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SEMI-ANNUAL STATUS REPORT NO. 2

OLIN CHEMICAL SUPERFUND SITE

51 EAMES STREET
WILMINGTON, MASSACHUSETTS

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

Submitted by:
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Project No. 6100-08-0016 / 05A

June 27, 2008

SEMS Doc ID 293558

MACTEC

engineering and constructing a better tomorrow

June 27, 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. 2
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. 2, 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).

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: S. Morrow, Olin (1 Hard Copy)
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Project Manager

Michael J. Murphy
Project Principal

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GLOSSARY OF ACRONYMS

AS/SVE	air sparging/soil vapor extraction
BEHP	bis(2-ethylhexyl)phthalate
DAPL	dense aqueous phase liquid
FS	Feasibility Study
IRA	Immediate Response Action
IRS	Interim Response Steps
IRSWP	Interim Response Steps Work Plan
LNAPL	light non-aqueous phase liquid
MACTEC	MACTEC Engineering and Consulting, Inc.
MassDEP	Massachusetts Department of Environmental Protection
MCP	Massachusetts Contingency Plan
NDPA	N-nitrosodiphenylamine
Olin	Olin Corporation
off-PWD	off-Property West Ditch
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
SPCC	Spill Prevention, Control and Countermeasure
SVOC	semi-volatile organic compound
USEPA	United States Environmental Protection Agency
UV	ultraviolet
VOC	volatile organic compounds
VPH	volatile petroleum hydrocarbons

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 December 2007 and May 2008 and presents monitoring data for the Slurry Wall/Cap and Plant B. The Slurry Wall/Cap analytical results include groundwater, surface water, and sediment for the 4th Quarter 2007 and groundwater and surface water results for the 1st Quarter 2008. The Plant B analytical results include groundwater for the 4th Quarter 2007 and 1st Quarter 2008.

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 Draft 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 Draft 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 Immediate Response Action (IRA) under the MCP. The system was installed in response to the seepage of LNAPL into the East Ditch that is 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 fourth quarter 2007 and first quarter 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. In addition, this report documents the field activities which are summarized in the field activity reports for each sampling event (including the first quarter 2008 and second 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

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

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2.0 SLURRY WALL/CAP

The following sections present results of chemical analysis for groundwater, surface water, and sediment for the fourth quarter 2007 and first quarter 2008 sampling events. Sediment sampling and analysis was conducted in the fourth quarter 2007 only. Validated analytical results from the second quarter 2008 sampling event were not available at the time of report preparation. Groundwater level data for the first quarter 2008 and second quarter 2008 are presented in field activity reports contained in **Appendices A-1** and **A-2**. The fourth quarter 2007 and first quarter 2008 data validation reports are provided in **Appendices B-1** and **B-2**, respectively.

In addition to the quarterly sampling conducted in accordance with the Draft 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 monthly by MACTEC and compiled as a monthly report. These reports are contained in **Appendix C**. These monthly reports were prepared previously by the BCS Group, Incorporated.

2.1 GROUNDWATER

Groundwater sampling and analysis for the fourth quarter 2007 sampling event was completed on November 12-16, 2007. The first quarter 2008 sampling event was completed March 4-6, 2008. The second quarter 2008 sampling event was completed May 16-23, 2008.

The fourth quarter 2007 sampling event included groundwater samples from seventeen 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 South Ditch. QA/QC samples included two duplicates and a matrix spike (MS) and matrix spike duplicate (MSD). The first quarter 2008 sampling event included groundwater samples from three monitoring wells (GW-25, GW-79S, GW-202S) and the three piezometers (PZ-16RR, PZ-17RR, PZ-18R). QA/QC samples included one duplicate, one MS, and one MSD. The second quarter 2008 sampling event included groundwater samples from same locations as the fourth quarter 2007 sampling event. QA/QC samples included three duplicates, an MS and an MSD.

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 **Appendix A-1 and A-2**, respectively. The field activity report for the fourth quarter 2007 was previously submitted with the previous SASR. Groundwater samples were analyzed for aluminum, chromium, ammonia, chloride, sulfate and specific conductance.

Table 2-1 presents analytical results for fourth quarter 2007 groundwater sampling. **Table 2-2** summarizes split-sample analytical data (for chloride, nitrogen, sulfate) that USEPA collected with MACTEC from monitoring wells GW-10S, GW-202D, GW-39, GW-55S and GW-76S during the Fourth Quarter 2007 sampling event. USEPA's Data Package has been attached as **Appendix F**. **Table 2-3** presents analytical results for the first quarter 2008 groundwater sampling. The analytical results for the second quarter 2008 sampling event were being received from the laboratory at the time this report was being prepared. Validation of that data is not complete; therefore, the second quarter 2008 analytical data are not included in this report.

The analytical results for metals were consistent between both sampling events for wells common to each event. Inorganic (chloride, ammonia, and sulfate) concentrations were slightly lower in GW-202S and GW-25 in 1st Quarter 2008 but higher in piezometers PZ-16RR and PZ-18R.

Appendix D-1 presents time series groundwater concentration plots for aluminum, ammonia, chloride, chromium, and sulfate. These plots include the data from the fourth quarter 2007 and the first quarter 2008 sampling events. The concentrations of metals and inorganics are within historical ranges.

Groundwater levels were collected from eighteen groundwater monitoring wells and five piezometers prior to each sampling event. These wells include the seventeen 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 **Appendix A-1 and A-2**. These measurements are also shown on **Figures 2-1 and 2-2**. The water levels for both periods show shallow groundwater along the west side flows south and then around the southern sides of the slurry wall 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 this measurement period. Along the south side of the Slurry Wall, shallow groundwater flows toward Upper South Ditch. In general, the Slurry Wall forces groundwater to flow around the containment area from north and west to south and to east.

Vertical gradients from deep to shallow overburden groundwater were downward north of the Slurry Wall (GW-34SR and GW-34D) and downward in the Ephemeral drainage (GW-55S and GW-55D). Near South Ditch groundwater gradients in shallow and deeper overburden groundwater (GW-202S and GW-202D) were weakly upward during both monitoring periods.

2.2 SURFACE WATER

The fourth quarter 2007, first quarter 2008, and second quarter 2008 sampling events included surface water samples from seven locations: ISCO1, ISCO2, ISCO3, PZ-16RR/PZ-16RSW, PZ-17RR, PZ-18R and SD-17. For each sampling event, QA/QC samples included a duplicate, MS, and MSD. 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 first and second quarter 2008 sampling events are contained in **Appendix A-1 and A-2**, respectively. The field activity report for the fourth quarter 2007 was previously submitted with the previous SASR. Groundwater samples were analyzed for aluminum, chromium, ammonia, chloride, sulfate and specific conductance.

Table 2-4 presents analytical results for fourth quarter 2007 surface water sampling. **Table 2-5** presents the analytical results for the first quarter 2008 surface water sampling. The fourth quarter 2007 and first quarter 2008 analytical results for aluminum, chromium, ammonia, chloride, sulfate and specific conductance are consistent with past results. Both inorganic and metal concentrations tended to be lower in the first quarter 2008 event compared to the fourth quarter 2007 event. The analytical results for the second quarter 2008 sampling event were being received from the laboratory at the time this report was being prepared. Validation of that data is not complete; therefore, the second quarter 2008 analytical data are not included in this report.

Appendix D-2 presents time series surface water concentration plots for aluminum, ammonia, chloride, chromium, and sulfate. These plots include the data from the fourth quarter 2007 and first quarter 2008 sampling event.

2.3 SEDIMENT

Sediment samples were collected during the fourth quarter 2007 sampling event from five locations: SD-SD1, SD-SD2, SD-SD3, SD-SD4 and SD-SD5. One duplicate, matrix spike, and

matrix spike duplicate sample were submitted for analysis. These samples were analyzed for aluminum, chromium, iron, moisture and percent solids. **Table 2-6** presents the analytical results for the fourth quarter 2007 sediment sampling. The analytical results for total aluminum, chromium, and iron are generally consistent with past results. The concentrations reported at sampling location SD-SD5 represent maximum detected concentrations at that location.

2.4 DATA LOGGER DATA

Data loggers were deployed in five monitoring wells (GW-10S, GW-35S, GW-CA1, GW-76S and GW-78S) to continuously monitor groundwater elevation within and around the cap area on-Site. **Appendix E** presents time series groundwater elevation plots compared to precipitation data in the Wilmington, Massachusetts area. These plots include groundwater elevations from November 2007 to May 2008.

2.5 TEMPORARY CAP INSPECTIONS

Inspections of the temporary cap have been conducted in March and June 2008 as part of the first and second quarter 2008 sampling events. Full descriptions of the temporary cap inspections, including any necessary repairs completed on the temporary cap, are included in the Field Activity Reports in **Appendix A** A number of repairs were completed in March 2008 and remained in good condition as of June 2008.

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.

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 South Ditch.

Some 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. The sand has not migrated from the cover, and the sand 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 ultraviolet (UV) protection afforded by its carbon black content fails to protect the polymer from significant deterioration.

3.0 PLANT B

The following sections present results of chemical analysis for groundwater for the fourth quarter 2007 sampling event. The planned limited groundwater sampling for the first quarter 2008 was not conducted due to damage to the monitoring well scheduled for sampling (GW-16). Analytical results were not available at the time of report preparation for the second quarter 2008 sampling event. Groundwater level data for the first quarter 2008 and second quarter 2008 are presented in the field activity reports in **Appendices A-1 and A-2**.

In addition to the quarterly sampling conducted in accordance with the Draft 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 Draft IRSWP (MACTEC 2007). The analytical data for the RGP are validated and retained on-Property by Olin in accordance with that permit. That data are not included in this report. The monthly water level and LNAPL thickness data (December 2007 – May 2008), collected since the submission of the previous SASR, are presented in this SASR in tables and figures.

3.1 GROUNDWATER

The fourth quarter 2007 sampling event is the annual event (end of year) and groundwater samples were collected from six monitoring or interceptor wells (GW-16, B-03, GW-101, GW-13, IW-10 and IW-6). The groundwater samples are analyzed for trimethylpentenes, NDPA, BEHP, volatile petroleum hydrocarbons (VPHs), ammonia, iron and pH. The first quarter 2008 sampling event was scheduled to include a groundwater sample from GW-16, however GW-16 was damaged prior to the sampling event and a groundwater sample could not be obtained.

On April 25, 2008, D.L. Maher Company installed monitoring well GW-16R to replace GW-16 which was previously damaged. GW-16R was installed to approximately the same depth as GW-16. GW-16 was abandoned in place.

The second quarter 2008 sampling event included a groundwater sample from GW-16R. The sample locations, details of sampling and the analytical program are contained in the field activity report in **Appendix A-2**.

Table 3-1 presents analytical results for fourth quarter 2007 groundwater samples. The fourth quarter analytical results for trimethylpentenes, NDPA, BEHP, VPH, ammonia, iron and pH are consistent with past results. The analytical results for the second quarter 2008 sampling event were being received from the laboratory at the time this report was being prepared. Validation of that data is not complete; therefore, the second quarter 2008 data are not included in this report.

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). The monthly water table elevation data are presented in **Tables 3-2 and 3-3** and in **Figures 3-1 through 3-6** for December 2007 through May 2008. In addition MACTEC measured groundwater levels in the same 25 monitoring wells and the three groundwater extraction wells previous to both the first quarter 2008 and second quarter 2008 sampling events and those data are tabulated in **Appendices A-1 and A-2**.

3.2 LNAPL

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 appears to be at the sensitivity of the meter; thus consistency of measurements between personnel has shown some variability. A comparison of two separate meters to resolve any measurement differences was being conducted at the time of this report. LNAPL thickness was also measured by MACTEC previous to the first quarter 2008 and second quarter 2008 sampling events. The number of wells with measurable LNAPL thickness during each sampling event varies as the LNAPL layer is very thin and is sporadically detected in certain individual wells from month to month. The LNAPL thickness data are presented in **Appendix A-1 and A-2** and in **Figures 3-7 and 3-8** for March and May 2008. A protocol for LNAPL thickness measurement and confirmation of LNAPL presence via visual observation is under development. This protocol will address the interpretation of instrument response for what appears to be very thin LNAPL layer (less than 0.01 feet). Over the most recent two years, LNAPL has been observed at least once in seven observation wells and two of the three groundwater extractions wells. Measurable LNAPL has always been observed from GW-23 near the northeast corner of the Plant B foundation. Measurable LNAPL has also been observed frequently from the nearby well P5 and extraction well IW-11.

The monthly LNAPL recovery data are presented in **Tables 3-2 and 3-3** for the December 2007 through May 2008 time period. The highest amount of LNAPL recovered during this time period was 0.74 gallons in December 2007. The total LNAPL recovered for December 2007 to May 2008 period was 3.5 gallons and represents an increase in the total LNAPL recovered compared to the previous period. Monthly and cumulative LNAPL Recovery Data was plotted and is summarized in **Figure 3.9.**

4.0 DAPL EXTRACTION PILOT TEST DESIGN

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

4.1 DESIGN SCHEDULE AND PROGRESS

The DAPL pilot system design schedule proposed in the Draft IRSWP (MACTEC, 2007a) was modified per USEPA comments on the IRSWP, dated November 2, 2007, and presented in a Draft Response to Comments Letter (RCL) dated December 31, 2007 (MACTEC, 2007b). This revised schedule included a dual design process to evaluate a USEPA request that Olin consider a truck transport option for the DAPL Pilot Study. In a second RCL from Olin to USEPA, dated February 27, 2008, Olin again emphasized its intention to streamline the pilot design schedule while still maintaining appropriate safety reviews (Olin, 2008). In addition, based on an assessment of anticipated transport costs and safety considerations, Olin indicated that implementation of a rail loading station was the preferred alternative. Olin provided USEPA a cost analysis on April 14, 2008 that compared transport and disposal costs for a rail loading facility and a truck loading facility.

Olin met with the property owner on April 28, 2008 to discuss the proposed project based on preliminary and conceptual site plans for two possible DAPL management configurations. These included a rail car loading station and a truck loading station. The site plans presented to the property owner were provided to USEPA electronically on May 7, 2008. Discussion between Olin and the Property owner are ongoing. In addition, discussions with the railroad (PanAm, Inc.) and with the potential waste disposal facility are on-going.

4.2 DESIGN STATUS

As discussed in the SASR No. 1 (MACTEC, 2008), a 60% internal draft design for the rail car loading option was completed and provided to Olin for review and comment in November, 2007. This review resulted in design recommendations to improve safety and maintenance. The safety topics concerned additional redundant alarm and shut down switches for detection of potential leaks in manholes structures or an overfill condition at the rail car. In addition, the burial depth of the dual wall pipeline was reduced and the line was heat-traced to make removal and replacement of the inner carrier pipe easier in the event that mineral encrustation became an operational problem.

A revised design was submitted in advance of a formal internal hazard review (a safety review required on all Olin design projects) which was completed on April 17, 2008. The final design has been completed and has been provided to Olin for final review. Bid documents are being prepared.

4.3 OPERATING PLANS

An Operation, Monitoring and Maintenance (OM&M) Plan will be developed during the latter phase of pilot system construction as final installed equipment manuals become available. At that time the Spill Prevention, Control and Countermeasures (SPCC) Plan will also be finalized. The monitoring components of the OM&M plan will be consistent with the approach presented in the Performance Monitoring Program prepared by MACTEC in December, 2004 and submitted to the Massachusetts Department of Environmental Protection (MassDEP) in January 2006 (Sleeman Hanley & DiNitto, 2006).

5.0 ADDITIONAL ACTIVITIES

5.1 SUBMITTALS

Since the last SASR, Olin has submitted the following documents and other information that has been requested. Although some of these submittals pertain to the Draft Focused RI Report, and not the IRSWP, they are mentioned for completeness.

February 27, 2008. Response to Comment Letters for the Focused Remedial Investigation Report and the Interim Response Step Work Plan were submitted to USEPA. This package included a copy of all Site boring logs and seven documents concerning IRA private well sampling status reports. The package also included a separate RCL responding to information requested by USEPA in its letter dated February 7, 2008 concerning the Site groundwater model and requests for the 2003 induction logging and multilevel piezometer sampling report, the 2001 seismic refraction survey report for the Maple Meadow Brook Area, and the 2006 seismic refraction survey report for the off-PWD Study Area.

April 4, 2008. A revised Section 3.0 from the IRSWP and supplemental information for Plant B, consisting of LNAPL distribution contours from 1999 through 2008 were provided to USEPA via electronic mail.

April 25, 2008. Historical aerial photographs of the Site were compiled and submitted to USEPA on compact disk.

May 7, 2008. The site layout for the rail car loading design and a concept drawing for a truck loading design were provided to USEPA via electronic mail. These were the same drawings provided to the property owner on April 28, 2008.

June 2, 2008. A memorandum concerning a proposed RI analyte list was provided to USEPA that responded to a list of "potential contaminants of concern" provided by USEPA to Olin on April 8, 2008.

5.2 MEETINGS

March 18, 2008. Olin, USEPA and their consultants met to review USEPA comments and questions concerning the Draft Focused RI Report. At conclusion of this meeting, Olin and USEPA had a discussion pertaining to the DAPL Pilot Study design.

6.0 REFERENCES

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

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

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

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

Sleeman Hanley & DiNitto, 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. January 16.

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

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

TABLES

Table 2-1
Slurry Wall / Cap Analytical Results for Fourth Quarter 2007 Groundwater Sampling

Semi-Annual Status Report No. 2
Olin Chemical Superfund Site
Wilmington, Massachusetts

Parameter	Frequency of Detection	Range of Reporting Limits for Non-Detects	Range of Detected Concentrations	Arithmetic Mean	GW-10S OC-GW-10S 11/13/2007	GW-201S OC-GW-201S 11/14/2007	GW-202D OC-GW 202D 11/13/2007	GW-202D OC-GW-202D DUP 11/13/2007	GW-202S OC-GW-202S 11/13/2007	GW-24 OC-GW-24 11/14/2007
Metals, Filtered (mg/L)										
Aluminum, Filtered	14 / 22	0.1 - 0.1	0.0071 - 24	1.29	1.6	< 0.1	0.55	0.56	< 0.1	0.014 J
Chromium, Filtered	19 / 22	0.005 - 0.005	0.0011 - 0.07	0.015	0.0054	0.015	0.07	0.07	0.0045 J	< 0.005
Inorganics (mg/L)										
Chloride	22 / 22		1.4 - 230	80.58	12	150	200	210	63	8.2
Nitrogen, Ammonia	22 / 22		0.12 - 240	67.75	1.2	150	230	240	120	38
Specific Conductance **(umhos/cm)**	22 / 22		93 - 3600	1264.68	150	3600	3500	3400	1700	430
Sulfate as SO4	22 / 22		11 - 1500	421.86	40	1500	1400	1400	590	78
Field Measurements										
pH **(pH units)**	19 / 19		3.97 - 8.26	6.25	3.97	6.64	5.82	5.82	6.26	8.26
Dissolved Oxygen **(mg/L)**	9 / 19	0.1 - 0.1	0.05 - 10.83	2.29	< 0.1	< 0.1	0.05	0.05	< 0.1	10.83
Oxidation Reduction Potential **(mv)**	19 / 19		-237 - 290	35.79	196	37	153	153	74	-93
Specific Conductance **(uS/cm)**	19 / 19		116 - 3970	1331.58	132	3970	3620	3620	1800	537

< - Compound not detected.
Value is detection limit.
J - estimated
mg/L - milligrams/liter
umhos/cm - micromhos/centimeter
umhos/cm = uS/cm
mv - millivolts

Table 2-1
Slurry Wall / Cap Analytical Results for Fourth Quarter 2007 Groundwater Sampling

Semi-Annual Status Report No. 2
Olin Chemical Superfund Site
Wilmington, Massachusetts

Parameter	GW-25 OC-GW-25 11/13/2007	GW-26 OC-GW-26 11/13/2007	GW-34D OC-GW-34D 11/13/2007	GW-34SR OC-GW-34SR 11/13/2007	GW-35S OC-GW-35S 11/14/2007	GW-39 OC-GW-39 11/13/2007	GW-39 OC-GW-39 DUP 11/13/2007	GW-42S OC-GW-42S 11/12/2007	GW-55S OC-GW-55S 11/13/2007	GW-76S OC-GW-76S 11/13/2007	GW-78S OC-GW-78S 11/14/2007
Metals, Filtered (mg/L)											
Aluminum, Filtered	< 0.1	< 0.1	0.0071 J	< 0.1	0.038 J	0.31	0.3	0.42	24	0.014 J	0.13
Chromium, Filtered	0.0083	0.0053	0.016	0.0011 J	0.022	< 0.005	< 0.005	0.016	0.0059	0.0019 J	0.027
Inorganics (mg/L)											
Chloride	150	58	2.4	1.4	7.8	59	59	66	120	26	24
Nitrogen, Ammonia	99	36	16	0.55	39	0.12	0.13	0.46	190	15	63
Specific Conductance **(umhos/cm)**	1500	510	200	93	720	720	730	320	2400	260	1100
Sulfate as SO4	350	88	42	11	200	270	270	20	900	45	480
Field Measurements											
pH **(pH units)**	6.93	5.89	6.33	5.76	7.04	5.39	5.39	4.95	4.34	5.79	5.16
Dissolved Oxygen **(mg/L)**	< 0.1	< 0.1	0.91	4.45	1.74	4.42	4.42	<0.1	< 0.1	< 0.1	< 0.1
Oxidation Reduction Potential **(mv)**	-89	-89	134	126	-237	290	290	-167	251	93	153
Specific Conductance **(uS/cm)**	1570	460	116	180	863	932	932	260	2200	240	1360

< - Compound not detected.
Value is detection limit.
J - estimated
mg/L - milligrams/liter
umhos/cm - micromhos/centimeter
umhos/cm = uS/cm
mv - millivolts

Table 2-1
Slurry Wall / Cap Analytical Results for Fourth Quarter 2007 Groundwater Sampling

Semi-Annual Status Report No. 2
Olin Chemical Superfund Site
Wilmington, Massachusetts

Parameter	GW-79S OC-GW-79S 11/14/2007	GW-CA1 OC-GW-CA1 11/14/2007	PZ-16RR OC-PZ-16RR 11/14/2007	PZ-17RR OC-PZ-17RR 11/14/2007	PZ-18R OC-PZ18R 11/14/2007
Metals, Filtered (mg/L)					
Aluminum, Filtered	0.02 J	0.014 J	< 0.1	< 0.1	< 0.1
Chromium, Filtered	0.036	0.0071	0.0051	0.0026 J	0.0048 J
Inorganics (mg/L)					
Chloride	220	13	230	24	69
Nitrogen, Ammonia	68	2.1	120	52	10
Specific Conductance **(umhos/cm)**	2000	750	2100	1200	440
Sulfate as SO4	730	160	320	350	37
Field Measurements					
pH **(pH units)**	6.21	6.9	7.36	7.49	7.23
Dissolved Oxygen **(mg/L)**	< 0.1	0.45	10.3	9.86	< 0.1
Oxidation Reduction Potential **(mv)**	-50	117	-172	-119	-95
Specific Conductance **(uS/cm)**	2210	897	2300	1350	563

< - Compound not detected.
Value is detection limit.
J - estimated
mg/L - milligrams/liter
umhos/cm - micromhos/centimeter
umhos/cm = uS/cm
mv - millivolts

Prepared by: BJR 6/5/08
Checked by: MJM 6/12/08

Table 2-2
Comparison of EPA Split Sample Data

Semi-Annual Status Report No. 2
Olin Chemical Superfund Site
Wilmington, Massachusetts

Parameter	GW-10S OC-GW-10S 11/13/2007	GW-10S 11/13/2007	GW-202D OC-GW 202D 11/13/2007	GW-202D OC-GW 202D DUP 11/13/2007	GW-202D 11/13/2007	GW-39 OC-GW-39 11/13/2007	GW-39 OC-GW-39 DUP 11/13/2007	GW-39 11/13/2007	GW-55S OC-GW-55S 11/13/2007	GW-55S 11/13/2007	GW-76S OC-GW-76S 11/13/2007	GW-76S 11/13/2007
Inorganics (mg/L)												
Chloride	12	12	200	210	210	59	59	62	120	110	26	26
Nitrogen, Ammonia	1.2	1.85	230	240	137	0.12	0.13	< 0.4	190	118	15	8.74
Sulfate as SO4	40	38	1400	1400	1400	270	270	270	900	880	45	46

< - Compound not detected. Value is detection limit.
J - estimated
mg/L - milligrams/liter

Shaded columns are EPA split samples.

Prepared by: BJR 6/9/08
Checked by: MJM 6/12/08

Table 2-3
Slurry Wall / Cap Analytical Results for First Quarter 2008 Groundwater Sampling

Semi-Annual Status Report No. 2
Olin Chemical Superfund Site
Wilmington, Massachusetts

Parameter	Frequency of Detection	Range of Reporting Limits for Non-Detects	Range of Detected Concentrations	Arithmetic Mean	GW-202S OC-GW-202S 3/5/2008	GW-25 OC-GW-25 3/5/2008	GW-25 OC-GW-25DUP 3/5/2008	GW-79S OC-GW-79S 3/5/2008	PZ-16RR OC-PZ-16RR 3/5/2008	PZ-17RR OC-PZ-17RR 3/5/2008	PZ-18R OC-PZ-18R 3/5/2008
Metals, Filtered (mg/L)											
Aluminum, Filtered	1 / 7	0.1 - 0.1	0.016 - 0.016	0.05	< 0.1	< 0.1	< 0.1	0.016 J	< 0.1	< 0.1	< 0.1
Chromium, Filtered	7 / 7		0.0022 - 0.012	0.01	0.004 J	0.0082	0.0082	0.012	0.0086	0.0022 J	0.0066
Inorganics (mg/L)											
Chloride	7 / 7		26 - 130	79.29	46	71	61	91	130	26	130
Nitrogen, Ammonia	7 / 7		23 - 180	91.57	85	66	64	170	180	53	23
Specific Conductance **(umhos/cm)**	7 / 7		840 - 2500	1434.29	1400	950	950	2200	2500	1200	840
Sulfate as SO4	7 / 7		130 - 950	465.71	490	240	210	950	850	390	130
Field Measurements											
pH **(pH units)**	6 / 6		6.48 - 7.83	7.24	6.76	7.38	7.38	6.48	7.42	7.83	7.54
Dissolved Oxygen **(mg/L)**	6 / 6		<0.1 - 9.88	2.78	0.26	<0.1	<0.1	<0.1	3.52	2.9	9.88
Oxidation Reduction Potential **(mv)**	6 / 6		-95 - 178	28.67	178	60	60	67	-88	-95	50
Specific Conductance **(uS/cm)**	6 / 6		752 - 2720	1365	840	1060	1060	2720	1980	752	836

< - Compound not detected.
Value is detection limit.
J - estimated
mg/L - milligrams/liter
umhos/cm - micromhos/centimeter
umhos/cm = uS/cm
mv - millivolts

Prepared by: BJR 6/5/08
Checked by: MJM 6/12/08

Table 2-4
Slurry Wall / Cap Analytical Results for Fourth Quarter 2007 Surface Water Sampling

Semi-Annual Status Report No. 2
Olin Chemical Superfund Site
Wilmington, Massachusetts

Parameter	Frequency of Detection	Range of Reporting Limits for Non-Detects	Range of Detected Concentrations	Arithmetic Mean	ISCO1 OC-ISCO-1 11/12/2007	ISCO2 OC-ISCO-2 11/12/2007	ISCO3 OC-ISCO-3 11/12/2007	PZ-16RR OC-PZ-16RSW 11/12/2007	PZ-17RR OC-DUPLICATE-PZ17RR 11/12/2007	PZ-17RR OC-PZ-17RR 11/12/2007	PZ-18R OC-PZ-18R 11/12/2007	SD-17 OC-SD-17 11/12/2007
Metals, Total (mg/L)												
Aluminum, Total	8 / 8		0.24 - 8.5	3.31	0.24	7.2	0.32	1.2	4.4	4.4	0.24	8.5
Chromium, Total	8 / 8		0.01 - 1.5	0.58	0.019	1	0.01	0.27	0.9	0.9	0.019	1.5
Sodium, Total	8 / 8		35 - 170	110.25	36 J	120 J	51 J	150	170	170	35 J	150 J
Metals, Filtered (mg/L)												
Aluminum, Filtered	8 / 8		0.094 - 2	0.80	0.14	0.17	0.094 J	0.46	1.7	1.7	0.11	2
Chromium, Filtered	8 / 8		0.007 - 0.51	0.21	0.0088	0.016	0.0071	0.16	0.5	0.5	0.0068	0.51
Sodium, Filtered	8 / 8		37 - 180	124.13	40 J	140 J	96 J	160	170	180	37 J	170 J
Inorganics (mg/L)												
Chloride	8 / 8		47 - 180	134.38	48	150	130	160	180	180	47	180
Nitrate as N	5 / 5		0.93 - 3.1	1.57	0.98	3.1	1.9	NA	NA	NA	0.93	0.95
Nitrite as N	2 / 5	0.1 - 0.1	0.012 - 0.013	0.04	0.013	< 0.1	< 0.1	NA	NA	NA	0.012	< 0.1
Nitrogen, Ammonia	8 / 8		7.9 - 98	62.15	8.3	76	37	86	97	98	7.9	87
Specific Conductance	8 / 8		330 - 1900	1333.75	340	1600	1000	1700	1900	1900	330	1900
Sulfate as SO4	8 / 8		60 - 660	421.50	62	480	220	580	660	660	60	650
Field Measurements												
pH **(pH units)**	5 / 5		5.56 - 6.91	6.24	5.93	6.91	6.58	6.04	5.95	5.95	6.22	5.56
Dissolved Oxygen **(mg/L)**	5 / 5		1.03 - 13.12	7.55	3.59	12.4	13.12	5.35	4.23	4.23	1.03	7.61
Oxidation Reduction Potential **(mv)**	5 / 5		-9 - 180	67.00	60	29	75	154	155	155	-9	180
Specific Conductance **(umhos/cm)**	5 / 5		547 - 1930	1021.20	547	1420	589	1620	1720	1720	620	1930

< - Compound not detected, value is detection limit.
J - estimated
mg/L - milligrams/liter
umhos/cm - micromhos/centimeter
umhos/cm = uS/cm
mv - millivolts
NA - Not analyzed

Prepared by: BJR 6/5/08
Checked by: MJM 6/12/08

Table 2-5
Slurry Wall / Cap Analytical Results for First Quarter 2008 Surface Water Sampling

Semi-Annual Status Report No. 2
Olin Chemical Superfund Site
Wilmington, Massachusetts

Parameter	Frequency of Detection	Range of Reporting Limits for Non-Detects	Range of Detected Concentrations	Arithmetic Mean	ISCO1 OC-ISCO-1 3/6/2008	ISCO2 OC-ISCO-2 3/6/2008	ISCO3 OC-ISCO-3 3/6/2008	PZ-16RR OC-PZ-16RR 3/6/2008	PZ-17RR OC-PZ-17RR 3/6/2008	PZ-18R OC-PZ-18R 3/6/2008	SD-17 OC-SD-17 3/6/2008	SD-17 OC-SD-17 DUP 3/6/2008
Metals, Total (mg/L)												
Aluminum, Total	8 / 8		0.57 - 9.4	3.10	0.57	1.7	1.8	2.9	9.4	0.59	4.9 J	2.9 J
Chromium, Total	8 / 8		0.063 - 2.3	0.66	0.063	0.26	0.29	0.61	2.3	0.064	1	0.72
Sodium, Total	8 / 8		59 - 84	69.50	59 J	61 J	60 J	72 J	81	62 J	77 J	84
Metals, Filtered (mg/L)												
Aluminum, Filtered	8 / 8		0.29 - 1.6	0.96	0.33	0.84	1	0.8	1.2	0.29	1.6	1.6
Chromium, Filtered	8 / 8		0.042 - 0.35	0.19	0.046	0.093	0.12	0.19	0.3	0.042	0.35	0.35
Sodium, Filtered	8 / 8		67 - 93	78.38	69 J	68 J	67 J	81 J	89	69 J	93 J	91
Inorganics (mg/L)												
Chloride	8 / 8		69 - 100	86.50	90	70	69	88	94	81	100	100
Nitrate as N	8 / 8		0.41 - 1.5	0.76	0.49	1.5	1.5	0.61	0.46	0.41	0.61	0.46
Nitrite as N	0 / 8	0.01 - 0.01		0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Nitrogen, Ammonia	8 / 8		18 - 37	28.25	18	27	26	27	36	18	37	37
Specific Conductance **(umhos/cm)**	8 / 8		580 - 840	716.25	580	680	680	720	810	580	840	840
Sulfate as SO4	8 / 8		88 - 190	151.88	97	160	160	160	170	88	190	190
Field Measurements												
pH **(pH units)**	7 / 7		5.54 - 6.84	5.81	5.74	5.56	6.84	5.59	5.54	5.83	5.57	5.57
Dissolved Oxygen **(mg/L)**	7 / 7		6.4 - 10.9	8.71	7.67	10.65	10.9	10.4	7.05	6.4	7.87	7.87
Oxidation Reduction Potential **(mv)**	7 / 7		72 - 102	81.43	88	76	65	102	93	72	74	74
Specific Conductance **(uS/cm)**	7 / 7		594 - 843	723.7	621	698	707	775	828	594	843	843

< - Compound not detected.
Value is detection limit.
J - estimated
mg/L - milligrams/liter

umhos/cm - micromhos/centimeter
umhos/cm = uS/cm
mv - millivolts

Prepared by: BJR 6/5/08
Checked by: MJM 6/12/08

Table 2-6
Slurry Wall / Cap Analytical Results for Fourth Quarter 2007 Sediment Sampling

Semi-Annual Status Report No. 2
Olin Chemical Superfund Site
Wilmington, Massachusetts

Parameter	Frequency of Detection	Range of Reporting Limits for Non-Detects	Range of Detected Concentrations	Arithmetic Mean	SD-SD1 OC-SD-SD1 11/16/2007	SD-SD1 OC-SD-SD1-DUP 11/16/2007	SD-SD2 OC-SD-SD2 11/16/2007	SD-SD3 OC-SD-SD3 11/16/2007	SD-SD4 OC-SD-SD4 11/16/2007	SD-SD5 OC-SD-SD5 11/16/2007
Metals (mg/kg)										
Aluminum, Total	6 / 6		6900 - 17000	9683	8500	8800	8200	6900	8700	17000
Chromium, Total	6 / 6		18 - 1600	314	20	18	110	120	18	1600
Iron, Total	6 / 6		9400 - 19000	11817	10000	9500	11000	9400	12000	19000
Inorganics (%)										
Moisture	6 / 6		26 - 58	40	42	58	33	26	27	54
Solids, Percent	6 / 6		42 - 74	60	58	42	67	74	73	46

mg/kg - milligrams per kilogram

Prepared by: BJR 6/5/08
Checked by: MJM 6/12/08

Table 3-1
Plant B Analytical Results for Fourth Quarter 2007 Groundwater Sampling

Semi-Annual Status Report No. 2
Olin Chemical Superfund Site
Wilmington, Massachusetts

Parameter	Frequency of Detection	Range of Reporting Limits for Non-Detects	Range of Detected Concentrations	Arithmetic Mean	B-03 OC-B-03 11/15/2007	GW-101 OC-GW-101 11/15/2007	GW-13 OC-GW-13 11/15/2007	GW-16 OC-GW-16 11/15/2007	GW-16 OC-GW-16 DUP 11/15/2007	IW-10 OC-IW-10 11/15/2007	IW-6 OC-IW-6 11/15/2007
Volatile Organics (mg/L)											
2,4,4-Trimethyl-1-pentene	4 / 7	0.001 - 0.01	0.073 - 0.33	0.13	< 0.01	0.073	< 0.001	0.33 J	0.31 J	< 0.001	0.17
2,4,4-Trimethyl-2-Pentene	4 / 7	0.001 - 0.01	0.0081 - 0.088	0.03	< 0.01	0.0081	< 0.001	0.088	0.085	< 0.001	0.026
Semivolatile Organics (mg/L)											
bis(2-EthylHexyl)phthalate	2 / 7	0.0051 - 0.0054	0.0099 - 0.054	0.01	< 0.0051	0.054	0.0099	< 0.0051	< 0.0051	< 0.0054	< 0.0054
N-Nitrosodiphenylamine	6 / 7	0.0051 - 0.0051	0.0014 - 0.21	0.07	0.024	0.0042 J	< 0.0051	0.21	0.21	0.0076	0.0014 J
VPH (mg/L)											
Benzene	0 / 7	0.005 - 0.005		0.0025	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
C5-C8 Aliphatics (FID)	4 / 7	0.1 - 0.1	0.23 - 1.2	0.489	< 0.1	0.23	< 0.1	1.1	1.2	< 0.1	0.74
C5-C8 Aliphatics, Unadjusted	4 / 7	0.1 - 0.1	0.23 - 1.2	0.489	< 0.1	0.23	< 0.1	1.1	1.2	< 0.1	0.74
C9-C10 Aromatics (PID)	0 / 7	0.1 - 0.1		0.050	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
C9-C12 Aliphatics (FID)	0 / 7	0.1 - 0.1		0.050	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
C9-C12 Aliphatics, Unadjusted	0 / 7	0.1 - 0.1		0.050	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0 / 7	0.005 - 0.005		0.0025	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
m,p-Xylene	0 / 7	0.01 - 0.01		0.0050	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Methyl-t-butyl ether (MTBE)	0 / 7	0.005 - 0.005		0.0025	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Naphthalene	0 / 7	0.01 - 0.01		0.0050	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
o-Xylene	2 / 7	0.005 - 0.005	0.0078 - 0.008	0.0040	< 0.005	< 0.005	< 0.005	0.008	0.0078	< 0.005	< 0.005
Toluene	0 / 7	0.005 - 0.005		0.0025	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
VPH Concentration (Total)	4 / 7	0.1 - 0.1	0.23 - 1.2	0.4886	< 0.1	0.23	< 0.1	1.1	1.2	< 0.1	0.74
Metals, Total (mg/L)											
Iron, Total	1 / 1		14 - 14	14.00							14
Metals, Filtered (mg/L)											
Iron, Filtered	6 / 6		0.42 - 8.8	3.20	0.86	7.2	0.42	1	0.9	8.8	
Inorganics (mg/L)											
Nitrogen, Ammonia	6 / 7	0.1 - 0.1	0.92 - 59	10.91	1.5	0.92	< 0.1	6.9	6.9	59	1.1
pH **(pH units)**	7 / 7		5.75 - 6.56	6.11	6.09 J	6.56 J	5.75 J	5.91 J	6.01 J	6.06 J	6.39 J
Field Measurements											
pH **(pH units)**	6 / 6		4.48 - 6.5	5.72	5.91	6.5	4.48	5.1		5.84	6.46
Dissolved Oxygen **(mg/L)**	5 / 6	0.1 - 0.1	0.7 - 4.63	2.10	4.06	2.41	0.7	4.63		< 0.1	0.74
Oxidation Reduction Potential **(mv)**	6 / 6		-91 - 152	16.50	152	-91	29	95		-5	-81
Specific Conductance **(uS/cm)**	6 / 6		36 - 1640	602.33	241	1190	36	161		346	1640

< - Compound not detected. Value is detection limit.
J - estimated
mg/L - milligrams/liter
umhos/cm - micromhos/centimeter
umhos/cm = uS/cm
mv - millivolts
VPH - Volatile Petroleum Hydrocarbons

Prepared by: BJR 6/5/08
Checked by: MJM 6/12/08

Table 3-2
Plant B Water Level and Product Recovery Data: December 2007 - February 2008 [1]
Semi-Annual Status Report No. 2
Olin Chemical Superfund Site
Wilmington, Massachusetts

Well ID[2]	Depth to Water feet[2]			Reference Elevation	Potentiometric Surface Elevation (feet NGVD)			Product Removed gallons		
	12/31/2007	1/31/2008	2/29/2008	feet	12/31/2007	1/31/2008	2/29/2008	12/31/2007	1/31/2008	2/29/2008
B-2	12.16	12.15	12.17	90.48	78.32	78.33	78.31			
B-3	11.88	11.95	11.91	90.32	78.44	78.37	78.41			
B-5R	12.53	12.05	12.53	91.38	78.85	79.33	78.85			
B-7A	8.88	8.71	8.86	88.81	79.93	80.10	79.95			
B-17	9.42	9.26	9.43	91.55	82.13	82.29	82.12			
GW-13[3]	11.51	11.88	11.52	90.57	79.06	78.69	79.05			
GW-14	9.81	9.48	9.83	88.70	78.89	79.22	78.87			
GW-15[3]	8.96	8.84	8.97	90.01	81.05	81.17	81.04			
GW-16[4]	NM	NM	NM	91.21	NM	NM	NM			
GW-23	13.12	13.10	13.15	91.04	77.93	77.95	77.90			
GW-52S[3]	9.25	8.51	9.29	87.95	78.70	79.44	78.66			
GW-100	12.02	12.19	12.04	90.15	78.13	77.96	78.11			
GW-101	12.07	12.21	12.08	90.14	78.07	77.93	78.06			
GW-102	11.04	11.17	11.03	89.00	77.96	77.83	77.97			
IW-1	12.58	12.38	12.60	90.71	78.13	78.33	78.11			
IW-2	13.54	13.51	13.55	90.53	76.99	77.02	76.98			
IW-3	12.49	12.17	12.51	90.76	78.27	78.59	78.25			
IW-6	11.22	11.41	11.22	89.15	77.93	77.74	77.93			
IW-7[3]	12.39	12.39	12.41	90.10	77.71	77.71	77.69			
IW-8[3]	12.14	12.25	12.12	89.94	77.80	77.69	77.82			
IW-9[3]	11.89	11.99	11.91	89.78	77.89	77.79	77.87			
IW-10[3]	12.22	12.38	12.23	90.43	78.21	78.05	78.20			
IW-11	16.08	15.61	16.07	89.92	73.84	74.31	73.85	0.74	0.47	0.67
IW-12	13.93	13.94	13.96	90.31	76.38	76.37	76.35			
IW-13	16.05	17.71	16.19	89.90	73.85	72.19	73.71	0.03		
PID	12.44	12.37	12.43	89.97	77.53	77.60	77.54			
P5	13.39	12.48	13.40	90.45	77.06	77.97	77.05			
12-IN	11.57	11.63	11.56	89.84	78.27	78.21	78.28			
SG	NM	NM	NM	79.25	NM	NM	NM			
					Recovered Product For Month			0.77	0.47	0.67

Notes: 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 - New top of casing reference elevations surveyed by Dana Perkins 4/98-5/98. Other wells resurveyed 11/97 following upgrades and repairs.

4 - GW-16 was not measure due to well destroyed.

Prepared by: KJC

Checked by: BJR

Table 3-3
Plant B Water Level and Product Recovery Data: March 2008 - May 2008 [1]
Semi-Annual Status Report No. 2
Olin Chemical Superfund Site
Wilmington, Massachusetts

Well ID[2]	Depth to Water feet[2]			Reference Elevation feet	Potentiometric Surface Elevation (feet NGVD)			Product Removed gallons		
	3/31/2008	5/1/2008	5/30/2008		3/31/2008	5/1/2008	5/30/2008	3/31/2008	5/1/2008	5/30/2008
B-2	12.17	11.70	12.02	90.48	78.31	78.78	78.46			
B-3	11.99	11.22	11.79	90.32	78.33	79.10	78.53			
B-5R	12.03	11.11	11.71	91.38	79.35	80.27	79.67			
B-7A	8.81	7.29	8.36	88.81	80.00	81.52	80.45			
B-17	9.33	8.31	9.69	91.55	82.22	83.24	81.86			
GW-13[3]	11.87	11.35	11.85	90.57	78.70	79.22	78.72			
GW-14	9.49	9.62	10.07	88.70	79.21	79.08	78.63			
GW-15[3]	8.88	7.85	8.19	90.01	81.13	82.16	81.82			
GW-16	NM	NM	NM	91.21	NM	NM	NM			
GW-16R[4]	NA	9.88	11.16		NA	NA	NA			
GW-23	13.16	11.90	10.91	91.04	77.89	79.15	80.13			
GW-52S[3]	8.49	7.82	7.89	87.95	79.46	80.13	80.06			
GW-100	12.21	11.73	12.05	90.15	77.94	78.42	78.10			
GW-101	12.27	11.72	12.29	90.14	77.87	78.42	77.85			
GW-102	11.21	10.43	11.01	89.00	77.79	78.57	77.99			
IW-1	12.41	11.78	12.30	90.71	78.30	78.93	78.41			
IW-2	13.50	13.11	13.45	90.53	77.03	77.42	77.08			
IW-3	12.19	11.94	12.05	90.76	78.57	78.82	78.71			
IW-6	11.45	10.92	11.29	89.15	77.70	78.23	77.86			
IW-7[3]	12.43	11.98	12.17	90.10	77.67	78.12	77.93			
IW-8[3]	12.23	11.83	12.00	89.94	77.71	78.11	77.94			
IW-9[3]	11.97	11.49	11.83	89.78	77.81	78.29	77.95			
IW-10[3]	12.41	11.91	12.31	90.43	78.02	78.52	78.12			
IW-11	15.58	15.12	15.40	89.92	74.34	74.80	74.52	0.40	0.49	0.49
IW-12	13.92	13.62	13.83	90.31	76.39	76.69	76.48			
IW-13	17.81	17.35	17.61	89.90	72.09	72.55	72.29	0.24		
PID	12.44	11.92	12.27	89.97	77.53	78.05	77.70			
P5	12.61	11.90	12.42	90.45	77.84	78.55	78.03			
12-IN	11.70	11.15	11.55	89.84	78.14	78.69	78.29			
SG	NM	NM	NM	80.67	NM	NM	NM			
					Recovered Product For Month			0.63	0.49	0.49

Notes: NM - Not Measured; NA - Not Applicable;

1 - Groundwater measurements and product recovery data collected by Olin.

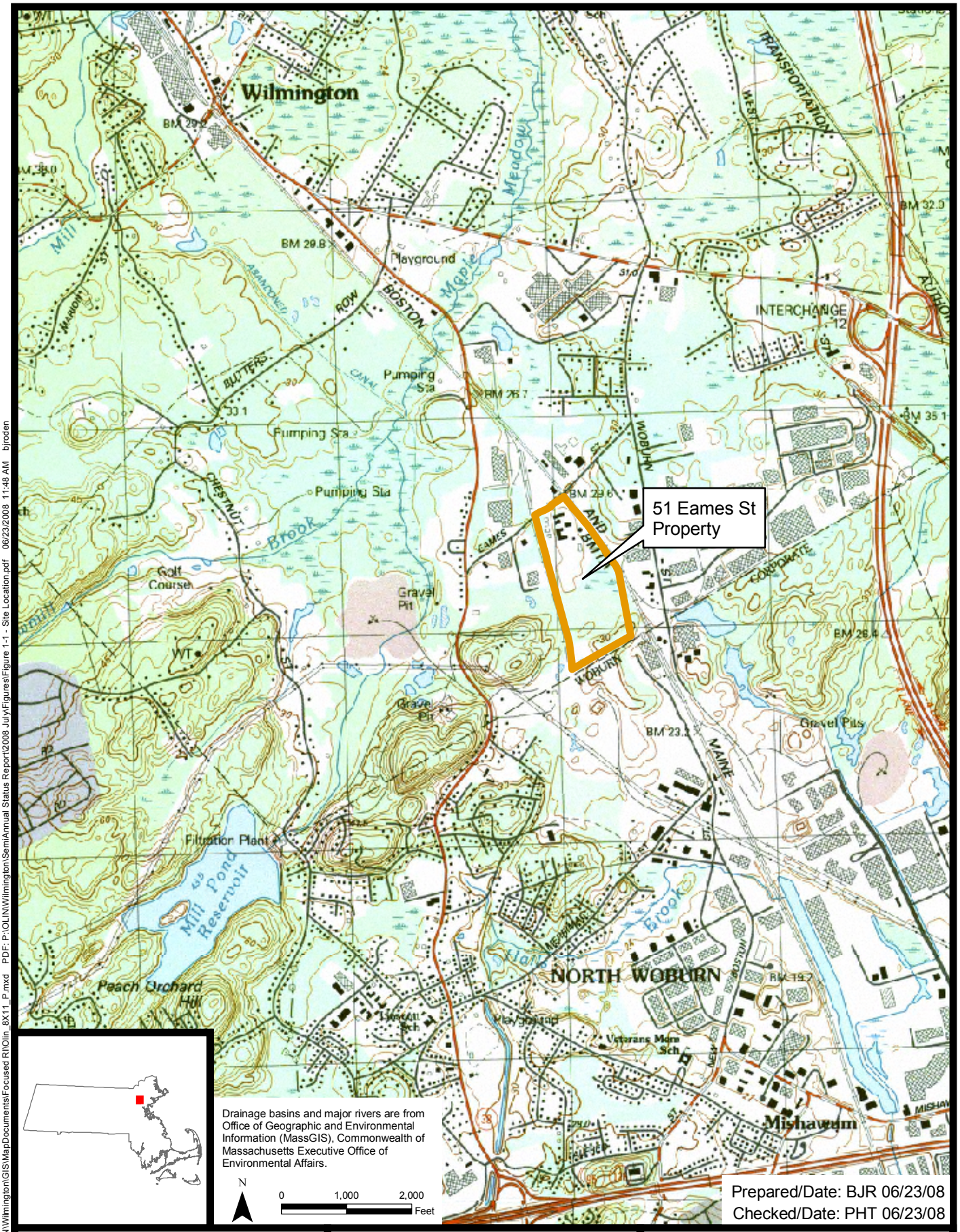
2 - Measurement collected from top of PVC. If well does not have PVC casing, measurement from top of steel casing.

3 - New top of casing reference elevations surveyed by Dana Perkins 4/98-5/98. Other wells resurveyed 11/97 following upgrades and repairs.

4 - GW-16R was installed in April 2008. Reference elevation has not yet been established.

Prepared by: KJC
Checked by: BJR

FIGURES



Olin Chemical Superfund Site
Wilmington, Massachusetts

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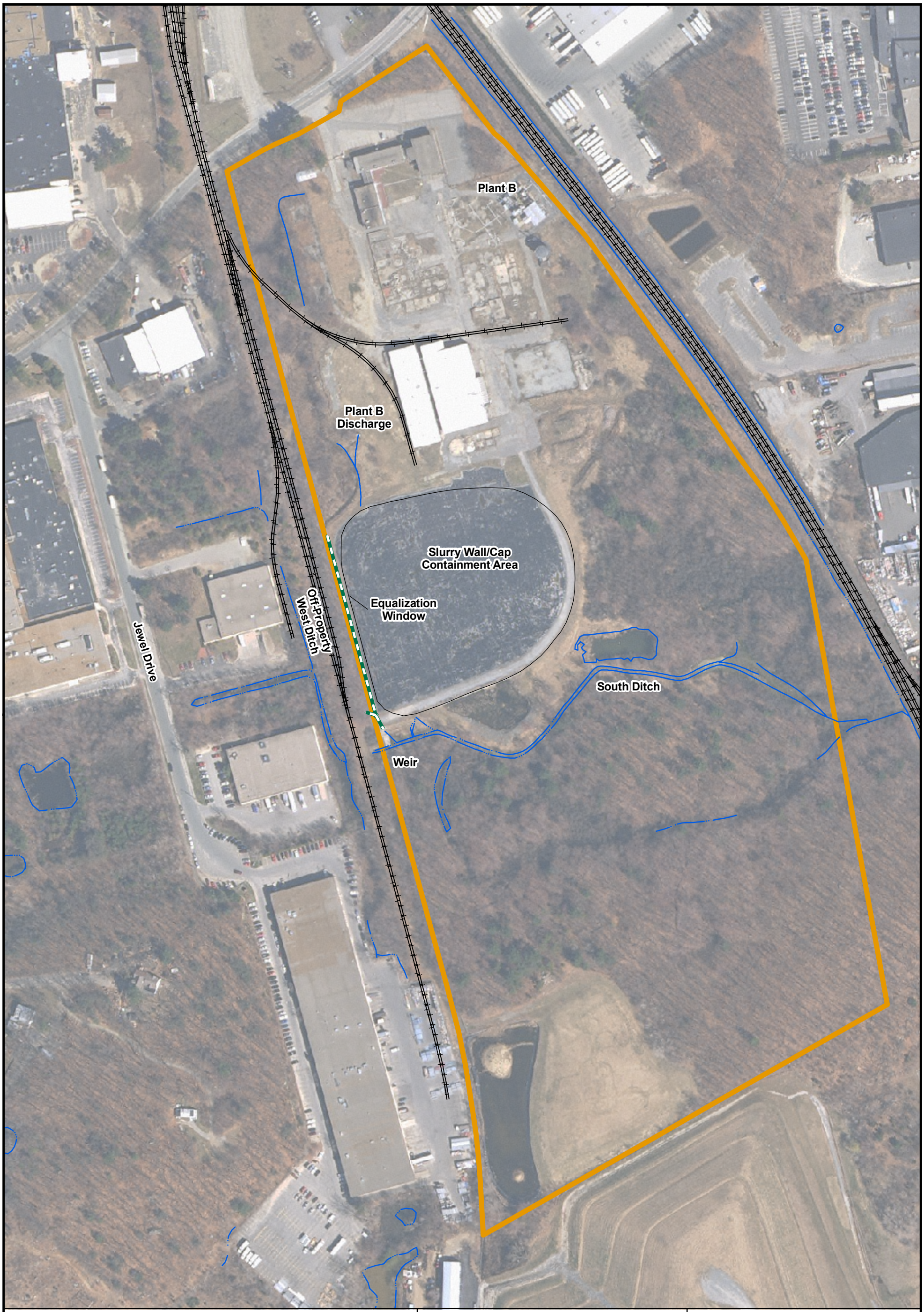
Figure 1-1
Site Location
Semi-Annual Status Report No. 2

Document: P:\OLIN\Wilmington\GIS\MapDocuments\Focused RI\Olin_8X11_P.mxd PDF: P:\OLIN\Wilmington\Semi\Annual Status Report\2008 July\Figures\Figure 1-1 - Site Location.pdf 06/23/2008 11:48 AM bjroden



Legend

- Railroad
- Water
- Culvert
- Site Boundary

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107 Audubon Road Suite 301
Wakefield, MA 01880

N

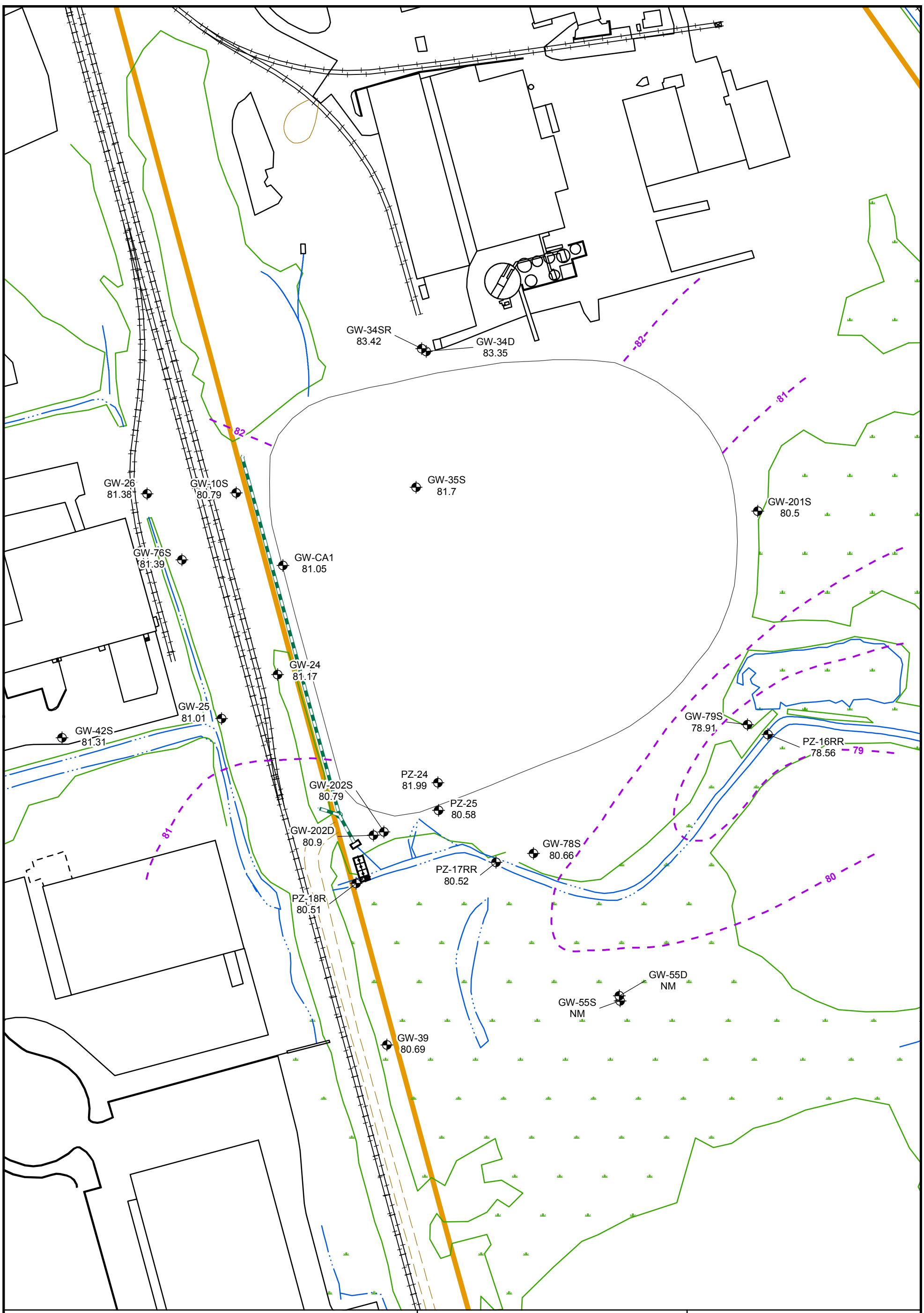
0 100 200 400 Feet

Figure 1-2
Site Plan

Semi-Annual Status Report No. 2
Olin Chemical Superfund Site
Wilmington, Massachusetts

Prepared/Date: BJR 06/12/08 | Checked/Date: PHT 06/12/08

Document: P:\OLIN\Wilmington\GIS\MapDocuments\Interim Response Work Plan\Olin_IRWP2.mxd PDF: P:\OLIN\Wilmington\SemiAnnual Status Report\2008 July\Figures\Figure 1-2 - Site Plan.pdf 06/12/2008 9:09 AM bjroden



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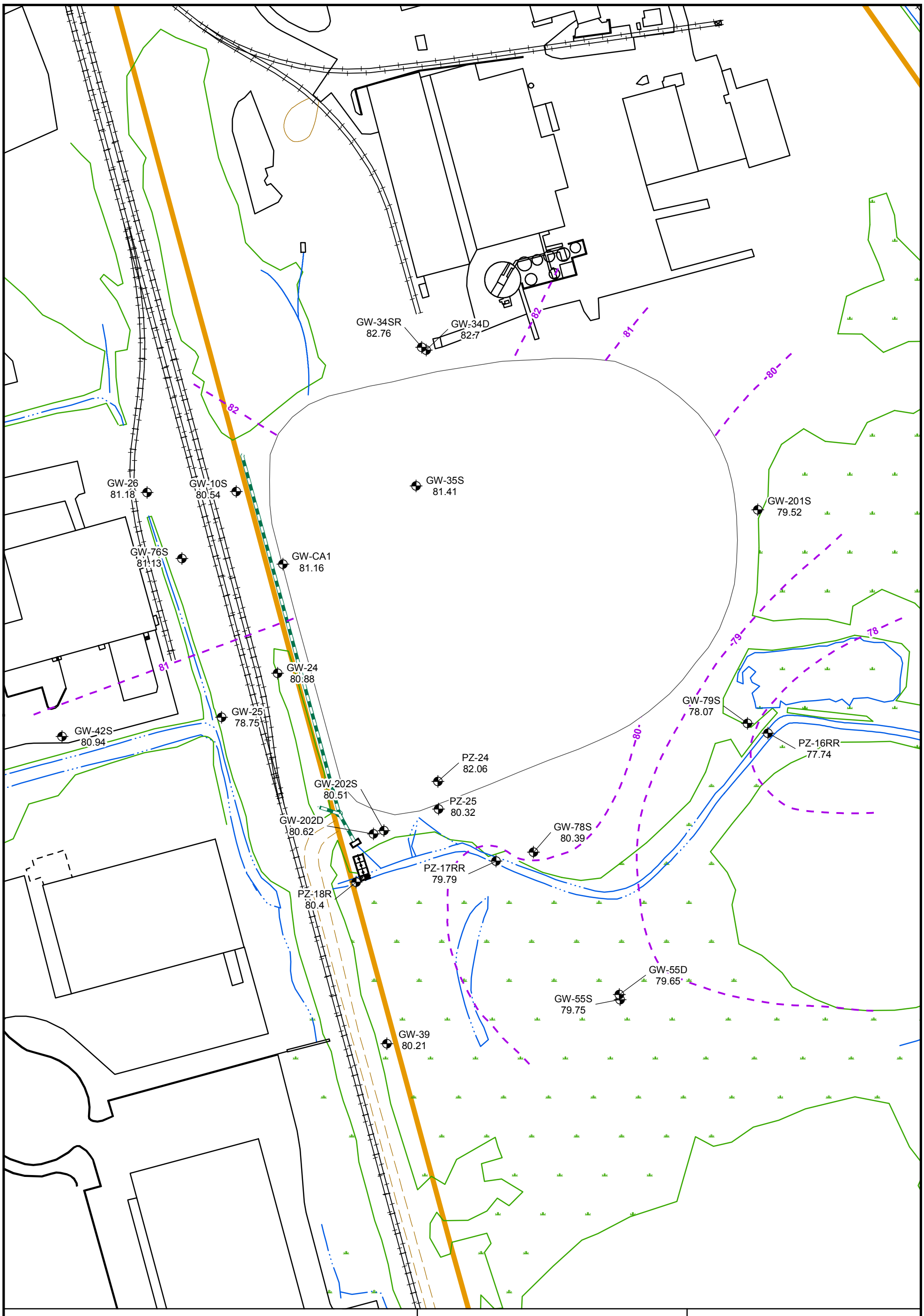

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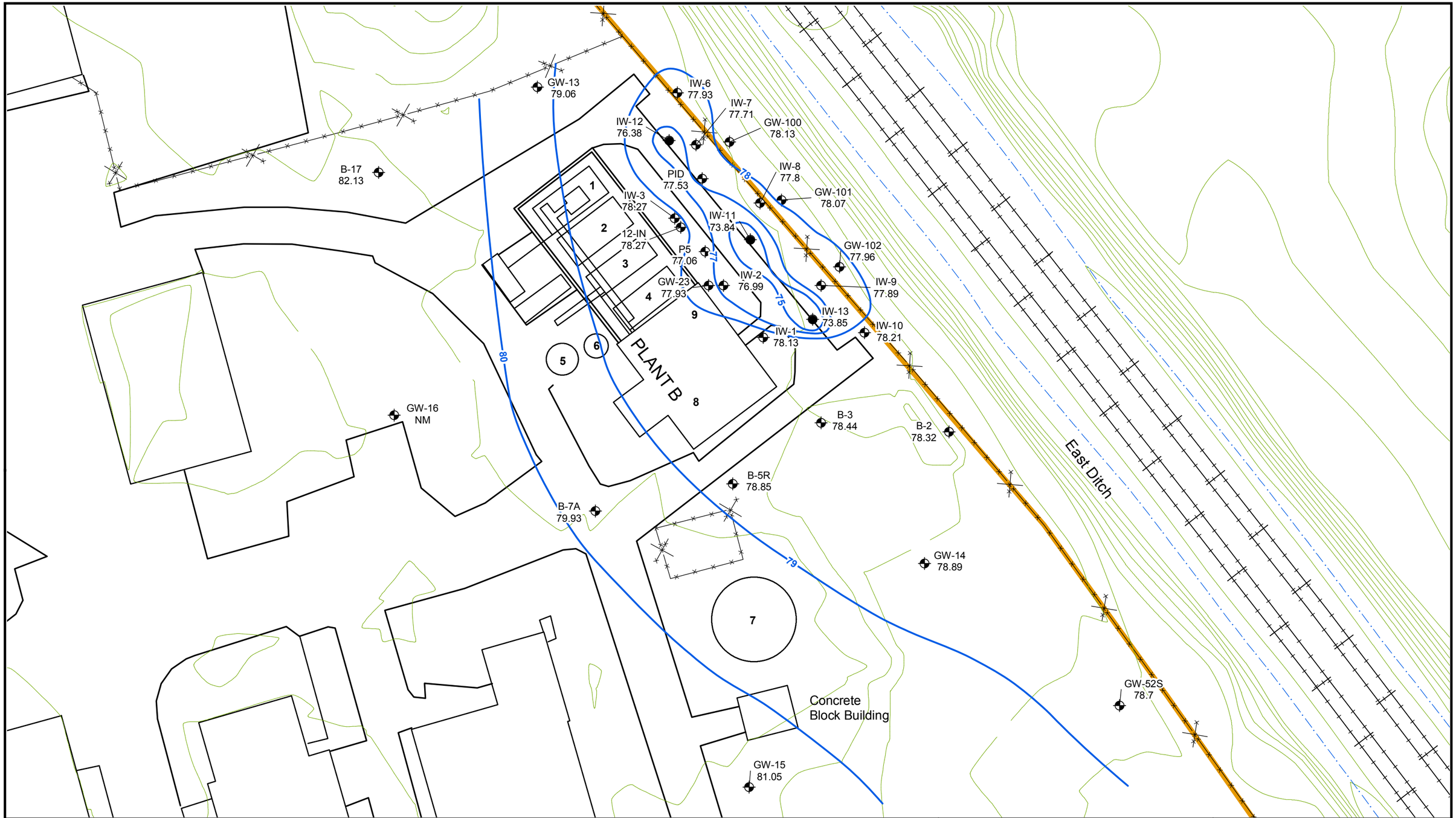

Tank #1 - Receives gravity overflow from Tank 2 and allows for further settling
Tank #2 - Caustic addition and initial iron drop-out
Tank #3 & #4 - Overnight holding tank for treated water
Tank #5 - Pre-carbon hold tank
Tank #6 - Residence tank
Tank #7 - Raw water (pH adjusted)
Tank #8 - Pre-carbon transfer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

Legend

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

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Wakefield, MA 01880

N

0 15 30 60 Feet

Figure 3-1
Plant B Interpreted Water Level Conditions
December 31, 2007
Semi-Annual Status Report No. 2
Olin Chemical Superfund Site
Wilmington, Massachusetts

Prepared/Date: BJR 06/16/08 | Checked/Date: PHT 06/16/08

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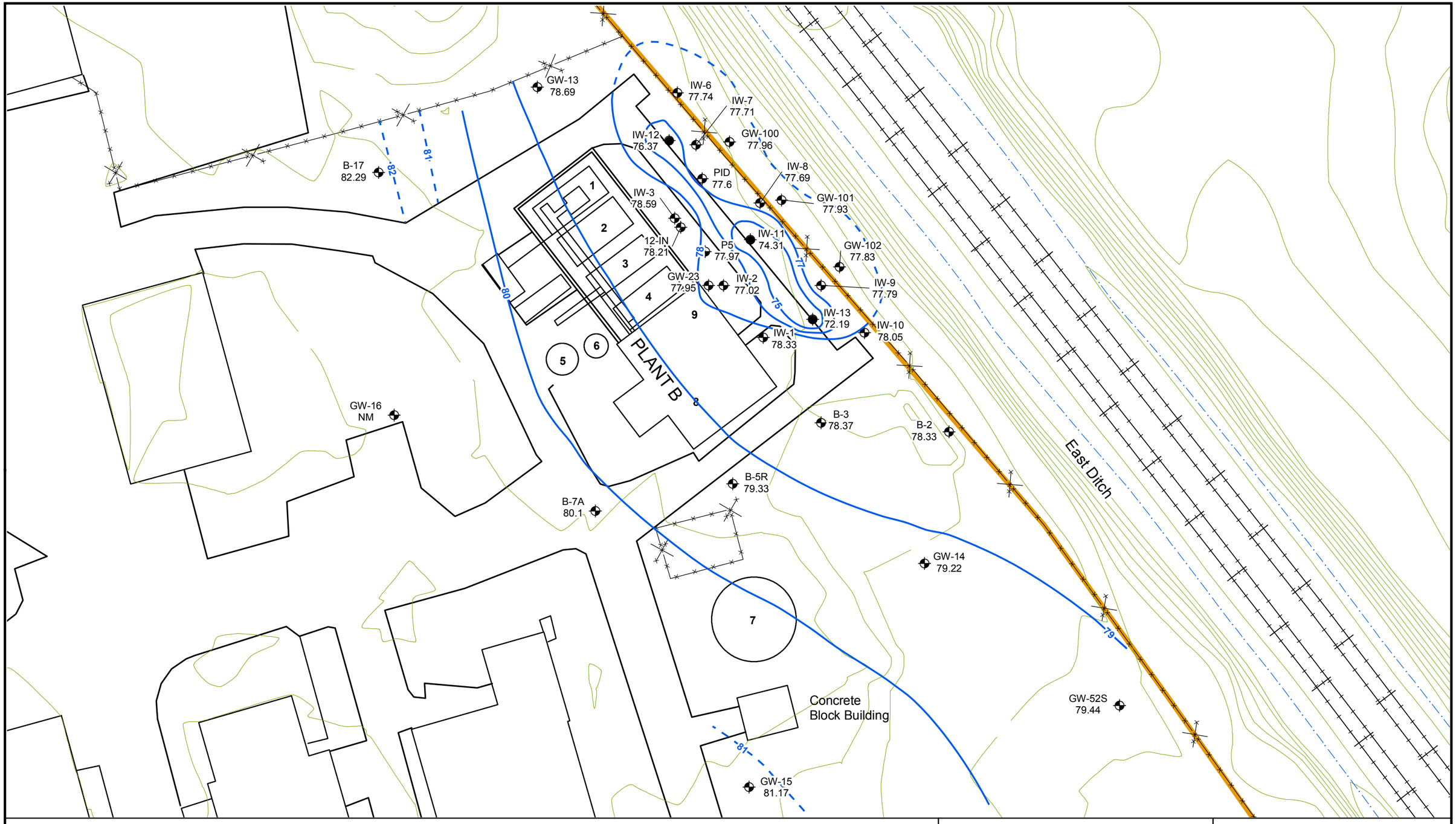

Tank #1 - Receives gravity overflow from Tank 2 and allows for further settling
Tank #2 - Caustic addition and initial iron drop-out
Tank #3 & #4 - Overnight holding tank for treated water
Tank #5 - Pre-carbon hold tank
Tank #6 - Residence tank
Tank #7 - Raw water (pH adjusted)
Tank #8 - Pre-carbon transfer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

Legend

- Interpreted Potentiometric Contour Line (FT/MSL)
- 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 3-2
Plant B Interpreted Water Level Conditions
January 31, 2008
Semi-Annual Status Report No. 2
Olin Chemical Superfund Site
Wilmington, Massachusetts

Prepared/Date: BJR 06/16/08 | Checked/Date: PHT 06/16/08

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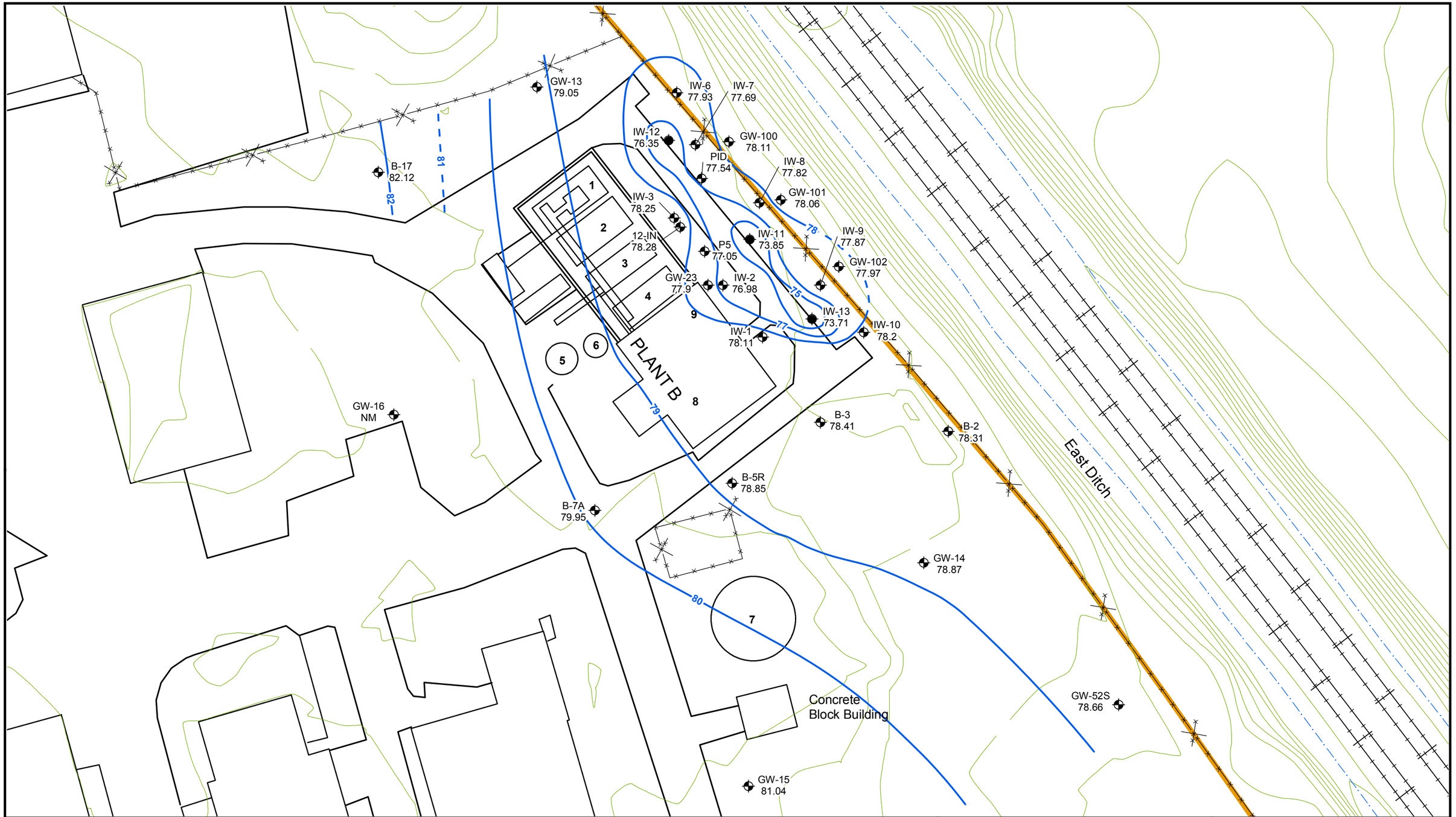

Tank #1 - Receives gravity overflow from Tank 2 and allows for further settling
Tank #2 - Caustic addition and initial iron drop-out
Tank #3 & #4 - Overnight holding tank for treated water
Tank #5 - Pre-carbon hold tank
Tank #6 - Residence tank
Tank #7 - Raw water (pH adjusted)
Tank #8 - Pre-carbon transfer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

Legend

- Interpreted Potentiometric Contour Line (FT/MSL)
- 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 3-3
Plant B Interpreted Water Level Conditions
February 29, 2008
Semi-Annual Status Report No. 2
Olin Chemical Superfund Site
Wilmington, Massachusetts

Prepared/Date: BJR 06/16/08 | Checked/Date: PHT 06/16/08

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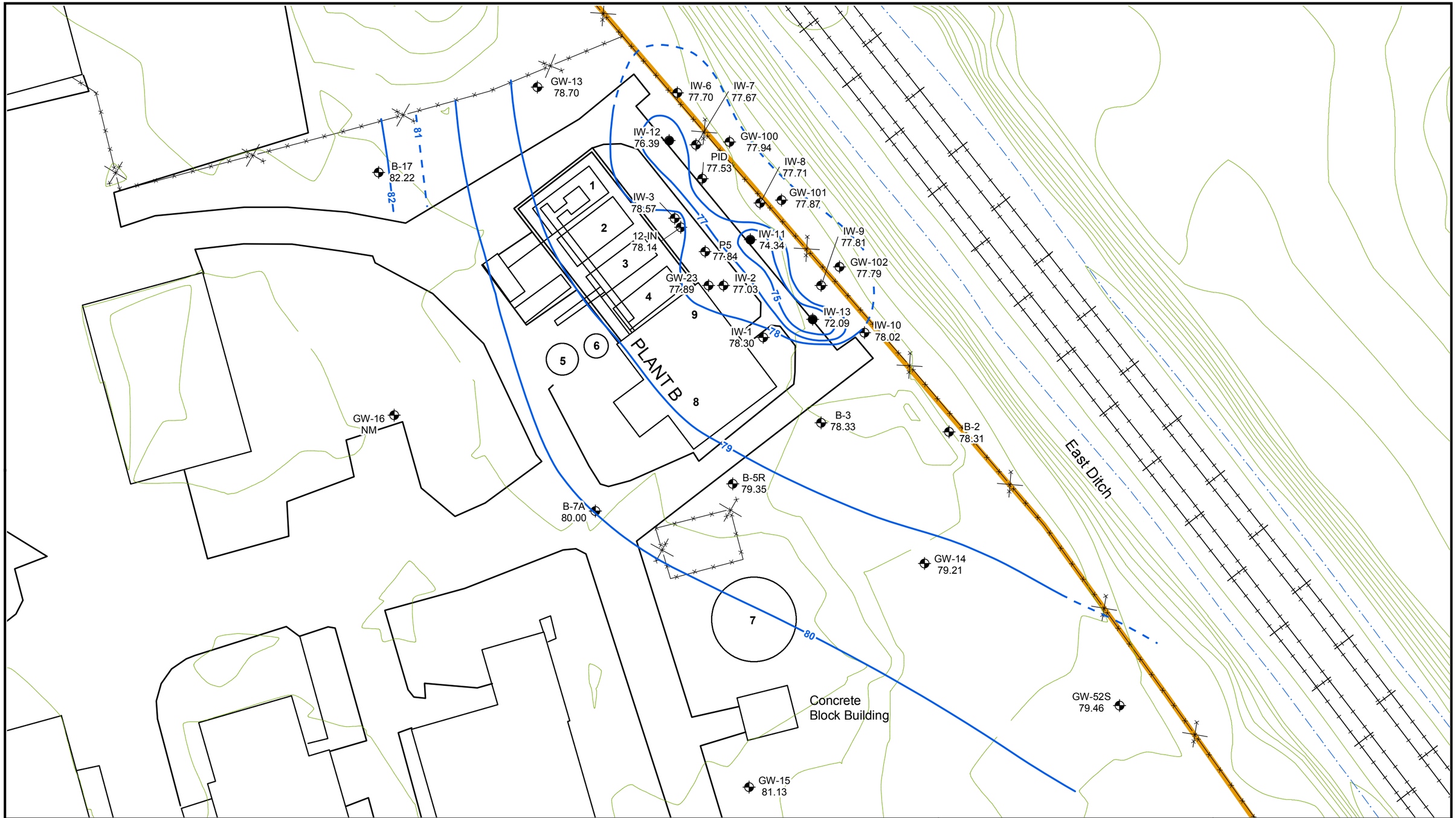

Tank #1 - Receives gravity overflow from Tank 2 and allows for further settling
Tank #2 - Caustic addition and initial iron drop-out
Tank #3 & #4 - Overnight holding tank for treated water
Tank #5 - Pre-carbon hold tank
Tank #6 - Residence tank
Tank #7 - Raw water (pH adjusted)
Tank #8 - Pre-carbon transfer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

Legend

- Interpreted Potentiometric Contour Line (FT/MSL)
- 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 3-4
Plant B Interpreted Water Level Conditions
March 31, 2008
Semi-Annual Status Report No. 2
Olin Chemical Superfund Site
Wilmington, Massachusetts

Prepared/Date: BJR 06/16/08 | Checked/Date: PHT 06/16/08

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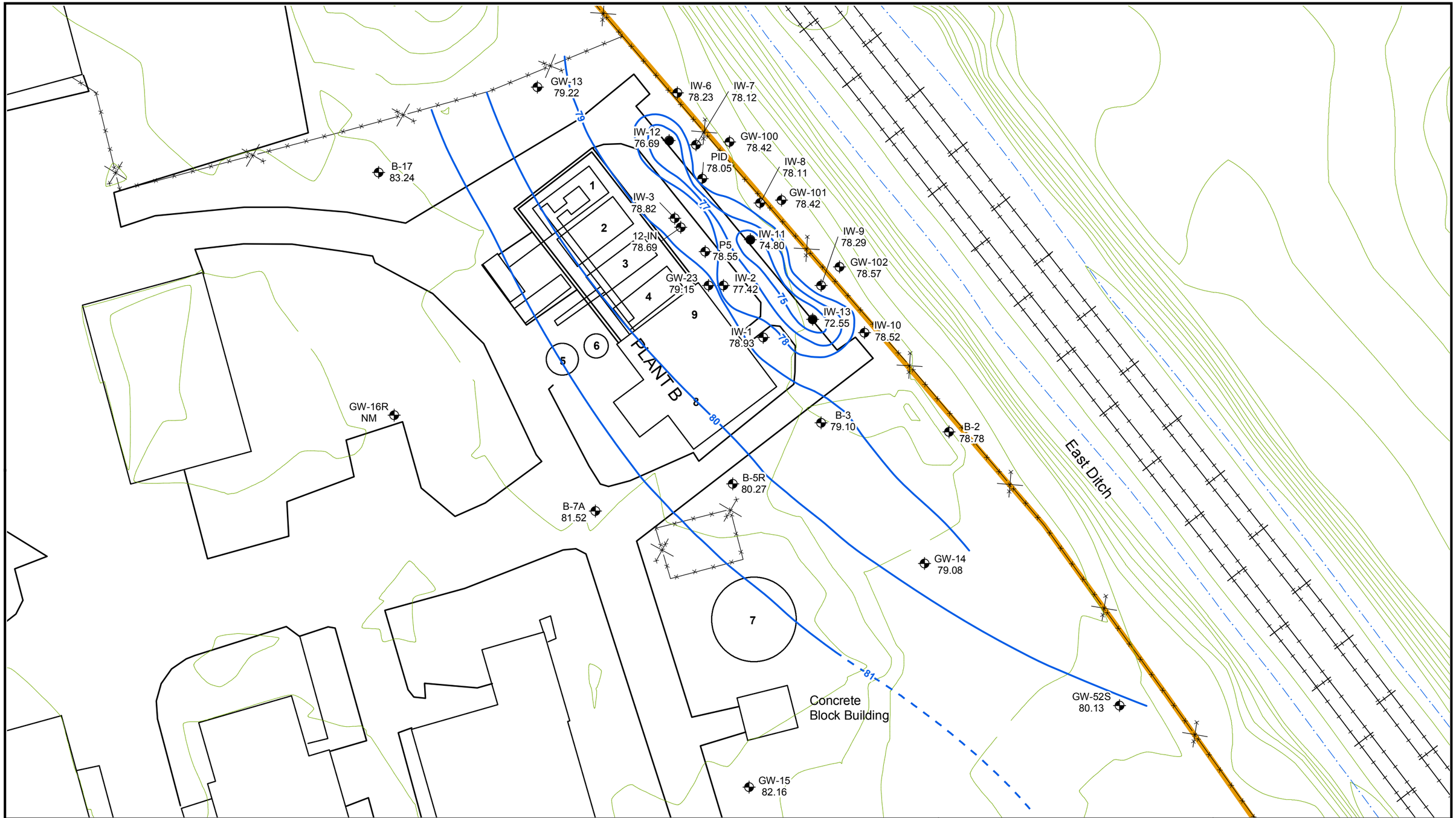

Tank #1 - Receives gravity overflow from Tank 2 and allows for further settling
Tank #2 - Caustic addition and initial iron drop-out
Tank #3 & #4 - Overnight holding tank for treated water
Tank #5 - Pre-carbon hold tank
Tank #6 - Residence tank
Tank #7 - Raw water (pH adjusted)
Tank #8 - Pre-carbon transfer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

Legend

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

NM - Not Measured

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Wakefield, MA 01880

N

0 15 30 60 Feet

Figure 3-5
Plant B Interpreted Water Level Conditions
May 1, 2008
Semi-Annual Status Report No. 2
Olin Chemical Superfund Site
Wilmington, Massachusetts

Prepared/Date: BJR 06/16/08 | Checked/Date: PHT 06/16/08

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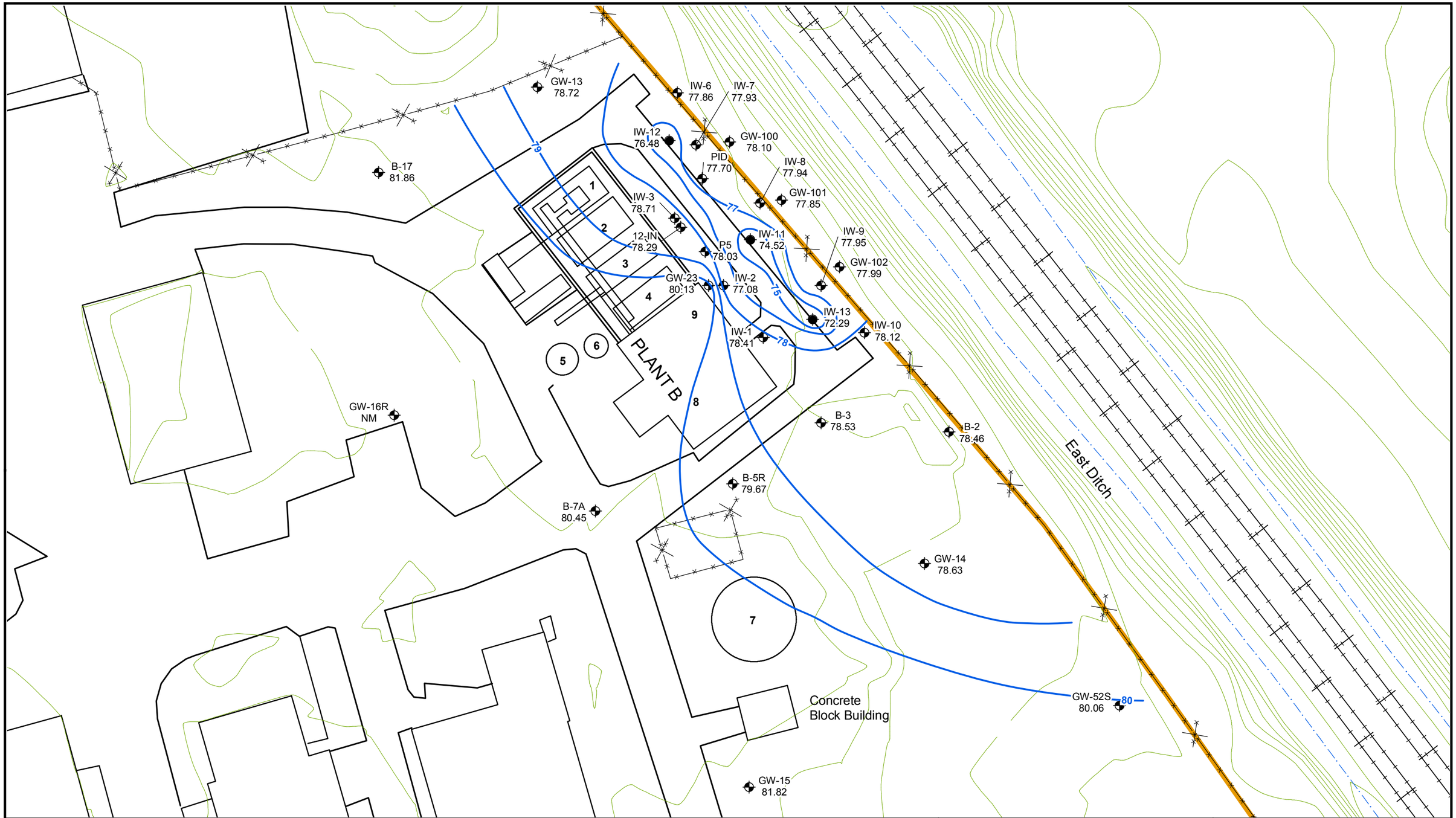

Tank #1 - Receives gravity overflow from Tank 2 and allows for further settling
Tank #2 - Caustic addition and initial iron drop-out
Tank #3 & #4 - Overnight holding tank for treated water
Tank #5 - Pre-carbon hold tank
Tank #6 - Residence tank
Tank #7 - Raw water (pH adjusted)
Tank #8 - Pre-carbon transfer
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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Wakefield, MA 01880

N

0 15 30 60 Feet

Figure 3-6
Plant B Interpreted Water Level Conditions
May 30, 2008
Semi-Annual Status Report No. 2
Olin Chemical Superfund Site
Wilmington, Massachusetts

Prepared/Date: BJR 06/16/08 | Checked/Date: PHT 06/16/08

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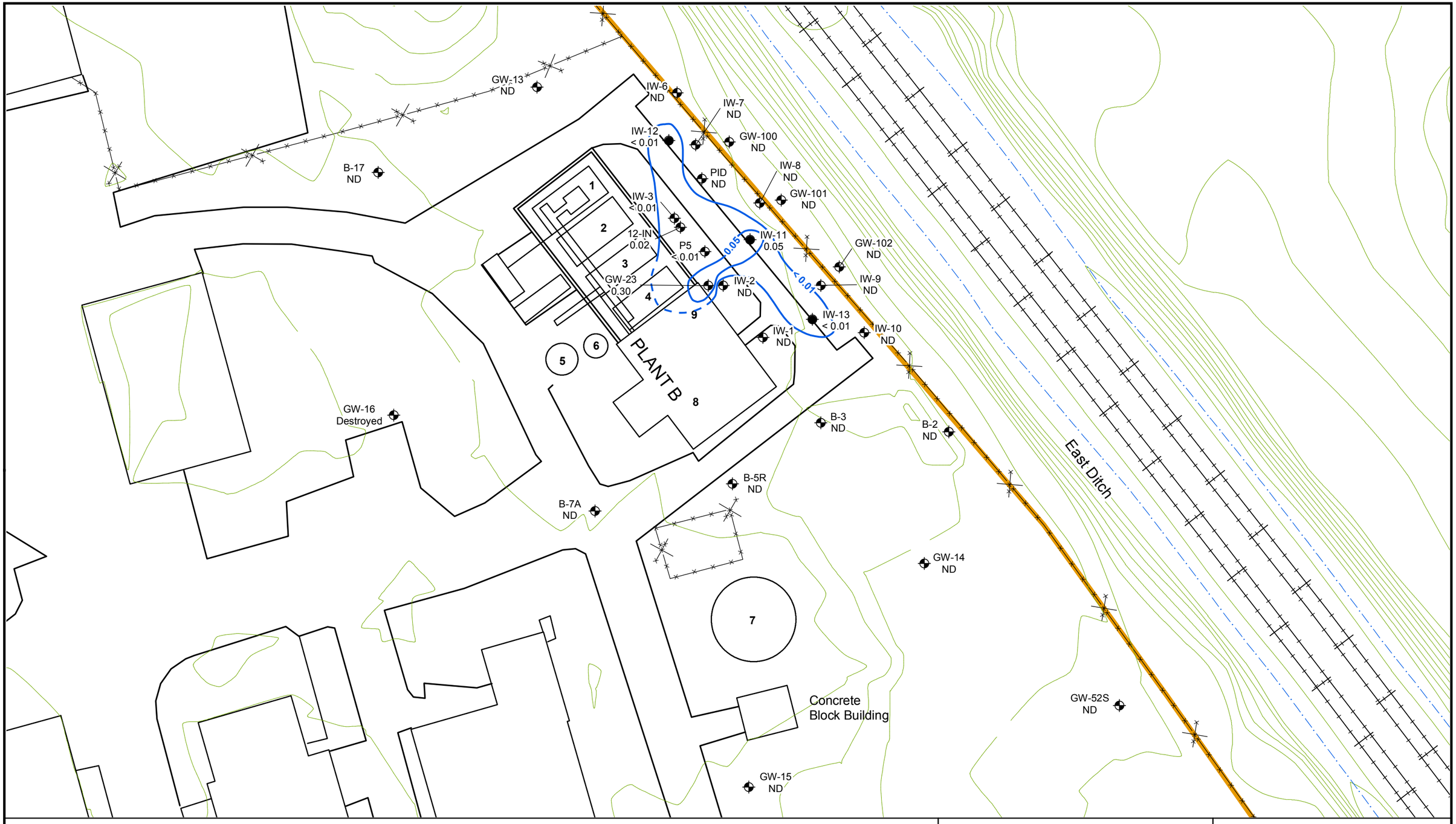

Tank #1 - Receives gravity overflow from Tank 2 and allows for further settling
Tank #2 - Caustic addition and initial iron drop-out
Tank #3 & #4 - Overnight holding tank for treated water
Tank #5 - Pre-carbon hold tank
Tank #6 - Residence tank
Tank #7 - Raw water (pH adjusted)
Tank #8 - Pre-carbon transfer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

Legend

- Interpreted LNAPL Thickness Contour (ft)
- Inferred LNAPLThickness Contour (ft)
- Recovery Well
- Monitoring Well
- Ditch
- Elevation Contours
- ND Not Detected

Note:
LNAPL thickness measurements are presented in Appendix A, Field Activity Reports.

