep Batch: 360-35773					
LCS 360-35773/2-A	Lab Control Spike	T	Water	3010A	
LCSD 360-35773/3-A	Lab Control Spike Duplicate	T	Water	3010A	
MB 360-35773/1-A	Method Blank	T	Water	3010A	
360-18434-1	OC-ISCO-3	T	Water	3010A	
360-18434-2	OC-ISCO-2	T	Water	3010A	
360-18434-3	OC-PZ-16RR	T	Water	3010A	
360-18434-4	OC-PZ-17RR	T	Water	3010A	
360-18434-5	OC-SD-17	T	Water	3010A	
360-18434-6	OC-PZ-18R	T	Water	3010A	
360-18434-7	OC-PZ-18R-DUP	T	Water	3010A	
360-18434-8	OC-ISCO-1	T	Water	3010A	
Analysis Batch:360-35844					
LCS 360-35773/2-A	Lab Control Spike	T	Water	6010B	360-35773
LCSD 360-35773/3-A	Lab Control Spike Duplicate	T	Water	6010B	360-35773
MB 360-35773/1-A	Method Blank	T	Water	6010B	360-35773
360-18434-1	OC-ISCO-3	T	Water	6010B	360-35773
360-18434-2	OC-ISCO-2	T	Water	6010B	360-35773
360-18434-3	OC-PZ-16RR	T	Water	6010B	360-35773
360-18434-4	OC-PZ-17RR	T	Water	6010B	360-35773
360-18434-5	OC-SD-17	T	Water	6010B	360-35773
360-18434-6	OC-PZ-18R	T	Water	6010B	360-35773
360-18434-7	OC-PZ-18R-DUP	T	Water	6010B	360-35773
360-18434-8	OC-ISCO-1	T	Water	6010B	360-35773

Client: Olin Corporation

Job Number: 360-18434-1

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: 360-18434-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
General Chemistry					
Analysis Batch:360-35667					
LCS 360-35667/1	Lab Control Spike	T	Water	SM 2510B	
MB 360-35667/4	Method Blank	T	Water	SM 2510B	
360-18434-1	OC-ISCO-3	T	Water	SM 2510B	
360-18434-1DU	Duplicate	T	Water	SM 2510B	
360-18434-2	OC-ISCO-2	T	Water	SM 2510B	
360-18434-3	OC-PZ-16RR	T	Water	SM 2510B	
360-18434-4	OC-PZ-17RR	T	Water	SM 2510B	
360-18434-5	OC-SD-17	T	Water	SM 2510B	
360-18434-6	OC-PZ-18R	T	Water	SM 2510B	
360-18434-7	OC-PZ-18R-DUP	T	Water	SM 2510B	
360-18434-8	OC-ISCO-1	T	Water	SM 2510B	
Analysis Batch:360-35705					
LCS 360-35705/2	Lab Control Spike	T	Water	300.0	
MB 360-35705/1	Method Blank	T	Water	300.0	
360-18434-1	OC-ISCO-3	T	Water	300.0	
360-18434-1MS	Matrix Spike	T	Water	300.0	
360-18434-1MSD	Matrix Spike Duplicate	T	Water	300.0	
360-18434-2	OC-ISCO-2	T	Water	300.0	
360-18434-3	OC-PZ-16RR	T	Water	300.0	
360-18434-4	OC-PZ-17RR	T	Water	300.0	
360-18434-5	OC-SD-17	T	Water	300.0	
360-18434-6	OC-PZ-18R	T	Water	300.0	
360-18434-7	OC-PZ-18R-DUP	T	Water	300.0	
360-18434-8	OC-ISCO-1	T	Water	300.0	
Analysis Batch:360-35710					
LCS 360-35710/2	Lab Control Spike	T	Water	300.0	
MB 360-35710/1	Method Blank	T	Water	300.0	
360-18434-1	OC-ISCO-3	T	Water	300.0	
360-18434-1MS	Matrix Spike	T	Water	300.0	
360-18434-1MSD	Matrix Spike Duplicate	T	Water	300.0	
360-18434-2	OC-ISCO-2	T	Water	300.0	
360-18434-3	OC-PZ-16RR	T	Water	300.0	
360-18434-4	OC-PZ-17RR	T	Water	300.0	
360-18434-5	OC-SD-17	T	Water	300.0	
360-18434-6	OC-PZ-18R	T	Water	300.0	
360-18434-7	OC-PZ-18R-DUP	T	Water	300.0	
360-18434-8	OC-ISCO-1	T	Water	300.0	

Client: Olin Corporation

Job Number: 360-18434-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
General Chemistry					
Prep Batch: 360-35761					
LCS 360-35761/2-A	Lab Control Spike	T	Water	Distill/Ammonia	
MB 360-35761/1-A	Method Blank	T	Water	Distill/Ammonia	
360-18434-1	OC-ISCO-3	T	Water	Distill/Ammonia	
360-18434-2	OC-ISCO-2	T	Water	Distill/Ammonia	
360-18434-3	OC-PZ-16RR	T	Water	Distill/Ammonia	
360-18434-4	OC-PZ-17RR	T	Water	Distill/Ammonia	
360-18434-5	OC-SD-17	T	Water	Distill/Ammonia	
360-18434-6	OC-PZ-18R	T	Water	Distill/Ammonia	
360-18434-7	OC-PZ-18R-DUP	T	Water	Distill/Ammonia	
360-18434-8	OC-ISCO-1	T	Water	Distill/Ammonia	
Analysis Batch:360-35778					
LCS 360-35761/2-A	Lab Control Spike	T	Water	10-107-06-1-K	360-35761
MB 360-35761/1-A	Method Blank	T	Water	10-107-06-1-K	360-35761
360-18434-1	OC-ISCO-3	T	Water	10-107-06-1-K	360-35761
360-18434-2	OC-ISCO-2	T	Water	10-107-06-1-K	360-35761
360-18434-3	OC-PZ-16RR	T	Water	10-107-06-1-K	360-35761
360-18434-4	OC-PZ-17RR	T	Water	10-107-06-1-K	360-35761
360-18434-5	OC-SD-17	T	Water	10-107-06-1-K	360-35761
360-18434-6	OC-PZ-18R	T	Water	10-107-06-1-K	360-35761
360-18434-7	OC-PZ-18R-DUP	T	Water	10-107-06-1-K	360-35761
360-18434-8	OC-ISCO-1	T	Water	10-107-06-1-K	360-35761

Report Basis
T = Total

Client: Olin Corporation

Job Number: 360-18434-1

Method Blank - Batch: 360-35673

Method: 6010B
Preparation: N/A

Lab Sample ID: MB 360-35673/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 08/28/2008 1155
Date Prepared: N/A

Analysis Batch: 360-35673
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: 360-35673

Method: 6010B
Preparation: N/A

LCS Lab Sample ID: LCS 360-35673/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 08/28/2008 1152
Date Prepared: N/A

Analysis Batch: 360-35673
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 360-35673/10
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 08/28/2008 1235
Date Prepared: N/A

Analysis Batch: 360-35673
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	100	101	80 - 120	1	20		
Chromium	99	100	80 - 120	1	20		
Sodium	98	98	80 - 120	0	20		

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-18434-1

Method Blank - Batch: 360-35684

Method: 6010B
Preparation: N/A

Lab Sample ID: MB 360-35684/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 08/28/2008 1238
Date Prepared: N/A

Analysis Batch: 360-35684
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	2.3	J	0.17	5.0
Sodium	ND		65	2000

Lab Control Spike/
Lab Control Spike Duplicate Recovery Report - Batch: 360-35684

Method: 6010B
Preparation: N/A

LCS Lab Sample ID: LCS 360-35684/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 08/28/2008 1235
Date Prepared: N/A

Analysis Batch: 360-35684
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 360-35684/7
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 08/28/2008 1311
Date Prepared: N/A

Analysis Batch: 360-35684
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	101	100	80 - 120	0	20		
Chromium	100	100	80 - 120	0	20		
Sodium	98	98	80 - 120	0	20		

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-18434-1

Matrix Spike - Batch: 360-35684

Method: 6010B
Preparation: N/A

Lab Sample ID: 360-18434-8
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 08/28/2008 1306
Date Prepared: N/A

Analysis Batch: 360-35684
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	11	J	5000	6830	136	75 - 125	F
Chromium	6.6		1000	1310	130	75 - 125	F
Sodium	110000		20000	130000	105	75 - 125	4

Duplicate - Batch: 360-35684

Method: 6010B
Preparation: N/A

Lab Sample ID: 360-18434-8
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 08/28/2008 1303
Date Prepared: N/A

Analysis Batch: 360-35684
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	11	J	11.3	0	20	J
Chromium	6.6		6.71	2	20	
Sodium	110000		109000	0	20	

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-18434-1

Method Blank - Batch: 360-35773

Method: 6010B
Preparation: 3010A

Lab Sample ID: MB 360-35773/1-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/04/2008 1356
Date Prepared: 09/03/2008 1204

Analysis Batch: 360-35844
Prep Batch: 360-35773
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	ND		0.17	5.0
Sodium	ND		65	2000

Lab Control Spike/
Lab Control Spike Duplicate Recovery Report - Batch: 360-35773

Method: 6010B
Preparation: 3010A

LCS Lab Sample ID: LCS 360-35773/2-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/04/2008 1359
Date Prepared: 09/03/2008 1204

Analysis Batch: 360-35844
Prep Batch: 360-35773
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 360-35773/3-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/04/2008 1402
Date Prepared: 09/03/2008 1204

Analysis Batch: 360-35844
Prep Batch: 360-35773
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	102	103	80 - 120	1	20		
Chromium	104	104	80 - 120	0	20		
Sodium	99	99	80 - 120	0	20		

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-18434-1

Method Blank - Batch: 360-35761

Method: 10-107-06-1-K
Preparation: Distill/Ammonia

Lab Sample ID: MB 360-35761/1-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/03/2008 1005
Date Prepared: 09/03/2008 0848

Analysis Batch: 360-35778
Prep Batch: 360-35761
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: 360-35761

Method: 10-107-06-1-K
Preparation: Distill/Ammonia

Lab Sample ID: LCS 360-35761/2-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/03/2008 1006
Date Prepared: 09/03/2008 0848

Analysis Batch: 360-35778
Prep Batch: 360-35761
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	9.62	96	85 - 115	

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-18434-1

Method Blank - Batch: 360-35705

Method: 300.0
Preparation: N/A

Lab Sample ID: MB 360-35705/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 08/28/2008 0931
Date Prepared: N/A

Analysis Batch: 360-35705
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: 360-35705

Method: 300.0
Preparation: N/A

Lab Sample ID: LCS 360-35705/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 08/28/2008 0946
Date Prepared: N/A

Analysis Batch: 360-35705
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	3.81	95	85 - 115	
Nitrite as N	4.00	4.00	100	85 - 115	

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-18434-1

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 360-35705

Method: 300.0
Preparation: N/A

MS Lab Sample ID:	360-18434-1	Analysis Batch: 360-35705	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:	08/28/2008 1032		Final Weight/Volume: 10 mL
Date Prepared:	N/A		

MSD Lab Sample ID:	360-18434-1	Analysis Batch: 360-35705	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:	08/28/2008 1047		Final Weight/Volume: 10 mL
Date Prepared:	N/A		

	% Rec.						
Analyte	MS	MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Nitrate as N	79	79	75 - 125	0	20		
Nitrite as N	86	86	75 - 125	0	20		

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-18434-1

Method Blank - Batch: 360-35710

Method: 300.0
Preparation: N/A

Lab Sample ID: MB 360-35710/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 08/28/2008 0931
Date Prepared: N/A

Analysis Batch: 360-35710
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: 360-35710

Method: 300.0
Preparation: N/A

Lab Sample ID: LCS 360-35710/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 08/28/2008 0946
Date Prepared: N/A

Analysis Batch: 360-35710
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	79.4	99	85 - 115	
Chloride	40.0	40.5	101	85 - 115	

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-18434-1

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 360-35710

Method: 300.0
Preparation: N/A

MS Lab Sample ID:	360-18434-1	Analysis Batch: 360-35710	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:	08/28/2008 1032		Final Weight/Volume: 10 mL
Date Prepared:	N/A		

MSD Lab Sample ID:	360-18434-1	Analysis Batch: 360-35710	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:	08/28/2008 1047		Final Weight/Volume: 10 mL
Date Prepared:	N/A		

	% Rec.						
Analyte	MS	MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Sulfate	94	94	75 - 125	0	20		
Chloride	92	95	75 - 125	1	20		

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-18434-1

Method Blank - Batch: 360-35667

Method: SM 2510B
Preparation: N/A

Lab Sample ID: MB 360-35667/4
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 08/28/2008 1112
Date Prepared: N/A

Analysis Batch: 360-35667
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: 360-35667

Method: SM 2510B
Preparation: N/A

Lab Sample ID: LCS 360-35667/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 08/28/2008 1105
Date Prepared: N/A

Analysis Batch: 360-35667
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	1410	1430	101	85 - 115	

Duplicate - Batch: 360-35667

Method: SM 2510B
Preparation: N/A

Lab Sample ID: 360-18434-1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 08/28/2008 1115
Date Prepared: N/A

Analysis Batch: 360-35667
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	1290	0	20	

Calculations are performed before rounding to avoid round-off errors in calculated results.

Login Sample Receipt Check List

Client: Olin Corporation

Job Number: 360-18434-1

Login Number: 18434
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	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.	False	Lab received 4 bottles labeled ISCO-1 DUP, ID is not on COC.
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	False	No volume was provided for "PZ-18R DUP"
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

360-18434

•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 #: 61000800116
Project Manager: Peter Thompson
Work ID: PCMP
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 flaz/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)	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
ISCO-3	SW	MAM	8-27-08 9:10	X		4	P		X	X				X	X	X	X	X		X							
ISCO-2	SW	DLC	8-27-08 9:25	X		4	P		X	X				X	X	X	X	X		X							
PZ-16RR	SW	MAM	8-27-08 9:50	X		4	P		X	X				X	X	X	X	X		X							
PZ-17RR	SW	MAM	8-27-08 10:10	X		4	P		X	X				X	X	X	X	X		X							
SD-17	SW	DLC	8-27-08 10:25	X		4	P		X	X				X	X	X	X	X		X							
PZ-18R	SW	MAM	8-27-08 10:37	X		4	P		X	X				X	X	X	X	X		X							
PZ-18R-DUP	SW	MAM	8-27-08	X		4	P		X	X				X	X	X	X	X		X							
ISCO-1	SW	DLC	8-27-08	X		4	P		X	X				X	X	X	X	X		X							

Dissolved metals are field filtered.

Groundwater Metals: Dissolved Al/Cr

Surfacewater Metals: Dissolved/Total Al/Cr/Na

SHORT HOLD TIME FOR NITRATE/NITRITE SAMPLES

Sampled by (print): David Chapman / Mark Maggiore
Signature:

Relinquished by: David Chapman Date: 8/27/08 Time: 1430
Received by: Jerry Dal Date: 8/27/08 Time: 1430

Relinquished by: Jerry Dal Date: 8/27/08 Time: 1615
Received by: Date: 8/27/08 Time: 1615

Method of shipment:

TestAmerica-Westfield

Cooler? Y / N Samples Iced? Y / N
Temp @ receipt: 5.0°C
Preservation/pH checked
By: Date: 8/27/08

Page 1 of 1

White = Lab file Yellow = Report copy Pink = Customer copy
STL-8245 (1000)

FILE COPY

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

Job Number: 360-18435-1

Job Description: PCMP Groundwater

For:
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Attention: Mr. Steven Morrow

CHECKED FOR COMPLETENESS OF PARAMETERS ORDERED BY:

Chris Picardi

Joseph A. Chiesa Jr.

Designee for
Becky C Mason
Project Manager II
becky.mason@testamericainc.com
09/09/2008

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

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MADEP MCP Analytical Method Report Certification Form

Laboratory Name:	**TestAmerica Westfield**	Project #:	**360-18435-1**
Project Location:	**PCMP**	MADEP RTN[1]:	

This form provides certifications for the following data set:[list Laboratory Sample ID Number(s)]
360-18435-(1-9)

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:** 9/9/08 14:48

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

WI-QA-037

MADEP MCP Analytical Method Report Certification Form

Laboratory Name:	**TestAmerica Westfield**	Project #:	**360-18435-1**
Project Location:	**PCMP**	MADEP RTN[1]:	

This form provides certifications for the following data set:[list Laboratory Sample ID Number(s)]
360-18435-(1-9)

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:** 9/9/08 14:48

The certification form has been electronically signed and approved. CAM VII A, Rev 3.2 April-04

CASE NARRATIVE

Client: Olin Corporation

Project: PCMP Groundwater

Report Number: 360-18435-1

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 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 08/27/2008; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 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.

DISSOLVED METALS

Samples 360-18435-1 through 360-18435-9 were analyzed for dissolved metals in accordance with EPA SW846 Method 6010B. The samples were analyzed on 08/28/2008.

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 360-35684/2 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).

AMMONIA

Samples 360-18435-1 through 360-18435-9 were analyzed for ammonia in accordance with LACHAT 10-107-06-1. The samples were prepared on 09/03/2008 and 09/05/2008 and analyzed on 09/03/2008 and 09/08/2008.

All QC performance standards and recommendations for this specific method were achieved.

Samples 360-18435-1(5X), 360-18435-2(10X), 360-18435-3(5X), 360-18435-4(10X), 360-18435-5(20X), 360-18435-6(10X), 360-18435-7(5X), 360-18435-8 and 360-18435-9(10X) required dilution prior to analysis. The reporting limits have been adjusted accordingly. Dilutions were due to high concentration.

ANIONS

Samples 360-18435-1 through 360-18435-9 were analyzed for anions in accordance with EPA Method 300.0. The samples were analyzed on 08/28/2008 and 08/30/2008.

All QC performance standards and recommendations for this specific method were achieved.

Samples 360-18435-1 through 360-18435-5(10X), 360-18435-5(20X) and 360-18435-6 through 360-18435-9(10X) required dilution prior to analysis. The reporting limits have been adjusted accordingly. Dilutions were due to high target concentration.

SPECIFIC CONDUCTANCE (CONDUCTIVITY)

Samples 360-18435-1 through 360-18435-9 were analyzed for Specific Conductance (Conductivity) in accordance with SM 2510B. The samples were analyzed on 08/28/2008.

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: 360-18435-1

Description	Lab Location	Method	Preparation Method
Matrix: Water			
Dissolved Metals	TAL WFD	SW846 6010B	
Sample Filtration performed in the Field	TAL WFD		FIELD_FLTRD
Lachat Ammonia	TAL WFD	QuickChem 10-107-06-1-K	
Distillation/Ammonia	TAL WFD		Distill/Ammonia
Chloride & Sulfate	TAL WFD	40CFR136A 300.0	
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.

QuickChem = Lachat Instruments

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: 360-18435-1

Method	Analyst	Analyst ID
SW846 6010B	Nasiatka, Ellen M	EMN
QuickChem 10-107-06-1-K	Lalashius, Andrew L	ALL
40CFR136A 300.0	Lalashius, Andrew L	ALL
SM SM 2510B	Emerich, Rich W	RWE

SAMPLE SUMMARY

Client: Olin Corporation

Job Number: 360-18435-1

Lab Sample ID	Client Sample ID	Client Matrix	Date/Time Sampled	Date/Time Received
360-18435-1	OC-GW-78S	Ground Water	08/26/2008 1130	08/27/2008 1615
360-18435-2	OC-GW-79S	Ground Water	08/26/2008 0940	08/27/2008 1615
360-18435-3	OC-GW-25	Ground Water	08/26/2008 1315	08/27/2008 1615
360-18435-4	OC-GW-79S DUP	Ground Water	08/26/2008 0940	08/27/2008 1615
360-18435-5	OC-GW-202D	Ground Water	08/25/2008 1605	08/27/2008 1615
360-18435-6	OC-GW-202S	Ground Water	08/25/2008 1545	08/27/2008 1615
360-18435-7	OC-PZ-18R	Ground Water	08/26/2008 1240	08/27/2008 1615
360-18435-8	OC-PZ-17RR	Ground Water	08/26/2008 1200	08/27/2008 1615
360-18435-9	OC-PZ-16RR	Ground Water	08/26/2008 0915	08/27/2008 1615

SAMPLE RESULTS

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-18435-1

Client Sample ID: OC-GW-78S
Lab Sample ID: 360-18435-1

Date Sampled: 08/26/2008 1130
Date Received: 08/27/2008 1615
Client Matrix: Ground Water

Analyte	Result/Qualifier		Unit	MDL	RL	Dilution
Method: Dissolved-6010B			Date Analyzed:		08/28/2008 1317	
Aluminum	20	J	ug/L	2.2	100	1.0
Chromium	12	~~B~~	ug/L	0.17	5.0	1.0

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-18435-1

Client Sample ID: OC-GW-78S
Lab Sample ID: 360-18435-1

Date Sampled: 08/26/2008 1130
Date Received: 08/27/2008 1615
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 10-107-06-1-K		Date Analyzed:		09/03/2008 1037	
Prep Method: Distill/Ammonia		Date Prepared:		09/03/2008 0848	
Ammonia	64	mg/L	0.50	0.50	5.0
Method: 300.0		Date Analyzed:		08/28/2008 1504	
Chloride	27	mg/L	1.0	1.0	1.0
Method: 300.0		Date Analyzed:		08/28/2008 1519	
Sulfate	550	mg/L	20	20	10
Method: SM 2510B		Date Analyzed:		08/28/2008 1126	
Specific Conductance	1300	umhos/cm	1.0	1.0	1.0

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-18435-1

Client Sample ID: OC-GW-79S
Lab Sample ID: 360-18435-2

Date Sampled: 08/26/2008 0940
Date Received: 08/27/2008 1615
Client Matrix: Ground Water

Analyte	Result/Qualifier		Unit	MDL	RL	Dilution
Method: Dissolved-6010B			Date Analyzed:		08/28/2008 1320	
Aluminum	17	J	ug/L	2.2	100	1.0
Chromium	16	B	ug/L	0.17	5.0	1.0

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-18435-1

Client Sample ID: OC-GW-79S
Lab Sample ID: 360-18435-2

Date Sampled: 08/26/2008 0940
Date Received: 08/27/2008 1615
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 10-107-06-1-K		Date Analyzed:		09/03/2008 1048	
Prep Method: Distill/Ammonia		Date Prepared:		09/03/2008 0848	
Ammonia	150	mg/L	1.0	1.0	10
Method: 300.0		Date Analyzed:		08/28/2008 1650	
Sulfate	1100	mg/L	20	20	10
Chloride	120	mg/L	10	10	10
Method: SM 2510B		Date Analyzed:		08/28/2008 1128	
Specific Conductance	2600	umhos/cm	1.0	1.0	1.0

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-18435-1

Client Sample ID: OC-GW-25
Lab Sample ID: 360-18435-3

Date Sampled: 08/26/2008 1315
Date Received: 08/27/2008 1615
Client Matrix: Ground Water

Analyte	Result/Qualifier		Unit	MDL	RL	Dilution
Method: Dissolved-6010B			Date Analyzed:		08/28/2008 1323	
Aluminum	3.0	J	ug/L	2.2	100	1.0
Chromium	~~4.8~~ 5.0	~~J B~~ U	ug/L	0.17	5.0	1.0

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-18435-1

Client Sample ID: OC-GW-25
Lab Sample ID: 360-18435-3

Date Sampled: 08/26/2008 1315
Date Received: 08/27/2008 1615
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 10-107-06-1-K		Date Analyzed:		09/03/2008 1049	
Prep Method: Distill/Ammonia		Date Prepared:		09/03/2008 0848	
Ammonia	54	mg/L	0.50	0.50	5.0
Method: 300.0		Date Analyzed:		08/28/2008 1720	
Sulfate	140	mg/L	20	20	10
Chloride	49	mg/L	10	10	10
Method: SM 2510B		Date Analyzed:		08/28/2008 1129	
Specific Conductance	690	umhos/cm	1.0	1.0	1.0

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-18435-1

Client Sample ID: OC-GW-79S DUP
Lab Sample ID: 360-18435-4

Date Sampled: 08/26/2008 0940
Date Received: 08/27/2008 1615
Client Matrix: Ground Water

Analyte	Result/Qualifier		Unit	MDL	RL	Dilution
Method: Dissolved-6010B			Date Analyzed:		08/28/2008 1326	
Aluminum	15	J	ug/L	2.2	100	1.0
Chromium	16	B	ug/L	0.17	5.0	1.0

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-18435-1

Client Sample ID: OC-GW-79S DUP
Lab Sample ID: 360-18435-4

Date Sampled: 08/26/2008 0940
Date Received: 08/27/2008 1615
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 10-107-06-1-K		Date Analyzed:		09/03/2008 1050	
Prep Method: Distill/Ammonia		Date Prepared:		09/03/2008 0848	
Ammonia	140	mg/L	1.0	1.0	10
Method: 300.0		Date Analyzed:		08/28/2008 1750	
Sulfate	1000	mg/L	20	20	10
Chloride	120	mg/L	10	10	10
Method: SM 2510B		Date Analyzed:		08/28/2008 1131	
Specific Conductance	2600	umhos/cm	1.0	1.0	1.0

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-18435-1

Client Sample ID: OC-GW-202D
Lab Sample ID: 360-18435-5

Date Sampled: 08/25/2008 1605
Date Received: 08/27/2008 1615
Client Matrix: Ground Water

Analyte	Result/Qualifier		Unit	MDL	RL	Dilution
Method: Dissolved-6010B			Date Analyzed:		08/28/2008 1329	
Aluminum	8400		ug/L	2.2	100	1.0
Chromium	620	B	ug/L	0.17	5.0	1.0

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-18435-1

Client Sample ID: OC-GW-202D
Lab Sample ID: 360-18435-5

Date Sampled: 08/25/2008 1605
Date Received: 08/27/2008 1615
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 10-107-06-1-K		Date Analyzed:		09/03/2008 1051	
Prep Method: Distill/Ammonia		Date Prepared:		09/03/2008 0848	
Ammonia	340	mg/L	2.0	2.0	20
Method: 300.0		Date Analyzed:		08/28/2008 1820	
Chloride	310	mg/L	10	10	10
Method: 300.0		Date Analyzed:		08/30/2008 1523	
Sulfate	2100	mg/L	40	40	20
Method: SM 2510B		Date Analyzed:		08/28/2008 1132	
Specific Conductance	4800	umhos/cm	1.0	1.0	1.0

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-18435-1

Client Sample ID: OC-GW-202S
Lab Sample ID: 360-18435-6

Date Sampled: 08/25/2008 1545
Date Received: 08/27/2008 1615
Client Matrix: Ground Water

Analyte	Result/Qualifier		Unit	MDL	RL	Dilution
Method: Dissolved-6010B			Date Analyzed:		08/28/2008 1332	
Aluminum	3.4	J	ug/L	2.2	100	1.0
Chromium	5.0	~~J B~~ U	ug/L	0.17	5.0	1.0

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-18435-1

Client Sample ID: OC-GW-202S
Lab Sample ID: 360-18435-6

Date Sampled: 08/25/2008 1545
Date Received: 08/27/2008 1615
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 10-107-06-1-K		Date Analyzed:		09/03/2008 1052	
Prep Method: Distill/Ammonia		Date Prepared:		09/03/2008 0848	
Ammonia	100	mg/L	1.0	1.0	10
Method: 300.0		Date Analyzed:		08/28/2008 1850	
Sulfate	590	mg/L	20	20	10
Chloride	57	mg/L	10	10	10
Method: SM 2510B		Date Analyzed:		08/28/2008 1134	
Specific Conductance	1600	umhos/cm	1.0	1.0	1.0

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-18435-1

Client Sample ID: OC-PZ-18R
Lab Sample ID: 360-18435-7

Date Sampled: 08/26/2008 1240
Date Received: 08/27/2008 1615
Client Matrix: Ground Water

Analyte	Result/Qualifier		Unit	MDL	RL	Dilution
Method: Dissolved-6010B			Date Analyzed:		08/28/2008 1335	
Aluminum	5.3	J	ug/L	2.2	100	1.0
Chromium	19	B	ug/L	0.17	5.0	1.0

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-18435-1

Client Sample ID: OC-PZ-18R
Lab Sample ID: 360-18435-7

Date Sampled: 08/26/2008 1240
Date Received: 08/27/2008 1615
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 10-107-06-1-K		Date Analyzed:		09/03/2008 1053	
Prep Method: Distill/Ammonia		Date Prepared:		09/03/2008 0848	
Ammonia	50	mg/L	0.50	0.50	5.0
Method: 300.0		Date Analyzed:		08/28/2008 1951	
Sulfate	120	mg/L	20	20	10
Chloride	94	mg/L	10	10	10
Method: SM 2510B		Date Analyzed:		08/28/2008 1135	
Specific Conductance	810	umhos/cm	1.0	1.0	1.0

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-18435-1

Client Sample ID: OC-PZ-17RR
Lab Sample ID: 360-18435-8

Date Sampled: 08/26/2008 1200
Date Received: 08/27/2008 1615
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B		Date Analyzed:	08/28/2008 1338		
Aluminum	ND	ug/L	2.2	100	1.0
Chromium	~~3.4~~ 5.0 ~~J B~~ U	ug/L	0.17	5.0	1.0

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-18435-1

Client Sample ID: OC-PZ-17RR
Lab Sample ID: 360-18435-8

Date Sampled: 08/26/2008 1200
Date Received: 08/27/2008 1615
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 10-107-06-1-K		Date Analyzed:		09/08/2008 1111	
Prep Method: Distill/Ammonia		Date Prepared:		09/05/2008 1222	
Ammonia	74	mg/L	1.0	1.0	10
Method: 300.0		Date Analyzed:		08/28/2008 2006	
Chloride	22	mg/L	1.0	1.0	1.0
Method: 300.0		Date Analyzed:		08/28/2008 2021	
Sulfate	490	mg/L	20	20	10
Method: SM 2510B		Date Analyzed:		08/28/2008 1137	
Specific Conductance	1400	umhos/cm	1.0	1.0	1.0

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-18435-1

Client Sample ID: OC-PZ-16RR
Lab Sample ID: 360-18435-9

Date Sampled: 08/26/2008 0915
Date Received: 08/27/2008 1615
Client Matrix: Ground Water

Analyte	Result/Qualifier		Unit	MDL	RL	Dilution
Method: Dissolved-6010B			Date Analyzed:		08/28/2008 1341	
Aluminum	3.3	J	ug/L	2.2	100	1.0
Chromium	7.1	~~B~~ U	ug/L	0.17	5.0	1.0

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-18435-1

Client Sample ID: OC-PZ-16RR
Lab Sample ID: 360-18435-9

Date Sampled: 08/26/2008 0915
Date Received: 08/27/2008 1615
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 10-107-06-1-K		Date Analyzed:		09/08/2008 1112	
Prep Method: Distill/Ammonia		Date Prepared:		09/05/2008 1222	
Ammonia	170	mg/L	1.0	1.0	10
Method: 300.0		Date Analyzed:		08/28/2008 2051	
Sulfate	610	mg/L	20	20	10
Chloride	140	mg/L	10	10	10
Method: SM 2510B		Date Analyzed:		08/28/2008 1138	
Specific Conductance	2200	umhos/cm	1.0	1.0	1.0

DATA REPORTING QUALIFIERS

Client: Olin Corporation

Job Number: 360-18435-1

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: 360-18435-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
Metals					
Analysis Batch:360-35684					
LCS 360-35684/1	Lab Control Spike	T	Water	6010B	
LCSD 360-35684/7	Lab Control Spike Duplicate	T	Water	6010B	
MB 360-35684/2	Method Blank	T	Water	6010B	
360-18435-1	OC-GW-78S	D	Water	6010B	
360-18435-2	OC-GW-79S	D	Water	6010B	
360-18435-3	OC-GW-25	D	Water	6010B	
360-18435-4	OC-GW-79S DUP	D	Water	6010B	
360-18435-5	OC-GW-202D	D	Water	6010B	
360-18435-6	OC-GW-202S	D	Water	6010B	
360-18435-7	OC-PZ-18R	D	Water	6010B	
360-18435-8	OC-PZ-17RR	D	Water	6010B	
360-18435-9	OC-PZ-16RR	D	Water	6010B	

Report Basis
D = Dissolved
T = Total

Client: Olin Corporation

Job Number: 360-18435-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
General Chemistry					
Analysis Batch:360-35667					
LCS 360-35667/1	Lab Control Spike	T	Water	SM 2510B	
MB 360-35667/4	Method Blank	T	Water	SM 2510B	
360-18435-1	OC-GW-78S	T	Water	SM 2510B	
360-18435-2	OC-GW-79S	T	Water	SM 2510B	
360-18435-3	OC-GW-25	T	Water	SM 2510B	
360-18435-4	OC-GW-79S DUP	T	Water	SM 2510B	
360-18435-5	OC-GW-202D	T	Water	SM 2510B	
360-18435-6	OC-GW-202S	T	Water	SM 2510B	
360-18435-7	OC-PZ-18R	T	Water	SM 2510B	
360-18435-8	OC-PZ-17RR	T	Water	SM 2510B	
360-18435-9	OC-PZ-16RR	T	Water	SM 2510B	
Analysis Batch:360-35710					
LCS 360-35710/2	Lab Control Spike	T	Water	300.0	
MB 360-35710/1	Method Blank	T	Water	300.0	
360-18435-1	OC-GW-78S	T	Water	300.0	
Analysis Batch:360-35712					
LCS 360-35712/2	Lab Control Spike	T	Water	300.0	
MB 360-35712/1	Method Blank	T	Water	300.0	
360-18435-2	OC-GW-79S	T	Water	300.0	
360-18435-3	OC-GW-25	T	Water	300.0	
360-18435-4	OC-GW-79S DUP	T	Water	300.0	
360-18435-5	OC-GW-202D	T	Water	300.0	
360-18435-6	OC-GW-202S	T	Water	300.0	
360-18435-7	OC-PZ-18R	T	Water	300.0	
360-18435-8	OC-PZ-17RR	T	Water	300.0	
360-18435-9	OC-PZ-16RR	T	Water	300.0	
360-18435-9MS	Matrix Spike	T	Water	300.0	
360-18435-9MSD	Matrix Spike Duplicate	T	Water	300.0	
Analysis Batch:360-35737					
LCS 360-35737/2	Lab Control Spike	T	Water	300.0	
MB 360-35737/1	Method Blank	T	Water	300.0	
360-18435-5	OC-GW-202D	T	Water	300.0	

Client: Olin Corporation

Job Number: 360-18435-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
General Chemistry					
Prep Batch: 360-35761					
LCS 360-35761/2-A	Lab Control Spike	T	Water	Distill/Ammonia	
MB 360-35761/1-A	Method Blank	T	Water	Distill/Ammonia	
360-18435-1	OC-GW-78S	T	Water	Distill/Ammonia	
360-18435-2	OC-GW-79S	T	Water	Distill/Ammonia	
360-18435-3	OC-GW-25	T	Water	Distill/Ammonia	
360-18435-4	OC-GW-79S DUP	T	Water	Distill/Ammonia	
360-18435-5	OC-GW-202D	T	Water	Distill/Ammonia	
360-18435-6	OC-GW-202S	T	Water	Distill/Ammonia	
360-18435-7	OC-PZ-18R	T	Water	Distill/Ammonia	
Analysis Batch:360-35778					
LCS 360-35761/2-A	Lab Control Spike	T	Water	10-107-06-1-K	360-35761
MB 360-35761/1-A	Method Blank	T	Water	10-107-06-1-K	360-35761
360-18435-1	OC-GW-78S	T	Water	10-107-06-1-K	360-35761
360-18435-2	OC-GW-79S	T	Water	10-107-06-1-K	360-35761
360-18435-3	OC-GW-25	T	Water	10-107-06-1-K	360-35761
360-18435-4	OC-GW-79S DUP	T	Water	10-107-06-1-K	360-35761
360-18435-5	OC-GW-202D	T	Water	10-107-06-1-K	360-35761
360-18435-6	OC-GW-202S	T	Water	10-107-06-1-K	360-35761
360-18435-7	OC-PZ-18R	T	Water	10-107-06-1-K	360-35761
Prep Batch: 360-35885					
LCS 360-35885/2-A	Lab Control Spike	T	Water	Distill/Ammonia	
MB 360-35885/1-A	Method Blank	T	Water	Distill/Ammonia	
360-18435-8	OC-PZ-17RR	T	Water	Distill/Ammonia	
360-18435-9	OC-PZ-16RR	T	Water	Distill/Ammonia	
Analysis Batch:360-35937					
LCS 360-35885/2-A	Lab Control Spike	T	Water	10-107-06-1-K	360-35885
MB 360-35885/1-A	Method Blank	T	Water	10-107-06-1-K	360-35885
360-18435-8	OC-PZ-17RR	T	Water	10-107-06-1-K	360-35885
360-18435-9	OC-PZ-16RR	T	Water	10-107-06-1-K	360-35885