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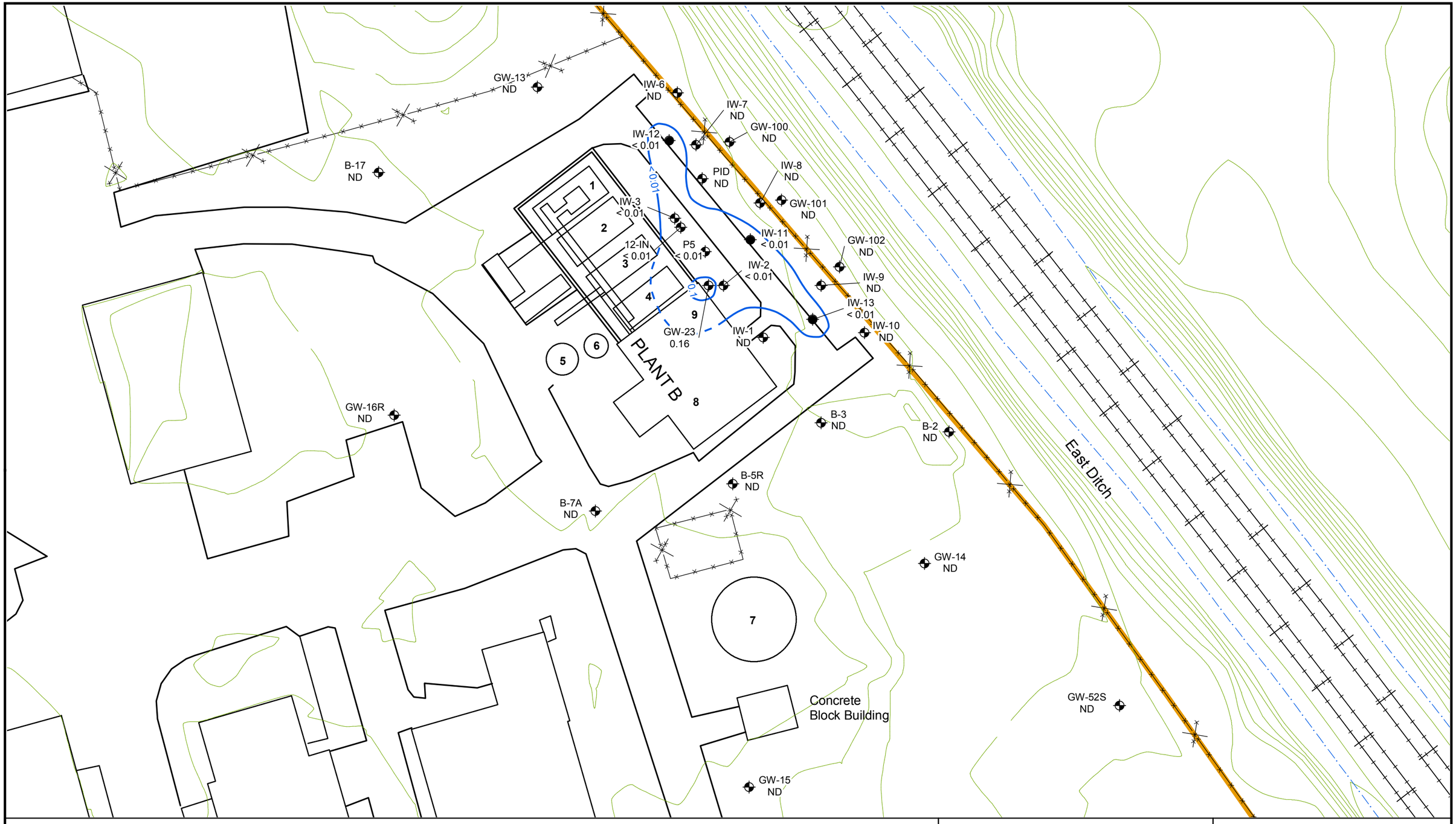
N

0 15 30 60 Feet

Figure 3-7
Plant B Interpreted LNAPL Thickness Contours
March 4, 2008
Semi-Annual Status Report No. 2
Olin Chemical Superfund Site
Wilmington, Massachusetts

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

Document: P:\OLIN\Wilmington\GIS\MapDocuments\Interim Response Work Plan\Olin_PlantB_11X17_LS.mxd PDF: P:\OLIN\Wilmington\SemiAnnual Status Report\2008 July\Figures\Figure 3-7 - Plant B Interpreted LNAPL Thickness Contour - March 4 2008.pdf 06/13/2008 2:30 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 LNAPL Thickness Contour (ft)
- Inferred LNAPLThickness Contour (ft)
- Recovery Well
- Monitoring Well
- Ditch
- Elevation Contours
- ND Not Detected

Note:
LNAPL thickness measurements are presented in Appendix A, Field Activity Reports.

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

N

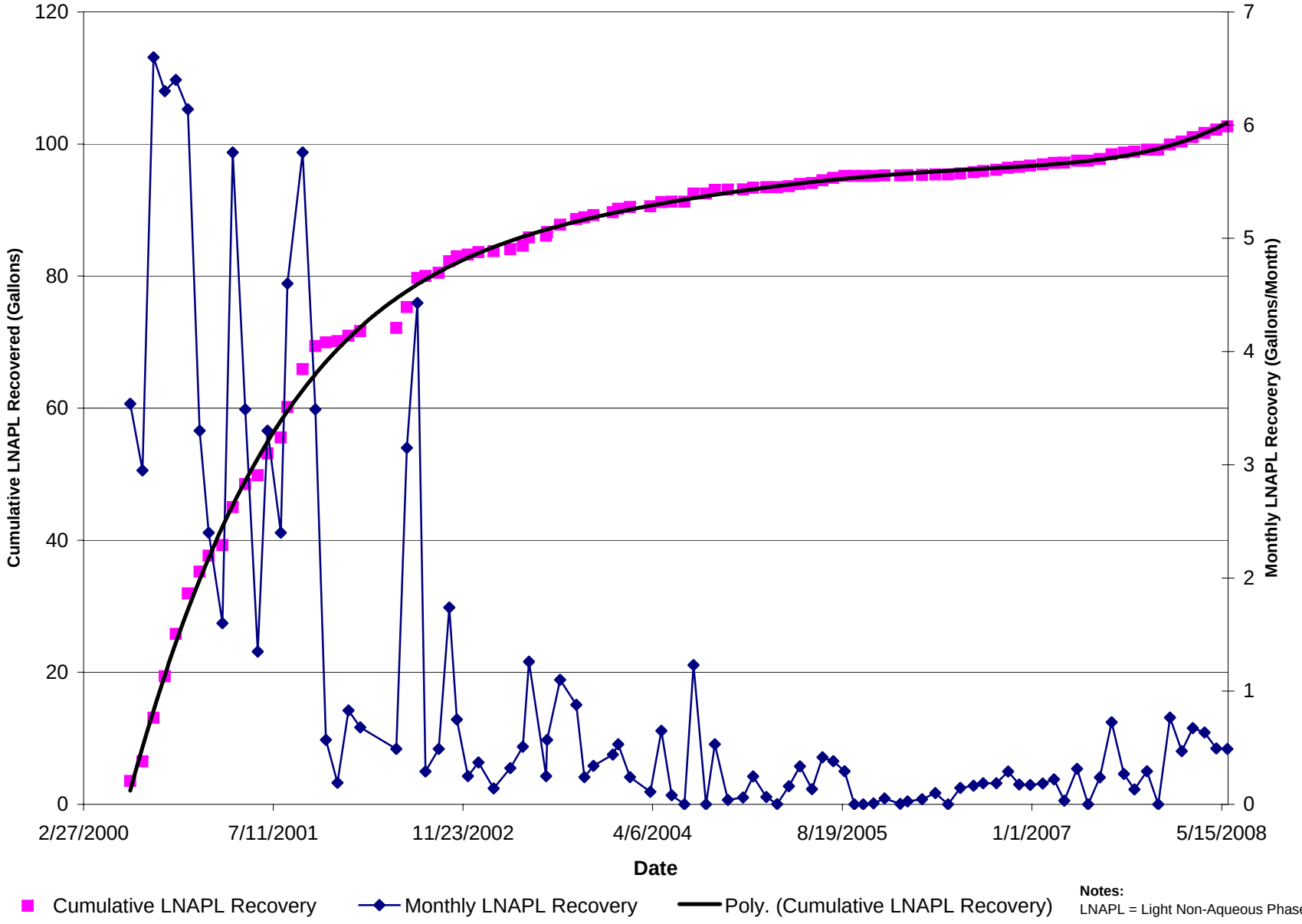
0 15 30 60 Feet

Figure 3-8
Plant B Interpreted LNAPL Thickness Contours
May 16, 2008
Semi-Annual Status Report No. 2
Olin Chemical Superfund Site
Wilmington, Massachusetts

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

Document: P:\OLIN\Wilmington\GIS\MapDocuments\Interim Response Work Plan\Olin_PlantB_11X17_LS.mxd PDF: P:\OLIN\Wilmington\SemiAnnual Status Report\2008 July\Figures\Figure 3-8 - Plant B Interpreted LNAPL Thickness Contour - May 16 2008.pdf 06/13/2008 2:24 PM bjroden

Figure 3-9
Monthly and Cumulative LNAPL Recovery
Semi-Annual Status Report No. 2
Olin Chemical Superfund Site
Wilmington, Massachusetts



Notes:
LNAPL = Light Non-Aqueous Phase Liquid

Prepared/Date: BJR 06/03/08
Checked/Date: PHT 06/12/08

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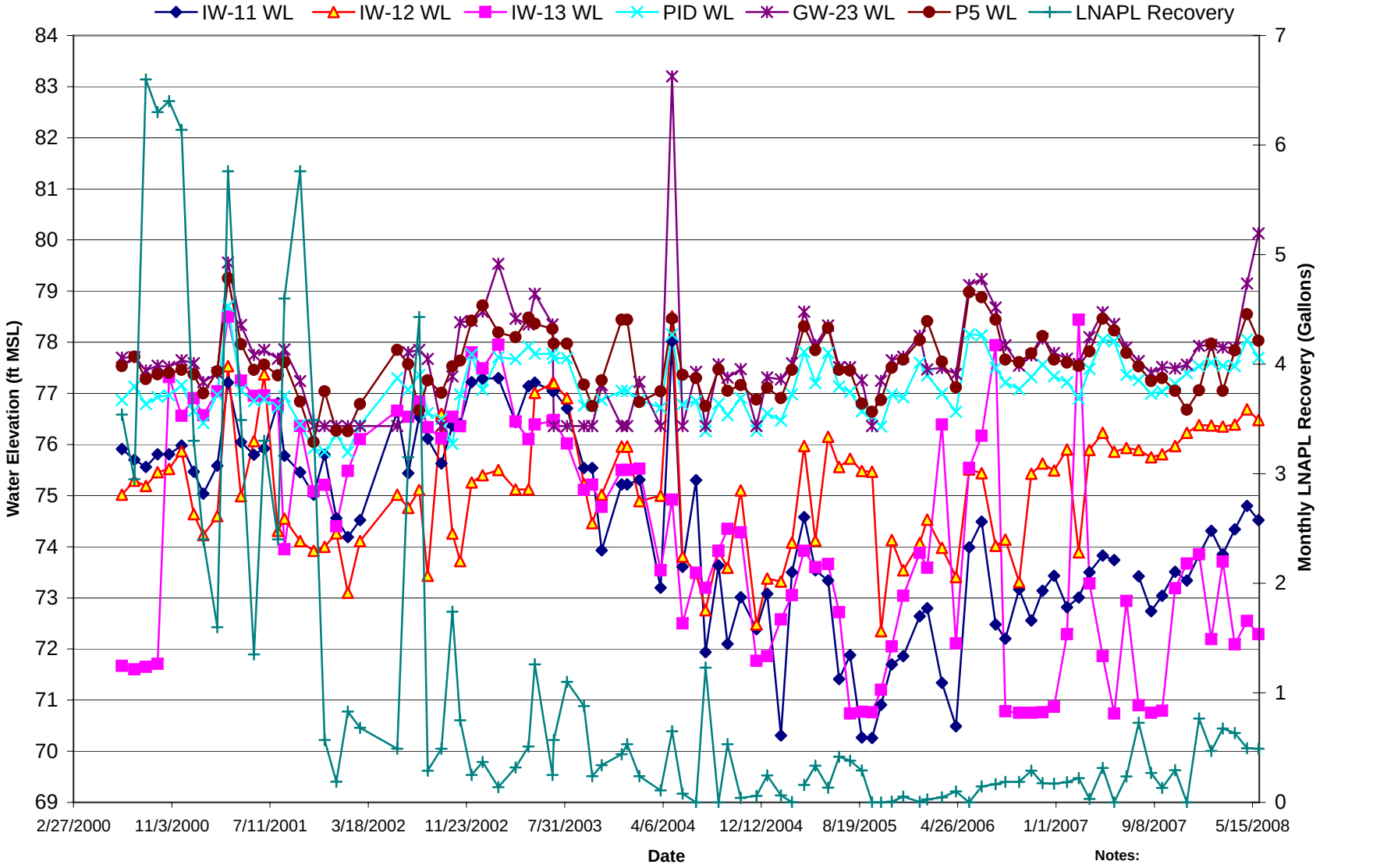
Monthy and Cumulative LNAPL Recovery Data Plot

Figure 3-10
Water Levels (WL) and Monthly LNAPL Recovery
Semi-Annual Status Report No. 2
Olin Chemical Superfund Site
Wilmington, Massachusetts



Notes:
LNAPL = Light Non-Aqueous Phase Liquid

Prepared/Date: BJR 06/19/08
Checked/Date: PHT 06/20/08

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Monthy and Cumulative LNAPL Recovery Data Plot, Figure3-10

APPENDIX A

Interim Response Steps Field Activity Reports

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

APPENDIX A

Interim Response Steps Field Activity Reports

A-1 First Quarter 2008 Sampling Event

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

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

Prepared for:

Olin Corporation
Wilmington, Massachusetts

Prepared By:

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MACTEC PROJECT NO. 6100080016.05A

June 6, 2008

Peter H. Thompson — Date
Project Manager

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 First 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 First 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 in 20 monitoring wells and three piezometers in the vicinity of the South Ditch area; groundwater sampling from three monitoring wells (GW-25, GW-79S and GW-202S) 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 March 4, 2008, MACTEC personnel completed a site reconnaissance of the monitoring well locations in the Slurry Wall/Cap Monitoring Program and collected groundwater level measurements. This included measuring depth to groundwater from 23 monitoring wells and piezometers using a water interface probe. Groundwater level measurements and the calculated groundwater elevations are summarized in **Table 2**.

2.1.2 Groundwater Sampling

On March 5, 2008, MACTEC personnel sampled groundwater from three 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 March 6, 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) on November 19, 2007 to continuously monitor groundwater elevation proximate to the cap area. On March 6, 2007, MACTEC downloaded data from these data loggers. The loggers were re-deployed and additional data will be collected during the next quarterly event scheduled for May 2008. Downloaded data logger data will be summarized in the Semi-annual Status Report dated June 2008.

2.1.5 Cap Inspection

The First Quarter 2008 Temporary Cap Inspection at the Site was completed on March 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 March 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 very few tears or perforations. The tears that were visible only penetrated the upper layer of the separated 2-ply cover. The Temporary Cap surface contained sediment and water deposited in low lying areas of the cap. Repairs of the cap were completed on April 13, 2008 and 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.
- Creating a panel layout map to depict location of sewn seams (**Figure 1**).
- 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.
- Completing repairs, using a 3-inch width heavy duty tarpaulin repair tape, on all new (previously not-repaired) holes in the polyethylene cover that could be identified during the inspection.
- Completing repairs on all observed older patches where the patch material was beginning to fail or had failed.
- Completing repairs on stress tears near and around well penetrations.
- Providing photo-documentation of typical repairs and conditions.
- Raising some of the submerged seams, where possible, above surrounding ponded water, and moving sandbags at other locations where the seams were being held in a submerged condition.

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 penetrate the underlying polyethylene sheet (Photo 4).
- 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 seem to affect the cap deleteriously (Photo 5).
- Patching and well penetrations continue to be monitored (Photos 1 to 3).

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. Although some sub grade settlement may have occurred, the topographic pattern matches fairly well the distribution of ponded water observed on the cap and which can be seen in **Figure 1**.

The deterioration 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. None-the-less, a program has begun to repair/replace the 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 well penetrations, patching the small tears located in the cap, and continuing to monitor the cap for future concerns is recommended. All observed holes and perforations have been repaired with a repair tape. The service life of the repair tape used in the past may be inferior to other tapes available on the market. 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.

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 First 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 product thickness in monitoring wells where product was observed; and EPA low flow groundwater sampling at monitoring well GW-16. Monitoring well locations are depicted in **Figure 2**.

3.1.1 Groundwater Level Measurements and Product Gauging

On March 4, 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 where LNAPL was observed. 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

Groundwater sampling was not completed at GW-16 during the First Quarter Plant B monitoring activities. That monitoring well was previously damaged and could not be sampled. Monitoring well GW-16 is scheduled to be replaced in April 2008. Groundwater level measurements and groundwater samples will be collected during the second quarterly sampling event in May 2008.

TABLES

Table 1
Groundwater and Surface Water Sampling Locations
Slurry Wall/Cap Monitoring Program
First Quarter 2008 Sampling Event
Olin Chemical Superfund Site
Wilmington, Massachusetts

Ground Water	Surface Water
GW-25	ISCO1
GW-79S	ISCO2
GW-202S	ISCO3
PZ-16RR	PZ-16RR
PZ-17RR	PZ-17RR
PZ-18R	PZ-18R
	SD-17

Notes:
Bold - DUP and MS/MSD also collected

Prepared by: DLC 3/14/08
Checked by: CTM 3/14/08

Table 2
Groundwater Elevations
Slurry Wall/Cap Monitoring Program
First 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	8.31	80.79		3/4/2008
GW-24	83.43	2.26	81.17		3/4/2008
GW-25	85.97	4.96	81.01		3/4/2008
GW-26	84.93	3.55	81.38		3/4/2008
GW-34D	90.36	7.01	83.35		3/4/2008
GW-34SR	89.13	5.71	83.42		3/4/2008
GW-35S	88.51	6.81	81.70		3/4/2008
GW-39	83.64	2.95	80.69		3/4/2008
GW-42S	84.18	2.87	81.31		3/4/2008
GW-43S	---	---	---	Destroyed	---
GW-55S	81.70	---	---	Frozen	---
GW-55D	81.95	---	---	Frozen	---
GW-76S	88.45	7.06	81.39	TOC	3/4/2008
GW-78S	84.89	4.23	80.66		3/4/2008
GW-79S	81.54	2.63	78.91		3/4/2008
GW-201S	83.29	2.79	80.50		3/4/2008
GW-202S	86.97	6.18	80.79		3/4/2008
GW-202D	86.52	5.62	80.90		3/4/2008
GW-CA1	88.01	6.96	81.05		3/4/2008
PZ-16RR/IN	81.0	2.44	78.56		3/4/2008
PZ-16RR/OUT	81.0	2.48	78.52		3/4/2008
PZ-17RR/IN	82.43	1.91	80.52		3/4/2008
PZ-17RR/OUT	82.43	3.22	79.21		3/4/2008
PZ-18R/IN	82.42	1.91	80.51		3/4/2008
PZ-18R/OUT	82.42	1.90	80.52		3/4/2008
PZ-24	89.43	7.44	81.99		3/4/2008
PZ-25	88.90	8.32	80.58		3/4/2008

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 3/14/08

Checked by: CTM 3/17/08

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

Monitoring Well Samples			
Location	GW-25	GW-79S	GW-202S
Date	3/5/2008	3/5/2008	3/5/2008
Depth to Water (ft)	4.80	2.45	5.84
pH (standard units)	7.38	6.48	6.76
Conductivity (µS/cm)	1060	2720	840
Dissolved oxygen (mg/L)	< 0.1	< 0.1	0.26
Temperature (ºC)	9.65	6.20	9.30
Turbidity (NTUS)	2.96	4.34	0.90
Redox (millivolts)	60	67	178

Piezometer Samples			
Location	PZ-16RR	PZ-17RR	PZ-18R
Date	3/5/2008	3/5/2008	3/5/2008
Depth to Water (ft)	6.0	6.0	3.35
pH (standard units)	7.42	7.83	7.54
Conductivity (µS/cm)	1980	752	836
Dissolved oxygen (mg/L)	3.52	2.90	9.88
Temperature (ºC)	6.0	7.3	6.95
Turbidity (NTU)	27.6	36.0	1.57
Redox (millivolts)	-88	-95	50

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

Prepared by: DLC 3/14/08
Checked by: CTM 3/14/08

Table 4
Groundwater Laboratory Analytical Program
Slurry Wall/Cap Monitoring Program
First 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	1	mg/L
Chloride	EPA 300.0	10	mg/L
Specific Conductivity	SM18 2510B	1	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 3/14/08
Checked by: CTM 3/14/08

Table 5
Final Field Parameters for Surface Water Sampling
Slurry Wall/Cap Monitoring Program
First 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	3/6/2008	3/6/2008	3/6/2008	3/6/2008	3/6/2008	3/6/2008	3/6/2008
Depth of Water (ft)	1.1	0.7	0.8	0.57	0.75	1.5	0.6
pH (standard units)	5.74	5.56	6.84	5.59	5.54	5.83	5.57
Conductivity (µS/cm)	621	698	707	775	828	594	843
Dissolved oxygen (mg/L)	7.67	10.65	10.90	10.40	7.05	6.40	7.87
Temperature (ºC)	4.07	5.55	8.65	3.49	3.41	4.34	5.02
Turbidity (NTUS)	5.74	8.1	1.95	29.7	13.20	4.1	11.3
Redox (millivolts)	88	76	65	102	93	72	74

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

Prepared by: DLC 3/14/08
Checked by: CTM 3/17/08

Table 6
Surface Water Analytical Program
Slurry Wall/Cap Monitoring Program
First 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	0.01	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 3/14/08
Checked by: CTM 3/14/08

Table 7
Groundwater Elevations
Plant B Monitoring Program
First 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	11.71	NPD	NA	78.77	3/4/2008
B-3	90.32	11.24	NPD	NA	79.08	3/4/2008
B-5R	91.38	11.09	NPD	NA	80.29	3/4/2008
B-7A	88.81	7.34	NPD	NA	81.47	3/4/2008
B-17	91.55	8.35	NPD	NA	83.20	3/4/2008
GW-13	90.57	11.31	NPD	NA	79.26	3/4/2008
GW-14	88.70	8.52	NPD	NA	80.18	3/4/2008
GW-15	90.01	7.74	NPD	NA	82.27	3/4/2008
GW-16	91.21	Destroyed	Destroyed	NA	NA	NA
GW-23	91.04	12.61	12.31	0.30	78.72	3/4/2008
GW-52S	87.95	7.40	NPD	NA	80.55	3/4/2008
GW-100	90.15	11.76	NPD	NA	78.39	3/4/2008
GW-101	90.14	11.91	NPD	NA	78.23	3/4/2008
GW-102	89.00	10.62	NPD	NA	78.38	3/4/2008
IW-1	90.71	11.73	NPD	NA	78.98	3/4/2008
IW-2	90.53	Dry	NPD	NA	NA	3/4/2008
IW-3	90.76	11.96	11.95	<0.01	78.80	3/4/2008
IW-6	89.15	11.02	NPD	NA	78.13	3/4/2008
IW-7	90.10	12.02	NPD	NA	78.08	3/4/2008
IW-8	89.94	11.79	NPD	NA	78.15	3/4/2008
IW-9	89.78	11.41	NPD	NA	78.37	3/4/2008
IW-10	90.43	11.90	NPD	NA	78.53	3/4/2008
IW-11	89.92	15.20	15.15	0.05	74.77	3/4/2008
IW-12	90.31	13.77	13.76	<0.01	76.54	3/4/2008
IW-13	89.90	14.81	14.80	<0.01	75.09	3/4/2008
PID	89.97	11.95	NPD	NA	78.02	3/4/2008
P5	90.45	11.99	11.98	<0.01	78.46	3/4/2008
12-IN	89.84	11.07	11.05	0.02	78.79	3/4/2008
SG	79.25	NA	NA	NA	NA	NA

Notes:

Prepared by: DLC 3/14/08
Checked by: CTM 3/17/08

(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.

FIGURES

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

Legend

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

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Wakefield, MA 01880

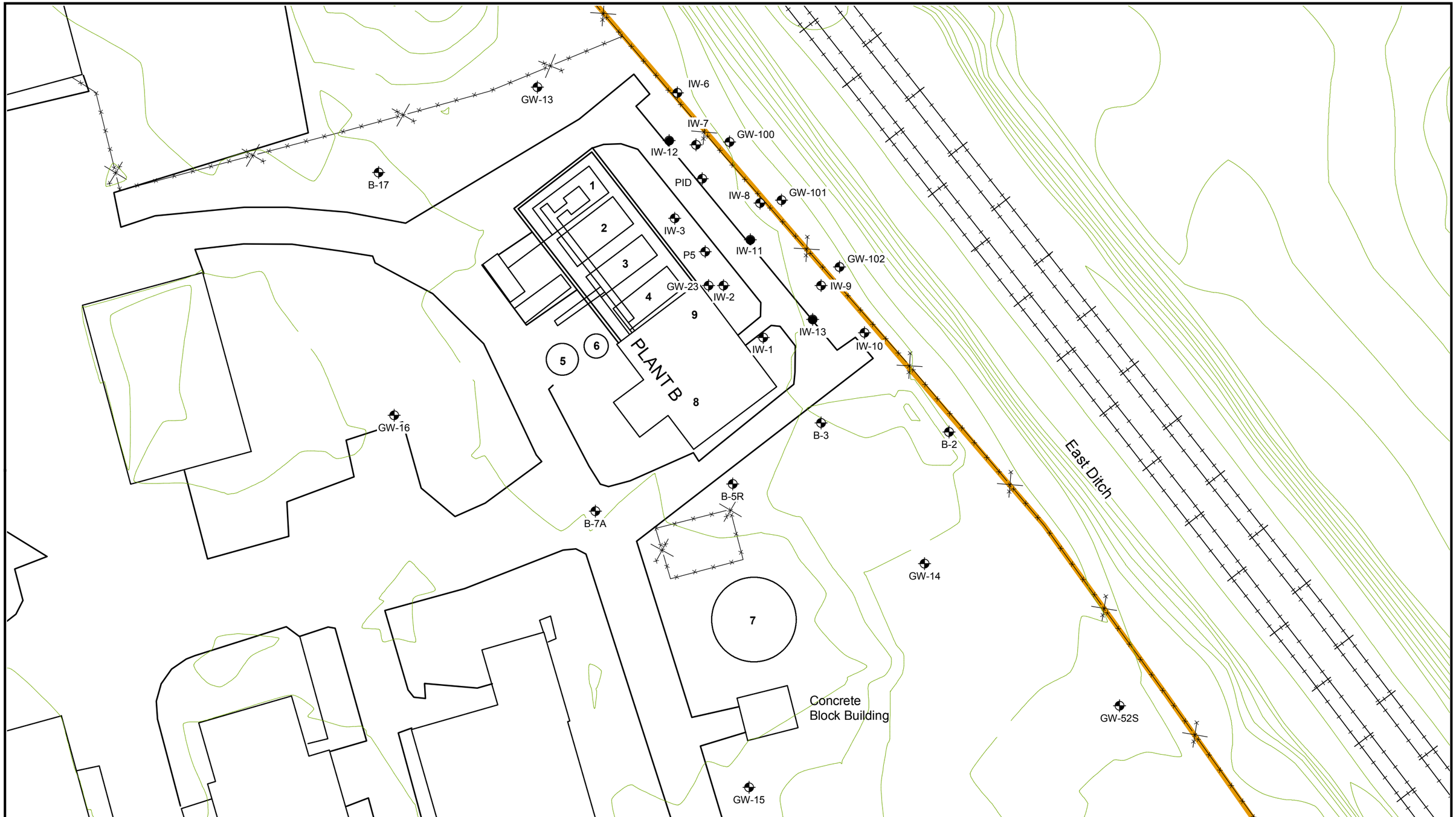
N

0 85 170 340 Feet

Figure 1
Slurry Wall/Cap Monitoring Program
Sampling Locations
Interim Response Steps Field Activity Report
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:
Groundwater sampling was not completed at GW-16 during the First Quarter Plant B monitoring activities. That monitoring well was previously damaged and could not be sampled.

MACTEC Engineering and Consulting
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\March Quarterly Sampling\Report\Figure 2 - Plant B Monitoring Program Sampling Locations.pdf 06/13/2008 1:42 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	PZ-16RR	ROUND NO.	1
SAMPLE ID	GW-202S	SITE TYPE	Superfund	DATE	3/5/2008
TIME	START 9:35 END 10:15	JOB NUMBER	6100-08-0016.04	BOTTLE TIME	10:05

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): 1.84 FT.

PROTECTIVE CASING / WELL DIFFERENCE: 0.16 FT.

INITIAL DEPTH TO WATER	5.79 FT.	WELL DEPTH (TOR)	13.31 FT.	PID AMBIENT AIR	<0.1 PPM	WELL DIAMETER	2 IN.
FINAL DEPTH TO WATER	5.84 FT.	SCREEN LENGTH	8 FT.	PID WELL MOUTH	<0.1 PPM		
DRAWDOWN VOLUME (initial - final x 0.16 (2-inch) or x 0.65 (4-inch))	0.008 FT.	RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED	0.0022	PRESSURE TO PUMP	N/A PSI		
TOTAL VOL. PURGED (purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)	3.70 GAL.			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%)	SAMPLE DEPTH	COMMENTS
9:40	5.84	350	8.9	686	6.89	0.12	5.33	195	11.5	
9:45	5.84	350	9.1	780	6.88	0.23	1.37	186	11.5	
9:48	5.84	350	9.1	802	6.83	0.28	2.01	185	11.5	
9:51	5.84	350	9.2	817	6.79	0.30	1.52	183	11.5	
9:54	5.84	350	9.3	820	6.78	0.30	1.06	183	11.5	
9:57	5.84	350	9.3	825	6.77	0.32	0.95	182	11.5	
10:00	5.84	350	9.3	840	6.76	0.26	0.9	178	11.5	
10:05	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: 3.7

LOCATION SKETCH

NOTES

SIGNATURE: for 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-79S	ROUND NO.	1
SAMPLE ID	GW-79S	SITE TYPE	Superfund	DATE	3/5/2008
TIME	START 9:31 END 10:30	JOB NUMBER	6100-08-0016.04	BOTTLE TIME	10:20

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

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

PROTECTIVE CASING STICKUP (FROM GROUND): 3.5 FT.

PROTECTIVE CASING / WELL DIFFERENCE: 0.20 FT.

INITIAL DEPTH TO WATER: 2.27 FT.

WELL DEPTH (TOR): 11.22 FT.

PID AMBIENT AIR: <0.1 PPM

WELL DIAMETER: 1 IN.

FINAL DEPTH TO WATER: 2.45 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: 0.02 FT.
(initial - final x 0.16 (2-inch) or x 0.65 (4-inch))

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED: 0.014

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 1.418 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%)	SAMPLE DEPTH	COMMENTS
9:32	2.31	80								
9:39	2.43	200					15.1			
9:47	2.44	150	6.47	2540	6.41	3.13	9.51	78	11.0	
9:54	2.45	150	6.23	2540	6.45	<0.1	7.98	70	11.0	
9:59	2.45	150	6.18	2530	6.46	<0.1	5.00	68	11.0	
10:04	2.45	150	6.20	2540	648	<0.1	3.56	67	11.0	
10:09	2.45	150	6.20	2720	6.48	<0.1	4.34	67	11.0	
10:20	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: 1.4

LOCATION SKETCH

NOTES

SIGNATURE: for Tom Hanlon

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.	1
SAMPLE ID	PZ-16RR	SITE TYPE	Superfund	DATE	3/5/2008
TIME	START 11:15 END 12:00	JOB NUMBER	6100-08-0016.04	BOTTLE TIME	11:50

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

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

PROTECTIVE CASING STICKUP (FROM GROUND): approx 3.25 FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 2.45 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: 1 FT.

PID WELL MOUTH: <0.1 PPM

WELL INTEGRITY:

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

DRAWDOWN VOLUME: 0.3 FT.
(initial - final x 0.16 (2-inch) or x 0.65 (4-inch))

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED: 0.75

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: approx 0.4 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 unit)	DISS. O2 (mg/L) (10%)	TURBIDITY (NTU) (10%) (0-2)	ORP/Eh (mV) (10%)	SAMPLE DEPTH	COMMENTS
11:30	6.00	100	6.3	1910	7.50	3.26	119	-88	6.00	Obtain reading, wait for recharge
11:35	6.00	100	5.7	1990	7.40	3.07	59.4	-94	6.00	Obtain reading, wait for recharge
11:40	6.00	100	6.0	1980	7.42	3.52	27.6	-88	6.00	Etc.
11:50	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: 0.4

NOTES

Poor recharge. Purge well, obtain 3 readings, wait for recharge, then sample

SIGNATURE: for 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-25	ROUND NO.	1
SAMPLE ID	GW-25, GW-25DUP, GW-25MS, GW-25MSD	SITE TYPE	Superfund	DATE	3/5/2008
TIME	START 11:49 END 12:50	JOB NUMBER	6100-08-0016.04	BOTTLE TIME	12:40

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: GW-25DUP,MS,MSD

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

PROTECTIVE CASING STICKUP (FROM GROUND): 3.75 FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 4.56 FT.

WELL DEPTH (TOR): 14.37 FT.

PID AMBIENT AIR: <0.1 PPM

WELL DIAMETER: 1 IN.

FINAL DEPTH TO WATER: 4.80 FT.

SCREEN LENGTH: N/A FT.

PID WELL MOUTH: <0.1 PPM

WELL INTEGRITY:

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

DRAWDOWN VOLUME: 0.384 FT.
(initial - final x 0.16 (2-inch) or x 0.65 (4-inch))

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED: 0.09

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 3.978 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%)	SAMPLE DEPTH	COMMENTS
11:49	4.8	200								Purging until clear
12:02	4.8	300	9.5	994	7.68	4.40	9.26	48	14.0	
12:07	4.8	300	9.48	984	7.60	3.57	5.54	49	14.0	
12:12	4.8	300	9.48	1050	7.51	1.60	4.93	52	14.0	
12:15	4.8	300	9.55	1040	7.49	1.38	4.70	54	14.0	
12:20	4.8	300	9.61	1020	7.41	0.84	3.12	58	14.0	
12:25	4.8	300	9.60	1120	7.42	0.00	3.02	57	14.0	
12:30	4.8	300	9.65	1060	7.38	0.00	2.96	60	14.0	
12:40	4.8	300	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: 4.0

NOTES

SIGNATURE: for 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	PZ-17RR	ROUND NO.	1
SAMPLE ID	PZ-17RR	SITE TYPE	Superfund	DATE	3/5/2008
TIME START	12:40 END 13:20	JOB NUMBER	6100-08-0016.04	BOTTLE TIME	13:05

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): 3.65 FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 1.90 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: 1 FT.

PID WELL MOUTH: <0.1 PPM

WELL INTEGRITY:

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

DRAWDOWN VOLUME: approx 0.5 FT.
(initial - final x 0.16 (2-inch) or x 0.65 (4-inch))

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED: 0.75

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 0.67 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%)	SAMPLE DEPTH	COMMENTS
12:50	6.00	100	7.4	635	8.11	2.96	87.8	-108	6.05	Obtain reading, wait for recharge,
12:55	6.00	100	7.7	703	7.77	3.06	41.0	-94	6.05	Obtain reading, wait for recharge,
13:00	6.00	100	7.3	752	7.83	2.90	36.0	-95	6.05	Etc.
13:05	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: 0.67

NOTES

Poor recharge. Purge well, obtain 3 readings, wait for recharge, then sample

SIGNATURE: for David Chapman

LOCATION SKETCH

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FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

PROJECT	OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA	SAMPLE ID	PZ-18R	ROUND NO.	1
SAMPLE ID	PZ-18R	SITE TYPE	Superfund	DATE	3/5/2008
TIME	START 13:40 END 14:30	JOB NUMBER	6100-08-0016.04	BOTTLE TIME	14:30

WATER LEVEL / PUMP SETTINGS

QC SAMPLE COLLECTED ID: N/A

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

PROTECTIVE CASING STICKUP (FROM GROUND): 3.5 FT.

PROTECTIVE CASING / WELL DIFFERENCE: N/A FT.

INITIAL DEPTH TO WATER: 1.86 FT.

WELL DEPTH (TOR): 5.95 FT.

PID AMBIENT AIR: <0.1 PPM

WELL DIAMETER: 1 IN.

FINAL DEPTH TO WATER: 3.30 FT.

SCREEN LENGTH: 1 FT.

PID WELL MOUTH: <0.1 PPM

WELL INTEGRITY:

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

DRAWDOWN VOLUME: 0.1 FT.
(initial - final x 0.16 (2-inch) or x 0.65 (4-inch))

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED: 0.04

PRESSURE TO PUMP: N/A PSI

TOTAL VOL. PURGED: 2.6 GAL.
(purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)

REFILL TIMER SETTING: N/A SEC.

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/L) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (µS/cm) (3%)	pH (units) (+/- 0.1 unit)	DISS. O2 (mg/L) (10%)	TURBIDITY (NTU) (10%) (0-2)	ORP/Eh (mV) (10%)	SAMPLE DEPTH	COMMENTS
13:40	1.86	200								
14:05	3.35	200	6.79	754	7.51	9.25	7.76	51	5.85	
14:10	3.35	200	6.96	808	7.53	9.45	4.45	43	5.85	
14:13	3.35	200	6.99	811	7.57	9.34	1.94	48	5.85	
14:16	3.35	200	7.10	811	7.54	9.16	1.96	49	5.85	
14:19	3.35	200	6.95	836	7.54	9.88	1.57	50	5.85	
14:30	3.35	200	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	HNC HNO3 / 4 DEG. C	1 X 500 mL	[X] Dis. Al, Cr

PURGE OBSERVATIONS

PURGE WATER CONTAINERIZED: [YES] NO

NUMBER OF GALLONS GENERATED: 2.6

LOCATION SKETCH

NOTES

SIGNATURE: for Tom Hanlon

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MACTEC ENGINEERING AND CONSULTING, INC. PAGE 1 OF 1

FIELD DATA RECORD - SURFACE WATER/ SEDIMENT SAMPLING

PROJECT: OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA JOB NUMBER: 6100-08-0016.04 DATE: 3/6/2008

FIELD SAMPLE NUMBER: PZ-16RR ACTIVITY TIME: START 9:10 END 9:25 BOTTLE TIME: 9:20

QC SAMPLES COLLECTED: None

SURFACE WATER DATA

WATER DEPTH AT LOCATION: 0.57 FT

SPEC. COND: 775 µS/cm

DEPTH OF SAMPLE FROM SURFACE: 0.3 FT

D.O.: 10 mg/L

TEMPERATURE: 3.49 DEG C

SALINITY: 0.0 %

TURBIDITY: 29.7 NTU

ORP: 102 mV

PH: 5.59 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:

EPTH OF SEDIMEN:

TYPE OF SAMPLE

- [ ] DISCRETE
- [ ] COMPOSITE

SAMPLE OBSERVATIONS

ODOR:

COLOR:

TYPE OF SEDIMENT:

- [ ] ORGANIC
- [ ] SAND
- [ ] GRAVEL
- [ ] CLAY
- [ ] OTHER

EQUIPMENT FOR COLLECTIOI

- [ ] 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

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FIELD DATA RECORD - SURFACE WATER/ SEDIMENT SAMPLING

PROJECT: OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA JOB NUMBER: 6100-08-0016.04 DATE: 3/6/2008

FIELD SAMPLE NUMBER: PZ-17RR ACTIVITY TIME: START 9:45 END 10:10 BOTTLE TIME: 10:00

QC SAMPLES COLLECTED: None

SURFACE WATER DATA

WATER DEPTH AT LOCATION: 0.75 FT

SPEC. COND: 828 µS/cm

DEPTH OF SAMPLE FROM SURFACE: 0.3 FT

D.O.: 7.1 mg/L

TEMPERATURE: 3.41 DEG C

SALINITY: 0.0 %

TURBIDITY: 13.2 NTU

ORP: 93 mV

PH: 5.54 UNITS

ASSOCIATED TRIP BLANK: N/A

RINSATE BLANK: N/A

EQUIPMENT USED

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

TYPE OF SURFACE WATER

- [X] STREAM/ RIVER
- [ ] LAKE/ POND
- [ ] SEEP
- [ ] MARSH
- [ ] OTHER

DECON FLUIDS USED:

- [ ] DI WATER N2 PURGE
- [ ] POTABLE WATER
- [X] NONE

SEDIMENT DATA

ASSOCIATED TRIP BLANK:

RINSATE BLANK:

EPTH OF SEDIMEN:

TYPE OF SAMPLE

- [ ] DISCRETE
- [ ] COMPOSITE

SAMPLE OBSERVATIONS

ODOR: _____

COLOR: _____

TYPE OF SEDIMENT:

- [ ] ORGANIC
- [ ] SAND
- [ ] GRAVEL
- [ ] CLAY
- [ ] OTHER _____

EQUIPMENT FOR COLLECTIOI

- [ ] 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

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FIELD DATA RECORD - SURFACE WATER/ SEDIMENT SAMPLING

PROJECT: OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA JOB NUMBER: 6100-08-0016.04 DATE: 3/6/2008

FIELD SAMPLE NUMBER: ISCO-1 ACTIVITY TIME: START 10:08 END 10:20 BOTTLE TIME: 10:15

QC SAMPLES COLLECTED: None

SURFACE WATER DATA

WATER DEPTH AT LOCATION: 1.1 FT SPEC. COND: 621 µS/cm

DEPTH OF SAMPLE FROM SURFACE: 0.3 FT D.O.: 7.67 mg/L

TEMPERATURE: 4.07 DEG C SALINITY: 0.0 %

TURBIDITY: 3.76 NTU ORP: 88 mV

PH: 5.74 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:

EPTH OF SEDIMEN:

TYPE OF SAMPLE
- [ ] DISCRETE
- [ ] COMPOSITE

SAMPLE OBSERVATIONS
- ODOR: _____
- COLOR: _____

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

EQUIPMENT FOR COLLECTIOI
- [ ] 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

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FIELD DATA RECORD - SURFACE WATER/ SEDIMENT SAMPLING

PROJECT: OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA JOB NUMBER: 6100-08-0016.04 DATE: 3/6/2008

FIELD SAMPLE NUMBER: PZ-18R ACTIVITY TIME: START 10:25 END 10:40 BOTTLE TIME: 10:35

QC SAMPLES COLLECTED: None

SURFACE WATER DATA

WATER DEPTH AT LOCATION: 1.5 FT

SPEC. COND: 594 µS/cm

DEPTH OF SAMPLE FROM SURFACE: 0.3 FT

D.O.: 6.40 mg/L

TEMPERATURE: 4.34 DEG C

SALINITY: 0.0 %

TURBIDITY: 4.1 NTU

ORP: 72 mV

PH: 5.83 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:

EPTH OF SEDIMEN:

TYPE OF SAMPLE: [ ] DISCRETE [ ] COMPOSITE

SAMPLE OBSERVATIONS

ODOR:

COLOR:

TYPE OF SEDIMENT:

- [ ] ORGANIC
- [ ] SAND
- [ ] GRAVEL
- [ ] CLAY
- [ ] OTHER

EQUIPMENT FOR COLLECTIOI

- [ ] 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

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FIELD DATA RECORD - SURFACE WATER/ SEDIMENT SAMPLING

PROJECT: OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA JOB NUMBER: 6100-08-0016.04 DATE: 3/6/2008

FIELD SAMPLE NUMBER: ISCO-3 ACTIVITY TIME: START 10:55 END 11:12 BOTTLE TIME: 11:10

QC SAMPLES COLLECTED: None

SURFACE WATER DATA

WATER DEPTH AT LOCATION: 0.8 FT
SPEC. COND: 707 µS/cm
DEPTH OF SAMPLE FROM SURFACE: 0.3 FT
D.O.: 11 mg/L
TEMPERATURE: 8.65 DEG C
SALINITY: 0.0 %
TURBIDITY: 1.95 NTU
ORP: 65 mV
PH: 6.84 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: _____

EPTH OF SEDIMEN: _____

TYPE OF SAMPLE
- [ ] DISCRETE
- [ ] COMPOSITE

SAMPLE OBSERVATIONS
- ODOR _____
- COLOR _____

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

EQUIPMENT FOR COLLECTIOI
- [ ] 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. PAGE 1 OF 1

FIELD DATA RECORD - SURFACE WATER/ SEDIMENT SAMPLING

PROJECT: OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA JOB NUMBER: 6100-08-0016.04 DATE: 3/6/2008

FIELD SAMPLE NUMBER: ISCO-2 ACTIVITY TIME: START 11:15 END 11:30 BOTTLE TIME: 11:25

QC SAMPLES COLLECTED: None

SURFACE WATER DATA

WATER DEPTH AT LOCATION: 0.7 FT SPEC. COND: 698 µS/cm

DEPTH OF SAMPLE FROM SURFACE: 0.3 FT D.O.: 10.65 mg/L

TEMPERATURE: 5.55 DEG C SALINITY: 0.0 %

TURBIDITY: 8.1 NTU ORP: 76 mV

PH: 5.56 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 COLLECT
- [ ] 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: for

MACTEC ENGINEERING AND CONSULTING, INC. PAGE 1 OF 1

FIELD DATA RECORD - SURFACE WATER/ SEDIMENT SAMPLING

PROJECT: OLIN CHEMICAL SUPERFUND SITE, WILMINGTON, MA JOB NUMBER: 6100-08-0016.04 DATE: 3/6/2008

FIELD SAMPLE NUMBER: SD-17 ACTIVITY TIME: START 11:40 END 12:15 BOTTLE TIME: 12:00

QC SAMPLES COLLECTED: SD-17 DUP, SD-17MS, SD-17MSD

SURFACE WATER DATA

WATER DEPTH AT LOCATION: 0.6 FT
SPEC. COND: 843 µS/cm
DEPTH OF SAMPLE FROM SURFACE: 0.3 FT
D.O.: 7.9 mg/L
TEMPERATURE: 5.02 DEG C
SALINITY: 0.0 %
TURBIDITY: 11.3 NTU
ORP: 74 mV
PH: 5.57 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:

EPTH OF SEDIMEN:

TYPE OF SAMPLE
- [ ] DISCRETE
- [ ] COMPOSITE

SAMPLE OBSERVATIONS
- ODOR
- COLOR

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

EQUIPMENT FOR COLLECTIOI
- [ ] 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: 3/5/2008

CREW ID OR TASK ID: First 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	pH	3.98 units		+/- 10% of standard
UNIT ID NO M0-15-05	Sp. Conductivity	4.49 mS/cm	Sp. Conductivity	4.56 mS/cm		+/- 10% of standard
	Redox	236 mV	Redox	238 mV		see note 1
	DO	N/A mg/L *	DO	10.32 mg/L		+/- 10% of standard
	Thermometer Temperature	N/A deg. C	Temperature	14.6 deg. C		+/- 2.0 deg. C
TURBIDITY METER TYPE Hach		<0.1 NTU (low)		0.1 NTU		within 0.3 NTU of
MODEL NO. U-22						the standard
UNIT ID NO. M024-01		800 NTU (high)		825 NTU		+/- 10% of standard
PHOTOIONIZATION						
METER TYPE	Background ppmv	Zero Air ppmv	Meter ppmv			within 5 ppmv of Zero
MODEL NO.	Span Gas ppmv		Meter ppmv			+/- 10% of standard
UNIT ID NO.						
OTHER METER TYPE						see note 2
MODEL NO.						see note 2
UNIT ID NO.						see note 2
OTHER METER TYPE						see note 2
MODEL NO.						see note 2
UNIT ID NO.						see note 2

MATERIALS RECORD

	Lot Number		
Deionized Water Source:		Calibration Fluids/ Standard Source:	Auto Cal
Trip Blank Water Source:		Lot Numbers pH	5907
Sample Preservatives Source: Lab Provided		mV	5907
Disposable Filter Type: 0.45 micron field filter		Sp. Cond.	5907
Other		Turb.	5907

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: 3/5/2008

CREW ID OR TASK ID: First 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	pH	3.97 units		+/- 10% of standard
UNIT ID NO M0-15	Sp. Conductivity	4.49 mS/cm	Sp. Conductivity	4.52 mS/cm		+/- 10% of standard
	Redox	236 mV	Redox	233 mV		see note 1
	DO	N/A mg/L *	DO	10.27 mg/L		+/- 10% of standard
	Thermometer Temperature	N/A deg. C	Temperature	13.9 deg. C		+/- 2.0 deg. C
TURBIDITY METER TYPE Hach		<0.1 NTU (low)		0.2 NTU		within 0.3 NTU of
MODEL NO. U-22						the standard
UNIT ID NO. M024-01		800 NTU (high)		815 NTU		+/- 10% of standard
PHOTOIONIZATION						
METER TYPE	Background ppmv	Zero Air ppmv	Meter ppmv			within 5 ppmv of Zero
MODEL NO.	Span Gas ppmv		Meter ppmv			+/- 10% of standard
UNIT ID NO.						
OTHER METER TYPE						see note 2
MODEL NO.						see note 2
UNIT ID NO.						see note 2
OTHER METER TYPE						see note 2
MODEL NO.						see note 2
UNIT ID NO.						see note 2

MATERIALS RECORD	Lot Number	Calibration Fluids/	
Deionized Water Source:		Standard Source:	Auto Cal
Trip Blank Water Source:		Lot Numbers pH	5907
Sample Preservatives Source: Lab Provided		mV	5907
Disposable Filter Type: 0.45 micron field filter		Sp. Cond.	5907
Other		Turb.	5907

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: 3/6/2008

CREW ID OR TASK ID: First Quarter 04 (PCMP SW) | 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	pH	3.99 units		+/- 10% of standard
UNIT ID NO M0-15	Sp. Conductivity	4.49 mS/cm	Sp. Conductivity	4.51 mS/cm		+/- 10% of standard
	Redox	236 mV	Redox	235 mV		see note 1
	DO	N/A mg/L *	DO	10.29 mg/L		+/- 10% of standard
	Thermometer Temperature	N/A deg. C	Temperature	15.4 deg. C		+/- 2.0 deg. C
TURBIDITY METER TYPE Hach		<0.1 NTU (low)		0.1 NTU		within 0.3 NTU of
MODEL NO. U-22						the standard
UNIT ID NO. M024-01		800 NTU (high)		822 NTU		+/- 10% of standard
PHOTOIONIZATION						
METER TYPE	Background ppmv	Zero Air ppmv	Meter ppmv			within 5 ppmv of Zero
MODEL NO.	Span Gas ppmv		Meter ppmv			+/- 10% of standard
UNIT ID NO.						
OTHER METER TYPE						see note 2
MODEL NO.						see note 2
UNIT ID NO.						see note 2
OTHER METER TYPE						see note 2
MODEL NO.						see note 2
UNIT ID NO.						see note 2

MATERIALS RECORD

	Lot Number		
Deionized Water Source:		Calibration Fluids/ Standard Source:	Auto Cal
Trip Blank Water Source:		Lot Numbers pH	5907
Sample Preservatives Source: Lab Provided		mV	5907
Disposable Filter Type: 0.45 micron field filter		Sp. Cond.	5907
Other		Turb.	5907

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

...ica 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

... Lowell Junction Road
N. Billerica, MA 01862
(P) 978-667-1400
(F) 978-667-7871

Client: Olin Chemical/MACTEC
Project #: 61000E0016/04
Address: 51 Eames Street
Project Manager: Peter Thompson
Wilmington, MA 01887
Work ID: PCMP
Phone: 339-927-3513 Fax: 781-246-5010
Contact: David Chapman

Job# | Quote# | PO#

Requested Turn Around Time
10 Business Day (Std) XX
15 Business Day
Other
Rush TAT Requested: 24 hrs 72 hrs 48 hrs 5 Day

Regulatory Classification / Special Report Format
NPDES Drinking Water DEP Form(s)
RCRA MCP GW1/S1 MWRA Smart Rpt
Other MCP QA/QC Rpt XX

Shaded areas for office use

Analysis Requested
Check analysis and specify method and analytes in comments section.
For example:
500-series for drinking water
600-series for waste water
8000-series for haz/solid waste
Use comments section to further define.

Comments
(Special Instructions)

MCP case narrative

Dissolved metals are field filtered.

Groundwater Metals: Dissolved Al/Cr

Surfacewater Metals: Dissolved/Total Al/Cr/Na

Sample Type Codes
WW-Wastewater DW-Drinking water SW-Surfacewater
LW-Labwater GW-Groundwater A-Air
S-Solid / Soil SL-Sludge O-Oil Z-Other

Sample ID	Sample Type	Sampler's Initials	Date Time Collected	Grab	Comp.	# Containers	Plastic(P) or Glass(G)	Preservative: NaHSO4/MeOH	HNO3 to pH <2	H2SO4 to pH <2	HCl to pH <2	NaOH to pH >12	NAOH/ZNAC	None / 4° C	Ammonia-Nitrogen	Chloride, Sulfate	Specific Condutivity	Nitrate, Nitrite	Groundwater metals	Surfacewater metals	Sediment: Al/Cr/Fe	Other	Other	Other	Other	Other	Other
GW-202S	GW	DLC	3/5/08 10:05	X		3	P		X	X				X	X	X	X		X							
GW-79S	GW	TRH ~~DLC~~	3/5/08 10:20	X		3	P		X	X				X	X	X	X		X							
PZ-16RR	GW	DLC	3/5/08 11:50	X		3	P		X	X				X	X	X	X		X							
PZ-17RR	GW	DLC	3/5/08 12:35	X		3	P		X	X				X	X	X	X		X							
GW-25	GW	TRH	3/5/08 13:40	X		3	P		X	X				X	X	X	X		X							
GW-25DUP	GW	TRH	3/5/08 13:40	X		3	P		X	X				X	X	X	X		X							
GW-25MS	GW	TRH	3/5/08 13:40	X		3	P		X	X				X	X	X	X		X							
GW-25MSD	GW	TRH	3/5/08 13:40	X		3	P		X	X				X	X	X	X		X							
PZ-18R	GW	TRH	3/5/08 14:30	X		3	P		X	X				X	X	X	X		X							

Sampled by (print): David Chapman / Tom Hanlon
Signature:

Relinquished by: David Chapman Date: 3/5/08 Time: 1500
Received by: Jerry Date: 3/5/08 Time: 1500

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

Method of shipment:

TestAmerica-Westfield

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

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

TestAmerica Laboratories, Inc.
Chain of Custody Form

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

[illegible] 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: 339-927-3793 Fax: (781)-246-5860

Project #: 6100080016/04
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.

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
PZ-16RR	SW	DLC/CTM	3/6/08 09:20	x		4	P		x	x				x	x	x	x	x		x							
PZ-17RR	SW	DLC/CTM	3/6/08 10:00	x		4	P		x	x				x	x	x	x	x		x							
ISCO-1	SW	DLC CTM TRH	3/6/08 10:15	x		4	P		x	x				x	x	x	x	x		x							
PZ-18R	SW	DLC CTM TRH	3/6/08 10:35	x		4	P		x	x				x	x	x	x	x		x							
ISCO-3	SW	DLC CTM TRH	3/6/08 11:10	x		4	P		x	x				x	x	x	x	x		x							
ISCO-2	SW	DLC CTM TRH	3/6/08 11:25	x		4	P		x	x				x	x	x	x	x		x							
SD-17	SW	DLC CTM TRH	3/6/08 12:00	x		4	P		x	x				x	x	x	x	x		x							
SD-17DUP	SW	DLC CTM TRH	3/6/08 12:00	x		4	P		x	x				x	x	x	x	x		x							
SD-17MS	SW	DLC CTM TRH	3/6/08 12:00	x		4	P		x	x				x	x	x	x	x		x							
SD-17MSD	SW	DLC CTM TRH	3/6/08 12:00	x		4	P		x	x				x	x	x	x	x		x							

Comments
(Special Instructions)

MCP case narrative

Dissolved metals are field filtered.

Groundwater Metals: Dissolved Al/Cr

Surfacewater Metals: Dissolved/Total Al/Cr/Na

Sampled by (print): David Chapman/Chris Mazzolini/[illegible]
Signature: [signature]

Relinquished by:	Date:	Time:	Received by:	Date:	Time:
David Chapman	3/6/08	1445	Jerry [signature]	3/6/08	1445
Relinquished by:	Date:	Time:	Received by:	Date:	Time:

Method of shipment:

TestAmerica-Westfield

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

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

APPENDIX C

First Quarter 2008
Temporary Cap Inspection Figure 1 and Photo Log

Legend

- Seam
- Monitoring Well

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

N

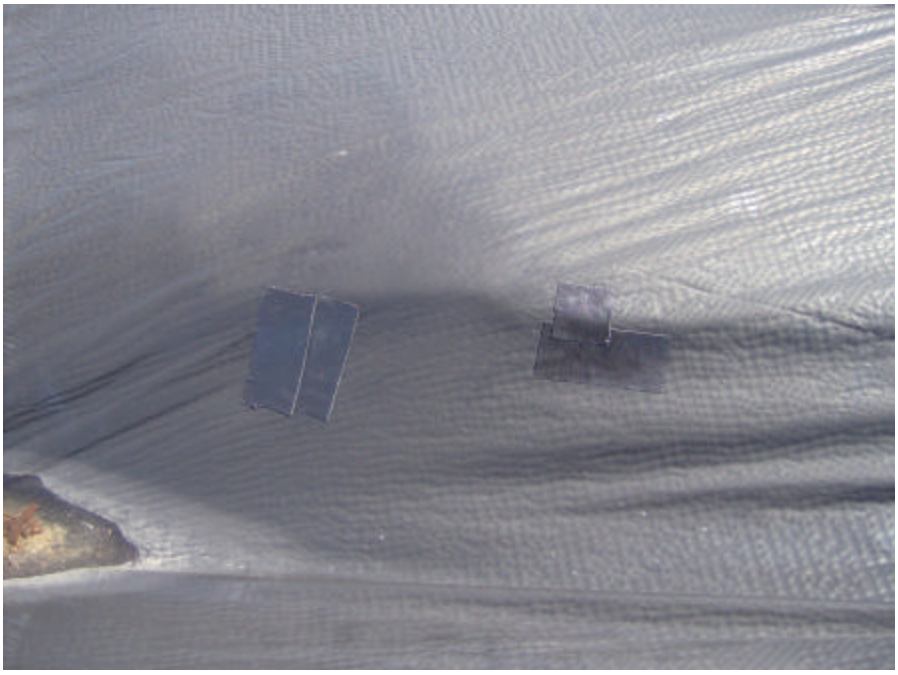
0 30 60 120 Feet

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

Prepared by BJR | Checked by PHT

Document: P:\OLIN\Wilmington\GIS\MapDocuments\Olin_11X17_LS.mxd PDF: P:\OLIN\Wilmington\2008 Quarterly Sampling\Figure 1 - Cap Seams.pdf 03/04/2008 12:13 PM bjroden

Photos 1 through 3: Typical Patching



1

2

3

Photos 4 and 5: Typical Seams

4

5

APPENDIX A

Interim Response Steps Field Activity Reports

A-2 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

Peter H. Thompson — Date 6/12/08
Project Manager

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

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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 Plant B Monitoring Program Sampling Locations

Appendices

Appendix A Field Data Records and Field Instrument Calibration Records
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Appendix D GW-16R Monitoring Well Installation Log and Well Development 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 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

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

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

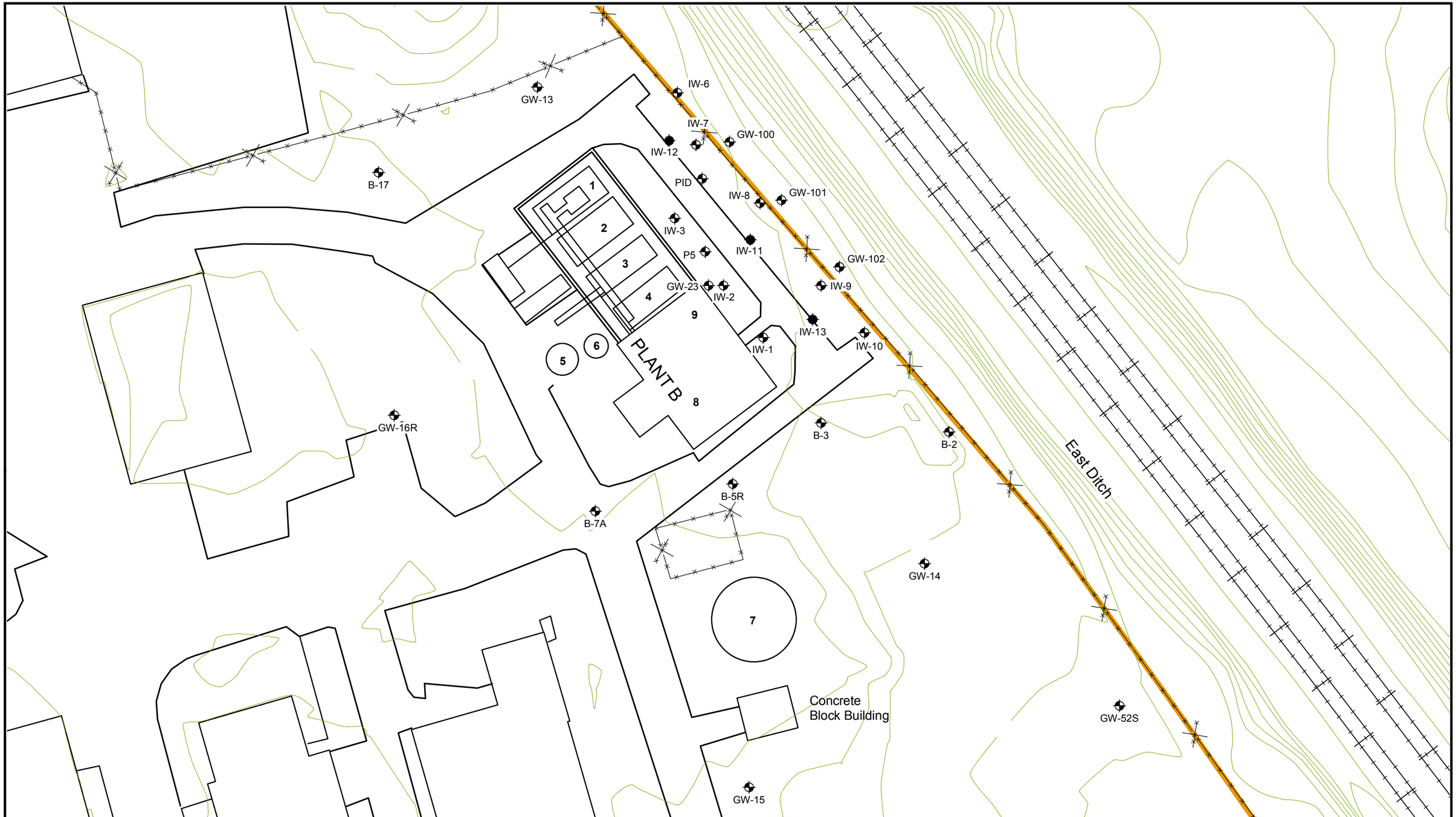
N

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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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		
DRAWDOWN VOLUME (initial - final x 0.16 {2-inch} or x 0.65 {4-inch})	0.054 FT.	RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED	0.017	PRESSURE TO PUMP	N/A PSI		
TOTAL VOL. PURGED (purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)	3.17 GAL.			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	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	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

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
FINAL DEPTH TO WATER	10.95 FT.	SCREEN LENGTH	5 FT.	PID WELL MOUTH	<0.1 PPM
DRAWDOWN VOLUME (initial - final x 0.16 {2-inch} or x 0.65 {4-inch})	0 FT.	RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED	0	PRESSURE TO PUMP	N/A PSI
TOTAL VOL. PURGED (purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)	8.36 GAL.			REFILL TIMER SETTING	N/A SEC.

WELL DIAMETER: 2 IN.

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	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	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
[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

LOCATION SKETCH

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-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

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-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		
DRAWDOWN VOLUME (initial - final x 0.16 (2-inch) or x 0.65 (4-inch))	0.054 FT.	RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED	0.023	PRESSURE TO PUMP	N/A PSI		
TOTAL VOL. PURGED (purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)	2.38 GAL.			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	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	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: 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
FINAL DEPTH TO WATER	3.95 FT.	SCREEN LENGTH	--- FT.	PID WELL MOUTH	<0.1 PPM
DRAWDOWN VOLUME (initial - final x 0.16 (2-inch) or x 0.65 (4-inch))	0.0163 FT.	RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED	0.004	PRESSURE TO PUMP	N/A PSI
TOTAL VOL. PURGED (purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)	3.96 GAL.			REFILL TIMER SETTING	N/A SEC.

WELL DIAMETER	2 IN.
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	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	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: 3.8

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

INITIAL DEPTH TO WATER	6.57 FT.	WELL DEPTH (TOR)	15 FT.	PID AMBIENT AIR	<0.1 PPM
FINAL DEPTH TO WATER	6.58 FT.	SCREEN LENGTH	10 FT.	PID WELL MOUTH	<0.1 PPM
DRAWDOWN VOLUME (initial - final x 0.16 {2-inch} or x 0.65 {4-inch})	0.00163 FT.	RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED	0.00035	PRESSURE TO PUMP	N/A PSI
TOTAL VOL. PURGED (purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)	4.62 GAL.			REFILL TIMER SETTING	N/A SEC.

PROTECTIVE CASING STICKUP (FROM GROUND)	FT.
PROTECTIVE CASING / WELL DIFFERENCE	FT.
WELL DIAMETER	2 IN.

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

DISCHARGE TIMER SETTING: N/A SEC.

PURGE DATA

TIME	DEPTH TO WATER (ft.) (0.3 ft.)	PURGE RATE (ml/L) (100-400)	TEMP. (deg. C) (3%)	SPEC. COND. (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	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

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		
DRAWDOWN VOLUME (initial - final x 0.16 {2-inch} or x 0.65 {4-inch})	0 FT.	RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED	0	PRESSURE TO PUMP	N/A PSI		
TOTAL VOL. PURGED (purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)	2.31 GAL.			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	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	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 2.25

NOTES

LOCATION SKETCH

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-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		
DRAWDOWN VOLUME (initial - final x 0.16 {2-inch} or x 0.65 {4-inch})	0.0049 FT.	RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED	0.0021	PRESSURE TO PUMP	N/A PSI		
TOTAL VOL. PURGED (purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)	2.38 GAL.			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	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	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: 2.25

NOTES

Odor from purge water

Duplicate, MS and MSD collected.

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

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-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		
DRAWDOWN VOLUME (initial - final x 0.16 {2-inch} or x 0.65 {4-inch})	0.0196 FT.	RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED	0.0055	PRESSURE TO PUMP	N/A PSI		
TOTAL VOL. PURGED (purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)	3.57 GAL.			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	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	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: 3.4

NOTES

LOCATION SKETCH

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-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	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: 3.60

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

INITIAL DEPTH TO WATER	1.97 FT.	WELL DEPTH (TOR)	10.1 FT.	PID AMBIENT AIR	<0.1 PPM	PROTECTIVE CASING STICKUP (FROM GROUND)	FT.
FINAL DEPTH TO WATER	1.98 FT.	SCREEN LENGTH	5 FT.	PID WELL MOUTH	<0.1 PPM	PROTECTIVE CASING / WELL DIFFERENCE	FT.
DRAWDOWN VOLUME (initial - final x 0.16 {2-inch} or x 0.65 {4-inch})	0.0016 FT.	RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED	0.000471	PRESSURE TO PUMP	N/A PSI	WELL DIAMETER	2 IN.
TOTAL VOL. PURGED (purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)	3.4 GAL.			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	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	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: 3.5

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

INITIAL DEPTH TO WATER	7.38 FT.	WELL DEPTH (TOR)	13 FT.	PROTECTIVE CASING STICKUP (FROM GROUND)	FT.	PROTECTIVE CASING / WELL DIFFERENCE	FT.
FINAL DEPTH TO WATER	7.43 FT.	SCREEN LENGTH	10 FT.	PID AMBIENT AIR	<0.1 PPM	WELL DIAMETER	2 IN.
DRAWDOWN VOLUME (initial - final x 0.16 (2-inch) or x 0.65 (4-inch))	0.0082 FT.	RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED	0.0023	PID WELL MOUTH	<0.1 PPM		
TOTAL VOL. PURGED (purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)	3.57 GAL.			PRESSURE TO PUMP	N/A PSI		
				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	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	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 3.6

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-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

NOTES

for Mark Maggiore

SIGNATURE: Mark Maggiore

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.	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

INITIAL DEPTH TO WATER	3.54 FT.	WELL DEPTH (TOR)	11.47 FT.	PROTECTIVE CASING STICKUP (FROM GROUND)	FT.
FINAL DEPTH TO WATER	3.58 FT.	SCREEN LENGTH	10 FT.	PID AMBIENT AIR	<0.1 PPM
DRAWDOWN VOLUME (initial - final x 0.16 {2-inch} or x 0.65 {4-inch})	0.0065 FT.	RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED	0.0016	PID WELL MOUTH	<0.1 PPM
TOTAL VOL. PURGED (purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)	3.96 GAL.			PRESSURE TO PUMP	N/A PSI
				REFILL TIMER SETTING	N/A SEC.

PROTECTIVE CASING / WELL DIFFERENCE	FT.	
WELL DIAMETER	2 IN.	
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	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

INITIAL DEPTH TO WATER	3.97 FT.	WELL DEPTH (TOR)	15.15 FT.	PROTECTIVE CASING STICKUP (FROM GROUND)	FT.
FINAL DEPTH TO WATER	4.02 FT.	SCREEN LENGTH	10 FT.	PID AMBIENT AIR	<0.1 PPM
DRAWDOWN VOLUME (initial - final x 0.16 (2-inch) or x 0.65 (4-inch))	0.0082 FT.	RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED	0.0028	PID WELL MOUTH	<0.1 PPM
TOTAL VOL. PURGED (purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)	2.93 GAL.			PRESSURE TO PUMP	N/A PSI
				REFILL TIMER SETTING	N/A SEC.

PROTECTIVE CASING / WELL DIFFERENCE	FT.	
WELL DIAMETER	2 IN.	
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	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	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 2.85

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-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	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

NOTES Duplicate Collected

ID: GW202S-DUP

LOCATION SKETCH

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		
DRAWDOWN VOLUME (initial - final x 0.16 {2-inch} or x 0.65 {4-inch})	0.34 FT.	RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED	0.082	PRESSURE TO PUMP	N/A PSI		
TOTAL VOL. PURGED (purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)	4.16 GAL.			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	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	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

NOTES

LOCATION SKETCH

SIGNATURE: for Tom Hanlon

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		
DRAWDOWN VOLUME (initial - final x 0.16 {2-inch} or x 0.65 {4-inch})	0.00815 FT.	RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED	0.0022	PRESSURE TO PUMP	N/A PSI		
TOTAL VOL. PURGED (purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)	3.63 GAL.			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	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	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: 3.50

NOTES Odor from purge water

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-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

INITIAL DEPTH TO WATER	2.41 FT.	WELL DEPTH (TOR)	6.05 FT.	PROTECTIVE CASING STICKUP (FROM GROUND)	FT.
FINAL DEPTH TO WATER	6.00 FT.	SCREEN LENGTH	0.5 FT.	PROTECTIVE CASING / WELL DIFFERENCE	FT.
DRAWDOWN VOLUME (initial - final x 0.16 {2-inch} or x 0.65 {4-inch})	0.59 FT.	RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED	1	PID AMBIENT AIR	<0.1 PPM
TOTAL VOL. PURGED (purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)	0.59 GAL.			PID WELL MOUTH	<0.1 PPM
				PRESSURE TO PUMP	N/A PSI
				REFILL TIMER SETTING	N/A SEC.
				DISCHARGE TIMER SETTING	N/A SEC.
				WELL DIAMETER	1 IN.

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	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	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: 0.4

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

INITIAL DEPTH TO WATER	2.31 FT.	WELL DEPTH (TOR)	6.05 FT.	PROTECTIVE CASING STICKUP (FROM GROUND)	FT.
FINAL DEPTH TO WATER	6.00 FT.	SCREEN LENGTH	0.5 FT.	PID AMBIENT AIR	<0.1 PPM
DRAWDOWN VOLUME (initial - final x 0.16 {2-inch} or x 0.65 {4-inch})	0.61 FT.	RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED	1	PID WELL MOUTH	<0.1 PPM
TOTAL VOL. PURGED (purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)	0.61 GAL.			PRESSURE TO PUMP	N/A PSI
				REFILL TIMER SETTING	N/A SEC.

PROTECTIVE CASING / WELL DIFFERENCE	FT.	
WELL DIAMETER	1 IN.	
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	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	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: 0.5

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

INITIAL DEPTH TO WATER	2.08 FT.	WELL DEPTH (TOR)	6.05 FT.	PROTECTIVE CASING STICKUP (FROM GROUND)	FT.
FINAL DEPTH TO WATER	3.08 FT.	SCREEN LENGTH	0.5 FT.	PROTECTIVE CASING / WELL DIFFERENCE	FT.
DRAWDOWN VOLUME (initial - final x 0.16 {2-inch} or x 0.65 {4-inch})	0.041 FT.	RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED	1	PID AMBIENT AIR	<0.1 PPM
TOTAL VOL. PURGED (purge rate (milliliters per minute) x time duration (minutes) x 0.00026 gal/ml)	5.55 GAL.			PID WELL MOUTH	<0.1 PPM
				PRESSURE TO PUMP	N/A PSI
				REFILL TIMER SETTING	N/A SEC.
				DISCHARGE TIMER SETTING	N/A SEC.
				WELL DIAMETER	1 IN.

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	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	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 5.2

NOTES

LOCATION SKETCH

SIGNATURE: David Chapman

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: _____ / 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 | 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: 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 | 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: 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	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-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		CALIBRATION INFORMATION STANDARD VALUE		METER VALUE		ACCEPTANCE CRITERIA **
HORIBA MODEL NO. U-22	pH	4.00	units	3.99	units	+/- 10% of standard
UNIT ID 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 / [signature] for Tom Hanlon

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 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. M015-11	Sp. Conductivity	4.49	mS/cm	4.49	mS/cm	+/- 10% of standard
	Redox	230	mV	220	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	0.29	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		CALIBRATION INFORMATION 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.

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2 = specify acceptance criteria in the Notes section

MACTEC ENGINEERING AND CONSULTING

FIELD INSTRUMENTATION CALIBRATION RECORD

PROJECT: Olin Chemical Superfund Site | DATE: 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 STANDARD VALUE		CALIBRATION INFORMATION 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 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	4.48	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	0.3	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.

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2 = specify acceptance criteria in the Notes section

MACTEC ENGINEERING AND CONSULTING

FIELD INSTRUMENTATION CALIBRATION RECORD

PROJECT: Olin Chemical Superfund Site | DATE: 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		CALIBRATION INFORMATION STANDARD VALUE		CALIBRATION INFORMATION 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	Calibration Fluids/	
Deionized Water Source:		Standard Source:	Auto Cal
Trip Blank Water Source:		Lot Numbers pH	5907
Sample Preservatives Source: Lab Provided		mV	5907
Disposable Filter Type: 0.45 micron field filter		Sp. Cond.	5907
Other		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.

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2 = specify acceptance criteria in the Notes section

MACTEC ENGINEERING AND CONSULTING

FIELD INSTRUMENTATION CALIBRATION RECORD

PROJECT: Olin Chemical Superfund Site | DATE: 5/23/2008

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		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	4.51	mS/cm	+/- 10% of standard
	Redox	230	mV	237	mV	see note 1
	DO	N/A	mg/L *	10.80	mg/L	+/- 10% of standard
	Thermometer Temperature	N/A	deg. C	---	deg. C	+/- 2.0 deg. C
TURBIDITY METER TYPE Hach		<0.1	NTU	0.48	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

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]-1C
Project Manager: [illegible]
Work ID: PCMP
Contact: David Chapman

Job# | Quote# | PO#

Requested Turn Around Time
10 Business Day (Std) XX | Rush TAT Requested:
15 Business Day | 24 hrs | 72 hrs
Other | 48 hrs | 5 Day

Regulatory Classification / Special Report Format
NPDES | Drinking Water | DEP Form(s)
RCRA | MCP GW1/S1 | MWRA Smart Rpt
Other | MCP QA/QC Rpt XX

Shaded areas for office use

Analysis Requested
Check analysis and specify method and analytes in comments section.
For example:
500-series for drinking water
600-series for waste water
8000-series for haz/solid waste
Use comments section to further define.

Comments
(Special Instructions)

MCP case narrative

Dissolved metals are field filtered.

Groundwater Metals: Dissolved Al/Cr

Surfacewater Metals: Dissolved/Total Al/Cr/Na

Sample Type Codes
WW-Wastewater DW-Drinking water SW-Surfacewater
LW-Labwater GW-Groundwater A-Air
S-Solid / Soil SL-Sludge O-Oil Z-Other

Sample ID	Sample Type	Sampler's Initials	Date / Time Collected	Grab	Comp.	# Containers	Plastic(P) or Glass(G)	Preservative: NaHSO4/MeOH	HNO3 to pH <2	H2SO4 to pH <2	HCl to pH <2	NaOH to pH >12	NAOH/ZNAC	None / 4° C	Ammonia-Nitrogen	Chloride, Sulfate	Specific Condutivity	Nitrate, Nitrite	Groundwater metals	Surfacewater metals	Sediment: Al/Cr/Fe	Other [illegible]	Other	Other	Other	Other	Other	Other
GW-42I	GW	DLC	[illegible]	X		6	P		X	X				X	X							X	X	X			
GW-42C	GW	TRI	[illegible]	X		3	P		X	X				X	X	X	X		X								
GW-JW-3A	GW	TRI	5/20/08 1005	X		3	P		X	X				X	X	X	X		X								
GW-JW-3A DUP	GW	TRI	5/20/08 1005	X		3	P		X	X				X	X	X	X		X								
GW-JW-1	GW	TRI	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								
X GW-39	GW	DLC	5/20/08 [illegible]	X		3	P		X	X				X	X	X	X		X								
GW-26	GW	DLC TRI	5/20/08 13 50	X		3	P		X	X				X	X	X	X		X								

Sampled by (print): David Chapman / Tom Hanlon
Signature:

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

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

Method of shipment:

TestAmerica-Westfield

Cooler ? Y / N Samples Iced? Y / N

Temp @ receipt: _____ °C

Preservation/pH checked

By: _____ Date: _____

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

TestAmerica Laboratories, Inc.

Chain of Custody Form

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

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

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

Client: Olin Chemical/MACTEC
Project #: [illegible]
Address: 51 Eames Street
Project Manager: [illegible]
Wilmington, MA 01887
Work ID: PCMP
Phone: Fax:
Contact: David Chapman

Job#	Quote#	PO#

Requested Turn Around Time

10 Business Day (Std) XX | Rush TAT Requested:
15 Business Day | 24 hrs ___ 72 hrs ___
Other | 48 hrs ___ 5 Day ___

Regulatory Classification / Special Report Format

NPDES ___ Drinking Water ___ DEP Form(s) ___
RCRA ___ MCP GW1/S1 ___ MWRA Smart Rpt ___
Other ___ MCP QA/QC Rpt XX

Shaded areas for office use

Analysis Requested

Check analysis and specify method and analytes in comments section.
For example:
500-series for drinking water
600-series for waste water
8000-series for haz/solid waste
Use comments section to further define.

Comments
(Special Instructions)

MCP case narrative

Dissolved metals are field filtered.

Groundwater Metals: Dissolved Al/Cr

Surfacewater Metals: Dissolved/Total Al/Cr/Na

Sample Type Codes
WW-Wastewater DW-Drinking water SW-Surfacewater
LW-Labwater GW-Groundwater A-Air
S-Solid / Soil SL-Sludge O-Oil Z-Other

Sample ID	Sample Type	Sampler's Initials	Date Time Collected	Grab	Comp.	# Containers	Plastic(P) or Glass(G)	Preservative: NaHSO4/MeOH	HNO3 to pH <2	H2SO4 to pH <2	HCl to pH <2	NaOH to pH >12	NAOH/ZNAC	None / 4° C	Ammonia-Nitrogen	Chloride, Sulfate	Specific Conductivity	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 11:55	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 14:45	X		3	P		X	X				X	X	X	X		X								
GW-355 DUP	GW	DLC	5/21/08 11:55	X		3	P		X	X				X	X	X	X		X								
GW-76	GW	TRH	5/21/08 10:25	X		3	P		X	X				X	X	X	X		X								
GW-10		TRH	5/21/08 11:10	X		3	P		X	X				X	X	X	X		X								
GW-25		TRH	5/21/08 13:25	X		3	P		X	X				X	X	X	X		X								
GW-24		TRH	5/21/08 14:45	X		3	P		X	X				X	X	X	X		X								

Sampled by (print): David Chapman / Tom Hanlon
Signature:

Cooler? Y / N Samples Iced? Y / N

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

Temp @ receipt: 5.1 °C

Preservation/pH checked

By: ___ Date: ___

Method of shipment:

TestAmerica-Westfield

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

TestAmerica Laboratories, Inc.

Chain of Custody Form

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THE LEADER IN ENVIRONMENTAL TESTING

•53 Southampton ... 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 #: 61000E00K
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 20	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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(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# | 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: Mark Maggione Date: 5/23/08 Time: 15:13
Received by: [signature] Date: 05/23/08 Time: 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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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
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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 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

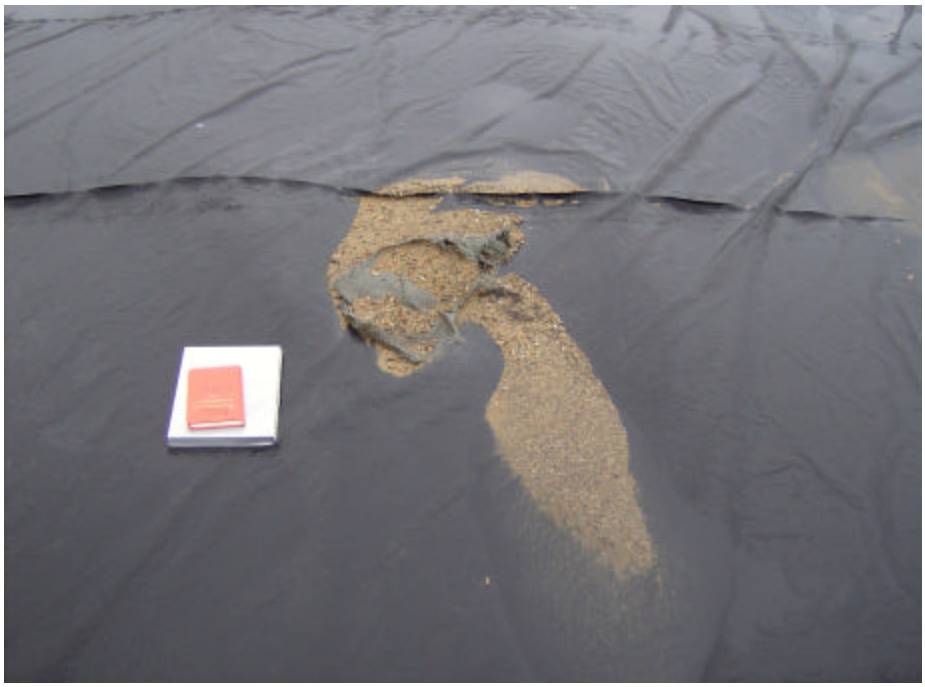
Prepared by BJR | Checked by DLC

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

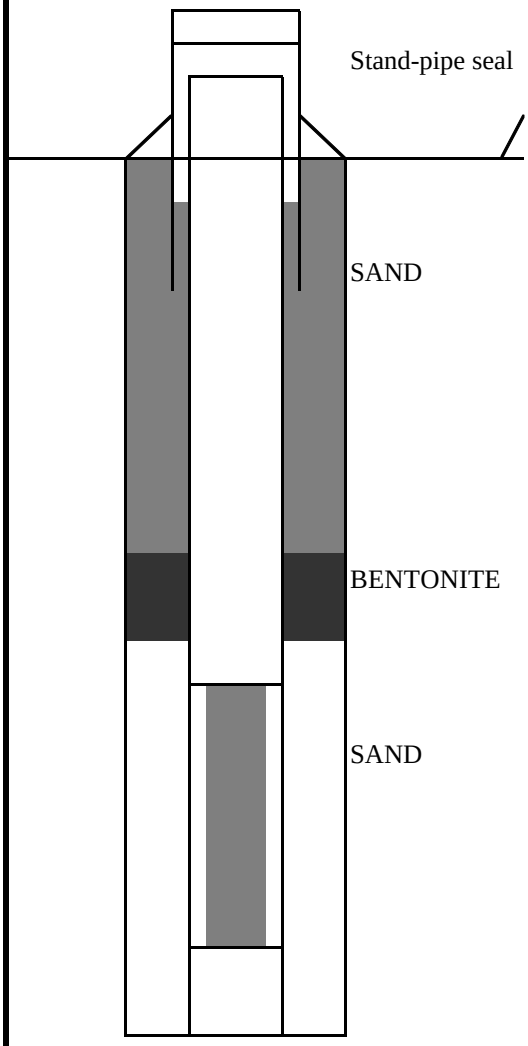
APPENDIX D

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 B

Data Validation Memorandum

B-1 Fourth Quarter 2007 Sampling Event
B-2 First Quarter 2008 Sampling Event

APPENDIX B

Data Validation Memorandum

B-1 Fourth Quarter 2007 Sampling Event

MACTEC

Engineering and Consulting, Inc.
511 Congress Street
P.O. Box 7050
Portland, Maine 04112-7050
Telephone: 207/775-5401
Fax: 207/772-4762
Home Page: www.mactec.com

To: Steve Morrow
From: Chris Ricardi
Date: January 4, 2008
Subject: Interim Response Steps Work Plan Slurry Wall/Cap Monitoring Program, former Post Construction Monitoring Program Soil – November 2007

Data Validation Summary
TestAmerica Laboratories Data Sets 360-13591

This sample set contained results for sediment samples collected during November 2007. The samples were analyzed by TestAmerica (formerly Severn Trent Laboratories) in Westfield, Massachusetts for the following constituents:

Samples 'OC-SD-SD1', 'OC-SD-SD1-DUP', 'OC-SD-SD2', 'OC-SD-SD3', 'OC-SD-SD4', and 'OC-SD-SD5', (360-13591-2 thru -7)

- Total metals (aluminum, chromium, iron), and total solids.

The Olin Wilmington Quality Assurance Project Plan 1999 (QAPP) was 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.

Validation Actions and Observations

No validation actions have been taken. Results are interpreted to be usable as reported by the laboratory.

Chris Ricardi

01/04/08

Chris Ricardi, NRCC-EAC
Senior Chemist

Date

MJ Murphy

01/04/08

Michael Murphy
Project Principal

Date

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

Job Number: 360-13591-1

Job Description: PCMP

For:
Olin Corporation
1186 Lower River Road
Charleston, TN 37310-0248

Attention: Mr. Steven Morrow

Christine Luranik Reynolds

Designee for
Becky C Mason
Project Manager II
becky.mason@testamericainc.com
11/30/2007

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

Table of Contents

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Report Narrative 3
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Method / Analyst Summary 7
Sample Summary 8
Sample Results 9
Sample Datasheets 10
Data Qualifiers 22
QC Results 23
Qc Association Summary 24
Qc Reports 25
Sample Receipt Checklist 27
Client Chain of Custody 28

MADEP MCP Analytical Method Report Certification Form

Laboratory Name:	**TestAmerica Westfield**	Project #:	**360-13591-1**
Project Location:		MADEP RTN[1]:	

This form provides certifications for the following data set:[list Laboratory Sample ID Number(s)]
360-13591-(1-8)

Sample Matrices:	Groundwater	Soil/Sediment		Drinking Water	Other:	
MCP SW-846 Methods Used	8260B( )	8151A ( )	8330 ( )	6010B (x)	7470A/1A ( )	Other ( )
	8270C( )	8081A ( )	VPH ( )	6020 ( )	9014M[2]/9012 ( )	
As specified in MADEP Compendium of Analytical Methods. (check all that apply)	8082 ( )	8021B ( )	EPH ( )	7000 S[3]( )	7196A ( )	

1 List Release Tracking Number (RTN), if known
2 M - SW-846 Method 9014 or MADEP Physiologically Available Cyanide (PAC) Method
3 S - SW-846 Methods 7000 Series List individual method and analyte.

An affirmative response to questions A, B, C and D is required for "Presumptive Certainty" status

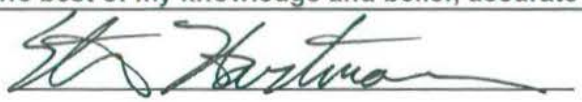
A	Were all samples received by the laboratory in a condition consistent with that described on the Chain-of-Custody documentation for the data set?	(Yes) No[1]
B	Were all QA/QC procedures required for the specified analytical method(s) included in this report followed, including the requirement to note and discuss in a narrative QC data that did not meet appropriate performance standards or guidelines?	(Yes) No[1]
C	Does the analytical data included in this report meet all the requirements for "Presumptive Certainty", as described in Section 2.0 (a), (b), (c) and (d) of the MADEP document CAM VII A, " Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	(Yes) N/A No[1]
D	**VPH and EPH methods only:** Was the VPH or EPH Method conducted without significant modifications (see Section 11.3 of respective Methods)?	Yes (N/A) No[1]

A response to questions E and F below is required for "Presumptive Certainty" status

E	Were all QC performance standards and recommendations for the specified methods achieved?	Yes (No[1])
F	Were results for all analyte-list compounds/elements for the specified method(s) reported?	(Yes) N/A No[1]

[1] All Negative responses must be addressed in an attached Environmental Laboratory case narrative.

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.

Signature:  **Position:** Laboratory Director

Printed Name: Steven C. Hartmann **Date:** 11/30/07

CAM VII A, Rev 3.2 April-04

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MADEP MA014
NY DOH 10843
RI DOH 57
CT DPH 0494
VT DECWSD

NELAP FL E87912 TOX
NELAP NJ MA008 TOX
NELAP NY 10843
NH DES 253901-A

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Tel:(413)572-4000
Fax:(413)572-3707

Boston Service Center
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N.Billerica, MA 01862
Tel:(978)667-1400
Fax:(978)667-7871

CASE NARRATIVE

Client: Olin

Project: PCMP

Report Number: 360-13591-1

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 11/16/2007; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 6.8°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.

TOTAL METALS

Samples 360-13591-2 through 360-13591-7 were analyzed for total metals in accordance with EPA SW846 Method 6010B. The samples were prepared and analyzed on 11/20/2007.

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 Iron failed the MS recovery criteria high for the matrix spike of sample 360-13591-2. Aluminum failed the MSD recovery criteria low for the matrix spike duplicate of sample 360-13591-2. Iron failed the MSD recovery criteria high. The sample concentration overwhelmed the amount of spike added. Refer to the QC report for details.

The following reported method is not listed in the MADEP Massachusetts Contingency Plan (MCP) Compendium of Analytical Methods (CAM), pursuant to the provisions of 310 CMR 40.0017(2).

PERCENT SOLIDS

Samples 360-13591-2 through 360-13591-7 were analyzed for percent solids in accordance with EPA Method 160.3 Modified. The samples were analyzed on 11/28/2007.

All QC performance standards and recommendations, which may affect Data Usability for this specific method, were achieved.

This case narrative is available in Word format upon request.

METHOD SUMMARY

Client: Olin Corporation

Job Number: 360-13591-1

Description	Lab Location	Method	Preparation Method
Matrix: Solid			
Inductively Coupled Plasma - Atomic Emission Spectrometry	TAL WFD	SW846 6010B	
Acid Digestion of Sediments, Sludges, and Soils	TAL WFD		SW846 3050B

Lab References:

TAL WFD = TestAmerica Westfield

Method References:

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: 360-13591-1

Method	Analyst	Analyst ID
SW846 6010B	Nasiatka, Ellen M	EMN
EPA PercentMoisture	Tester, Carla	CT

SAMPLE SUMMARY

Client: Olin Corporation

Job Number: 360-13591-1

Lab Sample ID	Client Sample ID	Client Matrix	Date/Time Sampled	Date/Time Received
360-13591-2	OC-SD-SD1	Solid	11/16/2007 0945	11/16/2007 1720
360-13591-2MS	OC-SD-SD1 MS	Solid	11/16/2007 0945	11/16/2007 1720
360-13591-2MSD	OC-SD-SD1 MSD	Solid	11/16/2007 0945	11/16/2007 1720
360-13591-3	OC-SD-SD1-DUP	Solid	11/16/2007 0945	11/16/2007 1720
360-13591-4	OC-SD-SD2	Solid	11/16/2007 1015	11/16/2007 1720
360-13591-5	OC-SD-SD3	Solid	11/16/2007 1030	11/16/2007 1720
360-13591-6	OC-SD-SD4	Solid	11/16/2007 1100	11/16/2007 1720
360-13591-7	OC-SD-SD5	Solid	11/16/2007 1040	11/16/2007 1720

SAMPLE RESULTS

Mr. Steven Morrow
Olin Corporation
1186 Lower River Road
Charleston, TN 37310-0248

Job Number: 360-13591-1

Client Sample ID: OC-SD-SD1
Lab Sample ID: 360-13591-2

Date Sampled: 11/16/2007 0945
Date Received: 11/16/2007 1720
Client Matrix: Solid
Percent Solids: 58

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: 6010B		Date Analyzed:		11/20/2007 1300	
Prep Method: 3050B		Date Prepared:		11/20/2007 0813	
Aluminum	8500	mg/Kg	0.51	4.9	1.0
Chromium	20	mg/Kg	0.43	0.98	1.0
Iron	10000	mg/Kg	2.0	9.8	1.0

Mr. Steven Morrow
Olin Corporation
1186 Lower River Road
Charleston, TN 37310-0248

Job Number: 360-13591-1

Client Sample ID: OC-SD-SD1
Lab Sample ID: 360-13591-2

Date Sampled: 11/16/2007 0945
Date Received: 11/16/2007 1720
Client Matrix: Solid

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: PercentMoisture		Date Analyzed:		11/28/2007 1352	
Percent Moisture	42	%	1.0	1.0	1.0

Mr. Steven Morrow
Olin Corporation
1186 Lower River Road
Charleston, TN 37310-0248

Job Number: 360-13591-1

Client Sample ID: OC-SD-SD1-DUP
Lab Sample ID: 360-13591-3

Date Sampled: 11/16/2007 0945
Date Received: 11/16/2007 1720
Client Matrix: Solid
Percent Solids: 42

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: 6010B		Date Analyzed:		11/20/2007 1319	
Prep Method: 3050B		Date Prepared:		11/20/2007 0813	
Aluminum	8800	mg/Kg	0.60	5.8	1.0
Chromium	18	mg/Kg	0.51	1.2	1.0
Iron	9500	mg/Kg	2.4	12	1.0

Mr. Steven Morrow
Olin Corporation
1186 Lower River Road
Charleston, TN 37310-0248

Job Number: 360-13591-1

Client Sample ID: OC-SD-SD1-DUP
Lab Sample ID: 360-13591-3

Date Sampled: 11/16/2007 0945
Date Received: 11/16/2007 1720
Client Matrix: Solid

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: PercentMoisture			Date Analyzed:	11/28/2007 1352	
Percent Moisture	58	%	1.0	1.0	1.0

Mr. Steven Morrow
Olin Corporation
1186 Lower River Road
Charleston, TN 37310-0248

Job Number: 360-13591-1

Client Sample ID: OC-SD-SD2
Lab Sample ID: 360-13591-4

Date Sampled: 11/16/2007 1015
Date Received: 11/16/2007 1720
Client Matrix: Solid
Percent Solids: 67

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: 6010B		Date Analyzed:		11/20/2007 1321	
Prep Method: 3050B		Date Prepared:		11/20/2007 0813	
Aluminum	8200	mg/Kg	0.44	4.2	1.0
Chromium	110	mg/Kg	0.37	0.84	1.0
Iron	11000	mg/Kg	1.7	8.4	1.0

Mr. Steven Morrow
Olin Corporation
1186 Lower River Road
Charleston, TN 37310-0248

Job Number: 360-13591-1

Client Sample ID: OC-SD-SD2
Lab Sample ID: 360-13591-4

Date Sampled: 11/16/2007 1015
Date Received: 11/16/2007 1720
Client Matrix: Solid

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: PercentMoisture			Date Analyzed:	11/28/2007 1352	
Percent Moisture	33	%	1.0	1.0	1.0

Mr. Steven Morrow
Olin Corporation
1186 Lower River Road
Charleston, TN 37310-0248

Job Number: 360-13591-1

Client Sample ID: OC-SD-SD3
Lab Sample ID: 360-13591-5

Date Sampled: 11/16/2007 1030
Date Received: 11/16/2007 1720
Client Matrix: Solid
Percent Solids: 74

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: 6010B		Date Analyzed:		11/20/2007 1324	
Prep Method: 3050B		Date Prepared:		11/20/2007 0813	
Aluminum	6900	mg/Kg	0.36	3.5	1.0
Chromium	120	mg/Kg	0.31	0.69	1.0
Iron	9400	mg/Kg	1.4	6.9	1.0

Mr. Steven Morrow
Olin Corporation
1186 Lower River Road
Charleston, TN 37310-0248

Job Number: 360-13591-1

Client Sample ID: OC-SD-SD3
Lab Sample ID: 360-13591-5

Date Sampled: 11/16/2007 1030
Date Received: 11/16/2007 1720
Client Matrix: Solid

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: PercentMoisture		Date Analyzed:	11/28/2007 1352		
Percent Moisture	26	%	1.0	1.0	1.0

Mr. Steven Morrow
Olin Corporation
1186 Lower River Road
Charleston, TN 37310-0248

Job Number: 360-13591-1

Client Sample ID: OC-SD-SD4
Lab Sample ID: 360-13591-6

Date Sampled: 11/16/2007 1100
Date Received: 11/16/2007 1720
Client Matrix: Solid
Percent Solids: 73

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: 6010B		Date Analyzed:		11/20/2007 1327	
Prep Method: 3050B		Date Prepared:		11/20/2007 0813	
Aluminum	8700	mg/Kg	0.40	3.9	1.0
Chromium	18	mg/Kg	0.34	0.77	1.0
Iron	12000	mg/Kg	1.6	7.7	1.0

Mr. Steven Morrow
Olin Corporation
1186 Lower River Road
Charleston, TN 37310-0248

Job Number: 360-13591-1

Client Sample ID: OC-SD-SD4
Lab Sample ID: 360-13591-6

Date Sampled: 11/16/2007 1100
Date Received: 11/16/2007 1720
Client Matrix: Solid

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: PercentMoisture			Date Analyzed:	11/28/2007 1352	
Percent Moisture	27	%	1.0	1.0	1.0

Mr. Steven Morrow
Olin Corporation
1186 Lower River Road
Charleston, TN 37310-0248

Job Number: 360-13591-1

Client Sample ID: OC-SD-SD5
Lab Sample ID: 360-13591-7

Date Sampled: 11/16/2007 1040
Date Received: 11/16/2007 1720
Client Matrix: Solid
Percent Solids: 46

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: 6010B		Date Analyzed:		11/20/2007 1329	
Prep Method: 3050B		Date Prepared:		11/20/2007 0813	
Aluminum	17000	mg/Kg	0.67	6.4	1.0
Chromium	1600	mg/Kg	0.57	1.3	1.0
Iron	19000	mg/Kg	2.6	13	1.0

Mr. Steven Morrow
Olin Corporation
1186 Lower River Road
Charleston, TN 37310-0248

Job Number: 360-13591-1

Client Sample ID: OC-SD-SD5
Lab Sample ID: 360-13591-7

Date Sampled: 11/16/2007 1040
Date Received: 11/16/2007 1720
Client Matrix: Solid

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: PercentMoisture		Date Analyzed:		11/28/2007 1352	
Percent Moisture	54	%	1.0	1.0	1.0

DATA REPORTING QUALIFIERS

Client: Olin Corporation

Job Number: 360-13591-1

Lab Section	Qualifier	Description
Metals		
	4	MS, MSD: The analyte present in the original sample is 4 times greater than the matrix spike concentration; therefore, control limits are not applicable.

QUALITY CONTROL RESULTS

Client: Olin Corporation

Job Number: 360-13591-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
Metals					
Prep Batch: 360-25892					
LCS 360-25892/2-A	Lab Control Spike	T	Solid	3050B	
LCSD 360-25892/3-A	Lab Control Spike Duplicate	T	Solid	3050B	
MB 360-25892/1-A	Method Blank	T	Solid	3050B	
360-13591-2	OC-SD-SD1	T	Solid	3050B	
360-13591-2MS	Matrix Spike	T	Solid	3050B	
360-13591-2MSD	Matrix Spike Duplicate	T	Solid	3050B	
360-13591-3	OC-SD-SD1-DUP	T	Solid	3050B	
360-13591-4	OC-SD-SD2	T	Solid	3050B	
360-13591-5	OC-SD-SD3	T	Solid	3050B	
360-13591-6	OC-SD-SD4	T	Solid	3050B	
360-13591-7	OC-SD-SD5	T	Solid	3050B	
Analysis Batch:360-25933					
LCS 360-25892/2-A	Lab Control Spike	T	Solid	6010B	360-25892
LCSD 360-25892/3-A	Lab Control Spike Duplicate	T	Solid	6010B	360-25892
MB 360-25892/1-A	Method Blank	T	Solid	6010B	360-25892
360-13591-2	OC-SD-SD1	T	Solid	6010B	360-25892
360-13591-2MS	Matrix Spike	T	Solid	6010B	360-25892
360-13591-2MSD	Matrix Spike Duplicate	T	Solid	6010B	360-25892
360-13591-3	OC-SD-SD1-DUP	T	Solid	6010B	360-25892
360-13591-4	OC-SD-SD2	T	Solid	6010B	360-25892
360-13591-5	OC-SD-SD3	T	Solid	6010B	360-25892
360-13591-6	OC-SD-SD4	T	Solid	6010B	360-25892
360-13591-7	OC-SD-SD5	T	Solid	6010B	360-25892

Report Basis
T = Total

General Chemistry

Analysis Batch:360-26190				
360-13591-2	OC-SD-SD1	T	Solid	PercentMoisture
360-13591-2MS	Matrix Spike	T	Solid	PercentMoisture
360-13591-2MSD	Matrix Spike Duplicate	T	Solid	PercentMoisture
360-13591-3	OC-SD-SD1-DUP	T	Solid	PercentMoisture
360-13591-4	OC-SD-SD2	T	Solid	PercentMoisture
360-13591-5	OC-SD-SD3	T	Solid	PercentMoisture
360-13591-6	OC-SD-SD4	T	Solid	PercentMoisture
360-13591-7	OC-SD-SD5	T	Solid	PercentMoisture

Report Basis
T = Total

Client: Olin Corporation

Job Number: 360-13591-1

Method Blank - Batch: 360-25892

Method: 6010B
Preparation: 3050B

Lab Sample ID: MB 360-25892/1-A
Client Matrix: Solid
Dilution: 1.0
Date Analyzed: 11/20/2007 1252
Date Prepared: 11/20/2007 0813

Analysis Batch: 360-25933
Prep Batch: 360-25892
Units: mg/Kg

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume: 2.00 g
Final Weight/Volume: 100 mL

Analyte	Result	Qual	MDL	RL
Aluminum	ND		0.26	2.5
Chromium	ND		0.22	0.50
Iron	ND		1.0	5.0

Lab Control Spike/
Lab Control Spike Duplicate Recovery Report - Batch: 360-25892

Method: 6010B
Preparation: 3050B

LCS Lab Sample ID: LCS 360-25892/2-A
Client Matrix: Solid
Dilution: 1.0
Date Analyzed: 11/20/2007 1255
Date Prepared: 11/20/2007 0813

Analysis Batch: 360-25933
Prep Batch: 360-25892
Units: mg/Kg

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume: 2.00 g
Final Weight/Volume: 100 mL

LCSD Lab Sample ID: LCSD 360-25892/3-A
Client Matrix: Solid
Dilution: 1.0
Date Analyzed: 11/20/2007 1258
Date Prepared: 11/20/2007 0813

Analysis Batch: 360-25933
Prep Batch: 360-25892
Units: mg/Kg

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume: 2.00 g
Final Weight/Volume: 100 mL

Analyte	% Rec. LCS	% Rec. LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Aluminum	96	92	80 - 120	3	30		
Chromium	97	94	80 - 120	4	30		
Iron	96	93	80 - 120	4	30		

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

Quality Control Results

Client: Olin Corporation

Job Number: 360-13591-1

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 360-25892

Method: 6010B
Preparation: 3050B

MS Lab Sample ID:	360-13591-2	Analysis Batch:	360-25933	Instrument ID:	Varian 720 ES ICP
Client Matrix:	Solid	Prep Batch:	360-25892	Lab File ID:	N/A
Dilution:	1.0			Initial Weight/Volume:	1.77 g
Date Analyzed:	11/20/2007 1303			Final Weight/Volume:	100 mL
Date Prepared:	11/20/2007 0813				

MSD Lab Sample ID:	360-13591-2	Analysis Batch:	360-25933	Instrument ID:	Varian 720 ES ICP
Client Matrix:	Solid	Prep Batch:	360-25892	Lab File ID:	N/A
Dilution:	1.0			Initial Weight/Volume:	1.77 g
Date Analyzed:	11/20/2007 1305			Final Weight/Volume:	100 mL
Date Prepared:	11/20/2007 0813				

	% Rec.						
Analyte	MS	MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Aluminum	561	9	75 - 125	27	35	4	4
Chromium	99	90	75 - 125	8	35		
Iron	651	488	75 - 125	6	35	4	4

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

Login Sample Receipt Check List

Client: Olin Corporation

Job Number: 360-13591-1

Login Number: 13591
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	6.8 C Submitted same day of sampling - OK.
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	

Severn Trent Laboratories, Inc.
Chain of Custody Form

SEVERN TRENT STL 43241

•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 / Service Center

Job# 13591 | Quote# | PO#

Client: Olin
Address:
Phone: Fax:
Project #:
Project Manager:
Work ID: PCMP
Contact:

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, NPDES
6000-series for groundwater, soil, waste
8000-series for groundwater, soil, waste
Use comments section to further define.

Comments *(Special Instructions)*

Please print legibility. If the analytical requests are not clearly defined on the chain-of-custody, the turnaround time will begin after all questions have been satisfactorily answered.

Requested Turnaround Time (PLEASE SPECIFY)
STANDARD ____ RUSH ____ *(Lab Approval Required)*

Regulatory Classification
NPDES ____ Drinking Water ____
RCRA ____ MCP GW1/S1 ____
Other ____

Special Report Format
QA/QC Report ____
DQE (MCP) Rpt X
DEP Form(s) ____

Sample Type Codes
WW-Wastewater DW-Drinking water SW-Surface water
LW-Lab water 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	Na2S2O3	None / 4° C	Volatiles 524 /624 /8260	Volatiles 601 /602 /8021	Semivoa 525 /625 /8270	PCB / Pest / Herbicide	EPH / VPH	DRO / GRO / ETPH	Metals 6010 / 200.7	Mercury 245.1 / 7470-71	General Chemistry	Bacteriological	Toxicity	Oil & Grease / TOC	Radchem / Other
~~IW-6~~	GW	TRH	11 15 07 1340	X		1	P							X													
SD-SD1	S	DLC	11 16 07 0945																		X						
SD-SD1 Dup	S	DLC																									
SD-SD1 MS	S	DLC																									
SD-SD1 MSD	S	DLC																									
SD-SD2	S	DLC	11 16 07 1015																								
SD-SD3	S	TRH	11 16 07 1030																								
SD-SD4	S	DLC	11 16 07 1100																								
SD-SD5	S		11 16 07 1040																								
																							11/16/07				

Per Dave Chapman Ran 11/19/07
4500 pH
metals → al/cr/Fe
Ran 11/19/07 per Tom Hanlon.
PCT 8-55

Sampled by (print): TRH/DLC/CTM
Signature: [signature]

Relinquished by:	Date:	Time:	Received by:	Date:	Time:
Tom Hanlon	11/16/07	1400	Jerry Dark	11/16/07	1400
Jerry Dark	11/16/07	1720	[signature]	11/16/07	1720

Cooler? Y / N
MADEP Requirement Samples Iced? Y / N
Temp @ receipt: 6.8°C
Preservation / pH checked? Y / N
By: [signature] Date: 11/16/07

STL WESTFIELD

Page 1 of 1

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

Version 1.2, Nov 2002

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

Reviewer/Date 12/14/07
Sr. Review/Date Chris Ricardi 12/20/07
Lab Report # 360-13591
Project # 630006001.61.1

aluminum, chromium, iron

1.0 Laboratory Deliverable Requirements

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

☑ *Name of Laboratory* ☑ *Address* ☑ *Project ID* ☑ *Phone #* ☑ *Sample identification – Field and Laboratory*
Client Information: ☑ *Name* ☑ *Address* ☑ *Client Contact* *(IDs must be cross-referenced)*

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

1.2 Laboratory Report Certification Statement ***Yes*** [✓] *No* [ ] *N/A* [ ] *Comments:*

Does the laboratory report include a completed Analytical Report Certification in the required format?

***ACTION**: If no, contact lab for submission of missing certification or certification with correct format.*

1.3 Laboratory Case Narrative: ***Yes*** [✓] *No* [ ] *N/A* [ ] *Comments:*

☑ *Narrative serves as an exception report for the project and method QA/QC performance.* ☑ *Narrative includes an explanation of each discrepancy on the*

Certification Statement.

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

1.4 Chain of Custody (COC) copy present with all documentation completed **Yes** [✓] No [ ] N/A [ ] Comments:

NOTE: Olin receives and maintains the *original COC.*

ACTION: If no, contact lab for submission of copy of completed *COC.*

1.5 Sample Receipt Information (*Cooler Receipt Form present?*): **Yes** [✓] No [ ] N/A [ ] Comments:

Were each of the following tasks completed and recorded upon receipt of the sample(s) into the laboratory?

☑ Sample temperature confirmed: must be 1° – 10° C. (If samples were sent by courier and delivered on the same day as collection, temperature requirement does not apply).

☑ Container type noted ☑ sample condition observed ☑ pH verified (where applicable) ☑ Field and lab IDs cross referenced

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

1.5.1 Were all samples delivered to the laboratory without breakage? **Yes** [✓] No [ ] N/A [ ] Comments:

1.5.2 Does the *Cooler Receipt Form* or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data? Yes [ ] **No** [✓] N/A [ ] Comments:

1.6 Sample Results Section: *Was each of the following requirements supplied in the laboratory report for each sample?* **Yes** [✓] No [ ] N/A [ ] Comments:

☑ Field ID and Lab ID ☑ *Date and time collected* ☑ Analyst Initials ☑ *Dilution Factor* ☑ % moisture or solids ☑ *Reporting limits*
☑ *Clean-up method* ☑ Analysis method ☑ *Preparation method* ☑ *Date of preparation/extraction/digestion clean-up and analysis, where applicable*
☑ Matrix ☑ Target analytes and concentrations ☑ Units (soils must be reported in dry weight)

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

1.7 QA/QC Information: Was each of the following information supplied in the laboratory report for each sample batch? **Yes** [✓] No [ ] N/A [ ] Comments:

☑ Method blank results ☑ LCS recoveries ☑ MS/MSD recoveries and RPDs ☑ Laboratory duplicate results (where applicable)

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

2.0 Holding Times

Have any technical holding times, determined from date of collection to date of analysis, been exceeded? Holding time for metals is 180 days from sample collection to analysis for both water and soil.

Yes [ ] **No [✓]** N/A [ ] Comments:

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

ACTION: If technical holding times are exceeded, qualify all positive results (J) and non-detects (UJ). If grossly exceeded (2X holding time) reject (R) all non-detect results.

3.0 Laboratory Method

3.1 Was the correct laboratory method used?

Yes [✓] No [ ] N/A [ ] Comments:

Water Digestion	3005A or 3010A or 3020A
Soil Digestion	3050B
Metals	6010B or 200.7

ACTION: If no, contact laboratory to provide justification for method change compared to the requested method. Contact senior chemist to inform Client of change and to request variance.

3.2 Are the practical quantitation limits the same as those specified by the ☐ SOW ☑ QAPP ☐ Lab ☐ MADEP

Yes [✓] No [ ] N/A [ ] Comments:

NOTE: *Verify that the reported metals match the target list specified on the COC.*

ACTION: If no, evaluate variation with respect to sample matrix, preparation, dilution, moisture, etc. If sample PQL is indeterminate, contact lab for explanation.

3.3 Are results present for each sample in the SDG? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, check Request for Analysis to verify if method was ordered and COC to verify that it was sent, and contact lab for resubmission of the missing data

3.4 If dilutions were required, were dilution factors reported? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact the lab for submission.

4.0 Method Blanks

4.1 Is the Method Blank Summary present? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, call the laboratory for submission of missing data.

4.2 Frequency of Analysis: Was a method blank analyzed for each digestion batch of < 20 field samples? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact laboratory for justification. Consult senior chemist for action needed. Narrate non-compliance.

4.3 Is the method blank less than the PQLs for all target elements? **Yes** [✓] No [ ] N/A [ ] Comments:

NOTE: *MADEP requires the method blank to be matrix matched and digested with the samples*

4.4 Do any method blanks have positive results for metals? Qualify data according to the following: Yes [ ] **No** [✓] N/A [ ] Comments:

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

ACTION: For any blank with positive results, list all contaminants for each method blank including the concentration detected and the flagging level (flagging level = 5x the blank value) and the associated samples and qualifiers.

5.0 Laboratory Control Standard

5.1 Was a laboratory control standard run with each analytical batch of 20 samples or less? **Yes** [✓] No [ ] N/A [ ] Comments:

NOTE: *A full target, second source LCS is required by MADEP.*
ACTION: Call laboratory for LCS form submittal. If data are not available, use professional judgement to evaluate data accuracy associated with that batch.

5.2 Is a LCS Summary Form present? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact lab for resubmission of missing data.

5.3 Is the recovery of any analyte outside of MADEP control limits? Yes [ ] **No** [✓] N/A [ ] Comments:

Sample Type	MADEP % Rec
Water	80-120
Soil	within Lab generated limits

ACTION: If recovery is above the upper limit, qualify all positive sample results within the batch as (J). If recovery is below the lower limit, qualify all positive and non-detects results within the batch as (J). If LCS recovery is <30%, positive and non-detect results are rejected (R).

Comments:

6.0 Matrix Spikes

Matrix spikes may be collected at different frequencies based on monthly, quarterly, or task specific schedules. Confirm spike requirements for each set with the senior chemist.

6.1 Were project-specific MS/MSDs collected? List project samples that were spiked.

Yes [✓] No [ ] N/A [ ] Comments: Sample OC-SD-SD1 (360-13591-2) was submitted for MS/MSD analysis.

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

The MS percent recovery for aluminum (561) and the MS/MSD recoveries for iron (651 and 498) are greater than the QC limit of 125. The MSD percent recovery for aluminum (9) is less than the low QC limit of 75. The unspiked sample concentration for aluminum and iron is greater than four times the spike conc. No further action required.

NOTE: If dilutions are required due to high sample concentrations (> 4X spike), the data are evaluated, but no flags are applied.

NOTE: If only one of the recoveries for an MS/MSD pair is outside of the control limits, no qualification is necessary. Use professional judgment for the MS/MSD flags.

ACTION: MS/MSD flags only apply to the sample spiked. If the recoveries of the MS and MSD exceed the upper control limit, qualify positive results as estimated (J). If the recoveries of the MS and MSD are lower than the lower control limit, qualify positive results and non-detects (J).

6.5 Are any RPDs for MS/MSD recoveries outside of the QC limits? Yes [ ] **No** [✓] N/A [ ] Comments:

NOTE: $RPD = \frac{S-D}{(S+D)/2} \times 100\%$ Where: S = MS sample result
D = MSD sample result

NOTE: If dilutions are required due to high sample concentrations, the data are evaluated, but no flags are applied.

ACTION: If the RPD exceeds the control limit, qualify positive results and non-detects (J).

7.0 Laboratory Duplicate

7.1 Was a laboratory duplicate sample analyzed? If so, is the Laboratory Duplicate Sample Form present? **Yes** [ ] No [✓] N/A [ ] Comments:

NOTE: *MADEP refers to this sample as a "matrix duplicate".*

ACTION: If not analyzed, qualification is not needed. If data is missing, contact laboratory for resubmission of report. Narrate non-compliance.

7.2 Is the RPD between the result for the laboratory duplicate sample and the result for the parent sample outside of the QA/QC limits? Yes [ ] **No** [ ] N/A [✓] Comments:

MADEP Laboratory Duplicate Sample RPD Criteria:	QAPP RPD
For aqueous results > 5× RL, RPD must be ± 20%	20
For aqueous results < 5× RL, RPD must be ≤ RL	20
For soil/sediment results > 5× RL, RPD must be ± 35%	20
For soil/sediment results < 5× RL, RPD must be ≤ 2× RL	20

ACTION: If the RPD exceeds the limits, qualify both positive results and non-detects as estimated and flag them J. Narrate non-compliance

8.0 Sampling Accuracy

The majority of ground water samples are collected directly from a tap, process stream, or with dedicated tubing. Rinse blanks will not be collected.

8.1 Were rinsate blanks collected? Prior to evaluating rinsate blanks, obtain a list of the associated samples from the senior chemist.

Yes [ ] No [✓] N/A [ ] Comments:

8.2 Do any rinsate blanks have positive results?

Yes [ ] **No** [ ] N/A [✓] Comments:

NOTE: *MADEP does not require the collection of rinsate blanks.*

ACTION: Evaluate rinsate results against blank results to determine if contaminant may be laboratory-derived. If results are not lab-related, qualify according to below.

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

9.0 Field Duplicates

9.1 Were field duplicate samples collected? Obtain a list of samples and their associated field duplicates.

Yes [✓] **No** [ ] N/A [ ] Comments:

Samples OC-SD-SD1 and OC-SD-SD1-DUP.

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: See attached.

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)

SAMPLE ID	ANALYTE	ORIG	DUP	RPD
OC-SD-SD1	Aluminum	8500	8800	3
OC-SD-SD1	Chromium	20	18	11
OC-SD-SD1	Iron	10000	9500	5

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.

MACTEC

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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: 1/9/08
Subject: Interim Response Steps Work Plan Slurry Wall/Cap Monitoring Program 4Q07 – November 2007

Data Validation Summary
TestAmerica Laboratories Data Set 360-13454

This sample set contained results for DAPL, ground water, and surface water samples collected during November 2007. The samples were analyzed by TestAmerica (formerly Severn Trent Laboratories) in Westfield, Massachusetts. Samples collected for Freezing Point were analyzed by Galbraith Laboratories, Knoxville, Tennessee. Samples were analyzed for the following parameters:

DAPL Samples 'OC-MP-2-1', 'OC-MP-2-4', and 'OC-GW-42D' (360-13454-1 thru -3)

- Freezing Point (Galbraith Laboratories, Knoxville, Tennessee).

Sample 'OC-GW-42S' (360-13454-4)

- Dissolved metals (aluminum and chromium), and general chemistry analysis for ammonia, chloride, sulfate, and specific conductance

Samples 'OC-PZ-17RR', 'OC-DUPLICATE-PZ17RR', and 'OC-PZ-16RSW' (360-13454-5 thru -7)

- Total and dissolved metals (aluminum, chromium, sodium), and general chemistry analysis for ammonia, chloride, sulfate, and specific conductance

The Olin Wilmington Quality Assurance Project Plan 1999 (QAPP) was 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.

No validation actions have been taken. Results are interpreted to be usable as reported by the laboratory.

Chris Ricardi

01/09/08

Senior Chemist, Chris Ricardi, NRCC-EAC Date

Project Principal: Michael Murphy Date

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

Job Number: 360-13454-1

Job Description: PCMP

For:
Olin Corporation
1186 Lower River Road
Charleston, TN 37310-0248

Attention: Mr. Steven Morrow

Joseph A. Clemens Jr.

Designee for
Becky C Mason
Project Manager II
becky.mason@testamericainc.com
12/11/2007

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 #:	**360-13454-1**
Project Location:	**PCMP**	MADEP RTN[1]:	

This form provides certifications for the following data set:[list Laboratory Sample ID Number(s)]
360-13454-(4-7)

Sample Matrices:	**Groundwater**	Soil/Sediment	Drinking Water	**Other:**	
MCP SW-846 Methods Used	8260B( )	8151A ( )	8330 ( )	6010B (x)	7470A/1A ( )	Other ( )
	8270C( )	8081A ( )	VPH ( )	6020 ( )	9014M[2]/9012 ( )	
As specified in MADEP Compendium of Analytical Methods. (check all that apply)	8082 ( )	8021B ( )	EPH ( )	7000 S[3]( )	7196A ( )	

1 List Release Tracking Number (RTN), if known
2 M - SW-846 Method 9014 or MADEP Physiologically Available Cyanide (PAC) Method
3 S - SW-846 Methods 7000 Series List individual method and analyte.

An affirmative response to questions A, B, C and D is required for "Presumptive Certainty" status

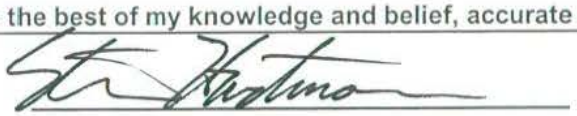
A	Were all samples received by the laboratory in a condition consistent with that described on the Chain-of-Custody documentation for the data set?	(Yes) No[1]
B	Were all QA/QC procedures required for the specified analytical method(s) included in this report followed, including the requirement to note and discuss in a narrative QC data that did not meet appropriate performance standards or guidelines?	(Yes) No[1]
C	Does the analytical data included in this report meet all the requirements for "Presumptive Certainty", as described in Section 2.0 (a), (b), (c) and (d) of the MADEP document CAM VII A, " Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	(Yes) N/A No[1]
D	**VPH and EPH methods only:** Was the VPH or EPH Method conducted without significant modifications (see Section 11.3 of respective Methods)?	Yes (N/A) No[1]

A response to questions E and F below is required for "Presumptive Certainty" status

E	Were all QC performance standards and recommendations for the specified methods achieved?	Yes (No[1])
F	Were results for all analyte-list compounds/elements for the specified method(s) reported?	Yes N/A (No[1])

[1] All Negative responses must be addressed in an attached Environmental Laboratory case narrative.

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.

Signature:  **Position:** Laboratory Director

Printed Name: Steven C. Hartmann **Date:** 12/14/07

CAM VII A, Rev 3.2 April-04

TestAmerica
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MADEP MA014
NY DOH 10843
RI DOH 57
CT DPH 0494
VT DECWSD

NELAP FL E87912 TOX
NELAP NJ MA008 TOX
NELAP NY 10843
NH DES 253901-A

TestAmerica Westfield
53 Southampton Rd,
Westfield, MA 01085
Tel:(413)572-4000
Fax:(413)572-3707

Boston Service Center
148 Rangeway Rd
N.Billerica, MA 01862
Tel:(978)667-1400
Fax:(978)667-7871

MADEP MCP Analytical Method Report Certification Form

Laboratory Name:	**TestAmerica Westfield**	Project #:	**360-13454-1**
Project Location:	**PCMP**	MADEP RTN[1]:	

This form provides certifications for the following data set:[list Laboratory Sample ID Number(s)]
360-13454-(4-7)

Sample Matrices:	**Groundwater**	Soil/Sediment	Drinking Water	**Other:**		
MCP SW-846 Methods Used	8260B( )	8151A ( )	8330 ( )	6010B ( )	7470A/1A ( )	Other (x)
	8270C( )	8081A ( )	VPH ( )	6020 ( )	9014M[2]/9012 ( )	
As specified in MADEP Compendium of Analytical Methods. (check all that apply)	8082 ( )	8021B ( )	EPH ( )	7000 S[3]( )	7196A ( )	

1 List Release Tracking Number (RTN), if known
2 M - SW-846 Method 9014 or MADEP Physiologically Available Cyanide (PAC) Method
3 S - SW-846 Methods 7000 Series List individual method and analyte.

An affirmative response to questions A, B, C and D is required for "Presumptive Certainty" status

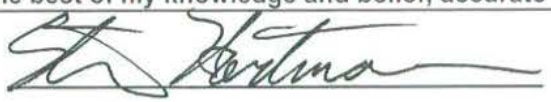
A	Were all samples received by the laboratory in a condition consistent with that described on the Chain-of-Custody documentation for the data set?	(Yes) No[1]
B	Were all QA/QC procedures required for the specified analytical method(s) included in this report followed, including the requirement to note and discuss in a narrative QC data that did not meet appropriate performance standards or guidelines?	(Yes) No[1]
C	Does the analytical data included in this report meet all the requirements for "Presumptive Certainty", as described in Section 2.0 (a), (b), (c) and (d) of the MADEP document CAM VII A, " Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	Yes (N/A) No[1]
D	**VPH and EPH methods only**: Was the VPH or EPH Method conducted without significant modifications (see Section 11.3 of respective Methods)?	Yes (N/A) No[1]

A response to questions E and F below is required for "Presumptive Certainty" status

E	Were all QC performance standards and recommendations for the specified methods achieved?	(Yes) No[1]
F	Were results for all analyte-list compounds/elements for the specified method(s) reported?	Yes (N/A) No[1]

[1] All Negative responses must be addressed in an attached Environmental Laboratory case narrative.

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.

Signature:  **Position:** Laboratory Director

Printed Name: Steven C. Hartmann **Date:** 12/11/07

CAM VII A, Rev 3.2 April-04

TestAmerica
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MADEP MA014
NY DOH 10843
RI DOH 57
CT DPH 0494
VT DECWSD

NELAP FL E87912 TOX
NELAP NJ MA008 TOX
NELAP NY 10843
NH DES 253901-A

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Boston Service Center
148 Rangeway Rd
N.Billerica, MA 01862
Tel:(978)667-1400
Fax:(978)667-7871

CASE NARRATIVE

Client: Olin Corporation

Project: PCMP

Report Number: 360-13454-1

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 11/12/2007; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 0.6°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 360-13454-4 through 360-13454-7 were analyzed for dissolved metals in accordance with EPA SW846 Method 6010B. The samples were analyzed on 11/13/2007 and 11/14/2007.

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:

Sodium failed the MS/MSD recovery criteria low for the matrix spike of sample 360-13454-5. The associated LCS recovered within control limits. Refer to the QC report for details.

General method information:
At the request of the client, an abbreviated/modified MCP analyte list was reported for this job.

TOTAL METALS

Samples 360-13454-5 through 360-13454-7 were analyzed for total metals in accordance with EPA SW846 Method 6010B. The samples were prepared and analyzed on 11/13/2007.

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 360-13454-4 through 360-13454-7 were analyzed for ammonia in accordance with LACHAT 10-107-06-1. The samples were prepared and analyzed on 11/15/2007.

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

Samples 360-13454-5 through 360-13454-7(10X) required dilution prior to analysis. The reporting limits have been adjusted accordingly. Dilutions were due to high concentration.

ANIONS

Samples 360-13454-4 through 360-13454-7 were analyzed for anions in accordance with EPA Method 300.0. The samples were analyzed on 11/13/2007.

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

Samples 360-13454-4 through 360-13454-7(10X) required dilution prior to analysis. The reporting limits have been adjusted accordingly. Dilutions were due to high target concentration.

SPECIFIC CONDUCTANCE (CONDUCTIVITY)

Samples 360-13454-4 through 360-13454-7 were analyzed for Specific Conductance (Conductivity) in accordance with SM 2510B. The samples were analyzed on 11/13/2007.

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

FREEZING POINT

This analysis was performed at Galbraith Laboratories, Inc., P.O. Box 51610, Knoxville, TN 37950-1610.

No anomalies were noted by the subcontract laborotory.

This case narrative is available in Word format upon request.

METHOD SUMMARY

Client: Olin Corporation

Job Number: 360-13454-1

Description	Lab Location	Method	Preparation Method
Matrix: Waste			
ASTM D2386 Freezing Point	SC0006	ASTM D2386	
Matrix: Water			
Dissolved Metals	TAL WFD	SW846 6010B	
Inductively Coupled Plasma - Atomic Emission Spectrometry	TAL WFD	SW846 6010B	
Total Metals	TAL WFD	SW846 6010B	
Sample Filtration performed in the Field	TAL WFD		FIELD_FLTRD
Sample Filtration	TAL WFD		FILTRATION
Acid Digestion of Aqueous Samples and Extracts for	TAL WFD		SW846 3010A
Lachat Ammonia-Nitrogen	TAL WFD	QuickChem 10-107-06-1	
Distillation/Ammonia	TAL WFD		Distill/Ammonia
Chloride & Sulfate	TAL WFD	40CFR136A 300.0	
Conductivity, Specific Conductance	TAL WFD	SM18 SM 2510B	

Lab References:

SC0006 = Galbraith Laboratories

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.

ASTM = ASTM International

QuickChem = Lachat Instruments

SM18 = "Standard Methods For The Examination Of Water And Wastewater", 18th Edition, 1992.

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: 360-13454-1

Method	Analyst	Analyst ID
SW846 6010B	Nasiatka, Ellen M	EMN
QuickChem 10-107-06-1	Lalashius, Andrew L	ALL
40CFR136A 300.0	Lalashius, Andrew L	ALL
SM18 SM 2510B	Emerich, Rich W	RWE

SAMPLE SUMMARY

Client: Olin Corporation

Job Number: 360-13454-1

Lab Sample ID	Client Sample ID	Client Matrix	Date/Time Sampled	Date/Time Received
360-13454-1	OC-MP-2-1	Waste	11/12/2007 1120	11/12/2007 1630
360-13454-2	OC-MP-2-4	Waste	11/12/2007 1125	11/12/2007 1630
360-13454-3	OC-GW-42D	Waste	11/12/2007 1130	11/12/2007 1630
360-13454-4	OC-GW-42S	Ground Water	11/12/2007 1220	11/12/2007 1630
360-13454-5	OC-PZ-17RR	Water	11/12/2007 1315	11/12/2007 1630
360-13454-6	OC-DUPLICATE-PZ17RR	Water	11/12/2007 1315	11/12/2007 1630
360-13454-7	OC-PZ-16RSW	Water	11/12/2007 1230	11/12/2007 1630

SAMPLE RESULTS

Mr. Steven Morrow
Olin Corporation
1186 Lower River Road
Charleston, TN 37310-0248

Job Number: 360-13454-1

Client Sample ID: OC-GW-42S
Lab Sample ID: 360-13454-4

Date Sampled: 11/12/2007 1220
Date Received: 11/12/2007 1630
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B		Date Analyzed:		11/14/2007 1323	
Aluminum	420	ug/L	6.0	100	1.0
Chromium	16	ug/L	0.68	5.0	1.0

Mr. Steven Morrow
Olin Corporation
1186 Lower River Road
Charleston, TN 37310-0248

Job Number: 360-13454-1

Client Sample ID: OC-GW-42S
Lab Sample ID: 360-13454-4

Date Sampled: 11/12/2007 1220
Date Received: 11/12/2007 1630
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 10-107-06-1		Date Analyzed:		11/15/2007 1433	
Prep Method: Distill/Ammonia		Date Prepared:		11/15/2007 1058	
Ammonia	0.46	mg/L	0.10	0.10	1.0
Method: 300.0		Date Analyzed:		11/13/2007 1514	
Sulfate	20	mg/L	2.0	2.0	1.0
Method: 300.0		Date Analyzed:		11/13/2007 1559	
Chloride	66	mg/L	10	10	10
Method: SM 2510B		Date Analyzed:		11/13/2007 1033	
Specific Conductance	320	umhos/cm	1.0	1.0	1.0

Mr. Steven Morrow
Olin Corporation
1186 Lower River Road
Charleston, TN 37310-0248

Job Number: 360-13454-1

Client Sample ID: OC-PZ-17RR
Lab Sample ID: 360-13454-5

Date Sampled: 11/12/2007 1315
Date Received: 11/12/2007 1630
Client Matrix: Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B		Date Analyzed:		11/13/2007 1203	
Aluminum	1700	ug/L	6.0	100	1.0
Chromium	500	ug/L	0.68	5.0	1.0
Sodium	180000	ug/L	95	2000	1.0
Method: 6010B		Date Analyzed:		11/13/2007 1434	
Prep Method: 3010A		Date Prepared:		11/13/2007 0742	
Aluminum	4400	ug/L	6.0	100	1.0
Chromium	900	ug/L	0.68	5.0	1.0
Sodium	170000	ug/L	95	2000	1.0

Mr. Steven Morrow
Olin Corporation
1186 Lower River Road
Charleston, TN 37310-0248

Job Number: 360-13454-1

Client Sample ID: OC-PZ-17RR
Lab Sample ID: 360-13454-5

Date Sampled: 11/12/2007 1315
Date Received: 11/12/2007 1630
Client Matrix: Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 10-107-06-1		Date Analyzed:		11/15/2007 1455	
Prep Method: Distill/Ammonia		Date Prepared:		11/15/2007 1058	
Ammonia	98	mg/L	1.0	1.0	10
Method: 300.0		Date Analyzed:		11/13/2007 1630	
Sulfate	660	mg/L	20	20	10
Chloride	180	mg/L	10	10	10
Method: SM 2510B		Date Analyzed:		11/13/2007 1034	
Specific Conductance	1900	umhos/cm	1.0	1.0	1.0

Mr. Steven Morrow
Olin Corporation
1186 Lower River Road
Charleston, TN 37310-0248

Job Number: 360-13454-1

Client Sample ID: OC-DUPLICATE-PZ17RR
Lab Sample ID: 360-13454-6

Date Sampled: 11/12/2007 1315
Date Received: 11/12/2007 1630
Client Matrix: Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B		Date Analyzed:		11/13/2007 1214	
Aluminum	1700	ug/L	6.0	100	1.0
Chromium	500	ug/L	0.68	5.0	1.0
Sodium	170000	ug/L	95	2000	1.0
Method: 6010B		Date Analyzed:		11/13/2007 1436	
Prep Method: 3010A		Date Prepared:		11/13/2007 0742	
Aluminum	4400	ug/L	6.0	100	1.0
Chromium	900	ug/L	0.68	5.0	1.0
Sodium	170000	ug/L	95	2000	1.0

Mr. Steven Morrow
Olin Corporation
1186 Lower River Road
Charleston, TN 37310-0248

Job Number: 360-13454-1

Client Sample ID: OC-DUPLICATE-PZ17RR
Lab Sample ID: 360-13454-6

Date Sampled: 11/12/2007 1315
Date Received: 11/12/2007 1630
Client Matrix: Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 10-107-06-1		Date Analyzed:		11/15/2007 1456	
Prep Method: Distill/Ammonia		Date Prepared:		11/15/2007 1058	
Ammonia	97	mg/L	1.0	1.0	10
Method: 300.0		Date Analyzed:		11/13/2007 1700	
Sulfate	660	mg/L	20	20	10
Chloride	180	mg/L	10	10	10
Method: SM 2510B		Date Analyzed:		11/13/2007 1036	
Specific Conductance	1900	umhos/cm	1.0	1.0	1.0

Mr. Steven Morrow
Olin Corporation
1186 Lower River Road
Charleston, TN 37310-0248

Job Number: 360-13454-1

Client Sample ID: OC-PZ-16RSW
Lab Sample ID: 360-13454-7

Date Sampled: 11/12/2007 1230
Date Received: 11/12/2007 1630
Client Matrix: Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B		Date Analyzed:		11/13/2007 1216	
Aluminum	460	ug/L	6.0	100	1.0
Chromium	160	ug/L	0.68	5.0	1.0
Sodium	160000	ug/L	95	2000	1.0
Method: 6010B		Date Analyzed:		11/13/2007 1439	
Prep Method: 3010A		Date Prepared:		11/13/2007 0742	
Aluminum	1200	ug/L	6.0	100	1.0
Chromium	270	ug/L	0.68	5.0	1.0
Sodium	150000	ug/L	95	2000	1.0

Mr. Steven Morrow
Olin Corporation
1186 Lower River Road
Charleston, TN 37310-0248

Job Number: 360-13454-1

Client Sample ID: OC-PZ-16RSW
Lab Sample ID: 360-13454-7

Date Sampled: 11/12/2007 1230
Date Received: 11/12/2007 1630
Client Matrix: Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 10-107-06-1		Date Analyzed:		11/15/2007 1457	
Prep Method: Distill/Ammonia		Date Prepared:		11/15/2007 1058	
Ammonia	86	mg/L	1.0	1.0	10
Method: 300.0		Date Analyzed:		11/13/2007 1730	
Sulfate	580	mg/L	20	20	10
Chloride	160	mg/L	10	10	10
Method: SM 2510B		Date Analyzed:		11/13/2007 1037	
Specific Conductance	1700	umhos/cm	1.0	1.0	1.0

SUBCONTRACTED DATA

LABORATORY REPORT

Becky Mason
TestAmerica Westfield
53 Southampton Rd
Westfield MA 01085

Report Date: 12/06/07

Purchase Order #: 360-13454

Fax #: 413-572-3707

SAMPLE ID	LAB ID	ANALYSIS	RESULTS
M-2-1 360-13454-1	D-5334	Freezing Point	Crystals disappeared at -3°C
M-2-4 360-13454-2	D-5335	Freezing Point	Crystals disappeared at -3°C
GW-42 D 360-13454-3	D-5336	Freezing Point	Crystals disappeared at 0°C

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LABORATORY REPORT

Becky Mason
TestAmerica Westfield

Report Date: 12/06/07
Lab ID: D-5334-36

TECHNICAL INFORMATION

Testing was performed according to ASTM Method D-2386, as requested.

Authorized Release of Data

Pat DeLozier
Production Coordinator

PD:yb

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Shipping: 2323 Sycamore Dr. | Knoxville, TN 37921-1700
Fax: 865.546.7209

TestAmerica Westfield
Westfield Exe... Park 53 Southampton Road,
Westfield, MA ...085
Phone (413) 572-4000 Fax (413) 572-3707

Galbraith Laboratories

Chain of Custody Record

D-5334-36

TestAmerica

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Mason, Becky C	Carrier Tracking No(s):	COC No: 360-2366.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: becky.mason@testamericainc.com		Page: Page 1 of 1
Company: Galbraith Laboratories		Analysis Requested		STL Job #: 360-13454-1
Address: PO BOX 51610,	Due Date Requested: ~~11/27/2007~~ 11/28/07			Preservation Codes:
City: Knoxville	TAT Requested (days):			A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
State, Zip: TN, 37950-7209				
Phone:	PO #:			
Email:	WO #:			Other:
Project Name: Laboratory Analysis	Project #: 36000015			
Site:	SSOW#:			

Sample Identification Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Preservation Code:	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	SUBCONTRACT/ASTM D1386 Freezing Point	Total Number of containers	Special Instructions/Note:
MP-2-1 (360-13454-1)	11/12/07	11:20		Waste				X	1	
MP-2-4 (360-13454-2)	11/12/07	11:25		Waste				X	1	Please Provide any QC you can with this Report.
GW-42D (360-13454-3)	11/12/07	11:30		Waste				X	1	

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Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:		
Relinquished by:	Date/Time: 11-13-07 1700	Company TA	Received by: Paul DeLongi	Date/Time: 11/14/07 11:15	Company Galbraith
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks:

DATA REPORTING QUALIFIERS

Client: Olin Corporation

Job Number: 360-13454-1

Lab Section	Qualifier	Description
Metals		
	4	MS, MSD: The analyte present in the original sample is 4 times greater than the matrix spike concentration; therefore, control limits are not applicable.

QUALITY CONTROL RESULTS

Client: Olin Corporation

Job Number: 360-13454-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
Metals					
Prep Batch: 360-25612					
LCS 360-25612/2-A	Lab Control Spike	T	Water	3010A	
LCSD 360-25612/3-A	Lab Control Spike Duplicate	T	Water	3010A	
MB 360-25612/1-A	Method Blank	T	Water	3010A	
360-13454-5	OC-PZ-17RR	T	Water	3010A	
360-13454-6	OC-DUPLICATE-PZ17RR	T	Water	3010A	
360-13454-7	OC-PZ-16RSW	T	Water	3010A	
Analysis Batch:360-25636					
LCS 360-25636/1	Lab Control Spike	T	Water	6010B	
LCSD 360-25636/9	Lab Control Spike Duplicate	T	Water	6010B	
MB 360-25636/2	Method Blank	T	Water	6010B	
360-13454-5	OC-PZ-17RR	D	Water	6010B	
360-13454-5DU	Duplicate	D	Water	6010B	
360-13454-5MS	Matrix Spike	D	Water	6010B	
360-13454-6	OC-DUPLICATE-PZ17RR	D	Water	6010B	
360-13454-7	OC-PZ-16RSW	D	Water	6010B	
Analysis Batch:360-25643					
LCS 360-25612/2-A	Lab Control Spike	T	Water	6010B	360-25612
LCSD 360-25612/3-A	Lab Control Spike Duplicate	T	Water	6010B	360-25612
MB 360-25612/1-A	Method Blank	T	Water	6010B	360-25612
360-13454-5	OC-PZ-17RR	T	Water	6010B	360-25612
360-13454-6	OC-DUPLICATE-PZ17RR	T	Water	6010B	360-25612
360-13454-7	OC-PZ-16RSW	T	Water	6010B	360-25612
Analysis Batch:360-25690					
LCS 360-25690/1	Lab Control Spike	T	Water	6010B	
LCSD 360-25690/7	Lab Control Spike Duplicate	T	Water	6010B	
MB 360-25690/2	Method Blank	T	Water	6010B	
360-13454-4	OC-GW-42S	D	Water	6010B	
360-13454-4DU	Duplicate	D	Water	6010B	
360-13454-4MS	Matrix Spike	D	Water	6010B	

Report Basis
D = Dissolved
T = Total

Client: Olin Corporation

Job Number: 360-13454-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
General Chemistry					
Analysis Batch:360-25627					
LCS 360-25627/1	Lab Control Spike	T	Water	SM 2510B	
MB 360-25627/3	Method Blank	T	Water	SM 2510B	
360-13454-4	OC-GW-42S	T	Water	SM 2510B	
360-13454-5	OC-PZ-17RR	T	Water	SM 2510B	
360-13454-6	OC-DUPLICATE-PZ17RR	T	Water	SM 2510B	
360-13454-7	OC-PZ-16RSW	T	Water	SM 2510B	
Analysis Batch:360-25676					
LCS 360-25676/2	Lab Control Spike	T	Water	300.0	
MB 360-25676/1	Method Blank	T	Water	300.0	
360-13454-4	OC-GW-42S	T	Water	300.0	
360-13454-5	OC-PZ-17RR	T	Water	300.0	
360-13454-6	OC-DUPLICATE-PZ17RR	T	Water	300.0	
360-13454-7	OC-PZ-16RSW	T	Water	300.0	
Prep Batch: 360-25733					
LCS 360-25733/2-A	Lab Control Spike	T	Water	Distill/Ammonia	
MB 360-25733/1-A	Method Blank	T	Water	Distill/Ammonia	
360-13454-4	OC-GW-42S	T	Water	Distill/Ammonia	
360-13454-5	OC-PZ-17RR	T	Water	Distill/Ammonia	
360-13454-6	OC-DUPLICATE-PZ17RR	T	Water	Distill/Ammonia	
360-13454-7	OC-PZ-16RSW	T	Water	Distill/Ammonia	
Analysis Batch:360-25795					
LCS 360-25733/2-A	Lab Control Spike	T	Water	10-107-06-1	360-25733
MB 360-25733/1-A	Method Blank	T	Water	10-107-06-1	360-25733
360-13454-4	OC-GW-42S	T	Water	10-107-06-1	360-25733
360-13454-5	OC-PZ-17RR	T	Water	10-107-06-1	360-25733
360-13454-6	OC-DUPLICATE-PZ17RR	T	Water	10-107-06-1	360-25733
360-13454-7	OC-PZ-16RSW	T	Water	10-107-06-1	360-25733

Report Basis
T = Total

Client: Olin Corporation

Job Number: 360-13454-1

Method Blank - Batch: 360-25612

Method: 6010B
Preparation: 3010A

Lab Sample ID: MB 360-25612/1-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/13/2007 1407
Date Prepared: 11/13/2007 0742

Analysis Batch: 360-25643
Prep Batch: 360-25612
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
Sodium	ND		95	2000
Aluminum	ND		6.0	100
Chromium	ND		0.68	5.0

Lab Control Spike/
Lab Control Spike Duplicate Recovery Report - Batch: 360-25612

Method: 6010B
Preparation: 3010A

LCS Lab Sample ID: LCS 360-25612/2-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/13/2007 1410
Date Prepared: 11/13/2007 0742

Analysis Batch: 360-25643
Prep Batch: 360-25612
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 360-25612/3-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/13/2007 1418
Date Prepared: 11/13/2007 0742

Analysis Batch: 360-25643
Prep Batch: 360-25612
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume: 50 mL
Final Weight/Volume: 50 mL

	% Rec.						
Analyte	LCS	LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Sodium	101	98	80 - 120	3	20		
Aluminum	104	100	80 - 120	4	20		
Chromium	105	101	80 - 120	3	20		

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

Client: Olin Corporation

Job Number: 360-13454-1

Method Blank - Batch: 360-25636

Method: 6010B
Preparation: N/A

Lab Sample ID: MB 360-25636/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/13/2007 1113
Date Prepared: N/A

Analysis Batch: 360-25636
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: mL

Analyte	Result	Qual	MDL	RL
Sodium	ND		95	2000
Aluminum	ND		6.0	100
Chromium	ND		0.68	5.0

Lab Control Spike/
Lab Control Spike Duplicate Recovery Report - Batch: 360-25636

Method: 6010B
Preparation: N/A

LCS Lab Sample ID: LCS 360-25636/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/13/2007 1111
Date Prepared: N/A

Analysis Batch: 360-25636
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 360-25636/9
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/13/2007 1219
Date Prepared: N/A

Analysis Batch: 360-25636
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
Sodium	97	97	80 - 120	1	20		
Aluminum	98	97	80 - 120	1	20		
Chromium	98	97	80 - 120	1	20		

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

Client: Olin Corporation

Job Number: 360-13454-1

Matrix Spike - Batch: 360-25636

Method: 6010B
Preparation: N/A

Lab Sample ID: 360-13454-5
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/13/2007 1208
Date Prepared: N/A

Analysis Batch: 360-25636
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
Sodium	180000	20000	187000	44 ok	75 - 125	4
Aluminum	1700	5000	6490	96	75 - 125	
Chromium	500	1000	1400	90	75 - 125	

Duplicate - Batch: 360-25636

Method: 6010B
Preparation: N/A

Lab Sample ID: 360-13454-5
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/13/2007 1206
Date Prepared: N/A

Analysis Batch: 360-25636
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: mL

Analyte	Sample Result/Qual	Result	RPD	Limit	Qual
Sodium	180000	177000	1	20	
Aluminum	1700	1700	0	20	
Chromium	500	497	1	20	

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

Client: Olin Corporation

Job Number: 360-13454-1

Method Blank - Batch: 360-25690

Method: 6010B
Preparation: N/A

Lab Sample ID: MB 360-25690/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/14/2007 1315
Date Prepared: N/A

Analysis Batch: 360-25690
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: mL

Analyte	Result	Qual	MDL	RL
Aluminum	ND		6.0	100
Chromium	ND		0.68	5.0

Lab Control Spike/
Lab Control Spike Duplicate Recovery Report - Batch: 360-25690

Method: 6010B
Preparation: N/A

LCS Lab Sample ID: LCS 360-25690/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/14/2007 1313
Date Prepared: N/A

Analysis Batch: 360-25690
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 360-25690/7
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/14/2007 1348
Date Prepared: N/A

Analysis Batch: 360-25690
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 10 mL

Analyte	% Rec. LCS	% Rec. LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Aluminum	98	99	80 - 120	1	20		
Chromium	97	99	80 - 120	2	20		

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

Client: Olin Corporation

Job Number: 360-13454-1

Matrix Spike - Batch: 360-25690

Method: 6010B
Preparation: N/A

Lab Sample ID: 360-13454-4
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/14/2007 1328
Date Prepared: N/A

Analysis Batch: 360-25690
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	420	5000	5530	102	75 - 125	
Chromium	16	1000	1020	101	75 - 125	

Duplicate - Batch: 360-25690

Method: 6010B
Preparation: N/A

Lab Sample ID: 360-13454-4
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/14/2007 1326
Date Prepared: N/A

Analysis Batch: 360-25690
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: mL

Analyte	Sample Result/Qual	Result	RPD	Limit	Qual
Aluminum	420	418	1	20	
Chromium	16	16.1	1	20	

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

Client: Olin Corporation

Job Number: 360-13454-1

Method Blank - Batch: 360-25733

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

Lab Sample ID: MB 360-25733/1-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/15/2007 1431
Date Prepared: 11/15/2007 1058

Analysis Batch: 360-25795
Prep Batch: 360-25733
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: mL
Final Weight/Volume: 50 mL

Analyte	Result	Qual	RL	RL
Ammonia	ND		0.10	0.10

Lab Control Spike - Batch: 360-25733

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

Lab Sample ID: LCS 360-25733/2-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/05/2007 1432
Date Prepared: 11/15/2007 1058

Analysis Batch: 360-25795
Prep Batch: 360-25733
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: mL
Final Weight/Volume: 50 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Ammonia	10.0	8.46	85	85 - 115	

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

Client: Olin Corporation

Job Number: 360-13454-1

Method Blank - Batch: 360-25676

Method: 300.0
Preparation: N/A

Lab Sample ID: MB 360-25676/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/13/2007 1228
Date Prepared: N/A

Analysis Batch: 360-25676
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: mL
Final Weight/Volume: mL

Analyte	Result	Qual	RL	RL
Sulfate	ND		2.0	2.0
Chloride	ND		1.0	1.0

Lab Control Spike - Batch: 360-25676

Method: 300.0
Preparation: N/A

Lab Sample ID: LCS 360-25676/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/13/2007 1243
Date Prepared: N/A

Analysis Batch: 360-25676
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: mL
Final Weight/Volume: mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Sulfate	80.0	83.4	104	85 - 115	
Chloride	40.0	41.6	104	85 - 115	

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

Client: Olin Corporation

Job Number: 360-13454-1

Method Blank - Batch: 360-25627

Method: SM 2510B
Preparation: N/A

Lab Sample ID: MB 360-25627/3
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/13/2007 1024
Date Prepared: N/A

Analysis Batch: 360-25627
Prep Batch: N/A
Units: umhos/cm

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

Analyte	Result	Qual	RL	RL
Specific Conductance	ND		1.0	1.0

Lab Control Spike - Batch: 360-25627

Method: SM 2510B
Preparation: N/A

Lab Sample ID: LCS 360-25627/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/13/2007 1021
Date Prepared: N/A

Analysis Batch: 360-25627
Prep Batch: N/A
Units: umhos/cm

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

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Specific Conductance	1410	1440	102	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: 360-13454-1

Login Number: 13454
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	
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.	False	No sample provided for dissolved metals for GW-42S, lab poured off.
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

•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 | Project #: 6300060010/81.17 | Job# 360-13454 | Quote# | PO#

Address: 51 Eames Street | Project Manager: Peter Thompson

Wilmington, MA 01887 | Work ID: PCMP

Phone: Fax: | Contact: David Chapman

Shaded areas for office use

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

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

put 10.2 6

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 ASTM - PZ-36	Other	Other	Other	Other	Other
MP-2-1	GW	DLC	11/12/07 11:20	✓		1	G							✓								✓					
MP-2-4	GW	DLC	11/12/07 11:25	✓		1	G							✓								✓					
GW-42D	GW	TRH	11/12/07 11:30	✓		1	G							✓								✓					
GW-42S	GW	DLC	11/12/07 12:20	✓		3	2P 1G		✓	✓				✓	✓	✓	✓		✓								
PZ-17RR	GW	DLC	11/12/07 13:15	✓		4	3P 1G		✓	✓				✓	✓	✓	✓			✓							
DUPLICATE - PZ17RR	GW	DLC	11/12/07 13:15	✓		4	P		✓	✓				✓	✓	✓	✓			✓							
PZ-16R SW	SW	TRH	11/12/07 13:30	✓		4	P		✓	✓				✓	✓	✓	✓			✓							

Dissolved metals are field filtered.

Groundwater Metals: Dissolved Al/Cr

Surfacewater Metals: Dissolved/Total Al/Cr/Na

PZ-17RR and DUPLICATE PZ-17RR are both surface water samples

The 6010B parameters for GW-42S was NOT FILTERED. Please use water from 500 mL NP bottle

Sampled by (print): David Chapman / Tom Hanlon | Signature: / for Tom

Relinquished by: David Chapman | Date: 11/12/07 | Time: 14:20 | Received by: Jerry Dal | Date: 11/12/07 | Time: 1420 Hanlon

Relinquished by: Jerry Dal | Date: 11/12/07 | Time: 1630 | Received by: | Date: 11/12/07 | Time: 1630

Method of shipment: | TestAmerica-Westfield

Cooler? (Y) / N Samples Iced? (Y) / N

Temp @ receipt: 0.6° °C

Preservation/pH checked

By: | Date: 11/12/07

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

OLIN-WILMINGTON
LEVEL I DATA QUALITY EVALUATION
STANDARD OPERATING PROCEDURE AND CHECKLIST
WET CHEMISTRY PARAMETERS BY VARIOUS METHODS

Reviewer/Date 1/7/08
Sr. Review/Date Chris Ricardi 1/9/08
Lab Report # 360-13454-1
Project # 63000600111.4/.1

ammonia, sulfate, chloride, specific conductance

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 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
- [✓] Dilution Factor
- [✓] % moisture or solids
- [✓] Reporting limits
- [✓] *Clean-up method*
- [✓] Analysis method
- [✓] Preparation method
- [✓] Date of preparation/extraction/digestion clean-up and analysis, where applicable
- [✓] Matrix
- [✓] Target analytes and concentrations
- [✓] Units (soils must be reported in dry weight)

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

1.7 QA/QC Information: Was the following information provided in the laboratory report for each sample batch? **Yes** [✓] No [ ] N/A [ ] Comments:

- [✓] Method blank results
- [✓] LCS recoveries
- [✓] MS/MSD recoveries and RPDs
- [✓] Laboratory duplicate results (where applicable)

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

2.0 Holding Times Yes [ ] **No** [✓] N/A [ ] Comments:

Have any technical holding times, determined from date of collection to date of analysis, been exceeded? The holding times are as follows:

✓ 28 days = ammonia, chemical oxygen demand, chloride, organic carbon, oil & grease, specific conductance, total organic carbon and sulfate

Alkalinity = 14 days | Sulfide, TDS, TSS = 7 days | pH = analyze immediately | Nitrate nitrogen as N = 48 hrs

Nitrite nitrogen as N = 48 hrs | Nitrate + Nitrite as N = 28 days

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

ACTION: If technical holding times are exceeded qualify results (J). For water samples that are grossly exceeded (>2X hold time) reject (R) all non-detect results. Professional judgment used to qualify soils.

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

3.1 Was the correct laboratory method used?

ACTION: If no, contact lab to provide justification for method change compared to the requested method. Contact senior chemist to inform Client of change or to request variance.

3.2 Are the practical quantitation limits the same as those specified by the ☐ SOW ☑ QAPP ☐ Lab?

Yes [ ] No [✓] N/A [ ] Comments: The lab reported a PQL for specific conductance (1 umhos/cm) that is less than the QAPP required PQL of 3 umhos/cm. No further action required.

Note: *The MADEP QA/QC Guidelines do not yet list PQLs for wet chemistry analyses, therefore all criteria will default to values stipulated in the QAPP*. Where the QAPP does not define criteria, QA/QC requirements default to limits employed by the lab**. Other criteria may also apply.*

Ammonia* ☑ = 0.1 mg/ L | Alkalinity** ☐ = 1 mg/L | Bicarbonate Alkalinity** ☐ = 1 mg/L | Carbonate Alkalinity** ☐ = 1 mg/L

Nitrate Nitrogen as N* ☐ = .05 mg/L | Nitrite Nitrogen as N* ☐ = .01 mg/L | Chloride* ☑ = 1 mg/L | Hardness *☐ = 2 mg/L

Spec. Cond.** ☒ 3 umhos/cm | Total Organic Carbon** ☐ = 1 mg/L | Oil & Grease* ☐ = 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 <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**☐ = 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.

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: $\%R = \frac{(SSR-SR)}{SA} \times 100\%$ 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*(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

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

9.1 Were field duplicate samples collected? Obtain a list of samples and their associated field duplicates. **Yes** [✓] No [ ] N/A [ ] Comments: Sample OC-PZ-17RR (360-13454-5) was submitted with a field duplicate OC-DUPLICATE-PZ17RR (360-13454-6).

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: See attached.

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:

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

SAMPLE ID	ANALYTE	ORIG	DUP	RPD
OC-PZ-17RR	Ammonia	98	97	1
OC-PZ-17RR	Sulfate	660	660	0
OC-PZ-17RR	Chloride	180	180	0
OC-PZ-17RR	Specific Conductance	1900	1900	0

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.

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

Reviewer/Date 1/7/08
Sr. Review/Date Chris Ricardi 1/9/08
Lab Report # 360-15454-1
Project # 630006.0011.G1.1

total and dissolved aluminum, chromium and sodium.

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: Sample aliquot for dissolved metals of sample GW-425 was not provided to lab. The lab poured off an aliquot upon receipt of samples.

1.5.2 Does the *Cooler Receipt Form* or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data? Yes [✓] **No** [ ] N/A [ ] Comments:

1.6 Sample Results Section: *Was each of the following requirements supplied in the laboratory report for each sample?* **Yes** [ ] No [ ] N/A [ ] Comments:

☑ Field ID and Lab ID ☑ *Date and time collected* ☑ Analyst Initials ☑ *Dilution Factor* ☐ % moisture or solids ☐ *Reporting limits*
☑ *Clean-up method* ☐ Analysis method ☑ *Preparation method* ☑ *Date of preparation/extraction/digestion clean-up and analysis, where applicable*
☑ Matrix ☑ Target analytes and concentrations ☑ Units (soils must be reported in dry weight)

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

1.7 QA/QC Information: Was each of the following information supplied in the laboratory report for each sample batch? **Yes** [✓] No [ ] N/A [ ] Comments:

☑ Method blank results ☑ LCS recoveries ☑ MS/MSD recoveries and RPDs ☑ Laboratory duplicate results (where applicable)

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

2.0 Holding Times

Have any technical holding times, determined from date of collection to date of analysis, been exceeded? Holding time for metals is 180 days from sample collection to analysis for both water and soil. Yes [ ] **No [✓]** N/A [ ] Comments:

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

ACTION: If technical holding times are exceeded, qualify all positive results (J) and non-detects (UJ). If grossly exceeded (2X holding time) reject (R) all non-detect results.

3.0 Laboratory Method

3.1 Was the correct laboratory method used? **Yes [✓]** No [ ] N/A [ ] Comments:

Water Digestion	3005A or 3010A or 3020A
Soil Digestion	3050B
Metals	6010B or 200.7

ACTION: If no, contact laboratory to provide justification for method change compared to the requested method. Contact senior chemist to inform Client of change and to request variance.

3.2 Are the practical quantitation limits the same as those specified by the ☐ SOW ☑ QAPP ☐ Lab ☐ MADEP **Yes [✓]** No [ ] N/A [ ] Comments:

NOTE: *Verify that the reported metals match the target list specified on the COC.*

ACTION: If no, evaluate variation with respect to sample matrix, preparation, dilution, moisture, etc. If sample PQL is indeterminate, contact lab for explanation.

3.3 Are results present for each sample in the SDG? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, check Request for Analysis to verify if method was ordered and COC to verify that it was sent, and contact lab for resubmission of the missing data

3.4 If dilutions were required, were dilution factors reported? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact the lab for submission.

4.0 Method Blanks

4.1 Is the Method Blank Summary present? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, call the laboratory for submission of missing data.

4.2 Frequency of Analysis: Was a method blank analyzed for each digestion batch of < 20 field samples? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact laboratory for justification. Consult senior chemist for action needed. Narrate non-compliance.

4.3 Is the method blank less than the PQLs for all target elements? **Yes** [✓] No [ ] N/A [ ] Comments:

NOTE: *MADEP requires the method blank to be matrix matched and digested with the samples*

4.4 Do any method blanks have positive results for metals? Qualify data according to the following: Yes [ ] **No** [✓] N/A [ ] Comments:

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

ACTION: For any blank with positive results, list all contaminants for each method blank including the concentration detected and the flagging level (flagging level = 5x the blank value) and the associated samples and qualifiers.

5.0 Laboratory Control Standard

5.1 Was a laboratory control standard run with each analytical batch of 20 samples or less?

Yes [✓] No [ ] N/A [ ] Comments:

NOTE: *A full target, second source LCS is required by MADEP.*
ACTION: Call laboratory for LCS form submittal. If data are not available, use professional judgement to evaluate data accuracy associated with that batch.

5.2 Is a LCS Summary Form present?

Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact lab for resubmission of missing data.

5.3 Is the recovery of any analyte outside of MADEP control limits?

Yes [ ] **No** [✓] N/A [ ] Comments:

Sample Type	*MADEP % Rec*
Water	*80-120*
Soil	within Lab generated limits

ACTION: If recovery is above the upper limit, qualify all positive sample results within the batch as (J). If recovery is below the lower limit, qualify all positive and non-detects results within the batch as (J). If LCS recovery is <30%, positive and non-detect results are rejected (R).

Comments:

6.0 Matrix Spikes

Matrix spikes may be collected at different frequencies based on monthly, quarterly, or task specific schedules. Confirm spike requirements for each set with the senior chemist.

6.1 Were project-specific MS/MSDs ~~collected~~ analyzed? List project samples that were spiked.

Yes [✓] No [ ] N/A [ ] Comments: The lab performed an MS analysis on samples OC-PZ-17RR (360-13454-5) and OC-GW-425 (360-13454-4).

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: The MS percent recovery for sodium in sample OC-PZ-17RR (44) is less than the lower control limit of 75. The unspiked sodium sample concentration is greater than 4X the spiking conc. No further action required.

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: MSD analysis was not performed.