Report Basis
T = Total

Client: Olin Corporation

Job Number: 360-18435-1

Method Blank - Batch: 360-35684

Method: 6010B
Preparation: N/A

Lab Sample ID: MB 360-35684/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 08/28/2008 1238
Date Prepared: N/A

Analysis Batch: 360-35684
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	2.3	J	0.17	5.0

Lab Control Spike/
Lab Control Spike Duplicate Recovery Report - Batch: 360-35684

Method: 6010B
Preparation: N/A

LCS Lab Sample ID: LCS 360-35684/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 08/28/2008 1235
Date Prepared: N/A

Analysis Batch: 360-35684
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 360-35684/7
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 08/28/2008 1311
Date Prepared: N/A

Analysis Batch: 360-35684
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	101	100	80 - 120	0	20		
Chromium	100	100	80 - 120	0	20		

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-18435-1

Method Blank - Batch: 360-35761

Method: 10-107-06-1-K
Preparation: Distill/Ammonia

Lab Sample ID: MB 360-35761/1-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/03/2008 1005
Date Prepared: 09/03/2008 0848

Analysis Batch: 360-35778
Prep Batch: 360-35761
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: 360-35761

Method: 10-107-06-1-K
Preparation: Distill/Ammonia

Lab Sample ID: LCS 360-35761/2-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/03/2008 1006
Date Prepared: 09/03/2008 0848

Analysis Batch: 360-35778
Prep Batch: 360-35761
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	9.62	96	85 - 115	

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-18435-1

Method Blank - Batch: 360-35885

Method: 10-107-06-1-K
Preparation: Distill/Ammonia

Lab Sample ID: MB 360-35885/1-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/08/2008 1105
Date Prepared: 09/05/2008 1222

Analysis Batch: 360-35937
Prep Batch: 360-35885
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: 360-35885

Method: 10-107-06-1-K
Preparation: Distill/Ammonia

Lab Sample ID: LCS 360-35885/2-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/08/2008 1106
Date Prepared: 09/05/2008 1222

Analysis Batch: 360-35937
Prep Batch: 360-35885
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	9.92	99	85 - 115	

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-18435-1

Method Blank - Batch: 360-35710

Method: 300.0
Preparation: N/A

Lab Sample ID: MB 360-35710/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 08/28/2008 0931
Date Prepared: N/A

Analysis Batch: 360-35710
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: 360-35710

Method: 300.0
Preparation: N/A

Lab Sample ID: LCS 360-35710/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 08/28/2008 0946
Date Prepared: N/A

Analysis Batch: 360-35710
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	79.4	99	85 - 115	
Chloride	40.0	40.5	101	85 - 115	

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-18435-1

Method Blank - Batch: 360-35712

Method: 300.0
Preparation: N/A

Lab Sample ID: MB 360-35712/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 08/28/2008 1604
Date Prepared: N/A

Analysis Batch: 360-35712
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: 360-35712

Method: 300.0
Preparation: N/A

Lab Sample ID: LCS 360-35712/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 08/28/2008 1619
Date Prepared: N/A

Analysis Batch: 360-35712
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	40.6	101	85 - 115	

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-18435-1

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 360-35712

Method: 300.0
Preparation: N/A

MS Lab Sample ID:	360-18435-9	Analysis Batch: 360-35712	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:	08/28/2008 2106		Final Weight/Volume: 10 mL
Date Prepared:	N/A		

MSD Lab Sample ID:	360-18435-9	Analysis Batch: 360-35712	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:	08/28/2008 2121		Final Weight/Volume: 10 mL
Date Prepared:	N/A		

	% Rec.						
Analyte	MS	MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Sulfate	100	97	75 - 125	1	20		
Chloride	105	103	75 - 125	1	20		

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-18435-1

Method Blank - Batch: 360-35737

Method: 300.0
Preparation: N/A

Lab Sample ID: MB 360-35737/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 08/30/2008 1307
Date Prepared: N/A

Analysis Batch: 360-35737
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: 360-35737

Method: 300.0
Preparation: N/A

Lab Sample ID: LCS 360-35737/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 08/30/2008 1322
Date Prepared: N/A

Analysis Batch: 360-35737
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	79.0	99	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: 360-18435-1

Method Blank - Batch: 360-35667

Method: SM 2510B
Preparation: N/A

Lab Sample ID: MB 360-35667/4
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 08/28/2008 1112
Date Prepared: N/A

Analysis Batch: 360-35667
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: 360-35667

Method: SM 2510B
Preparation: N/A

Lab Sample ID: LCS 360-35667/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 08/28/2008 1105
Date Prepared: N/A

Analysis Batch: 360-35667
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	1410	1430	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: 360-18435-1

Login Number: 18435
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	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.	False	No time on COC for PZ-17RR. Used 1200 as default.
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

360-18435

•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

Job#	Quote#	PO#

Client: Olin Chemical/MACTEC
Address: 51 Eames Street
Wilmington, MA 01887
Phone: Fax:

Project #: 61000800016
Project Manager: Peter Thompson
Work ID: PCMP
Contact: David Chapman

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
GW-78S	GW	DLC	8-26-08 11:30	X		3	P		X	X				X	X	X	X		X								
GW-79S	GW	DLC	8-26-08 9:40	X		3	P		X	X				X	X	X	X		X								
GW-25	GW	DLC	8-26-08 13:15	X		3	P		X	X				X	X	X	X		X								
GW-79S DUP	GW	DLC	8-26-08 9:40	X		3	P		X	X				X	X	X	X		X								
GW-202D	GW	DLC	8-25-08 16:05	X		3	P		X	X				X	X	X	X		X								
GW-202S	GW	MAM	8-25-08 15:45	X		3	P		X	X				X	X	X	X		X								
PZ-18R	GW	MAM	8-26-08 12:40	X		3	P		X	X				X	X	X	X		X								
PZ-17RR	GW	MAM	8-26-08	X		3	P		X	X				X	X	X	X		X								
PZ-16RR	GW	MAM	8-26-08 9:15	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:	Date:	Time:	Received by:	Date:	Time:
David Chapman	8/27/08	1430	[signature]	8/27/08	1430
[signature]	8/27/08	1615	[signature]	8/27/08	1615

Method of shipment:

TestAmerica-Westfield

Cooler? Y / N Samples Iced? Y / N
Temp @ receipt: 5.0°C °C
Preservation/pH checked
By: [initials] Date: 8/27/08

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 Chu Ricardi 10/6/08
Sr. Review/Date
Lab Report # 18434 + 18435
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*

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: GW missing time collected for P2-17RR. P2-18R Dup mislabeled as ISCO-1 Dup SW

1.6 Sample Results Section: *Was each of the following requirements supplied in the laboratory report for each sample?* **Yes** [✓] No [ ] N/A [ ] Comments:

→ See Note 1.5.2

☑ 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)
Cl, SO4 only NA

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: QC-ISCO-1 Cr U plus SW

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:

GWater ~~Cr 2.3~~ Action 11.5

~~U qualo for GW-25, GW-2025, PZ-17RR~~ PZ-16RR

- Removed B

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:

AL only Qual J

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.

MS for SW BCO-1 Al, Cr, Na

6.1 Were project-specific MS/MSDs collected? List project samples that were spiked.

Yes [✓] No [ ] N/A [ ] Comments: AL - 136% R

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: Cr - 130% R

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: CR U

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: * No additional Data quals -

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: LSD reported

SW - LAB DUP
1SCO-1
OK

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:

GW

	Sample	Dup
Al	17	15
Cr	16	16

SW

Dissolved	Samp	Dup	RPD
AL	15J	31J	NA
Cr	7.2	8.8	20
Na	110,000	110000	0

Total	Sample	Dup	RPD
AL	100	97	3
Cr	17	17	0
Na	100,000	96,000	4

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:

<30%

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:

Surface Waters ISCO-1 ISCO-3 ISCO-2 P2-16RR

Na J both total and dissoved

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. See Blanks Cv

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 Clinkscaid, 10/21/08
Sr. Review/Date
Lab Report # 18434 and 18435
Project # 6100080016

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: See Metals Checklist.

1.6 Sample Results Section: *Was the following information supplied in the laboratory report for each sample?* **Yes** [✓] No [ ] N/A [ ] Comments:

NA

☑ Field ID and Lab ID ☑ Date and time collected ☑ Analyst Initials ☑ Dilution Factor ☐ % 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 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)
Cl, SO4, NO3, NO2 Conductivity

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:

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: SW 18435-9 Cl, SO4

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: SW ISCO-3 NO3/NO2 SO4/CL-OK

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: Conductivity

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:

GW-79S	samp	dup	RPD
NH_3	150	140	6.9
SO4	1100	1000	9.5
Cl	120	120	0
Cond	2600	2600	0

PZ-18RR			RPD
NH_3	56	67	18
NO3	0.12	0.12	0
NO2	ND	ND	0
SO4	270	270	0
CL	120	130	8
[illegible]	1100	1100	0

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.

Ricardi, Christian

From: Mason, Becky [Becky.Mason@testamericainc.com]
Sent: Wednesday, October 22, 2008 4:59 PM
To: Ricardi, Christian
Subject: RE: Olin PCMP SW samples 18434

Hi Chris

We had to run Nitrite at a 10x due to the chloride in the sample. A lower dilution is not possible.

Becky

From: Ricardi, Christian [mailto:CSRicardi@mactec.com]
Sent: Wednesday, October 22, 2008 4:43 PM
To: Mason, Becky
Subject: Olin PCMP SW samples 18434

Hi Becky,

We are reviewing 18434 and have a question about the nitrite results. It looks like the nitrite results are being reported as ND in the 10X dilution of some samples when there is a 1X dilution result being reported for nitrate for samples 18434-1, 2, and 7. Is it possible to report the nitrite results using the detection limits from the 1X run for these samples?

Chris Ricardi, NRCC-EAC
Senior Environmental Scientist
MACTEC Engineering and Consulting
511 Congress Street/PO Box 7050
Portland, Maine 04112-7050
207 775-5401 X3694
Fax 207 772-4762

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MACTEC Engineering and Consulting, Inc.
107 Audubon Road, Building 2, Suite 301
Wakefield, Massachusetts 01880
Phone No.: (781) 245-6606
FAX No. : (781) 246-5060

TRANSMITTAL LETTER

To: Stephen G. Morrow, P.E.	Date: November 26, 2008
Olin Corporation	Client: Olin
3855 North Ocoee Street	Project: 51 Eames Street, Wilmington, MA
Suite 200	
Cleveland, Tennessee 37312	MACTEC PN: 6100-08-0016/15A
	Delivery: U.S.P.S.

☒ information ☐ purchasing
☐ estimating ☐ construction
☐ comments and/or approval ☐ see remarks

REMARKS: Enclosed please find the following data validation summary reports for the Olin Chemical Superfund Site, Wilmington, Massachusetts.

Prepared By: Annette Savastano AMS

Number	Revision No.	No. of Copies	Title or Description
1	-	1	Data Validation Report, August 2008 Plant B Quarterly Groundwater, Olin Chemical Superfund Site, Wilmington, Massachusetts, TestAmerica Laboratories Data Set 360-18433-1
2	-	1	Data Validation Report, September 2008 Monthly Plant B RGP, Olin Chemica Superfund Site, Wilmington, Massachusetts, TestAmerica Laboratories Data Set 360-18870-1

DISTRIBUTION: T = TRANSMITTAL LETTER; C = COPY OF DOCUMENT

	T	C		T	C
Brian Guichard, Olin Wilmington	X	X			
MACTEC Project File	X	X			

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: 11/20/08
Subject: 51 Eames Street Property Plant B Quarterly Groundwater August 2008

DATA VALIDATION REPORT
AUGUST 2008 PLANT B QUARTERLY GROUNDWATER
OLIN CHEMICAL SUPERFUND SITE
WILMINGTON, MASSACHUSETTS
TestAmerica Laboratories Data Set 360-18433-1

1.0 INTRODUCTION

Groundwater samples were collected from monitoring well GW-16 on August 26, 2008 as specified for Plant B monitoring quarterly sampling in the Interim Response Step Work Plan (IRSWP). Samples were analyzed by TestAmerica Laboratories in Westfield, Massachusetts. Data were reported in sample delivery group (SDG) 360-18433-1. 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), Standard Methods (APHA, 1995), or Massachusetts Department of Environmental Protection (MADEP, 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 a 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

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. Samples OC-GW-16R was sampled on August 26th, received at the lab on August 27th, and analyzed on August 28, 2008. 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

Chris Ricardi, NRCC-EAC
Senior Chemist

11/20/08
Date

M J Murphy

Michael Murphy
Project Principal

11/21/08
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.

Massachusetts Department of Environmental Protection (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), August, 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.

U.S. Environmental Protection Agency (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 – AUGUST 2008 PLANT B QUARTERLY GROUNDWATER

				VOCs	SVOCs	Metals	Ammonia	pH	MAVPH
Lab Sample ID	**Location**	**Sample ID**	**Sample Date**	**SW846 8260B**	**SW846 8270C**	**SW846 6010B**	**QuickChem 10-107-06-1-K**	**SM 4500 H+ B**	**MA DEP MAVPH**
360-18433-1	GW-16R	OC-GW-16R	8/26/2008	2	2	2	1	1	13

Notes:

Number listed under method indicates number of target analytes reported.

Prepared by/Date: KJC 09/12/08

Checked by/Date: TLC 11/7/08

Table 2
Final Results Summary
360-18433 Plant B Quarterly Groundwater
Olin Chemical Superfund Site
Wilmington, Massachusetts

			Loc Name	GW-16R	
			Field Sample Id	OC-GW-16R	
			Field Sample Date	08/26/08	
			QC Code	FS	
			Lab Sample Delivery Group	360-18433-1	
Frac	**Method**	**Analyte**	**Units**	Final Result	Final Qual
D	SW6010	Iron	ug/l	3600	
T	SW6010	Iron	ug/l	3500	
N	A4500	pH	Ph Units	6.79	J
N	E350.1	Nitrogen, as Ammonia	mg/l	9	
N	MAVPH	Benzene	ug/l	5	U
N	MAVPH	Ethyl benzene	ug/l	5	U
N	MAVPH	Methyl Tertbutyl Ether	ug/l	5	U
N	MAVPH	Naphthalene	ug/l	10	U
N	MAVPH	o-Xylene	ug/l	6.9	
N	MAVPH	Toluene	ug/l	5	U
N	MAVPH	Xylene, m/p	ug/l	10	U
N	MAVPH	C5-C8 Aliphatics	ug/l	1400	
N	MAVPH	C5-C8 Aliphatics (unadj.)	ug/l	1400	
N	MAVPH	C9-C10 Aromatics	ug/l	110	
N	MAVPH	C9-C12 Aliphatics	ug/l	100	U
N	MAVPH	C9-C12 Aliphatics (unadj.)	ug/l	120	
N	MAVPH	Volatile Petroleum Hydrocarbons, T	ug/l	1500	
N	SW8260	2,4,4-Trimethyl-1-pentene	ug/l	520	
N	SW8260	2,4,4-Trimethyl-2-Pentene	ug/l	110	
N	SW8270	Bis(2-Ethylhexyl)phthalate	ug/l	0.46	J
N	SW8270	N-Nitrosodiphenylamine	ug/l	430	

Notes:
N = normal
T = total (unfiltered)
D = dissolved (filtered)
FS = field sample
U = not detected, value is the detection limit
J = value is estimated

Prepared by/Date: KJC 11/11/08
Checked by/Date: TLC 11/11/08

field_sample_id	param_name	final_result	final_qualif	lab_resul	lab_qu	result_uom	dilution_	field_sample	extraction_	analysis_dat	validatior	validation_le
OC-GW-16R	**pH**	**6.79**	**J**	**6.79**	**HF**	**Ph Units**	**1**	**8/26/2008**		**8/28/2008**	**7-Nov**	**Olin Tier I**
OC-GW-16R	Nitrogen, as Ammonia	9		9		mg/l	1	8/26/2008	9/3/2008	9/3/2008	7-Nov	Olin Tier I
OC-GW-16R	Benzene	5	U	5	U	ug/l	1	8/26/2008	8/28/2008	8/28/2008	7-Nov	Olin Tier I
OC-GW-16R	C5-C8 Aliphatics	1400		1400		ug/l	1	8/26/2008	8/28/2008	8/28/2008	7-Nov	Olin Tier I
OC-GW-16R	C5-C8 Aliphatics (unadj.)	1400		1400		ug/l	1	8/26/2008	8/28/2008	8/28/2008	7-Nov	Olin Tier I
OC-GW-16R	C9-C10 Aromatics	110		110		ug/l	1	8/26/2008	8/28/2008	8/28/2008	7-Nov	Olin Tier I
OC-GW-16R	C9-C12 Aliphatics	100	U	100	U	ug/l	1	8/26/2008	8/28/2008	8/28/2008	7-Nov	Olin Tier I
OC-GW-16R	C9-C12 Aliphatics (unadj.)	120		120		ug/l	1	8/26/2008	8/28/2008	8/28/2008	7-Nov	Olin Tier I
OC-GW-16R	Ethyl benzene	5	U	5	U	ug/l	1	8/26/2008	8/28/2008	8/28/2008	7-Nov	Olin Tier I
OC-GW-16R	Methyl Tertbutyl Ether	5	U	5	U	ug/l	1	8/26/2008	8/28/2008	8/28/2008	7-Nov	Olin Tier I
OC-GW-16R	Naphthalene	10	U	10	U	ug/l	1	8/26/2008	8/28/2008	8/28/2008	7-Nov	Olin Tier I
OC-GW-16R	o-Xylene	6.9		6.9		ug/l	1	8/26/2008	8/28/2008	8/28/2008	7-Nov	Olin Tier I
OC-GW-16R	Toluene	5	U	5	U	ug/l	1	8/26/2008	8/28/2008	8/28/2008	7-Nov	Olin Tier I
OC-GW-16R	Volatile Petroleum Hydrocarbons, Total	1500		1500		ug/l	1	8/26/2008	8/28/2008	8/28/2008	7-Nov	Olin Tier I
OC-GW-16R	Xylene, m/p	10	U	10	U	ug/l	1	8/26/2008	8/28/2008	8/28/2008	7-Nov	Olin Tier I
OC-GW-16R	Iron	3500		3500		ug/l	1	8/26/2008	9/4/2008	9/4/2008	7-Nov	Olin Tier I
OC-GW-16R	Iron	3600		3600		ug/l	1	8/26/2008		8/28/2008	7-Nov	Olin Tier I
OC-GW-16R	2,4,4-Trimethyl-1-pentene	520		520		ug/l	10	8/26/2008	9/8/2008	9/8/2008	7-Nov	Olin Tier I
OC-GW-16R	2,4,4-Trimethyl-2-Pentene	110		110		ug/l	5	8/26/2008	9/5/2008	9/5/2008	7-Nov	Olin Tier I
OC-GW-16R	Bis(2-Ethylhexyl)phthalate	0.46	J	0.46	J	ug/l	1	8/26/2008	8/28/2008	8/30/2008	7-Nov	Olin Tier I
OC-GW-16R	N-Nitrosodiphenylamine	430		430		ug/l	50	8/26/2008	8/28/2008	9/10/2008	7-Nov	Olin Tier I

FILE COPY

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

Job Number: 360-18433-1

Job Description: Plant B Quaterly

For:
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Attention: Mr. Steven Morrow

CHECKED FOR COMPLETENESS OF PARAMETERS ORDERED BY: Tige Cunningham 11-4-08

Joseph A. Chiesa Jr.

Designee for
Becky C Mason
Project Manager II
becky.mason@testamericainc.com
09/11/2008

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

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MADEP MCP Analytical Method Report Certification Form

Laboratory Name:	**TestAmerica Westfield**	Project #:	**360-18433-1**
Project Location:	**Plant B**	MADEP RTN[1]:	

This form provides certifications for the following data set:[list Laboratory Sample ID Number(s)]
360-18433-1

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:** Laboratory Director

Printed Name: Steven C. Hartmann **Date:** 9/11/08 10:17

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 #:	**360-18433-1**
Project Location:	**Plant B**	MADEP RTN[1]:	

This form provides certifications for the following data set:[list Laboratory Sample ID Number(s)]
360-18433-1

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 ( )	

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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]

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E	Were all QC performance standards and recommendations for the specified methods achieved?	Yes √		No[1]
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Printed Name: Steven C. Hartmann **Date:** 9/11/08 10:17

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 #:	**360-18433-1**
Project Location:	**Plant B**	MADEP RTN[1]:	

This form provides certifications for the following data set:[list Laboratory Sample ID Number(s)]
360-18433-1

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 ( )	

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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]

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Signature: [signature] **Position:** Laboratory Director

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MADEP MCP Analytical Method Report Certification Form

Laboratory Name:	**TestAmerica Westfield**	Project #:	**360-18433-1**
Project Location:	**Plant B**	MADEP RTN[1]:	

This form provides certifications for the following data set:[list Laboratory Sample ID Number(s)]
360-18433-1

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	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]

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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: [signature] **Position:** Laboratory Director

Printed Name: Steven C. Hartmann **Date:** 9/11/08 10:17

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 #:	**360-18433-1**
Project Location:	**Plant B**	MADEP RTN[1]:	

This form provides certifications for the following data set:[list Laboratory Sample ID Number(s)]
360-18433-1

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 ( )	

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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:** 9/11/08 10:17

The certification form has been electronically signed and approved. CAM VII A, Rev 3.2 April-04

CASE NARRATIVE

Client: Olin Corporation

Project: Plant B Quaterly

Report Number: 360-18433-1

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 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 08/27/2008; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 3.8ºC.

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.

VOLATILE ORGANICS

Sample 360-18433-1 was analyzed for volatile organics in accordance with EPA SW846 Method 8260B. The sample was analyzed on 09/05/2008 and 09/08/2008.

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:
Samples 360-18433-1(10X) and 360-18433-1(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, an abbreviated MCP compound list was reported for this job.

VOLATILE PETROLEUM HYDROCARBONS

Sample 360-18433-1 was analyzed for volatile petroleum hydrocarbons in accordance with MADEP VPH. The sample was analyzed on 08/28/2008.

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.

SEMIVOLATILE ORGANICS

Sample 360-18433-1 was analyzed for semivolatile organics in accordance with EPA SW846 Method 8270C. The sample was prepared on 08/28/2008 and analyzed on 08/30/2008 and 09/10/2008.

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 360-18433-1(50X) required dilution prior to analysis. The reporting limits have been adjusted accordingly. Dilution was due to high target concentration. Consequently, all extraction 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 360-18433-1 was analyzed for dissolved metals in accordance with EPA SW846 Method 6010B. The sample was analyzed on 08/28/2008.

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

Sample 360-18433-1 was analyzed for total metals in accordance with EPA SW846 Method 6010B. The sample was prepared and analyzed on 09/04/2008.

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.

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 360-18433-1 was analyzed for ammonia in accordance with LACHAT 10-107-06-1. The sample was prepared and analyzed on 09/03/2008.

All QC performance standards and recommendations for this specific method were achieved.

PH

Sample 360-18433-1 was analyzed for pH in accordance with SM 4500 H+ B. The sample was analyzed on 08/28/2008.

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: 360-18433-1

Description	Lab Location	Method	Preparation Method
Matrix: Water			
Volatile Organic Compounds (Custom List)	TAL WFD	SW846 8260B	
Purge-and-Trap	TAL WFD		SW846 5030B
MADEP - Volatile Petroleum Hydrocarbons	TAL WFD	MA DEP MAVPH	
Purge-and-Trap	TAL WFD		SW846 5030B
Semivolatile Organic Compounds by GCMS - Low Levels	TAL WFD	SW846 8270C	
Separatory Funnel Liquid-Liquid Extraction	TAL WFD		SW846 3510C
Total Metals	TAL WFD	SW846 6010B	
Dissolved Metals	TAL WFD	SW846 6010B	
Preparation, Total Metals	TAL WFD		SW846 3010A
Sample Filtration performed in the Field	TAL WFD		FIELD_FLTRD
Lachat Ammonia	TAL WFD	QuickChem 10-107-06-1-K	
Distillation/Ammonia	TAL WFD		Distill/Ammonia
pH	TAL WFD	SM SM 4500 H+ B	

Lab References:

TAL WFD = TestAmerica Westfield

Method References:

MA DEP = Massachusetts Department Of Environmental Protection

QuickChem = Lachat Instruments

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: 360-18433-1

Method	Analyst	Analyst ID
SW846 8260B	Tester, Carla	CT
SW846 8270C	Zuccala, Marissa	MZ
MA DEP MAVPH	Rouleau, Catherine M	CMR
SW846 6010B	Nasiatka, Ellen M	EMN
SW846 6010B	Smith, Tim J	TJS
QuickChem 10-107-06-1-K	Lalashius, Andrew L	ALL
SM SM 4500 H+ B	Emerich, Rich W	RWE

SAMPLE SUMMARY

Client: Olin Corporation

Job Number: 360-18433-1

Lab Sample ID	Client Sample ID	Client Matrix	Date/Time Sampled	Date/Time Received
360-18433-1	OC-GW-16R	Ground Water	08/26/2008 1455	08/27/2008 1615

SAMPLE RESULTS

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-18433-1

Client Sample ID: OC-GW-16R
Lab Sample ID: 360-18433-1

Date Sampled: 08/26/2008 1455
Date Received: 08/27/2008 1615
Client Matrix: Ground Water

Analyte	Result/Qualifier		Unit	MDL	RL	Dilution
Method: 8260B			Date Analyzed:		09/05/2008 0640	
Prep Method: 5030B			Date Prepared:		09/05/2008 0640	
2,4,4-Trimethyl-2-pentene	110		ug/L	2.5	5.0	5.0
Surrogate					Acceptance Limits	
4-Bromofluorobenzene	91		%		70 - 130	
Dibromofluoromethane	107		%		70 - 130	
Toluene-d8 (Surr)	100		%		70 - 130	
Method: 8260B			Date Analyzed:		09/08/2008 2103	
Prep Method: 5030B			Date Prepared:		09/08/2008 2103	
2,4,4-Trimethyl-1-pentene	520		ug/L	8.1	10	10
Surrogate					Acceptance Limits	
4-Bromofluorobenzene	90		%		70 - 130	
Dibromofluoromethane	98		%		70 - 130	
Toluene-d8 (Surr)	101		%		70 - 130	
Method: 8270C			Date Analyzed:		08/30/2008 0424	
Prep Method: 3510C			Date Prepared:		08/28/2008 1013	
Bis(2-ethylhexyl) phthalate	0.46	J	ug/L	0.42	2.0	1.0
Surrogate					Acceptance Limits	
2,4,6-Tribromophenol	89		%		15 - 110	
2-Fluorobiphenyl	72		%		30 - 130	
2-Fluorophenol	26		%		15 - 110	
Nitrobenzene-d5	96		%		30 - 130	
Phenol-d5	17		%		15 - 110	
Terphenyl-d14	71		%		30 - 130	
Method: 8270C			Date Analyzed:		09/10/2008 1422	
Prep Method: 3510C			Date Prepared:		08/28/2008 1013	
N-Nitrosodiphenylamine	430		ug/L	19	250	50
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:		08/28/2008 1229	
Iron	3600		ug/L	16	100	1.0

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-18433-1

Client Sample ID: OC-GW-16R
Lab Sample ID: 360-18433-1

Date Sampled: 08/26/2008 1455
Date Received: 08/27/2008 1615
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: 6010B			Date Analyzed:	09/04/2008 1901	
Prep Method: 3010A			Date Prepared:	09/04/2008 0821	
Iron	3500	ug/L	16	100	1.0

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-18433-1

Client Sample ID: OC-GW-16R
Lab Sample ID: 360-18433-1

Date Sampled: 08/26/2008 1455
Date Received: 08/27/2008 1615
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: MAVPH		Date Analyzed:		08/28/2008 2015	
Prep Method: 5030B		Date Prepared:		08/28/2008 2015	
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	6.9	ug/L	5.0	5.0	1.0
Toluene	ND	ug/L	5.0	5.0	1.0
C5-C8 Aliphatics (unadjusted)	1400	ug/L	100	100	1.0
C9-C12 Aliphatics (unadjusted)	120	ug/L	100	100	1.0
C5-C8 Aliphatics (adjusted)	1400	ug/L	100	100	1.0
C9-C12 Aliphatics (adjusted)	ND	ug/L	100	100	1.0
C9-C10 Aromatics	110	ug/L	100	100	1.0
Total VPH	1500	ug/L	100	100	1.0
Surrogate				Acceptance Limits	
2,5-Dibromotoluene (fid)	94	%		70 - 130	
2,5-Dibromotoluene (pid)	114	%		70 - 130	
Method: 10-107-06-1-K		Date Analyzed:		09/03/2008 1007	
Prep Method: Distill/Ammonia		Date Prepared:		09/03/2008 0848	
Ammonia	9.0	mg/L	0.10	0.10	1.0
Method: SM 4500 H+ B		Date Analyzed:		08/28/2008 1142	
pH	6.79 J ~~HF~~	SU	0.100	0.100	1.0

11/7/08
TS

DATA REPORTING QUALIFIERS

Client: Olin Corporation

Job Number: 360-18433-1

Lab Section	Qualifier	Description
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.
	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: 360-18433-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
GC/MS VOA					
Analysis Batch:360-35889					
LCS 360-35889/1	Lab Control Spike	T	Water	8260B	
LCSD 360-35889/2	Lab Control Spike Duplicate	T	Water	8260B	
MB 360-35889/3	Method Blank	T	Water	8260B	
360-18433-1	OC-GW-16R	T	Water	8260B	
Analysis Batch:360-35986					
LCS 360-35986/1	Lab Control Spike	T	Water	8260B	
LCSD 360-35986/2	Lab Control Spike Duplicate	T	Water	8260B	
MB 360-35986/3	Method Blank	T	Water	8260B	
360-18433-1	OC-GW-16R	T	Water	8260B	

Report Basis
T = Total

GC/MS Semi VOA					
Prep Batch: 360-35660					
LCS 360-35660/2-A	Lab Control Spike	T	Water	3510C	
LCSD 360-35660/3-A	Lab Control Spike Duplicate	T	Water	3510C	
MB 360-35660/1-A	Method Blank	T	Water	3510C	
360-18433-1	OC-GW-16R	T	Water	3510C	
Analysis Batch:360-35791					
LCS 360-35660/2-A	Lab Control Spike	T	Water	8270C	360-35660
LCSD 360-35660/3-A	Lab Control Spike Duplicate	T	Water	8270C	360-35660
MB 360-35660/1-A	Method Blank	T	Water	8270C	360-35660
360-18433-1	OC-GW-16R	T	Water	8270C	360-35660

Report Basis
T = Total

GC VOA					
Analysis Batch:360-35695					
LCS 360-35695/1	Lab Control Spike	T	Water	MAVPH	
LCSD 360-35695/2	Lab Control Spike Duplicate	T	Water	MAVPH	
MB 360-35695/3	Method Blank	T	Water	MAVPH	
360-18433-1	OC-GW-16R	T	Water	MAVPH	

Report Basis
T = Total

Client: Olin Corporation

Job Number: 360-18433-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
Metals					
Analysis Batch:360-35673					
LCS 360-35673/1	Lab Control Spike	T	Water	6010B	
LCSD 360-35673/10	Lab Control Spike Duplicate	T	Water	6010B	
MB 360-35673/2	Method Blank	T	Water	6010B	
360-18433-1	OC-GW-16R	D	Water	6010B	
Prep Batch: 360-35797					
LCS 360-35797/2-A	Lab Control Spike	T	Water	3010A	
LCSD 360-35797/3-A	Lab Control Spike Duplicate	T	Water	3010A	
MB 360-35797/1-A	Method Blank	T	Water	3010A	
360-18433-1	OC-GW-16R	T	Water	3010A	
Analysis Batch:360-35859					
LCS 360-35797/2-A	Lab Control Spike	T	Water	6010B	360-35797
LCSD 360-35797/3-A	Lab Control Spike Duplicate	T	Water	6010B	360-35797
MB 360-35797/1-A	Method Blank	T	Water	6010B	360-35797
360-18433-1	OC-GW-16R	T	Water	6010B	360-35797

Report Basis
D = Dissolved
T = Total

General Chemistry					
Analysis Batch:360-35668					
LCS 360-35668/2	Lab Control Spike	T	Water	SM 4500 H+ B	
360-18433-1	OC-GW-16R	T	Water	SM 4500 H+ B	
Prep Batch: 360-35761					
LCS 360-35761/2-A	Lab Control Spike	T	Water	Distill/Ammonia	
MB 360-35761/1-A	Method Blank	T	Water	Distill/Ammonia	
360-18433-1	OC-GW-16R	T	Water	Distill/Ammonia	
360-18433-1MS	Matrix Spike	T	Water	Distill/Ammonia	
360-18433-1MSD	Matrix Spike Duplicate	T	Water	Distill/Ammonia	
Analysis Batch:360-35778					
LCS 360-35761/2-A	Lab Control Spike	T	Water	10-107-06-1-K	360-35761
MB 360-35761/1-A	Method Blank	T	Water	10-107-06-1-K	360-35761
360-18433-1	OC-GW-16R	T	Water	10-107-06-1-K	360-35761
360-18433-1MS	Matrix Spike	T	Water	10-107-06-1-K	360-35761
360-18433-1MSD	Matrix Spike Duplicate	T	Water	10-107-06-1-K	360-35761

Report Basis
T = Total

Client: Olin Corporation

Job Number: 360-18433-1

Method Blank - Batch: 360-35889

Method: 8260B
Preparation: 5030B

Lab Sample ID: MB 360-35889/3
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/05/2008 0315
Date Prepared: 09/05/2008 0315

Analysis Batch: 360-35889
Prep Batch: N/A
Units: ug/L

Instrument ID: HP 5890II/5972 GC/MS
Lab File ID: V04332.D
Initial Weight/Volume: 25 mL
Final Weight/Volume: 25 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	94	70 - 130
Dibromofluoromethane	107	70 - 130
Toluene-d8 (Surr)	97	70 - 130

Lab Control Spike/ Lab Control Spike Duplicate Recovery Report - Batch: 360-35889

Method: 8260B
Preparation: 5030B

LCS Lab Sample ID: LCS 360-35889/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/05/2008 0147
Date Prepared: 09/05/2008 0147

Analysis Batch: 360-35889
Prep Batch: N/A
Units: ug/L

Instrument ID: HP 5890II/5972 GC/MS
Lab File ID: V04329.D
Initial Weight/Volume: 25 mL
Final Weight/Volume: 25 mL

LCSD Lab Sample ID: LCSD 360-35889/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/05/2008 0216
Date Prepared: 09/05/2008 0216

Analysis Batch: 360-35889
Prep Batch: N/A
Units: ug/L

Instrument ID: HP 5890II/5972 GC/MS
Lab File ID: V04330.D
Initial Weight/Volume: 25 mL
Final Weight/Volume: 25 mL

Analyte	% Rec. LCS	% Rec. LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
2,4,4-Trimethyl-1-pentene	92	92	70 - 130	0	25		
2,4,4-Trimethyl-2-pentene	104	101	70 - 130	2	25		

Surrogate	LCS % Rec	LCSD % Rec	Acceptance Limits
4-Bromofluorobenzene	91	92	70 - 130
Dibromofluoromethane	102	102	70 - 130
Toluene-d8 (Surr)	101	99	70 - 130

Calculations are performed before rounding to avoid round-off errors in calculated results.