NOTE: $RPD = \frac{S-D}{(S+D)/2} \times 100\%$ Where: S = MS sample result, D = MSD sample result

NOTE: If dilutions are required due to high sample concentrations, the data are evaluated, but no flags are applied.

ACTION: If the RPD exceeds the control limit, qualify positive results and non-detects (J).

7.0 Laboratory Duplicate

7.1 Was a laboratory duplicate sample analyzed? If so, is the Laboratory Duplicate Sample Form present? **Yes** [✓] No [ ] N/A [ ] Comments:

NOTE: *MADEP refers to this sample as a "matrix duplicate".*

ACTION: If not analyzed, qualification is not needed. If data is missing, contact laboratory for resubmission of report. Narrate non-compliance.

7.2 Is the RPD between the result for the laboratory duplicate sample and the result for the parent sample outside of the QA/QC limits? Yes [ ] **No** [✓] N/A [ ] Comments:

MADEP Laboratory Duplicate Sample RPD Criteria:	QAPP RPD
For aqueous results > 5× RL, RPD must be ± 20%	20
For aqueous results < 5× RL, RPD must be ≤ RL	20
For soil/sediment results > 5× RL, RPD must be ± 35%	20
For soil/sediment results < 5× RL, RPD must be ≤ 2× RL	20

ACTION: If the RPD exceeds the limits, qualify both positive results and non-detects as estimated and flag them J. Narrate non-compliance

8.0 Sampling Accuracy

The majority of ground water samples are collected directly from a tap, process stream, or with dedicated tubing. Rinse blanks will not be collected.

8.1 Were rinsate blanks collected? Prior to evaluating rinsate blanks, obtain a list of the associated samples from the senior chemist.

Yes [ ] No [✓] N/A [ ] Comments:

8.2 Do any rinsate blanks have positive results?

Yes [ ] **No** [ ] N/A [✓] Comments:

***NOTE**: MADEP does not require the collection of rinsate blanks.*

ACTION: Evaluate rinsate results against blank results to determine if contaminant may be laboratory-derived. If results are not lab-related, qualify according to below.

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

9.0 Field Duplicates

9.1 Were field duplicate samples collected? Obtain a list of samples and their associated field duplicates.

Yes [✓] **No** [ ] N/A [ ] Comments: Sample OC-PZ-17RR (360-13454-5) was submitted with a field duplicate OC-DUPLICATE-PZ17RR (360-13454-6).

SAMPLE ID	ANALYTE	ORIG	DUP	RPD
OC-PZ-17RR	Total Aluminum	4400	4400	0
OC-PZ-17RR	Total Chromium	900	900	0
OC-PZ-17RR	Total Sodium	170000	170000	0
OC-PZ-17RR	Dissolved Aluminum	1700	1700	0
OC-PZ-17RR	Dissolved Chromium	500	500	0
OC-PZ-17RR	Dissolved Sodium	180000	170000	6

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: See attached.

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.

MACTEC

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To: Steve Morrow
From: Chris Ricardi
Date: January 4, 2008
Subject: Interim Response Steps Work Plan Slurry Wall/Cap Monitoring Program, former Post Construction Monitoring Program Surface Water and Ground Water – November 2007

Data Validation Summary
TestAmerica Laboratories Data Sets 360-13480, 360-13515, and 360-13542

These sample sets contained results for ground water and surface water samples collected during November 2007. The samples were analyzed by TestAmerica (formerly Severn Trent Laboratories) in Westfield, Massachusetts for the following constituents:

Samples 'OC-ISCO-1', OC-PZ-18R', 'OC-SD-17', 'OC-ISCO-3', and 'OC-ISCO-2' (360-13480-1 thru -5)

- Total and dissolved metals (aluminum, chromium, sodium), and general chemistry analysis for ammonia, nitrate, nitrite, chloride, sulfate, and specific conductance (TestAmerica, Westfield, Massachusetts).

Samples 'OC-GW-34SR', 'OC-GW-202D', 'OC-GW-202D DUP', 'OC-GW-10S', 'OC-GW-26', 'OC-GW-202S', and 'OC-GW-34D' (360-13480-6 thru -12)

- Dissolved metals (aluminum and chromium), and general chemistry analysis for ammonia, chloride, sulfate, and specific conductance.

Samples 'OC-GW-39', 'OC-GW-39 DUP', 'OC-GW-25', 'OC-GW-76S', 'OC-GW-55S', 'OC-GW-24', 'OC-PZ18R', 'OC-PZ-16RR', 'OC-PZ-17RR', 'OC-GW-201S', and 'OC-GW-79S' (360-13515-1 thru -11)

- Dissolved metals (aluminum and chromium), and general chemistry analysis for ammonia, chloride, sulfate, and specific conductance.

Samples 'OC-GW-78S', 'OC-GW-CA1', and 'OC-GW-35S' (360-13542-1 thru -3)

- Dissolved metals (aluminum and chromium), and general chemistry analysis for ammonia, chloride, sulfate, and specific conductance.

The Olin Wilmington Quality Assurance Project Plan 1999 (QAPP) was 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.

Validation Actions and Observations

The dissolved sodium results are greater than the total sodium results. Total and dissolved sodium results in samples OC-ISCO-1, OC-PZ-18R, OC-SD-17, OC-ISCO-3, and OC-ISCO-2 were qualified estimated (J).

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

Chris Ricardi

01/04/08

Chris Ricardi, NRCC-EAC
Senior Chemist

Date

Mr J Murphy

01/04/08

Michael Murphy
Project Principal

Date

MACTEC

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

Job Number: 360-13480-1

Job Description: PCMP

For:
Olin Corporation
1186 Lower River Road
Charleston, TN 37310-0248

Attention: Mr. Steven Morrow

Joseph A. Clemens Jr.

Designee for
Becky C Mason
Project Manager II
becky.mason@testamericainc.com
11/27/2007

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

MADEP MCP Analytical Method Report Certification Form

Laboratory Name:	**TestAmerica Westfield**	Project #:	**360-13480-1**
Project Location:	**PCMP**	MADEP RTN[1]:	

This form provides certifications for the following data set:[list Laboratory Sample ID Number(s)]
360-13480-(1-12)

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: Steven C. Hartmann **Position:** Laboratory Director

Printed Name: Steven C. Hartmann **Date:** 11/27/07

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

Boston Service Center
148 Rangeway Rd
N.Billerica, MA 01862
Tel:(978)667-1400
Fax:(978)667-7871

MADEP MCP Analytical Method Report Certification Form

Laboratory Name:	**TestAmerica Westfield**	Project #:	**360-13480-1**
Project Location:	**PCMP**	MADEP RTN[1]:	

This form provides certifications for the following data set:[list Laboratory Sample ID Number(s)]
360-13480-(1-12)

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

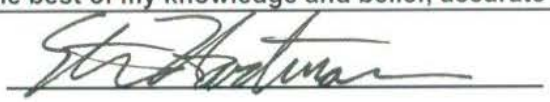
A	Were all samples received by the laboratory in a condition consistent with that described on the Chain-of-Custody documentation for the data set?	(Yes) No[1]
B	Were all QA/QC procedures required for the specified analytical method(s) included in this report followed, including the requirement to note 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:** 11/27/07

CAM VII A, Rev 3.2 April-04

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MADEP MA014
NY DOH 10843
RI DOH 57
CT DPH 0494
VT DECWSD

NELAP FL E87912 TOX
NELAP NJ MA008 TOX
NELAP NY 10843
NH DES 253901-A

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Fax:(978)667-7871

CASE NARRATIVE

Client: Olin Corporation

Project: PCMP

Report Number: 360-13480-1

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 11/13/2007; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 6.6°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 360-13480-1 through 360-13480-12 were analyzed for dissolved metals in accordance with EPA SW846 Method 6010B. The samples were analyzed on 11/14/2007.

All QA/QC procedures required to meet Presumptive Certainty for the specified analytical method were performed as per section B of the MADEP MCP analytical method report Certification form.

All QC performance standards and recommendations, which may affect Data Usability for this specific method, were achieved.

General method information:
At the request of the client, an abbreviated/modified MCP analyte list was reported for this job.

TOTAL METALS

Samples 360-13480-1 through 360-13480-5 were analyzed for total metals in accordance with EPA SW846 Method 6010B. The samples were prepared and analyzed on 11/15/2007.

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 360-13480-1 through 360-13480-12 were analyzed for ammonia in accordance with LACHAT 10-107-06-1. The samples were prepared on 11/15/2007 and 11/26/2007 and analyzed on 11/15/2007 and 11/27/2007.

All QC performance standards and recommendations for this specific method were achieved with the exception of:

Ammonia failed the MS/MSD recovery criteria high for the matrix spike duplicate of sample 360-13480-7. The associated LCS recovered within control limits. Refer to the QC report for details.

Samples 360-13480-3(10X), 360-13480-4(5X), 360-13480-5(10X), 360-13480-7(20X), 360-13480-8(20X), 360-13480-10(20X) and 360-13480-11(10X) required dilution prior to analysis. The reporting limits have been adjusted accordingly. Dilutions were due to high concentration.

ANIONS

Samples 360-13480-1 through 360-13480-12 were analyzed for anions in accordance with EPA Method 300.0. The samples were analyzed on 11/13/2007 and 11/14/2007.

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

Samples 360-13480-3 through 360-13480-5(10X), 360-13480-7(20X), 360-13480-8(10X), 360-13480-8(20X), 360-13480-10 and 360-13480-11(10X) required dilution prior to analysis. The reporting limits have been adjusted accordingly. Dilutions were due to high target concentration.

SPECIFIC CONDUCTANCE (CONDUCTIVITY)

Samples 360-13480-1 through 360-13480-12 were analyzed for Specific Conductance (Conductivity) in accordance with SM 2510B. The samples were analyzed on 11/14/2007.

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: 360-13480-1

Description	Lab Location	Method	Preparation Method
Matrix: Water			
Dissolved Metals	TAL WFD	SW846 6010B	
Total Metals	TAL WFD	SW846 6010B	
Sample Filtration performed in the Field	TAL WFD		FIELD_FLTRD
Acid Digestion of Aqueous Samples and Extracts for	TAL WFD		SW846 3010A
Lachat Ammonia-Nitrogen	TAL WFD	QuickChem 10-107-06-1	
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	SM18 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

SM18 = "Standard Methods For The Examination Of Water And Wastewater", 18th Edition, 1992.

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: 360-13480-1

Method	Analyst	Analyst ID
SW846 6010B	Nasiatka, Ellen M	EMN
QuickChem 10-107-06-1	Lalashius, Andrew L	ALL
40CFR136A 300.0	Lalashius, Andrew L	ALL
SM18 SM 2510B	Lalashius, Andrew L	ALL

SAMPLE SUMMARY

Client: Olin Corporation

Job Number: 360-13480-1

Lab Sample ID	Client Sample ID	Client Matrix	Date/Time Sampled	Date/Time Received
360-13480-1	OC-ISCO-1	Water	11/12/2007 1345	11/13/2007 1650
360-13480-2	OC-PZ-18R	Water	11/12/2007 1415	11/13/2007 1650
360-13480-2MS	OC-PZ-18R MS	Water	11/12/2007 1415	11/13/2007 1650
360-13480-2MSD	OC-PZ-18R MSD	Water	11/12/2007 1415	11/13/2007 1650
360-13480-3	OC-SD-17	Water	11/12/2007 1515	11/13/2007 1650
360-13480-4	OC-ISCO-3	Water	11/12/2007 1545	11/13/2007 1650
360-13480-5	OC-ISCO-2	Water	11/12/2007 1600	11/13/2007 1650
360-13480-6	OC-GW-34SR	Ground Water	11/13/2007 0925	11/13/2007 1650
360-13480-7	OC-GW 202D	Ground Water	11/13/2007 1100	11/13/2007 1650
360-13480-7MS	OC-GW 202D MS	Ground Water	11/13/2007 1100	11/13/2007 1650
360-13480-7MSD	OC-GW 202D MSD	Ground Water	11/13/2007 1100	11/13/2007 1650
360-13480-8	OC-GW 202D DUP	Ground Water	11/13/2007 1100	11/13/2007 1650
360-13480-9	OC-GW-10S	Ground Water	11/13/2007 1200	11/13/2007 1650
360-13480-10	OC-GW-26	Ground Water	11/13/2007 1101	11/13/2007 1650
360-13480-11	OC-GW-202S	Ground Water	11/13/2007 0950	11/13/2007 1650
360-13480-12	OC-GW-34D	Ground Water	11/13/2007 0855	11/13/2007 1650

SAMPLE RESULTS

Mr. Steven Morrow
Olin Corporation
1186 Lower River Road
Charleston, TN 37310-0248

Job Number: 360-13480-1

Client Sample ID: OC-ISCO-1
Lab Sample ID: 360-13480-1

Date Sampled: 11/12/2007 1345
Date Received: 11/13/2007 1650
Client Matrix: Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B		Date Analyzed:		11/14/2007 1225	
Aluminum	140	ug/L	6.0	100	1.0
Chromium	8.8	ug/L	0.68	5.0	1.0
Sodium	40000 J	ug/L	95	2000	1.0
Method: 6010B		Date Analyzed:		11/15/2007 1544	
Prep Method: 3010A		Date Prepared:		11/15/2007 0808	
Aluminum	240	ug/L	6.0	100	1.0
Chromium	19	ug/L	0.68	5.0	1.0
Sodium	36000 J	ug/L	95	2000	1.0

Mr. Steven Morrow
Olin Corporation
1186 Lower River Road
Charleston, TN 37310-0248

Job Number: 360-13480-1

Client Sample ID: OC-ISCO-1
Lab Sample ID: 360-13480-1

Date Sampled: 11/12/2007 1345
Date Received: 11/13/2007 1650
Client Matrix: Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 10-107-06-1		Date Analyzed:		11/15/2007 1441	
Prep Method: Distill/Ammonia		Date Prepared:		11/15/2007 1058	
Ammonia	8.3	mg/L	0.10	0.10	1.0
Method: 300.0		Date Analyzed:		11/14/2007 1115	
Sulfate	62	mg/L	2.0	2.0	1.0
Nitrate as N	0.98	mg/L	0.050	0.050	1.0
Chloride	48	mg/L	1.0	1.0	1.0
Nitrite as N	0.013	mg/L	0.010	0.010	1.0
Method: SM 2510B		Date Analyzed:		11/14/2007 1309	
Specific Conductance	340	umhos/cm	1.0	1.0	1.0

Mr. Steven Morrow
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1186 Lower River Road
Charleston, TN 37310-0248

Job Number: 360-13480-1

Client Sample ID: OC-PZ-18R
Lab Sample ID: 360-13480-2

Date Sampled: 11/12/2007 1415
Date Received: 11/13/2007 1650
Client Matrix: Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B		Date Analyzed:		11/14/2007 1228	
Aluminum	110	ug/L	6.0	100	1.0
Chromium	6.8	ug/L	0.68	5.0	1.0
Sodium	37000 J	ug/L	95	2000	1.0
Method: 6010B		Date Analyzed:		11/15/2007 1528	
Prep Method: 3010A		Date Prepared:		11/15/2007 0808	
Aluminum	240	ug/L	6.0	100	1.0
Chromium	19	ug/L	0.68	5.0	1.0
Sodium	35000 J	ug/L	95	2000	1.0

Mr. Steven Morrow
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1186 Lower River Road
Charleston, TN 37310-0248

Job Number: 360-13480-1

Client Sample ID: OC-PZ-18R
Lab Sample ID: 360-13480-2

Date Sampled: 11/12/2007 1415
Date Received: 11/13/2007 1650
Client Matrix: Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 10-107-06-1		Date Analyzed:		11/15/2007 1442	
Prep Method: Distill/Ammonia		Date Prepared:		11/15/2007 1058	
Ammonia	7.9	mg/L	0.10	0.10	1.0
Method: 300.0		Date Analyzed:		11/14/2007 1130	
Sulfate	60	mg/L	2.0	2.0	1.0
Nitrate as N	0.93	mg/L	0.050	0.050	1.0
Chloride	47	mg/L	1.0	1.0	1.0
Nitrite as N	0.012	mg/L	0.010	0.010	1.0
Method: SM 2510B		Date Analyzed:		11/14/2007 1310	
Specific Conductance	330	umhos/cm	1.0	1.0	1.0

Mr. Steven Morrow
Olin Corporation
1186 Lower River Road
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Job Number: 360-13480-1

Client Sample ID: OC-SD-17
Lab Sample ID: 360-13480-3

Date Sampled: 11/12/2007 1515
Date Received: 11/13/2007 1650
Client Matrix: Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B		Date Analyzed:		11/14/2007 1239	
Aluminum	2000	ug/L	6.0	100	1.0
Chromium	510	ug/L	0.68	5.0	1.0
Sodium	170000 J	ug/L	95	2000	1.0
Method: 6010B		Date Analyzed:		11/15/2007 1547	
Prep Method: 3010A		Date Prepared:		11/15/2007 0808	
Aluminum	8500	ug/L	6.0	100	1.0
Chromium	1500	ug/L	0.68	5.0	1.0
Sodium	150000 J	ug/L	95	2000	1.0

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Charleston, TN 37310-0248

Job Number: 360-13480-1

Client Sample ID: OC-SD-17
Lab Sample ID: 360-13480-3

Date Sampled: 11/12/2007 1515
Date Received: 11/13/2007 1650
Client Matrix: Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 10-107-06-1		Date Analyzed:		11/15/2007 1501	
Prep Method: Distill/Ammonia		Date Prepared:		11/15/2007 1058	
Ammonia	87	mg/L	1.0	1.0	10
Method: 300.0		Date Analyzed:		11/14/2007 1215	
Nitrate as N	0.95	mg/L	0.050	0.050	1.0
Method: 300.0		Date Analyzed:		11/14/2007 1230	
Sulfate	650	mg/L	20	20	10
Chloride	180	mg/L	10	10	10
Nitrite as N	ND	mg/L	0.10	0.10	10
Method: SM 2510B		Date Analyzed:		11/14/2007 1312	
Specific Conductance	1900	umhos/cm	1.0	1.0	1.0

Mr. Steven Morrow
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Job Number: 360-13480-1

Client Sample ID: OC-ISCO-3
Lab Sample ID: 360-13480-4

Date Sampled: 11/12/2007 1545
Date Received: 11/13/2007 1650
Client Matrix: Water

Analyte	Result/Qualifier		Unit	MDL	RL	Dilution
Method: Dissolved-6010B			Date Analyzed:		11/14/2007 1246	
Aluminum	94	J	ug/L	6.0	100	1.0
Chromium	7.1		ug/L	0.68	5.0	1.0
Sodium	96000	J	ug/L	95	2000	1.0
Method: 6010B			Date Analyzed:		11/15/2007 1549	
Prep Method: 3010A			Date Prepared:		11/15/2007 0808	
Aluminum	320		ug/L	6.0	100	1.0
Chromium	10		ug/L	0.68	5.0	1.0
Sodium	51000	J	ug/L	95	2000	1.0

Mr. Steven Morrow
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Job Number: 360-13480-1

Client Sample ID: OC-ISCO-3
Lab Sample ID: 360-13480-4

Date Sampled: 11/12/2007 1545
Date Received: 11/13/2007 1650
Client Matrix: Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 10-107-06-1		Date Analyzed:	11/15/2007 1459		
Prep Method: Distill/Ammonia		Date Prepared:	11/15/2007 1058		
Ammonia	37	mg/L	0.50	0.50	5.0
Method: 300.0		Date Analyzed:	11/14/2007 1245		
Nitrate as N	1.9	mg/L	0.050	0.050	1.0
Method: 300.0		Date Analyzed:	11/14/2007 1300		
Sulfate	220	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:	11/14/2007 1313		
Specific Conductance	1000	umhos/cm	1.0	1.0	1.0

Mr. Steven Morrow
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Job Number: 360-13480-1

Client Sample ID: OC-ISCO-2
Lab Sample ID: 360-13480-5

Date Sampled: 11/12/2007 1600
Date Received: 11/13/2007 1650
Client Matrix: Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B		Date Analyzed:		11/14/2007 1249	
Aluminum	170	ug/L	6.0	100	1.0
Chromium	16	ug/L	0.68	5.0	1.0
Sodium	140000 J	ug/L	95	2000	1.0
Method: 6010B		Date Analyzed:		11/15/2007 1552	
Prep Method: 3010A		Date Prepared:		11/15/2007 0808	
Aluminum	7200	ug/L	6.0	100	1.0
Chromium	1000	ug/L	0.68	5.0	1.0
Sodium	120000 J	ug/L	95	2000	1.0

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Job Number: 360-13480-1

Client Sample ID: OC-ISCO-2
Lab Sample ID: 360-13480-5

Date Sampled: 11/12/2007 1600
Date Received: 11/13/2007 1650
Client Matrix: Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 10-107-06-1		Date Analyzed:		11/15/2007 1500	
Prep Method: Distill/Ammonia		Date Prepared:		11/15/2007 1058	
Ammonia	76	mg/L	1.0	1.0	10
Method: 300.0		Date Analyzed:		11/14/2007 1416	
Nitrate as N	3.1	mg/L	0.050	0.050	1.0
Method: 300.0		Date Analyzed:		11/14/2007 1431	
Sulfate	480	mg/L	20	20	10
Chloride	150	mg/L	10	10	10
Nitrite as N	ND	mg/L	0.10	0.10	10
Method: SM 2510B		Date Analyzed:		11/14/2007 1315	
Specific Conductance	1600	umhos/cm	1.0	1.0	1.0

Mr. Steven Morrow
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1186 Lower River Road
Charleston, TN 37310-0248

Job Number: 360-13480-1

Client Sample ID: OC-GW-34SR
Lab Sample ID: 360-13480-6

Date Sampled: 11/13/2007 0925
Date Received: 11/13/2007 1650
Client Matrix: Ground Water

Analyte	Result/Qualifier		Unit	MDL	RL	Dilution
Method: Dissolved-6010B			Date Analyzed:		11/14/2007 1252	
Aluminum	ND		ug/L	6.0	100	1.0
Chromium	1.1	J	ug/L	0.68	5.0	1.0

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Job Number: 360-13480-1

Client Sample ID: OC-GW-34SR
Lab Sample ID: 360-13480-6

Date Sampled: 11/13/2007 0925
Date Received: 11/13/2007 1650
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 10-107-06-1		Date Analyzed:		11/15/2007 1447	
Prep Method: Distill/Ammonia		Date Prepared:		11/15/2007 1058	
Ammonia	0.55	mg/L	0.10	0.10	1.0
Method: 300.0		Date Analyzed:		11/13/2007 2001	
Sulfate	11	mg/L	2.0	2.0	1.0
Chloride	1.4	mg/L	1.0	1.0	1.0
Method: SM 2510B		Date Analyzed:		11/14/2007 1316	
Specific Conductance	93	umhos/cm	1.0	1.0	1.0

Mr. Steven Morrow
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Job Number: 360-13480-1

Client Sample ID: OC-GW 202D
Lab Sample ID: 360-13480-7

Date Sampled: 11/13/2007 1100
Date Received: 11/13/2007 1650
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B		Date Analyzed:		11/14/2007 1254	
Aluminum	550	ug/L	6.0	100	1.0
Chromium	70	ug/L	0.68	5.0	1.0

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Job Number: 360-13480-1

Client Sample ID: OC-GW 202D
Lab Sample ID: 360-13480-7

Date Sampled: 11/13/2007 1100
Date Received: 11/13/2007 1650
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 10-107-06-1		Date Analyzed:		11/27/2007 1141	
Prep Method: Distill/Ammonia		Date Prepared:		11/26/2007 0913	
Ammonia	230	mg/L	2.0	2.0	20
Method: 300.0		Date Analyzed:		11/14/2007 1717	
Sulfate	1400	mg/L	40	40	20
Chloride	200	mg/L	20	20	20
Method: SM 2510B		Date Analyzed:		11/14/2007 1317	
Specific Conductance	3500	umhos/cm	1.0	1.0	1.0

Mr. Steven Morrow
Olin Corporation
1186 Lower River Road
Charleston, TN 37310-0248

Job Number: 360-13480-1

Client Sample ID: OC-GW 202D DUP
Lab Sample ID: 360-13480-8

Date Sampled: 11/13/2007 1100
Date Received: 11/13/2007 1650
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B		Date Analyzed:		11/14/2007 1302	
Aluminum	560	ug/L	6.0	100	1.0
Chromium	70	ug/L	0.68	5.0	1.0

Mr. Steven Morrow
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1186 Lower River Road
Charleston, TN 37310-0248

Job Number: 360-13480-1

Client Sample ID: OC-GW 202D DUP
Lab Sample ID: 360-13480-8

Date Sampled: 11/13/2007 1100
Date Received: 11/13/2007 1650
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 10-107-06-1		Date Analyzed:		11/27/2007 1144	
Prep Method: Distill/Ammonia		Date Prepared:		11/26/2007 0913	
Ammonia	240	mg/L	2.0	2.0	20
Method: 300.0		Date Analyzed:		11/14/2007 1446	
Chloride	210	mg/L	10	10	10
Method: 300.0		Date Analyzed:		11/14/2007 1501	
Sulfate	1400	mg/L	40	40	20
Method: SM 2510B		Date Analyzed:		11/14/2007 1319	
Specific Conductance	3400	umhos/cm	1.0	1.0	1.0

Mr. Steven Morrow
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1186 Lower River Road
Charleston, TN 37310-0248

Job Number: 360-13480-1

Client Sample ID: OC-GW-10S
Lab Sample ID: 360-13480-9

Date Sampled: 11/13/2007 1200
Date Received: 11/13/2007 1650
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B		Date Analyzed:		11/14/2007 1305	
Aluminum	1600	ug/L	6.0	100	1.0
Chromium	5.4	ug/L	0.68	5.0	1.0

Mr. Steven Morrow
Olin Corporation
1186 Lower River Road
Charleston, TN 37310-0248

Job Number: 360-13480-1

Client Sample ID: OC-GW-10S
Lab Sample ID: 360-13480-9

Date Sampled: 11/13/2007 1200
Date Received: 11/13/2007 1650
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 10-107-06-1		Date Analyzed:		11/27/2007 1146	
Prep Method: Distill/Ammonia		Date Prepared:		11/26/2007 0913	
Ammonia	1.2	mg/L	0.10	0.10	1.0
Method: 300.0		Date Analyzed:		11/13/2007 1946	
Sulfate	40	mg/L	2.0	2.0	1.0
Chloride	12	mg/L	1.0	1.0	1.0
Method: SM 2510B		Date Analyzed:		11/14/2007 1320	
Specific Conductance	150	umhos/cm	1.0	1.0	1.0

Mr. Steven Morrow
Olin Corporation
1186 Lower River Road
Charleston, TN 37310-0248

Job Number: 360-13480-1

Client Sample ID: OC-GW-26
Lab Sample ID: 360-13480-10

Date Sampled: 11/13/2007 1101
Date Received: 11/13/2007 1650
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B		Date Analyzed:		11/14/2007 1308	
Aluminum	ND	ug/L	6.0	100	1.0
Chromium	5.3	ug/L	0.68	5.0	1.0

Mr. Steven Morrow
Olin Corporation
1186 Lower River Road
Charleston, TN 37310-0248

Job Number: 360-13480-1

Client Sample ID: OC-GW-26
Lab Sample ID: 360-13480-10

Date Sampled: 11/13/2007 1101
Date Received: 11/13/2007 1650
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 10-107-06-1		Date Analyzed:		11/27/2007 1144	
Prep Method: Distill/Ammonia		Date Prepared:		11/26/2007 0913	
Ammonia	36	mg/L	2.0	2.0	20
Method: 300.0		Date Analyzed:		11/13/2007 1228	
Sulfate	88	mg/L	2.0	2.0	1.0
Method: 300.0		Date Analyzed:		11/14/2007 1833	
Chloride	58	mg/L	10	10	10
Method: SM 2510B		Date Analyzed:		11/14/2007 1322	
Specific Conductance	510	umhos/cm	1.0	1.0	1.0

Mr. Steven Morrow
Olin Corporation
1186 Lower River Road
Charleston, TN 37310-0248

Job Number: 360-13480-1

Client Sample ID: OC-GW-202S
Lab Sample ID: 360-13480-11

Date Sampled: 11/13/2007 0950
Date Received: 11/13/2007 1650
Client Matrix: Ground Water

Analyte	Result/Qualifier		Unit	MDL	RL	Dilution
Method: Dissolved-6010B			Date Analyzed:		11/14/2007 1310	
Aluminum	ND		ug/L	6.0	100	1.0
Chromium	4.5	J	ug/L	0.68	5.0	1.0

Mr. Steven Morrow
Olin Corporation
1186 Lower River Road
Charleston, TN 37310-0248

Job Number: 360-13480-1

Client Sample ID: OC-GW-202S
Lab Sample ID: 360-13480-11

Date Sampled: 11/13/2007 0950
Date Received: 11/13/2007 1650
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 10-107-06-1		Date Analyzed:		11/27/2007 1145	
Prep Method: Distill/Ammonia		Date Prepared:		11/26/2007 0913	
Ammonia	120	mg/L	1.0	1.0	10
Method: 300.0		Date Analyzed:		11/14/2007 1531	
Sulfate	590	mg/L	20	20	10
Chloride	63	mg/L	10	10	10
Method: SM 2510B		Date Analyzed:		11/14/2007 1323	
Specific Conductance	1700	umhos/cm	1.0	1.0	1.0

Mr. Steven Morrow
Olin Corporation
1186 Lower River Road
Charleston, TN 37310-0248

Job Number: 360-13480-1

Client Sample ID: OC-GW-34D
Lab Sample ID: 360-13480-12

Date Sampled: 11/13/2007 0855
Date Received: 11/13/2007 1650
Client Matrix: Ground Water

Analyte	Result/Qualifier		Unit	MDL	RL	Dilution
Method: Dissolved-6010B			Date Analyzed:		11/14/2007 1318	
Aluminum	7.1	J	ug/L	6.0	100	1.0
Chromium	16		ug/L	0.68	5.0	1.0

Mr. Steven Morrow
Olin Corporation
1186 Lower River Road
Charleston, TN 37310-0248

Job Number: 360-13480-1

Client Sample ID: OC-GW-34D
Lab Sample ID: 360-13480-12

Date Sampled: 11/13/2007 0855
Date Received: 11/13/2007 1650
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 10-107-06-1		Date Analyzed:		11/27/2007 1126	
Prep Method: Distill/Ammonia		Date Prepared:		11/26/2007 0913	
Ammonia	16	mg/L	0.10	0.10	1.0
Method: 300.0		Date Analyzed:		11/14/2007 1546	
Sulfate	42	mg/L	2.0	2.0	1.0
Chloride	2.4	mg/L	1.0	1.0	1.0
Method: SM 2510B		Date Analyzed:		11/14/2007 1325	
Specific Conductance	200	umhos/cm	1.0	1.0	1.0

DATA REPORTING QUALIFIERS

Client: Olin Corporation

Job Number: 360-13480-1

Lab Section	Qualifier	Description
Metals		
	J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
General Chemistry		
	4	MS, MSD: The analyte present in the original sample is 4 times greater than the matrix spike concentration; therefore, control limits are not applicable.

QUALITY CONTROL RESULTS

Client: Olin Corporation

Job Number: 360-13480-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
Metals					
Analysis Batch:360-25689					
LCS 360-25689/13	Lab Control Spike	T	Water	6010B	
LCSD 360-25689/25	Lab Control Spike Duplicate	T	Water	6010B	
MB 360-25689/14	Method Blank	T	Water	6010B	
360-13480-1	OC-ISCO-1	D	Water	6010B	
360-13480-2	OC-PZ-18R	D	Water	6010B	
360-13480-2MS	Matrix Spike	D	Water	6010B	
360-13480-2MSD	Matrix Spike Duplicate	D	Water	6010B	
360-13480-3	OC-SD-17	D	Water	6010B	
360-13480-4	OC-ISCO-3	D	Water	6010B	
360-13480-5	OC-ISCO-2	D	Water	6010B	
360-13480-6	OC-GW-34SR	D	Water	6010B	
360-13480-7	OC-GW 202D	D	Water	6010B	
360-13480-7MS	Matrix Spike	D	Water	6010B	
360-13480-7MSD	Matrix Spike Duplicate	D	Water	6010B	
360-13480-8	OC-GW 202D DUP	D	Water	6010B	
360-13480-9	OC-GW-10S	D	Water	6010B	
360-13480-10	OC-GW-26	D	Water	6010B	
360-13480-11	OC-GW-202S	D	Water	6010B	
360-13480-12	OC-GW-34D	D	Water	6010B	
Prep Batch: 360-25707					
LCS 360-25707/2-A	Lab Control Spike	T	Water	3010A	
LCSD 360-25707/3-A	Lab Control Spike Duplicate	T	Water	3010A	
MB 360-25707/1-A	Method Blank	T	Water	3010A	
360-13480-1	OC-ISCO-1	T	Water	3010A	
360-13480-2	OC-PZ-18R	T	Water	3010A	
360-13480-2MS	Matrix Spike	T	Water	3010A	
360-13480-2MSD	Matrix Spike Duplicate	T	Water	3010A	
360-13480-3	OC-SD-17	T	Water	3010A	
360-13480-4	OC-ISCO-3	T	Water	3010A	
360-13480-5	OC-ISCO-2	T	Water	3010A	
Analysis Batch:360-25764					
LCS 360-25707/2-A	Lab Control Spike	T	Water	6010B	360-25707
LCSD 360-25707/3-A	Lab Control Spike Duplicate	T	Water	6010B	360-25707
MB 360-25707/1-A	Method Blank	T	Water	6010B	360-25707
360-13480-1	OC-ISCO-1	T	Water	6010B	360-25707
360-13480-2	OC-PZ-18R	T	Water	6010B	360-25707
360-13480-2MS	Matrix Spike	T	Water	6010B	360-25707
360-13480-2MSD	Matrix Spike Duplicate	T	Water	6010B	360-25707
360-13480-3	OC-SD-17	T	Water	6010B	360-25707
360-13480-4	OC-ISCO-3	T	Water	6010B	360-25707
360-13480-5	OC-ISCO-2	T	Water	6010B	360-25707

Client: Olin Corporation

Job Number: 360-13480-1

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: 360-13480-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
General Chemistry					
Analysis Batch:360-25676					
LCS 360-25676/2	Lab Control Spike	T	Water	300.0	
MB 360-25676/1	Method Blank	T	Water	300.0	
360-13480-10	OC-GW-26	T	Water	300.0	
Analysis Batch:360-25686					
LCS 360-25686/1	Lab Control Spike	T	Water	SM 2510B	
MB 360-25686/4	Method Blank	T	Water	SM 2510B	
360-13480-1	OC-ISCO-1	T	Water	SM 2510B	
360-13480-2	OC-PZ-18R	T	Water	SM 2510B	
360-13480-3	OC-SD-17	T	Water	SM 2510B	
360-13480-4	OC-ISCO-3	T	Water	SM 2510B	
360-13480-5	OC-ISCO-2	T	Water	SM 2510B	
360-13480-6	OC-GW-34SR	T	Water	SM 2510B	
360-13480-7	OC-GW 202D	T	Water	SM 2510B	
360-13480-8	OC-GW 202D DUP	T	Water	SM 2510B	
360-13480-9	OC-GW-10S	T	Water	SM 2510B	
360-13480-10	OC-GW-26	T	Water	SM 2510B	
360-13480-11	OC-GW-202S	T	Water	SM 2510B	
360-13480-12	OC-GW-34D	T	Water	SM 2510B	
Analysis Batch:360-25700					
LCS 360-25700/2	Lab Control Spike	T	Water	300.0	
MB 360-25700/1	Method Blank	T	Water	300.0	
360-13480-6	OC-GW-34SR	T	Water	300.0	
360-13480-9	OC-GW-10S	T	Water	300.0	
Prep Batch: 360-25733					
LCS 360-25733/2-A	Lab Control Spike	T	Water	Distill/Ammonia	
MB 360-25733/1-A	Method Blank	T	Water	Distill/Ammonia	
360-13480-1	OC-ISCO-1	T	Water	Distill/Ammonia	
360-13480-2	OC-PZ-18R	T	Water	Distill/Ammonia	
360-13480-2MS	Matrix Spike	T	Water	Distill/Ammonia	
360-13480-2MSD	Matrix Spike Duplicate	T	Water	Distill/Ammonia	
360-13480-3	OC-SD-17	T	Water	Distill/Ammonia	
360-13480-4	OC-ISCO-3	T	Water	Distill/Ammonia	
360-13480-5	OC-ISCO-2	T	Water	Distill/Ammonia	
360-13480-6	OC-GW-34SR	T	Water	Distill/Ammonia	

Client: Olin Corporation

Job Number: 360-13480-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
General Chemistry					
Analysis Batch:360-25788					
LCS 360-25788/2	Lab Control Spike	T	Water	300.0	
MB 360-25788/1	Method Blank	T	Water	300.0	
360-13480-1	OC-ISCO-1	T	Water	300.0	
360-13480-2	OC-PZ-18R	T	Water	300.0	
360-13480-2MS	Matrix Spike	T	Water	300.0	
360-13480-2MSD	Matrix Spike Duplicate	T	Water	300.0	
360-13480-3	OC-SD-17	T	Water	300.0	
360-13480-4	OC-ISCO-3	T	Water	300.0	
360-13480-5	OC-ISCO-2	T	Water	300.0	
360-13480-8	OC-GW 202D DUP	T	Water	300.0	
360-13480-11	OC-GW-202S	T	Water	300.0	
360-13480-12	OC-GW-34D	T	Water	300.0	
Analysis Batch:360-25789					
LCS 360-25789/2	Lab Control Spike	T	Water	300.0	
MB 360-25789/1	Method Blank	T	Water	300.0	
360-13480-7	OC-GW 202D	T	Water	300.0	
360-13480-7MS	Matrix Spike	T	Water	300.0	
360-13480-7MSD	Matrix Spike Duplicate	T	Water	300.0	
360-13480-10	OC-GW-26	T	Water	300.0	
Analysis Batch:360-25790					
LCS 360-25790/2	Lab Control Spike	T	Water	300.0	
MB 360-25790/1	Method Blank	T	Water	300.0	
360-13480-1	OC-ISCO-1	T	Water	300.0	
360-13480-2	OC-PZ-18R	T	Water	300.0	
360-13480-2MS	Matrix Spike	T	Water	300.0	
360-13480-2MSD	Matrix Spike Duplicate	T	Water	300.0	
360-13480-3	OC-SD-17	T	Water	300.0	
360-13480-4	OC-ISCO-3	T	Water	300.0	
360-13480-5	OC-ISCO-2	T	Water	300.0	
Analysis Batch:360-25795					
LCS 360-25733/2-A	Lab Control Spike	T	Water	10-107-06-1	360-25733
MB 360-25733/1-A	Method Blank	T	Water	10-107-06-1	360-25733
360-13480-1	OC-ISCO-1	T	Water	10-107-06-1	360-25733
360-13480-2	OC-PZ-18R	T	Water	10-107-06-1	360-25733
360-13480-2MS	Matrix Spike	T	Water	10-107-06-1	360-25733
360-13480-2MSD	Matrix Spike Duplicate	T	Water	10-107-06-1	360-25733
360-13480-3	OC-SD-17	T	Water	10-107-06-1	360-25733
360-13480-4	OC-ISCO-3	T	Water	10-107-06-1	360-25733
360-13480-5	OC-ISCO-2	T	Water	10-107-06-1	360-25733
360-13480-6	OC-GW-34SR	T	Water	10-107-06-1	360-25733

Client: Olin Corporation

Job Number: 360-13480-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
General Chemistry					
Prep Batch: 360-26058					
LCS 360-26058/2-A	Lab Control Spike	T	Water	Distill/Ammonia	
MB 360-26058/1-A	Method Blank	T	Water	Distill/Ammonia	
360-13480-7	OC-GW 202D	T	Water	Distill/Ammonia	
360-13480-7MS	Matrix Spike	T	Water	Distill/Ammonia	
360-13480-7MSD	Matrix Spike Duplicate	T	Water	Distill/Ammonia	
360-13480-8	OC-GW 202D DUP	T	Water	Distill/Ammonia	
360-13480-9	OC-GW-10S	T	Water	Distill/Ammonia	
360-13480-10	OC-GW-26	T	Water	Distill/Ammonia	
360-13480-11	OC-GW-202S	T	Water	Distill/Ammonia	
360-13480-12	OC-GW-34D	T	Water	Distill/Ammonia	
Analysis Batch:360-26134					
LCS 360-26058/2-A	Lab Control Spike	T	Water	10-107-06-1	360-26058
MB 360-26058/1-A	Method Blank	T	Water	10-107-06-1	360-26058
360-13480-7	OC-GW 202D	T	Water	10-107-06-1	360-26058
360-13480-7MS	Matrix Spike	T	Water	10-107-06-1	360-26058
360-13480-7MSD	Matrix Spike Duplicate	T	Water	10-107-06-1	360-26058
360-13480-8	OC-GW 202D DUP	T	Water	10-107-06-1	360-26058
360-13480-9	OC-GW-10S	T	Water	10-107-06-1	360-26058
360-13480-10	OC-GW-26	T	Water	10-107-06-1	360-26058
360-13480-11	OC-GW-202S	T	Water	10-107-06-1	360-26058
360-13480-12	OC-GW-34D	T	Water	10-107-06-1	360-26058

Report Basis
T = Total

Client: Olin Corporation

Job Number: 360-13480-1

Method Blank - Batch: 360-25689

Method: 6010B
Preparation: N/A

Lab Sample ID: MB 360-25689/14
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/14/2007 1040
Date Prepared: N/A

Analysis Batch: 360-25689
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: mL

Analyte	Result	Qual	MDL	RL
Aluminum	ND		6.0	100
Chromium	ND		0.68	5.0
Sodium	ND		95	2000

Lab Control Spike/
Lab Control Spike Duplicate Recovery Report - Batch: 360-25689

Method: 6010B
Preparation: N/A

LCS Lab Sample ID: LCS 360-25689/13
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/14/2007 1038
Date Prepared: N/A

Analysis Batch: 360-25689
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 360-25689/25
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/14/2007 1241
Date Prepared: N/A

Analysis Batch: 360-25689
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	99	98	80 - 120	0	20		
Chromium	99	98	80 - 120	1	20		
Sodium	99	97	80 - 120	2	20		

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

Client: Olin Corporation

Job Number: 360-13480-1

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 360-25689

Method: 6010B
Preparation: N/A

MS Lab Sample ID:	360-13480-2	Analysis Batch: 360-25689	Instrument ID: Varian 720 ES ICP
Client Matrix:	Water	Prep Batch: N/A	Lab File ID: N/A
Dilution:	1.0		Initial Weight/Volume:
Date Analyzed:	11/14/2007 1428		Final Weight/Volume: 10 mL
Date Prepared:	N/A		

MSD Lab Sample ID:	360-13480-2	Analysis Batch: 360-25689	Instrument ID: Varian 720 ES ICP
Client Matrix:	Water	Prep Batch: N/A	Lab File ID: N/A
Dilution:	1.0		Initial Weight/Volume:
Date Analyzed:	11/14/2007 1431		Final Weight/Volume: 10 mL
Date Prepared:	N/A		

	% Rec.					
Analyte	MS	MSD	Limit	RPD	RPD Limit	MS Qual MSD Qual
Aluminum	91	100	75 - 125	9	20	
Chromium	89	98	75 - 125	9	20	
Sodium	85	92	75 - 125	3	20	

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 360-25689

Method: 6010B
Preparation: N/A

MS Lab Sample ID:	360-13480-7	Analysis Batch: 360-25689	Instrument ID: Varian 720 ES ICP
Client Matrix:	Water	Prep Batch: N/A	Lab File ID: N/A
Dilution:	1.0		Initial Weight/Volume:
Date Analyzed:	11/14/2007 1434		Final Weight/Volume: 10 mL
Date Prepared:	N/A		

MSD Lab Sample ID:	360-13480-7	Analysis Batch: 360-25689	Instrument ID: Varian 720 ES ICP
Client Matrix:	Water	Prep Batch: N/A	Lab File ID: N/A
Dilution:	1.0		Initial Weight/Volume:
Date Analyzed:	11/14/2007 1436		Final Weight/Volume: 10 mL
Date Prepared:	N/A		

	% Rec.					
Analyte	MS	MSD	Limit	RPD	RPD Limit	MS Qual MSD Qual
Aluminum	92	90	75 - 125	2	20	
Chromium	88	87	75 - 125	1	20	

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

Client: Olin Corporation

Job Number: 360-13480-1

Method Blank - Batch: 360-25707

Method: 6010B
Preparation: 3010A

Lab Sample ID: MB 360-25707/1-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/15/2007 1520
Date Prepared: 11/15/2007 0808

Analysis Batch: 360-25764
Prep Batch: 360-25707
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		6.0	100
Chromium	ND		0.68	5.0
Sodium	ND		95	2000

Lab Control Spike/
Lab Control Spike Duplicate Recovery Report - Batch: 360-25707

Method: 6010B
Preparation: 3010A

LCS Lab Sample ID: LCS 360-25707/2-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/15/2007 1523
Date Prepared: 11/15/2007 0808

Analysis Batch: 360-25764
Prep Batch: 360-25707
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 360-25707/3-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/15/2007 1526
Date Prepared: 11/15/2007 0808

Analysis Batch: 360-25764
Prep Batch: 360-25707
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	100	102	80 - 120	2	20		
Chromium	101	102	80 - 120	1	20		
Sodium	99	100	80 - 120	1	20		

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

Client: Olin Corporation

Job Number: 360-13480-1

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 360-25707

Method: 6010B
Preparation: 3010A

MS Lab Sample ID:	360-13480-2	Analysis Batch: 360-25764	Instrument ID: Varian 720 ES ICP
Client Matrix:	Water	Prep Batch: 360-25707	Lab File ID: N/A
Dilution:	1.0		Initial Weight/Volume: 50 mL
Date Analyzed:	11/15/2007 1536		Final Weight/Volume: 50 mL
Date Prepared:	11/15/2007 0808		

MSD Lab Sample ID:	360-13480-2	Analysis Batch: 360-25764	Instrument ID: Varian 720 ES ICP
Client Matrix:	Water	Prep Batch: 360-25707	Lab File ID: N/A
Dilution:	1.0		Initial Weight/Volume: 50 mL
Date Analyzed:	11/15/2007 1539		Final Weight/Volume: 50 mL
Date Prepared:	11/15/2007 0808		

Analyte	% Rec. MS	% Rec. MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Aluminum	102	103	75 - 125	1	20		
Chromium	103	103	75 - 125	0	20		
Sodium	92	104	75 - 125	4	20		

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

Client: Olin Corporation

Job Number: 360-13480-1

Method Blank - Batch: 360-25733

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

Lab Sample ID: MB 360-25733/1-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/15/2007 1431
Date Prepared: 11/15/2007 1058

Analysis Batch: 360-25795
Prep Batch: 360-25733
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: mL
Final Weight/Volume: 50 mL

Analyte	Result	Qual	RL	RL
Ammonia	ND		0.10	0.10

Lab Control Spike - Batch: 360-25733

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

Lab Sample ID: LCS 360-25733/2-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/05/2007 1432
Date Prepared: 11/15/2007 1058

Analysis Batch: 360-25795
Prep Batch: 360-25733
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: mL
Final Weight/Volume: 50 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Ammonia	10.0	8.46	85	85 - 115	

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 360-25733

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

MS Lab Sample ID: 360-13480-2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/15/2007 1443
Date Prepared: 11/15/2007 1058

Analysis Batch: 360-25795
Prep Batch: 360-25733

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: mL
Final Weight/Volume: 50 mL

MSD Lab Sample ID: 360-13480-2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/15/2007 1444
Date Prepared: 11/15/2007 1058

Analysis Batch: 360-25795
Prep Batch: 360-25733

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: mL
Final Weight/Volume: 50 mL

Analyte	% Rec. MS	% Rec. MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Ammonia	85	85	75 - 125	0	20		

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

Client: Olin Corporation

Job Number: 360-13480-1

Method Blank - Batch: 360-26058

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

Lab Sample ID: MB 360-26058/1-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/27/2007 1118
Date Prepared: 11/26/2007 0913

Analysis Batch: 360-26134
Prep Batch: 360-26058
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: mL
Final Weight/Volume: 50 mL

Analyte	Result	Qual	RL	RL
Ammonia	ND		0.10	0.10

Lab Control Spike - Batch: 360-26058

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

Lab Sample ID: LCS 360-26058/2-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/27/2007 1119
Date Prepared: 11/26/2007 0913

Analysis Batch: 360-26134
Prep Batch: 360-26058
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: mL
Final Weight/Volume: 50 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Ammonia	10.0	9.80	98	85 - 115	

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 360-26058

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

MS Lab Sample ID: 360-13480-7
Client Matrix: Water
Dilution: 20
Date Analyzed: 11/27/2007 1142
Date Prepared: 11/26/2007 0913

Analysis Batch: 360-26134
Prep Batch: 360-26058

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: mL
Final Weight/Volume: 50 mL

MSD Lab Sample ID: 360-13480-7
Client Matrix: Water
Dilution: 20
Date Analyzed: 11/27/2007 1143
Date Prepared: 11/26/2007 0913

Analysis Batch: 360-26134
Prep Batch: 360-26058

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: mL
Final Weight/Volume: 50 mL

Analyte	% Rec. MS	% Rec. MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Ammonia	91	132	75 - 125	2	20	4	4

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

Client: Olin Corporation

Job Number: 360-13480-1

Method Blank - Batch: 360-25676

Method: 300.0
Preparation: N/A

Lab Sample ID: MB 360-25676/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/13/2007 1228
Date Prepared: N/A

Analysis Batch: 360-25676
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: mL
Final Weight/Volume: mL

Analyte	Result	Qual	RL	RL
Sulfate	ND		2.0	2.0
Chloride	ND		1.0	1.0

Lab Control Spike - Batch: 360-25676

Method: 300.0
Preparation: N/A

Lab Sample ID: LCS 360-25676/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/13/2007 1228
Date Prepared: N/A

Analysis Batch: 360-25676
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: mL
Final Weight/Volume: mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Sulfate	80.0	83.4	104	85 - 115	
Chloride	40.0	41.6	104	85 - 115	

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

Client: Olin Corporation

Job Number: 360-13480-1

Method Blank - Batch: 360-25700

Method: 300.0
Preparation: N/A

Lab Sample ID: MB 360-25700/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/13/2007 1901
Date Prepared: N/A

Analysis Batch: 360-25700
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume:

Analyte	Result	Qual	RL	RL
Sulfate	ND		2.0	2.0
Chloride	ND		1.0	1.0

Lab Control Spike - Batch: 360-25700

Method: 300.0
Preparation: N/A

Lab Sample ID: LCS 360-25700/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/13/2007 1916
Date Prepared: N/A

Analysis Batch: 360-25700
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: mL
Final Weight/Volume: mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Sulfate	80.0	84.2	105	85 - 115	
Chloride	40.0	41.9	105	85 - 115	

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

Client: Olin Corporation

Job Number: 360-13480-1

Method Blank - Batch: 360-25788

Method: 300.0
Preparation: N/A

Lab Sample ID: MB 360-25788/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/14/2007 1044
Date Prepared: N/A

Analysis Batch: 360-25788
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: mL
Final Weight/Volume: mL

Analyte	Result	Qual	RL	RL
Sulfate	ND		2.0	2.0
Chloride	ND		1.0	1.0

Lab Control Spike - Batch: 360-25788

Method: 300.0
Preparation: N/A

Lab Sample ID: LCS 360-25788/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/14/2007 1059
Date Prepared: N/A

Analysis Batch: 360-25788
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: mL
Final Weight/Volume: mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Sulfate	80.0	83.3	104	85 - 115	
Chloride	40.0	41.7	104	85 - 115	

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

Client: Olin Corporation

Job Number: 360-13480-1

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 360-25788

Method: 300.0
Preparation: N/A

MS Lab Sample ID: 360-13480-2
Client Matrix: Water
Dilution: 10
Date Analyzed: 11/14/2007 1145
Date Prepared: N/A

Analysis Batch: 360-25788
Prep Batch: N/A

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: mL
Final Weight/Volume: 10 mL

MSD Lab Sample ID: 360-13480-2
Client Matrix: Water
Dilution: 10
Date Analyzed: 11/14/2007 1200
Date Prepared: N/A

Analysis Batch: 360-25788
Prep Batch: N/A

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: mL
Final Weight/Volume: 10 mL

Analyte	% Rec. MS	% Rec. MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Sulfate	101	101	75 - 125	0	20		
Chloride	104	103	75 - 125	0	20		

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

Client: Olin Corporation

Job Number: 360-13480-1

Method Blank - Batch: 360-25789

Method: 300.0
Preparation: N/A

Lab Sample ID: MB 360-25789/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/14/2007 1647
Date Prepared: N/A

Analysis Batch: 360-25789
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: mL
Final Weight/Volume: mL

Analyte	Result	Qual	RL	RL
Sulfate	ND		2.0	2.0
Chloride	ND		1.0	1.0

Lab Control Spike - Batch: 360-25789

Method: 300.0
Preparation: N/A

Lab Sample ID: LCS 360-25789/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/14/2007 1702
Date Prepared: N/A

Analysis Batch: 360-25789
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: mL
Final Weight/Volume: mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Sulfate	80.0	83.3	104	85 - 115	
Chloride	40.0	41.9	105	85 - 115	

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

Client: Olin Corporation

Job Number: 360-13480-1

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 360-25789

Method: 300.0
Preparation: N/A

MS Lab Sample ID:	360-13480-7	Analysis Batch: 360-25789	Instrument ID: No Equipment Assigned
Client Matrix:	Water	Prep Batch: N/A	Lab File ID: N/A
Dilution:	20		Initial Weight/Volume: mL
Date Analyzed:	11/14/2007 1732		Final Weight/Volume: 10 mL
Date Prepared:	N/A		

MSD Lab Sample ID:	360-13480-7	Analysis Batch: 360-25789	Instrument ID: No Equipment Assigned
Client Matrix:	Water	Prep Batch: N/A	Lab File ID: N/A
Dilution:	20		Initial Weight/Volume: mL
Date Analyzed:	11/14/2007 1747		Final Weight/Volume: 10 mL
Date Prepared:	N/A		

	% Rec.						
Analyte	MS	MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Sulfate	85	84	75 - 125	0	20		
Chloride	105	105	75 - 125	0	20		

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

Client: Olin Corporation

Job Number: 360-13480-1

Method Blank - Batch: 360-25790

Method: 300.0
Preparation: N/A

Lab Sample ID: MB 360-25790/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/14/2007 1044
Date Prepared: N/A

Analysis Batch: 360-25790
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: mL
Final Weight/Volume: 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: 360-25790

Method: 300.0
Preparation: N/A

Lab Sample ID: LCS 360-25790/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/14/2007 1059
Date Prepared: N/A

Analysis Batch: 360-25790
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: mL
Final Weight/Volume: mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Nitrate as N	4.00	4.02	101	85 - 115	
Nitrite as N	4.00	4.26	107	85 - 115	

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

Client: Olin Corporation

Job Number: 360-13480-1

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 360-25790

Method: 300.0
Preparation: N/A

MS Lab Sample ID: 360-13480-2
Client Matrix: Water
Dilution: 10
Date Analyzed: 11/14/2007 1145
Date Prepared: N/A

Analysis Batch: 360-25790
Prep Batch: N/A

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: mL
Final Weight/Volume: 10 mL

MSD Lab Sample ID: 360-13480-2
Client Matrix: Water
Dilution: 10
Date Analyzed: 11/14/2007 1200
Date Prepared: N/A

Analysis Batch: 360-25790
Prep Batch: N/A

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: mL
Final Weight/Volume: 10 mL

Analyte	% Rec. MS	% Rec. MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Nitrate as N	97	96	75 - 125	1	20		
Nitrite as N	105	104	75 - 125	0	20		

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

Client: Olin Corporation

Job Number: 360-13480-1

Method Blank - Batch: 360-25686

Method: SM 2510B
Preparation: N/A

Lab Sample ID: MB 360-25686/4
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/14/2007 1250
Date Prepared: N/A

Analysis Batch: 360-25686
Prep Batch: N/A
Units: umhos/cm

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

Analyte	Result	Qual	RL	RL
Specific Conductance	ND		1.0	1.0

Lab Control Spike - Batch: 360-25686

Method: SM 2510B
Preparation: N/A

Lab Sample ID: LCS 360-25686/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/14/2007 1229
Date Prepared: N/A

Analysis Batch: 360-25686
Prep Batch: N/A
Units: umhos/cm

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

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Specific Conductance	1410	1390	99	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: 360-13480-1

Login Number: 13480
List Source: TestAmerica Westfield
Creator: Rinard, Kimberley A
List Number: 1

Question	T / F/ NA	Comment
Radioactivity either was not measured or, if measured, is at or below background	N/A	
The cooler's custody seal, if present, is intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	False	6.6 C OK
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

•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 #: 63000600.10 / 81.17
Project Manager: Peter Thompson
Work ID: PCMP
Contact: David Chapman

Job# 360-13480 | Quote# | PO#

Requested Turn Around Time
10 Business Day (Std) XX | Rush TAT Requested:
15 Business Day | 24 hrs | 72 hrs
Other | 48 hrs | 5 Day

Regulatory Classification / Special Report Format
NPDES | Drinking Water | DEP Form(s)
RCRA | MCP GW1/S1 | MWRA Smart Rpt
Other | MCP QA/QC Rpt XX

Shaded areas for office use

Analysis Requested
Check analysis and specify method and analytes in comments section.
For example:
500-series for drinking water
600-series for waste water
8000-series for haz/solid waste
Use comments section to further define.

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 At Cr dissolved	Other	Other	Other	Other	Other	Other
ISCO-1	SW	DLC/TRH	11/12/07 13:45	X		4	P		✓	✓				✓	✓	✓	✓	✓		✓								
PZ-18R MS/MSD	SW	DLC/TRH	11/12/07 14:15	X		4	P		✓	✓				✓	✓	✓	✓	✓		✓								
SD-17	SW	DLC/TRH	11/12/07 15:15	X		4	P		✓	✓				✓	✓	✓	✓	✓		✓								
ISCO-3	SW	DLC/TRH	11/12/07 15:45	X		4	P		✓	✓				✓	✓	✓	✓	✓		✓								
ISCO-2	SW	DLC/TRH	11/12/07 16:00	X		4	P		✓	✓				✓	✓	✓	✓	✓		✓								
GW-34 SR	GW	TRH	11 13 07 0925	X		3	P		✓	✓				✓	✓	✓	✓	✓		✓			X					
GW 202 D		TRH	11 13 07 11:00	X		3	P		✓	✓				✓	✓	✓	✓	✓		✓								
GW 202 D DUP		TRH																										
GW 202 D MS		TRH																										
GW 202 D MSD		TRH																										

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Comments (Special Instructions)

MCP case narrative

Run MS/MSD on PZ-18R per Dave Chapman 11/14/07

Dissolved metals are field filtered.

Groundwater Metals: Dissolved Al/Cr

Surfacewater Metals: Dissolved/Total Al/Cr/Na

PZ-18R a surface water sample (please note sample time/date

Sampled by (print): David Chapman / Tom Hanlon
Signature:

Relinquished by: Date: 11/13/07 Time: 1345
Received by: Jerry Dahl Date: 11/13/07 Time: 1345

Relinquished by: Jerry Dahl Date: 11/13/07 Time: 1650
Received by: Date: 11/13/07 Time: 1650

Method of shipment:

TestAmerica-Westfield

Cooler? Y / N Samples Iced? Y / N
Temp @ receipt: 6.6° °C
Preservation/pH checked
By: MAH Date: 11/13/07

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

TestAmerica Laboratories, Inc.
Chain of Custody Form

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

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

•149 Rangeway 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 #: 63000600.10
Project Manager: Peter Thompson
Work ID: PCMP
Contact: David Chapman

Job# 360-13480 | Quote# | PO#

Shaded areas for office use

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

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-10S	GW	DLC	11/13/07 12:00	✓		3	P		✓	✓				✓	✓	✓	✓		✓								
GW-26	GW	DLC	11/13/07 11:01	✓		3	P		✓	✓				✓	✓	✓	✓		✓								
GW-202S	GW	DLC	11/13/07 9:50	✓		3	P		✓	✓				✓	✓	✓	✓		✓								
GW-34D	GW	DLC	11/13/07 8:55	✓		3	P		✓	✓				✓	✓	✓	✓		✓								

11/13/07

Dissolved metals are field filtered.

Groundwater Metals: Dissolved Al/Cr

Surfacewater Metals: Dissolved/Total Al/Cr/Na

14TS=8°

Sampled by (print): David Chapman / Tom Hanlan
Signature:

Relinquished by: Date: 11/13/07 Time: 1345
Received by: Jerry Pach Date: 11/13/07 Time: 1345

Relinquished by: Jerry Pach Date: 11/13/07 Time: 1650
Received by: Date: 11/13/07 Time: 1650

Method of shipment:

TestAmerica-Westfield

Cooler? (Y) / N Samples Iced? (Y) / N
Temp @ receipt: 6.6°C °C
Preservation/pH checked
By: Date: 11/13/07

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

Version 1.2, Nov 2002

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

Reviewer/Date [illegible] 12/17/07
Sr. Review/Date Chris Ricardi 12/20/07
Lab Report # 340-13480
Project # 300060011.61.1

Aluminum, chromium

1.0 Laboratory Deliverable Requirements

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

☑ *Name of Laboratory* ☑ *Address* ☐ *Project ID* ☑ *Phone #* ☐ *Sample identification – Field and Laboratory*

Client Information: ☑ *Name* ☑ *Address* ☑ *Client Contact* *(IDs must be cross-referenced)*

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

1.2 Laboratory Report Certification Statement ***Yes*** [✓] *No* [ ] *N/A* [ ] *Comments:*

Does the laboratory report include a completed Analytical Report Certification in the required format?

***ACTION**: If no, contact lab for submission of missing certification or certification with correct format.*

1.3 Laboratory Case Narrative: ***Yes*** [✓] *No* [ ] *N/A* [ ] *Comments:*

☑ *Narrative serves as an exception report for the project and method QA/QC performance.* ☑ *Narrative includes an explanation of each discrepancy on the*

Certification Statement.

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

1.4 Chain of Custody (COC) copy present with all documentation completed **Yes** [✓] No [ ] N/A [ ] Comments:

NOTE: Olin receives and maintains the *original COC.*

ACTION: If no, contact lab for submission of copy of completed *COC.*

1.5 Sample Receipt Information (*Cooler Receipt Form present?*): **Yes** [✓] No [ ] N/A [ ] Comments:

Were each of the following tasks completed and recorded upon receipt of the sample(s) into the laboratory?

☑ Sample temperature confirmed: must be 1° – 10° C. (If samples were sent by courier and delivered on the same day as collection, temperature requirement does not apply).

☑ Container type noted ☑ sample condition observed ☑ pH verified (where applicable) ☐ Field and lab IDs cross referenced

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

1.5.1 Were all samples delivered to the laboratory without breakage? **Yes** [✓] No [ ] N/A [ ] Comments:

1.5.2 Does the *Cooler Receipt Form* or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data? Yes [ ] **No** [✓] N/A [ ] Comments:

1.6 Sample Results Section: *Was each of the following requirements supplied in the laboratory report for each sample?* **Yes** [✓] No [ ] N/A [ ] Comments:

☑ Field ID and Lab ID ☑ *Date and time collected* ☑ Analyst Initials ☑ *Dilution Factor* ☑ % moisture or solids ☐ *Reporting limits*
☑ *Clean-up method* ☑ Analysis method ☑ *Preparation method* ☑ *Date of preparation/extraction/digestion clean-up and analysis, where applicable*
☑ Matrix ☑ Target analytes and concentrations ☑ Units (soils must be reported in dry weight)

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

1.7 QA/QC Information: Was each of the following information supplied in the laboratory report for each sample batch? **Yes** [✓] No [ ] N/A [ ] Comments:

☑ Method blank results ☑ LCS recoveries ☑ MS/MSD recoveries and RPDs ☑ Laboratory duplicate results (where applicable)

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

2.0 Holding Times

Have any technical holding times, determined from date of collection to date of analysis, been exceeded? Holding time for metals is 180 days from sample collection to analysis for both water and soil.

Yes [ ] **No** [✓] N/A [ ] Comments:

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

ACTION: If technical holding times are exceeded, qualify all positive results (J) and non-detects (UJ). If grossly exceeded (2X holding time) reject (R) all non-detect results.

3.0 Laboratory Method

3.1 Was the correct laboratory method used?

Yes [✓] No [ ] N/A [ ] Comments:

Water Digestion	3005A or 3010A or 3020A
Soil Digestion	3050B
Metals	6010B or 200.7

ACTION: If no, contact laboratory to provide justification for method change compared to the requested method. Contact senior chemist to inform Client of change and to request variance.

3.2 Are the practical quantitation limits the same as those specified by the ☐ SOW ☑ QAPP ☐ Lab ☐ MADEP

Yes [✓] No [ ] N/A [ ] Comments:

NOTE: *Verify that the reported metals match the target list specified on the COC.*

ACTION: If no, evaluate variation with respect to sample matrix, preparation, dilution, moisture, etc. If sample PQL is indeterminate, contact lab for explanation.

3.3 Are results present for each sample in the SDG? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, check Request for Analysis to verify if method was ordered and COC to verify that it was sent, and contact lab for resubmission of the missing data

3.4 If dilutions were required, were dilution factors reported? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact the lab for submission.

4.0 Method Blanks

4.1 Is the Method Blank Summary present? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, call the laboratory for submission of missing data.

4.2 Frequency of Analysis: Was a method blank analyzed for each digestion batch of < 20 field samples? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact laboratory for justification. Consult senior chemist for action needed. Narrate non-compliance.

4.3 Is the method blank less than the PQLs for all target elements? **Yes** [✓] No [ ] N/A [ ] Comments:

NOTE: *MADEP requires the method blank to be matrix matched and digested with the samples*

4.4 Do any method blanks have positive results for metals? Qualify data according to the following: Yes [ ] **No** [✓] N/A [ ] Comments:

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

ACTION: For any blank with positive results, list all contaminants for each method blank including the concentration detected and the flagging level (flagging level = 5x the blank value) and the associated samples and qualifiers.

5.0 Laboratory Control Standard

5.1 Was a laboratory control standard run with each analytical batch of 20 samples or less?

Yes [✓] No [ ] N/A [ ] Comments:

NOTE: *A full target, second source LCS is required by MADEP.*
ACTION: Call laboratory for LCS form submittal. If data are not available, use professional judgement to evaluate data accuracy associated with that batch.

5.2 Is a LCS Summary Form present?

Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact lab for resubmission of missing data.

5.3 Is the recovery of any analyte outside of MADEP control limits?

Yes [ ] **No** [✓] N/A [ ] Comments:

Sample Type	*MADEP % Rec*
Water	*80-120*
Soil	within Lab generated limits

ACTION: If recovery is above the upper limit, qualify all positive sample results within the batch as (J). If recovery is below the lower limit, qualify all positive and non-detects results within the batch as (J). If LCS recovery is <30%, positive and non-detect results are rejected (R).

Comments:

6.0 Matrix Spikes

Matrix spikes may be collected at different frequencies based on monthly, quarterly, or task specific schedules. Confirm spike requirements for each set with the senior chemist.

6.1 Were project-specific MS/MSDs collected? List project samples that were spiked.

Yes [✓] No [ ] N/A [ ] Comments: Samples PZ-18R and GW2020 were submitted for MS/MSD analysis.

ACTION: If no, contact senior chemist to see if any were specified.

6.2 Is the Matrix Spike/Matrix Spike Duplicate Recovery Form present?

Yes [✓] No [ ] N/A [ ] Comments:

NOTE: *A full target, second source MS/MSD is required by MADEP.*
ACTION: If any matrix spike data are missing, call lab for resubmission.

6.3 Were matrix spikes analyzed as indicated on the COC and project schedule?

Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If any matrix spike data are missing, call lab for resubmission. If none, no qualification is needed. Narrate non-compliance.

6.4 Are any metal spike recoveries outside of the QC limits?

Yes [ ] No [✓] N/A [ ] Comments:

Sample Type	*MADEP % Rec*	QAPP % Rec	Method
Water	*75-125*	N/A	6010B
Water	*N/A*	70-130	200.7
Soil	*75-125*	75-125	6010B

NOTE: $\%R = \frac{(SSR-SR)}{SA} \times 100\%$ Where: SSR = Spiked sample result, SR = Sample result, SA = Spike added

NOTE: If dilutions are required due to high sample concentrations (> 4X spike), the data are evaluated, but no flags are applied.

NOTE: If only one of the recoveries for an MS/MSD pair is outside of the control limits, no qualification is necessary. Use professional judgment for the MS/MSD flags.

ACTION: MS/MSD flags only apply to the sample spiked. If the recoveries of the MS and MSD exceed the upper control limit, qualify positive results as estimated (J). If the recoveries of the MS and MSD are lower than the lower control limit, qualify positive results and non-detects (J).

6.5 Are any RPDs for MS/MSD recoveries outside of the QC limits? Yes [ ] **No** [✓] N/A [ ] Comments:

NOTE: $RPD = \frac{S-D}{(S+D)/2} \times 100\%$ Where: S = MS sample result
D = MSD sample result

NOTE: If dilutions are required due to high sample concentrations, the data are evaluated, but no flags are applied.

ACTION: If the RPD exceeds the control limit, qualify positive results and non-detects (J).

7.0 Laboratory Duplicate

7.1 Was a laboratory duplicate sample analyzed? If so, is the Laboratory Duplicate Sample Form present? **Yes** [ ] No [✓] N/A [ ] Comments:

NOTE: *MADEP refers to this sample as a "matrix duplicate".*

ACTION: If not analyzed, qualification is not needed. If data is missing, contact laboratory for resubmission of report. Narrate non-compliance.

7.2 Is the RPD between the result for the laboratory duplicate sample and the result for the parent sample outside of the QA/QC limits? Yes [ ] **No** [ ] N/A [✓] Comments:

MADEP Laboratory Duplicate Sample RPD Criteria:	QAPP RPD
For aqueous results > 5× RL, RPD must be ± 20%	20
For aqueous results < 5× RL, RPD must be ≤ RL	20
For soil/sediment results > 5× RL, RPD must be ± 35%	20
For soil/sediment results < 5× RL, RPD must be ≤ 2× RL	20

ACTION: If the RPD exceeds the limits, qualify both positive results and non-detects as estimated and flag them J. Narrate non-compliance

8.0 Sampling Accuracy

The majority of ground water samples are collected directly from a tap, process stream, or with dedicated tubing. Rinse blanks will not be collected.

8.1 Were rinsate blanks collected? Prior to evaluating rinsate blanks, obtain a list of the associated samples from the senior chemist.

Yes [ ] No [✓] N/A [ ] Comments:

8.2 Do any rinsate blanks have positive results?

Yes [ ] **No** [ ] N/A [✓] Comments:

***NOTE:** MADEP does not require the collection of rinsate blanks.*

ACTION: Evaluate rinsate results against blank results to determine if contaminant may be laboratory-derived. If results are not lab-related, qualify according to below.

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

9.0 Field Duplicates

9.1 Were field duplicate samples collected? Obtain a list of samples and their associated field duplicates.

Yes [✓] **No** [ ] N/A [ ] Comments:

Sample OC-GW-2010 was submitted with a field duplicate.

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: see attached.

ACTION: RPD must be ≤50% for soil and water. Qualify data (J) for both sample results if the RPD exceeds 50%.

10.0 Special QA/QC

10.1 Were both total and dissolved metals analysis performed? If so, the dissolved metal concentration should not exceed that of the total metal. Yes [✓] No [ ] N/A [ ] Comments:

Dissolved sodium results are significantly greater than total sodium results. All sodium results in surface water samples OC-ISCO-1, OC-PZ-18R, OC-SD-17, OC-ISCO-3, and OC-ISCO-2 were qualified estimated (J).

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)

SAMPLE ID	ANALYTE	ORIG	DUP	RPD
OC-GW-202D	Aluminum	550	560	2
OC-GW-202D	Chromium	70	70	0

10.0 Application of Validation Qualifiers

Was any of the data qualified?

Yes [✓] No [ ] N/A [ ] Comments:

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

REFERENCES

LAW, 1999, "Final Quality Assurance Project Plan, Olin Wilmington Property, 51 Eames Street, Wilmington, MA", LAW Engineering and Environmental Services, Kennesaw, GA 30144. August 1999

U.S. Environmental Protection Agency (USEPA), 1989. "Region 1 Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses"; Hazardous Site Evaluation Division; February 1989.

MADEP, 2001. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Massachusetts Quality Assurance and Quality Control (QA/QC) Requirements." BWSC-CAM, Interim Final Draft, Revision No. 2, 5 October 2001.

MADEP, 2001. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Quality Assurance and Quality Control Guidelines for Sampling, Data Evaluation and Reporting Activities," BWSC-CAM, Section VII, Public Comment Draft, Revision No. 0, 21 December 2001.

OLIN-WILMINGTON
LEVEL I DATA QUALITY EVALUATION
STANDARD OPERATING PROCEDURE AND CHECKLIST
WET CHEMISTRY PARAMETERS BY VARIOUS METHODS

Reviewer/Date [illegible] 12/14/07
Sr. Review/Date Chris Ricardi 12/20/07
Lab Report # 360-13480
Project # 63000600011.61.1

Ammonia, Sulfate, Nitrate, Chloride, Nitrite, Spec. Conductance

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 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 ☑ Dilution Factor ☑ % moisture or solids ☑ Reporting limits
☑ *Clean-up method* ☑ Analysis method ☑ Preparation method ☑ Date of preparation/extraction/digestion clean-up and analysis, where applicable
☑ Matrix ☑ Target analytes and concentrations ☑ Units (soils must be reported in dry weight)

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

1.7 **QA/QC Information:** Was the following information provided in the laboratory report for each sample batch? **Yes** [✓] No [ ] N/A [ ] Comments:

☑ Method blank results ☑ LCS recoveries ☑ MS/MSD recoveries and RPDs ☑ Laboratory duplicate results (where applicable)

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

2.0 **Holding Times** Yes [ ] **No** [✓] N/A [ ] Comments:

Have any technical holding times, determined from date of collection to date of analysis, been exceeded? The holding times are as follows:

✓ 28 days = ammonia, chemical oxygen demand, chloride, organic carbon, oil & grease, specific conductance, total organic carbon and sulfate

Alkalinity = 14 days Sulfide, TDS, TSS = 7 days pH = analyze immediately ✓ Nitrate nitrogen as N = 48 hrs

✓ Nitrite nitrogen as N = 48 hrs Nitrate + Nitrite as N = 28 days

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

ACTION: If technical holding times are exceeded qualify results (J). For water samples that are grossly exceeded (>2X hold time) reject (R) all non-detect results. Professional judgment used to qualify soils.

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

3.1 Was the correct laboratory method used?

ACTION: If no, contact lab to provide justification for method change compared to the requested method. Contact senior chemist to inform Client of change or to request variance.

3.2 Are the practical quantitation limits the same as those specified by the ☐ SOW ☑ QAPP ☐ Lab?

Yes [ ] No [✓] N/A [ ] Comments: The lab report a PQL for Spec. Cond (1 umhos/cm) that is less than the QAPP PQL. No further action required.

Note: *The MADEP QA/QC Guidelines do not yet list PQLs for wet chemistry analyses, therefore all criteria will default to values stipulated in the QAPP*. Where the QAPP does not define criteria, QA/QC requirements default to limits employed by the lab**. Other criteria may also apply.*

Ammonia* ☑ = 0.1 mg/ L | Alkalinity** ☐ = 1 mg/L | Bicarbonate Alkalinity** ☐ = 1 mg/L | Carbonate Alkalinity** ☐ = 1 mg/L

Nitrate Nitrogen as N* ☑ = .05 mg/L | Nitrite Nitrogen as N* ☑ = .01 mg/L | Chloride* ☑ = 1 mg/L | Hardness *☐ = 2 mg/L

Spec. Cond.** ☒ 3 umhos/cm | Total Organic Carbon** ☐ = 1 mg/L | Oil & Grease* ☐ = 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.

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: Samples OC-GW-20D and OC-PZ-1PR were submitted for MS/MSD analysis.

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: MSD for ammonia (132) in OC-GW-202D (320-13420-7) > QC limit.

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*(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?

NOTE: $RPD = \frac{S-D}{(S+D)/2} \times 100\%$ Where S = MS result, D = MSD result

Yes [✓] **No** [ ] N/A [ ] Comments: RPD for ammonia in OC-GW-202D (37) > than QC limit. The ammonia unspiked sample conc. in OC-GW-202D is greater than 4x the spiking conc. No further action required.

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

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

9.1 Were field duplicate samples collected? Obtain a list of samples and their associated field duplicates. **Yes** [✓] No [ ] N/A [ ] Comments: Sample OC-GW202D was submitted with a duplicate sample.

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: See attached.

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:

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

SAMPLE ID	ANALYTE	ORIG	DUP	RPD
OC-GW-202D	Ammonia	230	240	4
OC-GW-202D	Sulfate	1400	1400	0
OC-GW-202D	Chloride	200	210	5
OC-GW-202D	Specific Conductance	3500	3400	3

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.

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To: Steve Morrow
From: Chris Ricardi
Date: January 4, 2008
Subject: Interim Response Steps Work Plan Slurry Wall/Cap Monitoring Program, former Post Construction Monitoring Program Surface Water and Ground Water – November 2007

Data Validation Summary
TestAmerica Laboratories Data Sets 360-13480, 360-13515, and 360-13542

These sample sets contained results for ground water and surface water samples collected during November 2007. The samples were analyzed by TestAmerica (formerly Severn Trent Laboratories) in Westfield, Massachusetts for the following constituents:

Samples 'OC-ISCO-1', OC-PZ-18R', 'OC-SD-17', 'OC-ISCO-3', and 'OC-ISCO-2' (360-13480-1 thru -5)

- Total and dissolved metals (aluminum, chromium, sodium), and general chemistry analysis for ammonia, nitrate, nitrite, chloride, sulfate, and specific conductance (TestAmerica, Westfield, Massachusetts).

Samples 'OC-GW-34SR', 'OC-GW-202D', 'OC-GW-202D DUP', 'OC-GW-10S', 'OC-GW-26', 'OC-GW-202S', and 'OC-GW-34D' (360-13480-6 thru -12)

- Dissolved metals (aluminum and chromium), and general chemistry analysis for ammonia, chloride, sulfate, and specific conductance.

Samples 'OC-GW-39', 'OC-GW-39 DUP', 'OC-GW-25', 'OC-GW-76S', 'OC-GW-55S', 'OC-GW-24', 'OC-PZ18R', 'OC-PZ-16RR', 'OC-PZ-17RR', 'OC-GW-201S', and 'OC-GW-79S' (360-13515-1 thru -11)

- Dissolved metals (aluminum and chromium), and general chemistry analysis for ammonia, chloride, sulfate, and specific conductance.

Samples 'OC-GW-78S', 'OC-GW-CA1', and 'OC-GW-35S' (360-13542-1 thru -3)

- Dissolved metals (aluminum and chromium), and general chemistry analysis for ammonia, chloride, sulfate, and specific conductance.

The Olin Wilmington Quality Assurance Project Plan 1999 (QAPP) was 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.

Validation Actions and Observations

The dissolved sodium results are greater than the total sodium results. Total and dissolved sodium results in samples OC-ISCO-1, OC-PZ-18R, OC-SD-17, OC-ISCO-3, and OC-ISCO-2 were qualified estimated (J).

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

Chris Ricardi

01/04/08

Chris Ricardi, NRCC-EAC
Senior Chemist

Date

MJ Murphy

01/04/08

Michael Murphy
Project Principal

Date

MACTEC

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

Job Number: 360-13542-1

Job Description: PCMP

For:
Olin Corporation
1186 Lower River Road
Charleston, TN 37310-0248

Attention: Mr. Steven Morrow

Joseph A. Clemens

Designee for
Becky C Mason
Project Manager II
becky.mason@testamericainc.com
12/03/2007

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.

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ACCREDITED IN ACCORDANCE WITH nelac

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MADEP MCP Analytical Method Report Certification Form

Laboratory Name:	**TestAmerica Westfield**	Project #:	**360-13542-1**
Project Location:	**PCMP**	MADEP RTN[1]:	

This form provides certifications for the following data set:[list Laboratory Sample ID Number(s)]
360-13542-(1-3)

Sample Matrices: **Groundwater** Soil/Sediment Drinking Water Other:

MCP SW-846 Methods Used	8260B( )	8151A ( )	8330 ( )	6010B (x)	7470A/1A ( )	Other ( )
	8270C( )	8081A ( )	VPH ( )	6020 ( )	9014M[2]/9012 ( )	
As specified in MADEP Compendium of Analytical Methods. (check all that apply)	8082 ( )	8021B ( )	EPH ( )	7000 S[3]( )	7196A ( )	

1 List Release Tracking Number (RTN), if known
2 M - SW-846 Method 9014 or MADEP Physiologically Available Cyanide (PAC) Method
3 S - SW-846 Methods 7000 Series List individual method and analyte.

An affirmative response to questions A, B, C and D is required for "Presumptive Certainty" status

A	Were all samples received by the laboratory in a condition consistent with that described on the Chain-of-Custody documentation for the data set?	(Yes) No[1]
B	Were all QA/QC procedures required for the specified analytical method(s) included in this report followed, including the requirement to note and discuss in a narrative QC data that did not meet appropriate performance standards or guidelines?	(Yes) No[1]
C	Does the analytical data included in this report meet all the requirements for "Presumptive Certainty", as described in Section 2.0 (a), (b), (c) and (d) of the MADEP document CAM VII A, " Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	(Yes) N/A No[1]
D	**VPH and EPH methods only:** Was the VPH or EPH Method conducted without significant modifications (see Section 11.3 of respective Methods)?	Yes (N/A) No[1]

A response to questions E and F below is required for "Presumptive Certainty" status

E	Were all QC performance standards and recommendations for the specified methods achieved?	(Yes) No[1]
F	Were results for all analyte-list compounds/elements for the specified method(s) reported?	Yes N/A (No[1])

[1] All Negative responses must be addressed in an attached Environmental Laboratory case narrative.

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.

Signature: **Position:** Laboratory Director

Printed Name: Steven C. Hartmann **Date:** 12/3/07

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

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Westfield, MA 01085
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N.Billerica, MA 01862
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MADEP MCP Analytical Method Report Certification Form

Laboratory Name:	**TestAmerica Westfield**	Project #:	**360-13542-1**
Project Location:	**PCMP**	MADEP RTN[1]:	

This form provides certifications for the following data set:[list Laboratory Sample ID Number(s)]
360-13542-(1-3)

Sample Matrices: **Groundwater** Soil/Sediment Drinking Water Other:

MCP SW-846 Methods Used	8260B( )	8151A ( )	8330 ( )	6010B ( )	7470A/1A ( )	Other (x)
	8270C( )	8081A ( )	VPH ( )	6020 ( )	9014M[2]/9012 ( )	
As specified in MADEP Compendium of Analytical Methods. (check all that apply)	8082 ( )	8021B ( )	EPH ( )	7000 S[3]( )	7196A ( )	

1 List Release Tracking Number (RTN), if known
2 M - SW-846 Method 9014 or MADEP Physiologically Available Cyanide (PAC) Method
3 S - SW-846 Methods 7000 Series List individual method and analyte.

An affirmative response to questions A, B, C and D is required for "Presumptive Certainty" status

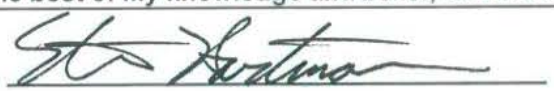
A	Were all samples received by the laboratory in a condition consistent with that described on the Chain-of-Custody documentation for the data set?	(Yes) No[1]
B	Were all QA/QC procedures required for the specified analytical method(s) included in this report followed, including the requirement to note and discuss in a narrative QC data that did not meet appropriate performance standards or guidelines?	(Yes) No[1]
C	Does the analytical data included in this report meet all the requirements for "Presumptive Certainty", as described in Section 2.0 (a), (b), (c) and (d) of the MADEP document CAM VII A, " Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	Yes (N/A) No[1]
D	**VPH and EPH methods only:** Was the VPH or EPH Method conducted without significant modifications (see Section 11.3 of respective Methods)?	Yes (N/A) No[1]

A response to questions E and F below is required for "Presumptive Certainty" status

E	Were all QC performance standards and recommendations for the specified methods achieved?	(Yes) No[1]
F	Were results for all analyte-list compounds/elements for the specified method(s) reported?	Yes (N/A) No[1]

[1] All Negative responses must be addressed in an attached Environmental Laboratory case narrative.

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.

Signature:  **Position:** Laboratory Director

Printed Name: Steven C. Hartmann **Date:** 12/3/07

CAM VII A, Rev 3.2 April-04

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MADEP MA014
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CASE NARRATIVE

Client: Olin Corporation

Project: PCMP

Report Number: 360-13542-1

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 11/15/2007; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 6.6°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 360-13542-1 through 360-13542-3 were analyzed for dissolved metals in accordance with EPA SW846 Method 6010B. The samples were analyzed on 11/19/2007.

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 360-13542-1 through 360-13542-3 were analyzed for ammonia in accordance with LACHAT 10-107-06-1. The samples were prepared and analyzed on 12/03/2007.

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

Samples 360-13542-1(10X) and 360-13542-3(5X) required dilution prior to analysis. The reporting limits have been adjusted accordingly. Dilutions were due to high concentration.