TC 11/7/08

Client: Olin Corporation

Job Number: 360-18433-1

Method Blank - Batch: 360-35986

Method: 8260B
Preparation: 5030B

Lab Sample ID: MB 360-35986/3
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/08/2008 1935
Date Prepared: 09/08/2008 1935

Analysis Batch: 360-35986
Prep Batch: N/A
Units: ug/L

Instrument ID: HP 5890II/5972 GC/MS
Lab File ID: V04357.D
Initial Weight/Volume: 25 mL
Final Weight/Volume: 25 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	103	70 - 130
Toluene-d8 (Surr)	98	70 - 130

Lab Control Spike/ Lab Control Spike Duplicate Recovery Report - Batch: 360-35986

Method: 8260B
Preparation: 5030B

LCS Lab Sample ID: LCS 360-35986/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/08/2008 1807
Date Prepared: 09/08/2008 1807

Analysis Batch: 360-35986
Prep Batch: N/A
Units: ug/L

Instrument ID: HP 5890II/5972 GC/MS
Lab File ID: V04354.D
Initial Weight/Volume: 25 mL
Final Weight/Volume: 25 mL

LCSD Lab Sample ID: LCSD 360-35986/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/08/2008 1836
Date Prepared: 09/08/2008 1836

Analysis Batch: 360-35986
Prep Batch: N/A
Units: ug/L

Instrument ID: HP 5890II/5972 GC/MS
Lab File ID: V04355.D
Initial Weight/Volume: 25 mL
Final Weight/Volume: 25 mL

Analyte	% Rec. LCS	% Rec. LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
2,4,4-Trimethyl-1-pentene	100	98	70 - 130	2	25		
2,4,4-Trimethyl-2-pentene	114	111	70 - 130	3	25		

Surrogate	LCS % Rec	LCSD % Rec	Acceptance Limits
4-Bromofluorobenzene	90	90	70 - 130
Dibromofluoromethane	99	101	70 - 130
Toluene-d8 (Surr)	102	101	70 - 130

Calculations are performed before rounding to avoid round-off errors in calculated results.

TC 11/x08

Client: Olin Corporation

Job Number: 360-18433-1

Method Blank - Batch: 360-35660

Method: 8270C
Preparation: 3510C

Lab Sample ID: MB 360-35660/1-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 08/29/2008 2310
Date Prepared: 08/28/2008 1013

Analysis Batch: 360-35791
Prep Batch: 360-35660
Units: ug/L

Instrument ID: Agilent 6890/5973 GC/MS
Lab File ID: B8771.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	82	30 - 130
2-Fluorophenol	34	15 - 110
Nitrobenzene-d5	96	30 - 130
Phenol-d5	19	15 - 110
Terphenyl-d14	87	30 - 130

Calculations are performed before rounding to avoid round-off errors in calculated results.

11/3/08
TC

Client: Olin Corporation

Job Number: 360-18433-1

Lab Control Spike/
Lab Control Spike Duplicate Recovery Report - Batch: 360-35660

Method: 8270C
Preparation: 3510C

LCS Lab Sample ID: LCS 360-35660/2-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 08/29/2008 2338
Date Prepared: 08/28/2008 1013

Analysis Batch: 360-35791
Prep Batch: 360-35660
Units: ug/L

Instrument ID: Agilent 6890/5973 GC/MS
Lab File ID: B8772.D
Initial Weight/Volume: 1000 mL
Final Weight/Volume: 1.0 mL
Injection Volume: 1.0 uL

LCSD Lab Sample ID: LCSD 360-35660/3-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 08/30/2008 0007
Date Prepared: 08/28/2008 1013

Analysis Batch: 360-35791
Prep Batch: 360-35660
Units: ug/L

Instrument ID: Agilent 6890/5973 GC/MS
Lab File ID: B8773.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	124	112	40 - 140	11	20		
N-Nitrosodiphenylamine	118	107	40 - 140	10	20		

Surrogate	LCS % Rec	LCSD % Rec	Acceptance Limits
2,4,6-Tribromophenol	99	87	15 - 110
2-Fluorobiphenyl	91	78	30 - 130
2-Fluorophenol	38	33	15 - 110
Nitrobenzene-d5	114	101	30 - 130
Phenol-d5	22	19	15 - 110
Terphenyl-d14	97	79	30 - 130

Calculations are performed before rounding to avoid round-off errors in calculated results.

11/7/08

Client: Olin Corporation

Job Number: 360-18433-1

Method Blank - Batch: 360-35695

Method: MAVPH
Preparation: 5030B

Lab Sample ID: MB 360-35695/3
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 08/28/2008 1657
Date Prepared: 08/28/2008 1657

Analysis Batch: 360-35695
Prep Batch: N/A
Units: ug/L

Instrument ID: HP 5890II GC w/ PID/FID
Lab File ID: G13923.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)	95	70 - 130
2,5-Dibromotoluene (pid)	126	70 - 130

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-18433-1

Lab Control Spike/
Lab Control Spike Duplicate Recovery Report - Batch: 360-35695

Method: MAVPH
Preparation: 5030B

LCS Lab Sample ID: LCS 360-35695/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 08/28/2008 1517
Date Prepared: 08/28/2008 1517

Analysis Batch: 360-35695
Prep Batch: N/A
Units: ug/L

Instrument ID: HP 5890II GC w/ PID/FID
Lab File ID: G13920.D
Initial Weight/Volume: 5 mL
Final Weight/Volume: 5 mL
Injection Volume:
Column ID: PRIMARY

LCSD Lab Sample ID: LCSD 360-35695/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 08/28/2008 1551
Date Prepared: 08/28/2008 1551

Analysis Batch: 360-35695
Prep Batch: N/A
Units: ug/L

Instrument ID: HP 5890II GC w/ PID/FID
Lab File ID: G13921.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	106	103	70 - 130	3	25		
Ethylbenzene	105	103	70 - 130	3	25		
m-Xylene & p-Xylene	104	101	70 - 130	3	25		
Methyl tert-butyl ether	98	91	70 - 130	7	25		
Naphthalene	108	108	70 - 130	0	25		
o-Xylene	104	102	70 - 130	2	25		
Toluene	104	101	70 - 130	2	25		
C5-C8 Aliphatics (unadjusted)	101	95	70 - 130	7	25		
C9-C12 Aliphatics (unadjusted)	95	91	70 - 130	4	25		
C9-C10 Aromatics	113	108	70 - 130	4	25		

Surrogate	LCS % Rec	LCSD % Rec	Acceptance Limits
2,5-Dibromotoluene (fid)	96	96	70 - 130
2,5-Dibromotoluene (pid)	111	109	70 - 130

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-18433-1

Method Blank - Batch: 360-35673

Method: 6010B
Preparation: N/A

Lab Sample ID: MB 360-35673/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 08/28/2008 1155
Date Prepared: N/A

Analysis Batch: 360-35673
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: 360-35673

Method: 6010B
Preparation: N/A

LCS Lab Sample ID: LCS 360-35673/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 08/28/2008 1152
Date Prepared: N/A

Analysis Batch: 360-35673
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 360-35673/10
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 08/28/2008 1235
Date Prepared: N/A

Analysis Batch: 360-35673
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	100	100	80 - 120	0	20		

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-18433-1

Method Blank - Batch: 360-35797

Method: 6010B
Preparation: 3010A

Lab Sample ID: MB 360-35797/1-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/04/2008 1820
Date Prepared: 09/04/2008 0821

Analysis Batch: 360-35859
Prep Batch: 360-35797
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: 360-35797

Method: 6010B
Preparation: 3010A

LCS Lab Sample ID: LCS 360-35797/2-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/04/2008 1823
Date Prepared: 09/04/2008 0821

Analysis Batch: 360-35859
Prep Batch: 360-35797
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 360-35797/3-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/04/2008 1826
Date Prepared: 09/04/2008 0821

Analysis Batch: 360-35859
Prep Batch: 360-35797
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
Iron	103	106	80 - 120	3	20		

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-18433-1

Method Blank - Batch: 360-35761

Method: 10-107-06-1-K
Preparation: Distill/Ammonia

Lab Sample ID: MB 360-35761/1-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/03/2008 1005
Date Prepared: 09/03/2008 0848

Analysis Batch: 360-35778
Prep Batch: 360-35761
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: 360-35761

Method: 10-107-06-1-K
Preparation: Distill/Ammonia

Lab Sample ID: LCS 360-35761/2-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/03/2008 1006
Date Prepared: 09/03/2008 0848

Analysis Batch: 360-35778
Prep Batch: 360-35761
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	9.62	96	85 - 115	

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 360-35761

Method: 10-107-06-1-K
Preparation: Distill/Ammonia

MS Lab Sample ID: 360-18433-1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/03/2008 1008
Date Prepared: 09/03/2008 0848

Analysis Batch: 360-35778
Prep Batch: 360-35761

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: 360-18433-1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 09/03/2008 1009
Date Prepared: 09/03/2008 0848

Analysis Batch: 360-35778
Prep Batch: 360-35761

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	93	91	75 - 125	1	20		

Calculations are performed before rounding to avoid round-off errors in calculated results.

Quality Control Results

Client: Olin Corporation

Job Number: 360-18433-1

Lab Control Spike - Batch: 360-35668

Method: SM 4500 H+ B
Preparation: N/A

Lab Sample ID: LCS 360-35668/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 08/28/2008 1109
Date Prepared: N/A

Analysis Batch: 360-35668
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	

Calculations are performed before rounding to avoid round-off errors in calculated results.

VPH SAMPLE INFORMATION DATA

SAMPLE INFORMATION

Sample ID: 18433-1 Batch# **35695**

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	☐ Samples NOT preserved in Methanol or air-tight container		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		

TestAmerica THE LEADER IN ENVIRONMENTAL TESTING

MADEP MA 014
RIDOH57
CTDPH 0494
VT DECWSD
NH DES 253903-A

NELAP FL E87912 TOX
NELAP NJ MA008 TOX
NELAP NY 10843
NYDOH 10843

TestAmerica Westfield
53 Southampton Rd.
Westfield, MA 01085
Tel:(413)572-4000
Fax:(413)572-3707

Boston-Service Center
148 Rangeway Rd.
N. Billerica, MA 01862
Tel:(978)667-1400
fax:(978)667-7871

Login Sample Receipt Check List

Client: Olin Corporation

Job Number: 360-18433-1

Login Number: 18433
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	3.8 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 18433

•53 Southampton Road
Westfield, MA 01085
(P) 413-572-4000
(F) 413-572-3707
STL-WESTFIELD

•149 Rangeway Road
N. Billerica, MA 01862
(P) 978-667-1400
(F) 978-667-7871
STL-BILLERICA

Job#	Quote#	PO#

Client: Olin Chemical/MACTEC
Address: 51 Eames Street
Wilmington, MA 01887
Phone: Fax:

Project #: 61000800.16
Project Manager: Peter Thompson
Work ID: Plant B
Contact: David Chapman

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)	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 Diss Fe	Other	Other	Other	Other	Other	Other
GW-16R	GW	DLC	8-26-08 14:55			13	V		2																		
						1	G		1	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

Dissolved Fe sampled. (Field Filtered)

8/27/08

Sampled by (print): David Chapman
Signature: [signature]

Relinquished by:	Date:	Time:	Received by:	Date:	Time:
David Chapman	8-27-08	1430	[signature]	8/27/08	1430
[signature]	8/27/08	1615	[signature]	8/27/08	1615

Method of shipment:

TestAmerica-Westfield

Cooler? Y / N Samples Iced? Y / N
Temp @ receipt: 3.8°c °C
Preservation/pH checked
By: [initials] Date: 8/27/08

White = Lab file Yellow = Report copy Pink = Customer copy
STL-8245 (1000)

OLIN-WILMINGTON
LEVEL I DATA QUALITY EVALUATION
STANDARD OPERATING PROCEDURE AND CHECKLIST
VOLATILE ORGANICS BY METHOD SW8260B/624

Reviewer/Date Tiye Cunningham / 11-5-08
Project # ~~Sr. Review/Date~~ 610008001G - 15A
Lab Report # 360-18433-1
~~MACTEC LAW Project #~~ Chris Ricardi 11/14/08
Senior Review / Date

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 added to VOC's

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* ☑ *Phone #* ☑ *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:** Are both of the following statements true?* ***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 the *original* 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 original COC.

Yes [✓] No [ ] N/A [ ] Comments:

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?

☑ 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 ☑ Custody seals checked ☑ 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 - 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* 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 ☐ MS/MSD recoveries and RPDs N/A ☐ Laboratory duplicate results (where applicable) 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, 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 reject (R) all non-detect results.

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:

NOTE: *The MADEP QA/QC Guidelines provides PQLs for volatile organic compounds. See the attached table for a listing of MADEP PQLs vs. the PQLs listed in the QAPP.*

NOTE: *It should be noted that PQLs associated with methanol preservation may not be adequate for some analytes of concern (i.e. 1,2-dichloroethane, cis and trans-dichloropropene, 1,1,2,2-tetrachloroethane, etc.). Therefore, the low-level option using sodium bisulfate or water as a perservative may be required.*

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. See the attached table for a listing of the MADEP minimum compound reporting list.*

3.4 Were Tentatively Identified Compounds (TICs) reported? **Yes** [ ] No [ ] N/A [✓] Comments: Not Requested

***NOTE**: MADEP requires that the top 10 TICs be reported. TICs are specified for analysis by the MADEP for sites with complex or uncertain histories and for the analyses of drinking water samples.*

***NOTE**: 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 (J).*

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 "JB"

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 "JB"

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, 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.

5.2 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: *MADEP guidelines list LCS recovery limits as 70-130 for most compounds. The laboratory must identify analytes that routinely exceed 70-130 percent. See the attached table for a listing of MADEP LCS control limits vs. the control limits listed in the QAPP.*

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. → Collected during the May 2008 Round

Yes [ ] No [✓] N/A [ ] Comments: No MS/MSD Submitted

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: $\%R_{SA} = \frac{(SSR-SR)}{} \times 100\%$ 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. See the attached table for a listing of MADEP MS/MSD control limits vs. the control limits listed in the QAPP.*

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.

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 is evaluated, but no flags are applied.

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).

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. See the attached table for a listing of MADEP MS/MSD RPD limits vs. the control limits listed in the QAPP.*

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 one or more VOC 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: 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. See the attached table for a listing of MADEP surrogate limits vs. the control limits listed in the QAPP.*

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 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.

Sample conc. < 5x blank value:	Sample conc. > 5x blank value:
Flag sample results "JB"	No qualification is needed

NOTE: For the common contaminants (methylene chloride, acetone, toluene, and 2-butanone), qualification is applied as indicated above using a 10x blank value in lieu of a 5x blank value.

8.3 Were ambient blanks shipped with VOC 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: QC samples collected for this program were collected during one of the other Quarterly Events.

☐ 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.

STL-Westfield, 2002. "Olin – General Chemistry Control Limits (Soil & Water)," Severn Trent Laboratories, Inc., 53 Southampton Road, Westfield, MA, 01085.

USEPA, 1988. "Laboratory Data Validation Functional Guidelines for Evaluating Organic and Inorganic Analysis," EPA/540/R-94-012 and EPA/540-R-94-013, July 1988.

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 Tige Cunningham 11-7-08
Sr. Review/Date Chris Ricardi 11/14/08
Lab Report # 360-18433-1
Project # 6100080016-15A

1.0 Laboratory Deliverable Requirements

No Quals added to SVOC's

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) N/A ☑ 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

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:

ND for BEHP & NDPA

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.*

only BEHP: NDPA reported

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: NO MS/MSD Collected

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:

NOTE: $\%R = QD \times 100\%$ 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

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.

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OLIN-WILMINGTON
LEVEL I DATA QUALITY EVALUATION
STANDARD OPERATING PROCEDURE AND CHECKLIST
ICP METALS BY METHOD 6010b/200.7

Reviewer/Date Tige Cunning 11-7-08
Sr. Review/Date Chris Ricciardi 11/14/08
Lab Report # 360-18453-1
MACTEC ~~LAW~~ Project # 610008001G-15A

Total & Dissolved Iron only by 6010B

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* ☑ *Phone #* ☐ *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:** Are both of the following statements true?* **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 the *original 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 *original 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 ☑ Custody seals checked ☑ 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 N/A ☐ Laboratory duplicate results (where applicable) N/A

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 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

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: *The MADEP QA/QC Guidelines provides PQLs for metals. See the attached table for a listing of MADEP PQLs vs. the PQLs listed in the QAPP.*

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 the appropriate 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 PQL? (See attached table for PQLs). **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:

For other SVOC contaminants:
If the sample concentration is < 5 × blank value, flag sample result "JB"
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, 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:

Sample Type	***MADEP % Rec***	QAPP % Rec	Method
Water	*80-120*	N/A	6010B
Water	*N/A*	85-115	200.7
Soil	*95% Confidence Limit (Lab Limits)*	85-115	6010B

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 <10%, positive and 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. 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 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 at the required frequency of 1 per digestion batch of < 20 field samples? **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: 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.

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: 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 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

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 the table below.

Sample conc. < 5x blank value:	Sample conc. > 5x blank value:
Flag sample result "JB"	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 ☐ *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 = 3500 ug/L
Fe Dissolved = 3600 ug/L

No Quals, difference is < 10%.

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.

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OLIN CORPORATION
LEVEL I DATA QUALITY EVALUATION
STANDARD OPERATING PROCEDURE AND CHECKLIST
VOLATILE PETROLEUM HYDROCARBONS BY METHOD MADEP

Reviewer/Date Tige Cunningham 11-7-08
Sr. Review/Date Chris Ricardi 11/14/08
Lab Report # 360-18433-1
~~LAW~~ MACTEC Project # 6100080016 - 15A

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* ☑ *Phone #* ☑ *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: *Are both of the following statements true?* ***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 the *original* 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 original 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 ☑ Custody seals checked ☑ 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 - 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) N

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 ☐ Laboratory duplicate results (where applicable) 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, 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 reject (R) all non-detect results.

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: QAPP Limits were corrected per MADEP VPH method.

NOTE: *The MADEP QA/QC Guidelines provides PQLs for volatile petroleum hydrocarbons. See the attached table for a listing of 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. See the attached table for a listing of the MADEP minimum compound reporting list.*

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:

If the sample concentration is < 5 × blank value, flag sample result "JB"

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. See the attached table for a listing of MADEP LCS control limits vs. the control limits listed in the QAPP*

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. See the attached table for a listing of MADEP MS/MSD control limits vs. the control limits listed in the QAPP.*

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. See the attached table for a listing of MADEP MS/MSD RPD limits vs. the control limits listed in the QAPP.*

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.

Sample conc. < 5x blank value:	Sample conc. > 5x blank value:
Flag sample results "JB"	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.

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USEPA, 1988. "Laboratory Data Validation Functional Guidelines for Evaluating Organic and Inorganic Analysis," EPA/540/R-94-012 and EPA/540-R-94-013, July 1988.

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OLIN-WILMINGTON
LEVEL I DATA QUALITY EVALUATION
STANDARD OPERATING PROCEDURE AND CHECKLIST
WET CHEMISTRY PARAMETERS BY VARIOUS METHODS

Reviewer/Date Tige Cunningham 11-7-08
Sr. Review/Date Chris Ricardi 11/14/08
Lab Report # 360-18433-1
Project # 6100080016-15A

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.

pH Qualified estimated (J)

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

Alkalinity – 1 500mL polyethylene/cool to 4°C

Chemical Oxygen Demand – 250 mL polyethylene/H_2SO_4 to pH<2,cool to 4°C

Chloride, pH, sulfate - 1 500mL polyethylene/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
Specific conductance, TDS, TSS – 100 mL polyethylene/cool to 4°C

TSS, TDS - 1 500mL 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:

N/A

☑ Method blank results ☑ LCS recoveries ☐ MS/MSD recoveries and RPDs ☐ Laboratory duplicate results (where applicable) N/A

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, 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

Collected 8/26, arrive 8/27 / analyzed 8/28/08
J Qual

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 ☐ SOW ☑ QAPP ☐ 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 * ☐ = 2.64 mg/L
Spec. Cond.** ☐ 3 umhos/cm	Total Organic Carbon** ☐ = 1 mg/L		Sulfate (EPA 300.0)* ☐ = 2 mg/L
COD:* Low – 20 mg/L	pH* ☑ < 2 to > 12	TDS* ☐ = 10 mg/L	TSS* ☐ = 5 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% Ammonia Nitrogen as N* ☑ = 80-120%

COD Low* ☐ = 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* ☑ = 80-120% 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. Ammonia Only

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? **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) ☑ = 74-125%

Chloride** ☐ = 75-125% Specific Conductivity * = NA Total Organic Carbon* = NA TDS** = NA

COD Low* ☐ = 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:

Alkalinity* = NA	Bicarbonate Alkalinity* = NA	Carbonate alkalinity* = NA	Ammonia** (LACHAT) ☑ = 20%
Chloride**(SM 4500 Cl) ☐ = 20%	Specific Conductivity * = NA	Total Organic Carbon* = NA	TDS** = NA Total Organic Carbon* = NA
COD Low** ☐ = 20%	COD High** ☐ = 20%	Nitrate Nitrogen as N** ☐ 20%	Nitrite Nitrogen as N** ☐ = 20%
Hardness* = NA	Sulfate (EPA 300.0)* ☐ = 20%	pH* = NA	TSS* = NA

Other parameter(list) _____ RPD = _____ ☐ RPD limit = _____

Other parameter(list) _____ RPD = _____ ☐ RPD limit = _____

* = Laboratory Limits ** = Olin QAPP Limits

(*MADEP has not yet defined LCS recovery limits for wet chemistry analyses.*)

7.0 Laboratory Duplicate

Are the RPDs for the laboratory duplicates <20%? **Yes** [__] No [__] N/A [✓] Comments:

ACTION: If the RPD is greater than specified limits, qualify all results for that analyte as estimated (J).

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:

SOW ☐ QAPP ☐ *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: RPD must be ≤50% for soil or ≤30% water. Qualify data (J) for both sample results if the RPD exceeds limit.

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.

→ pH qualified estimated due to Hold time

REFERENCES

MACTEC, Quality Assurance Project Plan for Remedial Investigation/Feasibility Study – Olin Chemical Superfund Site, Wilmington Property, 51 Eames Street, Wilmington, MA", MACTEC Engineering and Consulting. Draft .October 2008.

STL-Westfield, 2002. "Olin – General Chemistry Control Limits (Soil & Water)," Severn Trent Laboratories, Inc., 53 Southampton Road, Westfield, MA, 01085.

APPENDIX C

Weir Monthly Inspection Reports
April 2008 – September 2008

MACTEC

engineering and constructing a better tomorrow

May 9, 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 April 2008 are attached. MACTEC conducted an inspection on Friday, April 27, 2008.

West Ditch Off-Property

Clear water and leaves covering the bottom at Station A were visible most of the month. At the end of the month, dense pollen on the water surface obscured the bottom.

Throughout the middle of the month, clear water was observed at Station B. During one inspection at the beginning of the month the bottom was not visible due to rain, and at the end of the month, dense pollen on the water surface obscured the bottom.

Weir

Throughout the middle of the month, clear water was observed at Station D. During one inspection at the beginning of the month the bottom was not visible due to rain, and at the end of the month, dense pollen on the water surface obscured the bottom.

A low flow of water from the weir outlet pipe was observed throughout the month. The flow from the weir outlet pipe appeared to be clear during all of the inspections. The water below the weir was predominantly lightly murky with a bluish coloration in the center of the area.

Wetland Areas South of the South Ditch

At the beginning of the month, Stations H and I were inundated with clear water. As the month continued, water at these stations dried out, and by the end of the month, only saturated soils remained.

South Ditch Downstream of the Weir

Station E and Station F, located along the south ditch, had a heavy flow volume at the beginning of the month, dwindling to low flow at the end of the month. The brown, sandy bottom was observed on the bottom of the stream during all of the inspections. Station G, the delta area, had a high flow of clear water at the beginning of the month dwindling to no standing water at the end of the month.

The hay bale line had a moderate volume of water flowing throughout the month.

Wildlife

Robins, chickadees, red-winged blackbirds, a downy woodpecker, and an unidentified butterfly were observed or heard calling near the ditch area during the inspection. The layer of pollen on the water surface prevented observation of aquatic wildlife.

Please feel free to call 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. Joe Coyne, DEP – Boston (electronic)
Mr. Brian Guichard, Olin Corp.
Mr. Jim DiLorenzo, EPA
MACTEC Project File [P:\OLIN\Wilmington\South Ditch\Monthly Inspections\April 2008\April 2008 South Ditch Inspection.doc]

Olin Corporation
Wilmington Site
Interim Action Plan
South and West Ditch Precipitate Inspection Report

Date 4/4/2008 Time 8:00 Inspectors Brian Guichard

Station		Precipitate Observation Yes	Precipitate Observation No	Other Observations
Offsite Fenced Ditch System				Station A is clear with a slightly higher water level.
	Station A		x	Station B water is clear, the bottom is not visible due
	Station B		x	to the ongoing rain.
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Clear water, bottom is not visible due to the ongoing
	Station D		x	rain. The water level is higher than normal.
Weir - Downstream				Stations E & F have a high flow of lightly murky water
	Station E	x		the leaves have washed away leaving a sandy bottom.
	Station F	x		Station G has a high flow of clear water, the whole
	Station G		x	delta area is flooded.
Unnamed Ditch				Stations H and I are both flooded with clear 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 no flow from the outlet pipe. The main area has lightly murky water with a bluish coloration in the center. There is a heavy flow of clear water from the weir area.

The Haybale line has a high flow of clear water flowing through the center.

Olin Corporation

Wilmington Site

Interim Action Plan
South and West Ditch Precipitate Inspection Report

Date 4/11/2008 Time 9:00 Inspectors Leroy Johnson

Station		Precipitate Observation Yes	Precipitate Observation No	Other Observations
Offsite Fenced Ditch System				Stations A and B have clear water with leaves on the bottom.
	Station A		x	
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Clear water with leaves and rocks on the bottom.
	Station D		x	
Weir - Downstream				Stations E & F have a medium flow of clear water with a sandy bottom. Station G has a medium flow of clear water, the whole delta area is still flooded.
	Station E	x		
	Station F	x		
	Station G		x	
Unnamed Ditch				Stations H and I are both have free standing clear 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 a low flow from the outlet pipe. The main area has clear water with a bluish coloration in the center. There is a low flow of clear water from the weir area.

The Haybale line has a medium flow of clear water flowing through the center.

Olin Corporation
Wilmington Site
Interim Action Plan
South and West Ditch Precipitate Inspection Report

Date 4/18/2008 Time 13:15 Inspectors Leroy Johnson

Station		Precipitate Observation Yes	Precipitate Observation No	Other Observations
Offsite Fenced Ditch System				Stations A and B have clear water with leaves on the bottom.
	Station A		x	
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Clear water with leaves and rocks on the bottom.
	Station D		x	
Weir - Downstream				Stations E & F have a low flow of clear water with a sandy bottom. Station G has a low flow of clear water flowing through the center of the delta area.
	Station E	x		
	Station F	x		
	Station G		x	
Unnamed Ditch				Stations H and I are both mostly saturated soil with a little 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 no flow from the outlet pipe. The main area has clear water with a bluish coloration in the center. There is a low flow of clear water from the weir area. Several bubbling events were noticed.

The Haybale line has a low flow of clear water flowing through the center.

Olin Corporation
Wilmington Site
Interim Action Plan
South and West Ditch Precipitate Inspection Report

Date: 4/25/2008 Time: 8:00 Inspectors: Tony Rodolakis

Station		Precipitate Observation Yes	Precipitate Observation No	Other Observations
Offsite Fenced Ditch System				Water surface at Station A and B was covered with pollen. Bottom not visible.
	Station A		X	
	Station B		X	
West Ditch Foot Bridge				
	Station C			Filled in
Weir - Upstream				Water surface covered with pollen. Bottom not visible.
	Station D		X	
Weir - Downstream				
	Station E	X		Stations E and F have a moderate flow of clear water with a brown colored bottom.
	Station F	X		
	Station G		X	Station G has no standing water.
Unnamed Ditch				
	Station H		X	Saturaed soil at Station H and I was covered with pollen. Bottom not visible.
	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 from the outlet pipe.

Most water surfaces were covered with pollen that obscured the bottom.

The Haybale line has a moderate to heavy flow of clear water through the center. Foam was observed at the most upstream checkdam.

Wildlife observed: Robin, red-winged blackbird, black-capped chickadee, downy woodpecker, unidentified butterfly.

MACTEC

engineering and constructing a better tomorrow

June 17, 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 May 2008 are attached. MACTEC conducted an inspection on Friday, May 30, 2008.

West Ditch Off-Property

Station A and Station B both contained standing water with tannic colorations for most of the month. Leaves were observable on the bottom. Surface water at Station A and Station B was covered by pollen at the end of the month.

Weir

Clear water, leaves, and rocky substrate were consistently visible during the month at Station D.

Low flow conditions from the weir outlet pipe predominated throughout most of the month, with a moderate flow of water observed at the beginning of the month. Clear to lightly cloudy water and a brown and beige colored bottom were consistently observed at Station E and Station F. Green algae was reported along the edges of the shoreline.

South Ditch Downstream of the Weir

Station E and Station F, located along the south ditch, had generally a low flow volume throughout the month. A brownish coloring was observed on the bottom of the stream during all

of the inspections. Station G, the delta area, had a moderate flow of clear water through a center channel with the surrounding areas flooded. By the end of the month, arrowleaf had grown to about 6 inches high in the delta area.

The haybale line had a moderate volume of water flowing throughout the month.

Wetland Areas South of the South Ditch

Station H and Station I tended to have mostly saturated soil and with some standing water.

Wildlife

Raccoon tracks were observed in the mud during the inspections. Chickadees, red-winged blackbirds, mallards, and killdeer were observed and heard calling near the ditch area during the inspection. Water striders were observed near the weir area. Frogs were observed in South Ditch.

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\May 2008\May 2008 South Ditch Inspection.doc]

Olin Corporation
Wilmington Site
Interim Action Plan
South and West Ditch Precipitate Inspection Report

Date 5/2/2008 Time 11:30 Inspectors Leroy Johnson

Station		Precipitate Observation Yes	Precipitate Observation No	Other Observations
Offsite Fenced Ditch System				Stations A and B have clear water with leaves on the bottom.
	Station A		x	
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Clear water with leaves and rocks on the bottom.
	Station D		x	
Weir - Downstream				Stations E & F have a medium flow of clear water with a sandy bottom. Station G has a medium flow of clear water flowing through the center of the delta area.
	Station E	x		
	Station F	x		
	Station G		x	
Unnamed Ditch				Stations H and I are both mostly saturated soil.
	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. The main area has clear water with a bluish coloration in the center. There is a low flow of clear water from the weir area.

The Haybale line has a low flow of clear water flowing through the center.

Olin Corporation

Wilmington Site

Interim Action Plan

South and West Ditch Precipitate Inspection Report

Date 5/9/2008 Time 8:30 Inspectors Brian Guichard

Station		Precipitate Observation Yes	Precipitate Observation No	Other Observations
Offsite Fenced Ditch System				Station A has clear water with decomposing leaves on the bottom. The bottom at Station B cannot be seen due to tannic coloration and dark overcast skies.
	Station A		x	
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Clear water with leaves and rocks on the bottom.
	Station D		x	
Weir - Downstream				Stations E & F have a low flow of lightly cloudy water with a brown and beige colored bottom. Station G has a low flow of clear water wandering through the delta area.
	Station E	x		
	Station F	x		
	Station G		x	
Unnamed Ditch				Stations H and I both have free standing water with areas of saturated soil and mud.
	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. The main area has lightly cloudy water with a brown and beige precipitate on the bottom with some small areas of green algae growing along the edges. There is a low flow of clear water from the weir area.

The Haybale line has a low flow of lightly cloudy water flowing through the center.

Olin Corporation

Wilmington Site

Interim Action Plan

South and West Ditch Precipitate Inspection Report

Date 5/19/2008 Time 8:45 Inspectors Leroy Johnson

Station		Precipitate Observation Yes	Precipitate Observation No	Other Observations
Offsite Fenced Ditch System				Station A has clear water with decomposing leaves on the bottom. The bottom at Station B has a tannic coloration with leaves on the bottom.
	Station A		x	
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Clear water with leaves and rocks on the bottom.
	Station D		x	
Weir - Downstream				Stations E & F have a low flow of lightly cloudy water with a brown and beige colored bottom. Station G has a low flow of clear water wandering through the delta area which is mostly mud.
	Station E	x		
	Station F	x		
	Station G		x	
Unnamed Ditch				Stations H and I both have free standing water with areas of saturated soil and mud.
	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 medium flow from the outlet pipe. The main area has a lightly cloudy tannic colored water. The bottom is hard to see. There are some small areas of green algae growing along the edges and on the water surface. There is a low flow of clear water from the weir area.

The Haybale line has a low flow of lightly cloudy water flowing through the center.

Olin Corporation

Wilmington Site

Interim Action Plan

South and West Ditch Precipitate Inspection Report

Date 5/22/2008 Time 8:45 Inspectors Leroy Johnson

Station		Precipitate Observation Yes	Precipitate Observation No	Other Observations
Offsite Fenced Ditch System				Stations A and B have a tannic colored water with a pollen covered surface.
	Station A		x	
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Clear water with leaves and rocks on the bottom.
	Station D		x	
Weir - Downstream				Stations E & F have a low flow of lightly cloudy water with a brown and beige colored bottom. Station G has a low flow of clear water wandering through the delta area which is mostly mud.
	Station E	x		
	Station F	x		
	Station G		x	
Unnamed Ditch				Stations H and I both are mostly water saturated soil.
	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 medium flow from the outlet pipe. The main area has a lightly cloudy tannic colored water. There are some small areas of green algae growing along the edges and on the water surface. There is a low flow of clear water from the weir area.

The Haybale line has a low flow of lightly cloudy water flowing through the center.

Olin Corporation
Wilmington Site
Interim Action Plan
South and West Ditch Precipitate Inspection Report

Date: 5/30/08 **Time:** 8:00 **Inspectors:** Tony Rodolakis

Station		Precipitate Observation Yes	Precipitate Observation No	Other Observations
Offsite Fenced Ditch System				
	Station A		x	Stations A and B are mostly covered with pollen.
	Station B		x	Visible water is tannic colored.
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Clear water with leaves and rocks on the bottom.
	Station D		x	
Weir - Downstream				
	Station E	x		Stations E&F have low flow with clear water
	Station F	x		and brown bottom.
	Station G		x	Water at Station G is clear, low water level.
Unnamed Ditch				
	Station H		x	Stations H and I are mostly saturated soil
	Station I		x	with clear water.
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 has clear water with a slight tannic coloration. The haybale line has a low flow with generally clear water. Killdeer, red-winged blackbird, black-capped chickadee, and mallards were among the observed birds species. Raccoon prints were observed in the South Ditch channel. Water striders were observed near the weir area. Frogs were observedin South Ditch. Leaf-out of trees has resulted in a more shady environment along the ditches. Arrowleaf in the delta about 6" high.

MACTEC
engineering and constructing a better tomorrow

FILE COPY

July 21, 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 June 2008 are attached. MACTEC conducted an inspection on Friday, June 27, 2008.

West Ditch Off-Property

Station A and Station B both contained standing water with tannic colorations for most of the month. Leaves were observable on the bottom.

Weir

Clear water, leaves, and rocky substrate were consistently visible during the month at Station D.

No flow was observed from the weir outlet pipe throughout most of the month, with a low flow of water observed at the end of the month. Clear to lightly cloudy water and a brown and beige colored bottom were consistently observed at the weir area. Green algae was reported along the edges of the shoreline.

South Ditch Downstream of the Weir

Station E and Station F, located along the south ditch had flow volumes ranging from no flow to a moderate flow throughout the month. A brownish coloring was observed on the bottom of the stream during all of the inspections. Station G, the delta area, had a moderate flow of clear water

through a center channel with the surrounding areas flooded at the beginning of the month. By the end of the month, arrowleaf growth had made the water not visible.

The haybale line had a moderate volume of water flowing throughout the month.

Wetland Areas South of the South Ditch

Station H and Station I tended to have mostly saturated soil with some standing water.

Wildlife

Chickadees, red-winged blackbirds, robins, mocking bird, mallards, and cardinals were observed and heard calling near the ditch area during the inspection. Water striders were observed near the weir area. Frogs were observed in South Ditch in the vicinity of the haybale line.

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\June 2008\June 2008 South Ditch Inspection.doc]

Olin Corporation

Wilmington Site

Interim Action Plan

South and West Ditch Precipitate Inspection Report

Date 6/6/2008 Time 11:45 Inspectors Leroy Johnson

Station		Precipitate Observation Yes	Precipitate Observation No	Other Observations
Offsite Fenced Ditch System				Station A has clear water with leaves on the bottom.
	Station A		x	Station B has clear to lightly tannic colored water,
	Station B		x	the bottom is not visible at this time.
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Clear water with leaves and rocks on the bottom.
	Station D		x	
Weir - Downstream				Stations E & F have a medium flow of clear water
	Station E	x		with a brown and beige colored bottom.
	Station F	x		Station G has a medium flow of clear water.
	Station G		x	Vegetation is beginning to take over the area.
Unnamed Ditch				Stations H and I both have some 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 no flow from the outlet pipe. The main area has clear water on top with a brown and beige colored bottom. There are no signs of algae along the edges or on the water surface this week. A few small bubbling events were noticed. There is a medium flow of clear water from the weir area.

The Haybale line has a medium flow of clear water flowing through the center.

Olin Corporation

Wilmington Site

Interim Action Plan

South and West Ditch Precipitate Inspection Report

Date 6/13/2008 Time 10:00 Inspectors Leroy Johnson

Station		Precipitate Observation Yes	Precipitate Observation No	Other Observations
Offsite Fenced Ditch System				Station A has a low level of clear water with leaves on the bottom. Station B has clear to lightly tannic colored water, the bottom is not visible at this time.
	Station A		x	
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	Filled in
Weir - Upstream				Clear water with leaves and rocks on the bottom.
	Station D		x	
Weir - Downstream				Stations E & F have a trickle flow of clear water with a brown/beige colored bottom and pollen on the surface. Station G is covered with vegetation about waist high.
	Station E	x		
	Station F	x		
	Station G		x	
Unnamed Ditch				Stations H and I are both just muddy soil with no 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 no flow from the outlet pipe. The main area has clear water on top with a few small areas of white scum on the surface and a brown and beige colored bottom. No bubbling events were noticed. There is no flow of water from the weir area.

The Haybale line has no flow at this time.

Olin Corporation

Wilmington Site

Interim Action Plan

South and West Ditch Precipitate Inspection Report

Date 6/20/2008 Time 13:00 Inspectors Leroy Johnson

Station		Precipitate Observation Yes	Precipitate Observation No	Other Observations
Offsite Fenced Ditch System				Station A has a low level of clear water with leaves on the bottom. Station B has clear to lightly tannic colored water, the bottom is not visible at this time.
	Station A		x	
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	Filled in
Weir - Upstream				Clear water with leaves and rocks on the bottom.
	Station D		x	
Weir - Downstream				Stations E & F have no flow at this time. The bottom is brown and beige with some scum on the surface. Station G is covered with vegetation about waist high.
	Station E	x		
	Station F	x		
	Station G		x	
Unnamed Ditch				Stations H and I are both just soft soil with no 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 no flow from the outlet pipe. The main area has clear water on top, the surface is covered with a white scum, and a brown and beige colored bottom. No bubbling events were noticed. There is no flow of water from the weir area.

The Haybale line has no flow at this time.

Olin Corporation
Wilmington Site
Interim Action Plan
South and West Ditch Precipitate Inspection Report

Date: 6/27/08 **Time:** 8:00 **Inspectors:** Brian Roden

Station		Precipitate Observation Yes	Precipitate Observation No	Other Observations
Offsite Fenced Ditch System				Station A has a low water level. The water is clear and leaves are visible on the bottom
	Station A		x	
	Station B		x	Station B has clear water with organic material.
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Clear water with leaves and rocks on the bottom.
	Station D		x	
Weir - Downstream				Station E has a low flow of clear water. Waterlevel increase with input from detention pond drain moving toward Station F.
	Station E	x		
	Station F	x		
	Station G		x	Vegetation has overgrown Station G.
Unnamed Ditch				
	Station H		x	Stations H and I are mostly saturated soil with some free standing clear 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 low flow from the outlet pipe. The main area has mostly clear water with a slight tannic coloration. There was a small area of cloudy water.

The haybale line has a low flow with generally clear water, some foaming as the water came through the haybales. Cardinal, red-winged blackbird, mocking bird, robin, black-capped chickadee, and mallards were among the observed birds species. Water striders were observed near the weir area. Frogs were observed in the vicinity of the haybale line.

MACTEC
engineering and constructing a better tomorrow

August 7, 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 July 2008 are attached. MACTEC conducted an inspection on Friday, July 25, 2008.

West Ditch Off-Property

Station A and Station B both contained low levels of standing water with tannic colorations for most of the month. During the last inspection the water levels were higher due to heavy rains in days prior to the inspection. Leaves were observable on the bottom.

Weir

Clear water, leaves, and rocky substrate were consistently visible during the month at Station D.

Flow was observed from the weir outlet pipe throughout most of the month, with no flow of water observed during one inspection. Clear to lightly cloudy water and a brown and beige colored bottom were consistently observed at the weir area. Green algae was observed along the edges of the shoreline and in the main area.

South Ditch Downstream of the Weir

Station E and Station F, located along the south ditch had flow volumes ranging from low flow to moderate flow throughout the month. A brownish coloring was observed on the bottom of the

stream during all of the inspections. Station G, the delta area, had arrowleaf growth which made the water not visible.

The haybale line had a moderate volume of water flowing throughout the month.

Wetland Areas South of the South Ditch

Station H and Station I tended to have mostly saturated soil with some standing water. On the final inspection of the month there was a higher level of standing water due to heavy rains.

Wildlife

Chickadee, red-winged blackbird, robin, catbird, and downy woodpecker were bird species observed or heard calling near the ditch area during the inspection. Water striders were observed near the weir area. Frogs were observed in South Ditch in between Stations E and F as well as in the vicinity of the haybale line. A deer was observed during one inspection in the area of Station G. Also, a snake (10-12 inches in length) was observed on the pathway between Stations E and F during one 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:\OLIN\Wilmington\South Ditch\Monthly Inspections\June 2008\June 2008 South Ditch Inspection.doc]

Olin Corporation

Wilmington Site

Interim Action Plan

South and West Ditch Precipitate Inspection Report

Date 7/3/2008 Time 9:30 Inspectors Leroy Johnson

Station		Precipitate Observation Yes	Precipitate Observation No	Other Observations
Offsite Fenced Ditch System				Station A has a low level of clear water with leaves on the bottom. Station B has clear to lightly tannic colored water, the bottom is not visible at this time.
	Station A		x	
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	Filled in
Weir - Upstream				Clear water with leaves and rocks on the bottom.
	Station D		x	
Weir - Downstream				Stations E & F have a moderate flow of clear water. The bottom is brown and beige. Station G is covered with vegetation about chest high
	Station E	x		
	Station F	x		
	Station G		x	
Unnamed Ditch				Stations H has a little standing water, Station I is mostly mud with a few small areas of 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 a moderate flow from the outlet pipe. The main area has clear water on top with a few areas of lightly cloudy water, and a brown and beige colored bottom. No bubbling events were noticed. There is no flow of water from the weir area.

The Haybale line has a medium flow of clear water.

Note: noticed 1 large deer in the area of Station G

Olin Corporation
Wilmington Site
Interim Action Plan
South and West Ditch Precipitate Inspection Report

Date 7/11/2008 Time 12:15 Inspectors Leroy Johnson

Station		Precipitate Observation Yes	Precipitate Observation No	Other Observations
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; the bottom is not visible at this time.
	Station A		x	
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	Filled in
Weir - Upstream				Clear water with leaves and rocks on the bottom.
	Station D		x	
Weir - Downstream				Stations E & F have a moderate flow of clear water. The bottom is brown and beige. Station G is covered with vegetation about chest high.
	Station E	x		
	Station F	x		
	Station G		x	
Unnamed Ditch				Stations H is mostly covered with free standing water. Station I is mostly mud with a few small areas of 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 no flow from the outlet pipe. The main area has clear water on top with a few areas of lightly cloudy water, and a brown and beige colored bottom. No bubbling events were noticed. There is a moderate flow of clear water from the weir area.

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 7/17/2008 Time 12:30 Inspectors Leroy Johnson

Station		Precipitate Observation Yes	Precipitate Observation No	Other Observations
Offsite Fenced Ditch System				Station A has a low level of clear water with leaves on the bottom. Station B has a lightly tannic colored water, the bottom is covered with leaf litter and rocks.
	Station A		x	
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	Filled in
Weir - Upstream				Clear water with leaves and rocks on the bottom
	Station D		x	
Weir - Downstream				Stations E & F have a low flow of clear water. The bottom is brown and beige with a few small areas of foam on the surface. Station G is covered with vegetation
	Station E	x		
	Station F	x		
	Station G		x	
Unnamed Ditch				Stations H is mostly covered with grass. Station I is mostly muddy soil at this time
	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 from the outlet pipe. The main area has clear water with some patches or green algae on the surface, and a brown and beige colored bottom with a few areas of green algae there also. There are also a few small areas of white scum on the water surface. There is no flow from the weir area at this time.

The Haybale line has a medium flow of clear water.

Note: Saw 1 snake about 10-12" long on the pathway between stations E and F.

Olin Corporation
Wilmington Site
Interim Action Plan
South and West Ditch Precipitate Inspection Report

Date: 7/25/08 **Time:** 8:00 **Inspectors:** Brian Roden

Station		Precipitate Observation Yes	Precipitate Observation No	Other Observations
Offsite Fenced Ditch System				Station A has a high water level. The water is clear and leaves are visible on the bottom
	Station A		x	
	Station B		x	Station B has clear water with a high level.
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Clear water with leaves and rocks on the bottom.
	Station D		x	
Weir - Downstream				High water level with moderate flow from stations E and F. Some foaming after check dams.
	Station E	x		
	Station F	x		
	Station G		x	Vegetation has overgrown Station G.
Unnamed Ditch				
	Station H		x	Stations H and I are flooded with 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 from the weir outlet pipe. The main area has mostly clear water with a slight tannic coloration. There was a small area of cloudy water.

The haybale line has a moderate to heavy flow with generally clear water.

Red-winged blackbird, catbird, robin, black-capped chickadee, and downy woodpecker were among the observed birds species.

Frogs were observed in the vicinity of stations E and F as well as the delta and haybale areas.

Water levels were high due to heavy rains the day before inspection.

MACTEC
engineering and constructing a better tomorrow

September 8, 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 August 2008 are attached. MACTEC conducted an inspection on Friday, September 5, 2008.

West Ditch Off-Property

Station A and Station B both contained low levels of clear-colored standing water for the month. The substrate was visibly covered with leaves.

Weir

The water was clear for most of the month at Station D, but was observed to be stained during the last inspection. Leaves and rocks were consistently visible on the bottom.

Flow was observed from the weir outlet pipe throughout most of the month, with no flow of water observed during one inspection. At the weir area, the water was observed to be clear to mostly cloudy throughout the month, with a consistent brown and beige colored bottom. Green algae was observed in isolated patches on the bottom, and there was a white scum on the surface of the water.

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 flow volumes ranging from low flow to moderate flow throughout the month. A beige and brown coloring was observed on the bottom of the stream during all of the inspections. Station G, the delta area, was covered with arrowleaf growth, which made the water obstructed to view throughout the month.

Wetland Areas South of the South Ditch

Station H and Station I tended to have mostly saturated soil with some standing water. The soil was mostly covered with grassy vegetation.

Wildlife

Canada goose and killdeer were bird species observed near the ditch area during the inspection. Wood frogs were observed in the water at Station A, at the weir, and in South Ditch. A deer was observed near the Weir area during one 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:\OLIN\Wilmington\South Ditch\Monthly Inspections\JAugust 2008\August 2008 South Ditch Inspection.doc]

Olin Corporation

Wilmington Site

Interim Action Plan

South and West Ditch Precipitate Inspection Report

Date 8/1/2008 Time 8:45 Inspectors Leroy Johnson

Station		Precipitate Observation Yes	Precipitate Observation No	Other Observations
Offsite Fenced Ditch System				Station A has a low level of clear water with leaves on the bottom. Station B has a lightly tannic colored water, the bottom is not visible at this time.
	Station A		x	
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Clear water with leaves and rocks on the bottom.
	Station D		x	
Weir - Downstream				Stations E & F have a moderate flow of clear water. The bottom is brown and beige with some light foaming on the surface. Station G is covered with vegetation.
	Station E	x		
	Station F	x		
	Station G		x	
Unnamed Ditch				Stations H has some standing water and is mostly covered with grass, Station I also has standing water the rest of the area is mostly muddy soil.
	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 from the outlet pipe and a moderate flow from the weir area. The main area has lightly cloudy water with a brown and beige colored bottom. There are a few areas of green algae on the bottom and a few small areas of white scum on the water 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 8/8/2008 Time 9:00 Inspectors Leroy Johnson

Station		Precipitate Observation Yes	Precipitate Observation No	Other Observations
Offsite Fenced Ditch System				Station A has a low level of clear water with leaves on the bottom. Station B has a lightly tannic colored water. Vegetation covering about 1/2 of the water area.
	Station A		x	
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Clear water with leaves and rocks on the bottom.
	Station D		x	
Weir - Downstream				Stations E & F have a moderate flow of clear water. The bottom is brown and beige. Station G is covered with vegetation.
	Station E	x		
	Station F	x		
	Station G		x	
Unnamed Ditch				Stations H has standing water and is mostly covered with grass, Station I also has standing water the rest of the area is mostly muddy soil.
	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 medium flow from the outlet pipe and a moderate flow from the weir area. The main area has lightly cloudy water with a brown and beige colored bottom.

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 8/15/2008 Time 10:30 Inspectors Leroy Johnson

Station		Precipitate Observation Yes	Precipitate Observation No	Other Observations
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 vegetation covering about 1/2 of the water area.
	Station A		x	
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Clear water with leaves and rocks on the bottom.
	Station D		x	
Weir - Downstream				Stations E & F have a moderate flow of clear water. The bottom is brown and beige. Station G is covered with vegetation.
	Station E	x		
	Station F	x		
	Station G		x	
Unnamed Ditch				Stations H and I both have standing water. Station H is mostly covered with grass.
	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 medium flow from the outlet pipe and a moderate flow from the weir area. The main area has lightly cloudy water with a brown and beige colored bottom.

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 8/22/2008 Time 7:00 Inspectors Leroy Johnson

Station		Precipitate Observation Yes	Precipitate Observation No	Other Observations
Offsite Fenced Ditch System				Station A has a low level of clear water with leaves on the bottom. Station B has a lightly tannic colored water. Vegetation covering about 1/2 of the water area.
	Station A		x	
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Clear water with leaves and rocks on the bottom.
	Station D		x	
Weir - Downstream				Stations E & F have a low flow of clear water. The bottom is brown and beige. Station G is covered with vegetation.
	Station E	x		
	Station F	x		
	Station G		x	
Unnamed Ditch				Station H has some standing water and is mostly covered with grass. Station I also has standing water the rest of the area is mostly muddy soil.
	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 has lightly cloudy water with a brown and beige colored bottom and a few areas of white scum 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 8/29/2008 Time 10:00 Inspectors Leroy Johnson

Station		Precipitate Observation Yes	Precipitate Observation No	Other Observations
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 about 1/2 of the water area.
	Station A		x	
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Clear water with leaves and rocks on the bottom.
	Station D		x	
Weir - Downstream				Stations E & F have a low flow of clear water. The bottom is brown and beige. Station G is covered with vegetation.
	Station E	x		
	Station F	x		
	Station G		x	
Unnamed Ditch				Station H is muddy soil mostly covered with grass. Station I also has 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 is a moderate flow from the outlet pipe and a moderate flow from the weir area. The main area has mostly clear water with a brown and beige colored bottom and a few areas of white scum on the water surface.

Note: Saw one large deer near the weir area.

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: 9/5/08 **Time:** 8:00 **Inspectors:** Tony Rodolakis

Station		Precipitate Observation Yes	Precipitate Observation No	Other Observations
Offsite Fenced Ditch System				Station A has a low water level. There is little standing water. Leafy substrate visible. Station B has low water levels but standing water.
	Station A		x	
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Stained water with leaves and rocks on the bottom.
	Station D		x	
Weir - Downstream				Stations E & F have low flow of murky water and tan substrate. Station G is covered with vegetation.
	Station E	x		
	Station F	x		
	Station G	x		
Unnamed Ditch				Stations H and I had saturated soils with vegetation.
	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 very little flow of water from the weir outlet pipe. The main area has mostly cloudy, tan colored water with isolated green spots. Substrate was tan. A white scum was visible on the water surface. There was very low flow in South Ditch. There was little flow over the lines of haybales. The haybale line has a moderate to heavy flow with generally clear water.

Wildlife oberved: Canada goose, killdeer, 3 woodfrogs in water at at Station A, 3 woodfrogs in water at the Weir, and 4 woodfrogs in water in South Ditch.

MACTEC

engineering and constructing a better tomorrow

October 29, 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 September 2008 are attached. MACTEC conducted inspections on Friday, September 5, 2008 and September 26, 2008.

West Ditch Off-Property

Station A and Station B both contained low levels of clear-colored standing water for most of the month. During one inspection Station B had tannic colored water. The substrate was visibly covered with leaves.

Weir

The water at Station D had a tannic color during two inspections, was observed to be stained during one inspection, and was clear for the final inspection of the month. Leaves and rocks were visible on the bottom during two 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 to mostly cloudy throughout the month, with a consistent brown, tan, and beige colored bottom. Green algae was observed in isolated patches on the bottom, and there was a white scum on the surface of the water.

South Ditch Downstream of the Weir

Station E and Station F, located along the South Ditch, had low flow volumes throughout the month. A beige and brown coloring was observed on the bottom of the stream during all of the inspections, and a rust color was observed during two of the inspections. Station G, the delta area, was covered with arrowleaf growth, which obstructed the view of the water throughout the month.

Wetland Areas South of the South Ditch

Station H and Station I tended to have mostly saturated soil with some standing water. The soil was mostly covered with grassy vegetation.

Wildlife

Canada goose, killdeer and ducks were observed near the ditch area during the inspection. Wood frogs were observed in the water at Station A, at the weir, and in South Ditch.

Please feel free to contact either of the undersigned at 781-245-6606 with any questions.

Sincerely,
MACTEC Engineering and Consulting, Inc.

Brian Roden
Staff 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\September 2008\September 2008 South Ditch Inspection doc]

Olin Corporation
Wilmington Site
Interim Action Plan
South and West Ditch Precipitate Inspection Report

Date: 9/5/08 **Time:** 8:00 **Inspectors:** Tony Rodolakis

Station		Precipitate Observation Yes	Precipitate Observation No	Other Observations
Offsite Fenced Ditch System				Station A has a low water level. There is little standing water. Leafy substrate visible. Station B has low water levels but standing water.
	Station A		x	
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Stained water with leaves and rocks on the bottom.
	Station D		x	
Weir - Downstream				Stations E & F have low flow of murky water and tan substrate. Station G is covered with vegetation.
	Station E	x		
	Station F	x		
	Station G	x		
Unnamed Ditch				Stations H and I had saturated soils with vegetation.
	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 very little flow of water from the weir outlet pipe. The main area has mostly cloudy, tan colored water with isolated green spots. Substrate was tan. A white scum was visible on the water surface. There was very low flow in South Ditch. There was little flow over the lines of haybales. The haybale line has a moderate to heavy flow with generally clear water.

Wildlife oberved: Canada goose, killdeer, 3 woodfrogs in water at at Station A, 3 woodfrogs in water at the Weir, and 4 woodfrogs in water in South Ditch.

Olin Corporation
Wilmington Site

Interim Action Plan
South and West Ditch Precipitate Inspection Report

Date 9/12/2008 Time 7:00 Inspectors Brian Guichard

Station		Precipitate Observation Yes	Precipitate Observation No	Other Observations
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 about 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. Station G is covered with vegetation.
	Station E	x		
	Station F	x		
	Station G		x	
Unnamed Ditch				Station H is muddy soil mostly covered with grass. Station I also has 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 is no flow from the outlet pipe at this time and a medium flow from the weir area. The main area is lightly cloudy with a brown and beige colored bottom. The white scum on the water surface is mostly gone at this time and two bubbling events were noticed. Note: Saw 5 Ducks and several Geese near the weir area. 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 9/19/2008 Time 7:35 Inspectors Leroy Johnson

Station		Precipitate Observation Yes	Precipitate Observation No	Other Observations
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 about 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. Station G is covered with vegetation.
	Station E	x		
	Station F	x		
	Station G		x	
Unnamed Ditch				Station H is muddy soil with a little free standing water and mostly covered with grass. Station I also has 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 is a low flow from the outlet pipe at this time and a medium flow from the weir area. The main area is lightly cloudy with a brown and beige colored bottom. There is almost no more white scum remaining 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: 9/26/08 **Time:** 11:00 **Inspectors:** Brian Roden BJR

Station		Precipitate Observation Yes	Precipitate Observation No	Other Observations
Offsite Fenced Ditch System				Station A has a low water level with
	Station A		x	leafy substrate visible.
	Station B		x	Station B has a low water level covered by leaves.
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Clear water with leaves and rocks on
	Station D		x	the bottom.
Weir - Downstream				
	Station E	x		Stations E & F have low flow of murky water and
	Station F	x		tan substrate. Station G is covered with vegetation.
	Station G		x	
Unnamed Ditch				
	Station H		x	Station H has saturated soils with vegetation.
	Station I		x	Station I has muddy soils with vegetation.
Supplemental Inspection Locations (designate station location on page 2 of 2)				
Staff Gauge Level				

Condition of Weir / Haybale Barriers: There is very little flow of water from the weir outlet pipe. The main area has mostly cloudy, tan colored water with isolated green spots. Substrate was tan.

The haybale line has a low flow with generally clear water.

Multiple frogs were observed between Stations E and G.

APPENDIX D

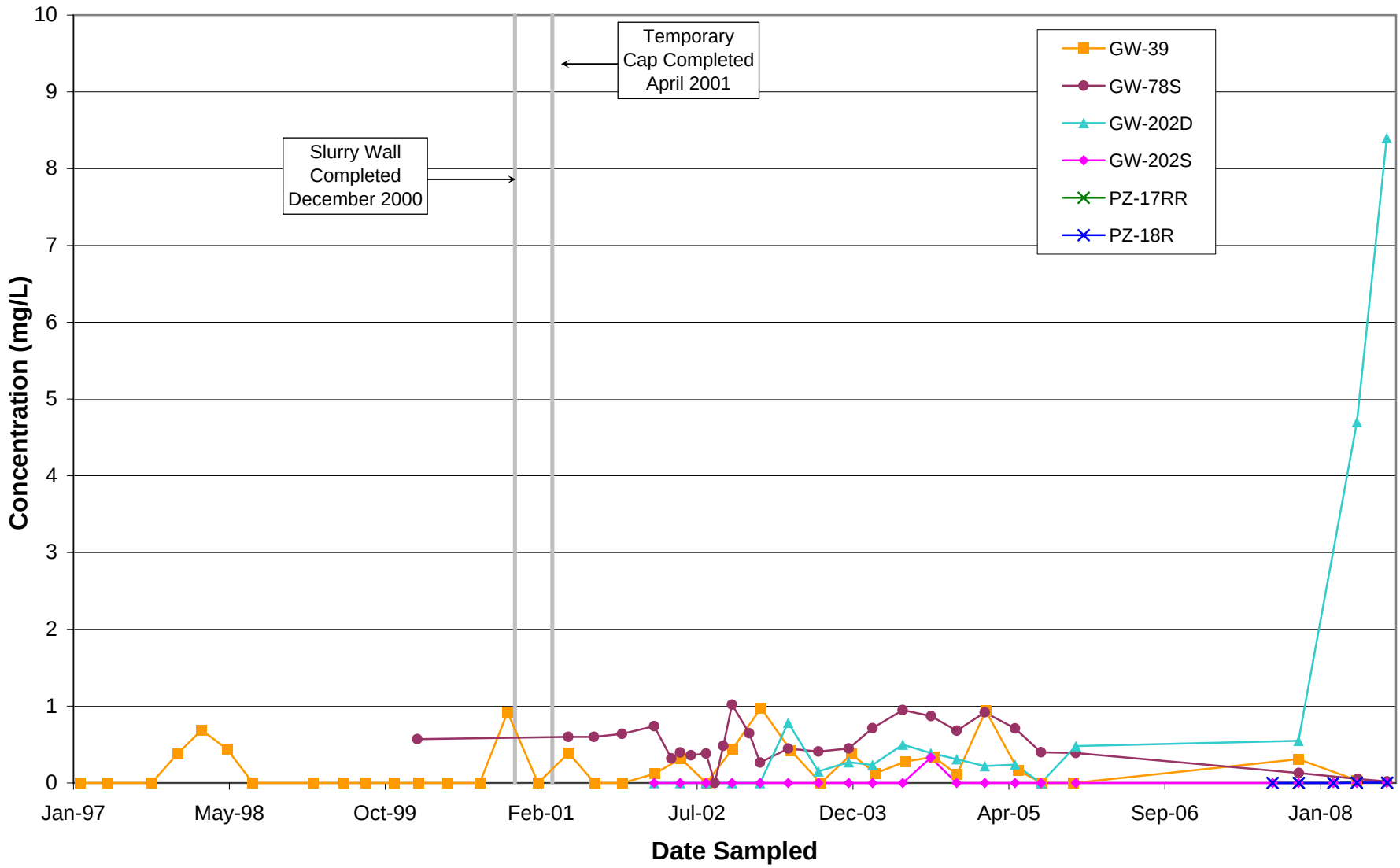
Slurry Wall/Cap Groundwater and Surface Water Quality Time Series Plots

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

APPENDIX D

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

D-1 Groundwater (Aluminum, Ammonia, Chloride, Chromium, Sulfate)



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Olin Wilmington Superfund Site
Wilmington, Massachusetts

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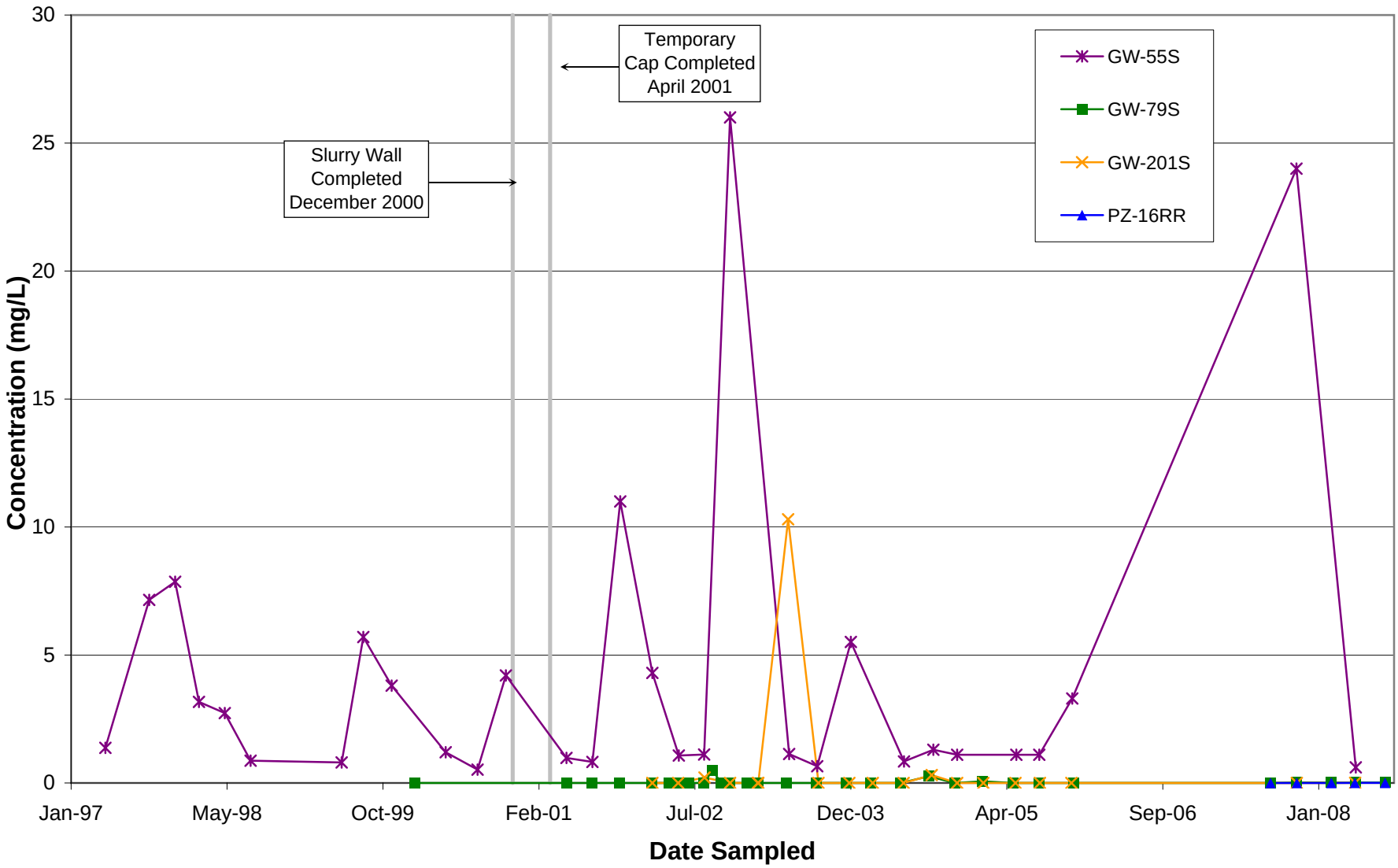
Filtered Aluminum in Groundwater South of Containment Structure

Figure D-1.1

P:\OLIN\Wilmington\SemiAnnual Status Report\2009 January\Appendix D\
Time Series Plots DAPL constituents.xls, Aluminum GW S

Prepared by: BJR
Checked by: MH



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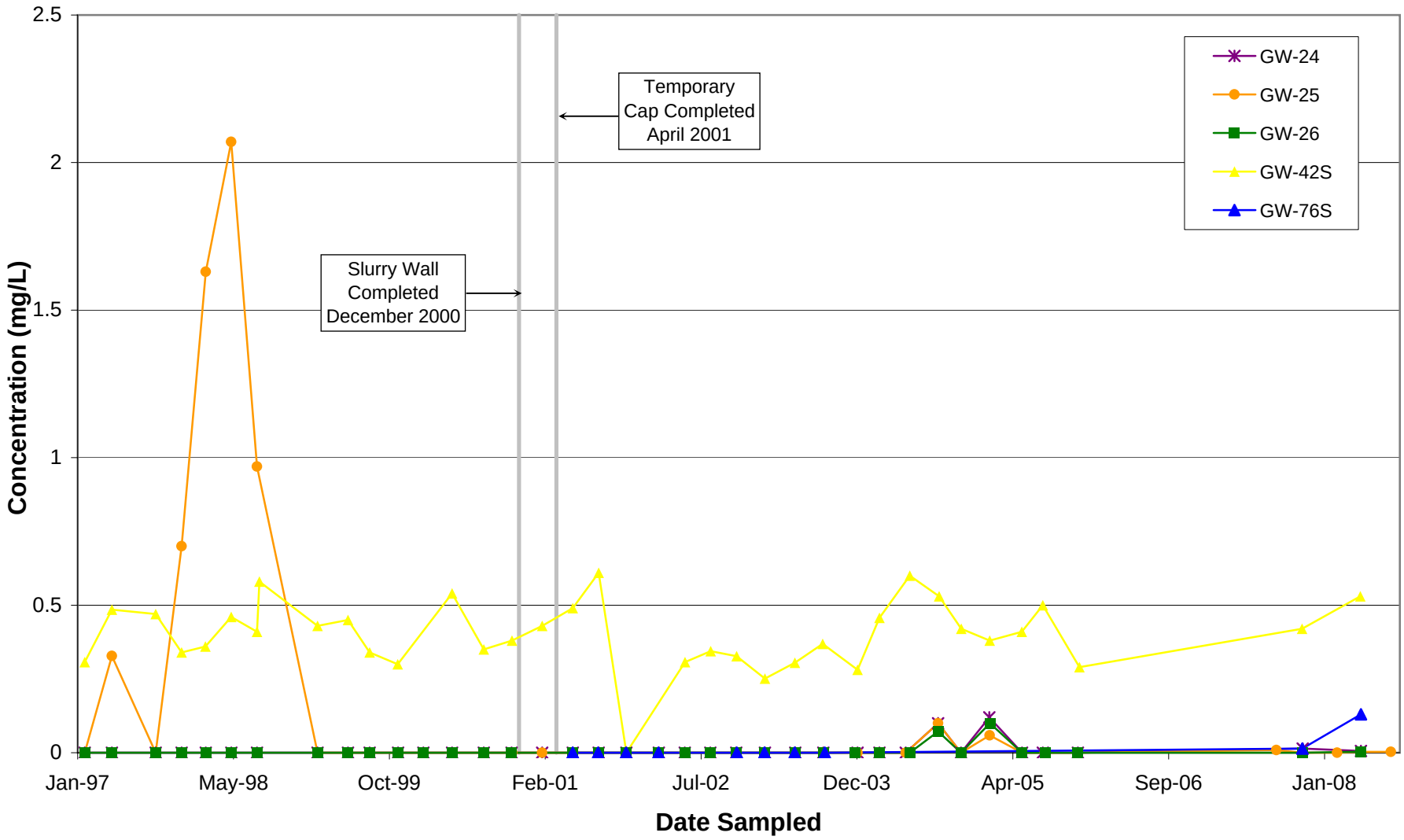
Filtered Aluminum in Groundwater Southeast of Containment Structure

Figure D-1.2

P:\OLIN\Wilmington\SemiAnnual Status Report\2009 January\Appendix D\
Time Series Plots DAPL constituents.xls, Aluminum GW SE

Prepared by: BJR
Checked by: MH



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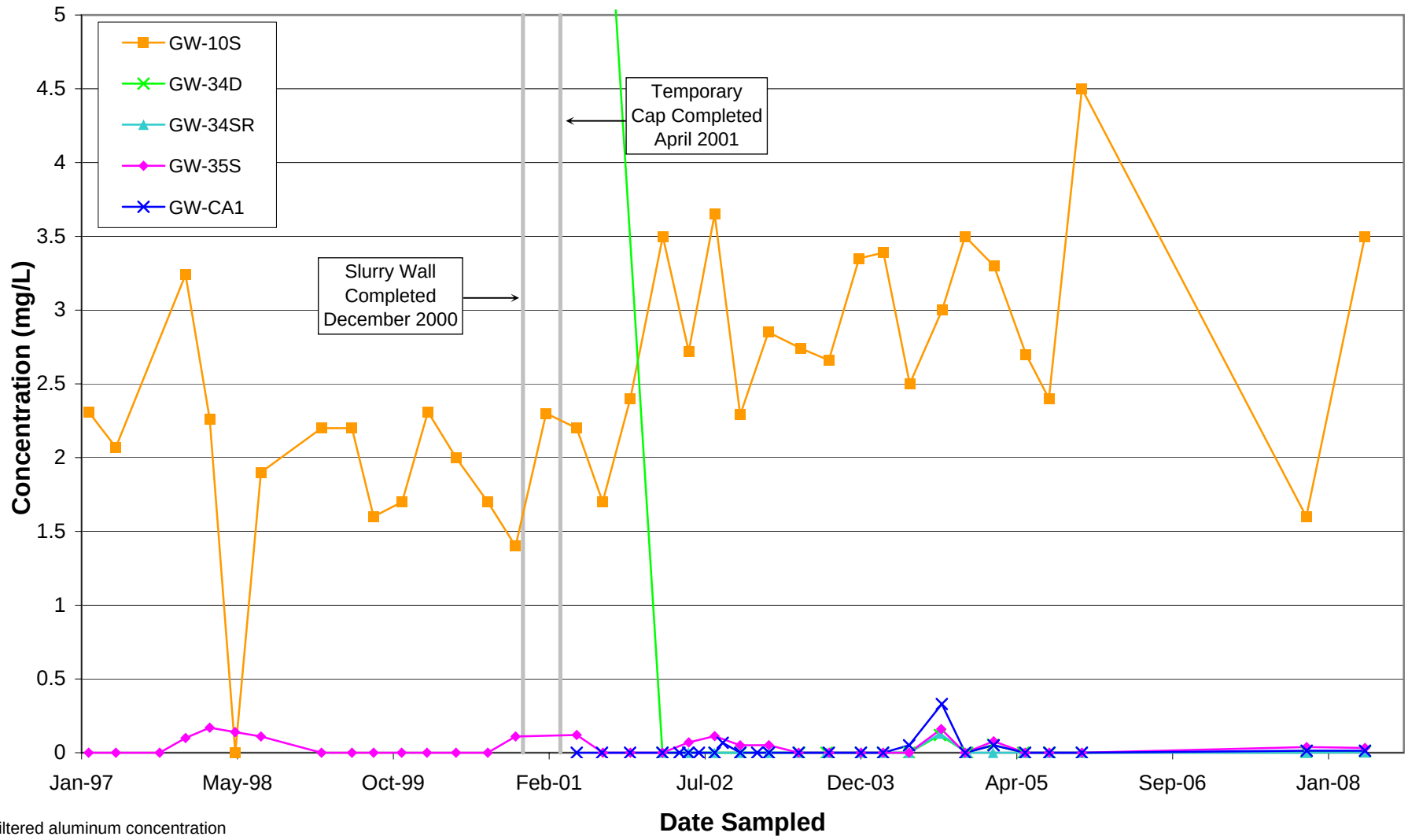
Filtered Aluminum in Groundwater West of Containment Structure

Figure D-1.3

P:\OLIN\Wilmington\SemiAnnual Status Report\2009 January\Appendix D\
Time Series Plots DAPL constituents.xls, Aluminum GW W

Prepared by: BJR
Checked by: MH



Filtered aluminum concentration
of 38 detected at GW-34D on 1/19/00 not shown.