ANIONS

Samples 360-13542-1 through 360-13542-3 were analyzed for anions in accordance with EPA Method 300.0. The samples were analyzed on 11/26/2007.

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

Samples 360-13542-1 through 360-13542-3(10X) required dilution prior to analysis. The reporting limits have been adjusted accordingly. Dilutions were due to high target concentration.

SPECIFIC CONDUCTANCE (CONDUCTIVITY)

Samples 360-13542-1 through 360-13542-3 were analyzed for Specific Conductance (Conductivity) in accordance with SM 2510B. The samples were analyzed on 11/16/2007.

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: 360-13542-1

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-Nitrogen	TAL WFD	QuickChem 10-107-06-1	
Distillation/Ammonia	TAL WFD		Distill/Ammonia
Chloride & Sulfate	TAL WFD	40CFR136A 300.0	
Conductivity, Specific Conductance	TAL WFD	SM18 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

SM18 = "Standard Methods For The Examination Of Water And Wastewater", 18th Edition, 1992.

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: 360-13542-1

Method	Analyst	Analyst ID
SW846 6010B	Nasiatka, Ellen M	EMN
QuickChem 10-107-06-1	Lalashius, Andrew L	ALL
40CFR136A 300.0	Lalashius, Andrew L	ALL
SM18 SM 2510B	Emerich, Rich W	RWE

SAMPLE SUMMARY

Client: Olin Corporation

Job Number: 360-13542-1

Lab Sample ID	Client Sample ID	Client Matrix	Date/Time Sampled	Date/Time Received
360-13542-1	OC-GW-78S	Ground Water	11/14/2007 1430	11/15/2007 1630
360-13542-2	OC-GW-CA1	Ground Water	11/14/2007 1415	11/15/2007 1630
360-13542-3	OC-GW-35S	Ground Water	11/14/2007 1530	11/15/2007 1630

SAMPLE RESULTS

Mr. Steven Morrow
Olin Corporation
1186 Lower River Road
Charleston, TN 37310-0248

Job Number: 360-13542-1

Client Sample ID: OC-GW-78S
Lab Sample ID: 360-13542-1

Date Sampled: 11/14/2007 1430
Date Received: 11/15/2007 1630
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B		Date Analyzed:		11/19/2007 1618	
Aluminum	130	ug/L	6.0	100	1.0
Chromium	27	ug/L	0.68	5.0	1.0

Mr. Steven Morrow
Olin Corporation
1186 Lower River Road
Charleston, TN 37310-0248

Job Number: 360-13542-1

Client Sample ID: OC-GW-78S
Lab Sample ID: 360-13542-1

Date Sampled: 11/14/2007 1430
Date Received: 11/15/2007 1630
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 10-107-06-1		Date Analyzed:		12/03/2007 1238	
Prep Method: Distill/Ammonia		Date Prepared:		12/03/2007 0922	
Ammonia	63	mg/L	1.0	1.0	10
Method: 300.0		Date Analyzed:		11/26/2007 0107	
Chloride	24	mg/L	1.0	1.0	1.0
Method: 300.0		Date Analyzed:		11/26/2007 0152	
Sulfate	480	mg/L	20	20	10
Method: SM 2510B		Date Analyzed:		11/16/2007 1546	
Specific Conductance	1100	umhos/cm	1.0	1.0	1.0

Mr. Steven Morrow
Olin Corporation
1186 Lower River Road
Charleston, TN 37310-0248

Job Number: 360-13542-1

Client Sample ID: OC-GW-CA1
Lab Sample ID: 360-13542-2

Date Sampled: 11/14/2007 1415
Date Received: 11/15/2007 1630
Client Matrix: Ground Water

Analyte	Result/Qualifier		Unit	MDL	RL	Dilution
Method: Dissolved-6010B			Date Analyzed:		11/19/2007 1626	
Aluminum	14	J	ug/L	6.0	100	1.0
Chromium	7.1		ug/L	0.68	5.0	1.0

Mr. Steven Morrow
Olin Corporation
1186 Lower River Road
Charleston, TN 37310-0248

Job Number: 360-13542-1

Client Sample ID: OC-GW-CA1
Lab Sample ID: 360-13542-2

Date Sampled: 11/14/2007 1415
Date Received: 11/15/2007 1630
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 10-107-06-1		Date Analyzed:		12/03/2007 1230	
Prep Method: Distill/Ammonia		Date Prepared:		12/03/2007 0922	
Ammonia	2.1	mg/L	0.10	0.10	1.0
Method: 300.0		Date Analyzed:		11/26/2007 0207	
Chloride	13	mg/L	1.0	1.0	1.0
Method: 300.0		Date Analyzed:		11/26/2007 0222	
Sulfate	160	mg/L	20	20	10
Method: SM 2510B		Date Analyzed:		11/16/2007 1547	
Specific Conductance	750	umhos/cm	1.0	1.0	1.0

Mr. Steven Morrow
Olin Corporation
1186 Lower River Road
Charleston, TN 37310-0248

Job Number: 360-13542-1

Client Sample ID: OC-GW-35S
Lab Sample ID: 360-13542-3

Date Sampled: 11/14/2007 1530
Date Received: 11/15/2007 1630
Client Matrix: Ground Water

Analyte	Result/Qualifier		Unit	MDL	RL	Dilution
Method: Dissolved-6010B			Date Analyzed:		11/19/2007 1629	
Aluminum	38	J	ug/L	6.0	100	1.0
Chromium	22		ug/L	0.68	5.0	1.0

Mr. Steven Morrow
Olin Corporation
1186 Lower River Road
Charleston, TN 37310-0248

Job Number: 360-13542-1

Client Sample ID: OC-GW-35S
Lab Sample ID: 360-13542-3

Date Sampled: 11/14/2007 1530
Date Received: 11/15/2007 1630
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 10-107-06-1		Date Analyzed:		12/03/2007 1239	
Prep Method: Distill/Ammonia		Date Prepared:		12/03/2007 0922	
Ammonia	39	mg/L	0.50	0.50	5.0
Method: 300.0		Date Analyzed:		11/26/2007 0237	
Chloride	7.8	mg/L	1.0	1.0	1.0
Method: 300.0		Date Analyzed:		11/26/2007 0252	
Sulfate	200	mg/L	20	20	10
Method: SM 2510B		Date Analyzed:		11/16/2007 1549	
Specific Conductance	720	umhos/cm	1.0	1.0	1.0

DATA REPORTING QUALIFIERS

Client: Olin Corporation

Job Number: 360-13542-1

Lab Section	Qualifier	Description
Metals		
	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: 360-13542-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
Metals					
Analysis Batch:360-25887					
LCS 360-25887/1	Lab Control Spike	T	Water	6010B	
LCSD 360-25887/13	Lab Control Spike Duplicate	T	Water	6010B	
MB 360-25887/2	Method Blank	T	Water	6010B	
360-13542-1	OC-GW-78S	D	Water	6010B	
360-13542-2	OC-GW-CA1	D	Water	6010B	
360-13542-3	OC-GW-35S	D	Water	6010B	

Report Basis
D = Dissolved
T = Total

General Chemistry					
Analysis Batch:360-25861					
LCS 360-25861/1	Lab Control Spike	T	Water	SM 2510B	
MB 360-25861/3	Method Blank	T	Water	SM 2510B	
360-13542-1	OC-GW-78S	T	Water	SM 2510B	
360-13542-2	OC-GW-CA1	T	Water	SM 2510B	
360-13542-3	OC-GW-35S	T	Water	SM 2510B	
Analysis Batch:360-26126					
LCS 360-26126/2	Lab Control Spike	T	Water	300.0	
MB 360-26126/1	Method Blank	T	Water	300.0	
360-13542-1	OC-GW-78S	T	Water	300.0	
360-13542-2	OC-GW-CA1	T	Water	300.0	
360-13542-3	OC-GW-35S	T	Water	300.0	
Prep Batch: 360-26351					
LCS 360-26351/2-A	Lab Control Spike	T	Water	Distill/Ammonia	
MB 360-26351/1-A	Method Blank	T	Water	Distill/Ammonia	
360-13542-1	OC-GW-78S	T	Water	Distill/Ammonia	
360-13542-2	OC-GW-CA1	T	Water	Distill/Ammonia	
360-13542-3	OC-GW-35S	T	Water	Distill/Ammonia	
Analysis Batch:360-26356					
LCS 360-26351/2-A	Lab Control Spike	T	Water	10-107-06-1	360-26351
MB 360-26351/1-A	Method Blank	T	Water	10-107-06-1	360-26351
360-13542-1	OC-GW-78S	T	Water	10-107-06-1	360-26351
360-13542-2	OC-GW-CA1	T	Water	10-107-06-1	360-26351
360-13542-3	OC-GW-35S	T	Water	10-107-06-1	360-26351

Report Basis
T = Total

Client: Olin Corporation

Job Number: 360-13542-1

Method Blank - Batch: 360-25887

Method: 6010B
Preparation: N/A

Lab Sample ID: MB 360-25887/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/19/2007 1552
Date Prepared: N/A

Analysis Batch: 360-25887
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: mL

Analyte	Result	Qual	MDL	RL
Aluminum	ND		6.0	100
Chromium	ND		0.68	5.0

Lab Control Spike/
Lab Control Spike Duplicate Recovery Report - Batch: 360-25887

Method: 6010B
Preparation: N/A

LCS Lab Sample ID: LCS 360-25887/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/19/2007 1549
Date Prepared: N/A

Analysis Batch: 360-25887
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 360-25887/13
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/19/2007 1621
Date Prepared: N/A

Analysis Batch: 360-25887
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 10 mL

Analyte	% Rec. LCS	% Rec. LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Aluminum	100	98	80 - 120	2	20		
Chromium	99	98	80 - 120	1	20		

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

Client: Olin Corporation

Job Number: 360-13542-1

Method Blank - Batch: 360-26351

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

Lab Sample ID: MB 360-26351/1-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 12/03/2007 1214
Date Prepared: 12/03/2007 0922

Analysis Batch: 360-26356
Prep Batch: 360-26351
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: mL
Final Weight/Volume: 50 mL

Analyte	Result	Qual	RL	RL
Ammonia	ND		0.10	0.10

Lab Control Spike - Batch: 360-26351

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

Lab Sample ID: LCS 360-26351/2-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 12/03/2007 1215
Date Prepared: 12/03/2007 0922

Analysis Batch: 360-26356
Prep Batch: 360-26351
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: mL
Final Weight/Volume: 50 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Ammonia	10.0	9.27	93	85 - 115	

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

Client: Olin Corporation

Job Number: 360-13542-1

Method Blank - Batch: 360-26126

Method: 300.0
Preparation: N/A

Lab Sample ID: MB 360-26126/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/26/2007 2221
Date Prepared: N/A

Analysis Batch: 360-26126
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume:

Analyte	Result	Qual	RL	RL
Sulfate	ND		2.0	2.0
Chloride	ND		1.0	1.0

Lab Control Spike - Batch: 360-26126

Method: 300.0
Preparation: N/A

Lab Sample ID: LCS 360-26126/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/26/2007 2236
Date Prepared: N/A

Analysis Batch: 360-26126
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: mL
Final Weight/Volume: mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Sulfate	80.0	82.7	103	85 - 115	
Chloride	40.0	40.9	102	85 - 115	

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

Client: Olin Corporation

Job Number: 360-13542-1

Method Blank - Batch: 360-25861

Method: SM 2510B
Preparation: N/A

Lab Sample ID: MB 360-25861/3
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/16/2007 1437
Date Prepared: N/A

Analysis Batch: 360-25861
Prep Batch: N/A
Units: umhos/cm

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

Analyte	Result	Qual	RL	RL
Specific Conductance	ND		1.0	1.0

Lab Control Spike - Batch: 360-25861

Method: SM 2510B
Preparation: N/A

Lab Sample ID: LCS 360-25861/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/16/2007 1424
Date Prepared: N/A

Analysis Batch: 360-25861
Prep Batch: N/A
Units: umhos/cm

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

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Specific Conductance	1410	1420	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: 360-13542-1

Login Number: 13542
List Source: TestAmerica Westfield
Creator: Rinard, Kimberley A
List Number: 1

Question	T / F/ NA	Comment
Radioactivity either was not measured or, if measured, is at or below background	N/A	
The cooler's custody seal, if present, is intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	False	6.6 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

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(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 #: 6300060010
Project Manager: Peter Thompson
Work ID: PCMP
Contact: David Chapman

Job# 360-13542 | Quote# | PO#

Shaded areas for office use

Analysis Requested
Check analysis and specify method and analytes in comments section.
For example:
500-series for drinking water
600-series for waste water
8000-series for haz/solid waste
Use comments section to further define.

Comments (Special Instructions)
MCP case narrative

Requested Turn Around Time
10 Business Day (Std) XX
15 Business Day
Other
Rush TAT Requested: 24 hrs 72 hrs 48 hrs 5 Day

Regulatory Classification / Special Report Format
NPDES Drinking Water DEP Form(s)
RCRA MCP GW1/S1 MWRA Smart Rpt
Other MCP QA/QC Rpt XX

Sample Type Codes
WW-Wastewater DW-Drinking water SW-Surfacewater
LW-Labwater GW-Groundwater A-Air
S-Solid / Soil SL-Sludge O-Oil Z-Other

Sample ID	Sample Type	Sampler's Initials	Date Time Collected	Grab	Comp.	# Containers	Plastic(P) or Glass(G)	NaHSO4/MeOH	HNO3 to pH <2	H2SO4 to pH <2	HCl to pH <2	NaOH to pH >12	NAOH/ZNAC	None / 4° C	Ammonia-Nitrogen	Chloride, Sulfate	Specific Condutivity	Nitrate, Nitrite	Groundwater metals	Surfacewater metals	Sediment: Al/Cr/Fe	Other	Other	Other	Other	Other	Other
GW - 78S	GW	DLC	11/14/07 14:30	X		3	P		X	X				X	X	X	X		X								
GW - CA1	GW	TRH	11/14/07 14:15	X		3	P		X	X				X	X	X	X		X								
GW - 35S	GW	TRH	11/14/07 15:30	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

11/15/07

WAR

DUT 16.6°

Sampled by (print): David Chapman / Tom Hanlon
Signature:

Relinquished by: David Chapman Date: 11/15/07 Time: 14:15
Received by: Jerry Oak Date: 11/15/07 Time: 1415

Relinquished by: Jerry Oak Date: 11/15/07 Time: 1630
Received by: WAR Date: 11/15/07 Time: 1630

Method of shipment:

TestAmerica-Westfield

Cooler? (Y) / N Samples Iced? (Y) / N
Temp @ receipt: 6.6°C
Preservation/pH checked
By: WAR Date: 11/15/07

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

Version 1.2, Nov 2002

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

Reviewer/Date 12/19/07
Sr. Review/Date Chas Ricardi 12/20/07
Lab Report # 360-13542
Project # 630006.0011.61.1

Aluminum, Chromium

1.0 Laboratory Deliverable Requirements

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

☑ *Name of Laboratory* ☑ *Address* ☑ *Project ID* ☑ *Phone #* ☑ *Sample identification – Field and Laboratory*
Client Information: ☑ *Name* ☑ *Address* ☑ *Client Contact* *(IDs must be cross-referenced)*

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

1.2 Laboratory Report Certification Statement ***Yes*** [✓] *No* [ ] *N/A* [ ] *Comments:*

Does the laboratory report include a completed Analytical Report Certification in the required format?

***ACTION**: If no, contact lab for submission of missing certification or certification with correct format.*

1.3 Laboratory Case Narrative: ***Yes*** [✓] *No* [ ] *N/A* [ ] *Comments:*

☑ *Narrative serves as an exception report for the project and method QA/QC performance.* ☑ *Narrative includes an explanation of each discrepancy on the*

Certification Statement.

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

1.4 Chain of Custody (COC) copy present with all documentation completed **Yes** [✓] No [ ] N/A [ ] Comments:

NOTE: Olin receives and maintains the *original COC.*

ACTION: If no, contact lab for submission of copy of completed *COC.*

1.5 Sample Receipt Information (*Cooler Receipt Form present?*): **Yes** [✓] No [ ] N/A [ ] Comments:

Were each of the following tasks completed and recorded upon receipt of the sample(s) into the laboratory?

☐ Sample temperature confirmed: must be 1° – 10° C. (If samples were sent by courier and delivered on the same day as collection, temperature requirement does not apply).

☑ Container type noted ☐ sample condition observed ☐ pH verified (where applicable) ☐ Field and lab IDs cross referenced

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

1.5.1 Were all samples delivered to the laboratory without breakage? **Yes** [✓] No [ ] N/A [ ] Comments:

1.5.2 Does the *Cooler Receipt Form* or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data? Yes [ ] **No** [✓] N/A [ ] Comments:

1.6 Sample Results Section: *Was each of the following requirements supplied in the laboratory report for each sample?* **Yes** [✓] No [ ] N/A [ ] Comments:

☑ Field ID and Lab ID ☑ *Date and time collected* ☑ Analyst Initials ☑ *Dilution Factor* ☐ % moisture or solids ☑ *Reporting limits*
☐ *Clean-up method* ☑ Analysis method ☑ *Preparation method* ☐ *Date of preparation/extraction/digestion clean-up and analysis, where applicable*
☐ Matrix ☑ Target analytes and concentrations ☑ Units (soils must be reported in dry weight)

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

1.7 QA/QC Information: Was each of the following information supplied in the laboratory report for each sample batch? **Yes** [✓] No [ ] N/A [ ] Comments:

☑ Method blank results ☑ LCS recoveries ☑ MS/MSD recoveries and RPDs ☐ Laboratory duplicate results (where applicable)

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

2.0 Holding Times

Have any technical holding times, determined from date of collection to date of analysis, been exceeded? Holding time for metals is 180 days from sample collection to analysis for both water and soil. Yes [ ] **No** [✓] N/A [ ] Comments:

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

ACTION: If technical holding times are exceeded, qualify all positive results (J) and non-detects (UJ). If grossly exceeded (2X holding time) reject (R) all non-detect results.

3.0 Laboratory Method

3.1 Was the correct laboratory method used? **Yes** [✓] No [ ] N/A [ ] Comments:

Water Digestion	3005A or 3010A or 3020A
Soil Digestion	3050B
Metals	6010B or 200.7

ACTION: If no, contact laboratory to provide justification for method change compared to the requested method. Contact senior chemist to inform Client of change and to request variance.

3.2 Are the practical quantitation limits the same as those specified by the ☐ SOW ☑ QAPP ☐ Lab ☐ MADEP **Yes** [✓] No [ ] N/A [ ] Comments:

NOTE: *Verify that the reported metals match the target list specified on the COC.*

ACTION: If no, evaluate variation with respect to sample matrix, preparation, dilution, moisture, etc. If sample PQL is indeterminate, contact lab for explanation.

3.3 Are results present for each sample in the SDG? Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If no, check Request for Analysis to verify if method was ordered and COC to verify that it was sent, and contact lab for resubmission of the missing data

3.4 If dilutions were required, were dilution factors reported? Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact the lab for submission.

4.0 Method Blanks

4.1 Is the Method Blank Summary present? Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If no, call the laboratory for submission of missing data.

4.2 Frequency of Analysis: Was a method blank analyzed for each digestion batch of < 20 field samples? Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact laboratory for justification. Consult senior chemist for action needed. Narrate non-compliance.

4.3 Is the method blank less than the PQLs for all target elements? Yes [✓] No [ ] N/A [ ] Comments:

NOTE: *MADEP requires the method blank to be matrix matched and digested with the samples*

4.4 Do any method blanks have positive results for metals? Qualify data according to the following: Yes [ ] No [✓] N/A [ ] Comments:

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

ACTION: For any blank with positive results, list all contaminants for each method blank including the concentration detected and the flagging level (flagging level = 5x the blank value) and the associated samples and qualifiers.

5.0 Laboratory Control Standard

5.1 Was a laboratory control standard run with each analytical batch of 20 samples or less? **Yes** [✓] No [ ] N/A [ ] Comments:

NOTE: *A full target, second source LCS is required by MADEP.*
ACTION: Call laboratory for LCS form submittal. If data are not available, use professional judgement to evaluate data accuracy associated with that batch.

5.2 Is a LCS Summary Form present? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact lab for resubmission of missing data.

5.3 Is the recovery of any analyte outside of MADEP control limits? Yes [ ] **No** [✓] N/A [ ] Comments:

Sample Type	*MADEP % Rec*
Water	*80-120*
Soil	within Lab generated limits

ACTION: If recovery is above the upper limit, qualify all positive sample results within the batch as (J). If recovery is below the lower limit, qualify all positive and non-detects results within the batch as (J). If LCS recovery is <30%, positive and non-detect results are rejected (R).

Comments:

6.0 Matrix Spikes

Matrix spikes may be collected at different frequencies based on monthly, quarterly, or task specific schedules. Confirm spike requirements for each set with the senior chemist.

6.1 Were project-specific MS/MSDs collected? List project samples that were spiked.

Yes [ ] No [✓] N/A [ ] Comments:

ACTION: If no, contact senior chemist to see if any were specified.

6.2 Is the Matrix Spike/Matrix Spike Duplicate Recovery Form present?

Yes [ ] No [ ] N/A [✓] Comments:

NOTE: *A full target, second source MS/MSD is required by MADEP.*
ACTION: If any matrix spike data are missing, call lab for resubmission.

6.3 Were matrix spikes analyzed as indicated on the COC and project schedule?

Yes [ ] No [ ] N/A [✓] Comments:

ACTION: If any matrix spike data are missing, call lab for resubmission. If none, no qualification is needed. Narrate non-compliance.

6.4 Are any metal spike recoveries outside of the QC limits?

Yes [ ] **No** [ ] N/A [✓] Comments:

Sample Type	*MADEP % Rec*	QAPP % Rec	Method
Water	*75-125*	N/A	6010B
Water	*N/A*	70-130	200.7
Soil	*75-125*	75-125	6010B

NOTE: $\%R = \frac{(SSR-SR)}{SA} \times 100\%$ Where: SSR = Spiked sample result, SR = Sample result, SA = Spike added

NOTE: If dilutions are required due to high sample concentrations (> 4X spike), the data are evaluated, but no flags are applied.

NOTE: If only one of the recoveries for an MS/MSD pair is outside of the control limits, no qualification is necessary. Use professional judgment for the MS/MSD flags.

ACTION: MS/MSD flags only apply to the sample spiked. If the recoveries of the MS and MSD exceed the upper control limit, qualify positive results as estimated (J). If the recoveries of the MS and MSD are lower than the lower control limit, qualify positive results and non-detects (J).

6.5 Are any RPDs for MS/MSD recoveries outside of the QC limits? Yes [ ] **No** [ ] N/A [✓] Comments:

NOTE: $RPD = \frac{S-D}{(S+D)/2} \times 100\%$ Where: S = MS sample result
D = MSD sample result

NOTE: If dilutions are required due to high sample concentrations, the data are evaluated, but no flags are applied.

ACTION: If the RPD exceeds the control limit, qualify positive results and non-detects (J).

7.0 Laboratory Duplicate

7.1 Was a laboratory duplicate sample analyzed? If so, is the Laboratory Duplicate Sample Form present? **Yes** [ ] No [✓] N/A [ ] Comments:

NOTE: *MADEP refers to this sample as a "matrix duplicate".*

ACTION: If not analyzed, qualification is not needed. If data is missing, contact laboratory for resubmission of report. Narrate non-compliance.

7.2 Is the RPD between the result for the laboratory duplicate sample and the result for the parent sample outside of the QA/QC limits? Yes [ ] **No** [ ] N/A [✓] Comments:

MADEP Laboratory Duplicate Sample RPD Criteria:	QAPP RPD
For aqueous results > 5x RL, RPD must be ± 20%	20
For aqueous results < 5x RL, RPD must be ≤ RL	20
For soil/sediment results > 5x RL, RPD must be ± 35%	20
For soil/sediment results < 5x RL, RPD must be ≤ 2x RL	20

ACTION: If the RPD exceeds the limits, qualify both positive results and non-detects as estimated and flag them J. Narrate non-compliance

8.0 Sampling Accuracy

The majority of ground water samples are collected directly from a tap, process stream, or with dedicated tubing. Rinse blanks will not be collected.

8.1 Were rinsate blanks collected? Prior to evaluating rinsate blanks, obtain a list of the associated samples from the senior chemist. **Yes** [ ] No [✓] N/A [ ] Comments:

8.2 Do any rinsate blanks have positive results? Yes [ ] **No** [ ] N/A [✓] Comments:

NOTE: *MADEP does not require the collection of rinsate blanks.*

ACTION: Evaluate rinsate results against blank results to determine if contaminant may be laboratory-derived. If results are not lab-related, qualify according to below.

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

9.0 Field Duplicates

9.1 Were field duplicate samples collected? Obtain a list of samples and their associated field duplicates. Yes [ ] **No** [✓] N/A [ ] Comments:

9.2 Were field duplicates collected per the required frequency? Yes [ ] No [ ] N/A [✓] Comments:

SOW ☐ QAPP *(1 per 10)* ☐ *MADEP Option 1 (1 per 20)* ☐ *MADEP Option 3 (1 per 10)* ☐

9.3 Was the RPD ≤ 50% for soils or waters? Calculate the RPD for all results and attach to this review. Yes [ ] No [ ] N/A [✓] Comments:

ACTION: RPD must be ≤50% for soil and water. Qualify data (J) for both sample results if the RPD exceeds 50%.

10.0 Special QA/QC

10.1 Were both total and dissolved metals analysis performed? If so, the dissolved metal concentration should not exceed that of the total metal. Yes [ ] **No** [✓] N/A [ ] Comments:

ACTION: If results for both total and dissolved are ≥ 5x the PQL **and** the dissolved concentration is 10% higher than the total, flag both results as estimated (J). If total and dissolved concentrations are less than 5x the PQL **and** the **difference** exceeds 2x the PQL, flag both results as estimated (J)

10.0 Application of Validation Qualifiers

Was any of the data qualified?

Yes [ ] No [✓] N/A [ ] Comments:

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

REFERENCES

LAW, 1999, "Final Quality Assurance Project Plan, Olin Wilmington Property, 51 Eames Street, Wilmington, MA", LAW Engineering and Environmental Services, Kennesaw, GA 30144. August 1999

U.S. Environmental Protection Agency (USEPA), 1989. "Region 1 Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses"; Hazardous Site Evaluation Division; February 1989.

MADEP, 2001. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Massachusetts Quality Assurance and Quality Control (QA/QC) Requirements." BWSC-CAM, Interim Final Draft, Revision No. 2, 5 October 2001.

MADEP, 2001. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Quality Assurance and Quality Control Guidelines for Sampling, Data Evaluation and Reporting Activities," BWSC-CAM, Section VII, Public Comment Draft, Revision No. 0, 21 December 2001.

OLIN-WILMINGTON
LEVEL I DATA QUALITY EVALUATION
STANDARD OPERATING PROCEDURE AND CHECKLIST
WET CHEMISTRY PARAMETERS BY VARIOUS METHODS

Reviewer/Date 12/04/07
Sr. Review/Date Chris Ricardi 12/20/07
Lab Report # 360-13542
Project # 630006.0011.61.1

Ammonia, Chloride, Sulfate, Spec. Conductance.

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 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 ☑ Dilution Factor ☐ % moisture or solids ☑ Reporting limits
☑ *Clean-up method* ☑ Analysis method ☑ Preparation method ☑ Date of preparation/extraction/digestion clean-up and analysis, where applicable
☑ Matrix ☑ Target analytes and concentrations ☑ Units (soils must be reported in dry weight)

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

1.7 **QA/QC Information:** Was the following information provided in the laboratory report for each sample batch? **Yes** [✓] No [ ] N/A [ ] Comments:

☑ Method blank results ☑ LCS recoveries ☐ MS/MSD recoveries and RPDs ☑ Laboratory duplicate results (where applicable)

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

2.0 **Holding Times** Yes [ ] **No** [✓] N/A [ ] Comments:

Have any technical holding times, determined from date of collection to date of analysis, been exceeded? The holding times are as follows:

✓ 28 days = ammonia, chemical oxygen demand, chloride, organic carbon, oil & grease, specific conductance, total organic carbon and sulfate

Alkalinity = 14 days | Sulfide, TDS, TSS = 7 days | pH = analyze immediately | Nitrate nitrogen as N = 48 hrs

Nitrite nitrogen as N = 48 hrs | Nitrate + Nitrite as N = 28 days

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

ACTION: If technical holding times are exceeded qualify results (J). For water samples that are grossly exceeded (>2X hold time) reject (R) all non-detect results. Professional judgment used to qualify soils.

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

3.1 Was the correct laboratory method used?

ACTION: If no, contact lab to provide justification for method change compared to the requested method. Contact senior chemist to inform Client of change or to request variance.

3.2 Are the practical quantitation limits the same as those specified by the ☐ SOW ☑ QAPP ☐ Lab? **Yes** [ ] No [✓] N/A [ ] Comments: The lab reported a PQL for Spec. Cond (1 umhos/cm) that is below the QAPP PQL. No further action required.

Note: *The MADEP QA/QC Guidelines do not yet list PQLs for wet chemistry analyses, therefore all criteria will default to values stipulated in the QAPP*. Where the QAPP does not define criteria, QA/QC requirements default to limits employed by the lab**. Other criteria may also apply.*

Ammonia* ☑ = 0.1 mg/ L | Alkalinity** ☐ = 1 mg/L | Bicarbonate Alkalinity** ☐ = 1 mg/L | Carbonate Alkalinity** ☐ = 1 mg/L

Nitrate Nitrogen as N* ☐ = .05 mg/L | Nitrite Nitrogen as N* ☐ = .01 mg/L | Chloride* ☐ = 1 mg/L | Hardness *☐ = 2 mg/L

Spec. Cond.** ☒ 3 umhos/cm | Total Organic Carbon** ☐ = 1 mg/L | Oil & Grease* ☐ = 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.

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: $\%R = \frac{(SSR-SR)}{SA} \times 100\%$ 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*(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

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

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:

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.

MACTEC

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511 Congress Street
P.O. Box 7050
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Telephone: 207/775-5401
Fax: 207/772-4762
Home Page: www.mactec.com

To: Steve Morrow
From: Chris Ricardi
Date: January 4, 2008
Subject: Interim Response Steps Work Plan Slurry Wall/Cap Monitoring Program, former Post Construction Monitoring Program Surface Water and Ground Water – November 2007

Data Validation Summary
TestAmerica Laboratories Data Sets 360-13480, 360-13515, and 360-13542

These sample sets contained results for ground water and surface water samples collected during November 2007. The samples were analyzed by TestAmerica (formerly Severn Trent Laboratories) in Westfield, Massachusetts for the following constituents:

Samples 'OC-ISCO-1', OC-PZ-18R', 'OC-SD-17', 'OC-ISCO-3', and 'OC-ISCO-2' (360-13480-1 thru -5)

- Total and dissolved metals (aluminum, chromium, sodium), and general chemistry analysis for ammonia, nitrate, nitrite, chloride, sulfate, and specific conductance (TestAmerica, Westfield, Massachusetts).

Samples 'OC-GW-34SR', 'OC-GW-202D', 'OC-GW-202D DUP', 'OC-GW-10S', 'OC-GW-26', 'OC-GW-202S', and 'OC-GW-34D' (360-13480-6 thru -12)

- Dissolved metals (aluminum and chromium), and general chemistry analysis for ammonia, chloride, sulfate, and specific conductance.

Samples 'OC-GW-39', 'OC-GW-39 DUP', 'OC-GW-25', 'OC-GW-76S', 'OC-GW-55S', 'OC-GW-24', 'OC-PZ18R', 'OC-PZ-16RR', 'OC-PZ-17RR', 'OC-GW-201S', and 'OC-GW-79S' (360-13515-1 thru -11)

- Dissolved metals (aluminum and chromium), and general chemistry analysis for ammonia, chloride, sulfate, and specific conductance.

Samples 'OC-GW-78S', 'OC-GW-CA1', and 'OC-GW-35S' (360-13542-1 thru -3)

- Dissolved metals (aluminum and chromium), and general chemistry analysis for ammonia, chloride, sulfate, and specific conductance.

The Olin Wilmington Quality Assurance Project Plan 1999 (QAPP) was 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.

Validation Actions and Observations

The dissolved sodium results are greater than the total sodium results. Total and dissolved sodium results in samples OC-ISCO-1, OC-PZ-18R, OC-SD-17, OC-ISCO-3, and OC-ISCO-2 were qualified estimated (J).

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

Chris Ricardi

01/04/08

Chris Ricardi, NRCC-EAC
Senior Chemist

Date

Mr J Murphy

01/04/08

Michael Murphy
Project Principal

Date

MACTEC

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

Job Number: 360-13515-1

Job Description: PCMP

For:
Olin Corporation
1186 Lower River Road
Charleston, TN 37310-0248

Attention: Mr. Steven Morrow

Joseph A. Clemens Jr.

Designee for
Becky C Mason
Project Manager II
becky.mason@testamericainc.com
12/03/2007

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 #:	**360-13515-1**
Project Location:	**PCMP**	MADEP RTN[1]:	

This form provides certifications for the following data set:[list Laboratory Sample ID Number(s)]
360-13515-(1-11)

Sample Matrices: **Groundwater** Soil/Sediment Drinking Water Other:

MCP SW-846 Methods Used	8260B( )	8151A ( )	8330 ( )	6010B (x)	7470A/1A ( )	Other ( )
	8270C( )	8081A ( )	VPH ( )	6020 ( )	9014M[2]/9012 ( )	
As specified in MADEP Compendium of Analytical Methods. (check all that apply)	8082 ( )	8021B ( )	EPH ( )	7000 S[3]( )	7196A ( )	

1 List Release Tracking Number (RTN), if known
2 M - SW-846 Method 9014 or MADEP Physiologically Available Cyanide (PAC) Method
3 S - SW-846 Methods 7000 Series List individual method and analyte.

An affirmative response to questions A, B, C and D is required for "Presumptive Certainty" status

A	Were all samples received by the laboratory in a condition consistent with that described on the Chain-of-Custody documentation for the data set?	(Yes) No[1]
B	Were all QA/QC procedures required for the specified analytical method(s) included in this report followed, including the requirement to note and discuss in a narrative QC data that did not meet appropriate performance standards or guidelines?	(Yes) No[1]
C	Does the analytical data included in this report meet all the requirements for "Presumptive Certainty", as described in Section 2.0 (a), (b), (c) and (d) of the MADEP document CAM VII A, " Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	(Yes) N/A No[1]
D	**VPH and EPH methods only:** Was the VPH or EPH Method conducted without significant modifications (see Section 11.3 of respective Methods)?	Yes (N/A) No[1]

A response to questions E and F below is required for "Presumptive Certainty" status

E	Were all QC performance standards and recommendations for the specified methods achieved?	(Yes) No[1]
F	Were results for all analyte-list compounds/elements for the specified method(s) reported?	Yes N/A (No[1])

[1] All Negative responses must be addressed in an attached Environmental Laboratory case narrative.

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.

Signature: **Position:** Laboratory Director

Printed Name: Steven C. Hartmann **Date:** 12/2/07

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

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53 Southampton Rd,
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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

MADEP MCP Analytical Method Report Certification Form

Laboratory Name:	**TestAmerica Westfield**	Project #:	**360-13515-1**
Project Location:	**PCMP**	MADEP RTN[1]:	

This form provides certifications for the following data set:[list Laboratory Sample ID Number(s)]
360-13515-(1-11)

Sample Matrices: **Groundwater** Soil/Sediment Drinking Water Other:

MCP SW-846 Methods Used	8260B( )	8151A ( )	8330 ( )	6010B ( )	7470A/1A ( )	Other (x)
	8270C( )	8081A ( )	VPH ( )	6020 ( )	9014M[2]/9012 ( )	
As specified in MADEP Compendium of Analytical Methods. (check all that apply)	8082 ( )	8021B ( )	EPH ( )	7000 S[3]( )	7196A ( )	

1 List Release Tracking Number (RTN), if known
2 M - SW-846 Method 9014 or MADEP Physiologically Available Cyanide (PAC) Method
3 S - SW-846 Methods 7000 Series List individual method and analyte.

An affirmative response to questions A, B, C and D is required for "Presumptive Certainty" status

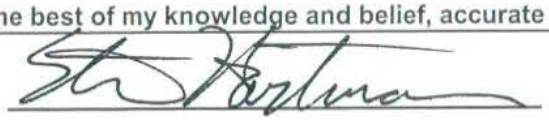
A	Were all samples received by the laboratory in a condition consistent with that described on the Chain-of-Custody documentation for the data set?	(Yes) No[1]
B	Were all QA/QC procedures required for the specified analytical method(s) included in this report followed, including the requirement to note and discuss in a narrative QC data that did not meet appropriate performance standards or guidelines?	(Yes) No[1]
C	Does the analytical data included in this report meet all the requirements for "Presumptive Certainty", as described in Section 2.0 (a), (b), (c) and (d) of the MADEP document CAM VII A, " Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	Yes (N/A) No[1]
D	**VPH and EPH methods only:** Was the VPH or EPH Method conducted without significant modifications (see Section 11.3 of respective Methods)?	Yes (N/A) No[1]

A response to questions E and F below is required for "Presumptive Certainty" status

E	Were all QC performance standards and recommendations for the specified methods achieved?	(Yes) No[1]
F	Were results for all analyte-list compounds/elements for the specified method(s) reported?	Yes (N/A) No[1]

[1] All Negative responses must be addressed in an attached Environmental Laboratory case narrative.

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.

Signature:  **Position:** Laboratory Director

Printed Name: Steven C. Hartmann **Date:** 12/2/07

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

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CASE NARRATIVE

Client: Olin Corporation

Project: PCMP

Report Number: 360-13515-1

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 11/14/2007; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 4.2°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 360-13515-1 through 360-13515-11 were analyzed for dissolved metals in accordance with EPA SW846 Method 6010B. The samples were analyzed on 11/15/2007.

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 360-13515-1 through 360-13515-11 were analyzed for ammonia in accordance with LACHAT 10-107-06-1. The samples were prepared on 11/26/2007 and 11/27/2007 and analyzed on 11/27/2007.

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

Samples 360-13515-3(10X), 360-13515-5(10X), 360-13515-6(10X), 360-13515-8(20X), 360-13515-9(10X), 360-13515-10(20X) and 360-13515-11(10X) required dilution prior to analysis. The reporting limits have been adjusted accordingly. Dilutions were due to high concentration.

ANIONS

Samples 360-13515-1 through 360-13515-11 were analyzed for anions in accordance with EPA Method 300.0. The samples were analyzed on 11/21/2007 and 11/30/2007.

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

Samples 360-13515-1 through 360-13515-3(10X), 360-13515-5(10X), 360-13515-7 through 360-13515-10(10X), 360-13515-10(50X) and 360-13515-11(10X) required dilution prior to analysis. The reporting limits have been adjusted accordingly. Dilutions were due to high target concentration.

SPECIFIC CONDUCTANCE (CONDUCTIVITY)

Samples 360-13515-1 through 360-13515-11 were analyzed for Specific Conductance (Conductivity) in accordance with SM 2510B. The samples were analyzed on 11/15/2007.

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: 360-13515-1

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-Nitrogen	TAL WFD	QuickChem 10-107-06-1	
Distillation/Ammonia	TAL WFD		Distill/Ammonia
Chloride & Sulfate	TAL WFD	40CFR136A 300.0	
Conductivity, Specific Conductance	TAL WFD	SM18 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

SM18 = "Standard Methods For The Examination Of Water And Wastewater", 18th Edition, 1992.

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: 360-13515-1

Method	Analyst	Analyst ID
SW846 6010B	Smith, Tim J	TJS
QuickChem 10-107-06-1	Lalashius, Andrew L	ALL
40CFR136A 300.0	Lalashius, Andrew L	ALL
SM18 SM 2510B	Emerich, Rich W	RWE

SAMPLE SUMMARY

Client: Olin Corporation

Job Number: 360-13515-1

Lab Sample ID	Client Sample ID	Client Matrix	Date/Time Sampled	Date/Time Received
360-13515-1	OC-GW-39	Ground Water	11/13/2007 1400	11/14/2007 1630
360-13515-2	OC-GW-39 DUP	Ground Water	11/13/2007 1400	11/14/2007 1630
360-13515-3	OC-GW-25	Ground Water	11/13/2007 1545	11/14/2007 1630
360-13515-4	OC-GW-76S	Ground Water	11/13/2007 1430	11/14/2007 1630
360-13515-5	OC-GW-55S	Ground Water	11/13/2007 1550	11/14/2007 1630
360-13515-6	OC-GW-24	Ground Water	11/14/2007 1020	11/14/2007 1630
360-13515-7	OC-PZ18R	Ground Water	11/14/2007 1200	11/14/2007 1630
360-13515-8	OC-PZ-16RR	Ground Water	11/14/2007 0915	11/14/2007 1630
360-13515-9	OC-PZ-17RR	Ground Water	11/14/2007 1030	11/14/2007 1630
360-13515-10	OC-GW-201S	Ground Water	11/14/2007 1135	11/14/2007 1630
360-13515-11	OC-GW-79S	Ground Water	11/14/2007 1315	11/14/2007 1630

SAMPLE RESULTS

Mr. Steven Morrow
Olin Corporation
1186 Lower River Road
Charleston, TN 37310-0248

Job Number: 360-13515-1

Client Sample ID: OC-GW-39
Lab Sample ID: 360-13515-1

Date Sampled: 11/13/2007 1400
Date Received: 11/14/2007 1630
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B		Date Analyzed:		11/15/2007 1212	
Aluminum	310	ug/L	6.0	100	1.0
Chromium	ND	ug/L	0.68	5.0	1.0

Mr. Steven Morrow
Olin Corporation
1186 Lower River Road
Charleston, TN 37310-0248

Job Number: 360-13515-1

Client Sample ID: OC-GW-39
Lab Sample ID: 360-13515-1

Date Sampled: 11/13/2007 1400
Date Received: 11/14/2007 1630
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 10-107-06-1		Date Analyzed:		11/27/2007 1129	
Prep Method: Distill/Ammonia		Date Prepared:		11/26/2007 0913	
Ammonia	0.12	mg/L	0.10	0.10	1.0
Method: 300.0		Date Analyzed:		11/21/2007 1819	
Sulfate	270	mg/L	20	20	10
Chloride	59	mg/L	10	10	10
Method: SM 2510B		Date Analyzed:		11/15/2007 1032	
Specific Conductance	720	umhos/cm	1.0	1.0	1.0

Mr. Steven Morrow
Olin Corporation
1186 Lower River Road
Charleston, TN 37310-0248

Job Number: 360-13515-1

Client Sample ID: OC-GW-39 DUP
Lab Sample ID: 360-13515-2

Date Sampled: 11/13/2007 1400
Date Received: 11/14/2007 1630
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B		Date Analyzed:	11/15/2007 1228		
Aluminum	300	ug/L	6.0	100	1.0
Chromium	ND	ug/L	0.68	5.0	1.0

Mr. Steven Morrow
Olin Corporation
1186 Lower River Road
Charleston, TN 37310-0248

Job Number: 360-13515-1

Client Sample ID: OC-GW-39 DUP
Lab Sample ID: 360-13515-2

Date Sampled: 11/13/2007 1400
Date Received: 11/14/2007 1630
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 10-107-06-1		Date Analyzed:		11/27/2007 1130	
Prep Method: Distill/Ammonia		Date Prepared:		11/26/2007 0913	
Ammonia	0.13	mg/L	0.10	0.10	1.0
Method: 300.0		Date Analyzed:		11/21/2007 1834	
Sulfate	270	mg/L	20	20	10
Chloride	59	mg/L	10	10	10
Method: SM 2510B		Date Analyzed:		11/15/2007 1035	
Specific Conductance	730	umhos/cm	1.0	1.0	1.0

Mr. Steven Morrow
Olin Corporation
1186 Lower River Road
Charleston, TN 37310-0248

Job Number: 360-13515-1

Client Sample ID: OC-GW-25
Lab Sample ID: 360-13515-3

Date Sampled: 11/13/2007 1545
Date Received: 11/14/2007 1630
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B		Date Analyzed:		11/15/2007 1231	
Aluminum	ND	ug/L	6.0	100	1.0
Chromium	8.3	ug/L	0.68	5.0	1.0

Mr. Steven Morrow
Olin Corporation
1186 Lower River Road
Charleston, TN 37310-0248

Job Number: 360-13515-1

Client Sample ID: OC-GW-25
Lab Sample ID: 360-13515-3

Date Sampled: 11/13/2007 1545
Date Received: 11/14/2007 1630
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 10-107-06-1		Date Analyzed:		11/27/2007 1147	
Prep Method: Distill/Ammonia		Date Prepared:		11/26/2007 0913	
Ammonia	99	mg/L	1.0	1.0	10
Method: 300.0		Date Analyzed:		11/21/2007 1849	
Sulfate	350	mg/L	20	20	10
Chloride	150	mg/L	10	10	10
Method: SM 2510B		Date Analyzed:		11/15/2007 1036	
Specific Conductance	1500	umhos/cm	1.0	1.0	1.0

Mr. Steven Morrow
Olin Corporation
1186 Lower River Road
Charleston, TN 37310-0248

Job Number: 360-13515-1

Client Sample ID: OC-GW-76S
Lab Sample ID: 360-13515-4

Date Sampled: 11/13/2007 1430
Date Received: 11/14/2007 1630
Client Matrix: Ground Water

Analyte	Result/Qualifier		Unit	MDL	RL	Dilution
Method: Dissolved-6010B			Date Analyzed:		11/15/2007 1233	
Aluminum	14	J	ug/L	6.0	100	1.0
Chromium	1.9	J	ug/L	0.68	5.0	1.0

Mr. Steven Morrow
Olin Corporation
1186 Lower River Road
Charleston, TN 37310-0248

Job Number: 360-13515-1

Client Sample ID: OC-GW-76S
Lab Sample ID: 360-13515-4

Date Sampled: 11/13/2007 1430
Date Received: 11/14/2007 1630
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 10-107-06-1		Date Analyzed:		11/27/2007 1132	
Prep Method: Distill/Ammonia		Date Prepared:		11/26/2007 0913	
Ammonia	15	mg/L	0.10	0.10	1.0
Method: 300.0		Date Analyzed:		11/21/2007 1547	
Sulfate	45	mg/L	2.0	2.0	1.0
Chloride	26	mg/L	1.0	1.0	1.0
Method: SM 2510B		Date Analyzed:		11/15/2007 1038	
Specific Conductance	260	umhos/cm	1.0	1.0	1.0

Mr. Steven Morrow
Olin Corporation
1186 Lower River Road
Charleston, TN 37310-0248

Job Number: 360-13515-1

Client Sample ID: OC-GW-55S
Lab Sample ID: 360-13515-5

Date Sampled: 11/13/2007 1550
Date Received: 11/14/2007 1630
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B		Date Analyzed:		11/15/2007 1236	
Aluminum	24000	ug/L	6.0	100	1.0
Chromium	5.9	ug/L	0.68	5.0	1.0

Mr. Steven Morrow
Olin Corporation
1186 Lower River Road
Charleston, TN 37310-0248

Job Number: 360-13515-1

Client Sample ID: OC-GW-55S
Lab Sample ID: 360-13515-5

Date Sampled: 11/13/2007 1550
Date Received: 11/14/2007 1630
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 10-107-06-1		Date Analyzed:		11/27/2007 1148	
Prep Method: Distill/Ammonia		Date Prepared:		11/26/2007 0913	
Ammonia	190	mg/L	1.0	1.0	10
Method: 300.0		Date Analyzed:		11/21/2007 1919	
Sulfate	900	mg/L	20	20	10
Chloride	120	mg/L	10	10	10
Method: SM 2510B		Date Analyzed:		11/15/2007 1039	
Specific Conductance	2400	umhos/cm	1.0	1.0	1.0

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Job Number: 360-13515-1

Client Sample ID: OC-GW-24
Lab Sample ID: 360-13515-6

Date Sampled: 11/14/2007 1020
Date Received: 11/14/2007 1630
Client Matrix: Ground Water

Analyte	Result/Qualifier		Unit	MDL	RL	Dilution
Method: Dissolved-6010B			Date Analyzed:		11/15/2007 1238	
Aluminum	14	J	ug/L	6.0	100	1.0
Chromium	ND		ug/L	0.68	5.0	1.0

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Job Number: 360-13515-1

Client Sample ID: OC-GW-24
Lab Sample ID: 360-13515-6

Date Sampled: 11/14/2007 1020
Date Received: 11/14/2007 1630
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 10-107-06-1		Date Analyzed:		11/27/2007 1151	
Prep Method: Distill/Ammonia		Date Prepared:		11/26/2007 0913	
Ammonia	38	mg/L	1.0	1.0	10
Method: 300.0		Date Analyzed:		11/21/2007 1618	
Sulfate	78	mg/L	2.0	2.0	1.0
Chloride	8.2	mg/L	1.0	1.0	1.0
Method: SM 2510B		Date Analyzed:		11/15/2007 1041	
Specific Conductance	430	umhos/cm	1.0	1.0	1.0

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Job Number: 360-13515-1

Client Sample ID: OC-PZ18R
Lab Sample ID: 360-13515-7

Date Sampled: 11/14/2007 1200
Date Received: 11/14/2007 1630
Client Matrix: Ground Water

Analyte	Result/Qualifier		Unit	MDL	RL	Dilution
Method: Dissolved-6010B			Date Analyzed:		11/15/2007 1241	
Aluminum	ND		ug/L	6.0	100	1.0
Chromium	4.8	J	ug/L	0.68	5.0	1.0

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Job Number: 360-13515-1

Client Sample ID: OC-PZ18R
Lab Sample ID: 360-13515-7

Date Sampled: 11/14/2007 1200
Date Received: 11/14/2007 1630
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 10-107-06-1		Date Analyzed:		11/27/2007 1621	
Prep Method: Distill/Ammonia		Date Prepared:		11/27/2007 1443	
Ammonia	10	mg/L	0.10	0.10	1.0
Method: 300.0		Date Analyzed:		11/21/2007 1703	
Sulfate	37	mg/L	2.0	2.0	1.0
Method: 300.0		Date Analyzed:		11/21/2007 2049	
Chloride	69	mg/L	10	10	10
Method: SM 2510B		Date Analyzed:		11/15/2007 1042	
Specific Conductance	440	umhos/cm	1.0	1.0	1.0

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Job Number: 360-13515-1

Client Sample ID: OC-PZ-16RR
Lab Sample ID: 360-13515-8

Date Sampled: 11/14/2007 0915
Date Received: 11/14/2007 1630
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B		Date Analyzed:		11/15/2007 1244	
Aluminum	ND	ug/L	6.0	100	1.0
Chromium	5.1	ug/L	0.68	5.0	1.0

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Job Number: 360-13515-1

Client Sample ID: OC-PZ-16RR
Lab Sample ID: 360-13515-8

Date Sampled: 11/14/2007 0915
Date Received: 11/14/2007 1630
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 10-107-06-1		Date Analyzed:		11/27/2007 1643	
Prep Method: Distill/Ammonia		Date Prepared:		11/27/2007 1443	
Ammonia	120	mg/L	2.0	2.0	20
Method: 300.0		Date Analyzed:		11/21/2007 2105	
Sulfate	320	mg/L	20	20	10
Chloride	230	mg/L	10	10	10
Method: SM 2510B		Date Analyzed:		11/15/2007 1043	
Specific Conductance	2100	umhos/cm	1.0	1.0	1.0

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Job Number: 360-13515-1

Client Sample ID: OC-PZ-17RR
Lab Sample ID: 360-13515-9

Date Sampled: 11/14/2007 1030
Date Received: 11/14/2007 1630
Client Matrix: Ground Water

Analyte	Result/Qualifier		Unit	MDL	RL	Dilution
Method: Dissolved-6010B			Date Analyzed:		11/15/2007 1252	
Aluminum	ND		ug/L	6.0	100	1.0
Chromium	2.6	J	ug/L	0.68	5.0	1.0

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Job Number: 360-13515-1

Client Sample ID: OC-PZ-17RR
Lab Sample ID: 360-13515-9

Date Sampled: 11/14/2007 1030
Date Received: 11/14/2007 1630
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 10-107-06-1		Date Analyzed:		11/27/2007 1644	
Prep Method: Distill/Ammonia		Date Prepared:		11/27/2007 1443	
Ammonia	52	mg/L	1.0	1.0	10
Method: 300.0		Date Analyzed:		11/21/2007 1733	
Chloride	24	mg/L	1.0	1.0	1.0
Method: 300.0		Date Analyzed:		11/21/2007 2120	
Sulfate	350	mg/L	20	20	10
Method: SM 2510B		Date Analyzed:		11/15/2007 1045	
Specific Conductance	1200	umhos/cm	1.0	1.0	1.0

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Job Number: 360-13515-1

Client Sample ID: OC-GW-201S
Lab Sample ID: 360-13515-10

Date Sampled: 11/14/2007 1135
Date Received: 11/14/2007 1630
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B		Date Analyzed:		11/15/2007 1254	
Aluminum	ND	ug/L	6.0	100	1.0
Chromium	15	ug/L	0.68	5.0	1.0

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Job Number: 360-13515-1

Client Sample ID: OC-GW-201S
Lab Sample ID: 360-13515-10

Date Sampled: 11/14/2007 1135
Date Received: 11/14/2007 1630
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 10-107-06-1		Date Analyzed:		11/27/2007 1644	
Prep Method: Distill/Ammonia		Date Prepared:		11/27/2007 1443	
Ammonia	150	mg/L	2.0	2.0	20
Method: 300.0		Date Analyzed:		11/21/2007 2135	
Chloride	150	mg/L	10	10	10
Method: 300.0		Date Analyzed:		11/30/2007 2035	
Sulfate	1500	mg/L	100	100	50
Method: SM 2510B		Date Analyzed:		11/15/2007 1046	
Specific Conductance	3600	umhos/cm	1.0	1.0	1.0

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Job Number: 360-13515-1

Client Sample ID: OC-GW-79S
Lab Sample ID: 360-13515-11

Date Sampled: 11/14/2007 1315
Date Received: 11/14/2007 1630
Client Matrix: Ground Water

Analyte	Result/Qualifier		Unit	MDL	RL	Dilution
Method: Dissolved-6010B			Date Analyzed:		11/15/2007 1257	
Aluminum	20	J	ug/L	6.0	100	1.0
Chromium	36		ug/L	0.68	5.0	1.0

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Job Number: 360-13515-1

Client Sample ID: OC-GW-79S
Lab Sample ID: 360-13515-11

Date Sampled: 11/14/2007 1315
Date Received: 11/14/2007 1630
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 10-107-06-1		Date Analyzed:		11/27/2007 1645	
Prep Method: Distill/Ammonia		Date Prepared:		11/27/2007 1443	
Ammonia	68	mg/L	1.0	1.0	10
Method: 300.0		Date Analyzed:		11/21/2007 2150	
Sulfate	730	mg/L	20	20	10
Chloride	220	mg/L	10	10	10
Method: SM 2510B		Date Analyzed:		11/15/2007 1048	
Specific Conductance	2000	umhos/cm	1.0	1.0	1.0

DATA REPORTING QUALIFIERS

Client: Olin Corporation

Job Number: 360-13515-1

Lab Section	Qualifier	Description
Metals		
	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: 360-13515-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
Metals					
Analysis Batch:360-25758					
LCS 360-25758/2	Lab Control Spike	T	Water	6010B	
LCSD 360-25758/14	Lab Control Spike Duplicate	T	Water	6010B	
MB 360-25758/3	Method Blank	T	Water	6010B	
360-13515-1	OC-GW-39	D	Water	6010B	
360-13515-1DU	Duplicate	D	Water	6010B	
360-13515-1MS	Matrix Spike	D	Water	6010B	
360-13515-2	OC-GW-39 DUP	D	Water	6010B	
360-13515-3	OC-GW-25	D	Water	6010B	
360-13515-4	OC-GW-76S	D	Water	6010B	
360-13515-5	OC-GW-55S	D	Water	6010B	
360-13515-6	OC-GW-24	D	Water	6010B	
360-13515-7	OC-PZ18R	D	Water	6010B	
360-13515-8	OC-PZ-16RR	D	Water	6010B	
360-13515-9	OC-PZ-17RR	D	Water	6010B	
360-13515-10	OC-GW-201S	D	Water	6010B	
360-13515-11	OC-GW-79S	D	Water	6010B	

Report Basis
D = Dissolved
T = Total

Client: Olin Corporation

Job Number: 360-13515-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
General Chemistry					
Analysis Batch:360-25728					
LCS 360-25728/1	Lab Control Spike	T	Water	SM 2510B	
MB 360-25728/3	Method Blank	T	Water	SM 2510B	
360-13515-1	OC-GW-39	T	Water	SM 2510B	
360-13515-1DU	Duplicate	T	Water	SM 2510B	
360-13515-2	OC-GW-39 DUP	T	Water	SM 2510B	
360-13515-3	OC-GW-25	T	Water	SM 2510B	
360-13515-4	OC-GW-76S	T	Water	SM 2510B	
360-13515-5	OC-GW-55S	T	Water	SM 2510B	
360-13515-6	OC-GW-24	T	Water	SM 2510B	
360-13515-7	OC-PZ18R	T	Water	SM 2510B	
360-13515-8	OC-PZ-16RR	T	Water	SM 2510B	
360-13515-9	OC-PZ-17RR	T	Water	SM 2510B	
360-13515-10	OC-GW-201S	T	Water	SM 2510B	
360-13515-11	OC-GW-79S	T	Water	SM 2510B	
Analysis Batch:360-26025					
LCS 360-26025/2	Lab Control Spike	T	Water	300.0	
MB 360-26025/1	Method Blank	T	Water	300.0	
360-13515-1	OC-GW-39	T	Water	300.0	
360-13515-2	OC-GW-39 DUP	T	Water	300.0	
360-13515-3	OC-GW-25	T	Water	300.0	
360-13515-4	OC-GW-76S	T	Water	300.0	
360-13515-5	OC-GW-55S	T	Water	300.0	
360-13515-6	OC-GW-24	T	Water	300.0	
360-13515-7	OC-PZ18R	T	Water	300.0	
360-13515-9	OC-PZ-17RR	T	Water	300.0	
Analysis Batch:360-26026					
LCS 360-26026/2	Lab Control Spike	T	Water	300.0	
MB 360-26026/1	Method Blank	T	Water	300.0	
360-13515-7	OC-PZ18R	T	Water	300.0	
360-13515-8	OC-PZ-16RR	T	Water	300.0	
360-13515-9	OC-PZ-17RR	T	Water	300.0	
360-13515-10	OC-GW-201S	T	Water	300.0	
360-13515-11	OC-GW-79S	T	Water	300.0	
Prep Batch: 360-26058					
LCS 360-26058/2-A	Lab Control Spike	T	Water		Distill/Ammonia
MB 360-26058/1-A	Method Blank	T	Water		Distill/Ammonia
360-13515-1	OC-GW-39	T	Water		Distill/Ammonia
360-13515-2	OC-GW-39 DUP	T	Water		Distill/Ammonia
360-13515-3	OC-GW-25	T	Water		Distill/Ammonia
360-13515-4	OC-GW-76S	T	Water		Distill/Ammonia
360-13515-5	OC-GW-55S	T	Water		Distill/Ammonia
360-13515-6	OC-GW-24	T	Water		Distill/Ammonia

Client: Olin Corporation

Job Number: 360-13515-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
General Chemistry					
Analysis Batch:360-26134					
LCS 360-26058/2-A	Lab Control Spike	T	Water	10-107-06-1	360-26058
MB 360-26058/1-A	Method Blank	T	Water	10-107-06-1	360-26058
360-13515-1	OC-GW-39	T	Water	10-107-06-1	360-26058
360-13515-2	OC-GW-39 DUP	T	Water	10-107-06-1	360-26058
360-13515-3	OC-GW-25	T	Water	10-107-06-1	360-26058
360-13515-4	OC-GW-76S	T	Water	10-107-06-1	360-26058
360-13515-5	OC-GW-55S	T	Water	10-107-06-1	360-26058
360-13515-6	OC-GW-24	T	Water	10-107-06-1	360-26058
Prep Batch: 360-26139					
LCS 360-26139/2-A	Lab Control Spike	T	Water	Distill/Ammonia	
MB 360-26139/1-A	Method Blank	T	Water	Distill/Ammonia	
360-13515-7	OC-PZ18R	T	Water	Distill/Ammonia	
360-13515-8	OC-PZ-16RR	T	Water	Distill/Ammonia	
360-13515-9	OC-PZ-17RR	T	Water	Distill/Ammonia	
360-13515-10	OC-GW-201S	T	Water	Distill/Ammonia	
360-13515-11	OC-GW-79S	T	Water	Distill/Ammonia	
Analysis Batch:360-26168					
LCS 360-26139/2-A	Lab Control Spike	T	Water	10-107-06-1	360-26139
MB 360-26139/1-A	Method Blank	T	Water	10-107-06-1	360-26139
360-13515-7	OC-PZ18R	T	Water	10-107-06-1	360-26139
360-13515-8	OC-PZ-16RR	T	Water	10-107-06-1	360-26139
360-13515-9	OC-PZ-17RR	T	Water	10-107-06-1	360-26139
360-13515-10	OC-GW-201S	T	Water	10-107-06-1	360-26139
360-13515-11	OC-GW-79S	T	Water	10-107-06-1	360-26139
Analysis Batch:360-26331					
LCS 360-26331/2	Lab Control Spike	T	Water	300.0	
MB 360-26331/1	Method Blank	T	Water	300.0	
360-13515-10	OC-GW-201S	T	Water	300.0	

Report Basis
T = Total

Client: Olin Corporation

Job Number: 360-13515-1

Method Blank - Batch: 360-25758

Method: 6010B
Preparation: N/A

Lab Sample ID: MB 360-25758/3
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/15/2007 1217
Date Prepared: N/A

Analysis Batch: 360-25758
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: mL

Analyte	Result	Qual	MDL	RL
Aluminum	ND		6.0	100
Chromium	ND		0.68	5.0

Lab Control Spike/
Lab Control Spike Duplicate Recovery Report - Batch: 360-25758

Method: 6010B
Preparation: N/A

LCS Lab Sample ID: LCS 360-25758/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/15/2007 1215
Date Prepared: N/A

Analysis Batch: 360-25758
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 360-25758/14
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/15/2007 1246
Date Prepared: N/A

Analysis Batch: 360-25758
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 10 mL

Analyte	% Rec. LCS	% Rec. LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Aluminum	98	98	80 - 120	0	20		
Chromium	98	98	80 - 120	0	20		

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

Client: Olin Corporation

Job Number: 360-13515-1

Matrix Spike - Batch: 360-25758

Method: 6010B
Preparation: N/A

Lab Sample ID: 360-13515-1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/15/2007 1223
Date Prepared: N/A

Analysis Batch: 360-25758
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	310	5000	5810	110	75 - 125	
Chromium	ND	1000	1080	108	75 - 125	

Duplicate - Batch: 360-25758

Method: 6010B
Preparation: N/A

Lab Sample ID: 360-13515-1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/15/2007 1220
Date Prepared: N/A

Analysis Batch: 360-25758
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: mL

Analyte	Sample Result/Qual	Result	RPD	Limit	Qual
Aluminum	310	302	2	20	
Chromium	ND	0.263	NC	20	

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

Client: Olin Corporation

Job Number: 360-13515-1

Method Blank - Batch: 360-26058

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

Lab Sample ID: MB 360-26058/1-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/27/2007 1118
Date Prepared: 11/26/2007 0913

Analysis Batch: 360-26134
Prep Batch: 360-26058
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: mL
Final Weight/Volume: 50 mL

Analyte	Result	Qual	RL	RL
Ammonia	ND		0.10	0.10

Lab Control Spike - Batch: 360-26058

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

Lab Sample ID: LCS 360-26058/2-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/27/2007 1119
Date Prepared: 11/26/2007 0913

Analysis Batch: 360-26134
Prep Batch: 360-26058
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: mL
Final Weight/Volume: 50 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Ammonia	10.0	9.80	98	85 - 115	

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

Client: Olin Corporation

Job Number: 360-13515-1

Method Blank - Batch: 360-26139

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

Lab Sample ID: MB 360-26139/1-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/27/2007 1620
Date Prepared: 11/27/2007 1443

Analysis Batch: 360-26168
Prep Batch: 360-26139
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: mL
Final Weight/Volume: 50 mL

Analyte	Result	Qual	RL	RL
Ammonia	ND		0.10	0.10

Lab Control Spike - Batch: 360-26139

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

Lab Sample ID: LCS 360-26139/2-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/27/2007 1621
Date Prepared: 11/27/2007 1443

Analysis Batch: 360-26168
Prep Batch: 360-26139
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: mL
Final Weight/Volume: 50 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Ammonia	10.0	8.57	86	85 - 115	

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

Client: Olin Corporation

Job Number: 360-13515-1

Method Blank - Batch: 360-26025

Method: 300.0
Preparation: N/A

Lab Sample ID: MB 360-26025/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/21/2007 1347
Date Prepared: N/A

Analysis Batch: 360-26025
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: mL
Final Weight/Volume: mL

Analyte	Result	Qual	RL	RL
Sulfate	ND		2.0	2.0
Chloride	ND		1.0	1.0

Lab Control Spike - Batch: 360-26025

Method: 300.0
Preparation: N/A

Lab Sample ID: LCS 360-26025/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/21/2007 1402
Date Prepared: N/A

Analysis Batch: 360-26025
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: mL
Final Weight/Volume: mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Sulfate	80.0	81.2	102	85 - 115	
Chloride	40.0	40.7	102	85 - 115	

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

Client: Olin Corporation

Job Number: 360-13515-1

Method Blank - Batch: 360-26026

Method: 300.0
Preparation: N/A

Lab Sample ID: MB 360-26026/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/21/2007 2004
Date Prepared: N/A

Analysis Batch: 360-26026
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: mL
Final Weight/Volume: mL

Analyte	Result	Qual	RL	RL
Sulfate	ND		2.0	2.0
Chloride	ND		1.0	1.0

Lab Control Spike - Batch: 360-26026

Method: 300.0
Preparation: N/A

Lab Sample ID: LCS 360-26026/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/21/2007 2019
Date Prepared: N/A

Analysis Batch: 360-26026
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: mL
Final Weight/Volume: mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Sulfate	80.0	78.7	98	85 - 115	
Chloride	40.0	41.1	103	85 - 115	

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

Client: Olin Corporation

Job Number: 360-13515-1

Method Blank - Batch: 360-26331

Method: 300.0
Preparation: N/A

Lab Sample ID: MB 360-26331/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/30/2007 1955
Date Prepared: N/A

Analysis Batch: 360-26331
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume:

Analyte	Result	Qual	RL	RL
Sulfate	ND		2.0	2.0
Chloride	ND		1.0	1.0

Lab Control Spike - Batch: 360-26331

Method: 300.0
Preparation: N/A

Lab Sample ID: LCS 360-26331/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/30/2007 2015
Date Prepared: N/A

Analysis Batch: 360-26331
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: mL
Final Weight/Volume: mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Sulfate	80.0	82.1	103	85 - 115	
Chloride	40.0	40.9	102	85 - 115	

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

Client: Olin Corporation

Job Number: 360-13515-1

Method Blank - Batch: 360-25728

Method: SM 2510B
Preparation: N/A

Lab Sample ID: MB 360-25728/3
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/15/2007 1030
Date Prepared: N/A

Analysis Batch: 360-25728
Prep Batch: N/A
Units: umhos/cm

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

Analyte	Result	Qual	RL	RL
Specific Conductance	ND		1.0	1.0

Lab Control Spike - Batch: 360-25728

Method: SM 2510B
Preparation: N/A

Lab Sample ID: LCS 360-25728/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/15/2007 1027
Date Prepared: N/A

Analysis Batch: 360-25728
Prep Batch: N/A
Units: umhos/cm

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

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Specific Conductance	1410	1440	102	85 - 115	

Duplicate - Batch: 360-25728

Method: SM 2510B
Preparation: N/A

Lab Sample ID: 360-13515-1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/15/2007 1033
Date Prepared: N/A

Analysis Batch: 360-25728
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: mL

Analyte	Sample Result/Qual	Result	RPD	Limit	Qual
Specific Conductance	720	729	1	20	

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

Login Sample Receipt Check List

Client: Olin Corporation

Job Number: 360-13515-1

Login Number: 13515
Creator: Rinard, Kimberley A
List Number: 1

List Source: TestAmerica Westfield

Question	T / F/ NA	Comment
Radioactivity either was not measured or, if measured, is at or below background	N/A	
The cooler's custody seal, if present, is intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	4.2 C
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	N/A	
If necessary, staff have been informed of any short hold time or quick TAT needs	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	

TestAmerica Laboratories, Inc.
Chain of Custody Form

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

•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 #: 63cc06cc10
Project Manager: Peter Thompson
Work ID: PCMP
Contact: David Chapman

Job# 360-13515 | Quote# | PO#

Requested Turn Around Time
10 Business Day (Std) XX
15 Business Day
Other
Rush TAT Requested: 24 hrs 72 hrs 48 hrs 5 Day

Regulatory Classification / Special Report Format
NPDES Drinking Water DEP Form(s)
RCRA MCP GW1/S1 MWRA Smart Rpt
Other MCP QA/QC Rpt XX

Shaded areas for office use

Analysis Requested
Check analysis and specify method and analytes in comments section.
For example:
500-series for drinking water
600-series for waste water
8000-series for haz/solid waste
Use comments section to further define.

Comments (Special Instructions)
MCP case narrative

Sample Type Codes
WW-Wastewater DW-Drinking water SW-Surfacewater
LW-Labwater GW-Groundwater A-Air
S-Solid / Soil SL-Sludge O-Oil Z-Other

Sample ID	Sample Type	Sampler's Initials	Date Time Collected	Grab	Comp.	# Containers	Plastic(P) or Glass(G)	Preservative: NaHSO4/MeOH	HNO3 to pH <2	H2SO4 to pH <2	HCl to pH <2	NaOH to pH >12	NAOH/ZNAC	None / 4° C	Ammonia-Nitrogen	Chloride, Sulfate	Specific Conductivity	Nitrate, Nitrite - N	Groundwater metals	Surfacewater metals	Sediment: Al/Cr/Fe	Other	Other	Other	Other	Other	Other
GW-39	GW	TRH	11 13 07 1400	X		3	P		X	X				X	X	X	X	X	X							
GW-39 dup	GW	TRH	11 13 07 1400	X		3	P		X	X				X	X	X	X	X	X							
GW-25	GW	TRH	11 13 07 1545	X		3	P		X	X				X	X	X	X	X	X							
GW-76S	GW	DLC	11/13/07 1430 RL	X		3	P		✓	✓				✓	✓	✓	✓		✓							
GW-55S	GW	DLC	11/13/07 1590 RL	X		3	P		✓	✓				✓	✓	✓	✓		✓							
GW-24	GW	TRH	11 14 07 1020	X		3	P		X	X				X	X	X	X		X							
PZ 18R	GW	TRH	11 14 07 1200	X		3	P		X	X				X	X	X	X		X							
PZ-16RR	GW	DLC	11/14/07 9:15	X		3	P		X	X				X	X	X	X		X							
PZ-17RR	GW	DLC	11/14/07 10:30	X		3	P		X	X				X	X	X	X		X							
GW-201S	GW	DLC	11/14/07 11:35	X		3	P		X	X				X	X	X	X		X							

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Dissolved metals are field filtered.
Groundwater Metals: Dissolved Al/Cr
Surfacewater Metals: Dissolved/Total Al/Cr/Na

Time added to GW-76S + GW-55S per Dale Chapman Rec 11/15/07

P4T22°

Sampled by (print): Thomas Hanlon / David Chapman 11/13/07
Signature:

Relinquished by: David Chapman Date: 11/14/07 Time: 1359
Received by: Date: 11/14/07 Time: 1359

Relinquished by: Date: 11/14/07 Time: 1630
Received by: Date: 11/14/07 Time: 1630

Method of shipment:

TestAmerica-Westfield

Cooler? (Y) / N Samples Iced? (Y) / N
Temp @ receipt: 4.2° °C
Preservation/pH checked
By: Date: 11/14/07

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

Severn Trent Laboratories, Inc.
Chain of Custody Form

SEVERN TRENT STL

43131

•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 / Service Center

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

Project #: 630006a010
Project Manager: Peter Thompson
Work ID: PCMP
Contact: David Chapman

Job#: 360-13515
Quote#
PO#

Requested Turnaround Time (PLEASE SPECIFY)
STANDARD X
RUSH ____ *(Lab Approval Required)*

Regulatory Classification
NPDES ____ Drinking Water ____
RCRA ____ MCP GW1/S1 ____
Other ____

Special Report Format
QA/QC Report? X
DQE (MCP) Rpt ____
DEP Form(s) 2 ____

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, NPDES
6000-series for groundwater, soil, waste
8000-series for groundwater, soil, waste
Use comments section to further define.

Comments
(Special Instructions)

Please print legibility. If the analytical requests are not clearly defined on the chain-of-custody, the turnaround time will begin after all questions have been satisfactorily answered.

Sample Type Codes
WW-Wastewater DW-Drinking water SW-Surface water
LW-Lab water 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	Na2S2O3	None / 4° C	Volatiles 524/624/8260	Volatiles 601/602/8021 Chloride, Surface	Semivol 525/625/8270 Surface Sample	PCB / Pest / Herbicide	EPH / VPH	DRO / GRO / ETPH	Metals 6010 / 200.7	Mercury 245.1 / 7470-71	General Chemistry	Bacteriological	Toxicity	Oil & Grease / TOC	Radchem / Other
GW-79S	GW	DLC	11/14/07 13:15	X		3	P		X	X				X	X	X	X	X								

MCP case narrative

Diss. metals are Field Filtered

Groundwater metals are Diss. Al/Cr

Surface water metals are Diss / Total Al, Cr, Na

D4772.2

Sampled by (print): David Chapman / Thomas Hanton
Signature:

Relinquished by: David Chapman	Date: 11/14/07	Time: 1339	Received by: Jerry Dal	Date: 11/14/07	Time: 1359
Relinquished by: Jerry Dal	Date: 11/14/07	Time: 1630	Received by: MRL	Date: 11/14/07	Time: 1630
Relinquished by:	Date:	Time:	Received by:	Date:	Time:

Cooler? (Y) / N
MADEP Requirement Samples Iced? (Y) / N
Temp @ receipt: 4.2° °C
Preservation / pH checked? (Y) / N
By: MRL Date: 11/14/07

STL WESTFIELD

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

OLIN-WILMINGTON
LEVEL I DATA QUALITY EVALUATION
STANDARD OPERATING PROCEDURE AND CHECKLIST
WET CHEMISTRY PARAMETERS BY VARIOUS METHODS

Reviewer/Date 12/14/07
Sr. Review/Date Chris Ricardi 12/20/07
Lab Report # 360-13515
Project # 63000600.11, 61.1

Ammonia, chloride, sulfate, spec. conductance

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 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
- [✓] 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 (N/A)
- [✓] Laboratory duplicate results (where applicable)

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

2.0 Holding Times Yes [ ] **No** [✓] N/A [ ] Comments:

Have any technical holding times, determined from date of collection to date of analysis, been exceeded? The holding times are as follows:

✓ 28 days = ammonia, chemical oxygen demand, chloride, organic carbon, oil & grease, specific conductance, total organic carbon and sulfate

Alkalinity = 14 days | Sulfide, TDS, TSS = 7 days | pH = analyze immediately | Nitrate nitrogen as N = 48 hrs

Nitrite nitrogen as N = 48 hrs | Nitrate + Nitrite as N = 28 days

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

ACTION: If technical holding times are exceeded qualify results (J). For water samples that are grossly exceeded (>2X hold time) reject (R) all non-detect results. Professional judgment used to qualify soils.

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

3.1 Was the correct laboratory method used?

ACTION: If no, contact lab to provide justification for method change compared to the requested method. Contact senior chemist to inform Client of change or to request variance.

3.2 Are the practical quantitation limits the same as those specified by the ☐ SOW ☑ QAPP ☐ Lab? **Yes** [ ] No [✓] N/A [ ] Comments: The lab reported a Spec. Cond. PQL (1 umhos/cm) that is less than the QAPP required limit. No further action required

Note: *The MADEP QA/QC Guidelines do not yet list PQLs for wet chemistry analyses, therefore all criteria will default to values stipulated in the QAPP*. Where the QAPP does not define criteria, QA/QC requirements default to limits employed by the lab**. Other criteria may also apply.*

Ammonia* ☑ = 0.1 mg/ L	Alkalinity** ☐ = 1 mg/L	Bicarbonate Alkalinity** ☐ = 1 mg/L	Carbonate Alkalinity** ☐ = 1 mg/L
Nitrate Nitrogen as N* ☐ = .05 mg/L	Nitrite Nitrogen as N* ☐ = .01 mg/L	Chloride* ☑ = 1 mg/L	Hardness *☐ = 2 mg/L
Spec. Cond.** ☒ 3 umhos/cm	Total Organic Carbon** ☐ = 1 mg/L	Oil & Grease* ☐ = 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.

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: $\%R = \frac{(SSR-SR)}{SA} \times 100\%$ 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*(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

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

9.1 Were field duplicate samples collected? Obtain a list of samples and their associated field duplicates. **Yes** [✓] No [ ] N/A [ ] Comments: Sample OC-GW-39 was submitted with a field duplicate.

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: See attached.

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:

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

SAMPLE ID	ANALYTE	ORIG	DUP	RPD
OC-GW-39	Ammonia	0.12	0.13	8
OC-GW-39	Sulfate	270	270	0
OC-GW-39	Chloride	59	59	0
OC-GW-39	Specific Conductance	720	730	1

REFERENCES

LAW, 1999, "Final Quality Assurance Project Plan, Olin Wilmington Property, 51 Eames Street, Wilmington, MA", LAW Engineering and Environmental Services, Kennesaw, GA 30144. August 1999.

STL-Westfield, 2002. "Olin – General Chemistry Control Limits (Soil & Water)," Severn Trent Laboratories, Inc., 53 Southampton Road, Westfield, MA, 01085.

Version 1.2, Nov 2002

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

Reviewer/Date 12/14/07
Sr. Review/Date Chris Record 12/20/07
Lab Report # 360-13575
Project # 630006011.61.1

Aluminum, Chromium

1.0 Laboratory Deliverable Requirements

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

☑ *Name of Laboratory* ☑ *Address* ☑ *Project ID* ☑ *Phone #* ☑ *Sample identification – Field and Laboratory*
Client Information: ☑ *Name* ☑ *Address* ☑ *Client Contact* *(IDs must be cross-referenced)*

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

1.2 Laboratory Report Certification Statement ***Yes*** [✓] *No* [ ] *N/A* [ ] *Comments:*

Does the laboratory report include a completed Analytical Report Certification in the required format?

ACTION: *If no, contact lab for submission of missing certification or certification with correct format.*

1.3 Laboratory Case Narrative: ***Yes*** [✓] *No* [ ] *N/A* [ ] *Comments:*

☑ *Narrative serves as an exception report for the project and method QA/QC performance.* ☑ *Narrative includes an explanation of each discrepancy on the*

Certification Statement.

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

1.4 Chain of Custody (COC) copy present with all documentation completed **Yes** [✓] No [ ] N/A [ ] Comments:

NOTE: Olin receives and maintains the *original COC.*

ACTION: If no, contact lab for submission of copy of completed *COC.*

1.5 Sample Receipt Information (*Cooler Receipt Form present?*): **Yes** [✓] No [ ] N/A [ ] Comments:

Were each of the following tasks completed and recorded upon receipt of the sample(s) into the laboratory?

☑ Sample temperature confirmed: must be 1° – 10° C. (If samples were sent by courier and delivered on the same day as collection, temperature requirement does not apply).

☑ Container type noted ☐ sample condition observed ☑ pH verified (where applicable) ☐ Field and lab IDs cross referenced

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

1.5.1 Were all samples delivered to the laboratory without breakage? **Yes** [✓] No [ ] N/A [ ] Comments:

1.5.2 Does the *Cooler Receipt Form* or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data? Yes [ ] **No** [✓] N/A [ ] Comments:

1.6 Sample Results Section: *Was each of the following requirements supplied in the laboratory report for each sample?* **Yes** [✓] No [ ] N/A [ ] Comments:

☑ Field ID and Lab ID ☑ *Date and time collected* ☑ Analyst Initials ☑ *Dilution Factor* ☐ % moisture or solids ☑ *Reporting limits*
☑ *Clean-up method* ☐ Analysis method ☑ *Preparation method* ☐ *Date of preparation/extraction/digestion clean-up and analysis, where applicable*
☑ Matrix ☑ Target analytes and concentrations ☑ Units (soils must be reported in dry weight)

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

1.7 QA/QC Information: Was each of the following information supplied in the laboratory report for each sample batch? **Yes** [✓] No [ ] N/A [ ] Comments:

☑ Method blank results ☑ LCS recoveries ☑ MS/MSD recoveries and RPDs ☑ Laboratory duplicate results (where applicable)

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

2.0 Holding Times

Have any technical holding times, determined from date of collection to date of analysis, been exceeded? Holding time for metals is 180 days from sample collection to analysis for both water and soil. Yes [ ] **No [✓]** N/A [ ] Comments:

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

ACTION: If technical holding times are exceeded, qualify all positive results (J) and non-detects (UJ). If grossly exceeded (2X holding time) reject (R) all non-detect results.

3.0 Laboratory Method

3.1 Was the correct laboratory method used? **Yes [✓]** No [ ] N/A [ ] Comments:

Water Digestion	3005A or 3010A or 3020A
Soil Digestion	3050B
Metals	6010B or 200.7

ACTION: If no, contact laboratory to provide justification for method change compared to the requested method. Contact senior chemist to inform Client of change and to request variance.

3.2 Are the practical quantitation limits the same as those specified by the ☐ SOW ☑ QAPP ☐ Lab ☐ MADEP **Yes [✓]** No [ ] N/A [ ] Comments:

NOTE: *Verify that the reported metals match the target list specified on the COC.*

ACTION: If no, evaluate variation with respect to sample matrix, preparation, dilution, moisture, etc. If sample PQL is indeterminate, contact lab for explanation.

3.3 Are results present for each sample in the SDG? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, check Request for Analysis to verify if method was ordered and COC to verify that it was sent, and contact lab for resubmission of the missing data

3.4 If dilutions were required, were dilution factors reported? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact the lab for submission.

4.0 Method Blanks

4.1 Is the Method Blank Summary present? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, call the laboratory for submission of missing data.

4.2 Frequency of Analysis: Was a method blank analyzed for each digestion batch of < 20 field samples? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact laboratory for justification. Consult senior chemist for action needed. Narrate non-compliance.

4.3 Is the method blank less than the PQLs for all target elements? **Yes** [✓] No [ ] N/A [ ] Comments:

NOTE: *MADEP requires the method blank to be matrix matched and digested with the samples*

4.4 Do any method blanks have positive results for metals? Qualify data according to the following: Yes [ ] **No** [✓] N/A [ ] Comments:

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

ACTION: For any blank with positive results, list all contaminants for each method blank including the concentration detected and the flagging level (flagging level = 5x the blank value) and the associated samples and qualifiers.

5.0 Laboratory Control Standard

5.1 Was a laboratory control standard run with each analytical batch of 20 samples or less?

Yes [✓] No [ ] N/A [ ] Comments:

NOTE: *A full target, second source LCS is required by MADEP.*
ACTION: Call laboratory for LCS form submittal. If data are not available, use professional judgement to evaluate data accuracy associated with that batch.

5.2 Is a LCS Summary Form present?

Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact lab for resubmission of missing data.

5.3 Is the recovery of any analyte outside of MADEP control limits?

Yes [ ] **No** [✓] N/A [ ] Comments:

Sample Type	*MADEP % Rec*
Water	*80-120*
Soil	within Lab generated limits

ACTION: If recovery is above the upper limit, qualify all positive sample results within the batch as (J). If recovery is below the lower limit, qualify all positive and non-detects results within the batch as (J). If LCS recovery is <30%, positive and non-detect results are rejected (R).

Comments:

6.0 Matrix Spikes

Matrix spikes may be collected at different frequencies based on monthly, quarterly, or task specific schedules. Confirm spike requirements for each set with the senior chemist.

6.1 Were project-specific MS/MSDs ~~collected~~ analyzed? List project samples that were spiked. @12/14/09

Yes [✓] No [ ] N/A [ ] Comments: The lab performed an MS analysis on sample OC-GW-39 (360-13515-1).

ACTION: If no, contact senior chemist to see if any were specified.

6.2 Is the Matrix Spike/Matrix Spike Duplicate Recovery Form present?

Yes [✓] No [ ] N/A [ ] Comments:

NOTE: *A full target, second source MS/MSD is required by MADEP.*
ACTION: If any matrix spike data are missing, call lab for resubmission.

6.3 Were matrix spikes analyzed as indicated on the COC and project schedule?

Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If any matrix spike data are missing, call lab for resubmission. If none, no qualification is needed. Narrate non-compliance.

6.4 Are any metal spike recoveries outside of the QC limits?

Yes [ ] No [✓] N/A [ ] Comments:

Sample Type	*MADEP % Rec*	QAPP % Rec	Method
Water	*75-125*	N/A	6010B
Water	*N/A*	70-130	200.7
Soil	*75-125*	75-125	6010B

NOTE: $\%R = \frac{(SSR-SR)}{SA} \times 100\%$ Where: SSR = Spiked sample result, SR = Sample result, SA = Spike added

NOTE: If dilutions are required due to high sample concentrations (> 4X spike), the data are evaluated, but no flags are applied.