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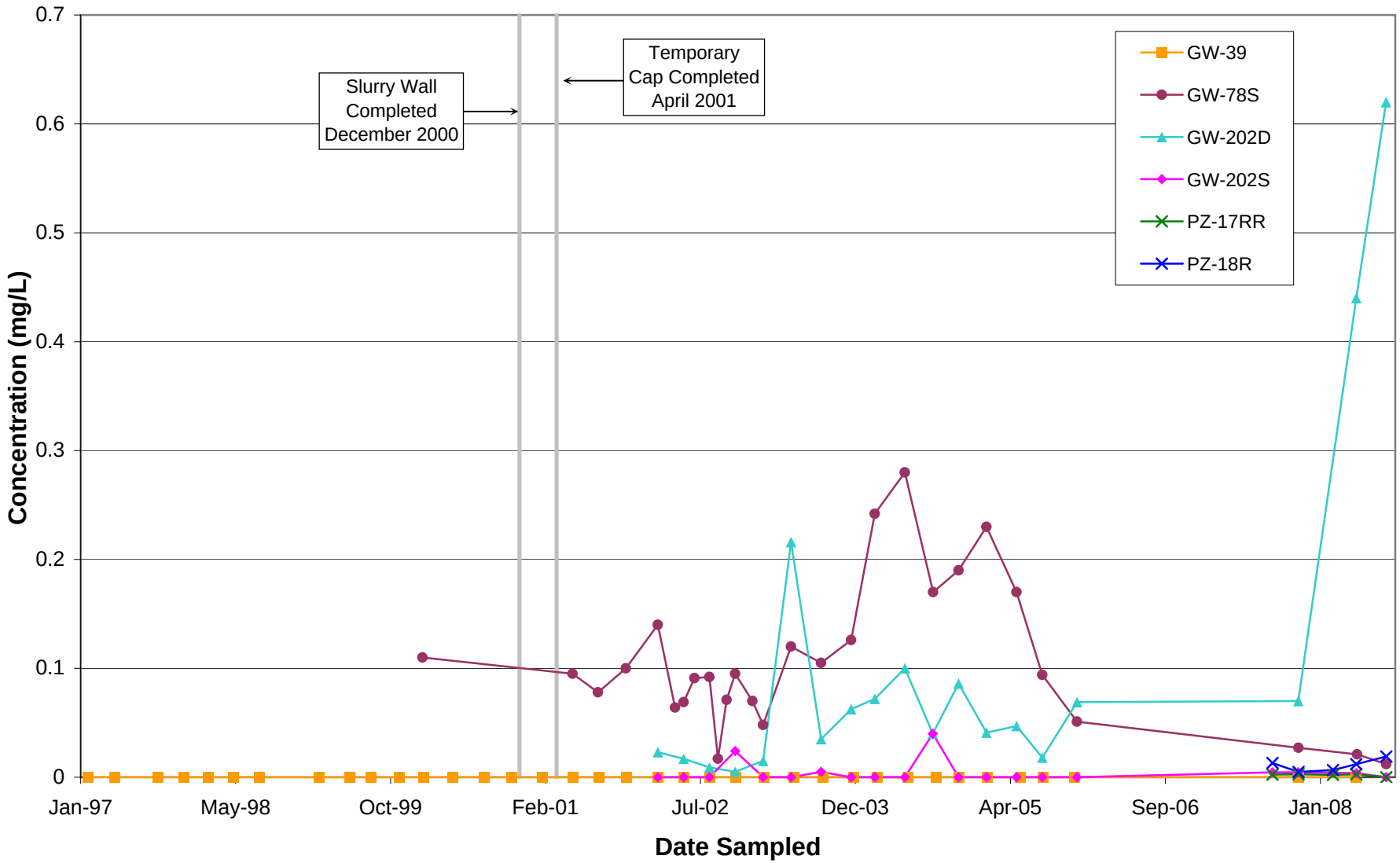
Filtered Aluminum in Groundwater North of Containment Structure

Figure D-1.4

P:\OLIN\Wilmington\SemiAnnual Status Report\2009 January\Appendix D\
Time Series Plots DAPL constituents.xls, Aluminum GW N

Prepared by: BJR
Checked by: MH



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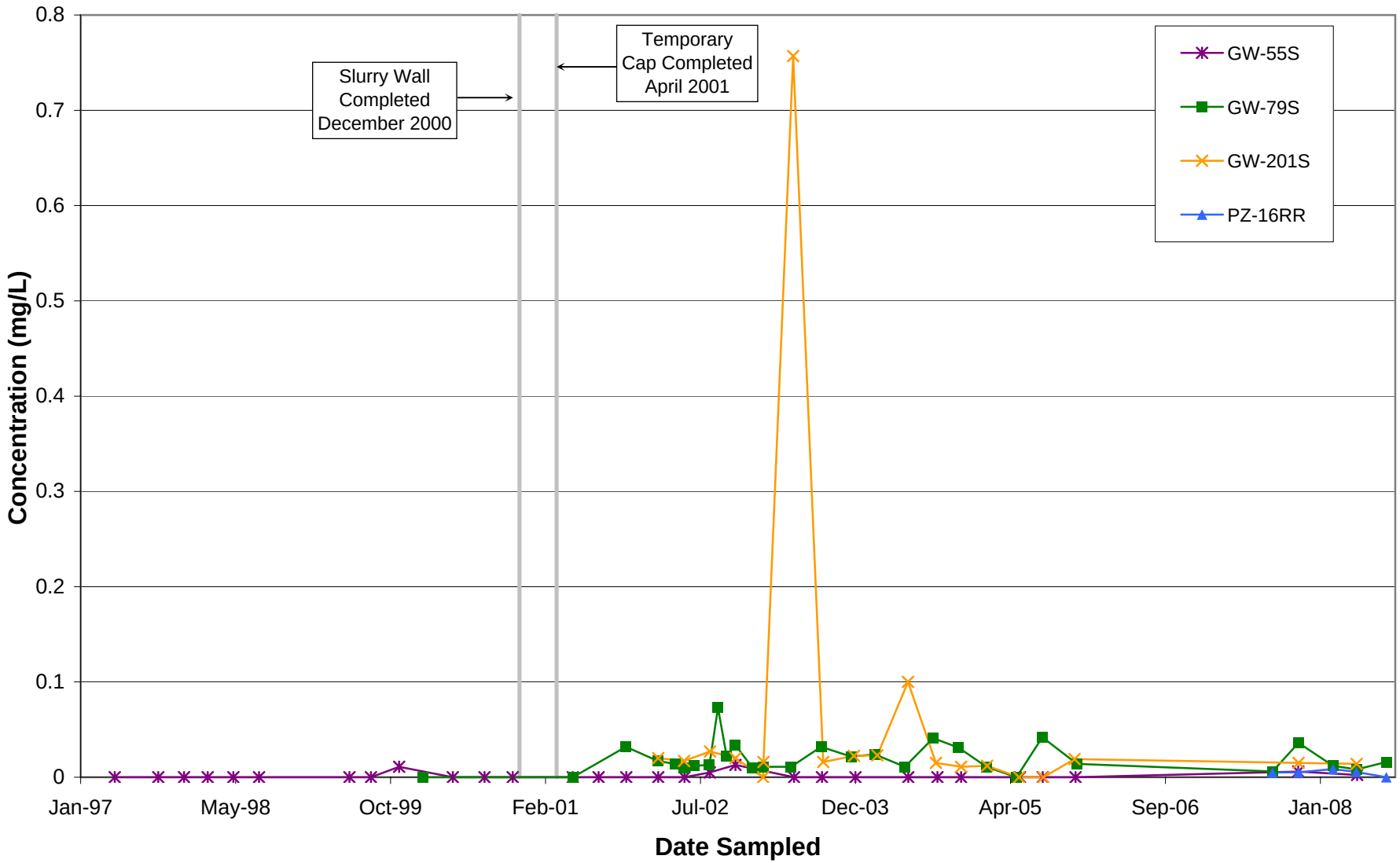
Filtered Chromium in Groundwater South of Containment Structure

Figure D-1.5

P:\OLIN\Wilmington\SemiAnnual Status Report\2009 January\Appendix D\
Time Series Plots DAPL constituents.xls, Dissolved Chromium GW S

Prepared by: BJR
Checked by: MH



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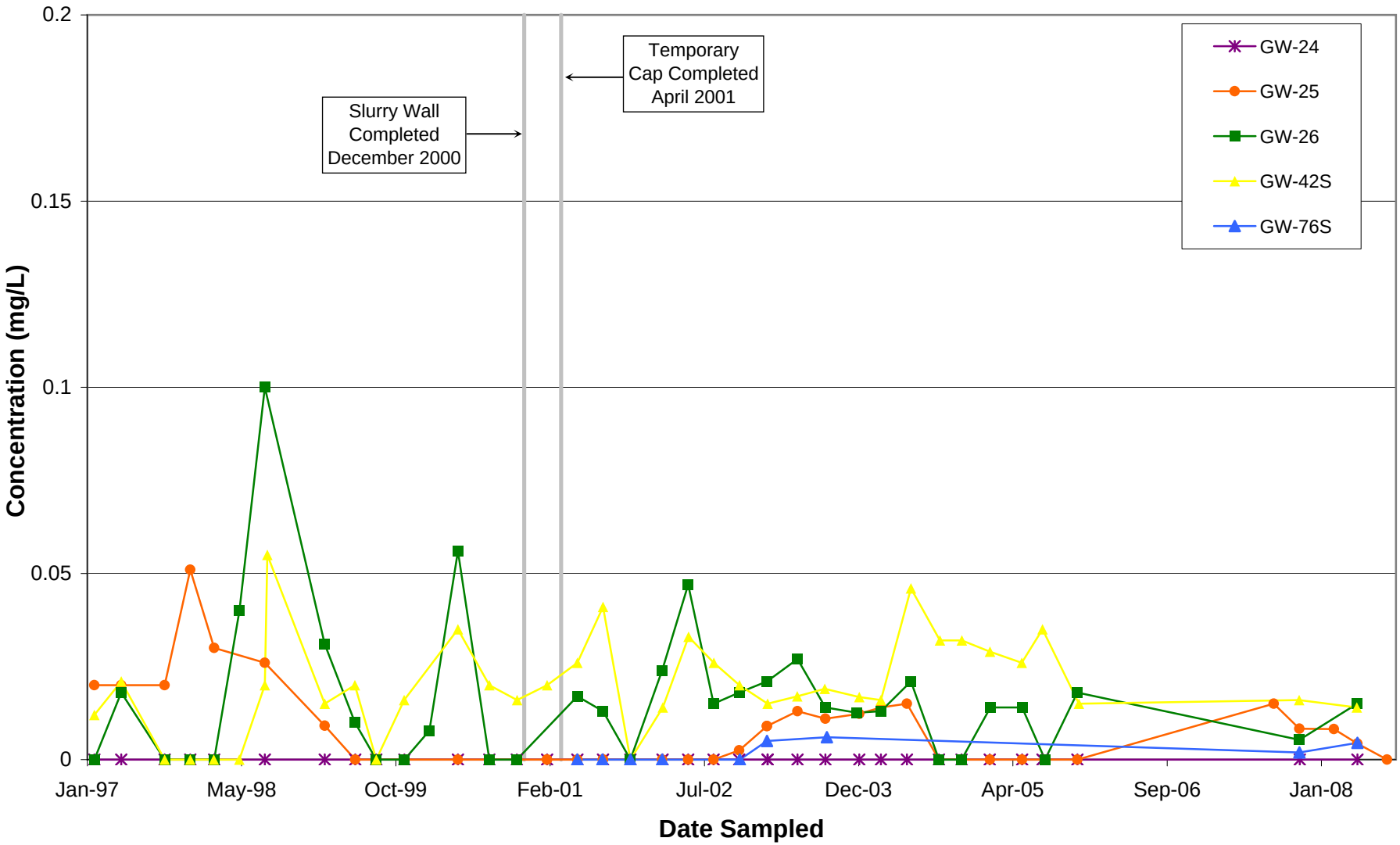
Filtered Chromium in Groundwater Southeast of Containment Structure

Figure D-1.6

P:\OLIN\Wilmington\SemiAnnual Status Report\2009 January\Appendix D\
Time Series Plots DAPL constituents.xls, Dissolved Chromium GW SE

Prepared by: BJR
Checked by: MH



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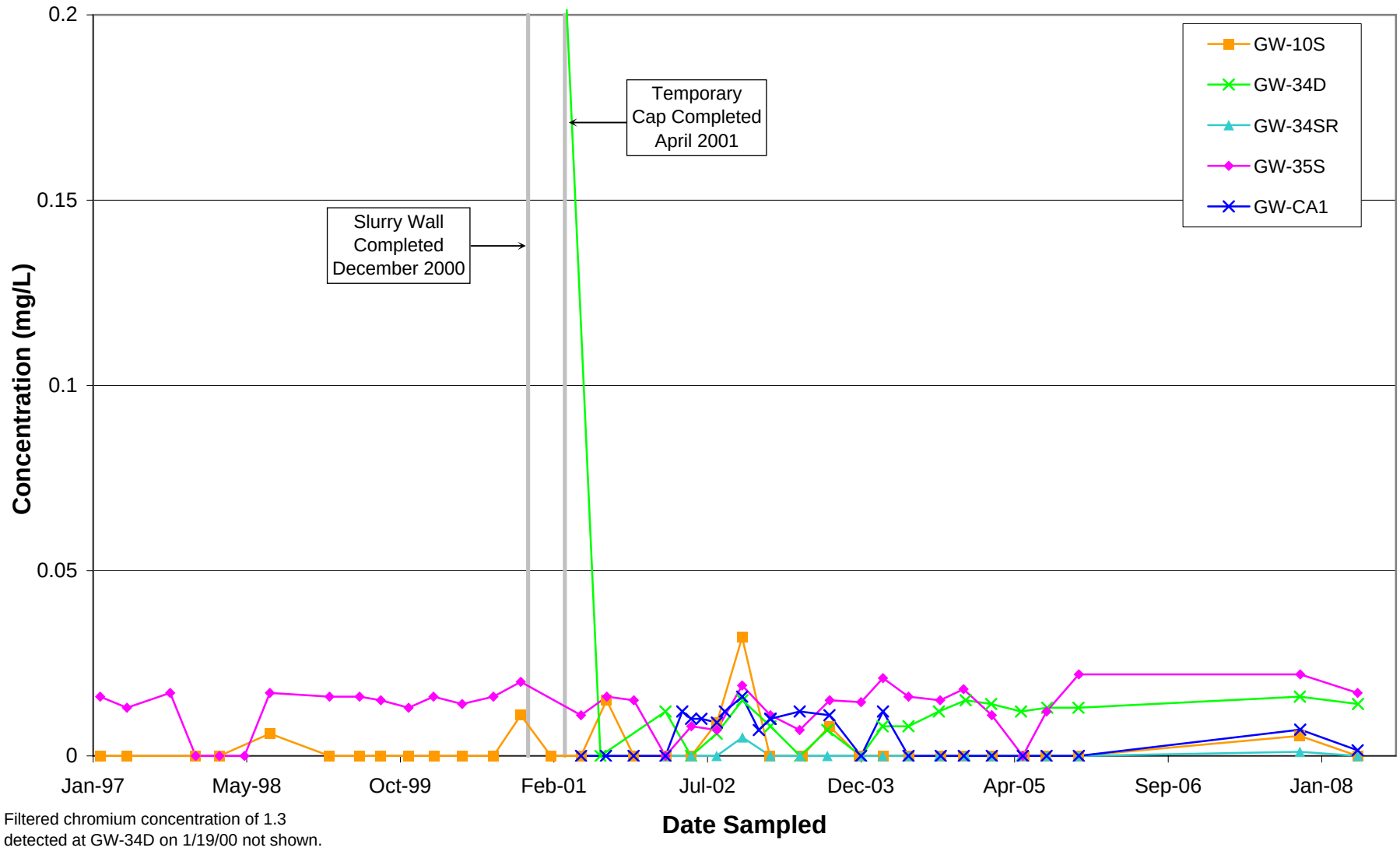
Filtered Chromium in Groundwater
West of Containment Structure

Figure D-1.7

P:\OLIN\Wilmington\SemiAnnual Status Report\2009 January\Appendix D\
Time Series Plots DAPL constituents.xls, Dissolved Chromium GW W

Prepared by: BJR
Checked by: MH

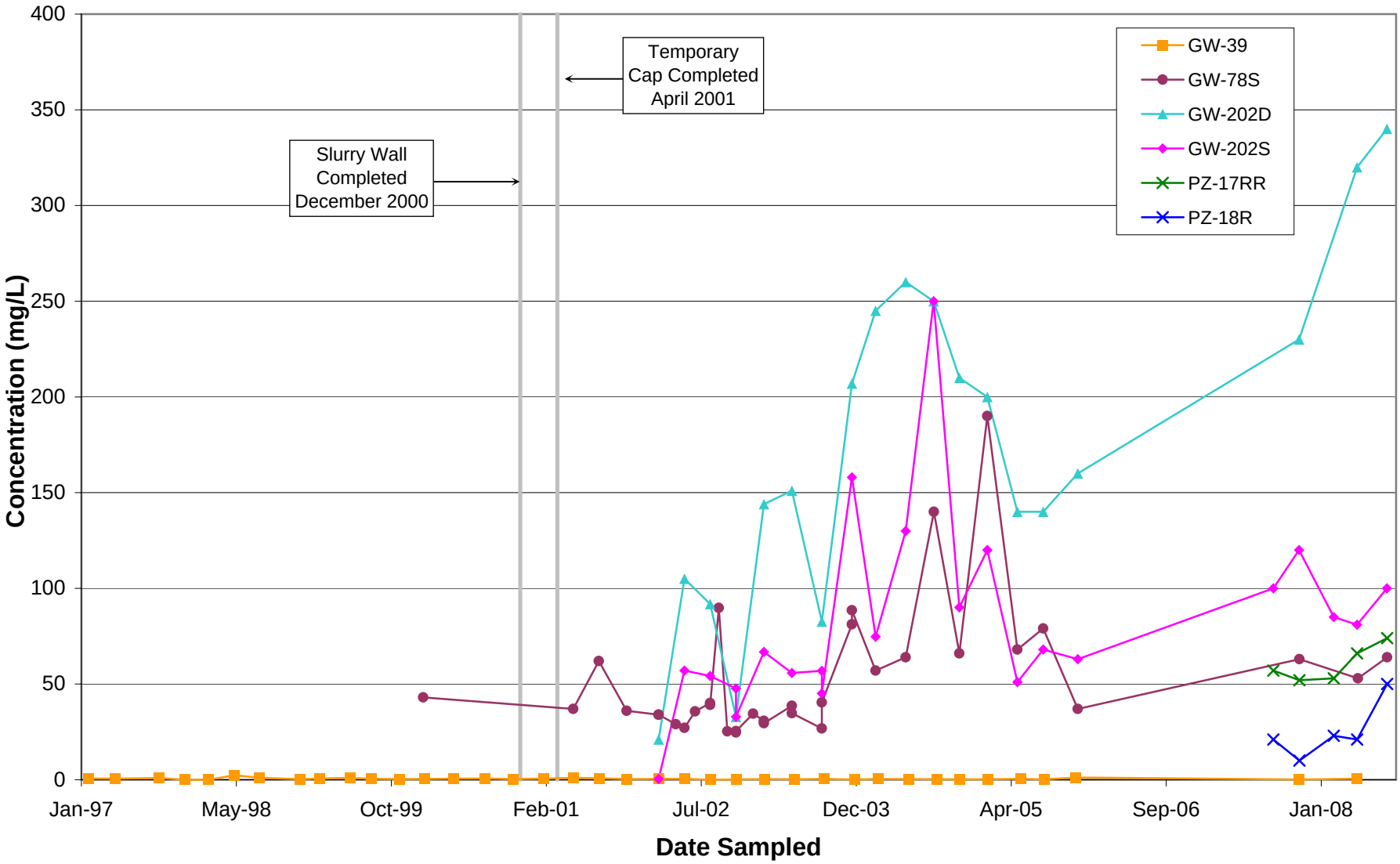


Filtered chromium concentration of 1.3 detected at GW-34D on 1/19/00 not shown.

Semi-Annual Status Report No. 3 Olin Wilmington Superfund Site Wilmington, Massachusetts	MACTEC	Filtered Chromium in Groundwater North of Containment Structure Figure D-1.8

P:\OLIN\Wilmington\SemiAnnual Status Report\2009 January\Appendix D\
Time Series Plots DAPL constituents.xls, Dissolved Chromium GW N

Prepared by: BJR
Checked by: MH



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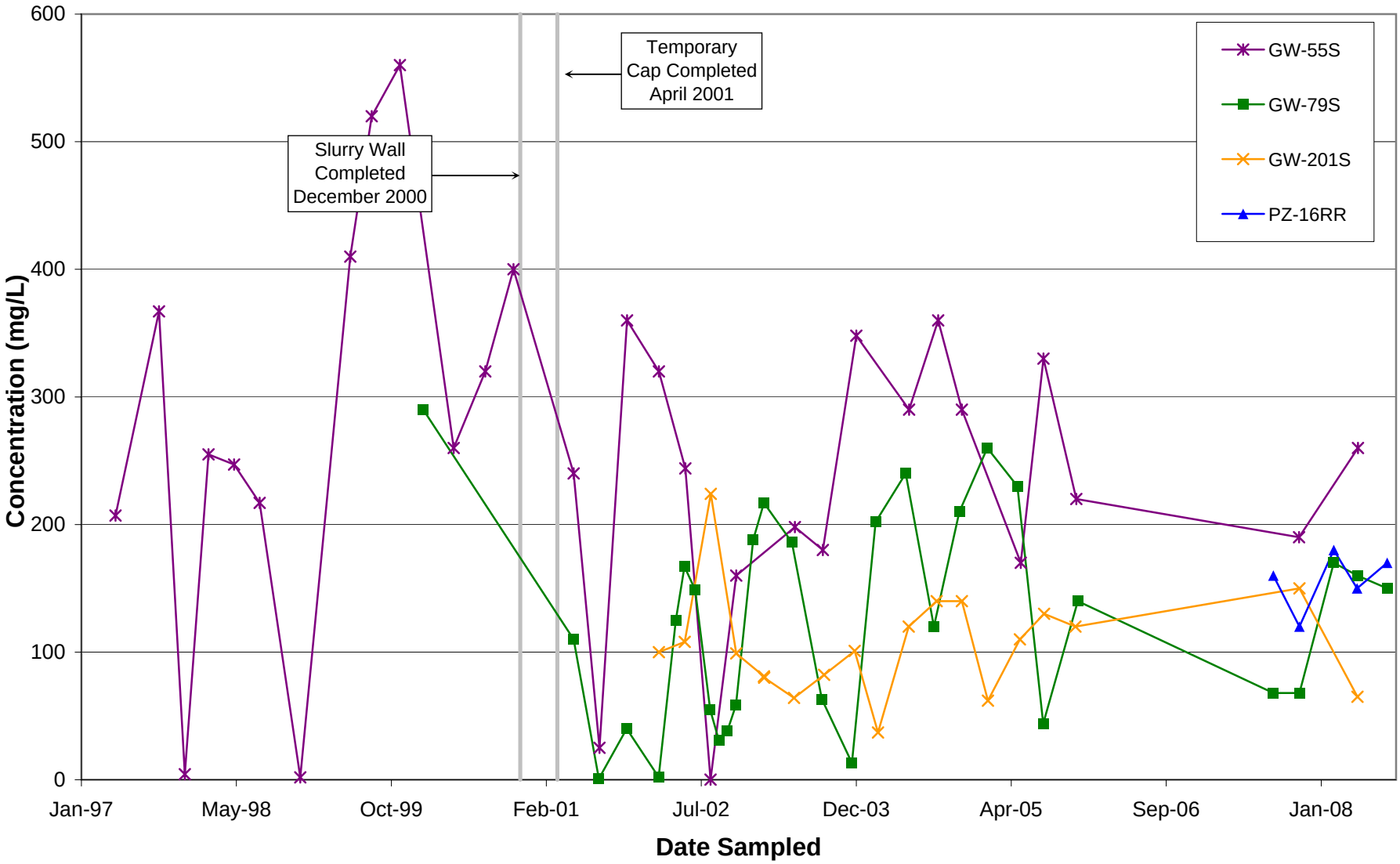
Ammonia in Groundwater South of Containment Structure

Figure D-1.9

P:\OLIN\Wilmington\SemiAnnual Status Report\2009 January\Appendix D\
Time Series Plots DAPL constituents.xls, Ammonia GW S

Prepared by: BJR
Checked by: MH



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Wilmington, Massachusetts

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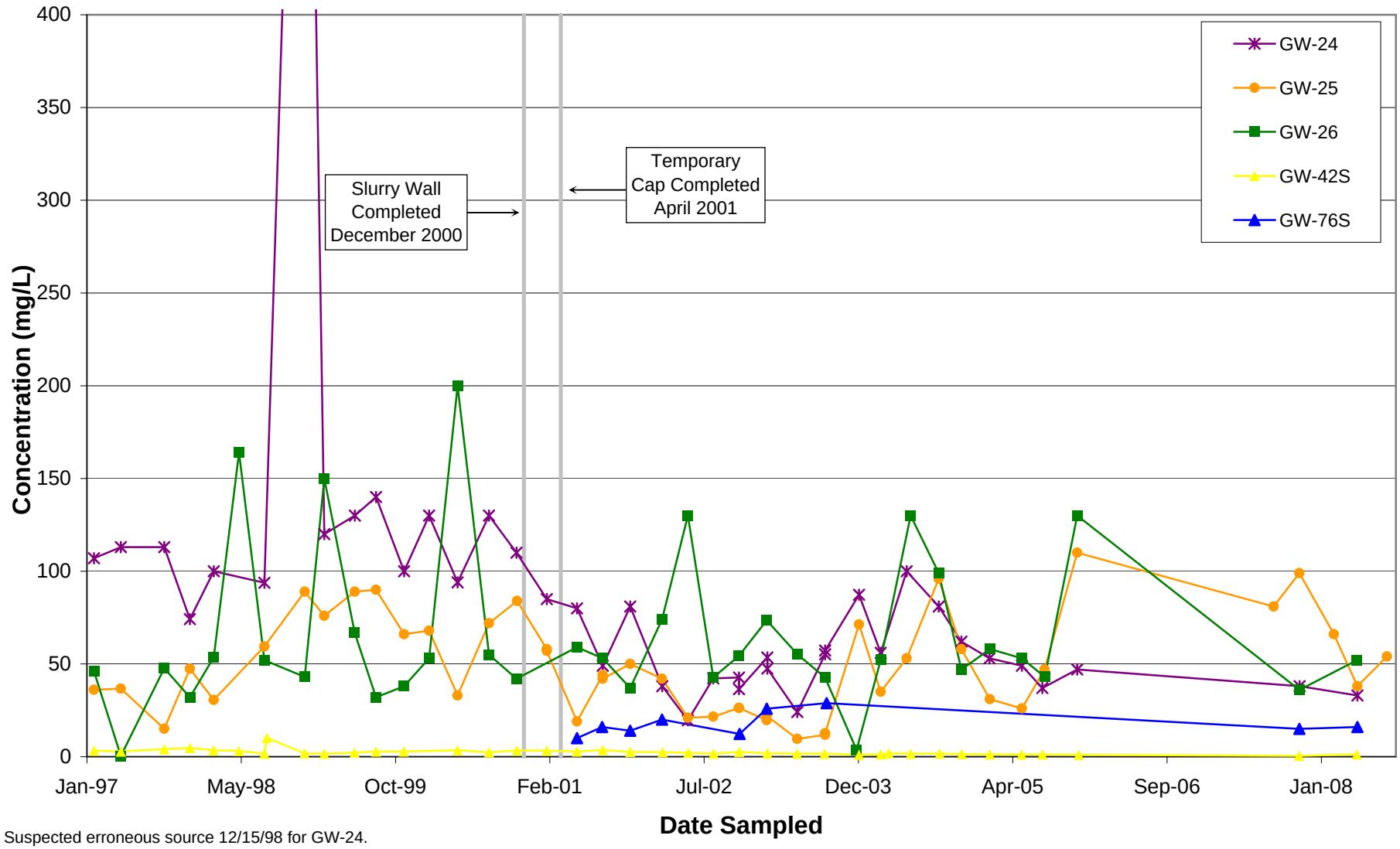
Ammonia in Groundwater Southeast of Containment Structure

Figure D-1.10

P:\OLIN\Wilmington\SemiAnnual Status Report\2009 January\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.

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Wilmington, Massachusetts

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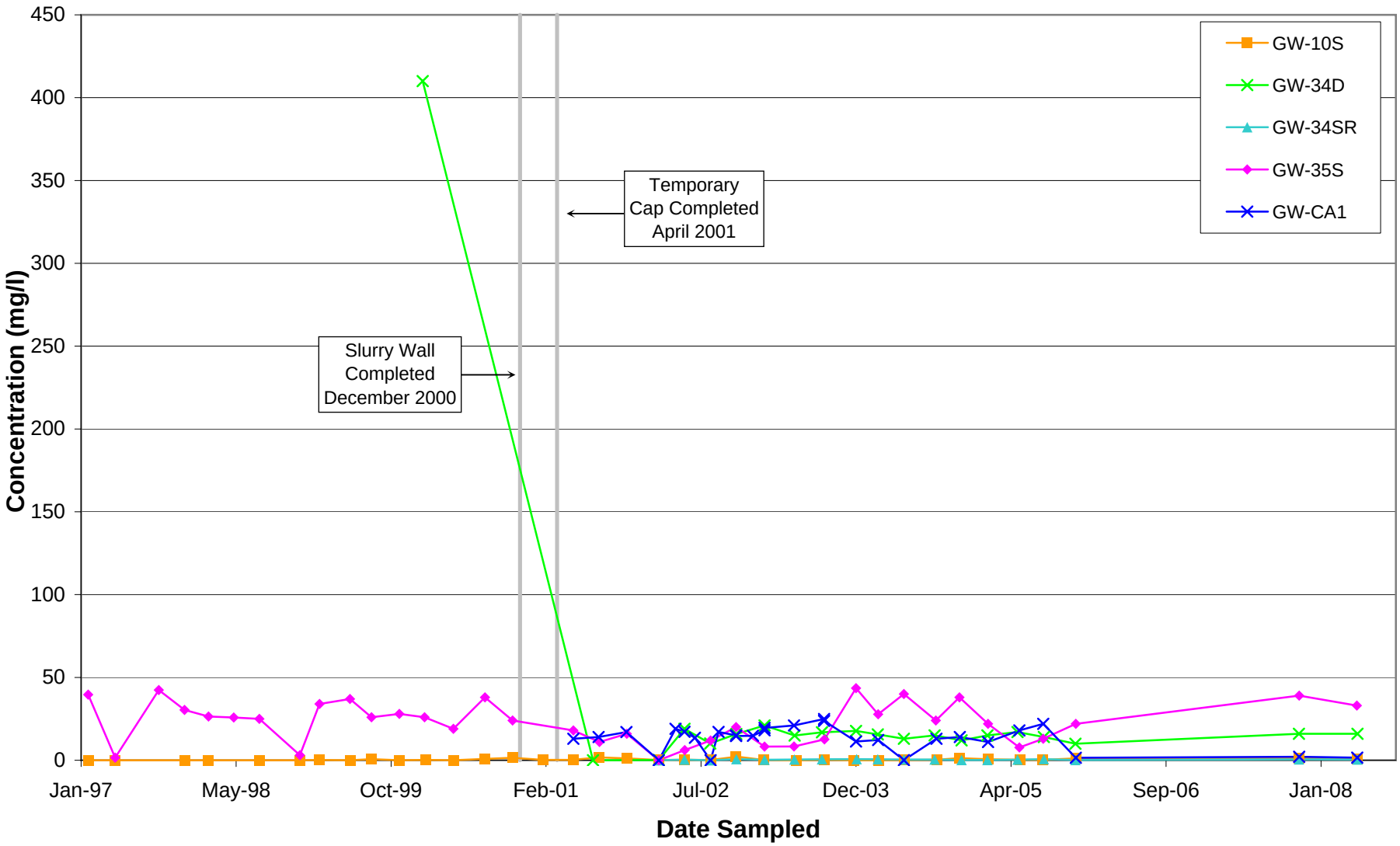
Ammonia in Groundwater West of Containment Structure

Figure D-1.11

P:\OLIN\Wilmington\SemiAnnual Status Report\2009 January\Appendix D\
Time Series Plots DAPL constituents.xls, Ammonia GW W

Prepared by: BJR
Checked by: MH



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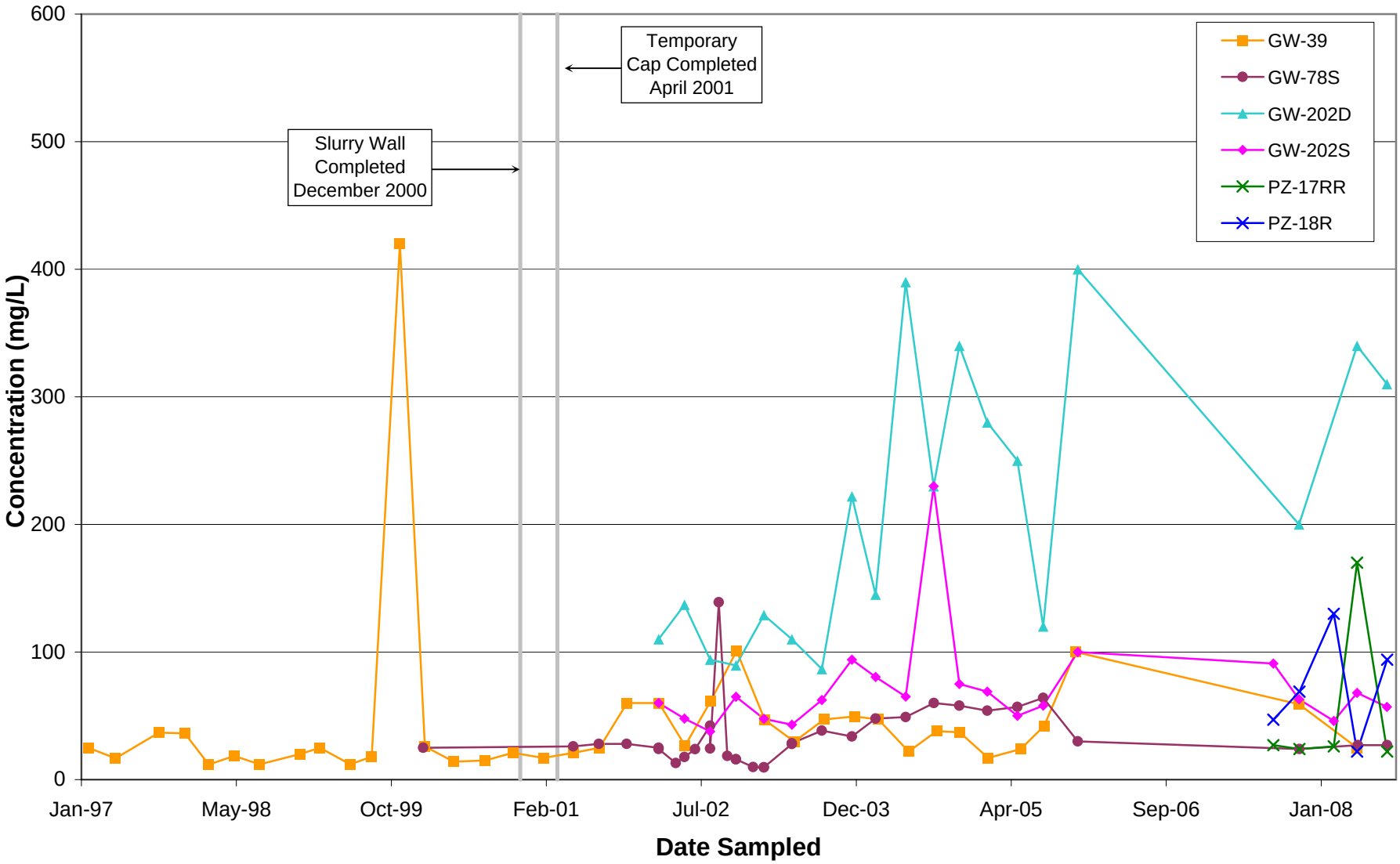
Ammonia in Groundwater North of Containment Structure

Figure D-1.12

P:\OLIN\Wilmington\SemiAnnual Status Report\2009 January\Appendix D\
Time Series Plots DAPL constituents.xls, Ammonia GW N

Prepared by: BJR
Checked by: MH



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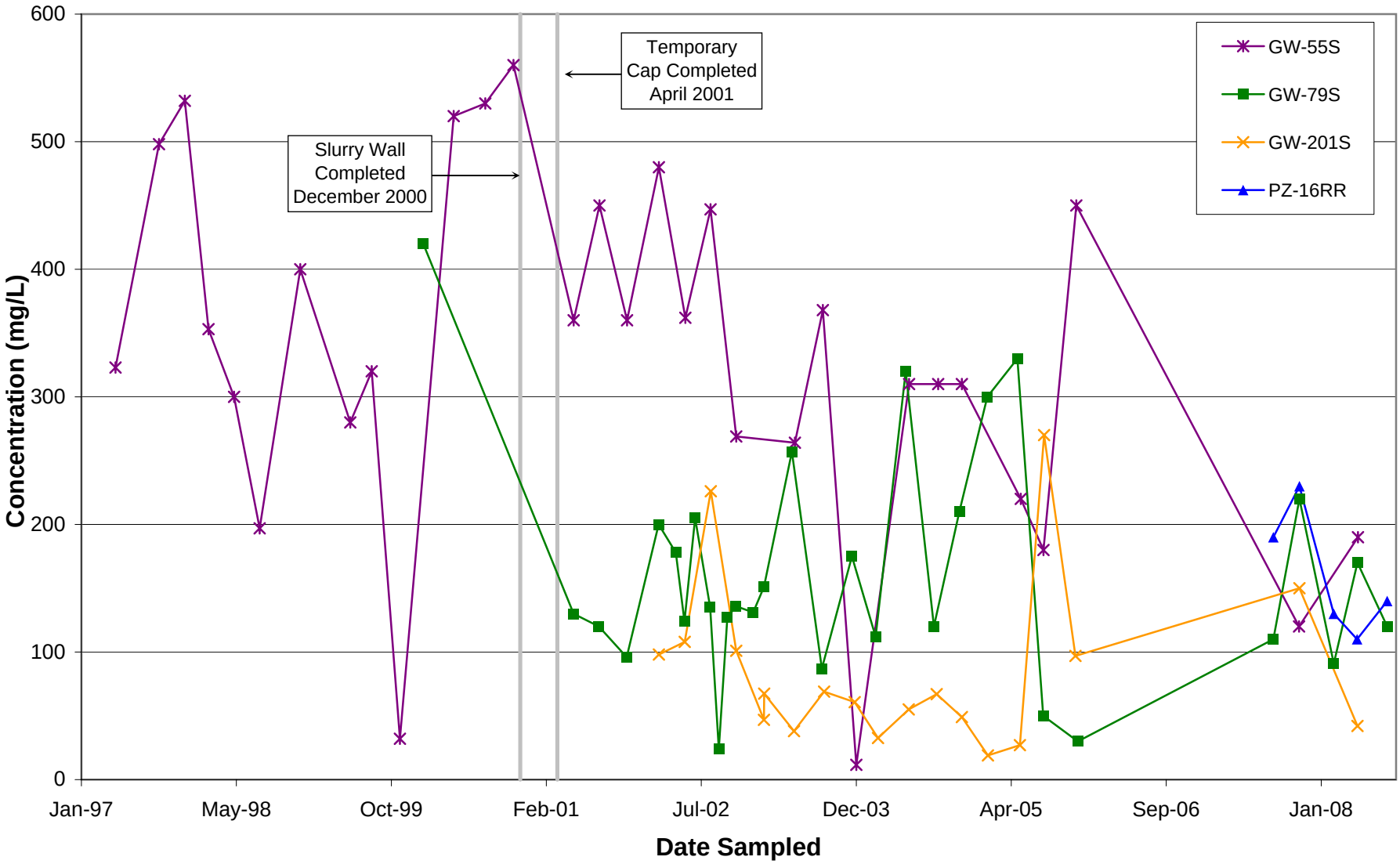
Chloride in Groundwater South of Containment Structure

Figure D-1.13

P:\OLIN\Wilmington\SemiAnnual Status Report\2009 January\Appendix D\
Time Series Plots DAPL constituents.xls, Chloride GW S

Prepared by: BJR
Checked by: MH



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Wilmington, Massachusetts

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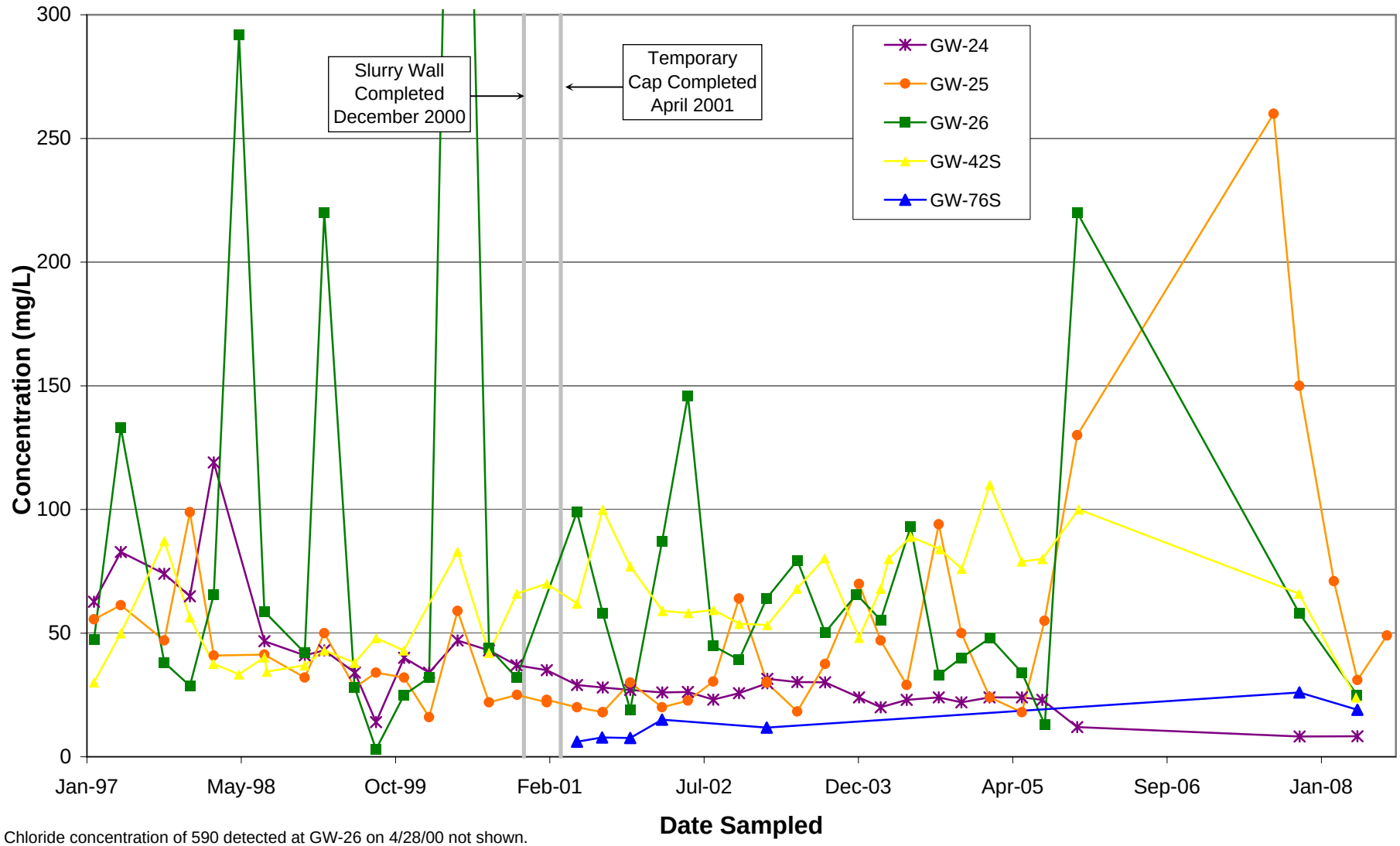
Chloride in Groundwater Southeast of Containment Structure

Figure D-1.14

P:\OLIN\Wilmington\SemiAnnual Status Report\2009 January\Appendix D\
Time Series Plots DAPL constituents.xls, Chloride GW SE

Prepared by: BJR
Checked by: MH



Chloride concentration of 590 detected at GW-26 on 4/28/00 not shown.

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Wilmington, Massachusetts

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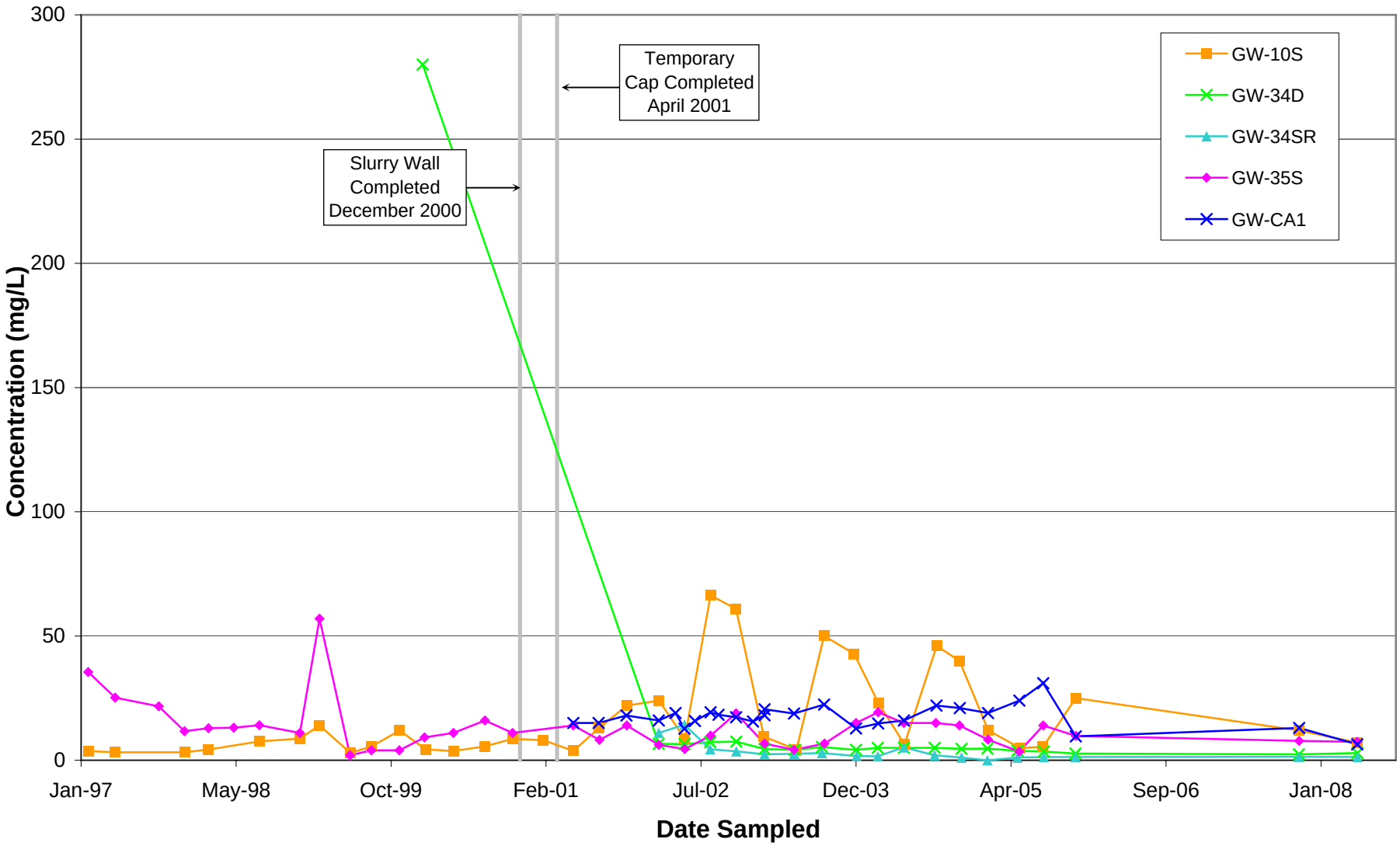
Chloride in Groundwater West of Containment Structure

Figure D-1.15

P:\OLIN\Wilmington\SemiAnnual Status Report\2009 January\Appendix D\
Time Series Plots DAPL constituents.xls, Chloride GW W

Prepared by: BJR
Checked by: MH



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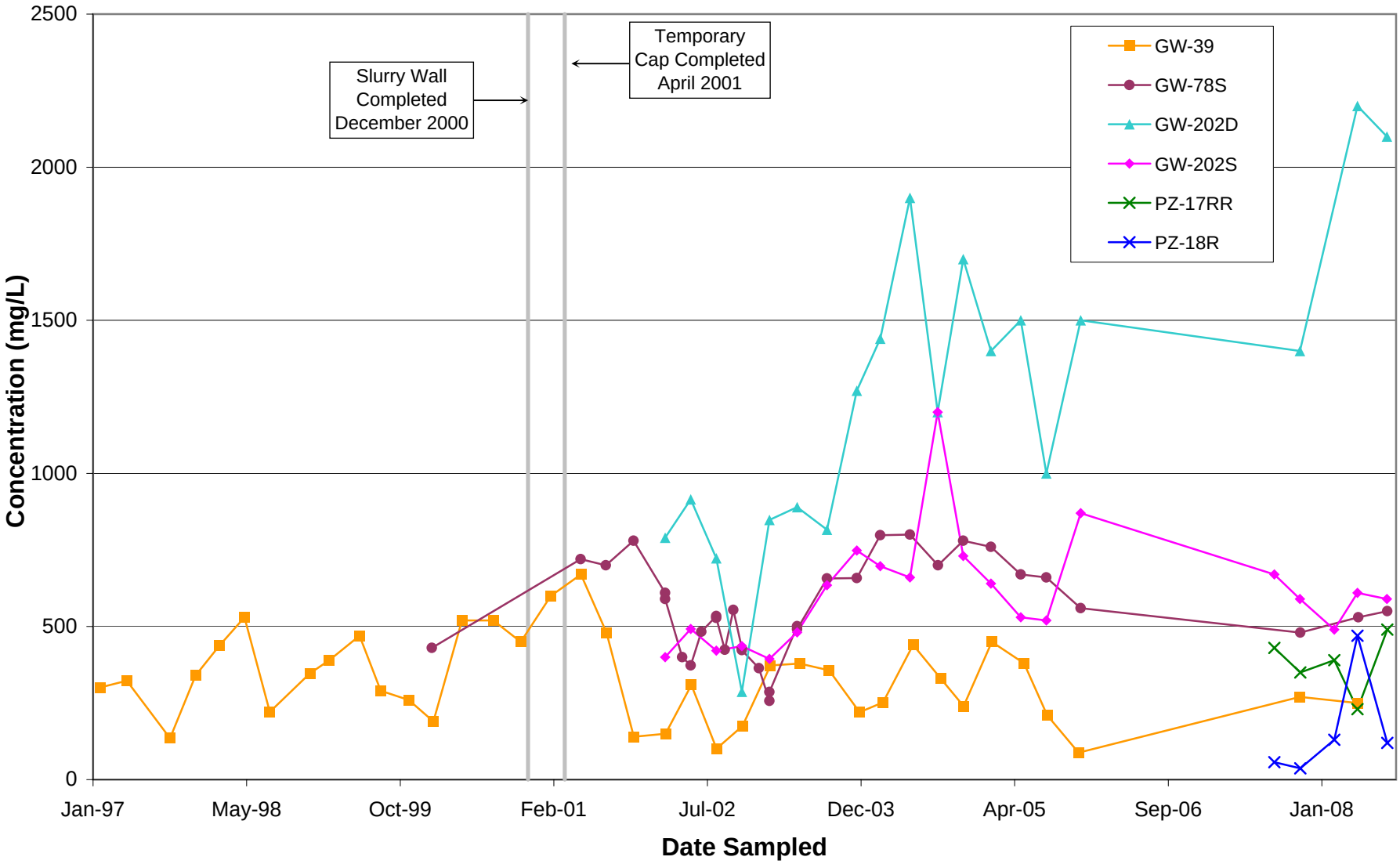
Chloride in Groundwater North of Containment Structure

Figure D-1.16

P:\OLIN\Wilmington\SemiAnnual Status Report\2009 January\Appendix D\
Time Series Plots DAPL constituents.xls, Chloride GW N

Prepared by: BJR
Checked by: MH



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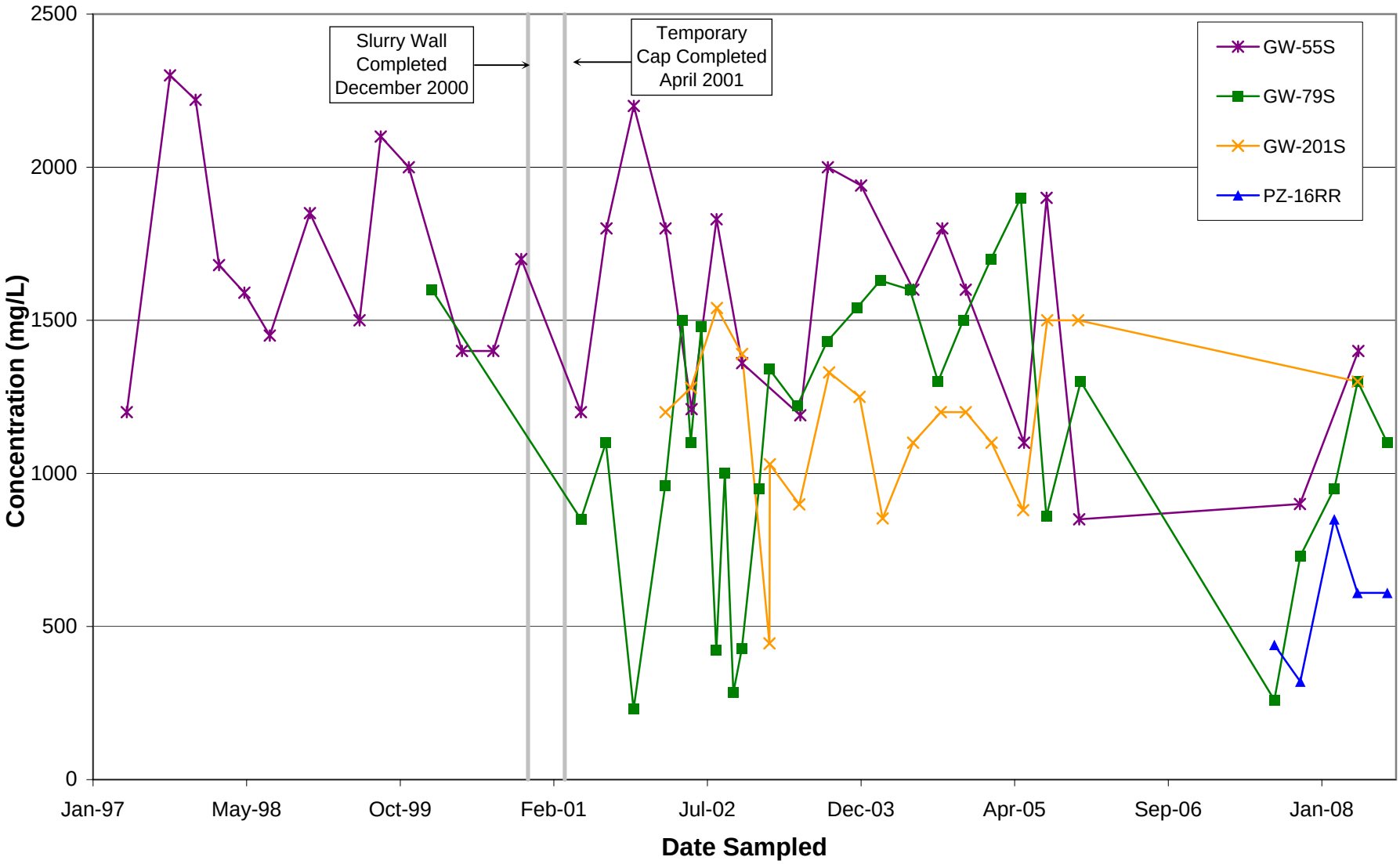
Sulfate in Groundwater South of Containment Structure

Figure D-1.17

P:\OLIN\Wilmington\SemiAnnual Status Report\2009 January\Appendix D\
Time Series Plots DAPL constituents.xls, Sulfate GW S

Prepared by: BJR
Checked by: MH



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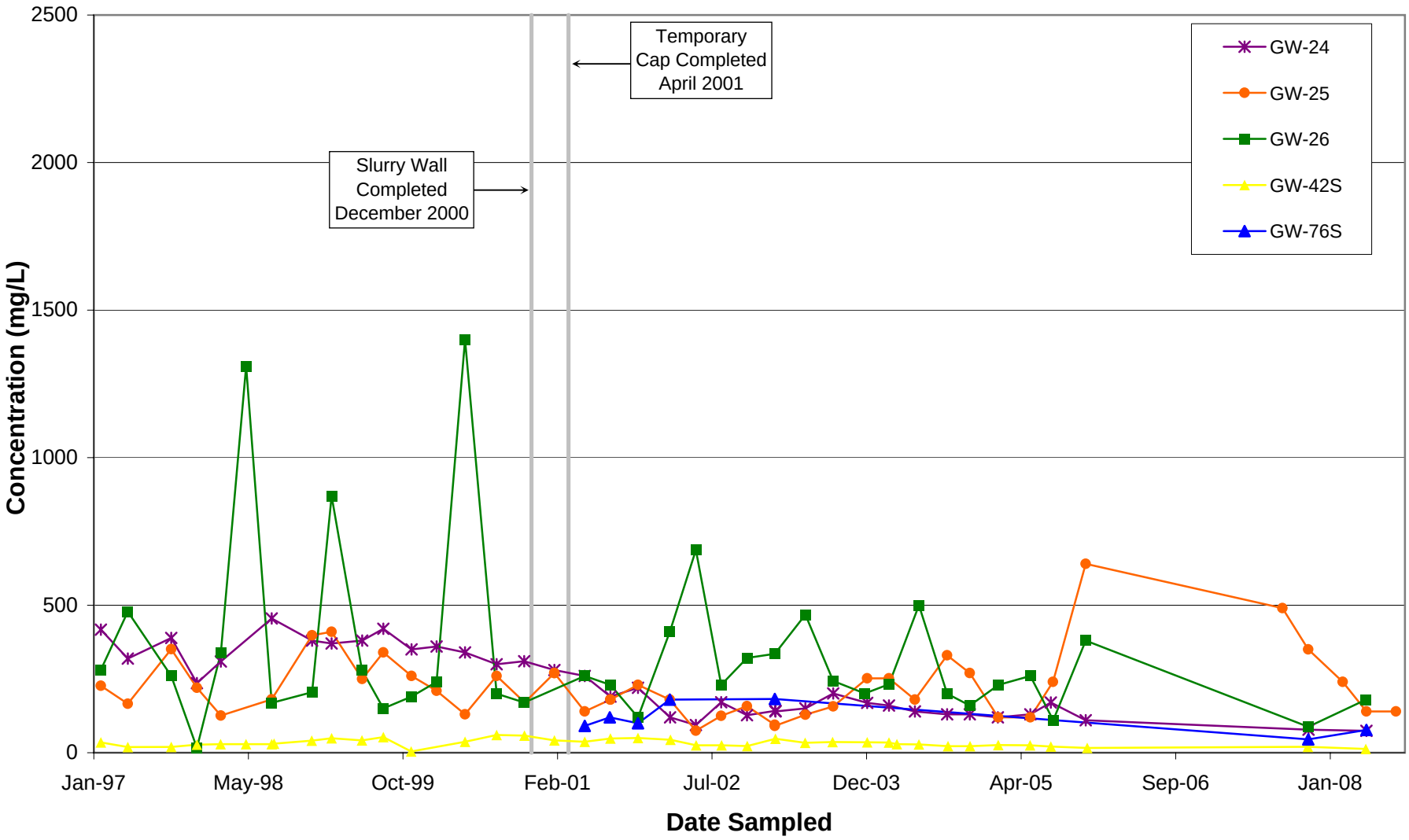
Sulfate in Groundwater Southeast of Containment Structure

Figure D-1.18

P:\OLIN\Wilmington\SemiAnnual Status Report\2009 January\Appendix D\
Time Series Plots DAPL constituents.xls, Sulfate GW SE

Prepared by: BJR
Checked by: MH



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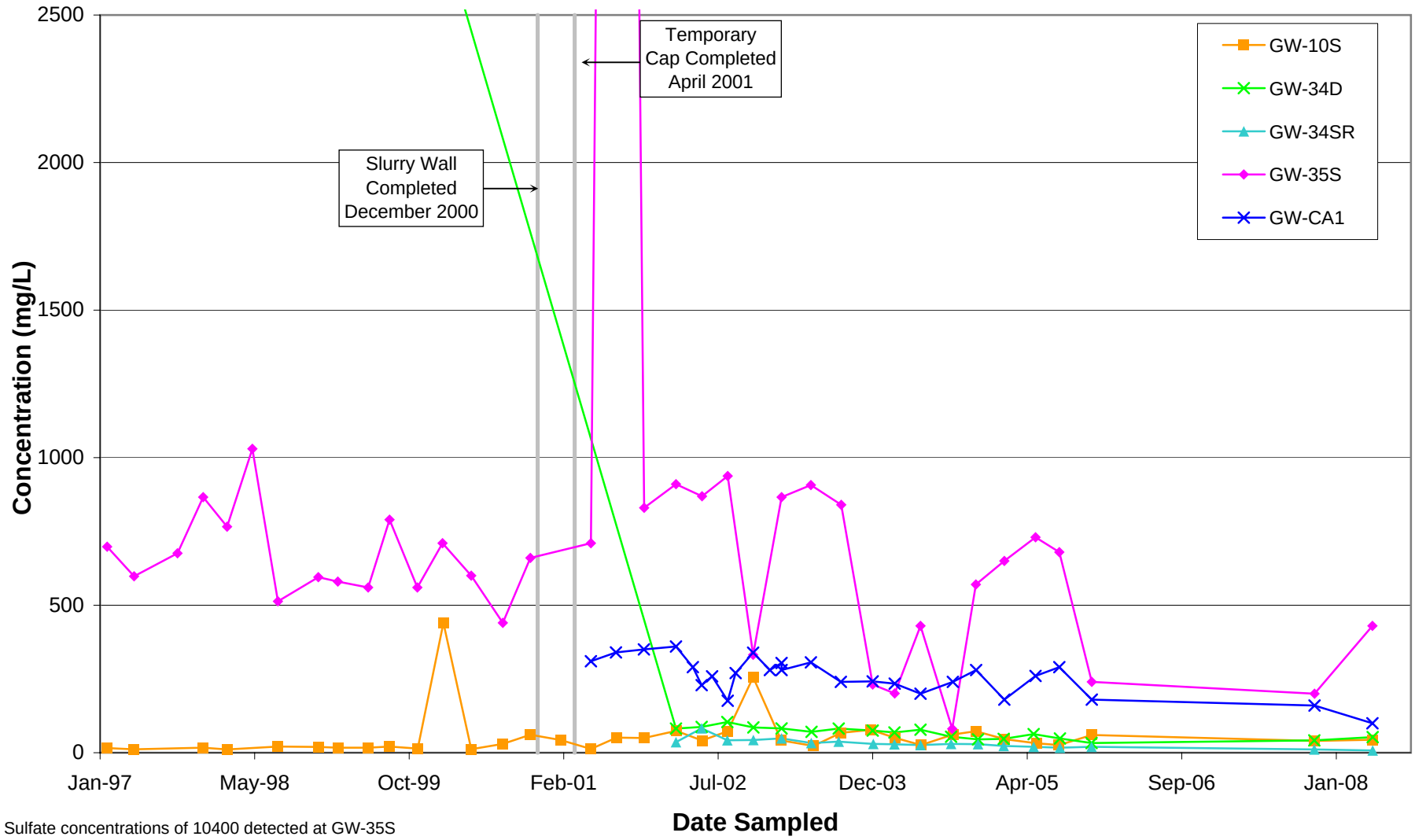
Sulfate in Groundwater West of Containment Structure

Figure D-1.19

P:\OLIN\Wilmington\SemiAnnual Status Report\2009 January\Appendix D\
Time Series Plots DAPL constituents.xls, Sulfate GW W

Prepared by: BJR
Checked by: MH



Sulfate concentrations of 10400 detected at GW-35S on 8/17/01 and 2800 detected at GW-34D on 1/19/00 not shown.

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Wilmington, Massachusetts

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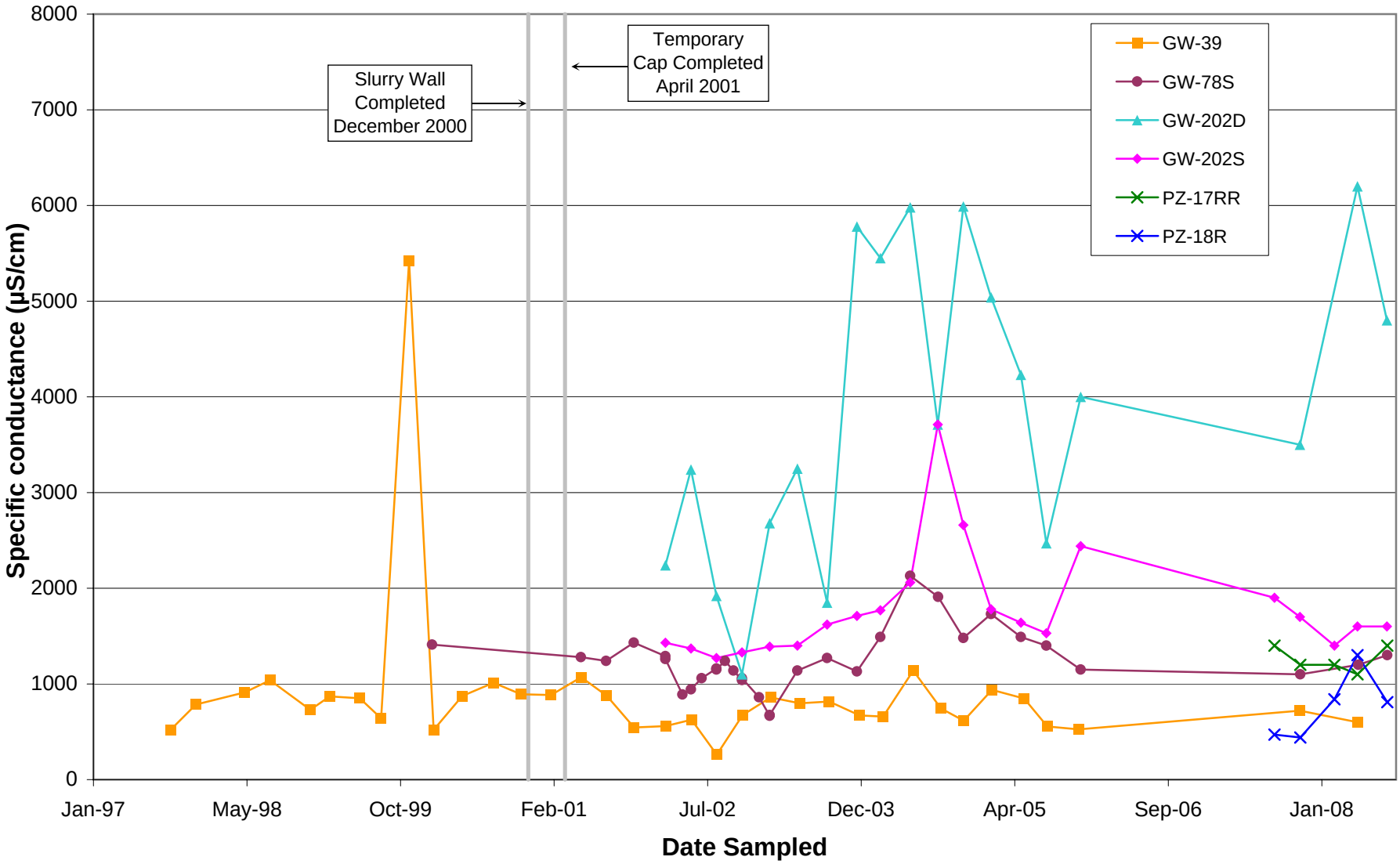
Sulfate in Groundwater North of Containment Structure

Figure D-1.20

P:\OLIN\Wilmington\SemiAnnual Status Report\2009 January\Appendix D\
Time Series Plots DAPL constituents.xls, Sulfate GW N