NOTE: If only one of the recoveries for an MS/MSD pair is outside of the control limits, no qualification is necessary. Use professional judgment for the MS/MSD flags.

ACTION: MS/MSD flags only apply to the sample spiked. If the recoveries of the MS and MSD exceed the upper control limit, qualify positive results as estimated (J). If the recoveries of the MS and MSD are lower than the lower control limit, qualify positive results and non-detects (J).

6.5 Are any RPDs for MS/MSD recoveries outside of the QC limits? Yes [ ] **No** [ ] N/A [✓] Comments: An MSD was not performed.

NOTE: RPD = $\frac{S-D}{(S+D)/2}$ x 100% Where: S = MS sample result
D = MSD sample result

NOTE: If dilutions are required due to high sample concentrations, the data are evaluated, but no flags are applied.

ACTION: If the RPD exceeds the control limit, qualify positive results and non-detects (J).

7.0 Laboratory Duplicate

7.1 Was a laboratory duplicate sample analyzed? If so, is the Laboratory Duplicate Sample Form present? **Yes** [✓] No [ ] N/A [ ] Comments:

NOTE: *MADEP refers to this sample as a "matrix duplicate".*

ACTION: If not analyzed, qualification is not needed. If data is missing, contact laboratory for resubmission of report. Narrate non-compliance.

7.2 Is the RPD between the result for the laboratory duplicate sample and the result for the parent sample outside of the QA/QC limits? Yes [ ] **No** [✓] N/A [ ] Comments:

MADEP Laboratory Duplicate Sample RPD Criteria:	QAPP RPD
For aqueous results > 5× RL, RPD must be ± 20%	20
For aqueous results < 5× RL, RPD must be ≤ RL	20
For soil/sediment results > 5× RL, RPD must be ± 35%	20
For soil/sediment results < 5× RL, RPD must be ≤ 2× RL	20

ACTION: If the RPD exceeds the limits, qualify both positive results and non-detects as estimated and flag them J. Narrate non-compliance

8.0 Sampling Accuracy

The majority of ground water samples are collected directly from a tap, process stream, or with dedicated tubing. Rinse blanks will not be collected.

8.1 Were rinsate blanks collected? Prior to evaluating rinsate blanks, obtain a list of the associated samples from the senior chemist.

Yes [ ] No [✓] N/A [ ] Comments:

8.2 Do any rinsate blanks have positive results?

Yes [ ] **No** [ ] N/A [✓] Comments:

NOTE: *MADEP does not require the collection of rinsate blanks.*

ACTION: Evaluate rinsate results against blank results to determine if contaminant may be laboratory-derived. If results are not lab-related, qualify according to below.

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

9.0 Field Duplicates

9.1 Were field duplicate samples collected? Obtain a list of samples and their associated field duplicates.

Yes [✓] **No** [ ] N/A [ ] Comments:

Sample OC-GW-39 was submitted with a field duplicate.

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: see attached.

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)

SAMPLE ID	ANALYTE	ORIG	DUP	RPD
OC-GW-39	Aluminum	310	300	3
OC-GW-39	Chromium	ND	ND	0

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.

MACTEC

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P.O. Box 7050
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Telephone: 207/775-5401
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Home Page: www.mactec.com

To: Steve Morrow
From: Chris Ricardi
Date: January 4, 2008
Subject: 51 Eames Street Property 4Q07 Plant B Monitoring for the IRSWP November 2007

Data Validation Summary
TestAmerica Laboratories Data Set 360-13592

This sample set contained results for groundwater samples identified as OC-B-03 collected during 4Q07 monitoring completed in November - 2007. The sample was analyzed by TestAmerica (formerly Severn Trent Laboratories) Westfield, Massachusetts for the following constituents:

Samples 'OC-B-03'

- volatile organic compounds (VOCs) for trimethylpentenes only
- Semivolatile organic compounds (SVOCs) for bis(2-ethylhexyl)phthalate and N-nitrosodiphenylamine only
- Massachusetts volatile petroleum hydrocarbons (MAVPH)
- Dissolved metals (iron only)
- General chemistry analysis for ammonia and pH.

The Olin Wilmington Quality Assurance Project Plan 1999 (QAPP) was 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.

Validation Actions and Observations

Bis(2-ethylhexyl) phthalate (0.55 µg/L) is reported in the SVOC method blank. An action limit was established at ten times the reported blank concentration. The result for bis(2-ethylhexyl) phthalate in sample OC-B-03 is less than the action limit and were qualified non-detect (U) at the reporting limit.

The same was received at the laboratory one day out of technical hold time for pH analysis. The laboratory analyzed pH upon receipt. The result for pH was qualified estimated (J).

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

Chris Ricardi

01/04/08

Chris Ricardi, NRCC-EAC
Senior Chemist

Date

Mr J Murphy

01/04/08

Michael J. Murphy
Project Principal

Date

MACTEC

MACTEC

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Home Page: www.mactec.com

To: Steve Morrow
From: Chris Ricardi
Date: 12/21/07
Subject: 51 Eames St Property 4Q07 Plant B Monitoring for the IRSWP November 2007

Data Validation Summary
TestAmerica Laboratories Data Set 360-13592

This sample set contained results for groundwater samples identified as OC-B-03 collected during monthly monitoring completed in November - 2007. The sample was analyzed by TestAmerica (formerly Severn Trent Laboratories) Westfield, Massachusetts for the following constituents:

Samples 'OC-B-03'

- volatile organic compounds (VOCs) for trimethylpentenes only
- Semivolatile organic compounds (SVOCs) for bis(2-ethylhexyl)phthalate and N-nitrosodiphenylamine only
- Massachusetts volatile petroleum hydrocarbons (MAVPH)
- Dissolved metals (iron only)
- General chemistry analysis for ammonia and pH.

The Olin Wilmington Quality Assurance Project Plan 1999 (QAPP) was 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.

Validation Actions and Observations

Bis(2-ethylhexyl) phthalate (0.55 µg/L) is reported in the SVOC method blank. An action limit was established at ten times the reported blank concentration. The result for bis(2-ethylhexyl) phthalate in sample OC-B-03 is less than the action limit and were qualified non-detect (U) at the reporting limit.

The same was received at the laboratory one day out of technical hold time for pH analysis. The laboratory analyzed pH upon receipt. The result for pH was qualified estimated (J).

Unless noted above, the remainder of the results is interpreted to be usable as reported by TestAmerica.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

Job Number: 360-13592-1

Job Description: Plant B

For:
Olin Corporation
1186 Lower River Road
Charleston, TN 37310-0248

Attention: Mr. Steven Morrow

Joseph A. Clemens Jr.

Designee for
Becky C Mason
Project Manager II
becky.mason@testamericainc.com
12/04/2007

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.
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ACCREDITED IN ACCORDANCE WITH nelac

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MADEP MCP Analytical Method Report Certification Form

Laboratory Name:	**TestAmerica Westfield**	Project #:	**360-13592-1**
Project Location:	**Plant B**	MADEP RTN[1]:	

This form provides certifications for the following data set:[list Laboratory Sample ID Number(s)]
360-13592-1

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

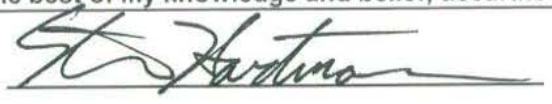
A	Were all samples received by the laboratory in a condition consistent with that described on the Chain-of-Custody documentation for the data set?	(Yes) No[1]
B	Were all QA/QC procedures required for the specified analytical method(s) included in this report followed, including the requirement to note 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:** 12/4/07

CAM VII A, Rev 3.2 April-04

TestAmerica
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MADEP MA014
NY DOH 10843
RI DOH 57
CT DPH 0494
VT DECWSD

NELAP FL E87912 TOX
NELAP NJ MA008 TOX
NELAP NY 10843
NH DES 253901-A

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Fax:(413)572-3707

Boston Service Center
148 Rangeway Rd
N.Billerica, MA 01862
Tel:(978)667-1400
Fax:(978)667-7871

MADEP MCP Analytical Method Report Certification Form

Laboratory Name:	**TestAmerica Westfield**	Project #:	**360-13592-1**
Project Location:	**Plant B**	MADEP RTN[1]:	

This form provides certifications for the following data set:[list Laboratory Sample ID Number(s)]
360-13592-1

Sample Matrices: **Groundwater** Soil/Sediment Drinking Water Other:

MCP SW-846	8260B( )	8151A ( )	8330 ( )	6010B ( )	7470A/1A ( )	Other ( )
Methods Used	8270C( )	8081A ( )	VPH (x)	6020 ( )	9014M[2]/9012 ( )	
As specified in MADEP	8082 ( )	8021B ( )	EPH ( )	7000 S[3]( )	7196A ( )	
Compendium of Analytical Methods. (check all that apply)	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:** 12/4/07

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

Boston Service Center
148 Rangeway Rd
N.Billerica, MA 01862
Tel:(978)667-1400
Fax:(978)667-7871

MADEP MCP Analytical Method Report Certification Form

Laboratory Name:	**TestAmerica Westfield**	Project #:	**360-13592-1**
Project Location:	**Plant B**	MADEP RTN[1]:	

This form provides certifications for the following data set:[list Laboratory Sample ID Number(s)]
360-13592-1

Sample Matrices:	**Groundwater**	Soil/Sediment	Drinking Water	Other:	
MCP SW-846 Methods Used	8260B( )	8151A ( )	8330 ( )	6010B ( )	7470A/1A ( )	Other ( )
	8270C(x)	8081A ( )	VPH ( )	6020 ( )	9014M[2]/9012 ( )	
As specified in MADEP Compendium of Analytical Methods. (check all that apply)	8082 ( )	8021B ( )	EPH ( )	7000 S[3]( )	7196A ( )	

1 List Release Tracking Number (RTN), if known
2 M - SW-846 Method 9014 or MADEP Physiologically Available Cyanide (PAC) Method
3 S - SW-846 Methods 7000 Series List individual method and analyte.

An affirmative response to questions A, B, C and D is required for "Presumptive Certainty" status

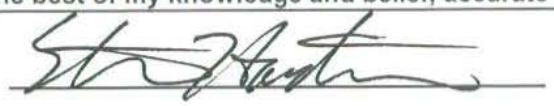
A	Were all samples received by the laboratory in a condition consistent with that described on the Chain-of-Custody documentation for the data set?	(Yes) No[1]
B	Were all QA/QC procedures required for the specified analytical method(s) included in this report followed, including the requirement to note and discuss in a narrative QC data that did not meet appropriate performance standards or guidelines?	(Yes) No[1]
C	Does the analytical data included in this report meet all the requirements for "Presumptive Certainty", as described in Section 2.0 (a), (b), (c) and (d) of the MADEP document CAM VII A, " Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	(Yes) N/A No[1]
D	**VPH and EPH methods only:** Was the VPH or EPH Method conducted without significant modifications (see Section 11.3 of respective Methods)?	Yes (N/A) No[1]

A response to questions E and F below is required for "Presumptive Certainty" status

E	Were all QC performance standards and recommendations for the specified methods achieved?	(Yes) No[1]
F	Were results for all analyte-list compounds/elements for the specified method(s) reported?	Yes N/A (No[1])

[1] All Negative responses must be addressed in an attached Environmental Laboratory case narrative.

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.

Signature:  **Position:** Laboratory Director

Printed Name: Steven C. Hartmann **Date:** 12/4/07

CAM VII A, Rev 3.2 April-04

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MADEP MCP Analytical Method Report Certification Form

Laboratory Name:	**TestAmerica Westfield**	Project #:	**360-13592-1**
Project Location:	**Plant B**	MADEP RTN[1]:	

This form provides certifications for the following data set:[list Laboratory Sample ID Number(s)]
360-13592-1

Sample Matrices: **Groundwater** Soil/Sediment Drinking Water Other:

MCP SW-846 Methods Used	8260B( )	8151A ( )	8330 ( )	6010B (x)	7470A/1A ( )	Other ( )
	8270C( )	8081A ( )	VPH ( )	6020 ( )	9014M[2]/9012 ( )	
As specified in MADEP Compendium of Analytical Methods. (check all that apply)	8082 ( )	8021B ( )	EPH ( )	7000 S[3]( )	7196A ( )	

1 List Release Tracking Number (RTN), if known
2 M - SW-846 Method 9014 or MADEP Physiologically Available Cyanide (PAC) Method
3 S - SW-846 Methods 7000 Series List individual method and analyte.

An affirmative response to questions A, B, C and D is required for "Presumptive Certainty" status

A	Were all samples received by the laboratory in a condition consistent with that described on the Chain-of-Custody documentation for the data set?	(Yes) No[1]
B	Were all QA/QC procedures required for the specified analytical method(s) included in this report followed, including the requirement to note and discuss in a narrative QC data that did not meet appropriate performance standards or guidelines?	(Yes) No[1]
C	Does the analytical data included in this report meet all the requirements for "Presumptive Certainty", as described in Section 2.0 (a), (b), (c) and (d) of the MADEP document CAM VII A, " Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	(Yes) N/A No[1]
D	**VPH and EPH methods only:** Was the VPH or EPH Method conducted without significant modifications (see Section 11.3 of respective Methods)?	Yes (N/A) No[1]

A response to questions E and F below is required for "Presumptive Certainty" status

E	Were all QC performance standards and recommendations for the specified methods achieved?	(Yes) No[1]
F	Were results for all analyte-list compounds/elements for the specified method(s) reported?	Yes N/A (No)[1]

[1] All Negative responses must be addressed in an attached Environmental Laboratory case narrative.

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.

Signature: _____ **Position:** Laboratory Director

Printed Name: Steven C. Hartmann **Date:** 12/4/07

CAM VII A, Rev 3.2 April-04

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MADEP MCP Analytical Method Report Certification Form

Laboratory Name:	**TestAmerica Westfield**	Project #:	**360-13592-1**
Project Location:	**Plant B**	MADEP RTN[1]:	

This form provides certifications for the following data set:[list Laboratory Sample ID Number(s)]
360-13592-1

Sample Matrices: **Groundwater** Soil/Sediment Drinking Water Other:

MCP SW-846 Methods Used	8260B( )	8151A ( )	8330 ( )	6010B ( )	7470A/1A ( )	Other (x)
	8270C( )	8081A ( )	VPH ( )	6020 ( )	9014M[2]/9012 ( )	
As specified in MADEP Compendium of Analytical Methods. (check all that apply)	8082 ( )	8021B ( )	EPH ( )	7000 S[3]( )	7196A ( )	

1 List Release Tracking Number (RTN), if known
2 M - SW-846 Method 9014 or MADEP Physiologically Available Cyanide (PAC) Method
3 S - SW-846 Methods 7000 Series List individual method and analyte.

An affirmative response to questions A, B, C and D is required for "Presumptive Certainty" status

A	Were all samples received by the laboratory in a condition consistent with that described on the Chain-of-Custody documentation for the data set?	(Yes) No[1]
B	Were all QA/QC procedures required for the specified analytical method(s) included in this report followed, including the requirement to note and discuss in a narrative QC data that did not meet appropriate performance standards or guidelines?	(Yes) No[1]
C	Does the analytical data included in this report meet all the requirements for "Presumptive Certainty", as described in Section 2.0 (a), (b), (c) and (d) of the MADEP document CAM VII A, " Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	Yes (N/A) No[1]
D	**VPH and EPH methods only:** Was the VPH or EPH Method conducted without significant modifications (see Section 11.3 of respective Methods)?	Yes (N/A) No[1]

A response to questions E and F below is required for "Presumptive Certainty" status

E	Were all QC performance standards and recommendations for the specified methods achieved?	(Yes) No[1]
F	Were results for all analyte-list compounds/elements for the specified method(s) reported?	Yes (N/A) No[1]

[1] All Negative responses must be addressed in an attached Environmental Laboratory case narrative.

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.

Signature: **Position:** Laboratory Director

Printed Name: Steven C. Hartmann **Date:** 12/4/07

CAM VII A, Rev 3.2 April-04

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CASE NARRATIVE

Client: Olin Corporation

Project: Plant B

Report Number: 360-13592-1

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 11/16/2007; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 6.8°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

Sample 360-13592-1 was analyzed for volatile organics in accordance with EPA SW846 Method 8260B. The sample was analyzed on 11/22/2007.

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 360-13592-1(10X) required dilution prior to analysis. The reporting limits have been adjusted accordingly. Dilution was due to foaming.

At the request of the client, a non-MCP compound list was reported for this job.

VOLATILE PETROLEUM HYDROCARBONS

Sample 360-13592-1 was analyzed for volatile petroleum hydrocarbons in accordance with MADEP VPH. The sample was analyzed on 11/21/2007.

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 360-13592-1 was analyzed for semivolatile organics in accordance with EPA SW846 Method 8270C. The sample was prepared on 11/20/2007 and analyzed on 11/27/2007.

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:
Bis(2-ethylhexyl) phthalate was detected in method blank MB 360-25951/1-A at a level that was above the method detection limit but below the reporting limit. The value should be considered an estimate, and has been flagged "J". If the associated sample reported a result above the MDL and/or RL, the result has been "B" flagged. Refer to the QC report for details.

At the request of the client, an abbreviated MCP compound list was reported for this job.

DISSOLVED METALS

Sample 360-13592-1 was analyzed for dissolved metals in accordance with EPA SW846 Method 6010B. The sample was analyzed on 11/19/2007.

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 method is 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 360-13592-1 was analyzed for ammonia in accordance with LACHAT 10-107-06-1. The sample was prepared and analyzed on 12/03/2007.

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

PH

Sample 360-13592-1 was analyzed for pH in accordance with SM 4500 H+ B. The sample was analyzed on 11/16/2007.

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: 360-13592-1

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-Nitrogen	TAL WFD	QuickChem 10-107-06-1	
Distillation/Ammonia	TAL WFD		Distill/Ammonia
pH	TAL WFD	SM19 SM 4500 H+ B	

Lab References:

TAL WFD = TestAmerica Westfield

Method References:

MA DEP = Massachusetts Department Of Environmental Protection

QuickChem = Lachat Instruments

SM19 = "Standard Methods For The Examination Of Water And Wastewater", 19Th Edition, 1995."

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: 360-13592-1

Method	Analyst	Analyst ID
SW846 8260B	Weigel, Brian	BW
SW846 8270C	Sullivan, Pat J	PJS
MA DEP MAVPH	Rouleau, Catherine M	CMR
SW846 6010B	Nasiatka, Ellen M	EMN
QuickChem 10-107-06-1	Lalashius, Andrew L	ALL
SM19 SM 4500 H+ B	Lalashius, Andrew L	ALL

SAMPLE SUMMARY

Client: Olin Corporation

Job Number: 360-13592-1

Lab Sample ID	Client Sample ID	Client Matrix	Date/Time Sampled	Date/Time Received
360-13592-1	OC-B-03	Ground Water	11/15/2007 1500	11/16/2007 1720

SAMPLE RESULTS

Mr. Steven Morrow
Olin Corporation
1186 Lower River Road
Charleston, TN 37310-0248

Job Number: 360-13592-1

Client Sample ID: OC-B-03
Lab Sample ID: 360-13592-1

Date Sampled: 11/15/2007 1500
Date Received: 11/16/2007 1720
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: 8260B		Date Analyzed:		11/22/2007 0154	
Prep Method: 5030B		Date Prepared:		11/22/2007 0154	
2,4,4-Trimethyl-1-pentene	ND	ug/L	2.0	10	10
2,4,4-Trimethyl-2-pentene	ND	ug/L	2.0	10	10
Surrogate				Acceptance Limits	
1,2-Dichloroethane-d4 (Surr)	87	%		70 - 130	
4-Bromofluorobenzene	89	%		70 - 130	
Dibromofluoromethane	105	%		70 - 130	
Toluene-d8 (Surr)	98	%		70 - 130	
Method: 8270C		Date Analyzed:		11/27/2007 0006	
Prep Method: 3510C		Date Prepared:		11/20/2007 1616	
Bis(2-ethylhexyl) phthalate	~~1.3 J B~~	ug/L	0.13	5.1	1.0
N-Nitrosodiphenylamine	24	ug/L	0.21	5.1	1.0
Surrogate				Acceptance Limits	
2,4,6-Tribromophenol	85	%		15 - 110	
2-Fluorobiphenyl	84	%		30 - 130	
2-Fluorophenol	32	%		15 - 110	
Nitrobenzene-d5	97	%		30 - 130	
Phenol-d5	19	%		15 - 110	
Terphenyl-d14	96	%		30 - 130	
Method: Dissolved-6010B		Date Analyzed:		11/19/2007 1634	
Iron	860	ug/L	14	100	1.0

Mr. Steven Morrow
Olin Corporation
1186 Lower River Road
Charleston, TN 37310-0248

Job Number: 360-13592-1

Client Sample ID: OC-B-03
Lab Sample ID: 360-13592-1

Date Sampled: 11/15/2007 1500
Date Received: 11/16/2007 1720
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: MAVPH		Date Analyzed:		11/21/2007 2214	
Prep Method: 5030B		Date Prepared:		11/21/2007 2214	
Benzene	ND	ug/L	5.0	5.0	1.0
Ethylbenzene	ND	ug/L	5.0	5.0	1.0
m-Xylene & p-Xylene	ND	ug/L	10	10	1.0
Methyl tert-butyl ether	ND	ug/L	5.0	5.0	1.0
Naphthalene	ND	ug/L	10	10	1.0
o-Xylene	ND	ug/L	5.0	5.0	1.0
Toluene	ND	ug/L	5.0	5.0	1.0
C5-C8 Aliphatics (unadjusted)	ND	ug/L	100	100	1.0
C9-C12 Aliphatics (unadjusted)	ND	ug/L	100	100	1.0
C5-C8 Aliphatics (adjusted)	ND	ug/L	100	100	1.0
C9-C12 Aliphatics (adjusted)	ND	ug/L	100	100	1.0
C9-C10 Aromatics	ND	ug/L	100	100	1.0
Total VPH	ND	ug/L	100	100	1.0
Surrogate				Acceptance Limits	
2,5-Dibromotoluene (fid)	102	%		70 - 130	
2,5-Dibromotoluene (pid)	107	%		70 - 130	
Method: 10-107-06-1		Date Analyzed:		12/03/2007 1222	
Prep Method: Distill/Ammonia		Date Prepared:		12/03/2007 0922	
Ammonia	1.5	mg/L	0.10	0.10	1.0
Method: SM 4500 H+ B		Date Analyzed:		11/16/2007 1811	
pH	6.09 J HF	SU	0.100	0.100	1.0

DATA REPORTING QUALIFIERS

Client: Olin Corporation

Job Number: 360-13592-1

Lab Section	Qualifier	Description
GC/MS Semi VOA		
	B	Compound was found in the blank and sample.
	J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
General Chemistry		
	HF	Field parameter with a holding time of 15 minutes

QUALITY CONTROL RESULTS

Client: Olin Corporation

Job Number: 360-13592-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
GC/MS VOA					
Analysis Batch:360-26028					
LCS 360-26028/1	Lab Control Spike	T	Water	8260B	
LCSD 360-26028/2	Lab Control Spike Duplicate	T	Water	8260B	
MB 360-26028/3	Method Blank	T	Water	8260B	
360-13592-1	OC-B-03	T	Water	8260B	
GC/MS Semi VOA					
Prep Batch: 360-25951					
LCS 360-25951/2-A	Lab Control Spike	T	Water	3510C	
LCSD 360-25951/3-A	Lab Control Spike Duplicate	T	Water	3510C	
MB 360-25951/1-A	Method Blank	T	Water	3510C	
360-13592-1	OC-B-03	T	Water	3510C	
Analysis Batch:360-26286					
LCS 360-25951/2-A	Lab Control Spike	T	Water	8270C	360-25951
LCSD 360-25951/3-A	Lab Control Spike Duplicate	T	Water	8270C	360-25951
MB 360-25951/1-A	Method Blank	T	Water	8270C	360-25951
360-13592-1	OC-B-03	T	Water	8270C	360-25951
GC VOA					
Analysis Batch:360-26061					
LCS 360-26061/1	Lab Control Spike	T	Water	MAVPH	
LCSD 360-26061/2	Lab Control Spike Duplicate	T	Water	MAVPH	
MB 360-26061/3	Method Blank	T	Water	MAVPH	
360-13592-1	OC-B-03	T	Water	MAVPH	

Report Basis
T = Total

Report Basis
T = Total

Report Basis
T = Total

Client: Olin Corporation

Job Number: 360-13592-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
Metals					
Analysis Batch:360-25887					
LCS 360-25887/1	Lab Control Spike	T	Water	6010B	
LCSD 360-25887/13	Lab Control Spike Duplicate	T	Water	6010B	
MB 360-25887/2	Method Blank	T	Water	6010B	
360-13592-1	OC-B-03	D	Water	6010B	
360-13592-1DU	Duplicate	D	Water	6010B	
360-13592-1MS	Matrix Spike	D	Water	6010B	

Report Basis
D = Dissolved
T = Total

General Chemistry					
Analysis Batch:360-25864					
LCS 360-25864/1	Lab Control Spike	T	Water	SM 4500 H+ B	
360-13592-1	OC-B-03	T	Water	SM 4500 H+ B	
360-13592-1DU	Duplicate	T	Water	SM 4500 H+ B	
Prep Batch: 360-26351					
LCS 360-26351/2-A	Lab Control Spike	T	Water	Distill/Ammonia	
MB 360-26351/1-A	Method Blank	T	Water	Distill/Ammonia	
360-13592-1	OC-B-03	T	Water	Distill/Ammonia	
Analysis Batch:360-26356					
LCS 360-26351/2-A	Lab Control Spike	T	Water	10-107-06-1	360-26351
MB 360-26351/1-A	Method Blank	T	Water	10-107-06-1	360-26351
360-13592-1	OC-B-03	T	Water	10-107-06-1	360-26351

Report Basis
T = Total

Client: Olin Corporation

Job Number: 360-13592-1

Method Blank - Batch: 360-26028

Method: 8260B
Preparation: 5030B

Lab Sample ID: MB 360-26028/3
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/21/2007 2149
Date Prepared: 11/21/2007 2149

Analysis Batch: 360-26028
Prep Batch: N/A
Units: ug/L

Instrument ID: Agilent 5890+/5973 GC/MS
Lab File ID: V00777.D
Initial Weight/Volume: 25 mL
Final Weight/Volume: 25 mL

Analyte	Result	Qual	MDL	RL
2,4,4-Trimethyl-1-pentene	ND		0.20	1.0
2,4,4-Trimethyl-2-pentene	ND		0.20	1.0

Surrogate	% Rec	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	90	70 - 130
4-Bromofluorobenzene	81	70 - 130
Dibromofluoromethane	107	70 - 130
Toluene-d8 (Surr)	103	70 - 130

Lab Control Spike/
Lab Control Spike Duplicate Recovery Report - Batch: 360-26028

Method: 8260B
Preparation: 5030B

LCS Lab Sample ID: LCS 360-26028/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/21/2007 2042
Date Prepared: 11/21/2007 2042

Analysis Batch: 360-26028
Prep Batch: N/A
Units: ug/L

Instrument ID: Agilent 5890+/5973 GC/MS
Lab File ID: V00774.D
Initial Weight/Volume: 25 mL
Final Weight/Volume: 25 mL

LCSD Lab Sample ID: LCSD 360-26028/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/21/2007 2105
Date Prepared: 11/21/2007 2105

Analysis Batch: 360-26028
Prep Batch: N/A
Units: ug/L

Instrument ID: Agilent 5890+/5973 GC/M
Lab File ID: V00775.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	82	85	70 - 130	3	25		
2,4,4-Trimethyl-2-pentene	91	98	70 - 130	7	25		

Surrogate	LCS % Rec	LCSD % Rec	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	83	78	70 - 130
4-Bromofluorobenzene	98	92	70 - 130
Dibromofluoromethane	93	91	70 - 130
Toluene-d8 (Surr)	96	95	70 - 130

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

Client: Olin Corporation

Job Number: 360-13592-1

Method Blank - Batch: 360-25951

Method: 8270C
Preparation: 3510C

Lab Sample ID: MB 360-25951/1-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/26/2007 2016
Date Prepared: 11/20/2007 1616

Analysis Batch: 360-26286
Prep Batch: 360-25951
Units: ug/L

Instrument ID: Agilent 6890/5973 GC/MS
Lab File ID: B7386.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	0.13	5.0
N-Nitrosodiphenylamine	ND		0.21	5.0

Surrogate	% Rec	Acceptance Limits
2,4,6-Tribromophenol	55	15 - 110
2-Fluorobiphenyl	73	30 - 130
2-Fluorophenol	29	15 - 110
Nitrobenzene-d5	86	30 - 130
Phenol-d5	17	15 - 110
Terphenyl-d14	85	30 - 130

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

Client: Olin Corporation

Job Number: 360-13592-1

Lab Control Spike/
Lab Control Spike Duplicate Recovery Report - Batch: 360-25951

Method: 8270C
Preparation: 3510C

LCS Lab Sample ID: LCS 360-25951/2-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/26/2007 2037
Date Prepared: 11/20/2007 1616

Analysis Batch: 360-26286
Prep Batch: 360-25951
Units: ug/L

Instrument ID: Agilent 6890/5973 GC/MS
Lab File ID: B7387.D
Initial Weight/Volume: 1000 mL
Final Weight/Volume: 1.0 mL
Injection Volume:

LCSD Lab Sample ID: LCSD 360-25951/3-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/26/2007 2058
Date Prepared: 11/20/2007 1616

Analysis Batch: 360-26286
Prep Batch: 360-25951
Units: ug/L

Instrument ID: Agilent 6890/5973 GC/MS
Lab File ID: B7388.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	113	97	40 - 140	15	20		
N-Nitrosodiphenylamine	119	108	40 - 140	10	20		

Surrogate	LCS % Rec	LCSD % Rec	Acceptance Limits
2,4,6-Tribromophenol	81	74	15 - 110
2-Fluorobiphenyl	78	72	30 - 130
2-Fluorophenol	29	29	15 - 110
Nitrobenzene-d5	92	88	30 - 130
Phenol-d5	17	16	15 - 110
Terphenyl-d14	86	81	30 - 130

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

Client: Olin Corporation

Job Number: 360-13592-1

Method Blank - Batch: 360-26061

Method: MAVPH
Preparation: 5030B

Lab Sample ID: MB 360-26061/3
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/21/2007 1750
Date Prepared: 11/21/2007 1750

Analysis Batch: 360-26061
Prep Batch: N/A
Units: ug/L

Instrument ID: HP 5890II GC w/ PID/FID
Lab File ID: G09604.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)	94	70 - 130
2,5-Dibromotoluene (pid)	99	70 - 130

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

Client: Olin Corporation

Job Number: 360-13592-1

Lab Control Spike/
Lab Control Spike Duplicate Recovery Report - Batch: 360-26061

Method: MAVPH
Preparation: 5030B

LCS Lab Sample ID: LCS 360-26061/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/21/2007 1505
Date Prepared: 11/21/2007 1505

Analysis Batch: 360-26061
Prep Batch: N/A
Units: ug/L

Instrument ID: HP 5890II GC w/ PID/FID
Lab File ID: G09599.D
Initial Weight/Volume: 5 mL
Final Weight/Volume: 5 mL
Injection Volume:
Column ID: PRIMARY

LCSD Lab Sample ID: LCSD 360-26061/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/21/2007 1538
Date Prepared: 11/21/2007 1538

Analysis Batch: 360-26061
Prep Batch: N/A
Units: ug/L

Instrument ID: HP 5890II GC w/ PID/FID
Lab File ID: G09600.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	94	91	70 - 130	3	25		
Ethylbenzene	92	89	70 - 130	3	25		
m-Xylene & p-Xylene	89	87	70 - 130	3	25		
Methyl tert-butyl ether	104	104	70 - 130	0	25		
Naphthalene	107	109	70 - 130	2	25		
o-Xylene	88	86	70 - 130	2	25		
Toluene	102	98	70 - 130	4	25		
C5-C8 Aliphatics (unadjusted)	119	115	70 - 130	4	25		
C9-C12 Aliphatics (unadjusted)	113	110	70 - 130	3	25		
C9-C10 Aromatics	102	100	70 - 130	2	25		

Surrogate	LCS % Rec	LCSD % Rec	Acceptance Limits
2,5-Dibromotoluene (fid)	100	102	70 - 130
2,5-Dibromotoluene (pid)	84	85	70 - 130

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

Client: Olin Corporation

Job Number: 360-13592-1

Method Blank - Batch: 360-25887

Method: 6010B
Preparation: N/A

Lab Sample ID: MB 360-25887/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/19/2007 1552
Date Prepared: N/A

Analysis Batch: 360-25887
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: mL

Analyte	Result	Qual	MDL	RL
Iron	ND		14	100

Lab Control Spike/
Lab Control Spike Duplicate Recovery Report - Batch: 360-25887

Method: 6010B
Preparation: N/A

LCS Lab Sample ID: LCS 360-25887/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/19/2007 1549
Date Prepared: N/A

Analysis Batch: 360-25887
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 360-25887/13
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/19/2007 1621
Date Prepared: N/A

Analysis Batch: 360-25887
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	98	80 - 120	1	20		

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

Client: Olin Corporation

Job Number: 360-13592-1

Matrix Spike - Batch: 360-25887

Method: 6010B
Preparation: N/A

Lab Sample ID: 360-13592-1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/19/2007 1639
Date Prepared: N/A

Analysis Batch: 360-25887
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 10 mL

Analyte	Sample Result/Qual	Spike Amount	Result	% Rec.	Limit	Qual
Iron	860	5000	5590	95	75 - 125	

Duplicate - Batch: 360-25887

Method: 6010B
Preparation: N/A

Lab Sample ID: 360-13592-1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/19/2007 1637
Date Prepared: N/A

Analysis Batch: 360-25887
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: mL

Analyte	Sample Result/Qual	Result	RPD	Limit	Qual
Iron	860	836	3	20	

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

Client: Olin Corporation

Job Number: 360-13592-1

Method Blank - Batch: 360-26351

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

Lab Sample ID: MB 360-26351/1-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 12/03/2007 1214
Date Prepared: 12/03/2007 0922

Analysis Batch: 360-26356
Prep Batch: 360-26351
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: mL
Final Weight/Volume: 50 mL

Analyte	Result	Qual	RL	RL
Ammonia	ND		0.10	0.10

Lab Control Spike - Batch: 360-26351

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

Lab Sample ID: LCS 360-26351/2-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 12/03/2007 1215
Date Prepared: 12/03/2007 0922

Analysis Batch: 360-26356
Prep Batch: 360-26351
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: mL
Final Weight/Volume: 50 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Ammonia	10.0	9.27	93	85 - 115	

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

Client: Olin Corporation

Job Number: 360-13592-1

Lab Control Spike - Batch: 360-25864

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

Lab Sample ID: LCS 360-25864/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/16/2007 1808
Date Prepared: N/A

Analysis Batch: 360-25864
Prep Batch: N/A
Units: SU

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

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
pH	6.00	5.970	100	90 - 110	

Duplicate - Batch: 360-25864

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

Lab Sample ID: 360-13592-1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/16/2007 1815
Date Prepared: N/A

Analysis Batch: 360-25864
Prep Batch: N/A
Units: SU

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

Analyte	Sample Result/Qual	Result	RPD	Limit	Qual
pH	6.09	6.180	1	20	

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

VPH SAMPLE INFORMATION DATA

SAMPLE INFORMATION

Sample ID: 13592-2 Batch# **26061**

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:	6.8°C			

Login Sample Receipt Check List

Client: Olin Corporation

Job Number: 360-13592-1

Login Number: 13592
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	6.8 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.	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
STL-WESTFIELD

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

Client: Olin Chemical/MACTEC
Project #:
Job# 360-13592
Quote#
PO#

Address: 51 Eames Street
Project Manager:

Wilmington, MA 01887
Work ID: Plant B

Phone: Fax:
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

Sample Type Codes
WW-Wastewater DW-Drinking water SW-Surfacewater
LW-Labwater GW-Groundwater A-Air
S-Solid / Soil SL-Sludge O-Oil Z-Other

Shaded areas for office use

Analysis Requested
Check analysis and specify method and analytes in comments section.
For example:
500-series for drinking water
600-series for waste water
8000-series for haz/solid waste
Use comments section to further define.

Comments
(Special Instructions)

MCP case narrative

Sample ID	Sample Type	Sampler's Initials	Date Time Collected	Grab	Comp.	# Containers	Plastic(P) or Glass(G)	Preservative: NaHSO4/MeOH	HNO3 to pH <2	H2SO4 to pH <2	HCl to pH <2	NaOH to pH >12	NAOH/ZNAC	None / 4° C	8260	VPH	8270	Ammonia	Iron by 6010	pH	Other	Other	Other	Other	Other	Other	Other
B-03	GW	TRH	11 15 07 1300			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

11/16/07

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Sampled by (print): Thomas Hanlon 11/16/07 Signature:

Relinquished by:	Thomas Hanlon	Date: 11/16/07	Time: 1400	Received by:	Date: 11/16/07 Time: 1400
Relinquished by:		Date: 11/16/07	Time: 1720	Received by:	Date: 11/16/07 Time: 1720
Method of shipment:				TestAmerica-Westfield	

Cooler? Y / N Samples Iced? Y / N
Temp @ receipt: 6.8° C
Preservation/pH checked
By: Date: 11/16/07

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

Version 1.1, March 2002

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

Reviewer/Date [signature] 12/19/07
Sr. Review/Date Chris Ricardi 12/20/07
Lab Report # 360-13592-1
LAW Project # 63220600111.61.1

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:** 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) 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 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 ☑ 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 ☑ *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) ☐ 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:

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 parameters 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 "U"

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 = Q/D x 100% Where: Q = sample surrogate result
D = surrogate added

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.

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
VOLATILE ORGANICS BY METHOD SW8260B/624

Reviewer/Date [signature] 12/13/07
Sr. Review/Date Chris Ricard 12/20/07
Lab Report # 360-13592-1
Project # 630006.0011.61.1

Note: The following analyses will be evaluated according to the "MADEP QA/QC Guidelines for **Sampling, Data Evaluation and Reporting Activities.**" MADEP, however, may not list QA/QC criteria for every chemical analysis. Where not defined by MADEP, criteria will default to values stipulated in the QAPP. Where the QAPP does not define criteria, QA/QC requirements will default to limits employed by the laboratory.

1.0 Laboratory Deliverable Requirements

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

☑ *Name of Laboratory* ☑ *Address* ☑ *Project ID* ☐ *Phone #* ☑ *Sample identification – Field and Laboratory*

Client Information: ☑ *Name* ☐ *Address* ☐ *Client Contact* *(IDs must be cross-referenced)*

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

1.2 Laboratory Report Certification Statement ***Yes*** [✓] *No* [ ] *N/A* [ ] *Comments:*

Does the laboratory report include a completed Analytical Report Certification in the required format?

ACTION: *If no, contact lab for submission of missing certification or certification with correct format.*

1.3 Laboratory Case Narrative: ***Yes*** [✓] *No* [ ] *N/A* [ ] *Comments:*

☑ *Narrative serves as an exception report for the project and method QA/QC performance.* ☐ *Narrative includes an explanation of each discrepancy on the Certification Statement.*

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

1.4 Chain of Custody (COC) copy present with all documentation completed? **Yes** [✓] No [ ] N/A [ ] Comments:

Does the laboratory report include completed Chain of Custody forms containing all samples in this SDG?

NOTE: Olin receives and maintains the *original* COC.

ACTION: If no, contact lab for submission of copy of completed COC.

1.5 Sample Receipt Information (*Cooler Receipt Form present?*):

Yes [✓] No [ ] N/A [ ] Comments:

Were each of the following tasks completed and recorded upon receipt of the sample(s) into the laboratory?

☑ Sample temperature confirmed: must be 1° – 10° C. (If samples were sent by courier and delivered on the same day as collection, temperature requirement does not apply).

☑ Container type noted ☑ Condition observed ☑ Field and lab IDs cross referenced

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

1.5.1 Were the correct bottles and preservatives used?

Yes [✓] No [ ] N/A [ ] Comments:

Water - 40 mL VOA vial/HCL to pH<2, cool to 4°C
Soil - 5 gram Encore™/cool to 4°C or 40 mL VOA vial with field preservation of sodium bisulfate (low-level) or methanol (high-level) or field preservation in water if soils are reactive to sodium bisulfate (i.e. alkaline conditions, excessive humic acid content, etc.)

ACTION: If no, inform senior chemist. Document justification for change in container/volume (if applicable); qualify both positive data and non-detect data (J) if cooler temperature exceeds 10°C. Rejection of data requires professional judgment

ACTION: If each VOA vial for a sample contains air bubbles or the VOA vial analyzed contained air bubbles, flag positives (J) and reject nondetects (R).

1.5.2 Were all samples delivered to the laboratory without breakage? Yes [✓] No [ ] N/A [ ] Comments:

1.5.3 Does the *Cooler Receipt Form* or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data? Yes [ ] **No [✓]** N/A [ ] Comments:

1.6 Sample Results Section: *Was the following information supplied in the laboratory report for each sample?* Yes [✓] No [ ] N/A [ ] Comments:

☑ Field ID and Lab ID ☑ Date and time collected ☑ Analyst Initials ☑ Dilution Factor ☑ % moisture or solids ☑ Reporting limits
☑ *Clean-up method* ☑ Analysis method ☑ Preparation method ☑ Date of preparation/extraction/digestion clean-up and analysis, where applicable
☑ Matrix ☑ Target analytes and concentrations ☑ Units (soils must be reported in dry weight)

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

1.7 QA/QC Information: Was the following information provided in the laboratory report for each sample batch? Yes [✓] No [ ] N/A [ ] Comments:

☑ Method blank results ☑ LCS recoveries ☐ MS/MSD recoveries and RPDs ☑ Surrogate recoveries

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

2.0 Holding Times

Have any technical holding times, determined from date of collection to date of analysis, been exceeded? Yes [ ] **No** [✓] N/A [ ] Comments:

For water samples, the holding time is 7 days (aromatics) from sampling for unpreserved samples and 14 days for preserved samples.

For soil samples, the holding time is 14 days from sampling if field preserved with sodium bisulfate/methanol/or water. If an Encore™ sampler was used, the lab must ***preserve*** the sample within 48 hours. Analytical holding time from time of preservation is 14 days.

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

ACTION: If technical holding times are exceeded, qualify all positive results (J) and non-detects (UJ). For water samples that are grossly exceeded (>2X hold time) reject (R) all non-detect results. For soil samples professional judgement will be used to determine if rejection is necessary.

3.0 Laboratory Method

3.1 Was the correct laboratory method used? **Yes** [✓] No [ ] N/A [ ] Comments:

Purge and Trap	Water: 5030B	Soil: 5035
Volatile Organics	8260B	

ACTION: If no, contact lab to provide justification for method change compared to the requested method. Contact senior chemist to inform Client of change or to request variance.

3.2 Are the practical quantitation limits the same as those specified by the **Yes** [✓] No [ ] N/A [ ] Comments:
☐ SOW ☑ QAPP ☐ Lab ☐ MADEP

Evaluate PQLs with respect to sample matrix, preparation, dilution, moisture, etc. If sample PQL is indeterminate, contact lab for explanation. Provide a listing of all samples with PQLs that are elevated due to dilution, sample matrix, or preparation factors.

3.3 Are the appropriate parameter results present for each sample in the SDG? **Yes** [✓] No [ ] N/A [ ] Comments:

NOTE: *The MADEP QA/QC Guidelines requires a minimum compound reporting list for volatile organic compounds. Determine target compound requirement and verify reporting list.*

3.4 Were Tentatively Identified Compounds (TICs) reported? **Yes** [ ] No [✓] N/A [ ] Comments:

NOTE: *TICs are only required for samples with full MADEP target list. Determine if TICs are required. MADEP requires that all TICs be reported to the LCS. Per the MADEP guidance, TICs, which are identified as aliphatic hydrocarbons, do not have to be reported as TICs. However, these compounds must be evaluated as part of the health-based risk assessment approach (VPH/EPH).*

ACTION*: Qualify reported TIC results as estimated and flag (NJ).*

3.5 If *dilutions were required, were dilution factors reported?* **Yes** [✓] No [ ] N/A [ ] Comments:

NOTE: *MADEP guidance states that if a diluted and an undiluted analysis is performed, the laboratory should report results for the lowest dilution within the valid calibration range for each analyte.*

ACTION: If no, contact the lab for submission.

4.0 Method Blanks

4.1 Are the Method Blank Summaries present? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, call the laboratory for submission of missing data.

4.2 Was a method blank analyzed for each analytical batch of 20 samples or less? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, document discrepancy in case narrative and contact lab for justification. Consult senior chemist for action needed.

4.3 Is the method blank less than the PQL? (See attached table for PQLs). **Yes** [✓] No [ ] N/A [ ] Comments:

NOTE: *MADEP allows common laboratory contaminants (acetone, methylene chloride and 2-butanone) to be present at concentrations < 5x the PQL.*

4.4 Do any method blanks have positive results for VOC parameters? Qualify data according to the following: Yes [ ] **No** [✓] N/A [ ] Comments:

For the common contaminants (methylene chloride, acetone, toluene, and 2-butanone):

If the sample concentration is < 10 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 10 × blank value, no qualification is needed.

For other VOC contaminants:

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

ACTION: If any blank has positive results, list all the concentrations detected and flagging level (flagging level = 10x or 5 × blank value) on the checklist. List all affected samples and their qualifiers.

5.0 Laboratory Control Standards

5.1 Was a laboratory control standard (LCS) run with each analytical batch of 20 samples or less? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, call laboratory for LCS form submittal. If data is not available, use professional judgment to determine qualification actions for data associated with that batch.

5.2 Is a LCS Summary Form present? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact lab for resubmission of missing data.

5.2 Is the recovery of any analyte outside of control limits? Yes [ ] **No** [✓] N/A [ ] Comments:

NOTE: *A full target, second source LCS is required by MADEP.*

NOTE: Use *MADEP guidelines list LCS recovery limits of 70-130.*

ACTION: If recovery is above the upper limit, qualify all positive sample results within the batch as (J). If recovery is below the lower limit but > 10%, qualify all positive and no-detect results within the batch as (J). If LCS recovery is <10%, non-detect results are rejected (R). Document qualified compounds and percent recoveries in the validation report.

5.4 Are 80% of LCS recoveries within laboratory control limits? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If 80% of LCS recoveries are not within limits, use professional judgment and consult Senior Chemist.

6.0 **Matrix Spikes**

Matrix spikes may be collected at different frequencies based on monthly, quarterly, or task specific schedules. Confirm spike requirements for each set with the senior chemist.

6.1 Were project-specific MS/MSDs collected? List project samples that were spiked. **Yes** [ ] No [✓] N/A [ ] Comments:

ACTION: If no, contact senior chemist to see if any were specified.

6.2 Is the MS/MSD Recovery Form present? **Yes** [ ] No [ ] N/A [✓] Comments:

ACTION: If no, contact lab for resubmission of missing data.

6.3 Were matrix spikes analyzed at the required frequency of 1 per 20 samples per matrix? **Yes** [ ] No [ ] N/A [✓] Comments:

ACTION: If any matrix spike data is missing, call lab for resubmission.

6.4 Are any VOC spike recoveries outside of the QC limits?

Yes [ ] No [ ] N/A [✓] Comments:

NOTE: $\%R = \frac{(SSR-SR)}{SA} \times 100\%$ Where: SSR = Spiked sample result
SR = Sample result
SA = Spike added

NOTE: *A full target, second source MS/MSD is required by MADEP.*

NOTE: *MADEP guidelines list MS/MSD recovery limits as 70-130.*

NOTES: 1) If only one of the recoveries for an MS/MSD pair is outside of the control limits, no qualification is necessary. Use professional judgment for the MS/MSD flags.
2) If the MS/MSD was performed by the laboratory on a non-project sample, no qualification is required.

ACTION: MS/MSD flags only apply to the sample spiked. If the recoveries of the MS and MSD exceed the upper control limit, qualify positive results as estimated (J). If the recoveries of the MS and MSD are lower than the lower control limit, qualify both positive results and non-detects (J). If recovery is < 10%, reject non-detects (R).

6.5 Are any RPDs for MS/MSD recoveries outside of the QA/QC limits?

Yes [ ] No [ ] N/A [✓] Comments:

NOTE: $RPD = \frac{S-D}{(S+D)/2} \times 100\%$ Where S = MS result
D = MSD result

NOTE: *MADEP guidelines list MS/MSD RPD limits for both water and soils as ≤ 20.*

ACTION: If the RPD exceeds the control limit, qualify positive results and non-detects (J).

7.0 Surrogate Recoveries

Were one or more VOC surrogate recoveries outside of laboratory limits for any Yes [ ] No [✓] N/A [ ] Comments:

sample or method blank? If yes, were samples re-analyzed?

NOTE: %R = QD x 100% Where: S = MS sample result
D = MSD sample result

NOTE: No qualification is required if two of the surrogates are within acceptable QC limits. If surrogate recoveries fail due to dilution, results are not flagged. Document on checklist and in the case narrative.

NOTE: *MADEP guidelines list surrogate limits for both water and soils as 70-130%. Surrogate recovery limits greater than ± 30% are allowed for difficult matrices (wastes, sludges, etc.) with appropriate analytical documentation.*

ACTION: If recoveries are >10%, but fail to meet quality control criteria: (1) For recoveries below the QC limit but >10%, qualify nondetects and positives (J), and (2) For recoveries above the QC limit, qualify only positives (J). If any surrogate recovery is <10% (unless the QC limits are below 10%, in which case, results are flagged as stated above), flag positives (J) and reject nondetects (R).

8.0 Sampling Accuracy

8.1 Were trip blanks shipped with VOC samples and analyzed?

Yes [ ] No [✓] N/A [ ] Comments:

NOTE: *MADEP requires trip blanks per the following frequency:*

	Soil/Sediment	*Aqueous*	*Drinking Water*
Option 1	*Not Required*	*Not Required*	*1 per cooler VOAs/VPH*
Option 3	*1 per 10 samples*	*1 per 10 samples*	*1 per 10 samples*

8.2 Do any trip blanks have positive results?

Yes [ ] **No** [ ] N/A [✓] Comments:

ACTION: Prepare a list of samples shipped in the same cooler as a contaminated blank.

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

The majority of ground water samples are collected directly from a tap, process stream, or with dedicated tubing. Rinse blanks will not be collected. **Yes** [ ] No [✓] N/A [ ] Comments:

8.3 Were rinsate blanks collected? Prior to evaluating rinsate blanks, obtain a list of the associated samples from the senior chemist.

NOTE: *MADEP does not specify the collection of rinsate blanks.*

8.4 Do any rinsate blanks have positive results? Yes [ ] **No** [ ] N/A [✓] Comments:

ACTION: Evaluate rinsate results against blank results to determine if contaminant may be laboratory-, ambient-, or shipment-derived. If results are not lab-, ambient-, or shipment-related, qualify according to the table above (8.2).

9.0 **Field Duplicates**

9.1 Were field duplicate samples collected? Obtain a list of samples and their associated field duplicates. **Yes** [ ] No [✓] N/A [ ] Comments:

9.2 Were field duplicates collected per the required frequency? **Yes** [ ] No [ ] N/A [✓] Comments:

☐ SOW ☐ QAPP *(1 per 10)* ☐ *MADEP Option 1(1 per 20)*

☐ *MADEP Option 3 (1 per 10)*

9.3 Was the RPD ≤ 50% for soils or 30% for waters? Calculate the RPD for all results and attach to this review. **Yes** [ ] No [ ] N/A [✓] Comments:

ACTION: Qualify data (J) for both sample results if the RPD goal is exceeded.

10.0 **Application of Validation Qualifiers**

Was any of the data qualified?

Yes [ ] No [✓] N/A [ ] Comments:

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

REFERENCES

LAW, 1999, "Final Quality Assurance Project Plan, Olin Wilmington Property, 51 Eames Street, Wilmington, MA", LAW Engineering and Environmental Services, Kennesaw, GA 30144. August 1999.

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OLIN-WILMINGTON
LEVEL I DATA QUALITY EVALUATION
STANDARD OPERATING PROCEDURE AND CHECKLIST
WET CHEMISTRY PARAMETERS BY VARIOUS METHODS

Reviewer/Date 12/6/07
Sr. Review/Date Chris Ricardi 12/20/07
Lab Report # 360-13592-1
Project # 63000600111.6/1.1

Ammonia, pH

Note: The following analyses will be evaluated according to the "MADEP QA/QC Guidelines for **Sampling, Data Evaluation and Reporting Activities.**" MADEP, however, may not list QA/QC criteria for every chemical analysis. Where not defined by MADEP, criteria will default to values stipulated in the QAPP. Where the QAPP does not define criteria, QA/QC requirements will default to limits employed by the laboratory.

1.0 Laboratory Deliverable Requirements

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

☑ *Name of Laboratory* ☑ *Address* ☑ *Project ID* ☑ *Phone #* ☑ *Sample identification – Field and Laboratory*
Client Information: ☑ *Name* ☐ *Address* ☑ *Client Contact* *(IDs must be cross-referenced)*

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

1.2 Laboratory Report Certification Statement ***Yes*** [✓] *No* [ ] *N/A* [ ] *Comments:*

Does the laboratory report include a completed Analytical Report Certification in the required format?

***ACTION**: If no, contact lab for submission of missing certification or certification with correct format.*

1.3 Laboratory Case Narrative: ***Yes*** [✓] *No* [ ] *N/A* [ ] *Comments:*

☑ *Narrative serves as an exception report for the project and method QA/QC performance.* ☑ *Narrative includes an explanation of each discrepancy on the Certification Statement.*

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

1.4 Chain of Custody (COC) copy present with all documentation completed? **Yes** [✓] No [ ] N/A [ ] Comments:

Does the laboratory report include copies of Chain of Custody forms containing all samples in this SDG?

NOTE: Olin receives and maintains the *original* COC.

ACTION: If no, contact lab for submission of copy of missing completed COC.

1.5 Sample Receipt Information (*Cooler Receipt Form*): Were each of the following tasks completed and recorded upon receipt of the sample(s) into the laboratory?

Yes [✓] No [ ] N/A [ ] Comments:

☑ Sample temperature confirmed: must be 1° – 10° C. (If samples were sent by courier and delivered on the same day as collection, temperature requirement does not apply).

☐ Container type noted ☑ Condition observed ☑ pH verified (where applicable) ☑ Field and lab IDs cross referenced

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

1.5.1 Were the correct bottles and preservatives used?

Yes [✓] No [ ] N/A [ ] Comments:

Ammonia,– 1 Liter polyethylene/H_2SO_4 to pH<2,cool to 4°C

Oil & Grease – 1 Liter glass/HCL 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 ☑ Dilution Factor ☑ % moisture or solids ☑ Reporting limits
☑ *Clean-up method* ☑ Analysis method ☐ Preparation method ☑ Date of preparation/extraction/digestion clean-up and analysis, where applicable
☑ Matrix ☑ Target analytes and concentrations ☑ Units (soils must be reported in dry weight)

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

1.7 **QA/QC Information:** Was the following information provided in the laboratory report for each sample batch? **Yes** [✓] No [ ] N/A [ ] Comments:

☑ Method blank results ☑ LCS recoveries ☐ MS/MSD recoveries and RPDs ☑ Laboratory duplicate results (where applicable)

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

2.0 **Holding Times** Yes [✓] **No** [ ] N/A [ ] Comments: The sample was received at the lab beyond holdtime for pH. The lab analyzed pH upon receipt.

Have any technical holding times, determined from date of collection to date of analysis, been exceeded? The holding times are as follows:

✓ 28 days = ammonia, chemical oxygen demand, chloride, organic carbon, oil & grease, specific conductance, total organic carbon and sulfate

Alkalinity = 14 days | Sulfide, TDS, TSS = 7 days | X pH = analyze immediately | Nitrate nitrogen as N = 48 hrs

Nitrite nitrogen as N = 48 hrs | Nitrate + Nitrite as N = 28 days

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

The result for pH was qualified estimated (J).

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 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.

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: $\%R = \frac{(SSR-SR)}{SA} \times 100\%$ 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*(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

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

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:

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.

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

Reviewer/Date 12/17/07
Sr. Review/Date Chris Randall 12/20/07
Lab Report # 360-13592-1
Project # 630006001.6.1

Iron

1.0 Laboratory Deliverable Requirements

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

☑ *Name of Laboratory* ☑ *Address* ☑ *Project ID* ☐ *Phone #* ☑ *Sample identification – Field and Laboratory*

Client Information: ☐ *Name* ☑ *Address* ☑ *Client Contact* *(IDs must be cross-referenced)*

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

1.2 Laboratory Report Certification Statement *Yes* [✓] *No* [ ] *N/A* [ ] *Comments:*

Does the laboratory report include a completed Analytical Report Certification in the required format?

***ACTION**: If no, contact lab for submission of missing certification or certification with correct format.*

1.3 Laboratory Case Narrative: *Yes* [✓] *No* [ ] *N/A* [ ] *Comments:*

☑ *Narrative serves as an exception report for the project and method QA/QC performance.* ☐ *Narrative includes an explanation of each discrepancy on the*

Certification Statement.

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

1.4 Chain of Custody (COC) copy present with all documentation completed **Yes** [✓] No [ ] N/A [ ] Comments:

NOTE: Olin receives and maintains the *original COC.*

ACTION: If no, contact lab for submission of copy of completed *COC.*

1.5 Sample Receipt Information (*Cooler Receipt Form present?*): Yes [✓] No [ ] N/A [ ] Comments:

Were each of the following tasks completed and recorded upon receipt of the sample(s) into the laboratory?

☑ Sample temperature confirmed: must be 1° – 10° C. (If samples were sent by courier and delivered on the same day as collection, temperature requirement does not apply).

☑ Container type noted ☑ sample condition observed ☑ pH verified (where applicable) ☑ Field and lab IDs cross referenced

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

1.5.1 Were all samples delivered to the laboratory without breakage? **Yes** [✓] No [ ] N/A [ ] Comments:

1.5.2 Does the *Cooler Receipt Form* or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data? Yes [ ] **No** [✓] N/A [ ] Comments:

1.6 Sample Results Section: *Was each of the following requirements supplied in the laboratory report for each sample?* **Yes** [✓] No [ ] N/A [ ] Comments:

☑ Field ID and Lab ID ☑ *Date and time collected* ☑ Analyst Initials ☑ *Dilution Factor* ☑ % moisture or solids ☑ *Reporting limits*
☑ *Clean-up method* ☑ Analysis method ☑ *Preparation method* ☑ *Date of preparation/extraction/digestion clean-up and analysis, where applicable*
☑ Matrix ☑ Target analytes and concentrations ☑ Units (soils must be reported in dry weight)

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

1.7 QA/QC Information: Was each of the following information supplied in the laboratory report for each sample batch? **Yes** [✓] No [ ] N/A [ ] Comments:

☑ Method blank results ☑ LCS recoveries ☑ MS/MSD recoveries and RPDs ☑ Laboratory duplicate results (where applicable)

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

2.0 Holding Times

Have any technical holding times, determined from date of collection to date of analysis, been exceeded? Holding time for metals is 180 days from sample collection to analysis for both water and soil.

Yes [ ] **No** [✓] N/A [ ] Comments:

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

ACTION: If technical holding times are exceeded, qualify all positive results (J) and non-detects (UJ). If grossly exceeded (2X holding time) reject (R) all non-detect results.

3.0 Laboratory Method

3.1 Was the correct laboratory method used?

Yes [✓] No [ ] N/A [ ] Comments:

Water Digestion	3005A or 3010A or 3020A
Soil Digestion	3050B
Metals	6010B or 200.7

ACTION: If no, contact laboratory to provide justification for method change compared to the requested method. Contact senior chemist to inform Client of change and to request variance.

3.2 Are the practical quantitation limits the same as those specified by the ☐ SOW ☑ QAPP ☐ Lab ☐ MADEP

Yes [✓] No [ ] N/A [ ] Comments:

NOTE: *Verify that the reported metals match the target list specified on the COC.*

ACTION: If no, evaluate variation with respect to sample matrix, preparation, dilution, moisture, etc. If sample PQL is indeterminate, contact lab for explanation.

3.3 Are results present for each sample in the SDG? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, check Request for Analysis to verify if method was ordered and COC to verify that it was sent, and contact lab for resubmission of the missing data

3.4 If dilutions were required, were dilution factors reported? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact the lab for submission.

4.0 Method Blanks

4.1 Is the Method Blank Summary present? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, call the laboratory for submission of missing data.

4.2 Frequency of Analysis: Was a method blank analyzed for each digestion batch of < 20 field samples? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact laboratory for justification. Consult senior chemist for action needed. Narrate non-compliance.

4.3 Is the method blank less than the PQLs for all target elements? **Yes** [✓] No [ ] N/A [ ] Comments:

NOTE: *MADEP requires the method blank to be matrix matched and digested with the samples*

4.4 Do any method blanks have positive results for metals? Qualify data according to the following: Yes [ ] **No** [✓] N/A [ ] Comments:

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

ACTION: For any blank with positive results, list all contaminants for each method blank including the concentration detected and the flagging level (flagging level = 5x the blank value) and the associated samples and qualifiers.

5.0 Laboratory Control Standard

5.1 Was a laboratory control standard run with each analytical batch of 20 samples or less?

Yes [✓] No [ ] N/A [ ] Comments:

NOTE: *A full target, second source LCS is required by MADEP.*
ACTION: Call laboratory for LCS form submittal. If data are not available, use professional judgement to evaluate data accuracy associated with that batch.

5.2 Is a LCS Summary Form present?

Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact lab for resubmission of missing data.

5.3 Is the recovery of any analyte outside of MADEP control limits?

Yes [ ] **No** [✓] N/A [ ] Comments:

Sample Type	*MADEP % Rec*
Water	*80-120*
Soil	within Lab generated limits

ACTION: If recovery is above the upper limit, qualify all positive sample results within the batch as (J). If recovery is below the lower limit, qualify all positive and non-detects results within the batch as (J). If LCS recovery is <30%, positive and non-detect results are rejected (R).

Comments:

6.0 Matrix Spikes

Matrix spikes may be collected at different frequencies based on monthly, quarterly, or task specific schedules. Confirm spike requirements for each set with the senior chemist.

6.1 Were project-specific MS/MSDs ~~collected~~ analyzed? List project samples that were spiked. Yes [✓] No [ ] N/A [ ] Comments: The lab performed an MS analysis on sample OC-B-03

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

MSD not performed.

NOTE: If dilutions are required due to high sample concentrations, the data are evaluated, but no flags are applied.

ACTION: If the RPD exceeds the control limit, qualify positive results and non-detects (J).

7.0 Laboratory Duplicate

7.1 Was a laboratory duplicate sample analyzed? If so, is the Laboratory Duplicate Sample Form present? **Yes** [✓] No [ ] N/A [ ] Comments:

NOTE: *MADEP refers to this sample as a "matrix duplicate".*

ACTION: If not analyzed, qualification is not needed. If data is missing, contact laboratory for resubmission of report. Narrate non-compliance.

7.2 Is the RPD between the result for the laboratory duplicate sample and the result for the parent sample outside of the QA/QC limits? Yes [ ] **No** [✓] N/A [ ] Comments:

MADEP Laboratory Duplicate Sample RPD Criteria:	QAPP RPD
For aqueous results > 5× RL, RPD must be ± 20%	20
For aqueous results < 5× RL, RPD must be ≤ RL	20
For soil/sediment results > 5× RL, RPD must be ± 35%	20
For soil/sediment results < 5× RL, RPD must be ≤ 2× RL	20

ACTION: If the RPD exceeds the limits, qualify both positive results and non-detects as estimated and flag them J. Narrate non-compliance

8.0 Sampling Accuracy

The majority of ground water samples are collected directly from a tap, process stream, or with dedicated tubing. Rinse blanks will not be collected.

8.1 Were rinsate blanks collected? Prior to evaluating rinsate blanks, obtain a list of the associated samples from the senior chemist. **Yes** [ ] No [✓] N/A [ ] Comments:

8.2 Do any rinsate blanks have positive results? Yes [ ] **No** [ ] N/A [✓] Comments:

NOTE: *MADEP does not require the collection of rinsate blanks.*

ACTION: Evaluate rinsate results against blank results to determine if contaminant may be laboratory-derived. If results are not lab-related, qualify according to below.

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

9.0 Field Duplicates

9.1 Were field duplicate samples collected? Obtain a list of samples and their associated field duplicates. Yes [ ] **No** [✓] N/A [ ] Comments:

9.2 Were field duplicates collected per the required frequency? Yes [ ] No [ ] N/A [✓] Comments:

SOW ☐ QAPP *(1 per 10)* ☐ *MADEP Option 1 (1 per 20)* ☐ *MADEP Option 3 (1 per 10)* ☐

9.3 Was the RPD ≤ 50% for soils or waters? Calculate the RPD for all results and attach to this review. Yes [ ] No [ ] N/A [✓] Comments:

ACTION: RPD must be ≤50% for soil and water. Qualify data (J) for both sample results if the RPD exceeds 50%.

10.0 Special QA/QC

10.1 Were both total and dissolved metals analysis performed? If so, the dissolved metal concentration should not exceed that of the total metal. Yes [ ] **No** [✓] N/A [ ] Comments:

ACTION: If results for both total and dissolved are ≥ 5x the PQL **and** the dissolved concentration is 10% higher than the total, flag both results as estimated (J). If total and dissolved concentrations are less than 5x the PQL **and** the **difference** exceeds 2x the PQL, flag both results as estimated (J)

10.0 Application of Validation Qualifiers

Was any of the data qualified?

Yes [ ] **No [✓]** N/A [ ] Comments:

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

REFERENCES

LAW, 1999, "Final Quality Assurance Project Plan, Olin Wilmington Property, 51 Eames Street, Wilmington, MA", LAW Engineering and Environmental Services, Kennesaw, GA 30144. August 1999

U.S. Environmental Protection Agency (USEPA), 1989. "Region 1 Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses"; Hazardous Site Evaluation Division; February 1989.

MADEP, 2001. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Massachusetts Quality Assurance and Quality Control (QA/QC) Requirements." BWSC-CAM, Interim Final Draft, Revision No. 2, 5 October 2001.

MADEP, 2001. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Quality Assurance and Quality Control Guidelines for Sampling, Data Evaluation and Reporting Activities," BWSC-CAM, Section VII, Public Comment Draft, Revision No. 0, 21 December 2001.

1.0 Laboratory Deliverable Requirements

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

☑ *Name of Laboratory* ☑ *Address* ☑ *Project ID* ☑ *Phone #* ☑ *Sample identification – Field and Laboratory*

Client Information: ☑ *Name* ☑ *Address* ☑ *Client Contact* *(IDs must be cross-referenced)*

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

1.2 Laboratory Report Certification Statement ***Yes*** [✓] *No* [ ] *N/A* [ ] *Comments:*

Does the laboratory report include a completed Analytical Report Certification in the required format?

***ACTION**: If no, contact lab for submission of missing certification or certification with correct format.*

1.3 Laboratory Case Narrative: ***Yes*** [✓] *No* [ ] *N/A* [ ] *Comments:*

☑ *Narrative serves as an exception report for the project and method QA/QC performance.*

☑ *Narrative includes an explanation of each discrepancy on the Certification Statement.*

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

1.4 Chain of Custody (COC) copy present of completed COC? **Yes** [✓] No [ ] N/A [ ] Comments:

Does the laboratory report include a copy of the completed Chain of Custody forms containing all samples in this SDG?

NOTE: Olin receives and maintains the *original* COC.

ACTION: If no, contact lab for submission of missing completed *COC*.

1.5 Sample Receipt Information (*Cooler Receipt Form*): Were each of the following tasks completed and recorded upon receipt of the sample(s) into the laboratory? **Yes** [✓] No [ ] N/A [ ] Comments:

☑ Sample temperature confirmed: must be 1° – 10° C. (If samples were sent by courier and delivered on the same day as collection, temperature requirement does not apply).

☑ Container type noted ☑ Condition observed ☑ pH verified (where applicable) ☑ Field and lab IDs cross referenced

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

1.5.1 Were the correct bottles and preservatives used? **Yes** [✓] No [ ] N/A [ ] Comments:

Water - 1 Liter amber bottle/cool to 4°C
Soil - 8 oz soil jar/cool to 4°C

ACTION: If no, inform senior chemist. Document justification for change in container/volume (if applicable), qualify positive and non-detect data (J) if cooler temperature exceeds 10°C. Rejection of data requires professional judgment.

1.5.2 Were all samples delivered to the laboratory without breakage? **Yes** [✓] No [ ] N/A [ ] Comments:

1.5.3 Does the *Cooler Receipt Form* or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data? Yes [ ] **No** [✓] N/A [ ] Comments:

1.6 Sample Results Section: *Was the following information supplied in the laboratory report for each sample?* **Yes** [✓] No [ ] N/A [ ] Comments:

☑ Field ID and Lab ID ☑ *Date and time collected* ☑ Analyst Initials ☑ *Dilution Factor* ☑ % moisture or solids ☑ *Reporting limits*
☑ *Clean-up method* ☑ Analysis method ☑ *Preparation method* ☑ *Date of preparation/extraction/digestion clean-up and analysis, where applicable*
☑ Matrix ☑ Target analytes and concentrations ☑ Units (soils must be reported in dry weight)

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

1.7 QA/QC Information: Was the following information provided in the laboratory report for each sample batch? **Yes** [✓] No [ ] N/A [ ] Comments:

☑ Method blank results ☑ LCS recoveries ☐ MS/MSD recoveries and RPDs ☑ Surrogate recoveries

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

2.0 Holding Times Yes [ ] **No** [✓] N/A [ ] Comments:

Have any technical holding times, determined from date of collection to date of analysis, been exceeded?

NOTE: For water samples, the holding time is 7 days from sampling to extraction and 40 days from extraction to analysis. For soil samples, the holding time is 14 days from sampling to extraction and 40 days from extraction to analysis.

ACTION: If technical holding times are exceeded, qualify all positive results (J) and non-detects (UJ). For water samples that are grossly exceeded (>2X hold time) reject (R) all non-detect results. For soil samples professional judgement will be used to determine if rejection is necessary.

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

3.1 Was the correct laboratory method used?

Water Extraction	3510C or *3520C*
Soil Extraction	*3540C* or 3550B
Semi-volatile Organics	8270C

ACTION: If no, contact project manager to inform Client of change; request variance from Client; contact laboratory to provide justification for method change compared to the requested method.

3.2 Are the practical quantitation limits the same as those specified by the ☐ SOW ☑ QAPP ☐ Lab? **Yes** [✓] No [ ] N/A [ ] Comments:

NOTE: *The QAPP and MADEP QA/QC Guidelines provides PQLs for semi-volatile organic compounds. Verify proper PQLs were used for each data set.*

ACTION: If no, evaluate change with respect to sample matrix, preparation, dilution, moisture, etc. If sample PQL is indeterminate, contact lab for explanation.

3.3 Are the appropriate parameter results present for each sample in the SDG? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, check Request for Analysis to verify if method was ordered and COC to verify that it was sent, and contact lab for resubmission of the missing data

3.4 Were Tentatively Identified Compounds (TICs) reported? **Yes** [ ] No [✓] N/A [ ] Comments:

NOTE *TICs are only required for samples with full MADEP target list. Determine if TICs are required. MADEP requires that all TICs be reported to the LCS. Per the MADEP guidance, TICs, which are identified as aliphatic hydrocarbons, do not have to be reported as TICs. However, these compounds must be evaluated as part of the health-based risk assessment approach (VPH/EPH).*

ACTION*: Qualify reported TIC results as estimated and flag (NJ).*

3.5 If *dilutions were required, were dilution factors reported?* **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact the lab for submission.

4.0 Method Blanks

4.1 Is the Method Blank Summary present? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, call the laboratory for submission of missing data.

4.2 For the analysis of SVOCs, has a method blank been analyzed for each analysis batch of field samples of 20 or less? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, document discrepancy in case narrative and contact lab for justification. Consult senior chemist for action needed.

4.3 Is the method blank less than the PQL?

Yes [✓] No [ ] N/A [ ] Comments:

NOTE: *MADEP allows common laboratory contaminants (such as phthalates) to be present at concentrations < 5x the PQL*

4.4 Do any method blanks have positive results for SVOC parameters? Qualify data according to the following:

Yes [✓] **No** [ ] N/A [ ] Comments:

Bis (2-ethylhexyl) phthalate. Action limit 10x conc. Sample result < AL; qualified NP at RL.

For the common contaminants (phthalates):

If the sample concentration is < 10 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 10 × blank value, no qualification is needed.

For other SVOC contaminants:

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

ACTION: For any blank with positive results, list all contaminants for each method blank, including the concentration detected and the flagging level (flagging level = 5x or 10x the blank value) and the associated samples and qualifiers.

5.0 Laboratory Control Standard

5.1 Was a laboratory control standard run with each analytical batch of 20 samples or less?

Yes [✓] No [ ] N/A [ ] Comments:

ACTION: Call laboratory for LCS form submittal. If data are not available, use professional judgment to determine the usability of sample results associated with that batch.

5.2 Is a LCS Summary Form present? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact lab for resubmission of missing data.

5.3 Is the recovery of any analyte outside of control limits? Yes [ ] **No** [✓] N/A [ ] Comments:

NOTE: *A full target, second source LCS is required by MADEP.*

NOTE: *MADEP guidelines list LCS recovery limits as 40-140 for base-neutral compounds and 30-130 for the acid compounds. The laboratory must identify analytes that routinely exceed these limits.*

ACTION: If recovery is above the upper limit, qualify all positive sample results within the batch as (J). If recovery is below the lower limit but > 10%, qualify all positive and no-detect results within the batch as (J). If LCS recovery is <10%, non-detect results are rejected (R).

5.4 Are 80% of LCS recoveries within laboratory control limits? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If 80% of LCS recoveries are not within limits, use professional judgment and consult Senior Chemist.

6.0 Matrix Spikes

Matrix spikes may be collected at different frequencies based on monthly, quarterly, or task specific schedules. Confirm spike requirements for each set with the senior chemist.

6.1 Were project specified MS/MSDs collected? List project samples that were spiked. **Yes** [ ] No [✓] N/A [ ] Comments:

ACTION: If no, contact senior chemist to see if any were specified.

6.2 Is the MS/MSD recovery form present? **Yes** [ ] No [ ] N/A [✓] Comments:

ACTION: If no, contact lab for resubmission of missing data.

6.3 Were matrix spikes analyzed at the required frequency of 1 per 20 samples per matrix? **Yes** [ ] No [ ] N/A [✓] Comments:

ACTION: If any matrix spike data are missing, call lab for resubmission.

6.4 Are any SVOC spike recoveries outside of the QC limits?

Yes [ ] **No** [ ] N/A [✓] Comments:

NOTE: $\%R = \frac{(SSR-SR)}{SA} \times 100\%$ Where: SSR = Spiked sample result
SR = Sample result
SA = Spike added

NOTE: *A full target, second source MS/MSD is required by MADEP.*

NOTE: *MADEP guidelines list MS/MSD recovery limits as 40-140 for base-neutral compounds and 30-130 for acid compounds.*

NOTES: 1) If only one of the recoveries for an MS/MSD pair is outside of the control limits, no qualification is necessary. Use professional judgment for the MS/MSD flags.
2) If the MS/MSD was performed by the laboratory on a non-project sample, no qualification is required.

ACTION: MS/MSD flags only apply to the sample spiked. If the recoveries of the MS and MSD exceed the upper control limit, qualify positive results as estimated (J). If the recoveries of the MS and MSD are lower than the lower control limit, qualify both positive results and non-detects (J). If LCS recovery is <10%, non-detect results are rejected (R).

6.5 Are any RPDs for MS/MSD recoveries outside of the QC limits? Yes [ ] **No** [ ] N/A [✓] Comments:

NOTE: RPD = $\frac{S-D}{(S+D)/2}$ x 100% Where: S = MS sample result
D = MSD sample result

NOTE: *MADEP guidelines list MS/MSD RPD limits for water as ≤ 20 and soils as ≤ 30.*

NOTE: Laboratory control limits apply when spiked sample results fall within the normal calibration range. If dilutions are required due to high sample concentrations, the data are evaluated, but no flags are applied.

ACTION: If the RPD exceeds the control limit, qualify positive results and non-detects (J).

7.0 Surrogate Recoveries

Were one or more SVOC surrogate recoveries outside of laboratory limits for any sample or method blank? If yes, were samples re-analyzed? Yes [ ] **No** [✓] N/A [ ] Comments:

NOTE: %R = QD x 100% Where: S = MS sample result
D = MSD sample result

NOTE: *MADEP guidelines list surrogate limits for soils as 30-130% for all surrogates, and for water as 30-130% for base-neutrals and 15-110% for acid surrogates.*

NOTE: Qualify BNE results based upon BNE surrogates and AE results based upon AE surrogates.

ACTION: If recoveries are >10%, but 2 or more from any one fraction (acid or base-neutral) fail to meet QC criteria: (1) For recoveries below the QC limit, qualify non-detects and positives (J), and (2) For recoveries above the QC limit, qualify only positives (J). If any surrogate recovery is <10% (unless the lab QC limits are below

10%, in which case, results are flagged as stated above), flag positives (J) and reject non-detects (R).

8.0 Sampling Accuracy

The majority of ground water samples are collected directly from a tap, process stream, or with dedicated tubing. Rinse blanks will not be collected.

8.1 Were rinsate blanks collected? Prior to evaluating rinsate blanks, obtain a list of the associated samples from the project chemist. Yes [ ] **No [✓]** N/A [ ] Comments:

***NOTE**: MADEP does not specify the collection of rinsate blanks.*

8.2 Do any rinsate blanks have positive results? Yes [ ] **No [ ]** N/A [✓] Comments:

NOTE: For the common contaminants (phthalates), qualification is applied as indicated above using a 10x blank value in lieu of a 5x blank value.

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

9.0 Field Duplicates

9.1 Were field duplicate samples collected? Obtain a list of the samples and their associated field duplicates. Yes [ ] **No [✓]** N/A [ ] Comments:

9.2 Were field duplicates collected per the required frequency? **Yes [ ]** No [ ] N/A [✓] Comments:

☐ SOW ☐ QAPP ☐ *MADEP Option 1(1 per 20)* ☐ *MADEP Option 3 (1 per 10)*

9.3 Was the RPD ≤ 50% for soils or waters? Calculate the RPD for all results and **Yes [ ]** No [ ] N/A [✓] Comments:

attach to this review.

ACTION: RPD must be ≤50% for soil and water. Qualify data (J) for both sample results if the RPD exceeds 50%.

10.0 Application of Validation Qualifiers

Was any of the data qualified?

Yes [✓] **No** [ ] N/A [ ] Comments:

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

REFERENCES

LAW, 1999, "Final Quality Assurance Project Plan, Olin Wilmington Property, 51 Eames Street, Wilmington, MA", LAW Engineering and Environmental Services, Kennesaw, GA 30144. August 1999.

STL-Westfield, 2002. "Olin – General Chemistry Control Limits (Soil & Water)," Severn Trent Laboratories, Inc., 53 Southampton Road, Westfield, MA, 01085.

U.S. Environmental Protection Agency (USEPA), 1996. "Region 1 EPA-NE Data Validation Guidelines For Evaluating Environmental Analyses"; Quality Assurance Unit Staff; Office of Environmental Measurement and Evaluation; December 1996

MADEP, 2001. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Massachusetts Quality Assurance / Quality Control (QA / QC Requirements," BWSC-CAM, Interim Final Draft, Revision No. 2, 5 October 2001.

MADEP, 2001. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Quality Assurance / Quality Control Guidelines for Sampling, Data Evaluation and reporting Activities, " BWSC-CAM, Section VII, Public Comment Draft, Revision No. 0, 21 December 2001.

MACTEC

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Telephone: 207/775-5401
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To: Steve Morrow
From: Chris Ricardi
Date: January 4, 2008
Subject: 51 Eames Street Property 4Q07 Plant B Monitoring for the IRSWP November 2007

Data Validation Summary
TestAmerica Laboratories Data Set 360-13540

This sample set contained results for groundwater samples identified as OC-GW-16, OC-GW-16 DUP, OC-IW-10, OC-GW-101, OC-GW-13, and OC-IW-6 collected during 4Q07 monitoring completed in November - 2007. The samples were analyzed by TestAmerica (formerly Severn Trent Laboratories) in Westfield, Massachusetts for the following constituents:

Samples 'OC-GW-16', 'OC-GW-16 DUP', 'OC-IW-10', 'OC-GW-101', 'OC-GW-13', and 'OC-IW-6'

- volatile organic compounds (VOCs) for trimethylpentenes only
- Semi volatile organic compounds (SVOCs) for bis(2-ethylhexyl)phthalate and N-nitrosodiphenylamine only
- Massachusetts volatile petroleum hydrocarbons (MAVPH)
- Dissolved metals (iron)
- General chemistry analysis for ammonia and pH.

The Olin Wilmington Quality Assurance Project Plan 1999 (QAPP) was 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.

Validation Actions and Observations

Bis(2-ethylhexyl) phthalate (0.55 µg/L) is reported in the SVOC method blank. An action limit was established at ten times the reported blank concentration. The result for bis(2-ethylhexyl) phthalate in samples OC-GW-16 (360-13540-1), OC-GW-16 DUP (360-13540-2), OC-IW-10 (360-13540-3), OC-GW-13 (360-13540-5), and OC-IW-6 (360-13540-6) is less than the action limit and was qualified non-detect (U).

The VOC matrix spike/matrix spike duplicate (MS/MSD) percent recovery for 2,4,4,-trimethyl-1-pentene (48 and 46) is less than the lower QC limit of 70. The results for 2,4,4,-trimethyl-1-pentene in samples OC-GW-16 (360-13540-1) and OC-GW-16 DUP (360-13540-2) were qualified estimated (J).

The laboratory analyzed pH one day beyond technical hold time. The results for pH were qualified estimated (J).

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

Chris Ricardi

01/04/08

Chris Ricardi, NRCC-EAC
Senior Chemist

Date

M J Murphy

01/04/08

Michael Murphy
Project Principal

Date

MACTEC

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

Job Number: 360-13540-1

Job Description: Plant B

For:
Olin Corporation
1186 Lower River Road
Charleston, TN 37310-0248

Attention: Mr. Steven Morrow

Joseph A. Clemens

Designee for
Becky C Mason
Project Manager II
becky.mason@testamericainc.com
12/04/2007

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 #:	**360-13540-1**
Project Location:	**Plant B**	MADEP RTN[1]:	

This form provides certifications for the following data set:[list Laboratory Sample ID Number(s)]
360-13540-(1-7)

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

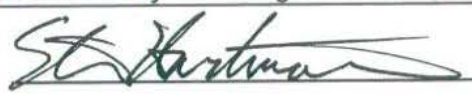
A	Were all samples received by the laboratory in a condition consistent with that described on the Chain-of-Custody documentation for the data set?	(Yes) No[1]
B	Were all QA/QC procedures required for the specified analytical method(s) included in this report followed, including the requirement to note 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:** 12/4/07

CAM VII A, Rev 3.2 April-04

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MADEP MA014
NY DOH 10843
RI DOH 57
CT DPH 0494
VT DECWSD

NELAP FL E87912 TOX
NELAP NJ MA008 TOX
NELAP NY 10843
NH DES 253901-A

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Westfield, MA 01085
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Fax:(413)572-3707

Boston Service Center
148 Rangeway Rd
N.Billerica, MA 01862
Tel:(978)667-1400
Fax:(978)667-7871

MADEP MCP Analytical Method Report Certification Form

Laboratory Name:	**TestAmerica Westfield**	Project #:	**360-13540-1**
Project Location:	**Plant B**	MADEP RTN[1]:	

This form provides certifications for the following data set:[list Laboratory Sample ID Number(s)]
360-13540-(1-7)

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
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3 S - SW-846 Methods 7000 Series List individual method and analyte.

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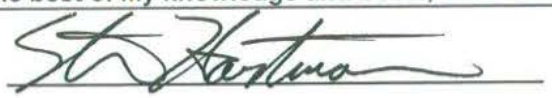
A	Were all samples received by the laboratory in a condition consistent with that described on the Chain-of-Custody documentation for the data set?	(Yes) No[1]
B	Were all QA/QC procedures required for the specified analytical method(s) included in this report followed, including the requirement to note 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:  **Position:** Laboratory Director

Printed Name: Steven C. Hartmann **Date:** 12/4/07

CAM VII A, Rev 3.2 April-04

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MADEP MA014
NY DOH 10843
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Tel:(978)667-1400
Fax:(978)667-7871

MADEP MCP Analytical Method Report Certification Form

Laboratory Name:	**TestAmerica Westfield**	Project #:	**360-13540-1**
Project Location:	**Plant B**	MADEP RTN[1]:	

This form provides certifications for the following data set:[list Laboratory Sample ID Number(s)]
360-13540-(1-7)

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 ( )	
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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

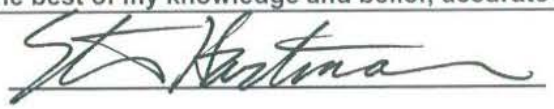
A	Were all samples received by the laboratory in a condition consistent with that described on the Chain-of-Custody documentation for the data set?	(Yes) No[1]
B	Were all QA/QC procedures required for the specified analytical method(s) included in this report followed, including the requirement to note 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:** 12/4/07

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

Boston Service Center 148 Rangeway Rd N.Billerica, MA 01862 Tel:(978)667-1400 Fax:(978)667-7871

MADEP MCP Analytical Method Report Certification Form

Laboratory Name:	**TestAmerica Westfield**	Project #:	**360-13540-1**
Project Location:	**Plant B**	MADEP RTN[1]:	

This form provides certifications for the following data set:[list Laboratory Sample ID Number(s)]
360-13540-(1-7)

Sample Matrices: **Groundwater** Soil/Sediment Drinking Water Other:

MCP SW-846 Methods Used	8260B( )	8151A ( )	8330 ( )	6010B (x)	7470A/1A ( )	Other ( )
	8270C( )	8081A ( )	VPH ( )	6020 ( )	9014M[2]/9012 ( )	
As specified in MADEP Compendium of Analytical Methods. (check all that apply)	8082 ( )	8021B ( )	EPH ( )	7000 S[3]( )	7196A ( )	

1 List Release Tracking Number (RTN), if known
2 M - SW-846 Method 9014 or MADEP Physiologically Available Cyanide (PAC) Method
3 S - SW-846 Methods 7000 Series List individual method and analyte.