Prepared by: BJR
Checked by: MH



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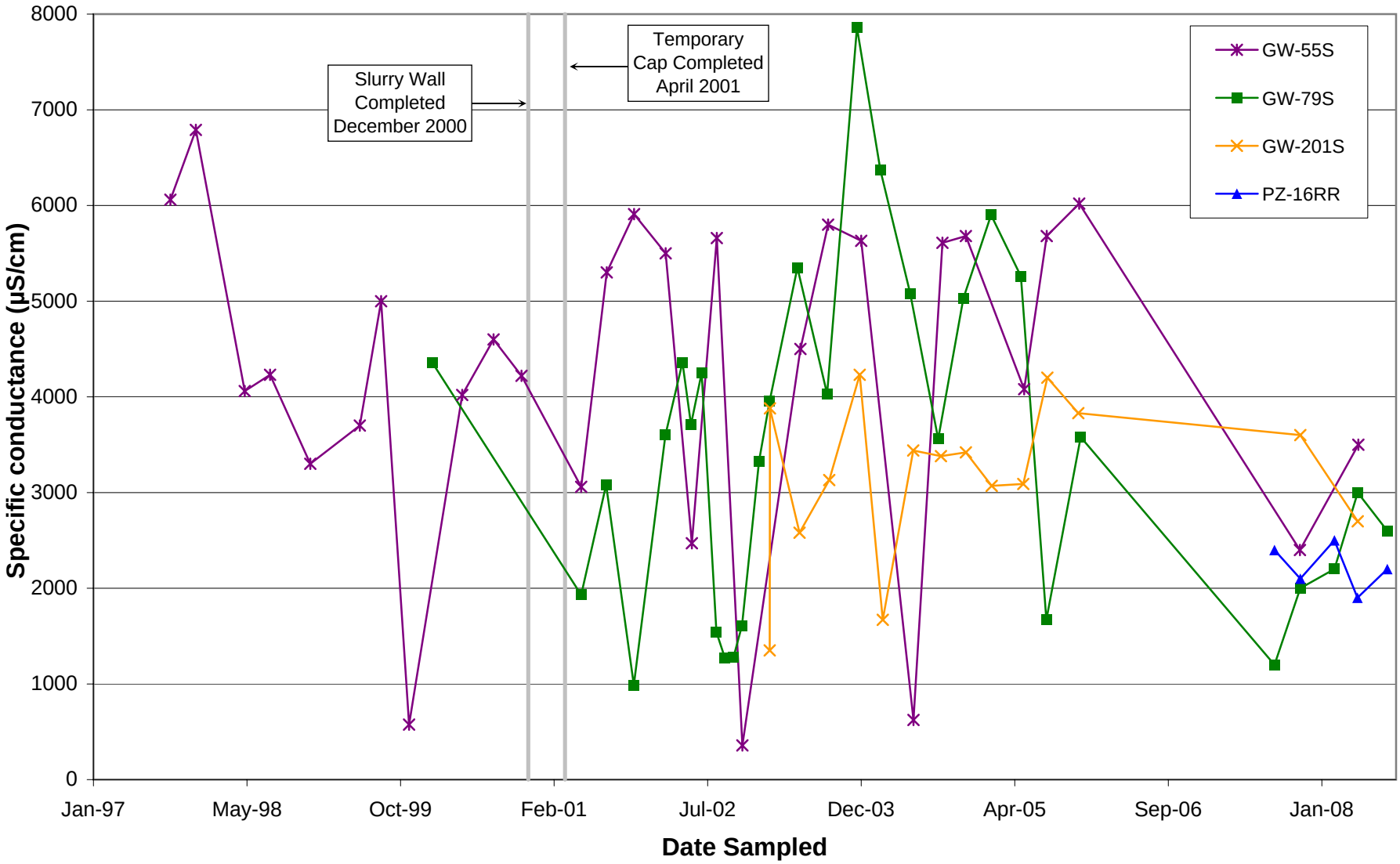
Specific Conductance in Groundwater South of Containment Structure

Figure D-1.21

P:\OLIN\Wilmington\SemiAnnual Status Report\2009 January\Appendix D\
Time Series Plots DAPL constituents.xls, Specific Conductance GW S

Prepared by: BJR
Checked by: MH



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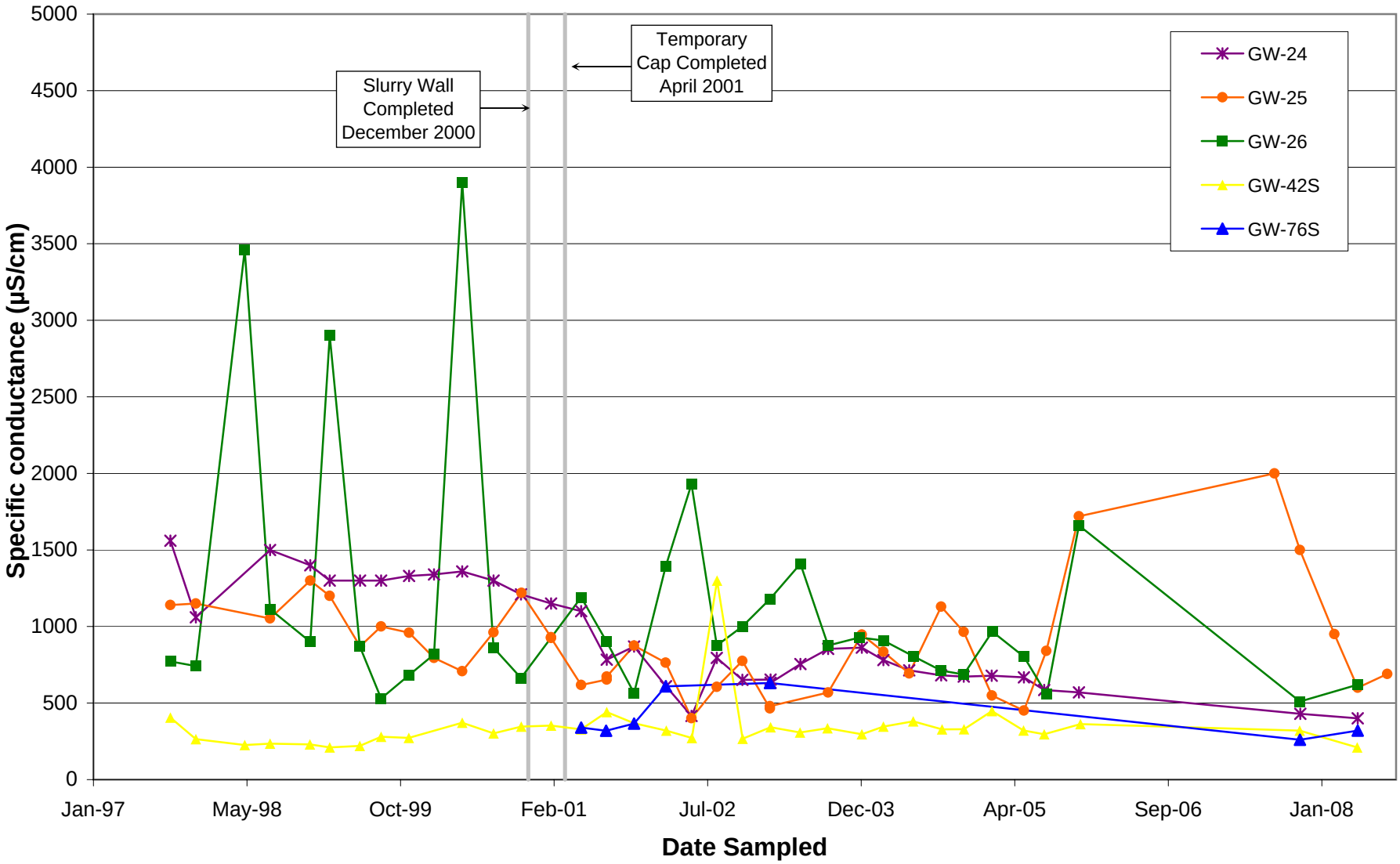
Specific Conductance in Groundwater
Southeast of Containment Structure

Figure D-1.22

P:\OLIN\Wilmington\SemiAnnual Status Report\2009 January\Appendix D\
Time Series Plots DAPL constituents.xls, Specific Conductance GW SE

Prepared by: BJR
Checked by: MH



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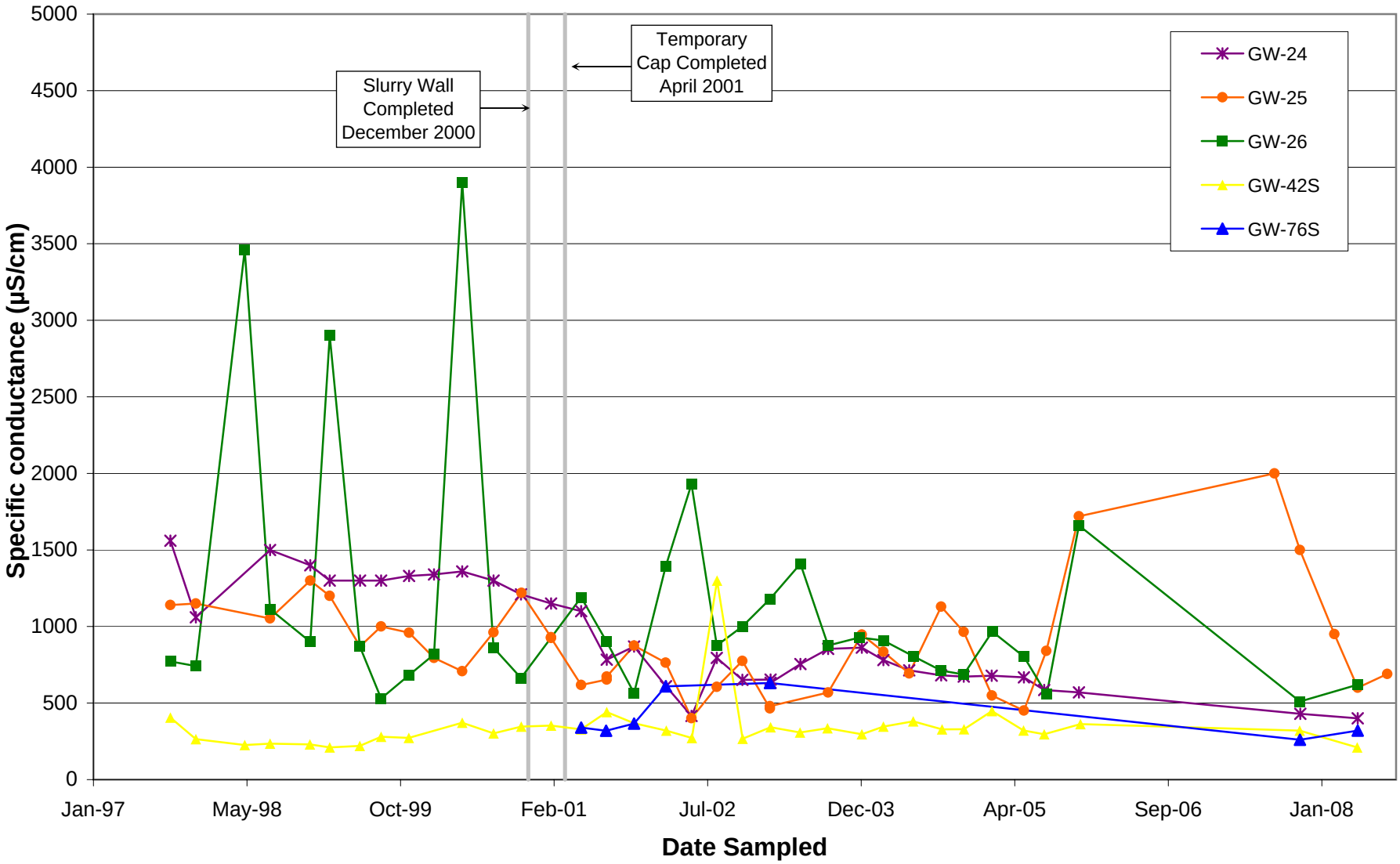
Specific Conductance in Groundwater
West of Containment Structure

Figure D-1.23

P:\OLIN\Wilmington\SemiAnnual Status Report\2009 January\Appendix D\
Time Series Plots DAPL constituents.xls, Specific Conductance GW W

Prepared by: BJR
Checked by: MH



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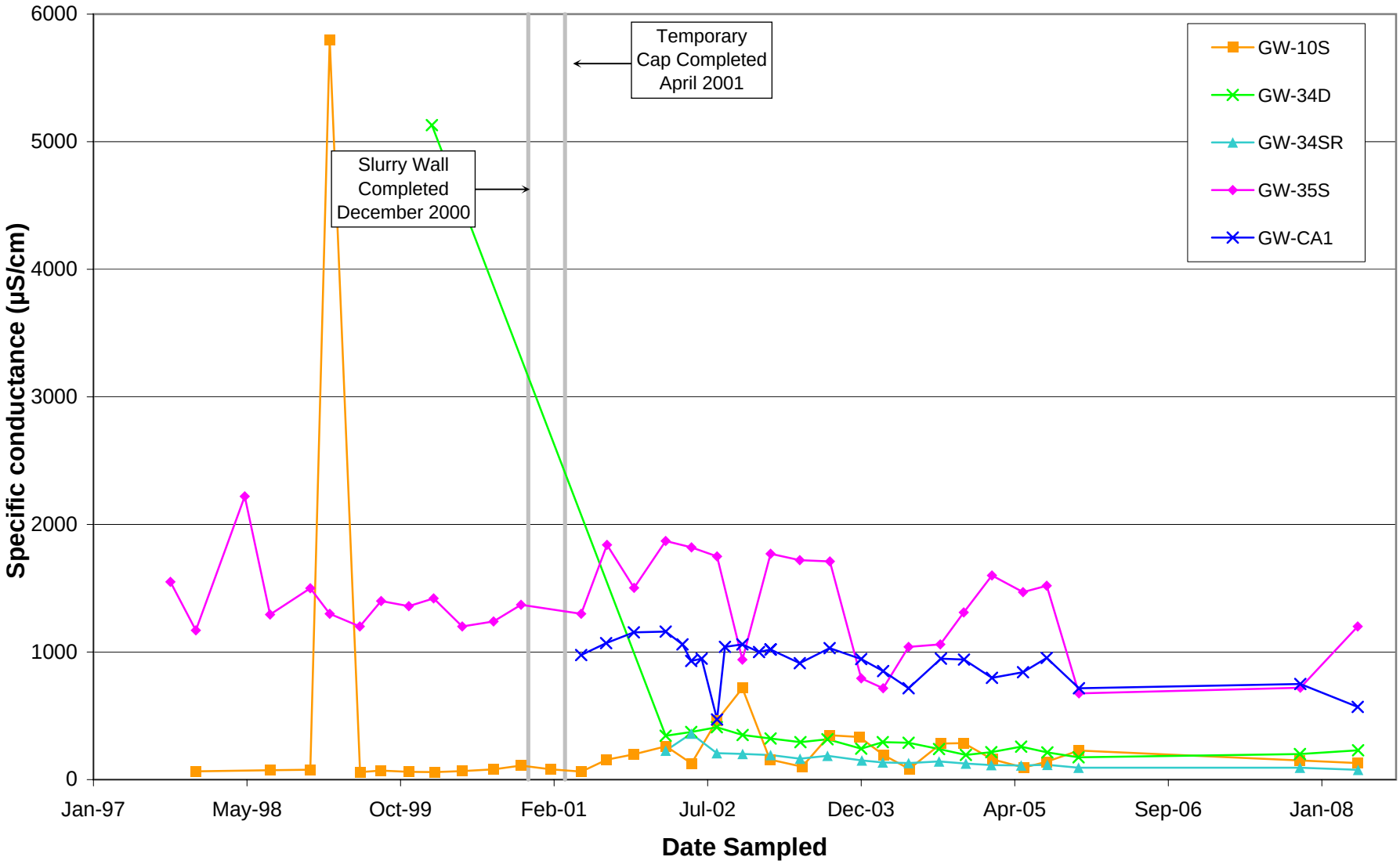
Specific Conductance in Groundwater
West of Containment Structure

Figure D-1.23

P:\OLIN\Wilmington\SemiAnnual Status Report\2009 January\Appendix D\
Time Series Plots DAPL constituents.xls, Specific Conductance GW W

Prepared by: BJR
Checked by: MH



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Specific Conductance in Groundwater
North of Containment Structure

Figure D-1.24

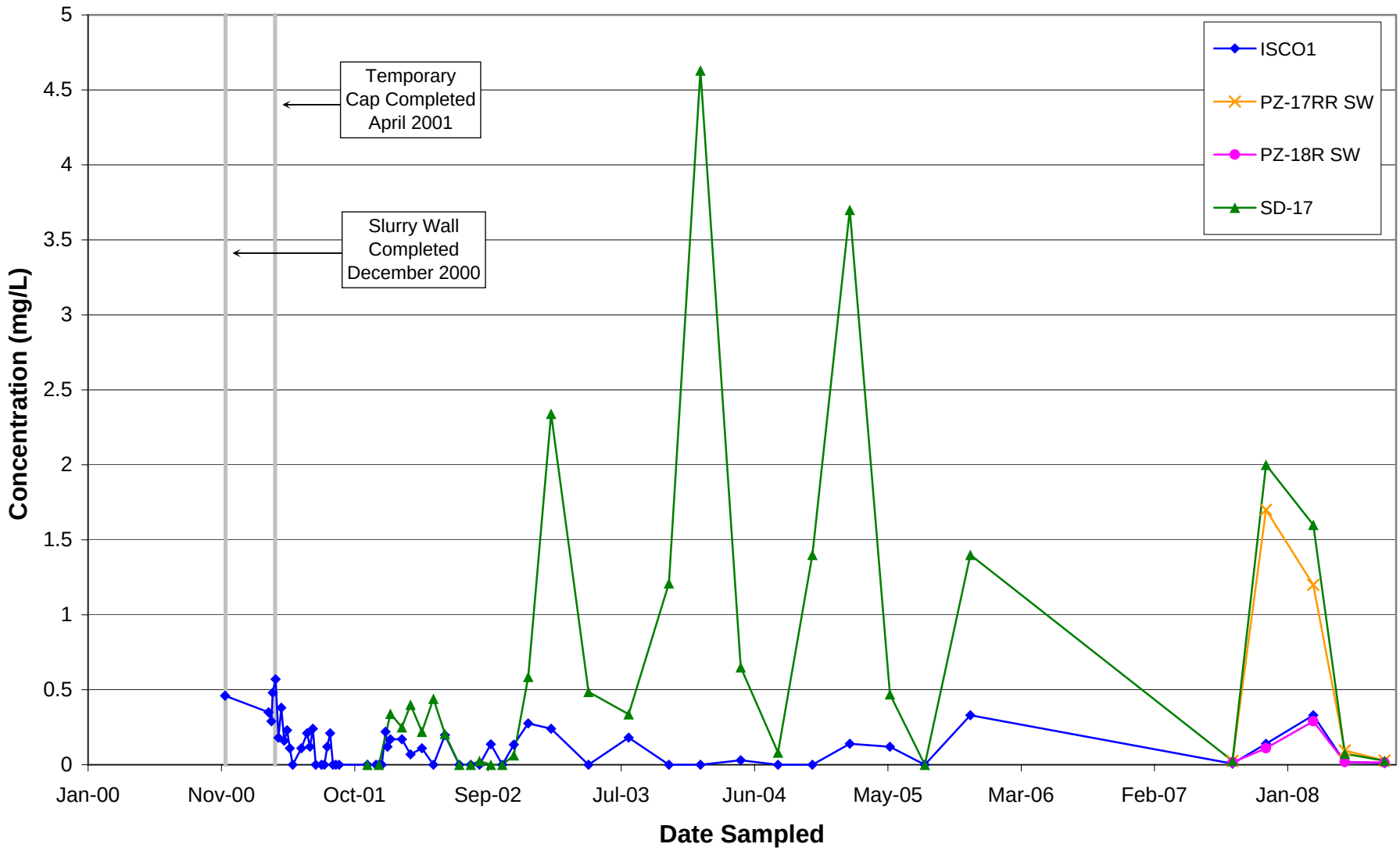
P:\OLIN\Wilmington\SemiAnnual Status Report\2009 January\Appendix D\
Time Series Plots DAPL constituents.xls, Specific Conductance GW N

Prepared by: BJR
Checked by: MH

APPENDIX D

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

D-2 Surface Water (Aluminum, Ammonia, Chloride, Chromium, Sulfate)



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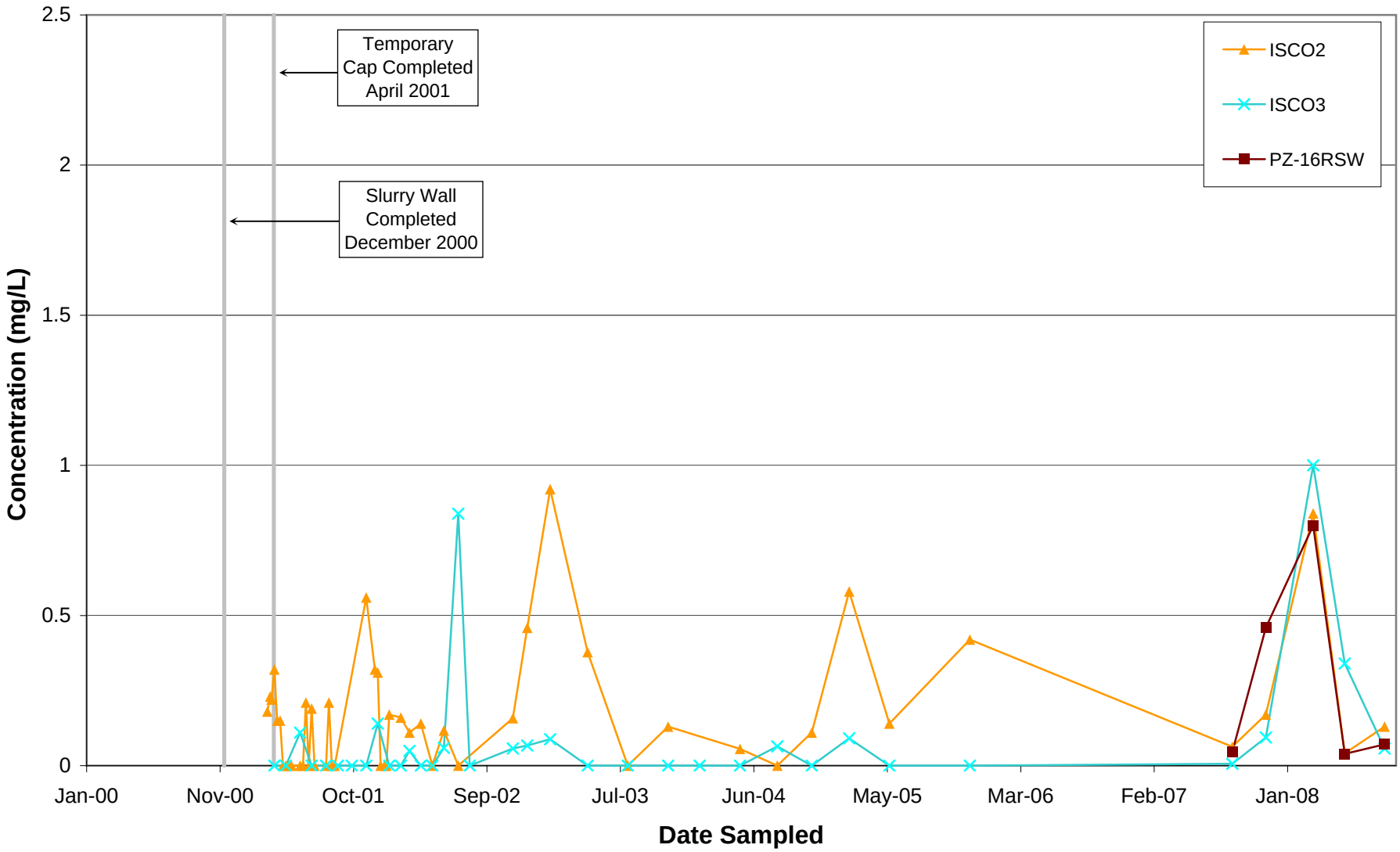
Filtered Aluminum in Surface Water in the Upper South Ditch

Figure D-2.1

P:\OLIN\Wilmington\SemiAnnual Status Report\2009 January\Appendix D\
Time Series Plots DAPL constituents.xls, Aluminum SW UpperSD

Prepared by: BJR
Checked by: MH



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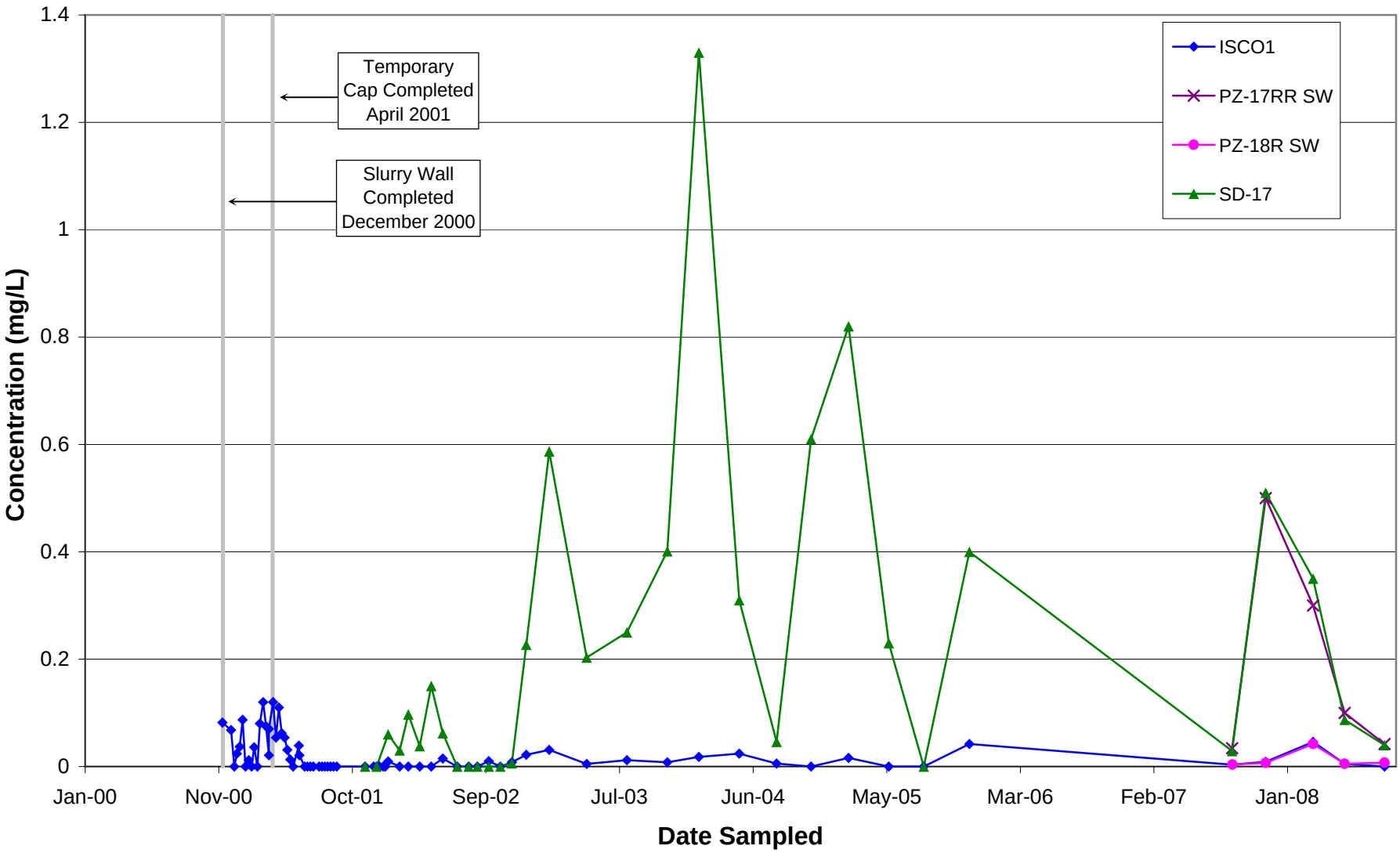
Filtered Aluminum in Surface Water in the Lower South Ditch

Figure D-2.2

P:\OLIN\Wilmington\SemiAnnual Status Report\2009 January\Appendix D\
Time Series Plots DAPL constituents.xls, Aluminum SW LowerSD

Prepared by: BJR
Checked by: MH



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Wilmington, Massachusetts

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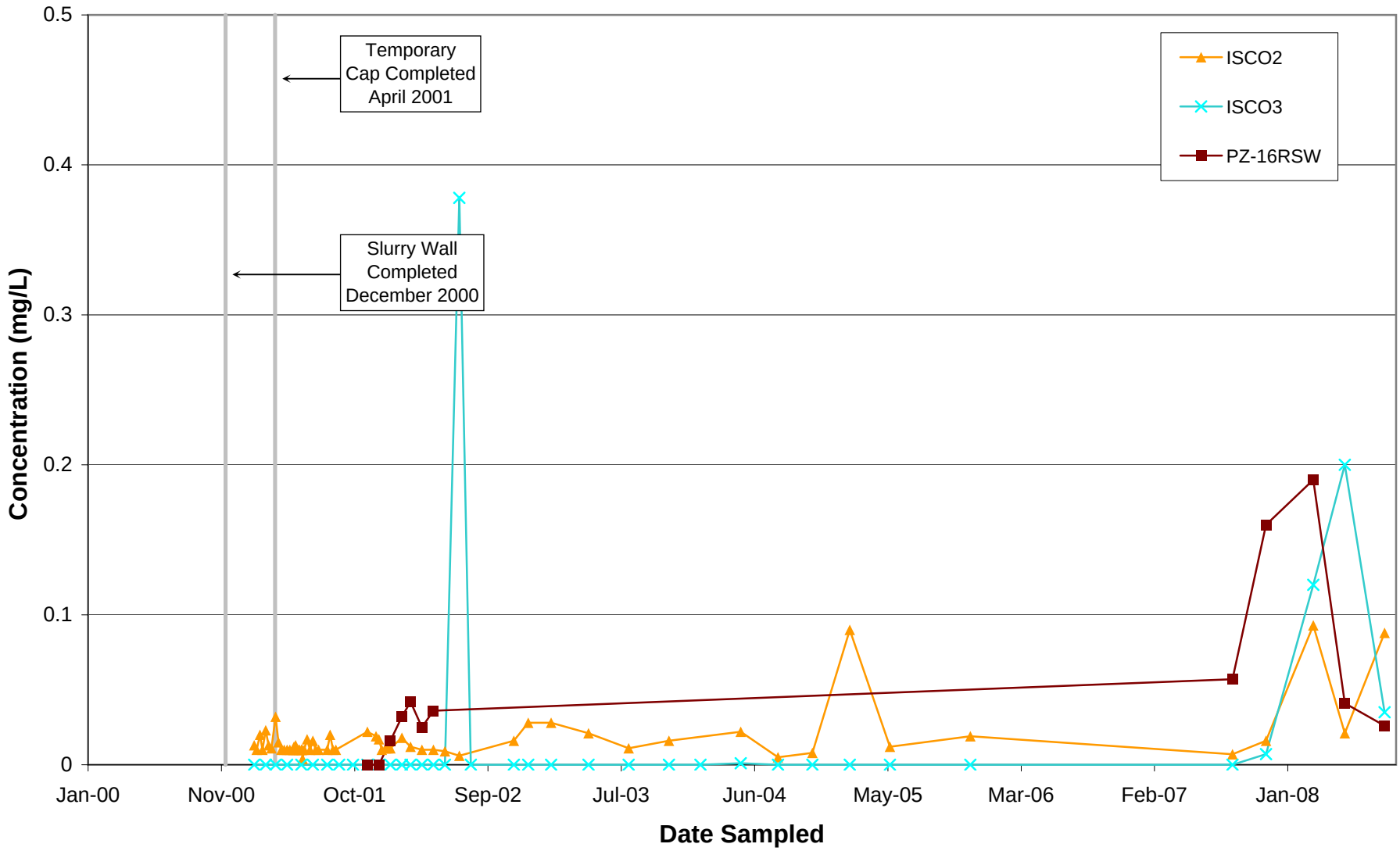
Filtered Chromium in Surface Water in the Upper South Ditch

Figure D-2.3

P:\OLIN\Wilmington\SemiAnnual Status Report\2009 January\Appendix D\
Time Series Plots DAPL constituents.xls, Dissolved Chromium SW UpperSD

Prepared by: BJR
Checked by: MH



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Wilmington, Massachusetts

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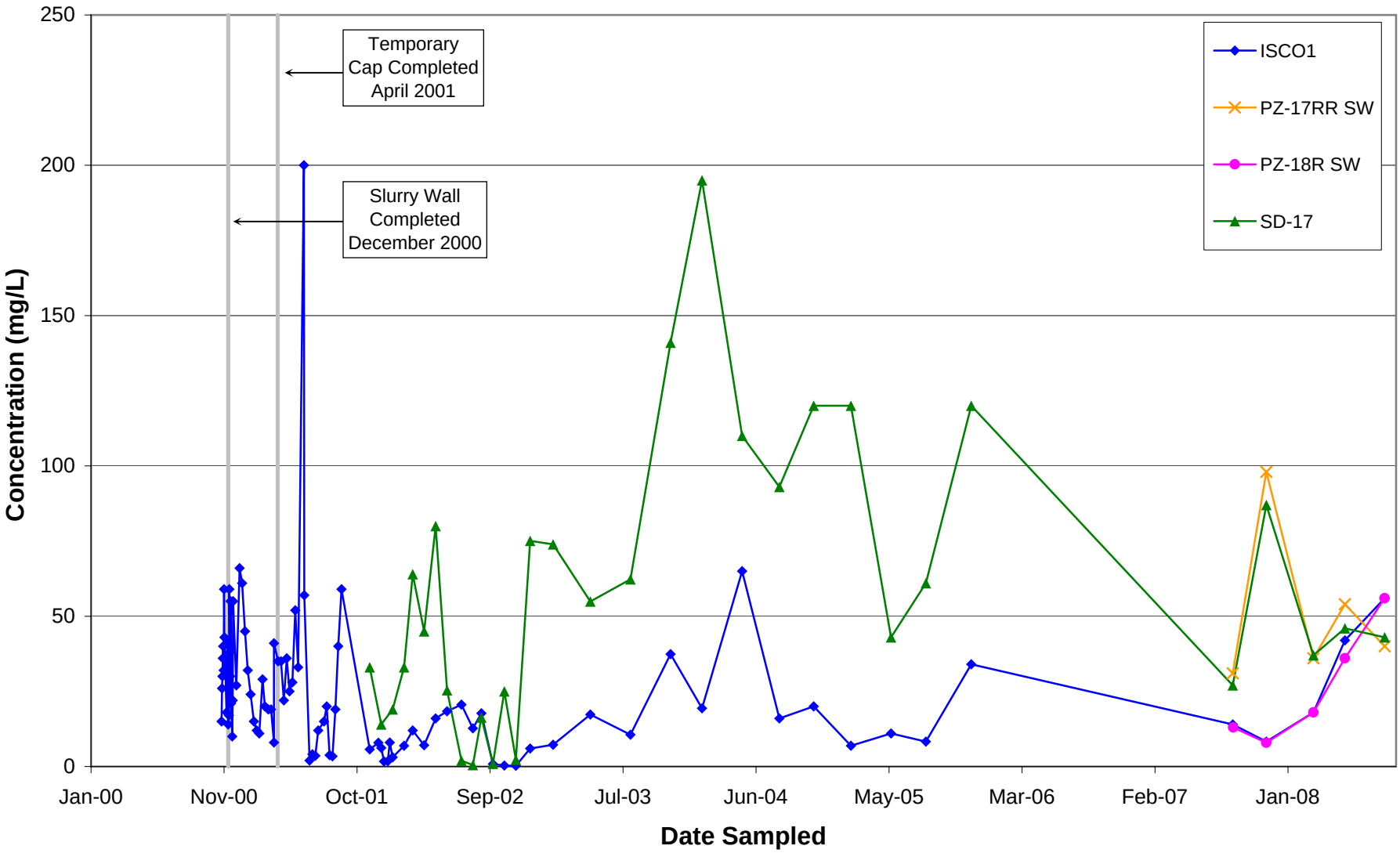
Filtered Chromium in Surface Water in the Lower South Ditch

Figure D-2.4

P:\OLIN\Wilmington\SemiAnnual Status Report\2009 January\Appendix D\
Time Series Plots DAPL constituents.xls, Dissolved Chromium SW LowerSD

Prepared by: BJR
Checked by: MH



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Wilmington, Massachusetts

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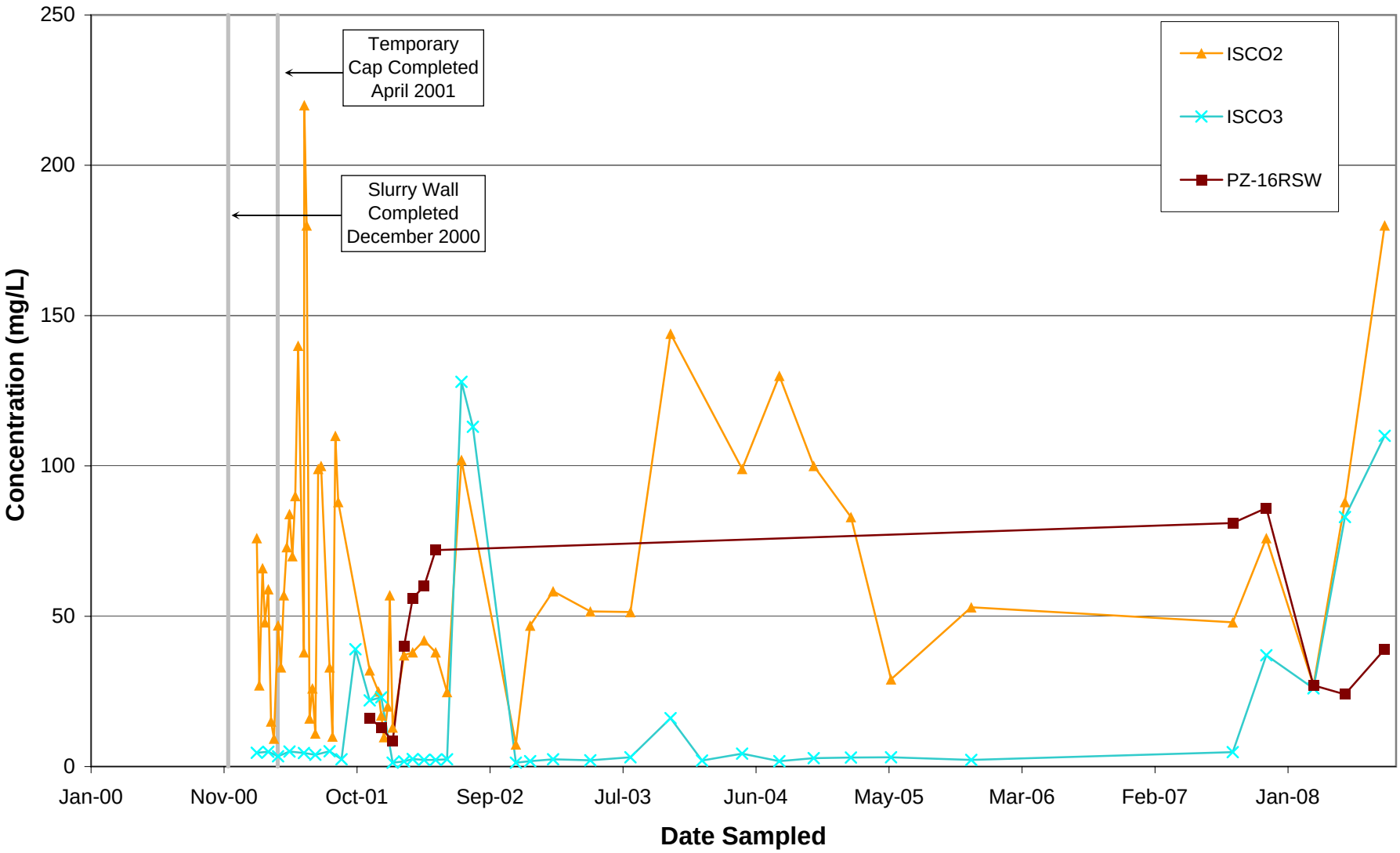
Ammonia in Surface Water in the Upper South Ditch

Figure D-2.5

P:\OLIN\Wilmington\SemiAnnual Status Report\2009 January\Appendix D\
Time Series Plots DAPL constituents.xls, Ammonia SW UpperSD

Prepared by: BJR
Checked by: MH



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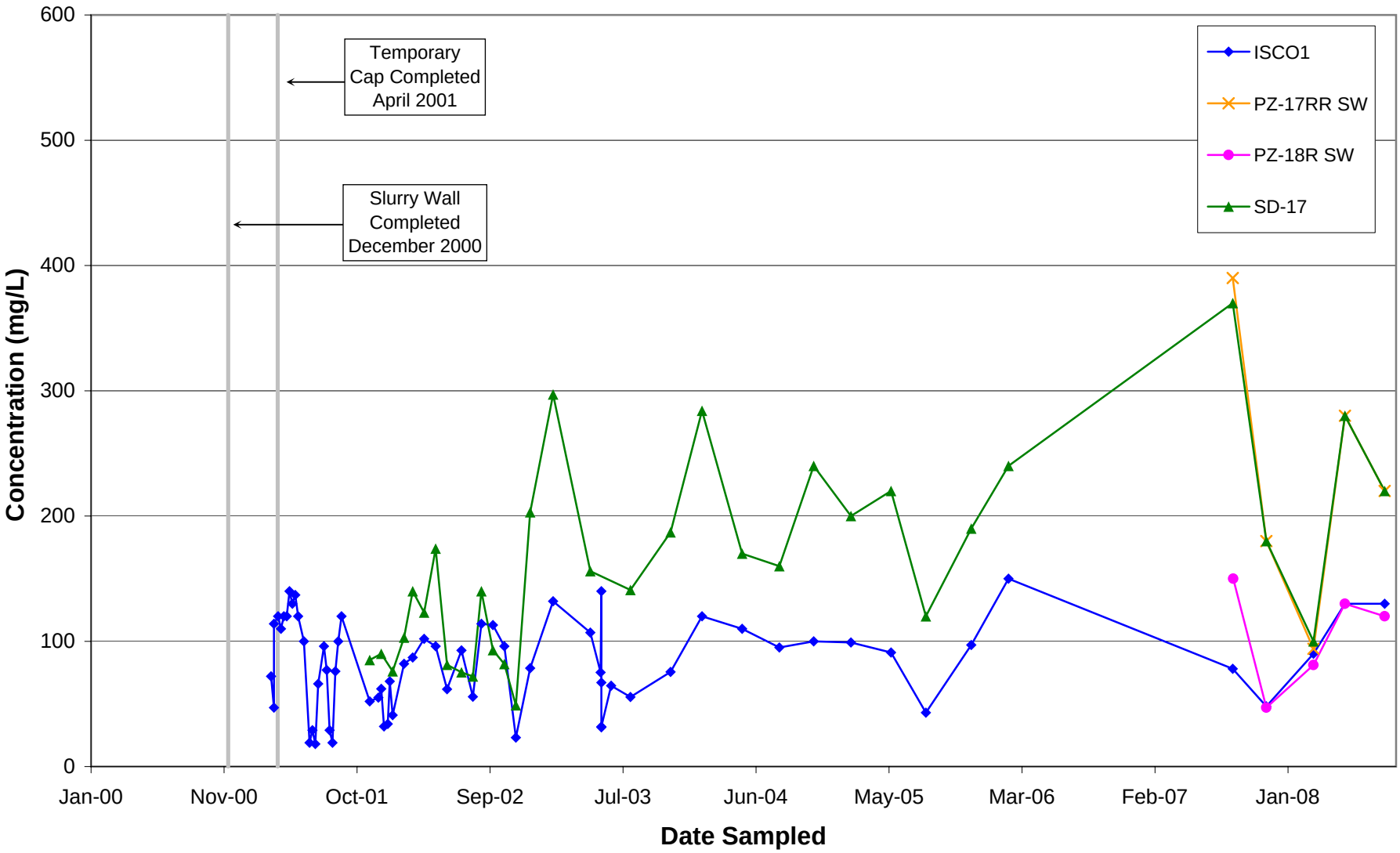
Ammonia in Surface Water in the Lower South Ditch

Figure D-2.6

P:\OLIN\Wilmington\SemiAnnual Status Report\2009 January\Appendix D\
Time Series Plots DAPL constituents.xls, Ammonia SW LowerSD

Prepared by: BJR
Checked by: MH



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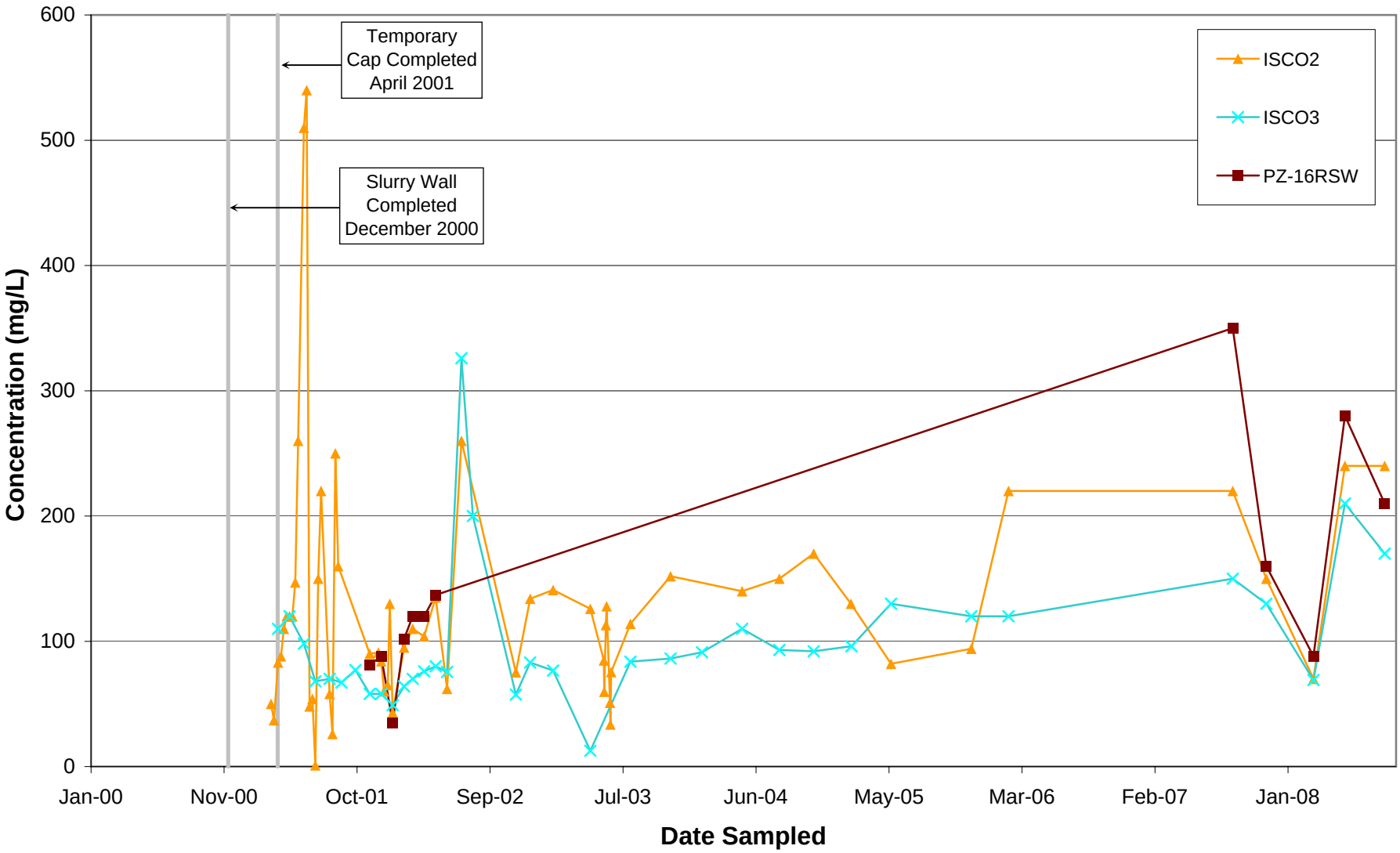
Chloride in Surface Water in the Upper South Ditch

Figure D-2.7

P:\OLIN\Wilmington\SemiAnnual Status Report\2009 January\Appendix D\
Time Series Plots DAPL constituents.xls, Chloride SW UpperSD

Prepared by: BJR
Checked by: MH



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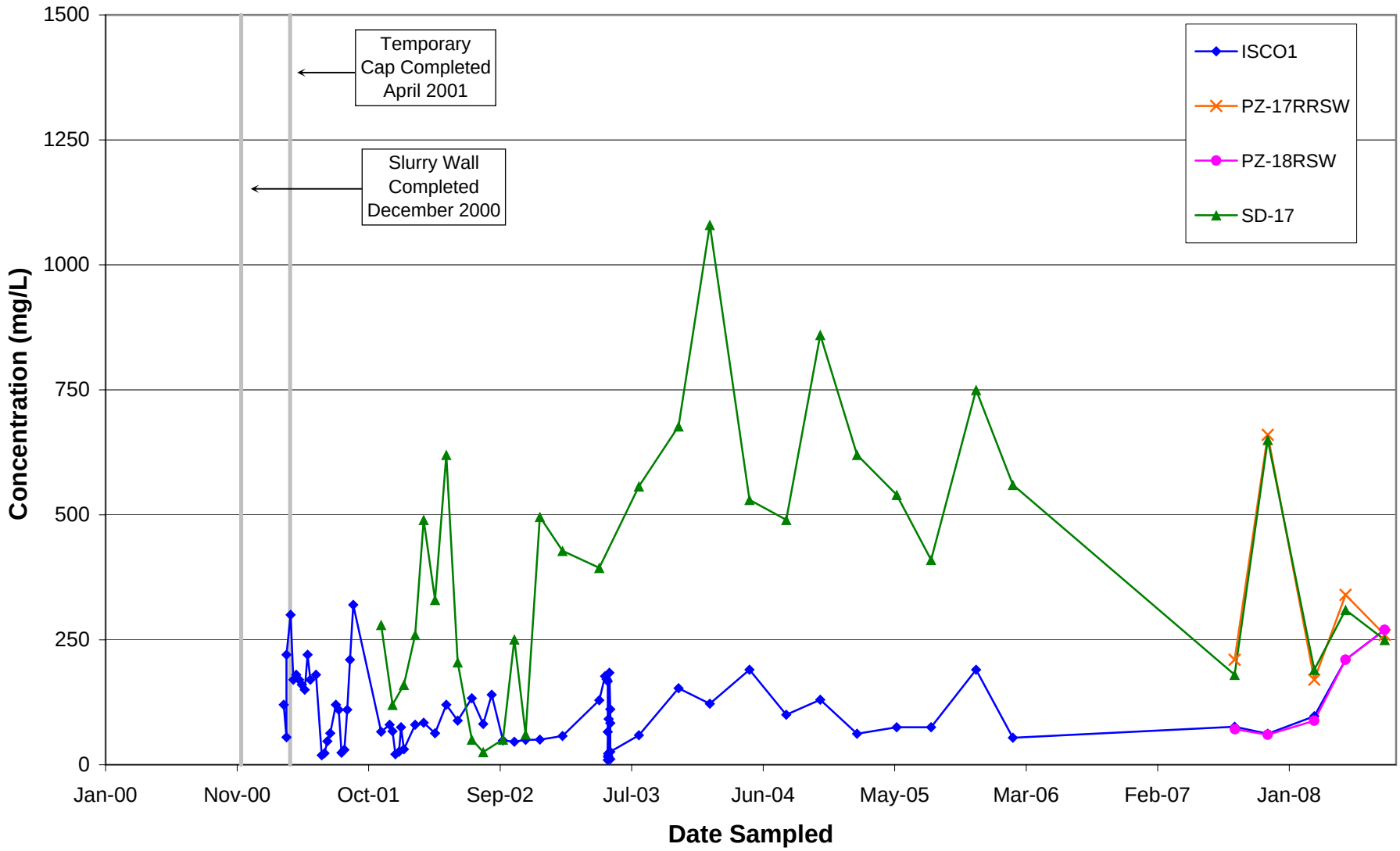
Chloride in Surface Water in the Lower South Ditch

Figure D-2.8

P:\OLIN\Wilmington\SemiAnnual Status Report\2009 January\Appendix D\
Time Series Plots DAPL constituents.xls, Chloride SW LowerSD

Prepared by: BJR
Checked by: MH



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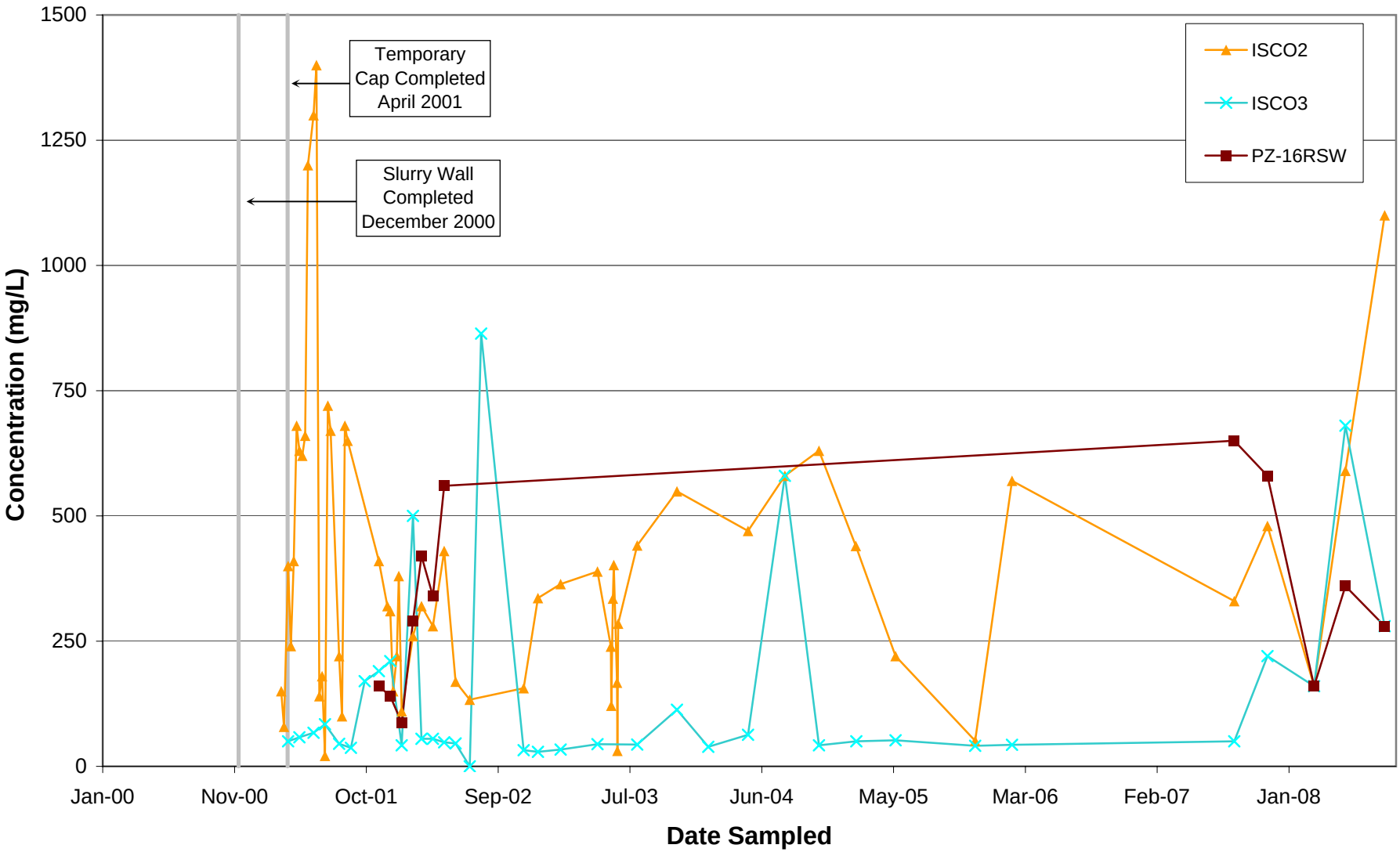
Sulfate in Surface Water in the Upper South Ditch

Figure D-2.9

P:\OLIN\Wilmington\SemiAnnual Status Report\2009 January\Appendix D\
Time Series Plots DAPL constituents.xls, Sulfate SW UpperSD

Prepared by: BJR
Checked by: MH



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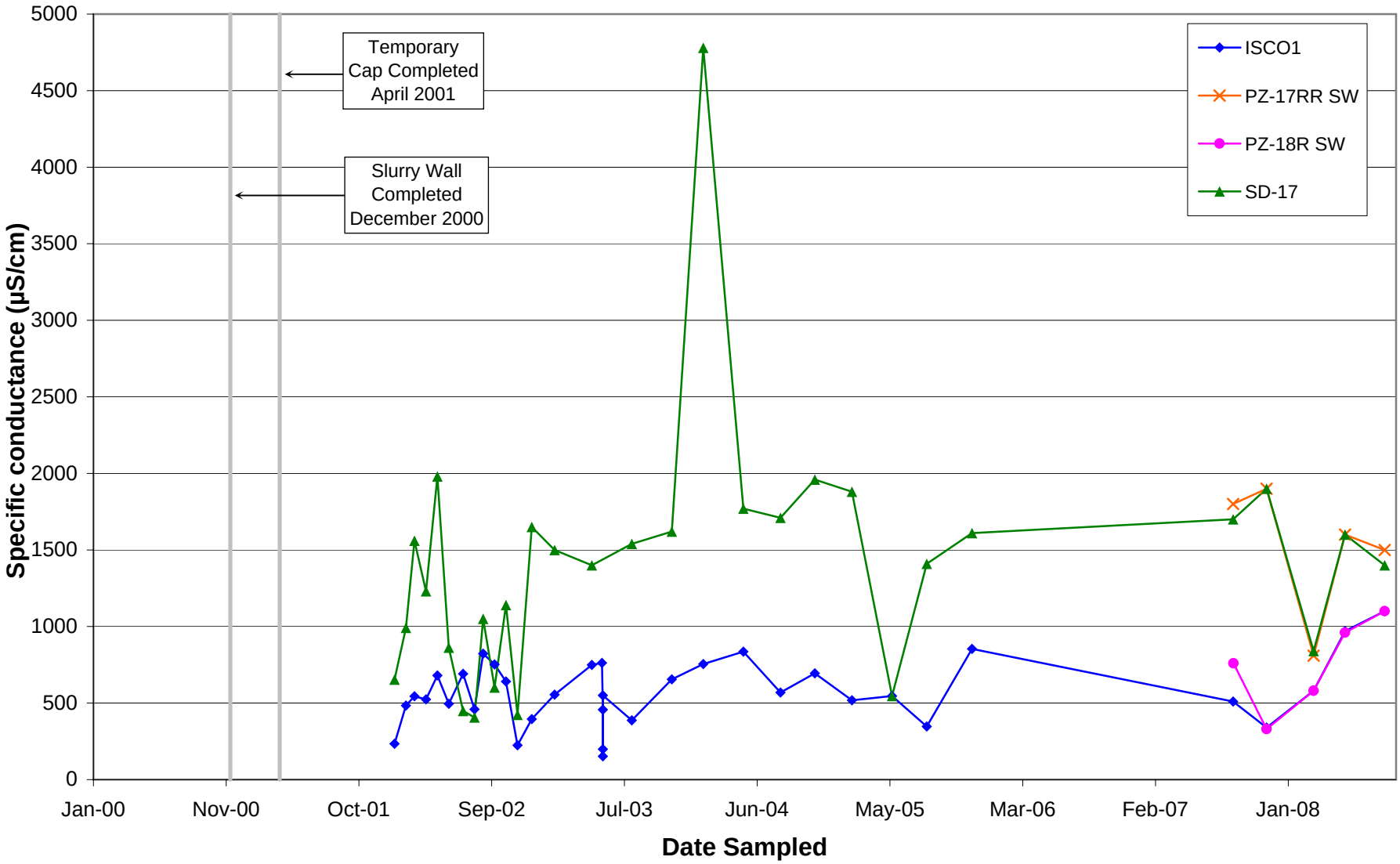
Sulfate in Surface Water in the Lower South Ditch

Figure D-2.10

P:\OLIN\Wilmington\SemiAnnual Status Report\2009 January\Appendix D\
Time Series Plots DAPL constituents.xls, Sulfate SW LowerSD

Prepared by: BJR
Checked by: MH



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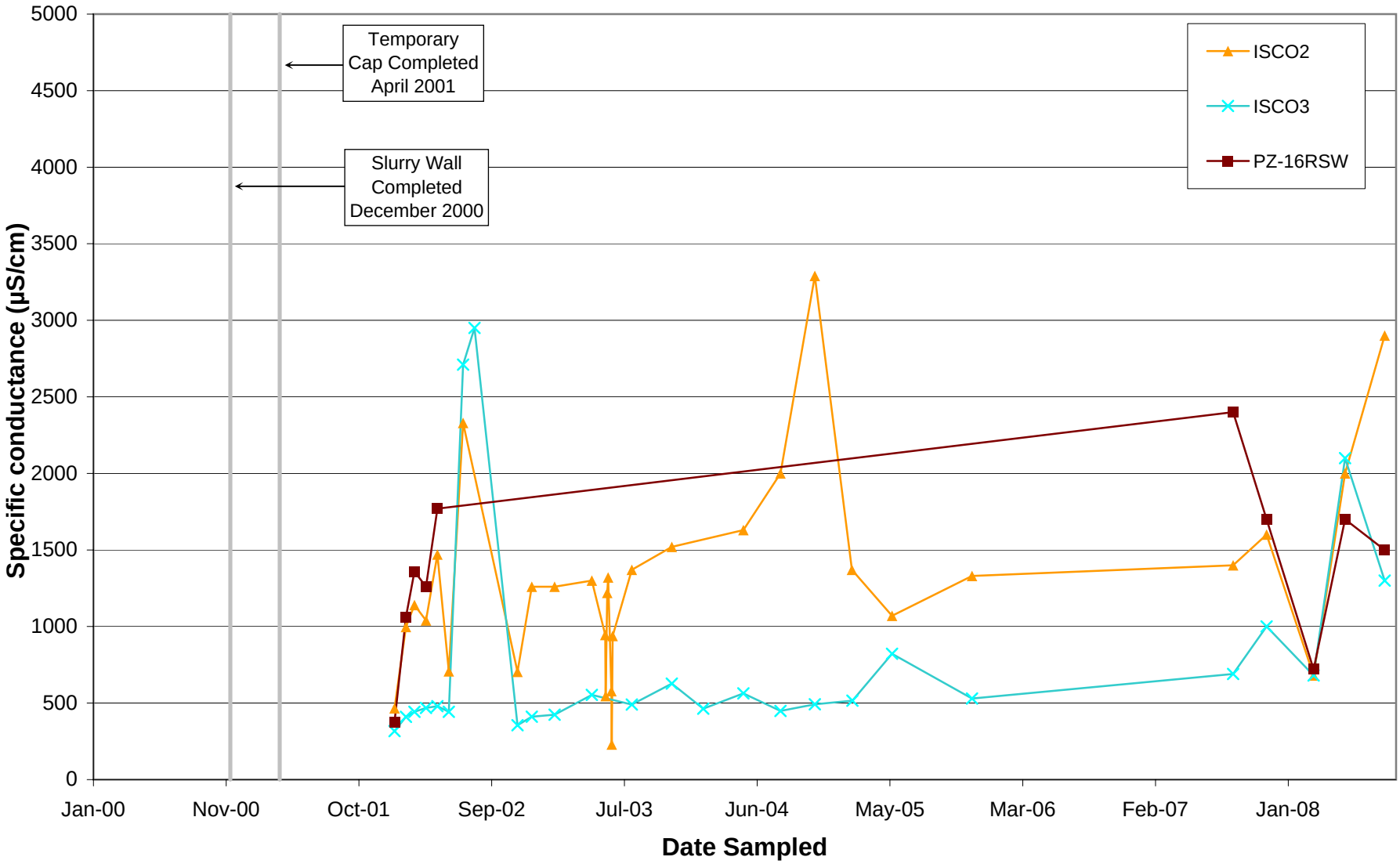
Specific Conductance in Surface Water in the Upper South Ditch

Figure D-2.11

P:\OLIN\Wilmington\SemiAnnual Status Report\2009 January\Appendix D\
Time Series Plots DAPL constituents.xls, Specific Conductance SW UpperSD

Prepared by: BJR
Checked by: MH



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Specific Conductance in Surface Water in the Lower South Ditch

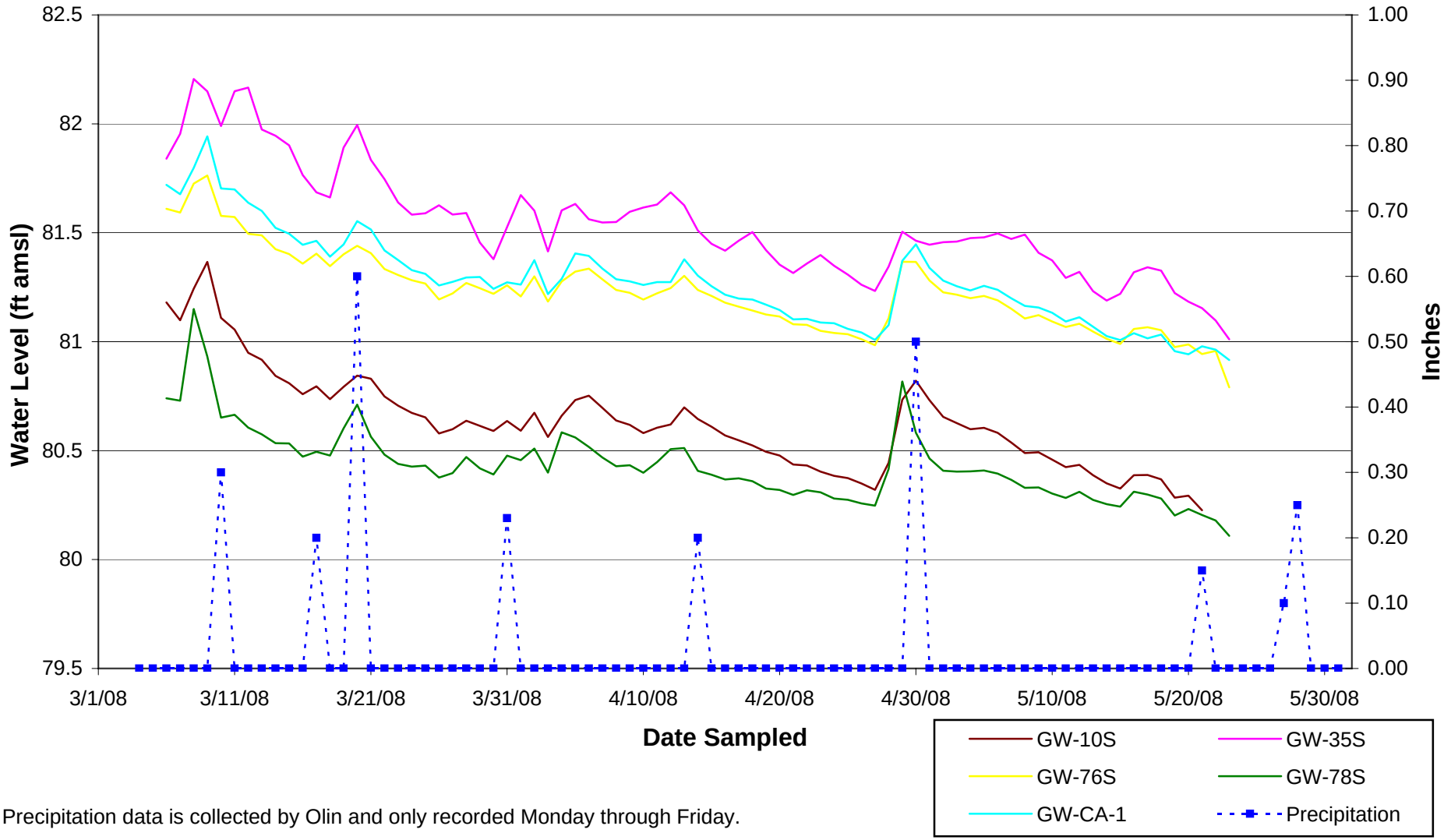
Figure D-2.12

P:\OLIN\Wilmington\SemiAnnual Status Report\2009 January\Appendix D\
Time Series Plots DAPL constituents.xls, Specific Conductance SW LowerSD

Prepared by: BJR
Checked by: MH

APPENDIX E

Slurry Wall/Cap Data Logger Water Level Plots

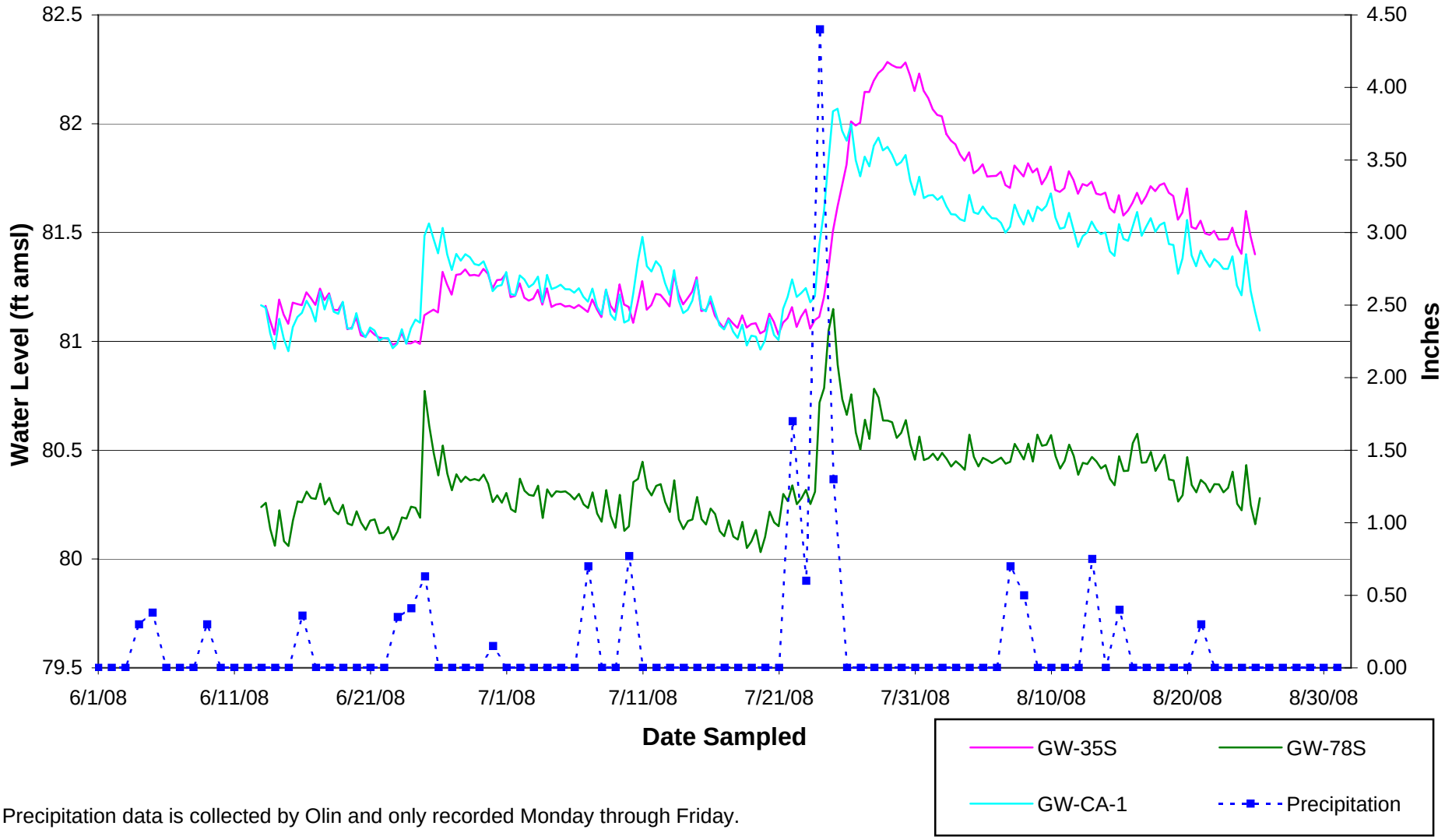


Precipitation data is collected by Olin and only recorded Monday through Friday.

Semi-Annual Status Report No. 3 Olin Wilmington Superfund Site Wilmington, Massachusetts	MACTEC	Groundwater Elevation (Corrected for Barometric Pressure) and Site Specific Precipitation Figure E-1

P:\OLIN\Wilmington\SemiAnnual Status Report\2009 January\Appendix E\
Data Logger Corrections.xls2nd Quarter Fig

Prepared by: BJR
Checked by: PHT



Precipitation data is collected by Olin and only recorded Monday through Friday.

Semi-Annual Status Report No. 3 Olin Wilmington Superfund Site Wilmington, Massachusetts	MACTEC	Groundwater Elevation (Corrected for Barometric Pressure) and Site Specific Precipitation Figure E-2

P:\OLIN\Wilmington\SemiAnnual Status Report\2009 January\Appendix E\
Data Logger Corrections.xls3rd Quarter Fig

Prepared by: BJR
Checked by: PHT