An affirmative response to questions A, B, C and D is required for "Presumptive Certainty" status

A	Were all samples received by the laboratory in a condition consistent with that described on the Chain-of-Custody documentation for the data set?	(Yes) No[1]
B	Were all QA/QC procedures required for the specified analytical method(s) included in this report followed, including the requirement to note and discuss in a narrative QC data that did not meet appropriate performance standards or guidelines?	(Yes) No[1]
C	Does the analytical data included in this report meet all the requirements for "Presumptive Certainty", as described in Section 2.0 (a), (b), (c) and (d) of the MADEP document CAM VII A, " Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	(Yes) N/A No[1]
D	**VPH and EPH methods only:** Was the VPH or EPH Method conducted without significant modifications (see Section 11.3 of respective Methods)?	Yes (N/A) No[1]

A response to questions E and F below is required for "Presumptive Certainty" status

E	Were all QC performance standards and recommendations for the specified methods achieved?	(Yes) No[1]
F	Were results for all analyte-list compounds/elements for the specified method(s) reported?	Yes N/A (No[1])

[1] All Negative responses must be addressed in an attached Environmental Laboratory case narrative.

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.

Signature: _____ **Position:** Laboratory Director

Printed Name: Steven C. Hartmann **Date:** 12/4/07

CAM VII A, Rev 3.2 April-04

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MADEP MA014
NY DOH 10843
RI DOH 57
CT DPH 0494
VT DECWSD

NELAP FL E87912 TOX
NELAP NJ MA008 TOX
NELAP NY 10843
NH DES 253901-A

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MADEP MCP Analytical Method Report Certification Form

Laboratory Name:	**TestAmerica Westfield**	Project #:	**360-13540-1**
Project Location:	**Plant B**	MADEP RTN[1]:	

This form provides certifications for the following data set:[list Laboratory Sample ID Number(s)]
360-13540-(1-7)

Sample Matrices: **Groundwater** Soil/Sediment Drinking Water Other:

MCP SW-846 Methods Used	8260B( )	8151A ( )	8330 ( )	6010B ( )	7470A/1A ( )	Other (x)
	8270C( )	8081A ( )	VPH ( )	6020 ( )	9014M[2]/9012 ( )	
As specified in MADEP Compendium of Analytical Methods. (check all that apply)	8082 ( )	8021B ( )	EPH ( )	7000 S[3]( )	7196A ( )	

1 List Release Tracking Number (RTN), if known
2 M - SW-846 Method 9014 or MADEP Physiologically Available Cyanide (PAC) Method
3 S - SW-846 Methods 7000 Series List individual method and analyte.

An affirmative response to questions A, B, C and D is required for "Presumptive Certainty" status

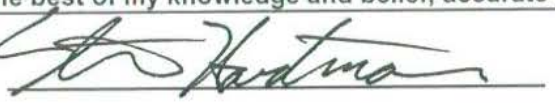
A	Were all samples received by the laboratory in a condition consistent with that described on the Chain-of-Custody documentation for the data set?	(Yes) No[1]
B	Were all QA/QC procedures required for the specified analytical method(s) included in this report followed, including the requirement to note and discuss in a narrative QC data that did not meet appropriate performance standards or guidelines?	(Yes) No[1]
C	Does the analytical data included in this report meet all the requirements for "Presumptive Certainty", as described in Section 2.0 (a), (b), (c) and (d) of the MADEP document CAM VII A, " Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	Yes (N/A) No[1]
D	**VPH and EPH methods only:** Was the VPH or EPH Method conducted without significant modifications (see Section 11.3 of respective Methods)?	Yes (N/A) No[1]

A response to questions E and F below is required for "Presumptive Certainty" status

E	Were all QC performance standards and recommendations for the specified methods achieved?	(Yes) No[1]
F	Were results for all analyte-list compounds/elements for the specified method(s) reported?	Yes (N/A) No[1]

[1] All Negative responses must be addressed in an attached Environmental Laboratory case narrative.

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.

Signature:  **Position:** Laboratory Director

Printed Name: Steven C. Hartmann **Date:** 12/4/07

CAM VII A, Rev 3.2 April-04

TestAmerica
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MADEP MA014
NY DOH 10843
RI DOH 57
CT DPH 0494
VT DECWSD

NELAP FL E87912 TOX
NELAP NJ MA008 TOX
NELAP NY 10843
NH DES 253901-A

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CASE NARRATIVE

Client: Olin Corporation

Project: Plant B

Report Number: 360-13540-1

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 11/15/2007; the samples arrived in good condition, properly preserved and on ice. The temperatures of the coolers at receipt were 6.6, 5.2 and 6.2°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 360-13540-1 through 360-13540-7 were analyzed for volatile organics in accordance with EPA SW846 Method 8260B. The samples were analyzed on 11/21/2007, 11/22/2007 and 11/23/2007.

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 failed the MS/MSD recovery criteria low for the matrix spike and matrix spike duplicate of sample 360-13540-1. The associated LCS recovered within control limits. Refer to the QC report for details.

General method information:
Samples 360-13540-1(10X), 360-13540-2(10X) and 360-13540-6(5X) required dilution prior to analysis. The reporting limits have been adjusted accordingly. Dilutions for 360-13540-(1-2) were due to foaming. Dilution for 360-13540-6 was due to high target concentration.

At the request of the client, a non-MCP compound list was reported for this job.

VOLATILE PETROLEUM HYDROCARBONS

Samples 360-13540-1 through 360-13540-7 were analyzed for volatile petroleum hydrocarbons in accordance with MADEP VPH. The samples were analyzed on 11/19/2007, 11/20/2007 and 11/21/2007.

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:

For batch 25988, Methyl tert-butyl ether failed the criteria low for the closing CCV.

SEMIVOLATILE ORGANICS

Samples 360-13540-1 through 360-13540-6 were analyzed for semivolatile organics in accordance with EPA SW846 Method 8270C. The samples were prepared on 11/20/2007 and analyzed on 11/26/2007 and 11/29/2007.

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:

N-Nitrosodiphenylamine failed the MS/MSD recovery criteria low for the matrix spike and matrix spike duplicate of sample 360-13540-1. The associated 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 360-25951/1-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 360-13540-1(10X), 360-13540-2(10X) and 360-13540-4(5X) required dilution prior to analysis. The reporting limits have been adjusted accordingly. Dilutions were due to high target concentration.

At the request of the client, an abbreviated MCP compound list was reported for this job.

DISSOLVED METALS

Samples 360-13540-1 through 360-13540-6 were analyzed for dissolved metals in accordance with EPA SW846 Method 6010B. The samples were analyzed on 11/19/2007.

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 360-13540-1 through 360-13540-6 were analyzed for ammonia in accordance with LACHAT 10-107-06-1. The samples were prepared and analyzed on 11/27/2007 and 12/03/2007.

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

PH

Samples 360-13540-1 through 360-13540-6 were analyzed for pH in accordance with SM 4500 H+ B. The samples were analyzed on 11/16/2007.

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: 360-13540-1

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-Nitrogen	TAL WFD	QuickChem 10-107-06-1	
Distillation/Ammonia	TAL WFD		Distill/Ammonia
pH	TAL WFD	SM19 SM 4500 H+ B	

Lab References:

TAL WFD = TestAmerica Westfield

Method References:

MA DEP = Massachusetts Department Of Environmental Protection

QuickChem = Lachat Instruments

SM19 = "Standard Methods For The Examination Of Water And Wastewater", 19Th Edition, 1995."

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: 360-13540-1

Method	Analyst	Analyst ID
SW846 8260B	Weigel, Brian	BW
SW846 8270C	Sullivan, Pat J	PJS
MA DEP MAVPH	Rouleau, Catherine M	CMR
SW846 6010B	Nasiatka, Ellen M	EMN
QuickChem 10-107-06-1	Lalashius, Andrew L	ALL
SM19 SM 4500 H+ B	Emerich, Rich W	RWE

SAMPLE SUMMARY

Client: Olin Corporation

Job Number: 360-13540-1

Lab Sample ID	Client Sample ID	Client Matrix	Date/Time Sampled	Date/Time Received
360-13540-1	OC-GW-16	Ground Water	11/15/2007 0930	11/15/2007 1630
360-13540-1MS	OC-GW-16 MS	Ground Water	11/15/2007 0930	11/15/2007 1630
360-13540-1MSD	OC-GW-16 MSD	Ground Water	11/15/2007 0930	11/15/2007 1630
360-13540-2	OC-GW-16 DUP	Ground Water	11/15/2007 0930	11/15/2007 1630
360-13540-3	OC-IW-10	Ground Water	11/15/2007 1155	11/15/2007 1630
360-13540-4	OC-GW-101	Ground Water	11/15/2007 1200	11/15/2007 1630
360-13540-5	OC-GW-13	Ground Water	11/15/2007 1300	11/15/2007 1630
360-13540-6	OC-IW-6	Ground Water	11/15/2007 1340	11/15/2007 1630
360-13540-7	OC-Trip Blank	Water	11/15/2007 0930	11/15/2007 1630

SAMPLE RESULTS

Mr. Steven Morrow
Olin Corporation
1186 Lower River Road
Charleston, TN 37310-0248

Job Number: 360-13540-1

Client Sample ID: OC-GW-16
Lab Sample ID: 360-13540-1

Date Sampled: 11/15/2007 0930
Date Received: 11/15/2007 1630
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: 8260B		Date Analyzed:		11/21/2007 2319	
Prep Method: 5030B		Date Prepared:		11/21/2007 2319	
2,4,4-Trimethyl-1-pentene	330 J	ug/L	2.0	10	10
2,4,4-Trimethyl-2-pentene	88	ug/L	2.0	10	10
Surrogate				Acceptance Limits	
1,2-Dichloroethane-d4 (Surr)	89	%		70 - 130	
4-Bromofluorobenzene	84	%		70 - 130	
Dibromofluoromethane	106	%		70 - 130	
Toluene-d8 (Surr)	105	%		70 - 130	
Method: 8270C		Date Analyzed:		11/26/2007 2119	
Prep Method: 3510C		Date Prepared:		11/20/2007 1616	
Bis(2-ethylhexyl) phthalate	0.60 J,B	ug/L	0.13	5.1	1.0
Surrogate				Acceptance Limits	
2,4,6-Tribromophenol	90	%		15 - 110	
2-Fluorobiphenyl	77	%		30 - 130	
2-Fluorophenol	29	%		15 - 110	
Nitrobenzene-d5	96	%		30 - 130	
Phenol-d5	19	%		15 - 110	
Terphenyl-d14	88	%		30 - 130	
Method: 8270C		Date Analyzed:		11/29/2007 1738	
Prep Method: 3510C		Date Prepared:		11/20/2007 1616	
N-Nitrosodiphenylamine	210	ug/L	2.1	51	10
Surrogate				Acceptance Limits	
2,4,6-Tribromophenol	95	%		15 - 110	
2-Fluorobiphenyl	123	%		30 - 130	
2-Fluorophenol	33	%		15 - 110	
Nitrobenzene-d5	69	%		30 - 130	
Phenol-d5	19	%		15 - 110	
Terphenyl-d14	112	%		30 - 130	
Method: Dissolved-6010B		Date Analyzed:		11/19/2007 1555	
Iron	1000	ug/L	14	100	1.0

Mr. Steven Morrow
Olin Corporation
1186 Lower River Road
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Job Number: 360-13540-1

Client Sample ID: OC-GW-16
Lab Sample ID: 360-13540-1

Date Sampled: 11/15/2007 0930
Date Received: 11/15/2007 1630
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: MAVPH		Date Analyzed:		11/19/2007 2035	
Prep Method: 5030B		Date Prepared:		11/19/2007 2035	
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	8.0	ug/L	5.0	5.0	1.0
Toluene	ND	ug/L	5.0	5.0	1.0
C5-C8 Aliphatics (unadjusted)	1100	ug/L	100	100	1.0
C9-C12 Aliphatics (unadjusted)	ND	ug/L	100	100	1.0
C5-C8 Aliphatics (adjusted)	1100	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	1100	ug/L	100	100	1.0
Surrogate				Acceptance Limits	
2,5-Dibromotoluene (fid)	84	%		70 - 130	
2,5-Dibromotoluene (pid)	90	%		70 - 130	
Method: 10-107-06-1		Date Analyzed:		11/27/2007 1626	
Prep Method: Distill/Ammonia		Date Prepared:		11/27/2007 1443	
Ammonia	6.9	mg/L	0.10	0.10	1.0
Method: SM 4500 H+ B		Date Analyzed:		11/16/2007 0939	
pH	5.91 J HF	SU	0.100	0.100	1.0

Mr. Steven Morrow
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1186 Lower River Road
Charleston, TN 37310-0248

Job Number: 360-13540-1

Client Sample ID: OC-GW-16 DUP
Lab Sample ID: 360-13540-2

Date Sampled: 11/15/2007 0930
Date Received: 11/15/2007 1630
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: 8260B		Date Analyzed:		11/21/2007 2341	
Prep Method: 5030B		Date Prepared:		11/21/2007 2341	
2,4,4-Trimethyl-1-pentene	310 J	ug/L	2.0	10	10
2,4,4-Trimethyl-2-pentene	85	ug/L	2.0	10	10
Surrogate				Acceptance Limits	
1,2-Dichloroethane-d4 (Surr)	82	%		70 - 130	
4-Bromofluorobenzene	88	%		70 - 130	
Dibromofluoromethane	99	%		70 - 130	
Toluene-d8 (Surr)	91	%		70 - 130	
Method: 8270C		Date Analyzed:		11/26/2007 2222	
Prep Method: 3510C		Date Prepared:		11/20/2007 1616	
Bis(2-ethylhexyl) phthalate	~~1.3~~ 5.1 U ~~J B~~	ug/L	0.13	5.1	1.0
Surrogate				Acceptance Limits	
2,4,6-Tribromophenol	94	%		15 - 110	
2-Fluorobiphenyl	86	%		30 - 130	
2-Fluorophenol	34	%		15 - 110	
Nitrobenzene-d5	105	%		30 - 130	
Phenol-d5	20	%		15 - 110	
Terphenyl-d14	106	%		30 - 130	
Method: 8270C		Date Analyzed:		11/29/2007 1842	
Prep Method: 3510C		Date Prepared:		11/20/2007 1616	
N-Nitrosodiphenylamine	210	ug/L	2.1	51	10
Surrogate				Acceptance Limits	
2,4,6-Tribromophenol	109	%		15 - 110	
2-Fluorobiphenyl	100	%		30 - 130	
2-Fluorophenol	31	%		15 - 110	
Nitrobenzene-d5	71	%		30 - 130	
Phenol-d5	21	%		15 - 110	
Terphenyl-d14	117	%		30 - 130	
Method: Dissolved-6010B		Date Analyzed:		11/19/2007 1605	
Iron	900	ug/L	14	100	1.0

Mr. Steven Morrow
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Job Number: 360-13540-1

Client Sample ID: OC-GW-16 DUP
Lab Sample ID: 360-13540-2

Date Sampled: 11/15/2007 0930
Date Received: 11/15/2007 1630
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: MAVPH		Date Analyzed:		11/19/2007 2108	
Prep Method: 5030B		Date Prepared:		11/19/2007 2108	
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	7.8	ug/L	5.0	5.0	1.0
Toluene	ND	ug/L	5.0	5.0	1.0
C5-C8 Aliphatics (unadjusted)	1200	ug/L	100	100	1.0
C9-C12 Aliphatics (unadjusted)	ND	ug/L	100	100	1.0
C5-C8 Aliphatics (adjusted)	1200	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	1200	ug/L	100	100	1.0
Surrogate				Acceptance Limits	
2,5-Dibromotoluene (fid)	90	%		70 - 130	
2,5-Dibromotoluene (pid)	91	%		70 - 130	
Method: 10-107-06-1		Date Analyzed:		11/27/2007 1631	
Prep Method: Distill/Ammonia		Date Prepared:		11/27/2007 1443	
Ammonia	6.9	mg/L	0.10	0.10	1.0
Method: SM 4500 H+ B		Date Analyzed:		11/16/2007 0946	
pH	6.01 J HF	SU	0.100	0.100	1.0

Mr. Steven Morrow
Olin Corporation
1186 Lower River Road
Charleston, TN 37310-0248

Job Number: 360-13540-1

Client Sample ID: OC-IW-10
Lab Sample ID: 360-13540-3

Date Sampled: 11/15/2007 1155
Date Received: 11/15/2007 1630
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: 8260B		Date Analyzed:		11/22/2007 0003	
Prep Method: 5030B		Date Prepared:		11/22/2007 0003	
2,4,4-Trimethyl-1-pentene	ND	ug/L	0.20	1.0	1.0
2,4,4-Trimethyl-2-pentene	ND	ug/L	0.20	1.0	1.0
Surrogate				Acceptance Limits	
1,2-Dichloroethane-d4 (Surr)	85	%		70 - 130	
4-Bromofluorobenzene	89	%		70 - 130	
Dibromofluoromethane	102	%		70 - 130	
Toluene-d8 (Surr)	90	%		70 - 130	
Method: 8270C		Date Analyzed:		11/26/2007 2243	
Prep Method: 3510C		Date Prepared:		11/20/2007 1616	
Bis(2-ethylhexyl) phthalate	~~0.73~~ 5.4 J B	ug/L	0.14	5.4	1.0
N-Nitrosodiphenylamine	7.6	ug/L	0.23	5.4	1.0
Surrogate				Acceptance Limits	
2,4,6-Tribromophenol	81	%		15 - 110	
2-Fluorobiphenyl	76	%		30 - 130	
2-Fluorophenol	32	%		15 - 110	
Nitrobenzene-d5	94	%		30 - 130	
Phenol-d5	19	%		15 - 110	
Terphenyl-d14	88	%		30 - 130	
Method: Dissolved-6010B		Date Analyzed:		11/19/2007 1608	
Iron	8800	ug/L	14	100	1.0

Mr. Steven Morrow
Olin Corporation
1186 Lower River Road
Charleston, TN 37310-0248

Job Number: 360-13540-1

Client Sample ID: OC-IW-10
Lab Sample ID: 360-13540-3

Date Sampled: 11/15/2007 1155
Date Received: 11/15/2007 1630
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: MAVPH		Date Analyzed:		11/19/2007 2141	
Prep Method: 5030B		Date Prepared:		11/19/2007 2141	
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)	87	%		70 - 130	
2,5-Dibromotoluene (pid)	94	%		70 - 130	
Method: 10-107-06-1		Date Analyzed:		11/27/2007 1646	
Prep Method: Distill/Ammonia		Date Prepared:		11/27/2007 1443	
Ammonia	59	mg/L	0.50	0.50	5.0
Method: SM 4500 H+ B		Date Analyzed:		11/16/2007 0950	
pH	6.06 J HF	SU	0.100	0.100	1.0

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Job Number: 360-13540-1

Client Sample ID: OC-GW-101
Lab Sample ID: 360-13540-4

Date Sampled: 11/15/2007 1200
Date Received: 11/15/2007 1630
Client Matrix: Ground Water

Analyte	Result/Qualifier		Unit	MDL	RL	Dilution
Method: 8260B			Date Analyzed:		11/22/2007 0025	
Prep Method: 5030B			Date Prepared:		11/22/2007 0025	
2,4,4-Trimethyl-1-pentene	73		ug/L	0.20	1.0	1.0
2,4,4-Trimethyl-2-pentene	8.1		ug/L	0.20	1.0	1.0
Surrogate					Acceptance Limits	
1,2-Dichloroethane-d4 (Surr)	86		%		70 - 130	
4-Bromofluorobenzene	95		%		70 - 130	
Dibromofluoromethane	104		%		70 - 130	
Toluene-d8 (Surr)	95		%		70 - 130	
Method: 8270C			Date Analyzed:		11/26/2007 2303	
Prep Method: 3510C			Date Prepared:		11/20/2007 1616	
N-Nitrosodiphenylamine	4.2	J	ug/L	0.21	5.1	1.0
Surrogate					Acceptance Limits	
2,4,6-Tribromophenol	85		%		15 - 110	
2-Fluorobiphenyl	78		%		30 - 130	
2-Fluorophenol	32		%		15 - 110	
Nitrobenzene-d5	97		%		30 - 130	
Phenol-d5	19		%		15 - 110	
Terphenyl-d14	94		%		30 - 130	
Method: 8270C			Date Analyzed:		11/29/2007 1903	
Prep Method: 3510C			Date Prepared:		11/20/2007 1616	
Bis(2-ethylhexyl) phthalate	54	B	ug/L	0.66	25	5.0
Surrogate					Acceptance Limits	
2,4,6-Tribromophenol	67		%		15 - 110	
2-Fluorobiphenyl	88		%		30 - 130	
2-Fluorophenol	31		%		15 - 110	
Nitrobenzene-d5	73		%		30 - 130	
Phenol-d5	17		%		15 - 110	
Terphenyl-d14	108		%		30 - 130	
Method: Dissolved-6010B			Date Analyzed:		11/19/2007 1610	
Iron	7200		ug/L	14	100	1.0

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Job Number: 360-13540-1

Client Sample ID: OC-GW-101
Lab Sample ID: 360-13540-4

Date Sampled: 11/15/2007 1200
Date Received: 11/15/2007 1630
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: MAVPH		Date Analyzed:		11/19/2007 2214	
Prep Method: 5030B		Date Prepared:		11/19/2007 2214	
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)	230	ug/L	100	100	1.0
C9-C12 Aliphatics (unadjusted)	ND	ug/L	100	100	1.0
C5-C8 Aliphatics (adjusted)	230	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	230	ug/L	100	100	1.0
Surrogate				Acceptance Limits	
2,5-Dibromotoluene (fid)	83	%		70 - 130	
2,5-Dibromotoluene (pid)	91	%		70 - 130	
Method: 10-107-06-1		Date Analyzed:		11/27/2007 1633	
Prep Method: Distill/Ammonia		Date Prepared:		11/27/2007 1443	
Ammonia	0.92	mg/L	0.10	0.10	1.0
Method: SM 4500 H+ B		Date Analyzed:		11/16/2007 0953	
pH	6.56 J HF	SU	0.100	0.100	1.0

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Job Number: 360-13540-1

Client Sample ID: OC-GW-13
Lab Sample ID: 360-13540-5

Date Sampled: 11/15/2007 1300
Date Received: 11/15/2007 1630
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: 8260B		Date Analyzed:		11/22/2007 0048	
Prep Method: 5030B		Date Prepared:		11/22/2007 0048	
2,4,4-Trimethyl-1-pentene	ND	ug/L	0.20	1.0	1.0
2,4,4-Trimethyl-2-pentene	ND	ug/L	0.20	1.0	1.0
Surrogate				Acceptance Limits	
1,2-Dichloroethane-d4 (Surr)	83	%		70 - 130	
4-Bromofluorobenzene	89	%		70 - 130	
Dibromofluoromethane	107	%		70 - 130	
Toluene-d8 (Surr)	90	%		70 - 130	
Method: 8270C		Date Analyzed:		11/26/2007 2324	
Prep Method: 3510C		Date Prepared:		11/20/2007 1616	
Bis(2-ethylhexyl) phthalate	9.9 B	ug/L	0.13	5.1	1.0
N-Nitrosodiphenylamine	ND	ug/L	0.21	5.1	1.0
Surrogate				Acceptance Limits	
2,4,6-Tribromophenol	81	%		15 - 110	
2-Fluorobiphenyl	77	%		30 - 130	
2-Fluorophenol	32	%		15 - 110	
Nitrobenzene-d5	93	%		30 - 130	
Phenol-d5	19	%		15 - 110	
Terphenyl-d14	89	%		30 - 130	
Method: Dissolved-6010B		Date Analyzed:		11/19/2007 1613	
Iron	420	ug/L	14	100	1.0

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Job Number: 360-13540-1

Client Sample ID: OC-GW-13
Lab Sample ID: 360-13540-5

Date Sampled: 11/15/2007 1300
Date Received: 11/15/2007 1630
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: MAVPH		Date Analyzed:		11/21/2007 0043	
Prep Method: 5030B		Date Prepared:		11/21/2007 0043	
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)	89	%		70 - 130	
2,5-Dibromotoluene (pid)	97	%		70 - 130	
Method: 10-107-06-1		Date Analyzed:		11/27/2007 1634	
Prep Method: Distill/Ammonia		Date Prepared:		11/27/2007 1443	
Ammonia	ND	mg/L	0.10	0.10	1.0
Method: SM 4500 H+ B		Date Analyzed:		11/16/2007 0957	
pH	5.75 J ~~HF~~	SU	0.100	0.100	1.0

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Job Number: 360-13540-1

Client Sample ID: OC-IW-6
Lab Sample ID: 360-13540-6

Date Sampled: 11/15/2007 1340
Date Received: 11/15/2007 1630
Client Matrix: Ground Water

Analyte	Result/Qualifier		Unit	MDL	RL	Dilution
Method: 8260B			Date Analyzed:		11/23/2007 2028	
Prep Method: 5030B			Date Prepared:		11/23/2007 2028	
2,4,4-Trimethyl-1-pentene	170		ug/L	1.0	5.0	5.0
2,4,4-Trimethyl-2-pentene	26		ug/L	1.0	5.0	5.0
Surrogate					Acceptance Limits	
1,2-Dichloroethane-d4 (Surr)	90		%		70 - 130	
4-Bromofluorobenzene	85		%		70 - 130	
Dibromofluoromethane	100		%		70 - 130	
Toluene-d8 (Surr)	88		%		70 - 130	
Method: 8270C			Date Analyzed:		11/26/2007 2345	
Prep Method: 3510C			Date Prepared:		11/20/2007 1616	
Bis(2-ethylhexyl) phthalate	5.4	B	ug/L	0.13	5.1	1.0
N-Nitrosodiphenylamine	1.4	J	ug/L	0.21	5.1	1.0
Surrogate					Acceptance Limits	
2,4,6-Tribromophenol	79		%		15 - 110	
2-Fluorobiphenyl	73		%		30 - 130	
2-Fluorophenol	27		%		15 - 110	
Nitrobenzene-d5	83		%		30 - 130	
Phenol-d5	16		%		15 - 110	
Terphenyl-d14	82		%		30 - 130	
Method: Dissolved-6010B			Date Analyzed:		11/19/2007 1616	
Iron	14000		ug/L	14	100	1.0

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Job Number: 360-13540-1

Client Sample ID: OC-IW-6
Lab Sample ID: 360-13540-6

Date Sampled: 11/15/2007 1340
Date Received: 11/15/2007 1630
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: MAVPH		Date Analyzed:		11/21/2007 0116	
Prep Method: 5030B		Date Prepared:		11/21/2007 0116	
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)	740	ug/L	100	100	1.0
C9-C12 Aliphatics (unadjusted)	ND	ug/L	100	100	1.0
C5-C8 Aliphatics (adjusted)	740	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	740	ug/L	100	100	1.0
Surrogate				Acceptance Limits	
2,5-Dibromotoluene (fid)	89	%		70 - 130	
2,5-Dibromotoluene (pid)	94	%		70 - 130	
Method: 10-107-06-1		Date Analyzed:		12/03/2007 1226	
Prep Method: Distill/Ammonia		Date Prepared:		12/03/2007 0922	
Ammonia	1.1	mg/L	0.10	0.10	1.0
Method: SM 4500 H+ B		Date Analyzed:		11/16/2007 1001	
pH	6.39 J HF	SU	0.100	0.100	1.0

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Job Number: 360-13540-1

Client Sample ID: OC-Trip Blank
Lab Sample ID: 360-13540-7

Date Sampled: 11/15/2007 0930
Date Received: 11/15/2007 1630
Client Matrix: Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: 8260B		Date Analyzed:		11/22/2007 0132	
Prep Method: 5030B		Date Prepared:		11/22/2007 0132	
2,4,4-Trimethyl-1-pentene	ND	ug/L	0.20	1.0	1.0
2,4,4-Trimethyl-2-pentene	ND	ug/L	0.20	1.0	1.0
Surrogate				Acceptance Limits	
1,2-Dichloroethane-d4 (Surr)	83	%		70 - 130	
4-Bromofluorobenzene	87	%		70 - 130	
Dibromofluoromethane	101	%		70 - 130	
Toluene-d8 (Surr)	90	%		70 - 130	

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Job Number: 360-13540-1

Client Sample ID: OC-Trip Blank
Lab Sample ID: 360-13540-7

Date Sampled: 11/15/2007 0930
Date Received: 11/15/2007 1630
Client Matrix: Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: MAVPH		Date Analyzed:		11/20/2007 2337	
Prep Method: 5030B		Date Prepared:		11/20/2007 2337	
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)	87	%		70 - 130	
2,5-Dibromotoluene (pid)	95	%		70 - 130	

DATA REPORTING QUALIFIERS

Client: Olin Corporation

Job Number: 360-13540-1

Lab Section	Qualifier	Description
GC/MS VOA		
	F	MS or MSD exceeds the control limits
GC/MS Semi VOA		
	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.
General Chemistry		
	HF	Field parameter with a holding time of 15 minutes

QUALITY CONTROL RESULTS

Client: Olin Corporation

Job Number: 360-13540-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
GC/MS VOA					
Analysis Batch:360-26028					
LCS 360-26028/1	Lab Control Spike	T	Water	8260B	
LCSD 360-26028/2	Lab Control Spike Duplicate	T	Water	8260B	
MB 360-26028/3	Method Blank	T	Water	8260B	
360-13540-1	OC-GW-16	T	Water	8260B	
360-13540-1MS	Matrix Spike	T	Water	8260B	
360-13540-1MSD	Matrix Spike Duplicate	T	Water	8260B	
360-13540-2	OC-GW-16 DUP	T	Water	8260B	
360-13540-3	OC-IW-10	T	Water	8260B	
360-13540-4	OC-GW-101	T	Water	8260B	
360-13540-5	OC-GW-13	T	Water	8260B	
360-13540-7	OC-Trip Blank	T	Water	8260B	
Analysis Batch:360-26107					
LCS 360-26107/1	Lab Control Spike	T	Water	8260B	
LCSD 360-26107/2	Lab Control Spike Duplicate	T	Water	8260B	
MB 360-26107/3	Method Blank	T	Water	8260B	
360-13540-6	OC-IW-6	T	Water	8260B	

Report Basis
T = Total

Client: Olin Corporation

Job Number: 360-13540-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
GC/MS Semi VOA					
Prep Batch: 360-25951					
LCS 360-25951/2-A	Lab Control Spike	T	Water	3510C	
LCSD 360-25951/3-A	Lab Control Spike Duplicate	T	Water	3510C	
MB 360-25951/1-A	Method Blank	T	Water	3510C	
360-13540-1	OC-GW-16	T	Water	3510C	
360-13540-1MS	Matrix Spike	T	Water	3510C	
360-13540-1MSD	Matrix Spike Duplicate	T	Water	3510C	
360-13540-2	OC-GW-16 DUP	T	Water	3510C	
360-13540-3	OC-IW-10	T	Water	3510C	
360-13540-4	OC-GW-101	T	Water	3510C	
360-13540-5	OC-GW-13	T	Water	3510C	
360-13540-6	OC-IW-6	T	Water	3510C	
Analysis Batch:360-26286					
LCS 360-25951/2-A	Lab Control Spike	T	Water	8270C	360-25951
LCSD 360-25951/3-A	Lab Control Spike Duplicate	T	Water	8270C	360-25951
MB 360-25951/1-A	Method Blank	T	Water	8270C	360-25951
360-13540-1	OC-GW-16	T	Water	8270C	360-25951
360-13540-1MS	Matrix Spike	T	Water	8270C	360-25951
360-13540-1MSD	Matrix Spike Duplicate	T	Water	8270C	360-25951
360-13540-2	OC-GW-16 DUP	T	Water	8270C	360-25951
360-13540-3	OC-IW-10	T	Water	8270C	360-25951
360-13540-4	OC-GW-101	T	Water	8270C	360-25951
360-13540-5	OC-GW-13	T	Water	8270C	360-25951
360-13540-6	OC-IW-6	T	Water	8270C	360-25951

Report Basis
T = Total

Client: Olin Corporation

Job Number: 360-13540-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
GC VOA					
Analysis Batch:360-25928					
LCS 360-25928/1	Lab Control Spike	T	Water	MAVPH	
LCSD 360-25928/2	Lab Control Spike Duplicate	T	Water	MAVPH	
MB 360-25928/3	Method Blank	T	Water	MAVPH	
360-13540-1	OC-GW-16	T	Water	MAVPH	
360-13540-1MS	Matrix Spike	T	Water	MAVPH	
360-13540-1MSD	Matrix Spike Duplicate	T	Water	MAVPH	
360-13540-2	OC-GW-16 DUP	T	Water	MAVPH	
360-13540-3	OC-IW-10	T	Water	MAVPH	
360-13540-4	OC-GW-101	T	Water	MAVPH	
Analysis Batch:360-25988					
LCS 360-25988/1	Lab Control Spike	T	Water	MAVPH	
LCSD 360-25988/2	Lab Control Spike Duplicate	T	Water	MAVPH	
MB 360-25988/3	Method Blank	T	Water	MAVPH	
360-13540-5	OC-GW-13	T	Water	MAVPH	
360-13540-6	OC-IW-6	T	Water	MAVPH	
360-13540-7	OC-Trip Blank	T	Water	MAVPH	

Report Basis
T = Total

Metals

Analysis Batch:360-25887					
LCS 360-25887/1	Lab Control Spike	T	Water	6010B	
LCSD 360-25887/13	Lab Control Spike Duplicate	T	Water	6010B	
MB 360-25887/2	Method Blank	T	Water	6010B	
360-13540-1	OC-GW-16	D	Water	6010B	
360-13540-1MS	Matrix Spike	D	Water	6010B	
360-13540-1MSD	Matrix Spike Duplicate	D	Water	6010B	
360-13540-2	OC-GW-16 DUP	D	Water	6010B	
360-13540-3	OC-IW-10	D	Water	6010B	
360-13540-4	OC-GW-101	D	Water	6010B	
360-13540-5	OC-GW-13	D	Water	6010B	
360-13540-6	OC-IW-6	D	Water	6010B	

Report Basis
D = Dissolved
T = Total

Client: Olin Corporation

Job Number: 360-13540-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
General Chemistry					
Analysis Batch:360-25786					
LCS 360-25786/14	Lab Control Spike	T	Water	SM 4500 H+ B	
360-13540-1	OC-GW-16	T	Water	SM 4500 H+ B	
360-13540-1DU	Duplicate	T	Water	SM 4500 H+ B	
360-13540-2	OC-GW-16 DUP	T	Water	SM 4500 H+ B	
360-13540-3	OC-IW-10	T	Water	SM 4500 H+ B	
360-13540-4	OC-GW-101	T	Water	SM 4500 H+ B	
360-13540-5	OC-GW-13	T	Water	SM 4500 H+ B	
360-13540-6	OC-IW-6	T	Water	SM 4500 H+ B	
Prep Batch: 360-26139					
LCS 360-26139/2-A	Lab Control Spike	T	Water	Distill/Ammonia	
MB 360-26139/1-A	Method Blank	T	Water	Distill/Ammonia	
360-13540-1	OC-GW-16	T	Water	Distill/Ammonia	
360-13540-1MS	Matrix Spike	T	Water	Distill/Ammonia	
360-13540-1MSD	Matrix Spike Duplicate	T	Water	Distill/Ammonia	
360-13540-2	OC-GW-16 DUP	T	Water	Distill/Ammonia	
360-13540-3	OC-IW-10	T	Water	Distill/Ammonia	
360-13540-4	OC-GW-101	T	Water	Distill/Ammonia	
360-13540-5	OC-GW-13	T	Water	Distill/Ammonia	
Analysis Batch:360-26168					
LCS 360-26139/2-A	Lab Control Spike	T	Water	10-107-06-1	360-26139
MB 360-26139/1-A	Method Blank	T	Water	10-107-06-1	360-26139
360-13540-1	OC-GW-16	T	Water	10-107-06-1	360-26139
360-13540-1MS	Matrix Spike	T	Water	10-107-06-1	360-26139
360-13540-1MSD	Matrix Spike Duplicate	T	Water	10-107-06-1	360-26139
360-13540-2	OC-GW-16 DUP	T	Water	10-107-06-1	360-26139
360-13540-3	OC-IW-10	T	Water	10-107-06-1	360-26139
360-13540-4	OC-GW-101	T	Water	10-107-06-1	360-26139
360-13540-5	OC-GW-13	T	Water	10-107-06-1	360-26139
Prep Batch: 360-26351					
LCS 360-26351/2-A	Lab Control Spike	T	Water	Distill/Ammonia	
MB 360-26351/1-A	Method Blank	T	Water	Distill/Ammonia	
360-13540-6	OC-IW-6	T	Water	Distill/Ammonia	
Analysis Batch:360-26356					
LCS 360-26351/2-A	Lab Control Spike	T	Water	10-107-06-1	360-26351
MB 360-26351/1-A	Method Blank	T	Water	10-107-06-1	360-26351
360-13540-6	OC-IW-6	T	Water	10-107-06-1	360-26351

Report Basis
T = Total

Client: Olin Corporation

Job Number: 360-13540-1

Method Blank - Batch: 360-26028

Method: 8260B
Preparation: 5030B

Lab Sample ID: MB 360-26028/3
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/21/2007 2149
Date Prepared: 11/21/2007 2149

Analysis Batch: 360-26028
Prep Batch: N/A
Units: ug/L

Instrument ID: Agilent 5890+/5973 GC/MS
Lab File ID: V00777.D
Initial Weight/Volume: 25 mL
Final Weight/Volume: 25 mL

Analyte	Result	Qual	MDL	RL
2,4,4-Trimethyl-1-pentene	ND		0.20	1.0
2,4,4-Trimethyl-2-pentene	ND		0.20	1.0

Surrogate	% Rec	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	90	70 - 130
4-Bromofluorobenzene	81	70 - 130
Dibromofluoromethane	107	70 - 130
Toluene-d8 (Surr)	103	70 - 130

Lab Control Spike/
Lab Control Spike Duplicate Recovery Report - Batch: 360-26028

Method: 8260B
Preparation: 5030B

LCS Lab Sample ID: LCS 360-26028/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/21/2007 2042
Date Prepared: 11/21/2007 2042

Analysis Batch: 360-26028
Prep Batch: N/A
Units: ug/L

Instrument ID: Agilent 5890+/5973 GC/MS
Lab File ID: V00774.D
Initial Weight/Volume: 25 mL
Final Weight/Volume: 25 mL

LCSD Lab Sample ID: LCSD 360-26028/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/21/2007 2105
Date Prepared: 11/21/2007 2105

Analysis Batch: 360-26028
Prep Batch: N/A
Units: ug/L

Instrument ID: Agilent 5890+/5973 GC/M
Lab File ID: V00775.D
Initial Weight/Volume: 25 mL
Final Weight/Volume: 25 mL

Analyte	% Rec. LCS	LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
2,4,4-Trimethyl-1-pentene	82	85	70 - 130	3	25		
2,4,4-Trimethyl-2-pentene	91	98	70 - 130	7	25		

Surrogate	LCS % Rec	LCSD % Rec	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	83	78	70 - 130
4-Bromofluorobenzene	98	92	70 - 130
Dibromofluoromethane	93	91	70 - 130
Toluene-d8 (Surr)	96	95	70 - 130

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

Client: Olin Corporation

Job Number: 360-13540-1

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 360-26028

Method: 8260B
Preparation: 5030B

MS Lab Sample ID:	360-13540-1	Analysis Batch: 360-26028	Instrument ID: Agilent 5890+/5973 GC/M
Client Matrix:	Water	Prep Batch: N/A	Lab File ID: V00794.D
Dilution:	10		Initial Weight/Volume: 25 mL
Date Analyzed:	11/22/2007 0408		Final Weight/Volume: 25 mL
Date Prepared:	11/22/2007 0408		

MSD Lab Sample ID:	360-13540-1	Analysis Batch: 360-26028	Instrument ID: Agilent 5890+/5973 GC/MS
Client Matrix:	Water	Prep Batch: N/A	Lab File ID: V00795.D
Dilution:	10		Initial Weight/Volume: 25 mL
Date Analyzed:	11/22/2007 0431		Final Weight/Volume: 25 mL
Date Prepared:	11/22/2007 0431		

Analyte	% Rec. MS	% Rec. MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
2,4,4-Trimethyl-1-pentene	48	46	70 - 130	1	30	F	F
2,4,4-Trimethyl-2-pentene	89	73	70 - 130	13	30		

Surrogate	MS % Rec	MSD % Rec	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	80	81	70 - 130
4-Bromofluorobenzene	90	89	70 - 130
Dibromofluoromethane	99	99	70 - 130
Toluene-d8 (Surr)	107	103	70 - 130

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

Client: Olin Corporation

Job Number: 360-13540-1

Method Blank - Batch: 360-26107

Method: 8260B
Preparation: 5030B

Lab Sample ID: MB 360-26107/3
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/23/2007 1403
Date Prepared: 11/23/2007 1403

Analysis Batch: 360-26107
Prep Batch: N/A
Units: ug/L

Instrument ID: Agilent 5890+/5973 GC/MS
Lab File ID: V00801.D
Initial Weight/Volume: 25 mL
Final Weight/Volume: 25 mL

Analyte	Result	Qual	MDL	RL
2,4,4-Trimethyl-1-pentene	ND		0.20	1.0
2,4,4-Trimethyl-2-pentene	ND		0.20	1.0

Surrogate	% Rec	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	83	70 - 130
4-Bromofluorobenzene	81	70 - 130
Dibromofluoromethane	99	70 - 130
Toluene-d8 (Surr)	98	70 - 130

Lab Control Spike/ Lab Control Spike Duplicate Recovery Report - Batch: 360-26107

Method: 8260B
Preparation: 5030B

LCS Lab Sample ID: LCS 360-26107/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/23/2007 1257
Date Prepared: 11/23/2007 1257

Analysis Batch: 360-26107
Prep Batch: N/A
Units: ug/L

Instrument ID: Agilent 5890+/5973 GC/MS
Lab File ID: V00798.D
Initial Weight/Volume: 25 mL
Final Weight/Volume: 25 mL

LCSD Lab Sample ID: LCSD 360-26107/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/23/2007 1319
Date Prepared: 11/23/2007 1319

Analysis Batch: 360-26107
Prep Batch: N/A
Units: ug/L

Instrument ID: Agilent 5890+/5973 GC/M
Lab File ID: V00799.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	97	89	70 - 130	8	25		
2,4,4-Trimethyl-2-pentene	104	98	70 - 130	6	25		

Surrogate	LCS % Rec	LCSD % Rec	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	80	77	70 - 130
4-Bromofluorobenzene	99	92	70 - 130
Dibromofluoromethane	92	89	70 - 130
Toluene-d8 (Surr)	88	92	70 - 130

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

Client: Olin Corporation

Job Number: 360-13540-1

Method Blank - Batch: 360-25951

Method: 8270C
Preparation: 3510C

Lab Sample ID: MB 360-25951/1-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/26/2007 2016
Date Prepared: 11/20/2007 1616

Analysis Batch: 360-26286
Prep Batch: 360-25951
Units: ug/L

Instrument ID: Agilent 6890/5973 GC/MS
Lab File ID: B7386.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	0.13	5.0
N-Nitrosodiphenylamine	ND		0.21	5.0

Surrogate	% Rec	Acceptance Limits
2,4,6-Tribromophenol	55	15 - 110
2-Fluorobiphenyl	73	30 - 130
2-Fluorophenol	29	15 - 110
Nitrobenzene-d5	86	30 - 130
Phenol-d5	17	15 - 110
Terphenyl-d14	85	30 - 130

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

Client: Olin Corporation

Job Number: 360-13540-1

Lab Control Spike/
Lab Control Spike Duplicate Recovery Report - Batch: 360-25951

Method: 8270C
Preparation: 3510C

LCS Lab Sample ID: LCS 360-25951/2-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/26/2007 2037
Date Prepared: 11/20/2007 1616

Analysis Batch: 360-26286
Prep Batch: 360-25951
Units: ug/L

Instrument ID: Agilent 6890/5973 GC/MS
Lab File ID: B7387.D
Initial Weight/Volume: 1000 mL
Final Weight/Volume: 1.0 mL
Injection Volume:

LCSD Lab Sample ID: LCSD 360-25951/3-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/26/2007 2058
Date Prepared: 11/20/2007 1616

Analysis Batch: 360-26286
Prep Batch: 360-25951
Units: ug/L

Instrument ID: Agilent 6890/5973 GC/MS
Lab File ID: B7388.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	113	97	40 - 140	15	20		
N-Nitrosodiphenylamine	119	108	40 - 140	10	20		

Surrogate	LCS % Rec	LCSD % Rec	Acceptance Limits
2,4,6-Tribromophenol	81	74	15 - 110
2-Fluorobiphenyl	78	72	30 - 130
2-Fluorophenol	29	29	15 - 110
Nitrobenzene-d5	92	88	30 - 130
Phenol-d5	17	16	15 - 110
Terphenyl-d14	86	81	30 - 130

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

Client: Olin Corporation

Job Number: 360-13540-1

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 360-25951

Method: 8270C
Preparation: 3510C

MS Lab Sample ID: 360-13540-1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/26/2007 2140
Date Prepared: 11/20/2007 1616

Analysis Batch: 360-26286
Prep Batch: 360-25951

Instrument ID: Agilent 6890/5973 GC/MS
Lab File ID: B7390.D
Initial Weight/Volume: 990 mL
Final Weight/Volume: 1.0 mL
Injection Volume:

MSD Lab Sample ID: 360-13540-1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/26/2007 2201
Date Prepared: 11/20/2007 1616

Analysis Batch: 360-26286
Prep Batch: 360-25951

Instrument ID: Agilent 6890/5973 GC/MS
Lab File ID: B7391.D
Initial Weight/Volume: 990 mL
Final Weight/Volume: 1.0 mL
Injection Volume:

Analyte	% Rec. MS	% Rec. MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Bis(2-ethylhexyl) phthalate	109	105	40 - 140	4	20		

Surrogate	MS % Rec	MSD % Rec	Acceptance Limits
2,4,6-Tribromophenol	88	88	15 - 110
2-Fluorobiphenyl	78	78	30 - 130
2-Fluorophenol	31	30	15 - 110
Nitrobenzene-d5	97	98	30 - 130
Phenol-d5	20	19	15 - 110
Terphenyl-d14	79	80	30 - 130

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

Client: Olin Corporation

Job Number: 360-13540-1

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 360-25951

Method: 8270C
Preparation: 3510C

MS Lab Sample ID: 360-13540-1
Client Matrix: Water
Dilution: 10
Date Analyzed: 11/29/2007 1759
Date Prepared: 11/20/2007 1616

Analysis Batch: 360-26286
Prep Batch: 360-25951

Instrument ID: Agilent 6890/5973 GC/MS
Lab File ID: B7413.D
Initial Weight/Volume: 990 mL
Final Weight/Volume: 1.0 mL
Injection Volume:

MSD Lab Sample ID: 360-13540-1
Client Matrix: Water
Dilution: 10
Date Analyzed: 11/29/2007 1821
Date Prepared: 11/20/2007 1616

Analysis Batch: 360-26286
Prep Batch: 360-25951

Instrument ID: Agilent 6890/5973 GC/MS
Lab File ID: B7414.D
Initial Weight/Volume: 990 mL
Final Weight/Volume: 1.0 mL
Injection Volume:

Analyte	% Rec. MS	% Rec. MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
N-Nitrosodiphenylamine	-172	-123	40 - 140	3	20	4	4

Surrogate	MS % Rec	MSD % Rec	Acceptance Limits
2,4,6-Tribromophenol	99	95	15 - 110
2-Fluorobiphenyl	104	104	30 - 130
2-Fluorophenol	27	29	15 - 110
Nitrobenzene-d5	60	71	30 - 130
Phenol-d5	16	18	15 - 110
Terphenyl-d14	83	89	30 - 130

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

Client: Olin Corporation

Job Number: 360-13540-1

Method Blank - Batch: 360-25928

Method: MAVPH
Preparation: 5030B

Lab Sample ID: MB 360-25928/3
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/19/2007 1929
Date Prepared: 11/19/2007 1929

Analysis Batch: 360-25928
Prep Batch: N/A
Units: ug/L

Instrument ID: HP 5890II GC w/ PID/FID
Lab File ID: G09528.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)	84	70 - 130
2,5-Dibromotoluene (pid)	93	70 - 130

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

Client: Olin Corporation

Job Number: 360-13540-1

Lab Control Spike/
Lab Control Spike Duplicate Recovery Report - Batch: 360-25928

Method: MAVPH
Preparation: 5030B

LCS Lab Sample ID: LCS 360-25928/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/19/2007 1645
Date Prepared: 11/19/2007 1645

Analysis Batch: 360-25928
Prep Batch: N/A
Units: ug/L

Instrument ID: HP 5890II GC w/ PID/FID
Lab File ID: G09523.D
Initial Weight/Volume: 5 mL
Final Weight/Volume: 5 mL
Injection Volume:
Column ID: PRIMARY

LCSD Lab Sample ID: LCSD 360-25928/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/19/2007 1718
Date Prepared: 11/19/2007 1718

Analysis Batch: 360-25928
Prep Batch: N/A
Units: ug/L

Instrument ID: HP 5890II GC w/ PID/FID
Lab File ID: G09524.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	94	92	70 - 130	3	25		
Ethylbenzene	92	89	70 - 130	3	25		
m-Xylene & p-Xylene	89	87	70 - 130	3	25		
Methyl tert-butyl ether	83	81	70 - 130	3	25		
Naphthalene	99	98	70 - 130	1	25		
o-Xylene	88	86	70 - 130	2	25		
Toluene	92	90	70 - 130	3	25		
C5-C8 Aliphatics (unadjusted)	109	105	70 - 130	3	25		
C9-C12 Aliphatics (unadjusted)	106	104	70 - 130	3	25		
C9-C10 Aromatics	102	98	70 - 130	4	25		

Surrogate	LCS % Rec	LCSD % Rec	Acceptance Limits
2,5-Dibromotoluene (fid)	83	84	70 - 130
2,5-Dibromotoluene (pid)	78	78	70 - 130

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

Client: Olin Corporation

Job Number: 360-13540-1

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 360-25928

Method: MAVPH
Preparation: 5030B

MS Lab Sample ID: 360-13540-1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/20/2007 0629
Date Prepared: 11/20/2007 0629

Analysis Batch: 360-25928
Prep Batch: N/A

Instrument ID: HP 5890II GC w/ PID/FID
Lab File ID: G09548.D
Initial Weight/Volume: 5 mL
Final Weight/Volume: 5 mL
Injection Volume:
Column ID: PRIMARY

MSD Lab Sample ID: 360-13540-1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/20/2007 0702
Date Prepared: 11/20/2007 0702

Analysis Batch: 360-25928
Prep Batch: N/A

Instrument ID: HP 5890II GC w/ PID/FID
Lab File ID: G09549.D
Initial Weight/Volume: 5 mL
Final Weight/Volume: 5 mL
Injection Volume:
Column ID: PRIMARY

Analyte	% Rec. MS	MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Benzene	90	91	70 - 130	1	50		
Ethylbenzene	83	84	70 - 130	1	50		
m-Xylene & p-Xylene	82	82	70 - 130	1	50		
Methyl tert-butyl ether	82	84	70 - 130	1	50		
Naphthalene	98	98	70 - 130	0	50		
o-Xylene	81	81	70 - 130	1	50		
Toluene	86	86	70 - 130	0	50		
C5-C8 Aliphatics (unadjusted)	96	98	70 - 130	1	50		
C9-C12 Aliphatics (unadjusted)	110	110	70 - 130	0	50		
C9-C10 Aromatics	124	118	70 - 130	4	50		

Surrogate	MS % Rec	MSD % Rec	Acceptance Limits
2,5-Dibromotoluene (fid)	94	91	70 - 130
2,5-Dibromotoluene (pid)	75	74	70 - 130

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

Client: Olin Corporation

Job Number: 360-13540-1

Method Blank - Batch: 360-25988

Method: MAVPH
Preparation: 5030B

Lab Sample ID: MB 360-25988/3
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/20/2007 1914
Date Prepared: 11/20/2007 1914

Analysis Batch: 360-25988
Prep Batch: N/A
Units: ug/L

Instrument ID: HP 5890II GC w/ PID/FID
Lab File ID: G09566.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)	86	70 - 130
2,5-Dibromotoluene (pid)	92	70 - 130

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

Client: Olin Corporation

Job Number: 360-13540-1

Lab Control Spike/
Lab Control Spike Duplicate Recovery Report - Batch: 360-25988

Method: MAVPH
Preparation: 5030B

LCS Lab Sample ID: LCS 360-25988/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/20/2007 1629
Date Prepared: 11/20/2007 1629

Analysis Batch: 360-25988
Prep Batch: N/A
Units: ug/L

Instrument ID: HP 5890II GC w/ PID/FID
Lab File ID: G09561.D
Initial Weight/Volume: 5 mL
Final Weight/Volume: 5 mL
Injection Volume:
Column ID: PRIMARY

LCSD Lab Sample ID: LCSD 360-25988/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/20/2007 1702
Date Prepared: 11/20/2007 1702

Analysis Batch: 360-25988
Prep Batch: N/A
Units: ug/L

Instrument ID: HP 5890II GC w/ PID/FID
Lab File ID: G09562.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	93	89	70 - 130	4	25		
Ethylbenzene	90	87	70 - 130	3	25		
m-Xylene & p-Xylene	87	84	70 - 130	3	25		
Methyl tert-butyl ether	75	73	70 - 130	2	25		
Naphthalene	94	92	70 - 130	2	25		
o-Xylene	85	83	70 - 130	3	25		
Toluene	91	87	70 - 130	4	25		
C5-C8 Aliphatics (unadjusted)	112	107	70 - 130	4	25		
C9-C12 Aliphatics (unadjusted)	110	106	70 - 130	4	25		
C9-C10 Aromatics	96	92	70 - 130	5	25		

Surrogate	LCS % Rec	LCSD % Rec	Acceptance Limits
2,5-Dibromotoluene (fid)	88	87	70 - 130
2,5-Dibromotoluene (pid)	75	75	70 - 130

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

Client: Olin Corporation

Job Number: 360-13540-1

Method Blank - Batch: 360-25887

Method: 6010B
Preparation: N/A

Lab Sample ID: MB 360-25887/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/19/2007 1552
Date Prepared: N/A

Analysis Batch: 360-25887
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: mL

Analyte	Result	Qual	MDL	RL
Iron	ND		14	100

Lab Control Spike/
Lab Control Spike Duplicate Recovery Report - Batch: 360-25887

Method: 6010B
Preparation: N/A

LCS Lab Sample ID: LCS 360-25887/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/19/2007 1549
Date Prepared: N/A

Analysis Batch: 360-25887
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 360-25887/13
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/19/2007 1621
Date Prepared: N/A

Analysis Batch: 360-25887
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	98	80 - 120	1	20		

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

Client: Olin Corporation

Job Number: 360-13540-1

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 360-25887

Method: 6010B
Preparation: N/A

MS Lab Sample ID:	360-13540-1	Analysis Batch: 360-25887	Instrument ID: Varian 720 ES ICP
Client Matrix:	Water	Prep Batch: N/A	Lab File ID: N/A
Dilution:	1.0		Initial Weight/Volume:
Date Analyzed:	11/19/2007 1557		Final Weight/Volume: 10 mL
Date Prepared:	N/A		

MSD Lab Sample ID:	360-13540-1	Analysis Batch: 360-25887	Instrument ID: Varian 720 ES ICP
Client Matrix:	Water	Prep Batch: N/A	Lab File ID: N/A
Dilution:	1.0		Initial Weight/Volume:
Date Analyzed:	11/19/2007 1600		Final Weight/Volume: 10 mL
Date Prepared:	N/A		

	% Rec.						
Analyte	MS	MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Iron	93	93	75 - 125	0	20		

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

Client: Olin Corporation

Job Number: 360-13540-1

Method Blank - Batch: 360-26139

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

Lab Sample ID: MB 360-26139/1-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/27/2007 1620
Date Prepared: 11/27/2007 1443

Analysis Batch: 360-26168
Prep Batch: 360-26139
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: mL
Final Weight/Volume: 50 mL

Analyte	Result	Qual	RL	RL
Ammonia	ND		0.10	0.10

Lab Control Spike - Batch: 360-26139

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

Lab Sample ID: LCS 360-26139/2-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/27/2007 1621
Date Prepared: 11/27/2007 1443

Analysis Batch: 360-26168
Prep Batch: 360-26139
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: mL
Final Weight/Volume: 50 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Ammonia	10.0	8.57	86	85 - 115	

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 360-26139

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

MS Lab Sample ID: 360-13540-1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/27/2007 1627
Date Prepared: 11/27/2007 1443

Analysis Batch: 360-26168
Prep Batch: 360-26139

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: mL
Final Weight/Volume: 50 mL

MSD Lab Sample ID: 360-13540-1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/27/2007 1628
Date Prepared: 11/27/2007 1443

Analysis Batch: 360-26168
Prep Batch: 360-26139

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: mL
Final Weight/Volume: 50 mL

Analyte	% Rec. MS	% Rec. MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Ammonia	96	93	75 - 125	2	20		

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

Client: Olin Corporation

Job Number: 360-13540-1

Method Blank - Batch: 360-26351

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

Lab Sample ID: MB 360-26351/1-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 12/03/2007 1214
Date Prepared: 12/03/2007 0922

Analysis Batch: 360-26356
Prep Batch: 360-26351
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: mL
Final Weight/Volume: 50 mL

Analyte	Result	Qual	RL	RL
Ammonia	ND		0.10	0.10

Lab Control Spike - Batch: 360-26351

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

Lab Sample ID: LCS 360-26351/2-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 12/03/2007 1215
Date Prepared: 12/03/2007 0922

Analysis Batch: 360-26356
Prep Batch: 360-26351
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: mL
Final Weight/Volume: 50 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Ammonia	10.0	9.27	93	85 - 115	

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

Client: Olin Corporation

Job Number: 360-13540-1

Lab Control Spike - Batch: 360-25786

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

Lab Sample ID: LCS 360-25786/14
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/16/2007 0935
Date Prepared: N/A

Analysis Batch: 360-25786
Prep Batch: N/A
Units: SU

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

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
pH	6.00	6.010	100	90 - 110	

Duplicate - Batch: 360-25786

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

Lab Sample ID: 360-13540-1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 11/16/2007 0942
Date Prepared: N/A

Analysis Batch: 360-25786
Prep Batch: N/A
Units: SU

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

Analyte	Sample Result/Qual	Result	RPD	Limit	Qual
pH	5.91	5.960	1	20	

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

VPH SAMPLE INFORMATION DATA

SAMPLE INFORMATION

Sample ID: 13540-1 Batch# **25928**

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	[X] Received at 4°C ± 2°C	[X] Other:	6.6 & 6.2°C			

Sample ID: 13540-1 MS Batch# **25928**

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	[X] Received at 4°C ± 2°C	[X] Other:	6.6 & 6.2°C			

Sample ID: 13540-1 MSD Batch# **25928**

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	[X] Received at 4°C ± 2°C	[X] Other:	6.6 & 6.2°C			

VPH SAMPLE INFORMATION DATA

SAMPLE INFORMATION

Sample ID: 13540-2 Batch# **25928**

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	[x] Received at 4°C ± 2°C	[x] Other:	6.6 & 6.2°C			

Sample ID: 13540-3 Batch# **25928**

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	[x] Received at 4°C ± 2°C	[x] Other:	6.6 & 6.2°C			

Sample ID: 13540-4 Batch# **25928**

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	[x] Received at 4°C ± 2°C	[x] Other:	6.6 & 6.2°C			

VPH SAMPLE INFORMATION DATA

SAMPLE INFORMATION

Sample ID: 13540-5 Batch# **25988**

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	[X] Received at 4°C ± 2°C	[X] Other:	6.6 & 6.2°C			

Sample ID: 13540-6 Batch# **25988**

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	[X] Received at 4°C ± 2°C	[X] Other:	6.6 & 6.2°C			

Sample ID: 13540-7 Batch# **25988**

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	[X] Received at 4°C ± 2°C	[X] Other:	6.6 & 6.2°C			

Login Sample Receipt Check List

Client: Olin Corporation

Job Number: 360-13540-1

Login Number: 13540
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	6.6 C / 5.2 C / 6.2 C received same day sampling
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
STL-WESTFIELD

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

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

Project #: 63000600.10
Project Manager: Peter Thompson
Work ID: Plant B
Contact: David Chapman

Job#: 260 - 3540 | Quote# | PO#

Requested Turn Around Time
10 Business Day (Std) XX | Rush TAT Requested:
15 Business Day | 24 hrs | 72 hrs
Other | 48 hrs | 5 Day

Regulatory Classification / Special Report Format
NPDES | Drinking Water | DEP Form(s)
RCRA | MCP GW1/S1 | MWRA Smart Rpt
Other | MCP QA/QC Rpt XX

Shaded areas for office use

Analysis Requested
Check analysis and specify method and analytes in comments section.
For example:
500-series for drinking water
600-series for waste water
8000-series for haz/solid waste
Use comments section to further define.

Comments
(Special Instructions)

MCP case narrative

Sample Type Codes
WW-Wastewater DW-Drinking water SW-Surfacewater
LW-Labwater GW-Groundwater A-Air
S-Solid / Soil SL-Sludge O-Oil Z-Other

Sample ID	Sample Type	Sampler's Initials	Date Time Collected	Grab	Comp.	# Containers	Plastic(P) or Glass(G)	Preservative: NaHSO4/MeOH	HNO3 to pH <2	H2SO4 to pH <2	HCl to pH <2	NaOH to pH >12	NAOH/ZNAC	None / 4° C	8260	VPH	8270	Ammonia	Iron by 6010	pH	Other	Other	Other	Other	Other	Other	Other
GW-16	GW	DLC	11/15/07 9:30	X		12	VG		1	1	7			3	X	X	X	X	X	X							
GW-16 DUP	GW	DLC	11/15/07 9:30	X																							
GW-16MS	GW	DLC	11/15/07 9:30																								
GW-16MSD	GW	DLC	11/15/07 9:30																								
IW-10	GW	DLC	11/15/07 11:55																								
GW-101	GW	TRIP DLC	11/15/07 12:00																								
GW-13	GW	DLC	11/15/07 13:00																								
IW-6	GW	TRIP	11/15/07 13:40																								

8260 Compounds Only:
2,4,4 Trimethyl-1-pentene
2,4,4 Trimethyl-2-pentene

8270 Comounds Only:
NDPA
BEHP

11/15/07 KMP
11/15/07 KMP
Hot Box 4.7 16.6°

Sampled by (print): David Chapman / Tom Hanlon
Signature:

Relinquished by: David Chapman Date: 11/15/07 Time: 14:15
Received by: Date: 11/15/07 Time: 1415

Relinquished by: Date: 11/15/07 Time: 1630
Received by: Date: 11/15/07 Time: 1630

Method of shipment:

TestAmerica-Westfield

Cooler ? Y / N Samples Iced Y / N
Temp @ receipt: 6.1 6.4 5.2 6.2 °C
Preservation/pH checked
By: KMP Date: 11/15/07

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

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

Reviewer/Date [signature] 12/17/07
Sr. Review/Date Chris Ricardi 12/20/07
Lab Report # 360-13540-1
Project # 63000C0011.61.1

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

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

1.5.1 Were the correct bottles and preservatives used? **Yes** [✓] No [ ] N/A [ ] Comments:

Water - 1 Liter amber bottle/cool to 4°C
Soil - 8 oz soil jar/cool to 4°C

ACTION: If no, inform senior chemist. Document justification for change in container/volume (if applicable), qualify positive and non-detect data (J) if cooler temperature exceeds 10°C. Rejection of data requires professional judgment.

1.5.2 Were all samples delivered to the laboratory without breakage? **Yes** [✓] No [ ] N/A [ ] Comments:

1.5.3 Does the *Cooler Receipt Form* or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data? Yes [ ] **No** [✓] N/A [ ] Comments:

1.6 Sample Results Section: *Was the following information supplied in the laboratory report for each sample?* **Yes** [✓] No [ ] N/A [ ] Comments:

☑ Field ID and Lab ID ☑ *Date and time collected* ☑ Analyst Initials ☑ *Dilution Factor* ☑ % moisture or solids ☑ *Reporting limits*
☑ *Clean-up method* ☑ Analysis method ☑ *Preparation method* ☑ *Date of preparation/extraction/digestion clean-up and analysis, where applicable*
☑ Matrix ☑ Target analytes and concentrations ☑ Units (soils must be reported in dry weight)

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

1.7 QA/QC Information: Was the following information provided in the laboratory report for each sample batch? **Yes** [✓] No [ ] N/A [ ] Comments:

☑ Method blank results ☑ LCS recoveries ☑ MS/MSD recoveries and RPDs ☑ Surrogate recoveries

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

2.0 Holding Times Yes [ ] **No** [✓] N/A [ ] Comments:

Have any technical holding times, determined from date of collection to date of analysis, been exceeded?

NOTE: For water samples, the holding time is 7 days from sampling to extraction and 40 days from extraction to analysis. For soil samples, the holding time is 14 days from sampling to extraction and 40 days from extraction to analysis.

ACTION: If technical holding times are exceeded, qualify all positive results (J) and non-detects (UJ). For water samples that are grossly exceeded (>2X hold time) reject (R) all non-detect results. For soil samples professional judgement will be used to determine if rejection is necessary.

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

3.1 Was the correct laboratory method used?

Water Extraction	3510C or *3520C*
Soil Extraction	*3540C* or 3550B
Semi-volatile Organics	8270C

ACTION: If no, contact project manager to inform Client of change; request variance from Client; contact laboratory to provide justification for method change compared to the requested method.

3.2 Are the practical quantitation limits the same as those specified by the ☐ SOW ☑ QAPP ☐ Lab? **Yes** [✓] No [ ] N/A [ ] Comments:

NOTE: *The QAPP and MADEP QA/QC Guidelines provides PQLs for semi-volatile organic compounds. Verify proper PQLs were used for each data set.*

ACTION: If no, evaluate change with respect to sample matrix, preparation, dilution, moisture, etc. If sample PQL is indeterminate, contact lab for explanation.

3.3 Are the appropriate parameter results present for each sample in the SDG? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, check Request for Analysis to verify if method was ordered and COC to verify that it was sent, and contact lab for resubmission of the missing data

3.4 Were Tentatively Identified Compounds (TICs) reported? **Yes** [ ] No [✓] N/A [ ] Comments:

NOTE *TICs are only required for samples with full MADEP target list. Determine if TICs are required. MADEP requires that all TICs be reported to the LCS. Per the MADEP guidance, TICs, which are identified as aliphatic hydrocarbons, do not have to be reported as TICs. However, these compounds must be evaluated as part of the health-based risk assessment approach (VPH/EPH).*

ACTION*: Qualify reported TIC results as estimated and flag (NJ).*

3.5 If *dilutions were required, were dilution factors reported?* **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact the lab for submission.

4.0 Method Blanks

4.1 Is the Method Blank Summary present? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, call the laboratory for submission of missing data.

4.2 For the analysis of SVOCs, has a method blank been analyzed for each analysis batch of field samples of 20 or less? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, document discrepancy in case narrative and contact lab for justification. Consult senior chemist for action needed.

4.3 Is the method blank less than the PQL?

Yes [ ] No [✓] N/A [ ] Comments: Bis(2-ethylhexyl)phthalate at 0.55 µg/L. At 10x blank (5.5). The result for bis(2-ethylhexyl)phthalate in samples OC-GW-16

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: OC-GW-16 DUP
OC-IW-10
OC-IW-6
are less than RL and were qualified non-detect (U).

For the common contaminants (phthalates):

If the sample concentration is < 10 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 10 × blank value, no qualification is needed.

For other SVOC contaminants:

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

ACTION: For any blank with positive results, list all contaminants for each method blank, including the concentration detected and the flagging level (flagging level = 5x or 10x the blank value) and the associated samples and qualifiers.

5.0 Laboratory Control Standard

5.1 Was a laboratory control standard run with each analytical batch of 20 samples or less?

Yes [✓] No [ ] N/A [ ] Comments:

ACTION: Call laboratory for LCS form submittal. If data are not available, use professional judgment to determine the usability of sample results associated with that batch.

5.2 Is a LCS Summary Form present? **Yes [✓]** No [ ] N/A [ ] Comments:

ACTION: If no, contact lab for resubmission of missing data.

5.3 Is the recovery of any analyte outside of control limits? Yes [ ] **No [✓]** N/A [ ] Comments:

NOTE: *A full target, second source LCS is required by MADEP.*

NOTE: *MADEP guidelines list LCS recovery limits as 40-140 for base-neutral compounds and 30-130 for the acid compounds. The laboratory must identify analytes that routinely exceed these limits.*

ACTION: If recovery is above the upper limit, qualify all positive sample results within the batch as (J). If recovery is below the lower limit but > 10%, qualify all positive and no-detect results within the batch as (J). If LCS recovery is <10%, non-detect results are rejected (R).

5.4 Are 80% of LCS recoveries within laboratory control limits? **Yes [✓]** No [ ] N/A [ ] Comments:

ACTION: If 80% of LCS recoveries are not within limits, use professional judgment and consult Senior Chemist.

6.0 Matrix Spikes

Matrix spikes may be collected at different frequencies based on monthly, quarterly, or task specific schedules. Confirm spike requirements for each set with the senior chemist.

6.1 Were project specified MS/MSDs collected? List project samples that were spiked. **Yes** [✓] No [ ] N/A [ ] Comments: Sample OC-GW-16 was submitted for MS/MSD analysis.

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: The MS/MSD percent recoveries for N-nitrosodiphenylamine (-172 and -123) are less than the lower QC control limit. Unspiked sample conc is >4x spiking conc. No further action required.

NOTE: $\%R = \frac{(SSR-SR)}{SA} \times 100\%$ Where: SSR = Spiked sample result, SR = Sample result, SA = Spike added

NOTE: *A full target, second source MS/MSD is required by MADEP.*

NOTE: *MADEP guidelines list MS/MSD recovery limits as 40-140 for base-neutral compounds and 30-130 for acid compounds.*

NOTES: 1) If only one of the recoveries for an MS/MSD pair is outside of the control limits, no qualification is necessary. Use professional judgment for the MS/MSD flags.

2) If the MS/MSD was performed by the laboratory on a non-project sample, no qualification is required.

ACTION: MS/MSD flags only apply to the sample spiked. If the recoveries of the MS and MSD exceed the upper control limit, qualify positive results as estimated (J). If the recoveries of the MS and MSD are lower than the lower control limit, qualify both positive results and non-detects (J). If LCS recovery is <10%, non-detect results are rejected (R).

6.5 Are any RPDs for MS/MSD recoveries outside of the QC limits? Yes [ ] **No** [✓] N/A [ ] Comments:

NOTE: RPD = $\frac{S-D}{(S+D)/2}$ x 100% Where: S = MS sample result
D = MSD sample result

NOTE: *MADEP guidelines list MS/MSD RPD limits for water as ≤ 20 and soils as ≤ 30.*

NOTE: Laboratory control limits apply when spiked sample results fall within the normal calibration range. If dilutions are required due to high sample concentrations, the data are evaluated, but no flags are applied.

ACTION: If the RPD exceeds the control limit, qualify positive results and non-detects (J).

7.0 Surrogate Recoveries

Were one or more SVOC surrogate recoveries outside of laboratory limits for any sample or method blank? If yes, were samples re-analyzed? Yes [ ] **No** [✓] N/A [ ] Comments:

NOTE: %R = QD x 100% Where: S = MS sample result
D = MSD sample result

NOTE: *MADEP guidelines list surrogate limits for soils as 30-130% for all surrogates, and for water as 30-130% for base-neutrals and 15-110% for acid surrogates.*

NOTE: Qualify BNE results based upon BNE surrogates and AE results based upon AE surrogates.

ACTION: If recoveries are >10%, but 2 or more from any one fraction (acid or base-neutral) fail to meet QC criteria: (1) For recoveries below the QC limit, qualify non-detects and positives (J), and (2) For recoveries above the QC limit, qualify only positives (J). If any surrogate recovery is <10% (unless the lab QC limits are below

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: Sample CC-GW-16 was submitted with a field duplicate.

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: See attached.

attach to this review.

ACTION: RPD must be ≤50% for soil and water. Qualify data (J) for both sample results if the RPD exceeds 50%.

10.0 Application of Validation Qualifiers

Was any of the data qualified?

Yes [✓] **No** [ ] N/A [ ] Comments:

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

REFERENCES

LAW, 1999, "Final Quality Assurance Project Plan, Olin Wilmington Property, 51 Eames Street, Wilmington, MA", LAW Engineering and Environmental Services, Kennesaw, GA 30144. August 1999.

STL-Westfield, 2002. "Olin – General Chemistry Control Limits (Soil & Water)," Severn Trent Laboratories, Inc., 53 Southampton Road, Westfield, MA, 01085.

U.S. Environmental Protection Agency (USEPA), 1996. "Region 1 EPA-NE Data Validation Guidelines For Evaluating Environmental Analyses"; Quality Assurance Unit Staff; Office of Environmental Measurement and Evaluation; December 1996

MADEP, 2001. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Massachusetts Quality Assurance / Quality Control (QA / QC Requirements," BWSC-CAM, Interim Final Draft, Revision No. 2, 5 October 2001.

MADEP, 2001. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Quality Assurance / Quality Control Guidelines for Sampling, Data Evaluation and reporting Activities, " BWSC-CAM, Section VII, Public Comment Draft, Revision No. 0, 21 December 2001.

SAMPLE ID	ANALYTE	ORIG	DUP	RPD
OC-GW-16	bis (2ethylhexyl) phthalate	ND	ND	0
OC-GW-16	N-nitrosodiphenylamine	210	210	0

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

Reviewer/Date 12/17/07
Sr. Review/Date Chris Ricaurte 12/20/07
Lab Report # 360-13940-1
Project # 63000611.61.1

Note: The following analyses will be evaluated according to the "MADEP QA/QC Guidelines for **Sampling, Data Evaluation and Reporting Activities.**" MADEP, however, may not list QA/QC criteria for every chemical analysis. Where not defined by MADEP, criteria will default to values stipulated in the QAPP. Where the QAPP does not define criteria, QA/QC requirements will default to limits employed by the laboratory.

1.0 Laboratory Deliverable Requirements

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

☑ *Name of Laboratory* ☑ *Address* ☑ *Project ID* ☑ *Phone #* ☑ *Sample identification – Field and Laboratory*

Client Information: ☑ *Name* ☑ *Address* ☑ *Client Contact* *(IDs must be cross-referenced)*

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

1.2 Laboratory Report Certification Statement ***Yes*** [✓] *No* [ ] *N/A* [ ] *Comments:*

Does the laboratory report include a completed Analytical Report Certification in the required format?

ACTION: *If no, contact lab for submission of missing certification or certification with correct format.*

1.3 Laboratory Case Narrative: ***Yes*** [✓] *No* [ ] *N/A* [ ] *Comments:*

☑ *Narrative serves as an exception report for the project and method QA/QC performance.* ☐ *Narrative includes an explanation of each discrepancy on the Certification Statement.*

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

1.4 Chain of Custody (COC) copy present with all documentation completed? **Yes** [✓] No [ ] N/A [ ] Comments:

Does the laboratory report include completed Chain of Custody forms containing all samples in this SDG?

NOTE: Olin receives and maintains the *original* COC.

ACTION: If no, contact lab for submission of copy of completed COC.

1.5 Sample Receipt Information (*Cooler Receipt Form present?*):

Yes [✓] No [ ] N/A [ ] Comments:

Were each of the following tasks completed and recorded upon receipt of the sample(s) into the laboratory?

☑ Sample temperature confirmed: must be 1° – 10° C. (If samples were sent by courier and delivered on the same day as collection, temperature requirement does not apply).

☑ Container type noted ☑ Condition observed ☑ Field and lab IDs cross referenced

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

1.5.1 Were the correct bottles and preservatives used?

Yes [✓] No [ ] N/A [ ] Comments:

Water - 40 mL VOA vial/HCL to pH<2, cool to 4°C
Soil - 5 gram Encore™/cool to 4°C or 40 mL VOA vial with field preservation of sodium bisulfate (low-level) or methanol (high-level) or field preservation in water if soils are reactive to sodium bisulfate (i.e. alkaline conditions, excessive humic acid content, etc.)

ACTION: If no, inform senior chemist. Document justification for change in container/volume (if applicable); qualify both positive data and non-detect data (J) if cooler temperature exceeds 10°C. Rejection of data requires professional judgment

ACTION: If each VOA vial for a sample contains air bubbles or the VOA vial analyzed contained air bubbles, flag positives (J) and reject nondetects (R).

1.5.2 Were all samples delivered to the laboratory without breakage? Yes [✓] No [ ] N/A [ ] Comments:

1.5.3 Does the *Cooler Receipt Form* or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data? Yes [ ] **No** [✓] N/A [ ] Comments:

1.6 Sample Results Section: *Was the following information supplied in the laboratory report for each sample?* Yes [✓] No [ ] N/A [ ] Comments:

☑ Field ID and Lab ID ☑ Date and time collected ☑ Analyst Initials ☑ Dilution Factor ☑ % moisture or solids ☑ Reporting limits
☑ *Clean-up method* ☑ Analysis method ☑ Preparation method ☑ Date of preparation/extraction/digestion clean-up and analysis, where applicable
☑ Matrix ☑ Target analytes and concentrations ☑ Units (soils must be reported in dry weight)

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

1.7 QA/QC Information: Was the following information provided in the laboratory report for each sample batch? Yes [✓] No [ ] N/A [ ] Comments:

☑ Method blank results ☐ LCS recoveries ☑ MS/MSD recoveries and RPDs ☑ Surrogate recoveries

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

2.0 Holding Times

Have any technical holding times, determined from date of collection to date of analysis, been exceeded? Yes [ ] **No [✓]** N/A [ ] Comments:

For water samples, the holding time is 7 days (aromatics) from sampling for unpreserved samples and 14 days for preserved samples.

For soil samples, the holding time is 14 days from sampling if field preserved with sodium bisulfate/methanol/or water. If an Encore™ sampler was used, the lab must ***preserve*** the sample within 48 hours. Analytical holding time from time of preservation is 14 days.

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

ACTION: If technical holding times are exceeded, qualify all positive results (J) and non-detects (UJ). For water samples that are grossly exceeded (>2X hold time) reject (R) all non-detect results. For soil samples professional judgement will be used to determine if rejection is necessary.

3.0 Laboratory Method

3.1 Was the correct laboratory method used? **Yes [✓]** No [ ] N/A [ ] Comments:

Purge and Trap	Water: 5030B	Soil: 5035
Volatile Organics	8260B	

ACTION: If no, contact lab to provide justification for method change compared to the requested method. Contact senior chemist to inform Client of change or to request variance.

3.2 Are the practical quantitation limits the same as those specified by the **Yes [✓]** No [ ] N/A [ ] Comments:
☐ SOW ☑ QAPP ☐ Lab ☐ MADEP

Evaluate PQLs with respect to sample matrix, preparation, dilution, moisture, etc. If sample PQL is indeterminate, contact lab for explanation. Provide a listing of all samples with PQLs that are elevated due to dilution, sample matrix, or preparation factors.

3.3 Are the appropriate parameter results present for each sample in the SDG? Yes [✓] No [ ] N/A [ ] Comments:

NOTE: *The MADEP QA/QC Guidelines requires a minimum compound reporting list for volatile organic compounds. Determine target compound requirement and verify reporting list.*

3.4 Were Tentatively Identified Compounds (TICs) reported? Yes [ ] No [✓] N/A [ ] Comments:

***NOTE**: TICs are only required for samples with full MADEP target list. Determine if TICs are required. MADEP requires that all TICs be reported to the LCS. Per the MADEP guidance, TICs, which are identified as aliphatic hydrocarbons, do not have to be reported as TICs. However, these compounds must be evaluated as part of the health-based risk assessment approach (VPH/EPH).*

***ACTION**: Qualify reported TIC results as estimated and flag (NJ).*

3.5 If *dilutions were required, were dilution factors reported?* Yes [✓] No [ ] N/A [ ] Comments:

NOTE: *MADEP guidance states that if a diluted and an undiluted analysis is performed, the laboratory should report results for the lowest dilution within the valid calibration range for each analyte.*

ACTION: If no, contact the lab for submission.

4.0 Method Blanks

4.1 Are the Method Blank Summaries present? Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If no, call the laboratory for submission of missing data.

4.2 Was a method blank analyzed for each analytical batch of 20 samples or less? Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If no, document discrepancy in case narrative and contact lab for justification. Consult senior chemist for action needed.

4.3 Is the method blank less than the PQL? (See attached table for PQLs). **Yes** [✓] No [ ] N/A [ ] Comments:

NOTE: *MADEP allows common laboratory contaminants (acetone, methylene chloride and 2-butanone) to be present at concentrations < 5x the PQL.*

4.4 Do any method blanks have positive results for VOC parameters? Qualify data according to the following: Yes [ ] **No** [✓] N/A [ ] Comments:

For the common contaminants (methylene chloride, acetone, toluene, and 2-butanone):

If the sample concentration is < 10 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 10 × blank value, no qualification is needed.

For other VOC contaminants:

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

ACTION: If any blank has positive results, list all the concentrations detected and flagging level (flagging level = 10x or 5 × blank value) on the checklist. List all affected samples and their qualifiers.

5.0 Laboratory Control Standards

5.1 Was a laboratory control standard (LCS) run with each analytical batch of 20 samples or less? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, call laboratory for LCS form submittal. If data is not available, use professional judgment to determine qualification actions for data associated with that batch.

5.2 Is a LCS Summary Form present? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact lab for resubmission of missing data.

5.2 Is the recovery of any analyte outside of control limits? Yes [ ] **No** [✓] N/A [ ] Comments:

NOTE: *A full target, second source LCS is required by MADEP.*

NOTE: Use *MADEP guidelines list LCS recovery limits of 70-130.*

ACTION: If recovery is above the upper limit, qualify all positive sample results within the batch as (J). If recovery is below the lower limit but > 10%, qualify all positive and no-detect results within the batch as (J). If LCS recovery is <10%, non-detect results are rejected (R). Document qualified compounds and percent recoveries in the validation report.

5.4 Are 80% of LCS recoveries within laboratory control limits? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If 80% of LCS recoveries are not within limits, use professional judgment and consult Senior Chemist.

6.0 Matrix Spikes

Matrix spikes may be collected at different frequencies based on monthly, quarterly, or task specific schedules. Confirm spike requirements for each set with the senior chemist.

6.1 Were project-specific MS/MSDs collected? List project samples that were spiked.
Yes [✓] No [ ] N/A [ ] Comments: Sample OC-GW-16 was submitted for MS/MSD analysis.

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: The MS/MSD percent recovery for 2,4,4-Trimethyl-1-pentene (4P and 4G) is less than the lower QC limit of 70. The result for 2,4,4-Trimethyl-1-pentene in samples OC-GW-16 and OC-GW-16 DUP (360-135540-1 and -2) were qualified estimated (J).

NOTE: %R = $\frac{(SSR-SR)}{SA} \times 100\%$ Where: SSR = Spiked sample result
SR = Sample result
SA = Spike added

NOTE: *A full target, second source MS/MSD is required by MADEP.*

NOTE: *MADEP guidelines list MS/MSD recovery limits as 70-130.*

NOTES: 1) If only one of the recoveries for an MS/MSD pair is outside of the control limits, no qualification is necessary. Use professional judgment for the MS/MSD flags.
2) If the MS/MSD was performed by the laboratory on a non-project sample, no qualification is required.

ACTION: MS/MSD flags only apply to the sample spiked. If the recoveries of the MS and MSD exceed the upper control limit, qualify positive results as estimated (J). If the recoveries of the MS and MSD are lower than the lower control limit, qualify both positive results and non-detects (J). If recovery is < 10%, reject non-detects (R).

6.5 Are any RPDs for MS/MSD recoveries outside of the QA/QC limits?

Yes [ ] No [✓] N/A [ ] Comments:

NOTE: RPD = $\frac{S-D}{(S+D)/2} \times 100\%$ Where S = MS result
D = MSD result

NOTE: *MADEP guidelines list MS/MSD RPD limits for both water and soils as ≤ 20.*

ACTION: If the RPD exceeds the control limit, qualify positive results and non-detects (J).

7.0 **Surrogate Recoveries**

Were one or more VOC surrogate recoveries outside of laboratory limits for any Yes [ ] No [✓] N/A [ ] Comments:

sample or method blank? If yes, were samples re-analyzed?

NOTE: %R = QD x 100% Where: S = MS sample result
D = MSD sample result

NOTE: No qualification is required if two of the surrogates are within acceptable QC limits. If surrogate recoveries fail due to dilution, results are not flagged. Document on checklist and in the case narrative.

NOTE: *MADEP guidelines list surrogate limits for both water and soils as 70-130%. Surrogate recovery limits greater than ± 30% are allowed for difficult matrices (wastes, sludges, etc.) with appropriate analytical documentation.*

ACTION: If recoveries are >10%, but fail to meet quality control criteria: (1) For recoveries below the QC limit but >10%, qualify nondetects and positives (J), and (2) For recoveries above the QC limit, qualify only positives (J). If any surrogate recovery is <10% (unless the QC limits are below 10%, in which case, results are flagged as stated above), flag positives (J) and reject nondetects (R).

8.0 Sampling Accuracy

8.1 Were trip blanks shipped with VOC samples and analyzed? **Yes [✓]** No [ ] N/A [ ] Comments:

NOTE: *MADEP requires trip blanks per the following frequency:*

	Soil/Sediment	*Aqueous*	*Drinking Water*
Option 1	*Not Required*	*Not Required*	*1 per cooler VOAs/VPH*
Option 3	*1 per 10 samples*	*1 per 10 samples*	*1 per 10 samples*

8.2 Do any trip blanks have positive results? Yes [ ] **No [✓]** N/A [ ] Comments:

ACTION: Prepare a list of samples shipped in the same cooler as a contaminated blank.

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

The majority of ground water samples are collected directly from a tap, process stream, or with dedicated tubing. Rinse blanks will not be collected. **Yes** [ ] No [✓] N/A [ ] Comments:

8.3 Were rinsate blanks collected? Prior to evaluating rinsate blanks, obtain a list of the associated samples from the senior chemist.

NOTE: *MADEP does not specify the collection of rinsate blanks.*

8.4 Do any rinsate blanks have positive results? Yes [ ] **No** [ ] N/A [✓] Comments:

ACTION: Evaluate rinsate results against blank results to determine if contaminant may be laboratory-, ambient-, or shipment-derived. If results are not lab-, ambient-, or shipment-related, qualify according to the table above (8.2).

9.0 Field Duplicates

9.1 Were field duplicate samples collected? Obtain a list of samples and their associated field duplicates. **Yes** [✓] No [ ] N/A [ ] Comments: Sample OC-GW-16 was submitted with a field duplicate.

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: see attached.

ACTION: Qualify data (J) for both sample results if the RPD goal is exceeded.

SAMPLE ID	ANALYTE	ORIG	DUP	RPD
OC-GW-16	2,4,4-trimethyl-1-pentene	330	310	6
OC-GW-16	2,4,4-trimethyl-2-pentene	88	85	3

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.

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

Reviewer/Date 12/17/07
Sr. Review/Date Chris Ricardi 12/20/07
Lab Report # 360-13540-1
LAW Project # 6300006011.61.1

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:** 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) 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 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 ☑ 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 ☑ *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) ☑ 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:

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 parameters 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 "U"

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: Sample QC-GW-16 was submitted for MS/MSD analysis.

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 = Q/D x 100% Where: Q = sample surrogate result
D = surrogate added

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: Sample OC-GW-16 was submitted with a field duplicate

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: See attached.

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

SAMPLE ID	ANALYTE	ORIG	DUP	RPD
OC-GW-16	Benzene	ND	ND	0
OC-GW-16	Ethylbenzene	ND	ND	0
OC-GW-16	m-Xylene & p-Xylene	ND	ND	0
OC-GW-16	Mehtyl tert-butyl ether	ND	ND	0
OC-GW-16	Naphthalene	ND	ND	0
OC-GW-16	o-Xylene	8	7.8	3
OC-GW-16	Toluene	ND	ND	0
OC-GW-16	C5-C8 Aliphatics (unadjusted)	1100	1200	9
OC-GW-16	C9-C12 Aliphatics (unadjusted)	ND	ND	0
OC-GW-16	C5-C8 Aliphatics (adjusted)	1100	1200	9
OC-GW-16	C9-C12 Aliphatics (adjusted)	ND	ND	0
OC-GW-16	C9-C10 Aromatics	ND	ND	0
OC-GW-16	Total VPH	1100	1200	9

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
ICP METALS BY METHOD 6010B/200.7

Reviewer/Date 12/17/07
Sr. Review/Date Chris Reinelt 12/20/07
Lab Report # 360-13540-1
Project # 630006011.61.1

Iron

1.0 Laboratory Deliverable Requirements

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

☑ *Name of Laboratory* ☑ *Address* ☑ *Project ID* ☑ *Phone #* ☑ *Sample identification – Field and Laboratory*
Client Information: ☑ *Name* ☐ *Address* ☑ *Client Contact* *(IDs must be cross-referenced)*

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

1.2 Laboratory Report Certification Statement ***Yes*** [✓] *No* [ ] *N/A* [ ] *Comments:*

Does the laboratory report include a completed Analytical Report Certification in the required format?

ACTION: *If no, contact lab for submission of missing certification or certification with correct format.*

1.3 Laboratory Case Narrative: ***Yes*** [✓] *No* [ ] *N/A* [ ] *Comments:*

☑ *Narrative serves as an exception report for the project and method QA/QC performance.* ☑ *Narrative includes an explanation of each discrepancy on the*

Certification Statement.

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

1.4 Chain of Custody (COC) copy present with all documentation completed **Yes** [✓] No [ ] N/A [ ] Comments:

NOTE: Olin receives and maintains the *original COC.*

ACTION: If no, contact lab for submission of copy of completed *COC.*

1.5 Sample Receipt Information (*Cooler Receipt Form present?*): **Yes** [✓] No [ ] N/A [ ] Comments:

Were each of the following tasks completed and recorded upon receipt of the sample(s) into the laboratory?

☑ Sample temperature confirmed: must be 1° – 10° C. (If samples were sent by courier and delivered on the same day as collection, temperature requirement does not apply).

☑ Container type noted ☑ sample condition observed ☑ pH verified (where applicable) ☑ Field and lab IDs cross referenced

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

1.5.1 Were all samples delivered to the laboratory without breakage? **Yes** [✓] No [ ] N/A [ ] Comments:

1.5.2 Does the *Cooler Receipt Form* or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data? Yes [X] **No** [✓] N/A [ ] Comments: (W) 12/19/07

1.6 Sample Results Section: *Was each of the following requirements supplied in the laboratory report for each sample?* **Yes** [✓] No [ ] N/A [ ] Comments:

☑ Field ID and Lab ID ☑ *Date and time collected* ☑ Analyst Initials ☑ *Dilution Factor* ☑ % moisture or solids ☑ *Reporting limits*
☑ *Clean-up method* ☑ Analysis method ☑ *Preparation method* ☑ *Date of preparation/extraction/digestion clean-up and analysis, where applicable*
☑ Matrix ☑ Target analytes and concentrations ☑ Units (soils must be reported in dry weight)

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

1.7 QA/QC Information: Was each of the following information supplied in the laboratory report for each sample batch? **Yes** [✓] No [ ] N/A [ ] Comments:

☑ Method blank results ☑ LCS recoveries ☑ MS/MSD recoveries and RPDs ☑ Laboratory duplicate results (where applicable)

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

2.0 Holding Times

Have any technical holding times, determined from date of collection to date of analysis, been exceeded? Holding time for metals is 180 days from sample collection to analysis for both water and soil.

Yes [ ] **No [✓]** N/A [ ] Comments:

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

ACTION: If technical holding times are exceeded, qualify all positive results (J) and non-detects (UJ). If grossly exceeded (2X holding time) reject (R) all non-detect results.

3.0 Laboratory Method

3.1 Was the correct laboratory method used?

Yes [✓] No [ ] N/A [ ] Comments:

Water Digestion	3005A or 3010A or 3020A
Soil Digestion	3050B
Metals	6010B or 200.7

ACTION: If no, contact laboratory to provide justification for method change compared to the requested method. Contact senior chemist to inform Client of change and to request variance.

3.2 Are the practical quantitation limits the same as those specified by the ☐ SOW ☑ QAPP ☐ Lab ☐ MADEP

Yes [✓] No [ ] N/A [ ] Comments:

NOTE: *Verify that the reported metals match the target list specified on the COC.*

ACTION: If no, evaluate variation with respect to sample matrix, preparation, dilution, moisture, etc. If sample PQL is indeterminate, contact lab for explanation.

3.3 Are results present for each sample in the SDG? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, check Request for Analysis to verify if method was ordered and COC to verify that it was sent, and contact lab for resubmission of the missing data

3.4 If dilutions were required, were dilution factors reported? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact the lab for submission.

4.0 Method Blanks

4.1 Is the Method Blank Summary present? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, call the laboratory for submission of missing data.

4.2 Frequency of Analysis: Was a method blank analyzed for each digestion batch of < 20 field samples? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact laboratory for justification. Consult senior chemist for action needed. Narrate non-compliance.

4.3 Is the method blank less than the PQLs for all target elements? **Yes** [✓] No [ ] N/A [ ] Comments:

NOTE: *MADEP requires the method blank to be matrix matched and digested with the samples*

4.4 Do any method blanks have positive results for metals? Qualify data according to the following: Yes [ ] **No** [✓] N/A [ ] Comments:

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

ACTION: For any blank with positive results, list all contaminants for each method blank including the concentration detected and the flagging level (flagging level = 5x the blank value) and the associated samples and qualifiers.

5.0 Laboratory Control Standard

5.1 Was a laboratory control standard run with each analytical batch of 20 samples or less? **Yes** [✓] No [ ] N/A [ ] Comments:

NOTE: *A full target, second source LCS is required by MADEP.*
ACTION: Call laboratory for LCS form submittal. If data are not available, use professional judgement to evaluate data accuracy associated with that batch.

5.2 Is a LCS Summary Form present? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact lab for resubmission of missing data.

5.3 Is the recovery of any analyte outside of MADEP control limits? Yes [ ] **No** [✓] N/A [ ] Comments:

Sample Type	*MADEP % Rec*
Water	*80-120*
Soil	within Lab generated limits

ACTION: If recovery is above the upper limit, qualify all positive sample results within the batch as (J). If recovery is below the lower limit, qualify all positive and non-detects results within the batch as (J). If LCS recovery is <30%, positive and non-detect results are rejected (R).

Comments:

6.0 Matrix Spikes

Matrix spikes may be collected at different frequencies based on monthly, quarterly, or task specific schedules. Confirm spike requirements for each set with the senior chemist.

6.1 Were project-specific MS/MSDs collected? List project samples that were spiked.

Yes [✓] No [ ] N/A [ ] Comments: Sample OC-GW-16 was submitted for MS/MSD analysis.

ACTION: If no, contact senior chemist to see if any were specified.

6.2 Is the Matrix Spike/Matrix Spike Duplicate Recovery Form present?

Yes [✓] No [ ] N/A [ ] Comments:

NOTE: *A full target, second source MS/MSD is required by MADEP.*
ACTION: If any matrix spike data are missing, call lab for resubmission.

6.3 Were matrix spikes analyzed as indicated on the COC and project schedule?

Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If any matrix spike data are missing, call lab for resubmission. If none, no qualification is needed. Narrate non-compliance.

6.4 Are any metal spike recoveries outside of the QC limits?

Yes [ ] No [✓] N/A [ ] Comments:

Sample Type	***MADEP % Rec***	QAPP % Rec	Method
Water	*75-125*	N/A	6010B
Water	*N/A*	70-130	200.7
Soil	*75-125*	75-125	6010B

NOTE: $\%R = \frac{(SSR-SR)}{SA} \times 100\%$ Where: SSR = Spiked sample result, SR = Sample result, SA = Spike added

NOTE: If dilutions are required due to high sample concentrations (> 4X spike), the data are evaluated, but no flags are applied.

NOTE: If only one of the recoveries for an MS/MSD pair is outside of the control limits, no qualification is necessary. Use professional judgment for the MS/MSD flags.

ACTION: MS/MSD flags only apply to the sample spiked. If the recoveries of the MS and MSD exceed the upper control limit, qualify positive results as estimated (J). If the recoveries of the MS and MSD are lower than the lower control limit, qualify positive results and non-detects (J).

6.5 Are any RPDs for MS/MSD recoveries outside of the QC limits? Yes [ ] **No** [✓] N/A [ ] Comments:

NOTE: $RPD = \frac{S-D}{(S+D)/2} \times 100\%$ Where: S = MS sample result
D = MSD sample result

NOTE: If dilutions are required due to high sample concentrations, the data are evaluated, but no flags are applied.

ACTION: If the RPD exceeds the control limit, qualify positive results and non-detects (J).

7.0 Laboratory Duplicate

7.1 Was a laboratory duplicate sample analyzed? If so, is the Laboratory Duplicate Sample Form present? **Yes** [ ] No [✓] N/A [ ] Comments:

NOTE: *MADEP refers to this sample as a "matrix duplicate".*

ACTION: If not analyzed, qualification is not needed. If data is missing, contact laboratory for resubmission of report. Narrate non-compliance.

7.2 Is the RPD between the result for the laboratory duplicate sample and the result for the parent sample outside of the QA/QC limits? Yes [ ] **No** [ ] N/A [✓] Comments:

MADEP Laboratory Duplicate Sample RPD Criteria:	QAPP RPD
For aqueous results > 5× RL, RPD must be ± 20%	20
For aqueous results < 5× RL, RPD must be ≤ RL	20
For soil/sediment results > 5× RL, RPD must be ± 35%	20
For soil/sediment results < 5× RL, RPD must be ≤ 2× RL	20

ACTION: If the RPD exceeds the limits, qualify both positive results and non-detects as estimated and flag them J. Narrate non-compliance

8.0 Sampling Accuracy

The majority of ground water samples are collected directly from a tap, process stream, or with dedicated tubing. Rinse blanks will not be collected.

8.1 Were rinsate blanks collected? Prior to evaluating rinsate blanks, obtain a list of the associated samples from the senior chemist.

Yes [ ] No [✓] N/A [ ] Comments:

8.2 Do any rinsate blanks have positive results?

Yes [ ] No [ ] N/A [✓] Comments:

***NOTE:** MADEP does not require the collection of rinsate blanks.*

ACTION: Evaluate rinsate results against blank results to determine if contaminant may be laboratory-derived. If results are not lab-related, qualify according to below.

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

9.0 Field Duplicates

9.1 Were field duplicate samples collected? Obtain a list of samples and their associated field duplicates.

Yes [✓] No [ ] N/A [ ] Comments: Sample OC-GW-16 was submitted with a field duplicate.

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:

Sample conc (µg/L) | Dup conc. (µg/L) | RPD
~~1,000~~ 1,000 | 902 | 10

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.

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OLIN-WILMINGTON
LEVEL I DATA QUALITY EVALUATION
STANDARD OPERATING PROCEDURE AND CHECKLIST
WET CHEMISTRY PARAMETERS BY VARIOUS METHODS

Reviewer/Date [illegible] 12/17/07
Sr. Review/Date Chris Ricardi 12/20/07
Lab Report # 360-13540-1
Project # 03 0006 0011.01.1

Ammonia, pH

Note: The following analyses will be evaluated according to the "MADEP QA/QC Guidelines for **Sampling, Data Evaluation and Reporting Activities.**" MADEP, however, may not list QA/QC criteria for every chemical analysis. Where not defined by MADEP, criteria will default to values stipulated in the QAPP. Where the QAPP does not define criteria, QA/QC requirements will default to limits employed by the laboratory.

1.0 Laboratory Deliverable Requirements

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

☑ *Name of Laboratory* ☑ *Address* ☑ *Project ID* ☑ *Phone #* ☑ *Sample identification – Field and Laboratory*
Client Information: ☑ *Name* ☑ *Address* ☑ *Client Contact* *(IDs must be cross-referenced)*

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

1.2 Laboratory Report Certification Statement ***Yes*** [✓] *No* [ ] *N/A* [ ] *Comments:*

Does the laboratory report include a completed Analytical Report Certification in the required format?

***ACTION**: If no, contact lab for submission of missing certification or certification with correct format.*

1.3 Laboratory Case Narrative: ***Yes*** [✓] *No* [ ] *N/A* [ ] *Comments:*

☑ *Narrative serves as an exception report for the project and method QA/QC performance.* ☑ *Narrative includes an explanation of each discrepancy on the Certification Statement.*

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

1.4 Chain of Custody (COC) copy present with all documentation completed? **Yes** [✓] No [ ] N/A [ ] Comments:

Does the laboratory report include copies of Chain of Custody forms containing all samples in this SDG?

NOTE: Olin receives and maintains the *original* COC.

ACTION: If no, contact lab for submission of copy of missing completed COC.

1.5 Sample Receipt Information (*Cooler Receipt Form*): Were each of the following tasks completed and recorded upon receipt of the sample(s) into the laboratory?

Yes [✓] No [ ] N/A [ ] Comments:

☑ Sample temperature confirmed: must be 1° – 10° C. (If samples were sent by courier and delivered on the same day as collection, temperature requirement does not apply).

☑ Container type noted ☑ Condition observed ☑ pH verified (where applicable) ☐ Field and lab IDs cross referenced

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

1.5.1 Were the correct bottles and preservatives used?

Yes [✓] No [ ] N/A [ ] Comments:

Ammonia,– 1 Liter polyethylene/H_2SO_4 to pH<2,cool to 4°C

Oil & Grease – 1 Liter glass/HCL 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
- [✓] Dilution Factor
- [NA] % 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
- [NA] Laboratory duplicate results (where applicable)

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

2.0 Holding Times Yes [✓] **No** [ ] N/A [ ] Comments: The lab analyzed pH one day beyond hold time. Result for pH were qualified estimated (J).

Have any technical holding times, determined from date of collection to date of analysis, been exceeded? The holding times are as follows:

- [✓] 28 days = ammonia, chemical oxygen demand, chloride, organic carbon, oil & grease, specific conductance, total organic carbon and sulfate
- Alkalinity = 14 days
- Sulfide, TDS, TSS = 7 days
- [X] pH = analyze immediately
- Nitrate nitrogen as N = 48 hrs
- Nitrite nitrogen as N = 48 hrs
- Nitrate + Nitrite as N = 28 days

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

ACTION: If technical holding times are exceeded qualify results (J). For water samples that are grossly exceeded (>2X hold time) reject (R) all non-detect results. Professional judgment used to qualify soils.

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

3.1 Was the correct laboratory method used?

ACTION: If no, contact lab to provide justification for method change compared to the requested method. Contact senior chemist to inform Client of change or to request variance.

3.2 Are the practical quantitation limits the same as those specified by the ☐ 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.

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: Sample OG-GW-16 was submitted for MS/MSD analysis.

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*(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

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

9.1 Were field duplicate samples collected? Obtain a list of samples and their associated field duplicates. **Yes** [✓] No [ ] N/A [ ] Comments: Sample OC-GW-16 was submitted with a field duplicate.

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: See attached.

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:

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

SAMPLE ID	ANALYTE	ORIG	DUP	RPD
OC-GW-16	Ammonia	6.9	6.9	0
OC-GW-16	pH	5.91	6.01	2

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 First Quarter 2008 Sampling Event

MACTEC

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To: Steve Morrow
From: Chris Ricardi
Date: April 16, 2008
Subject: Interim Response Steps Work Plan
Slurry Wall/Cap Monitoring Program 1Q08 - March 2008

DATA VALIDATION REPORT
MARCH 2008 SLURRY WALL / CAP SURFACE WATER AND GROUNDWATER
OLIN CHEMICAL SUPERFUND SITE
WILMINGTON, MASSACHUSETTS
TestAmerica Laboratories Data Sets 360-15366-1 and 360-15388-1

1.0 INTRODUCTION

Surface water and groundwater samples were collected from the Olin Chemical Superfund Site on March 5 and March 6, 2008. Samples were analyzed by TestAmerica Laboratories in Westfield, Massachusetts. Data were reported in sample delivery groups (SDG) 360-15366-1 and 360-15388-1. 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 300.0, and specific conductance by SM18 SM 2510B

The Olin Wilmington Quality Assurance Project Plan 1999 (QAPP) was 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.

With the exception of the data qualification items discussed in the sections below, results are determined to be usable as reported by the laboratory.

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

Matrix Spikes

Surface water sample OC-SD-17 (total fraction) was used as a MS/MSD. The percent recovery of sodium is below the lower control limit of 75 in the MS (67) and MSD (74). Sodium was qualified estimated (J) in sample OC-SD-17 (total fraction).

Field Duplicates

The Relative Percent Difference (RPD) for the aluminum results (total) for sample OC-SD-17 and field duplicate sample OC-SD-17 DUP (51) is above the control limit of 50. The total aluminum results are qualified estimated (J) in sample OC-SD-17 and OC-SD-17 DUP.

Sample Result Verification

The sodium concentration reported in dissolved samples was greater than ten percent higher than the concentration reported in the total fraction for the following surface water samples: OC-PZ-16RR, OC-ISCO-1, OC-PZ-18R, OC-ISCO-3, OC-ISCO-2, and OC-SD-17. Sodium was qualified estimated (J) in the total and dissolved fraction 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
* Laboratory Control Sample
* Detection limits
* Sample Result Verification / Electronic Evaluation Verification

* = indicates that criteria were met for this parameter

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

4/19/08
Date

M J Murphy

Michael Murphy
Project Principal

4/19/08
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, 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), 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 - 360-15366 & 360-15388
Data Validation Report
March 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	(Lachat 10-107-06-1) EPA 350.1	40CFR136A 300.0	40CFR136A 300.4	SM18 2510B
Groundwater									
360-15366-1	GW-202S	OC-GW-202S	3/5/2008		2	1	2		1
360-15366-2	GW-79S	OC-GW-79S	3/5/2008		2	1	2		1
360-15366-3	PZ-16RR	OC-PZ-16RR	3/5/2008		2	1	2		1
360-15366-4	PZ-17RR	OC-PZ-17RR	3/5/2008		2	1	2		1
360-15366-5	GW-25	OC-GW-25	3/5/2008		2	1	2		1
360-15366-6	GW-25	OC-GW-25DUP	3/5/2008		2	1	2		1
360-15366-7	PZ-18R	OC-PZ-18R	3/5/2008		2	1	2		1
Surface Water									
360-15388-1	PZ-16RR	OC-PZ-16RR	3/6/2008	3	3	1	2	2	1
360-15388-2	PZ-17RR	OC-PZ-17RR	3/6/2008	3	3	1	2	2	1
360-15388-3	ISCO-1	OC-ISCO-1	3/6/2008	3	3	1	2	2	1
360-15388-4	PZ-18R	OC-PZ-18R	3/6/2008	3	3	1	2	2	1
360-15388-5	ISCO-3	OC-ISCO-3	3/6/2008	3	3	1	2	2	1
360-15388-6	ISCO-2	OC-ISCO-2	3/6/2008	3	3	1	2	2	1
360-15388-7	SD-17	OC-SD-17	3/6/2008	3	3	1	2	2	1
360-15388-8	SD-17	OC-SD-17 DUP	3/6/2008	3	3	1	2	2	1

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

Prepared by / Date: KJC 04/18/08
Checked by / Date: CSR 04/18/08

Table 2
Final Results Summary - 360-15366 & 360-15388
March 2008 Slurry Wall / Cap Surface Water and Groundater
Olin Chemical Superfund Site
Wilmington, Massachusetts

			Loc Name	GW-202S		GW-25		GW-25		GW-79S		PZ-16RR		PZ-17RR		PZ-18R	
			Field Sample Id	OC-GW-202S		OC-GW-25		OC-GW-25DUP		OC-GW-79S		OC-PZ-16RR		OC-PZ-17RR		OC-PZ-18R	
			Field Sample Date	03/05/08		03/05/08		03/05/08		03/05/08		03/05/08		03/05/08		03/05/08	
			Qc Code	FS		FS		FD		FS		FS		FS		FS	
			Lab Sample Delivery Group	360-15366		360-15366		360-15366		360-15366		360-15366		360-15366		360-15366	
Frac	Method	Analyte	Units	Final Resu	Final Qual	Final Resu	Final Qual	Final Resu	Final Qual	Final Resu	Final Qual	Final Resu	Final Qual	Final Resu	Final Qual	Final Resu	Final Qual
N	40CFR136A 300.0	Chloride	mg/L	46		71		61		91		130		26		130	
N	40CFR136A 300.0	Sulfate as SO4	mg/L	490		240		210		950		850		390		130	
N	QuickChem 350.1	Nitrogen, Ammonia	mg/L	85		66		64		170		180		53		23	
N	SM18 2510B	Specific Conductance	umhos/cm	1400		950		950		2200		2500		1200		840	
F	SW846 6010B	Aluminum, Filtered	mg/L	0.1	U	0.1	U	0.1	U	0.016	J	0.1	U	0.1	U	0.1	U
F	SW846 6010B	Chromium, Filtered	mg/L	0.004	J	0.0082		0.0082		0.012		0.0086		0.0022	J	0.0066	

Notes:
N = normal
F = filtered
FS = field sample
FD = field duplicate
U = not detected, value is the detection limit
J = value is estimated

Prepared by / Date: KJC 04/18/08
Checked by / Date: CSR 04/18/08

Table 2
Final Results Summary - 360-15366 & 360-15388
March 2008 Slurry Wall / Cap Surface Water and Groundater
Olin Chemical Superfund Site
Wilmington, Massachusetts

			Loc Name	ISCO1		ISCO2		ISCO3		PZ-16RR		PZ-17RR		PZ-18R		SD-17		SD-17	
			Field Sample Id	OC-ISCO-1		OC-ISCO-2		OC-ISCO-3		OC-PZ-16RR		OC-PZ-17RR		OC-PZ-18R		OC-SD-17		OC-SD-17 DUP	
			Field Sample Date	03/06/08		03/06/08		03/06/08		03/06/08		03/06/08		03/06/08		03/06/08		03/06/08	
			Qc Code	FS		FS		FS		FS		FS		FS		FS		FD	
			Lab Sample Delivery Group	360-15388		360-15388		360-15388		360-15388		360-15388		360-15388		360-15388		360-15388	
Frac	Method	Analyte	Units	Final Resu	Final Qual	Final Resu	Final Qual	Final Resu	Final Qual	Final Resu	Final Qual	Final Resu	Final Qual	Final Resu	Final Qual	Final Resu	Final Qual	Final Resu	Final Qual
N	40CFR136A 300.0	Chloride	mg/L	90		70		69		88		94		81		100		100	
N	40CFR136A 300.0	Sulfate as SO4	mg/L	97		160		160		160		170		88		190		190	
N	40CFR136A 300_4	Nitrate as N	mg/L	0.49		1.5		1.5		0.61		0.46		0.41		0.61		0.46	
N	40CFR136A 300_4	Nitrite as N	mg/L	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U
N	QuickChem 350.1	Nitrogen, Ammonia	mg/L	18		27		26		27		36		18		37		37	
N	SM18 2510B	Specific Conductance	umhos/cm	580		680		680		720		810		580		840		840	
F	SW846 6010B	Aluminum, Filtered	mg/L	0.33		0.84		1		0.8		1.2		0.29		1.6		1.6	
F	SW846 6010B	Chromium, Filtered	mg/L	0.046		0.093		0.12		0.19		0.3		0.042		0.35		0.35	
F	SW846 6010B	Sodium, Filtered	mg/L	69	J	68	J	67	J	81	J	89		69	J	93	J	91	
T	SW846 6010B	Aluminum, Total	mg/L	0.57		1.7		1.8		2.9		9.4		0.59		4.9	J	2.9	J
T	SW846 6010B	Chromium, Total	mg/L	0.063		0.26		0.29		0.61		2.3		0.064		1		0.72	
T	SW846 6010B	Sodium, Total	mg/L	59	J	61	J	60	J	72	J	81		62	J	77	J	84	

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 04/18/08
Checked by / Date: CSR 04/18/08

Level I Rev. on done 3/31/08 TC

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

Job Number: 360-15388-1

Job Description: PCMP Surfacewater

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

Attention: Mr. Steven Morrow

Joseph A. Clemmer

Designee for
Becky C Mason
Project Manager II
becky.mason@testamericainc.com
03/14/2008

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 #:	360-15388-1
Project Location:	PCMP	MADEP RTN[1]:	

This form provides certifications for the following data set:[list Laboratory Sample ID Number(s)]
360-15388-(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: Steven Hartmann **Position:** Laboratory Director

Printed Name: Steven C. Hartmann **Date:** 3/14/08

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

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N.Billerica, MA 01862
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Fax:(978)667-7871

MADEP MCP Analytical Method Report Certification Form

Laboratory Name:	TestAmerica Westfield	Project #:	360-15388-1
Project Location:	PCMP	MADEP RTN[1]:	

This form provides certifications for the following data set:[list Laboratory Sample ID Number(s)]
360-15388-(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

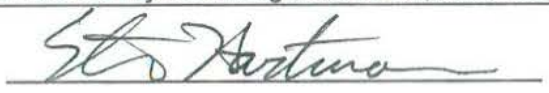
A	Were all samples received by the laboratory in a condition consistent with that described on the Chain-of-Custody documentation for the data set?	(Yes) No[1]
B	Were all QA/QC procedures required for the specified analytical method(s) included in this report followed, including the requirement to note 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:** 3/14/08

CAM VII A, Rev 3.2 April-04

TestAmerica
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MADEP MA014
NY DOH 10843
RI DOH 57
CT DPH 0494
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CASE NARRATIVE

Client: Olin Corporation

Project: PCMP Surfacewater

Report Number: 360-15388-1

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 03/06/2008; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 2.6°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 360-15388-1 through 360-15388-8 were analyzed for dissolved metals in accordance with EPA SW846 Method 6010B. The samples were analyzed on 03/07/2008.

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:

Sodium failed the MS/MSD recovery criteria low for the matrix spike and matrix spike duplicate of sample 360-15388-7. The associated LCS and LCSD recovered within control limits. Refer to the QC report for details.

General method information:
At the request of the client, an abbreviated/modified MCP analyte list was reported for this job.

TOTAL METALS

Samples 360-15388-1 through 360-15388-8 were analyzed for total metals in accordance with EPA SW846 Method 6010B. The samples were prepared and analyzed on 03/07/2008.

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:

Sodium failed the MS/MSD recovery criteria low for the matrix spike and matrix spike duplicate of sample 360-15388-7. The associated LCS and LCSD recovered within control limits. Refer to the QC report for details.

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 360-15388-1 through 360-15388-8 were analyzed for ammonia in accordance with LACHAT 10-107-06-1. The samples were prepared and analyzed on 03/10/2008.

All QC performance standards and recommendations for this specific method were achieved with the exception of:

Ammonia failed the MS/MSD recovery criteria low for the matrix spike duplicate of sample 360-15388-7. The associated LCS recovered within control limits. Refer to the QC report for details.

Samples 360-15388-1(5X), 360-15388-2(5X) and 360-15388-5 through 360-15388-8(5X) required dilution prior to analysis. The reporting limits have been adjusted accordingly. Dilutions were due to high concentration.

ANIONS

Samples 360-15388-1 through 360-15388-8 were analyzed for anions in accordance with EPA Method 300.0. The samples were analyzed on 03/07/2008.

All QC performance standards and recommendations for this specific method were achieved with the exception of:

Chloride and Sulfate failed the MS/MSD recovery criteria high for the matrix spike of sample 360-15388-7. The associated LCS recovered within control limits. Refer to the QC report for details.

Samples 360-15388-1 through 360-15388-8(10X) required dilution prior to analysis. The reporting limits have been adjusted accordingly. Dilutions were due to high target concentration.

SPECIFIC CONDUCTANCE (CONDUCTIVITY)

Samples 360-15388-1 through 360-15388-8 were analyzed for Specific Conductance (Conductivity) in accordance with SM 2510B. The samples were analyzed on 03/07/2008.

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: 360-15388-1

Description	Lab Location	Method	Preparation Method
Matrix: Water			
Dissolved Metals	TAL WFD	SW846 6010B	
Total Metals	TAL WFD	SW846 6010B	
Sample Filtration performed in the Field	TAL WFD		FIELD_FLTRD
Acid Digestion of Aqueous Samples and Extracts for	TAL WFD		SW846 3010A
Lachat Ammonia-Nitrogen	TAL WFD	QuickChem 10-107-06-1	
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	SM18 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

SM18 = "Standard Methods For The Examination Of Water And Wastewater", 18th Edition, 1992.

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: 360-15388-1

Method	Analyst	Analyst ID
SW846 6010B	Balicki, Charles W	CWB
QuickChem 10-107-06-1	Lalashius, Andrew L	ALL
40CFR136A 300.0	Emerich, Rich W	RWE
40CFR136A 300.0	Lalashius, Andrew L	ALL
SM18 SM 2510B	Emerich, Rich W	RWE

SAMPLE SUMMARY

Client: Olin Corporation

Job Number: 360-15388-1

Lab Sample ID	Client Sample ID	Client Matrix	Date/Time Sampled	Date/Time Received
360-15388-1	OC-PZ-16RR	Water	03/06/2008 0920	03/06/2008 1730
360-15388-2	OC-PZ-17RR	Water	03/06/2008 1000	03/06/2008 1730
360-15388-3	OC-ISCO-1	Water	03/06/2008 1015	03/06/2008 1730
360-15388-4	OC-PZ-18R	Water	03/06/2008 1035	03/06/2008 1730
360-15388-5	OC-ISCO-3	Water	03/06/2008 1110	03/06/2008 1730
360-15388-6	OC-ISCO-2	Water	03/06/2008 1125	03/06/2008 1730
360-15388-7	OC-SD-17	Water	03/06/2008 1200	03/06/2008 1730
360-15388-7MS	OC-SD-17 MS	Water	03/06/2008 1200	03/06/2008 1730
360-15388-7MSD	OC-SD-17 MSD	Water	03/06/2008 1200	03/06/2008 1730
360-15388-8	OC-SD-17 DUP	Water	03/06/2008 1200	03/06/2008 1730

SAMPLE RESULTS

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

Job Number: 360-15388-1

Client Sample ID: OC-PZ-16RR
Lab Sample ID: 360-15388-1

Date Sampled: 03/06/2008 0920
Date Received: 03/06/2008 1730
Client Matrix: Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B		Date Analyzed:		03/07/2008 1217	
Aluminum	800	ug/L	6.0	100	1.0
Chromium	190	ug/L	0.68	5.0	1.0
Sodium	81000 J	ug/L	95	2000	1.0
Method: 6010B		Date Analyzed:		03/07/2008 1613	
Prep Method: 3010A		Date Prepared:		03/07/2008 0855	
Aluminum	2900	ug/L	6.0	100	1.0
Chromium	610	ug/L	0.68	5.0	1.0
Sodium	72000 J	ug/L	95	2000	1.0

Dissolved Sodium > 10% of Total fraction

TC

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

Job Number: 360-15388-1

Client Sample ID: OC-PZ-16RR
Lab Sample ID: 360-15388-1

Date Sampled: 03/06/2008 0920
Date Received: 03/06/2008 1730
Client Matrix: Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 10-107-06-1		Date Analyzed:	03/10/2008 1355		
Prep Method: Distill/Ammonia		Date Prepared:	03/10/2008 1113		
Ammonia	27	mg/L	0.50	0.50	5.0
Method: 300.0		Date Analyzed:	03/07/2008 1653		
Nitrate as N	0.61	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:	03/07/2008 1708		
Sulfate	160	mg/L	20	20	10
Chloride	88	mg/L	10	10	10
Method: SM 2510B		Date Analyzed:	03/07/2008 1433		
Specific Conductance	720	umhos/cm	1.0	1.0	1.0

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

Job Number: 360-15388-1

Client Sample ID: OC-PZ-17RR
Lab Sample ID: 360-15388-2

Date Sampled: 03/06/2008 1000
Date Received: 03/06/2008 1730
Client Matrix: Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B		Date Analyzed:		03/07/2008 1225	
Aluminum	1200	ug/L	6.0	100	1.0
Chromium	300	ug/L	0.68	5.0	1.0
Sodium	89000	ug/L	95	2000	1.0
Method: 6010B		Date Analyzed:		03/07/2008 1621	
Prep Method: 3010A		Date Prepared:		03/07/2008 0855	
Aluminum	9400	ug/L	6.0	100	1.0
Chromium	2300	ug/L	0.68	5.0	1.0
Sodium	81000	ug/L	95	2000	1.0

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

Job Number: 360-15388-1

Client Sample ID: OC-PZ-17RR
Lab Sample ID: 360-15388-2

Date Sampled: 03/06/2008 1000
Date Received: 03/06/2008 1730
Client Matrix: Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 10-107-06-1		Date Analyzed:	03/10/2008 1356		
Prep Method: Distill/Ammonia		Date Prepared:	03/10/2008 1113		
Ammonia	36	mg/L	0.50	0.50	5.0
Method: 300.0		Date Analyzed:	03/07/2008 1723		
Nitrate as N	0.46	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:	03/07/2008 1738		
Sulfate	170	mg/L	20	20	10
Chloride	94	mg/L	10	10	10
Method: SM 2510B		Date Analyzed:	03/07/2008 1435		
Specific Conductance	810	umhos/cm	1.0	1.0	1.0

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

Job Number: 360-15388-1

Client Sample ID: OC-ISCO-1
Lab Sample ID: 360-15388-3

Date Sampled: 03/06/2008 1015
Date Received: 03/06/2008 1730
Client Matrix: Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B		Date Analyzed:	03/07/2008 1228		
Aluminum	330	ug/L	6.0	100	1.0
Chromium	46	ug/L	0.68	5.0	1.0
Sodium	69000 J	ug/L	95	2000	1.0
Method: 6010B		Date Analyzed:	03/07/2008 1623		
Prep Method: 3010A		Date Prepared:	03/07/2008 0855		
Aluminum	570	ug/L	6.0	100	1.0
Chromium	63	ug/L	0.68	5.0	1.0
Sodium	59000 J	ug/L	95	2000	1.0

Dissolved Sodium > 10% of total fraction

TC

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

Job Number: 360-15388-1

Client Sample ID: OC-ISCO-1
Lab Sample ID: 360-15388-3

Date Sampled: 03/06/2008 1015
Date Received: 03/06/2008 1730
Client Matrix: Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 10-107-06-1		Date Analyzed:	03/10/2008 1340		
Prep Method: Distill/Ammonia		Date Prepared:	03/10/2008 1113		
Ammonia	18	mg/L	0.10	0.10	1.0
Method: 300.0		Date Analyzed:	03/07/2008 1753		
Sulfate	97	mg/L	2.0	2.0	1.0
Nitrate as N	0.49	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:	03/07/2008 1808		
Chloride	90	mg/L	10	10	10
Method: SM 2510B		Date Analyzed:	03/07/2008 1436		
Specific Conductance	580	umhos/cm	1.0	1.0	1.0

Mr. Steven Morrow
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3855 North Ocoee Street
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Cleveland, TN 37312-4441

Job Number: 360-15388-1

Client Sample ID: OC-PZ-18R
Lab Sample ID: 360-15388-4

Date Sampled: 03/06/2008 1035
Date Received: 03/06/2008 1730
Client Matrix: Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B		Date Analyzed:		03/07/2008 1230	
Aluminum	290	ug/L	6.0	100	1.0
Chromium	42	ug/L	0.68	5.0	1.0
Sodium	69000 J	ug/L	95	2000	1.0
Method: 6010B		Date Analyzed:		03/07/2008 1626	
Prep Method: 3010A		Date Prepared:		03/07/2008 0855	
Aluminum	590	ug/L	6.0	100	1.0
Chromium	64	ug/L	0.68	5.0	1.0
Sodium	62000 J	ug/L	95	2000	1.0

Dissolved Sodium > 10% of Total fraction

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

Job Number: 360-15388-1

Client Sample ID: OC-PZ-18R
Lab Sample ID: 360-15388-4

Date Sampled: 03/06/2008 1035
Date Received: 03/06/2008 1730
Client Matrix: Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 10-107-06-1		Date Analyzed:	03/10/2008 1341		
Prep Method: Distill/Ammonia		Date Prepared:	03/10/2008 1113		
Ammonia	18	mg/L	0.10	0.10	1.0
Method: 300.0		Date Analyzed:	03/07/2008 1854		
Sulfate	88	mg/L	2.0	2.0	1.0
Nitrate as N	0.41	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:	03/07/2008 1909		
Chloride	81	mg/L	10	10	10
Method: SM 2510B		Date Analyzed:	03/07/2008 1438		
Specific Conductance	580	umhos/cm	1.0	1.0	1.0

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Job Number: 360-15388-1

Client Sample ID: OC-ISCO-3
Lab Sample ID: 360-15388-5

Date Sampled: 03/06/2008 1110
Date Received: 03/06/2008 1730
Client Matrix: Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B		Date Analyzed:		03/07/2008 1233	
Aluminum	1000	ug/L	6.0	100	1.0
Chromium	120	ug/L	0.68	5.0	1.0
Sodium	67000 J	ug/L	95	2000	1.0
Method: 6010B		Date Analyzed:		03/07/2008 1628	
Prep Method: 3010A		Date Prepared:		03/07/2008 0855	
Aluminum	1800	ug/L	6.0	100	1.0
Chromium	290	ug/L	0.68	5.0	1.0
Sodium	60000 J	ug/L	95	2000	1.0

dissolved Sodium >10% of Total fraction

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Job Number: 360-15388-1

Client Sample ID: OC-ISCO-3
Lab Sample ID: 360-15388-5

Date Sampled: 03/06/2008 1110
Date Received: 03/06/2008 1730
Client Matrix: Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 10-107-06-1		Date Analyzed:	03/10/2008 1357		
Prep Method: Distill/Ammonia		Date Prepared:	03/10/2008 1113		
Ammonia	26	mg/L	0.50	0.50	5.0
Method: 300.0		Date Analyzed:	03/07/2008 1924		
Nitrate as N	1.5	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:	03/07/2008 1939		
Sulfate	160	mg/L	20	20	10
Chloride	69	mg/L	10	10	10
Method: SM 2510B		Date Analyzed:	03/07/2008 1439		
Specific Conductance	680	umhos/cm	1.0	1.0	1.0

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Job Number: 360-15388-1

Client Sample ID: OC-ISCO-2
Lab Sample ID: 360-15388-6

Date Sampled: 03/06/2008 1125
Date Received: 03/06/2008 1730
Client Matrix: Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B		Date Analyzed:		03/07/2008 1236	
Aluminum	840	ug/L	6.0	100	1.0
Chromium	93	ug/L	0.68	5.0	1.0
Sodium	68000 J	ug/L	95	2000	1.0
Method: 6010B		Date Analyzed:		03/07/2008 1631	
Prep Method: 3010A		Date Prepared:		03/07/2008 0855	
Aluminum	1700	ug/L	6.0	100	1.0
Chromium	260	ug/L	0.68	5.0	1.0
Sodium	61000 J	ug/L	95	2000	1.0

Dissolved Sodium >10% of total fraction

TC

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Job Number: 360-15388-1

Client Sample ID: OC-ISCO-2
Lab Sample ID: 360-15388-6

Date Sampled: 03/06/2008 1125
Date Received: 03/06/2008 1730
Client Matrix: Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 10-107-06-1		Date Analyzed:	03/10/2008 1359		
Prep Method: Distill/Ammonia		Date Prepared:	03/10/2008 1113		
Ammonia	27	mg/L	0.50	0.50	5.0
Method: 300.0		Date Analyzed:	03/07/2008 1954		
Nitrate as N	1.5	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:	03/07/2008 2009		
Sulfate	160	mg/L	20	20	10
Chloride	70	mg/L	10	10	10
Method: SM 2510B		Date Analyzed:	03/07/2008 1440		
Specific Conductance	680	umhos/cm	1.0	1.0	1.0

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Job Number: 360-15388-1

Client Sample ID: OC-SD-17
Lab Sample ID: 360-15388-7

Date Sampled: 03/06/2008 1200
Date Received: 03/06/2008 1730
Client Matrix: Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B		Date Analyzed:		03/07/2008 1207	
Aluminum	1600	ug/L	6.0	100	1.0
Chromium	350	ug/L	0.68	5.0	1.0
Sodium	93000 J	ug/L	95	2000	1.0
Method: 6010B		Date Analyzed:		03/07/2008 1602	
Prep Method: 3010A		Date Prepared:		03/07/2008 0855	
Aluminum	4900 J	ug/L	6.0	100	1.0
Chromium	1000	ug/L	0.68	5.0	1.0
Sodium	77000 J	ug/L	95	2000	1.0

Al RPD total is 51.3%

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Job Number: 360-15388-1

Client Sample ID: OC-SD-17
Lab Sample ID: 360-15388-7

Date Sampled: 03/06/2008 1200
Date Received: 03/06/2008 1730
Client Matrix: Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 10-107-06-1		Date Analyzed:	03/10/2008 1400		
Prep **Method:** Distill/Ammonia		Date Prepared:	03/10/2008 1113		
Ammonia	37	mg/L	0.50	0.50	5.0
Method: 300.0		Date Analyzed:	03/07/2008 1552		
Nitrate as N	0.61	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:	03/07/2008 1607		
Sulfate	190	mg/L	20	20	10
Chloride	100	mg/L	10	10	10
Method: SM 2510B		Date Analyzed:	03/07/2008 1442		
Specific Conductance	840	umhos/cm	1.0	1.0	1.0

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Job Number: 360-15388-1

Client Sample ID: OC-SD-17 DUP
Lab Sample ID: 360-15388-8

Date Sampled: 03/06/2008 1200
Date Received: 03/06/2008 1730
Client Matrix: Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B		Date Analyzed:		03/07/2008 1238	
Aluminum	1600	ug/L	6.0	100	1.0
Chromium	350	ug/L	0.68	5.0	1.0
Sodium	91000	ug/L	95	2000	1.0
Method: 6010B		Date Analyzed:		03/07/2008 1634	
Prep Method: 3010A		Date Prepared:		03/07/2008 0855	
Aluminum	2900 J	ug/L	6.0	100	1.0
Chromium	720	ug/L	0.68	5.0	1.0
Sodium	84000	ug/L	95	2000	1.0

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Job Number: 360-15388-1

Client Sample ID: OC-SD-17 DUP
Lab Sample ID: 360-15388-8

Date Sampled: 03/06/2008 1200
Date Received: 03/06/2008 1730
Client Matrix: Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 10-107-06-1		Date Analyzed:	03/10/2008 1403		
Prep Method: Distill/Ammonia		Date Prepared:	03/10/2008 1113		
Ammonia	37	mg/L	0.50	0.50	5.0
Method: 300.0		Date Analyzed:	03/07/2008 2024		
Nitrate as N	0.46	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:	03/07/2008 2039		
Sulfate	190	mg/L	20	20	10
Chloride	100	mg/L	10	10	10
Method: SM 2510B		Date Analyzed:	03/07/2008 1445		
Specific Conductance	840	umhos/cm	1.0	1.0	1.0

DATA REPORTING QUALIFIERS

Client: Olin Corporation

Job Number: 360-15388-1

Lab Section	Qualifier	Description
Metals		
	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.
General Chemistry		
	F	MS or MSD exceeds the control limits

QUALITY CONTROL RESULTS

Client: Olin Corporation

Job Number: 360-15388-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
Metals					
Prep Batch: 360-29494					
LCS 360-29494/2-A	Lab Control Spike	T	Water	3010A	
LCSD 360-29494/3-A	Lab Control Spike Duplicate	T	Water	3010A	
MB 360-29494/1-A	Method Blank	T	Water	3010A	
360-15388-1	OC-PZ-16RR	T	Water	3010A	
360-15388-2	OC-PZ-17RR	T	Water	3010A	
360-15388-3	OC-ISCO-1	T	Water	3010A	
360-15388-4	OC-PZ-18R	T	Water	3010A	
360-15388-5	OC-ISCO-3	T	Water	3010A	
360-15388-6	OC-ISCO-2	T	Water	3010A	
360-15388-7	OC-SD-17	T	Water	3010A	
360-15388-7MS	Matrix Spike	T	Water	3010A	
360-15388-7MSD	Matrix Spike Duplicate	T	Water	3010A	
360-15388-8	OC-SD-17 DUP	T	Water	3010A	
Analysis Batch:360-29531					
LCS 360-29531/13	Lab Control Spike	T	Water	6010B	
LCSD 360-29531/25	Lab Control Spike Duplicate	T	Water	6010B	
MB 360-29531/14	Method Blank	T	Water	6010B	
360-15388-1	OC-PZ-16RR	D	Water	6010B	
360-15388-2	OC-PZ-17RR	D	Water	6010B	
360-15388-3	OC-ISCO-1	D	Water	6010B	
360-15388-4	OC-PZ-18R	D	Water	6010B	
360-15388-5	OC-ISCO-3	D	Water	6010B	
360-15388-6	OC-ISCO-2	D	Water	6010B	
360-15388-7	OC-SD-17	D	Water	6010B	
360-15388-7MS	Matrix Spike	D	Water	6010B	
360-15388-7MSD	Matrix Spike Duplicate	D	Water	6010B	
360-15388-8	OC-SD-17 DUP	D	Water	6010B	
Analysis Batch:360-29537					
LCS 360-29494/2-A	Lab Control Spike	T	Water	6010B	360-29494
LCSD 360-29494/3-A	Lab Control Spike Duplicate	T	Water	6010B	360-29494
MB 360-29494/1-A	Method Blank	T	Water	6010B	360-29494
360-15388-1	OC-PZ-16RR	T	Water	6010B	360-29494
360-15388-2	OC-PZ-17RR	T	Water	6010B	360-29494
360-15388-3	OC-ISCO-1	T	Water	6010B	360-29494
360-15388-4	OC-PZ-18R	T	Water	6010B	360-29494
360-15388-5	OC-ISCO-3	T	Water	6010B	360-29494
360-15388-6	OC-ISCO-2	T	Water	6010B	360-29494
360-15388-7	OC-SD-17	T	Water	6010B	360-29494
360-15388-7MS	Matrix Spike	T	Water	6010B	360-29494
360-15388-7MSD	Matrix Spike Duplicate	T	Water	6010B	360-29494
360-15388-8	OC-SD-17 DUP	T	Water	6010B	360-29494

Client: Olin Corporation

Job Number: 360-15388-1

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: 360-15388-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
General Chemistry					
Analysis Batch:360-29517					
LCS 360-29517/1	Lab Control Spike	T	Water	SM 2510B	
MB 360-29517/4	Method Blank	T	Water	SM 2510B	
360-15388-1	OC-PZ-16RR	T	Water	SM 2510B	
360-15388-2	OC-PZ-17RR	T	Water	SM 2510B	
360-15388-3	OC-ISCO-1	T	Water	SM 2510B	
360-15388-4	OC-PZ-18R	T	Water	SM 2510B	
360-15388-5	OC-ISCO-3	T	Water	SM 2510B	
360-15388-6	OC-ISCO-2	T	Water	SM 2510B	
360-15388-7	OC-SD-17	T	Water	SM 2510B	
360-15388-7DU	Duplicate	T	Water	SM 2510B	
360-15388-8	OC-SD-17 DUP	T	Water	SM 2510B	
Prep Batch: 360-29552					
LCS 360-29552/2-A	Lab Control Spike	T	Water	Distill/Ammonia	
MB 360-29552/1-A	Method Blank	T	Water	Distill/Ammonia	
360-15388-1	OC-PZ-16RR	T	Water	Distill/Ammonia	
360-15388-2	OC-PZ-17RR	T	Water	Distill/Ammonia	
360-15388-3	OC-ISCO-1	T	Water	Distill/Ammonia	
360-15388-4	OC-PZ-18R	T	Water	Distill/Ammonia	
360-15388-5	OC-ISCO-3	T	Water	Distill/Ammonia	
360-15388-6	OC-ISCO-2	T	Water	Distill/Ammonia	
360-15388-7	OC-SD-17	T	Water	Distill/Ammonia	
360-15388-7MS	Matrix Spike	T	Water	Distill/Ammonia	
360-15388-7MSD	Matrix Spike Duplicate	T	Water	Distill/Ammonia	
360-15388-8	OC-SD-17 DUP	T	Water	Distill/Ammonia	
Analysis Batch:360-29558					
LCS 360-29552/2-A	Lab Control Spike	T	Water	10-107-06-1	360-29552
MB 360-29552/1-A	Method Blank	T	Water	10-107-06-1	360-29552
360-15388-1	OC-PZ-16RR	T	Water	10-107-06-1	360-29552
360-15388-2	OC-PZ-17RR	T	Water	10-107-06-1	360-29552
360-15388-3	OC-ISCO-1	T	Water	10-107-06-1	360-29552
360-15388-4	OC-PZ-18R	T	Water	10-107-06-1	360-29552
360-15388-5	OC-ISCO-3	T	Water	10-107-06-1	360-29552
360-15388-6	OC-ISCO-2	T	Water	10-107-06-1	360-29552
360-15388-7	OC-SD-17	T	Water	10-107-06-1	360-29552
360-15388-7MS	Matrix Spike	T	Water	10-107-06-1	360-29552
360-15388-7MSD	Matrix Spike Duplicate	T	Water	10-107-06-1	360-29552
360-15388-8	OC-SD-17 DUP	T	Water	10-107-06-1	360-29552

Client: Olin Corporation

Job Number: 360-15388-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
General Chemistry					
Analysis Batch:360-29600					
LCS 360-29600/11	Lab Control Spike	T	Water	300.0	
MB 360-29600/10	Method Blank	T	Water	300.0	
360-15388-1	OC-PZ-16RR	T	Water	300.0	
360-15388-2	OC-PZ-17RR	T	Water	300.0	
360-15388-3	OC-ISCO-1	T	Water	300.0	
360-15388-4	OC-PZ-18R	T	Water	300.0	
360-15388-5	OC-ISCO-3	T	Water	300.0	
360-15388-6	OC-ISCO-2	T	Water	300.0	
360-15388-7	OC-SD-17	T	Water	300.0	
360-15388-7MS	Matrix Spike	T	Water	300.0	
360-15388-7MSD	Matrix Spike Duplicate	T	Water	300.0	
360-15388-8	OC-SD-17 DUP	T	Water	300.0	
Analysis Batch:360-29776					
LCS 360-29776/2	Lab Control Spike	T	Water	300.0	
MB 360-29776/1	Method Blank	T	Water	300.0	
360-15388-1	OC-PZ-16RR	T	Water	300.0	
360-15388-2	OC-PZ-17RR	T	Water	300.0	
360-15388-3	OC-ISCO-1	T	Water	300.0	
360-15388-4	OC-PZ-18R	T	Water	300.0	
360-15388-5	OC-ISCO-3	T	Water	300.0	
360-15388-6	OC-ISCO-2	T	Water	300.0	
360-15388-7	OC-SD-17	T	Water	300.0	
360-15388-7MS	Matrix Spike	T	Water	300.0	
360-15388-7MSD	Matrix Spike Duplicate	T	Water	300.0	
360-15388-8	OC-SD-17 DUP	T	Water	300.0	

Report Basis
T = Total

Client: Olin Corporation

Job Number: 360-15388-1

Method Blank - Batch: 360-29494

Method: 6010B
Preparation: 3010A

Lab Sample ID: MB 360-29494/1-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 03/07/2008 1554
Date Prepared: 03/07/2008 0855

Analysis Batch: 360-29537
Prep Batch: 360-29494
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		6.0	100
Chromium	ND		0.68	5.0
Sodium	ND		95	2000

Lab Control Spike/
Lab Control Spike Duplicate Recovery Report - Batch: 360-29494

Method: 6010B
Preparation: 3010A

LCS Lab Sample ID: LCS 360-29494/2-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 03/07/2008 1557
Date Prepared: 03/07/2008 0855

Analysis Batch: 360-29537
Prep Batch: 360-29494
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 360-29494/3-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 03/07/2008 1559
Date Prepared: 03/07/2008 0855

Analysis Batch: 360-29537
Prep Batch: 360-29494
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume: 50 mL
Final Weight/Volume: 50 mL

	% Rec.						
Analyte	LCS	LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Aluminum	96	97	80 - 120	1	20		
Chromium	98	99	80 - 120	1	20		
Sodium	92	93	80 - 120	1	20		

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

Client: Olin Corporation

Job Number: 360-15388-1

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 360-29494

Method: 6010B
Preparation: 3010A

MS Lab Sample ID:	360-15388-7	Analysis Batch: 360-29537	Instrument ID: Varian 720 ES ICP
Client Matrix:	Water	Prep Batch: 360-29494	Lab File ID: N/A
Dilution:	1.0		Initial Weight/Volume: 50 mL
Date Analyzed:	03/07/2008 1605		Final Weight/Volume: 50 mL
Date Prepared:	03/07/2008 0855		

MSD Lab Sample ID:	360-15388-7	Analysis Batch: 360-29537	Instrument ID: Varian 720 ES ICP
Client Matrix:	Water	Prep Batch: 360-29494	Lab File ID: N/A
Dilution:	1.0		Initial Weight/Volume: 50 mL
Date Analyzed:	03/07/2008 1607		Final Weight/Volume: 50 mL
Date Prepared:	03/07/2008 0855		

	% Rec.						
Analyte	MS	MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Aluminum	92	86	75 - 125	3	20		
Chromium	80	83	75 - 125	1	20		
Sodium	67	74	75 - 125	1	20	F	F

~~high levels in native sample,~~
~~NO Qualifiers added.~~ TC 4/1/08

Sodium Matrix Spike conc = 20ppm
native concentration of total fraction = 77ppm
(J) Qualify

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

Client: Olin Corporation

Job Number: 360-15388-1

Method Blank - Batch: 360-29531

Method: 6010B
Preparation: N/A

Lab Sample ID: MB 360-29531/14
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 03/07/2008 1040
Date Prepared: N/A

Analysis Batch: 360-29531
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: mL

Analyte	Result	Qual	MDL	RL
Aluminum	ND		6.0	100
Chromium	ND		0.68	5.0
Sodium	ND		95	2000

Lab Control Spike/
Lab Control Spike Duplicate Recovery Report - Batch: 360-29531

Method: 6010B
Preparation: N/A

LCS Lab Sample ID: LCS 360-29531/13
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 03/07/2008 1037
Date Prepared: N/A

Analysis Batch: 360-29531
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 360-29531/25
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 03/07/2008 1220
Date Prepared: N/A

Analysis Batch: 360-29531
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 10 mL

Analyte	% Rec. LCS	% Rec. LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Aluminum	100	100	80 - 120	0	20		
Chromium	100	100	80 - 120	1	20		
Sodium	100	98	80 - 120	3	20		

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

Client: Olin Corporation

Job Number: 360-15388-1

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 360-29531

Method: 6010B
Preparation: N/A

MS Lab Sample ID: 360-15388-7
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 03/07/2008 1209
Date Prepared: N/A

Analysis Batch: 360-29531
Prep Batch: N/A

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 10 mL

MSD Lab Sample ID: 360-15388-7
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 03/07/2008 1212
Date Prepared: N/A

Analysis Batch: 360-29531
Prep Batch: N/A

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 10 mL

Analyte	% Rec. MS	% Rec. MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Aluminum	105	109	75 - 125	3	20		
Chromium	100	104	75 - 125	2	20		
Sodium	80	79	75 - 125	0	20	4	4

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

Client: Olin Corporation

Job Number: 360-15388-1

Method Blank - Batch: 360-29552

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

Lab Sample ID: MB 360-29552/1-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 03/10/2008 1336
Date Prepared: 03/10/2008 1113

Analysis Batch: 360-29558
Prep Batch: 360-29552
Units: mg/L

Instrument ID: Lachat 8000 FIA
Lab File ID: N/A
Initial Weight/Volume: mL
Final Weight/Volume: 50 mL

Analyte	Result	Qual	RL	RL
Ammonia	ND		0.10	0.10

Lab Control Spike - Batch: 360-29552

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

Lab Sample ID: LCS 360-29552/2-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 03/10/2008 1337
Date Prepared: 03/10/2008 1113

Analysis Batch: 360-29558
Prep Batch: 360-29552
Units: mg/L

Instrument ID: Lachat 8000 FIA
Lab File ID: N/A
Initial Weight/Volume: mL
Final Weight/Volume: 50 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Ammonia	10.0	9.42	94	85 - 115	

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 360-29552

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

MS Lab Sample ID: 360-15388-7
Client Matrix: Water
Dilution: 10
Date Analyzed: 03/10/2008 1401
Date Prepared: 03/10/2008 1113

Analysis Batch: 360-29558
Prep Batch: 360-29552

Instrument ID: Lachat 8000 FIA
Lab File ID: N/A
Initial Weight/Volume: mL
Final Weight/Volume: 50 mL

MSD Lab Sample ID: 360-15388-7
Client Matrix: Water
Dilution: 10
Date Analyzed: 03/10/2008 1402
Date Prepared: 03/10/2008 1113

Analysis Batch: 360-29558
Prep Batch: 360-29552

Instrument ID: Lachat 8000 FIA
Lab File ID: N/A
Initial Weight/Volume: mL
Final Weight/Volume: 50 mL

Analyte	% Rec. MS	% Rec. MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Ammonia	102	67	75 - 125	8	20		F

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

only MSD out, MS w/in limits

Client: Olin Corporation

Job Number: 360-15388-1

Method Blank - Batch: 360-29600

Method: 300.0
Preparation: N/A

Lab Sample ID: MB 360-29600/10
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 03/07/2008 1522
Date Prepared: N/A

Analysis Batch: 360-29600
Prep Batch: N/A
Units: mg/L

Instrument ID: Lachat 8500 Ion
Lab File ID: OM_3-7-2008_01-05-13PM
Initial Weight/Volume:
Final Weight/Volume: mL

Analyte	Result	Qual	RL	RL
Sulfate	ND		2.0	2.0
Chloride	ND		1.0	1.0

Lab Control Spike - Batch: 360-29600

Method: 300.0
Preparation: N/A

Lab Sample ID: LCS 360-29600/11
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 03/07/2008 1537
Date Prepared: N/A

Analysis Batch: 360-29600
Prep Batch: N/A
Units: mg/L

Instrument ID: Lachat 8500 Ion
Lab File ID: OM_3-7-2008_01-05-13PM
Initial Weight/Volume:
Final Weight/Volume: mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Sulfate	80.0	76.1	95	85 - 115	
Chloride	40.0	38.4	96	85 - 115	

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

Client: Olin Corporation

Job Number: 360-15388-1

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 360-29600

Method: 300.0
Preparation: N/A

MS Lab Sample ID: 360-15388-7
Client Matrix: Water
Dilution: 10
Date Analyzed: 03/07/2008 1622
Date Prepared: N/A

Analysis Batch: 360-29600
Prep Batch: N/A

Instrument ID: Lachat 8500 Ion
Lab File ID: OM_3-7-2008_01-05-13P
Initial Weight/Volume:
Final Weight/Volume: 10 mL

MSD Lab Sample ID: 360-15388-7
Client Matrix: Water
Dilution: 10
Date Analyzed: 03/07/2008 1638
Date Prepared: N/A

Analysis Batch: 360-29600
Prep Batch: N/A

Instrument ID: Lachat 8500 Ion
Lab File ID: OM_3-7-2008_01-05-13PM
Initial Weight/Volume:
Final Weight/Volume: 10 mL

Analyte	% Rec. MS	% Rec. MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Sulfate	132	113	75 - 125	9	20	F	
Chloride	134	115	75 - 125	9	20	F	

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

Client: Olin Corporation

Job Number: 360-15388-1

Method Blank - Batch: 360-29776

Method: 300.0
Preparation: N/A

Lab Sample ID: MB 360-29776/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 03/07/2008 1522
Date Prepared: N/A

Analysis Batch: 360-29776
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: mL
Final Weight/Volume: 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: 360-29776

Method: 300.0
Preparation: N/A

Lab Sample ID: LCS 360-29776/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 03/07/2008 1537
Date Prepared: N/A

Analysis Batch: 360-29776
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: mL
Final Weight/Volume: mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Nitrate as N	4.00	3.76	94	85 - 115	
Nitrite as N	4.00	3.80	95	85 - 115	

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

Client: Olin Corporation

Job Number: 360-15388-1

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 360-29776

Method: 300.0
Preparation: N/A

MS Lab Sample ID: 360-15388-7
Client Matrix: Water
Dilution: 10
Date Analyzed: 03/07/2008 1622
Date Prepared: N/A

Analysis Batch: 360-29776
Prep Batch: N/A

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: mL
Final Weight/Volume: 10 mL

MSD Lab Sample ID: 360-15388-7
Client Matrix: Water
Dilution: 10
Date Analyzed: 03/07/2008 1638
Date Prepared: N/A

Analysis Batch: 360-29776
Prep Batch: N/A

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: mL
Final Weight/Volume: 10 mL

Analyte	% Rec. MS	% Rec. MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Nitrate as N	118	107	75 - 125	9	20		
Nitrite as N	121	111	75 - 125	9	20		

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

Client: Olin Corporation

Job Number: 360-15388-1

Method Blank - Batch: 360-29517

Method: SM 2510B
Preparation: N/A

Lab Sample ID: MB 360-29517/4
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 03/07/2008 1342
Date Prepared: N/A

Analysis Batch: 360-29517
Prep Batch: N/A
Units: umhos/cm

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

Analyte	Result	Qual	RL	RL
Specific Conductance	ND		1.0	1.0

Lab Control Spike - Batch: 360-29517

Method: SM 2510B
Preparation: N/A

Lab Sample ID: LCS 360-29517/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 03/07/2008 1321
Date Prepared: N/A

Analysis Batch: 360-29517
Prep Batch: N/A
Units: umhos/cm

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

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Specific Conductance	1400	1420	101	85 - 115	

Duplicate - Batch: 360-29517

Method: SM 2510B
Preparation: N/A

Lab Sample ID: 360-15388-7
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 03/07/2008 1443
Date Prepared: N/A

Analysis Batch: 360-29517
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: mL

Analyte	Sample Result/Qual	Result	RPD	Limit	Qual
Specific Conductance	840	837	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: 360-15388-1

Login Number: 15388
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	2.6 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

•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: 339-927-3793 Fax: (781)-246-5060

Project #: 6100080016/04
Project Manager: Peter Thompson
Work ID: PCMP
Contact: David Chapman

Job#: 360-15388 Quote# PO#

Shaded areas for office use

Analysis Requested
Check analysis and specify method and analytes in comments section.
For example:
500-series for drinking water
600-series for waste water
8000-series for haz/solid waste
Use comments section to further define.

Comments (Special Instructions)

MCP case narrative

Requested Turn Around Time
10 Business Day (Std) XX
15 Business Day
Other
Rush TAT Requested: 24 hrs 72 hrs 48 hrs 5 Day

Regulatory Classification / Special Report Format
NPDES Drinking Water DEP Form(s)
RCRA MCP GW1/S1 MWRA Smart Rpt
Other MCP QA/QC Rpt XX

Sample Type Codes
WW-Wastewater DW-Drinking water SW-Surfacewater
LW-Labwater GW-Groundwater A-Air
S-Solid / Soil SL-Sludge O-Oil Z-Other

Sample ID	Sample Type	Sampler's Initials	Date Time Collected	Grab	Comp.	# Containers	Plastic(P) or Glass(G)	NaHSO4/MeOH	HNO3 to pH <2	H2SO4 to pH <2	HCl to pH <2	NaOH to pH >12	NAOH/ZNAC	None / 4° C	Ammonia-Nitrogen	Chloride, Sulfate	Specific Condutivity	Nitrate, Nitrite	Groundwater metals	Surfacewater metals	Sediment: Al/Cr/Fe	Other	Other	Other	Other	Other	Other
PZ-16RR	SW	DLC/CTM	3/6/08 09:20	X		4	P		X	X				X	X	X	X	X		X							
PZ-17RR	SW	DLC/CTM	3/6/08 10:00	X		4	P		X	X				X	X	X	X	X		X							
ISCO-1	SW	DLC CTM TRH	3/6/08 10:15	X		4	P		X	X				X	X	X	X	X		X							
PZ-18R	SW	DLC CTM TRH	3/6/08 10:35	X		4	P		X	X				X	X	X	X	X		X							
ISCO-3	SW	DLC CTM TRH	3/6/08 11:10	X		4	P		X	X				X	X	X	X	X		X							
ISCO-2	SW	DLC CTM TRH	3/6/08 11:25	X		4	P		X	X				X	X	X	X	X		X							
SD-17	SW	DLC CTM TRH	3/6/08 12:00	X		4	P		X	X				X	X	X	X	X		X							
SD-17DUP	SW	DLC CTM TRH	3/6/08 12:00	X		4	P		X	X				X	X	X	X	X		X							
SD-17MS	SW	DLC CTM TRH	3/6/08 12:00	X		4	P		X	X				X	X	X	X	X		X							
SD-17MSD	SW	DLC CTM TRH	3/6/08 12:00	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

Sampled by (print): David Chapman / Chris Mazzolini / Tom Hanlon
Signature: [signature]

Relinquished by:	Date:	Time:	Received by:	Date:	Time:
David Chapman	3/6/08	1445	[signature]	3/6/08	1445
[signature]	3/6/08	1730	[signature]	3/6/08	1730

Method of shipment:

TestAmerica-Westfield

Cooler? Y / N Samples Iced? Y / N
Temp @ receipt: 2.6 °C
Preservation/pH checked
By: [signature] Date: 3/6/08

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

OLIN-WILMINGTON
LEVEL I DATA QUALITY EVALUATION
STANDARD OPERATING PROCEDURE AND CHECKLIST
WET CHEMISTRY PARAMETERS BY VARIOUS METHODS

Reviewer/Date: Tige Cunningham 3/31/08
Sr. Review/Date: Chris Ricardi 4/14/08
Lab Report #: TestAmerica - 360-15366 : 360-15388
Project #: 61000800016-15A

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.

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 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
- [✓] 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
- [✓] Laboratory duplicate results (where applicable)

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

2.0 Holding Times Yes [ ] **No** [ ] N/A [ ] Comments:

Have any technical holding times, determined from date of collection to date of analysis, been exceeded? The holding times are as follows:

28 days = ammonia, chemical oxygen demand, chloride, organic carbon, oil & grease, specific conductance, total organic carbon and sulfate

Alkalinity = 14 days

Sulfide, TDS, TSS = 7 days

pH = analyze immediately

Nitrate nitrogen as N = 48 hrs (TC)

Nitrite nitrogen as N = 48 hrs (TC)

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 ☐ 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 <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**☑ = 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.

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: Only one spike was out (Low) for ammonia. Out high for Cl, Sulfate

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*(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

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

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:

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.

Version 1.2, Nov 2002

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

Reviewer/Date Tige Cunningham 3/28/07
Sr. Review/Date
Lab Report # TestAmerica 360-15360 ; 360-15358
Project # 610008016 - 15A

NO Qualifiers Added to groundwater metals

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.

Aluminum Qualified (J) in sample OC-SD-17 & OC-SD-17 Dup Total fraction only.

☑ Name of Laboratory ☑ Address ☑ Project ID ☑ Phone # ☑ Sample identification – Field and Laboratory

Client Information: ☑ Name ☑ Address ☐ Client Contact (IDs must be cross-referenced)

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

1.2 Laboratory Report Certification Statement Yes [✓] No [ ] N/A [ ] Comments:

Does the laboratory report include a completed Analytical Report Certification in the required format?

***ACTION**: If no, contact lab for submission of missing certification or certification with correct format.*

1.3 Laboratory Case Narrative: Yes [✓] No [ ] N/A [ ] Comments:

☑ *Narrative serves as an exception report for the project and method QA/QC performance.* ☐ *Narrative includes an explanation of each discrepancy on the*

Certification Statement.

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

1.4 Chain of Custody (COC) copy present with all documentation completed Yes [✓] No [ ] N/A [ ] Comments:

NOTE: Olin receives and maintains the *original COC.*

ACTION: If no, contact lab for submission of copy of completed *COC.*

1.5 Sample Receipt Information (*Cooler Receipt Form present?*): **Yes** [✓] No [ ] N/A [ ] Comments:

Were each of the following tasks completed and recorded upon receipt of the sample(s) into the laboratory?

☑ Sample temperature confirmed: must be 1° – 10° C. (If samples were sent by courier and delivered on the same day as collection, temperature requirement does not apply).

☑ Container type noted ☑ sample condition observed ☑ pH verified (where applicable) ☑ Field and lab IDs cross referenced

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

1.5.1 Were all samples delivered to the laboratory without breakage? **Yes** [✓] No [ ] N/A [ ] Comments:

1.5.2 Does the *Cooler Receipt Form* or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data? Yes [ ] **No** [✓] N/A [ ] Comments:

1.6 Sample Results Section: *Was each of the following requirements supplied in the laboratory report for each sample?* **Yes** [✓] No [ ] N/A [ ] Comments:

☑ Field ID and Lab ID ☑ *Date and time collected* ☑ Analyst Initials ☑ *Dilution Factor* 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 each of the following information supplied in the laboratory report for each sample batch? **Yes** [✓] No [ ] N/A [ ] Comments:

☑ Method blank results ☑ LCS recoveries ☑ MS/MSD recoveries and RPDs ☑ Laboratory duplicate results (where applicable)

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

2.0 Holding Times

Have any technical holding times, determined from date of collection to date of analysis, been exceeded? Holding time for metals is 180 days from sample collection to analysis for both water and soil.

Yes [ ] **No** [✓] N/A [ ] Comments:

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

ACTION: If technical holding times are exceeded, qualify all positive results (J) and non-detects (UJ). If grossly exceeded (2X holding time) reject (R) all non-detect results.

3.0 Laboratory Method

3.1 Was the correct laboratory method used?

Yes [✓] No [ ] N/A [✓] (TC) Comments:

NO digestion was listed for groundwater

Water Digestion	3005A or 3010A or 3020A
Soil Digestion	3050B
Metals	6010B or 200.7

ACTION: If no, contact laboratory to provide justification for method change compared to the requested method. Contact senior chemist to inform Client of change and to request variance.

3.2 Are the practical quantitation limits the same as those specified by the ☐ SOW ☑ QAPP ☐ Lab ☐ MADEP

Yes [✓] No [ ] N/A [ ] Comments:

NOTE: *Verify that the reported metals match the target list specified on the COC.*

ACTION: If no, evaluate variation with respect to sample matrix, preparation, dilution, moisture, etc. If sample PQL is indeterminate, contact lab for explanation.

3.3 Are results present for each sample in the SDG? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, check Request for Analysis to verify if method was ordered and COC to verify that it was sent, and contact lab for resubmission of the missing data

3.4 If dilutions were required, were dilution factors reported? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact the lab for submission.

4.0 Method Blanks

4.1 Is the Method Blank Summary present? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, call the laboratory for submission of missing data.

4.2 Frequency of Analysis: Was a method blank analyzed for each digestion batch of < 20 field samples? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact laboratory for justification. Consult senior chemist for action needed. Narrate non-compliance.

4.3 Is the method blank less than the PQLs for all target elements? **Yes** [✓] No [ ] N/A [ ] Comments:

NOTE: *MADEP requires the method blank to be matrix matched and digested with the samples*

4.4 Do any method blanks have positive results for metals? Qualify data according to the following: Yes [ ] **No** [✓] N/A [ ] Comments:

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

ACTION: For any blank with positive results, list all contaminants for each method blank including the concentration detected and the flagging level (flagging level = 5x the blank value) and the associated samples and qualifiers.

5.0 Laboratory Control Standard

5.1 Was a laboratory control standard run with each analytical batch of 20 samples or less?

Yes [✓] No [ ] N/A [ ] Comments:

NOTE: *A full target, second source LCS is required by MADEP.*
ACTION: Call laboratory for LCS form submittal. If data are not available, use professional judgement to evaluate data accuracy associated with that batch.

5.2 Is a LCS Summary Form present?

Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact lab for resubmission of missing data.

5.3 Is the recovery of any analyte outside of MADEP control limits?

Yes [ ] **No** [✓] N/A [ ] Comments:

Sample Type	***MADEP % Rec***
Water	*80-120*
Soil	within Lab generated limits

ACTION: If recovery is above the upper limit, qualify all positive sample results within the batch as (J). If recovery is below the lower limit, qualify all positive and non-detects results within the batch as (J). If LCS recovery is <30%, positive and non-detect results are rejected (R).

Comments:

6.0 Matrix Spikes

Matrix spikes may be collected at different frequencies based on monthly, quarterly, or task specific schedules. Confirm spike requirements for each set with the senior chemist.

6.1 Were project-specific MS/MSDs collected? List project samples that were spiked.

Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact senior chemist to see if any were specified.

6.2 Is the Matrix Spike/Matrix Spike Duplicate Recovery Form present?

Yes [✓] No [ ] N/A [ ] Comments:

NOTE: *A full target, second source MS/MSD is required by MADEP.* only Al : Cr reported
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 [✓] (JC) N/A [ ] Comments:

Spike on sample OC-SD-17
Sodium MS Recovery = 67%
MSD Recovery = 74%
J Qualify Sodium in OC-SD-17

Sample Type	***MADEP % Rec***	QAPP % Rec	Method
Water	*75-125*	N/A	6010B
Water	*N/A*	70-130	200.7
Soil	*75-125*	75-125	6010B

NOTE: %R = $\frac{(SSR-SR)}{SA} \times 100\%$ Where: SSR = Spiked sample result, SR = Sample result, SA = Spike added

NOTE: If dilutions are required due to high sample concentrations (> 4X spike), the data are evaluated, but no flags are applied.

NOTE: If only one of the recoveries for an MS/MSD pair is outside of the control limits, no qualification is necessary. Use professional judgment for the MS/MSD flags.

ACTION: MS/MSD flags only apply to the sample spiked. If the recoveries of the MS and MSD exceed the upper control limit, qualify positive results as estimated (J). If the recoveries of the MS and MSD are lower than the lower control limit, qualify positive results and non-detects (J).

6.5 Are any RPDs for MS/MSD recoveries outside of the QC limits? Yes [ ] **No** [✓] N/A [ ] Comments:

NOTE: $RPD = \frac{S-D}{(S+D)/2} \times 100\%$ Where: S = MS sample result
D = MSD sample result

NOTE: If dilutions are required due to high sample concentrations, the data are evaluated, but no flags are applied.

ACTION: If the RPD exceeds the control limit, qualify positive results and non-detects (J).

7.0 Laboratory Duplicate

7.1 Was a laboratory duplicate sample analyzed? If so, is the Laboratory Duplicate Sample Form present? **Yes** [✓] No [ ] N/A [ ] Comments:

NOTE: *MADEP refers to this sample as a "matrix duplicate".*

ACTION: If not analyzed, qualification is not needed. If data is missing, contact laboratory for resubmission of report. Narrate non-compliance.

7.2 Is the RPD between the result for the laboratory duplicate sample and the result for the parent sample outside of the QA/QC limits? Yes [ ] **No** [✓] N/A [ ] Comments:

MADEP Laboratory Duplicate Sample RPD Criteria:	QAPP RPD
For aqueous results > 5× RL, RPD must be ± 20%	20
For aqueous results < 5× RL, RPD must be ≤ RL	20
For soil/sediment results > 5× RL, RPD must be ± 35%	20
For soil/sediment results < 5× RL, RPD must be ≤ 2× RL	20

ACTION: If the RPD exceeds the limits, qualify both positive results and non-detects as estimated and flag them J. Narrate non-compliance

8.0 Sampling Accuracy

The majority of ground water samples are collected directly from a tap, process stream, or with dedicated tubing. Rinse blanks will not be collected.

8.1 Were rinsate blanks collected? Prior to evaluating rinsate blanks, obtain a list of the associated samples from the senior chemist. **Yes** [ ] No [✓] N/A [ ] Comments:

8.2 Do any rinsate blanks have positive results? Yes [ ] **No** [ ] N/A [✓] Comments:

***NOTE**: MADEP does not require the collection of rinsate blanks.*

ACTION: Evaluate rinsate results against blank results to determine if contaminant may be laboratory-derived. If results are not lab-related, qualify according to below.

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

9.0 Field Duplicates

9.1 Were field duplicate samples collected? Obtain a list of samples and their associated field duplicates. Yes [✓] **No** [ ] N/A [ ] Comments:

9.2 Were field duplicates collected per the required frequency? Yes [✓] No [ ] N/A [ ] Comments:

SOW ☐ QAPP *(1 per 10)* ☐ *MADEP Option 1 (1 per 20)* ☐ *MADEP Option 3 (1 per 10)* ☐

9.3 Was the RPD ≤ 50% for soils or waters? Calculate the RPD for all results and attach to this review. Yes [~~✓~~] (TC) No [✓] N/A [ ] Comments:

Sample OC-SD-17

ACTION: RPD must be ≤50% for soil and water. Qualify data (J) for both sample results if the RPD exceeds 50%.

Aluminum in total Fraction is 51.3%. J Qual Al in Total Fraction (estimated)

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** [~~✓~~] (TC) 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)

Sodium was >10% in Dissolved Fraction in Samples:

OC-PZ-16RR
OC-ISCO-1
OC-PZ-18R
OC-ISCO-3
OC-ISCO-2
OC-SD-17

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.

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To: Steve Morrow
From: Chris Ricardi
Date: April 16, 2008
Subject: Interim Response Steps Work Plan
Slurry Wall/Cap Monitoring Program 1Q08 - March 2008

DATA VALIDATION REPORT
MARCH 2008 SLURRY WALL / CAP SURFACE WATER AND GROUNDWATER
OLIN CHEMICAL SUPERFUND SITE
WILMINGTON, MASSACHUSETTS
TestAmerica Laboratories Data Sets 360-15366-1 and 360-15388-1

1.0 INTRODUCTION

Surface water and groundwater samples were collected from the Olin Chemical Superfund Site on March 5 and March 6, 2008. Samples were analyzed by TestAmerica Laboratories in Westfield, Massachusetts. Data were reported in sample delivery groups (SDG) 360-15366-1 and 360-15388-1. 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 300.0, and specific conductance by SM18 SM 2510B

The Olin Wilmington Quality Assurance Project Plan 1999 (QAPP) was 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.

With the exception of the data qualification items discussed in the sections below, results are determined to be usable as reported by the laboratory.

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

Matrix Spikes

Surface water sample OC-SD-17 (total fraction) was used as a MS/MSD. The percent recovery of sodium is below the lower control limit of 75 in the MS (67) and MSD (74). Sodium was qualified estimated (J) in sample OC-SD-17 (total fraction).

Field Duplicates

The Relative Percent Difference (RPD) for the aluminum results (total) for sample OC-SD-17 and field duplicate sample OC-SD-17 DUP (51) is above the control limit of 50. The total aluminum results are qualified estimated (J) in sample OC-SD-17 and OC-SD-17 DUP.

Sample Result Verification

The sodium concentration reported in dissolved samples was greater than ten percent higher than the concentration reported in the total fraction for the following surface water samples: OC-PZ-16RR, OC-ISCO-1, OC-PZ-18R, OC-ISCO-3, OC-ISCO-2, and OC-SD-17. Sodium was qualified estimated (J) in the total and dissolved fraction 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
* Laboratory Control Sample
* Detection limits
* Sample Result Verification / Electronic Evaluation Verification

* = indicates that criteria were met for this parameter

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

4/19/08
Date

M J Murphy

Michael Murphy
Project Principal

4/19/08
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, 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), 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 - 360-15366 & 360-15388
Data Validation Report
March 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	(Lachat 10-107-06-1) EPA 350.1	40CFR136A 300.0	40CFR136A 300.4	SM18 2510B
Groundwater									
360-15366-1	GW-202S	OC-GW-202S	3/5/2008		2	1	2		1
360-15366-2	GW-79S	OC-GW-79S	3/5/2008		2	1	2		1
360-15366-3	PZ-16RR	OC-PZ-16RR	3/5/2008		2	1	2		1
360-15366-4	PZ-17RR	OC-PZ-17RR	3/5/2008		2	1	2		1
360-15366-5	GW-25	OC-GW-25	3/5/2008		2	1	2		1
360-15366-6	GW-25	OC-GW-25DUP	3/5/2008		2	1	2		1
360-15366-7	PZ-18R	OC-PZ-18R	3/5/2008		2	1	2		1
Surface Water									
360-15388-1	PZ-16RR	OC-PZ-16RR	3/6/2008	3	3	1	2	2	1
360-15388-2	PZ-17RR	OC-PZ-17RR	3/6/2008	3	3	1	2	2	1
360-15388-3	ISCO-1	OC-ISCO-1	3/6/2008	3	3	1	2	2	1
360-15388-4	PZ-18R	OC-PZ-18R	3/6/2008	3	3	1	2	2	1
360-15388-5	ISCO-3	OC-ISCO-3	3/6/2008	3	3	1	2	2	1
360-15388-6	ISCO-2	OC-ISCO-2	3/6/2008	3	3	1	2	2	1
360-15388-7	SD-17	OC-SD-17	3/6/2008	3	3	1	2	2	1
360-15388-8	SD-17	OC-SD-17 DUP	3/6/2008	3	3	1	2	2	1

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

Prepared by / Date: KJC 04/18/08
Checked by / Date: CSR 04/18/08

Table 2
Final Results Summary - 360-15366 & 360-15388
March 2008 Slurry Wall / Cap Surface Water and Groundater
Olin Chemical Superfund Site
Wilmington, Massachusetts

			Loc Name	GW-202S		GW-25		GW-25		GW-79S		PZ-16RR		PZ-17RR		PZ-18R	
			Field Sample Id	OC-GW-202S		OC-GW-25		OC-GW-25DUP		OC-GW-79S		OC-PZ-16RR		OC-PZ-17RR		OC-PZ-18R	
			Field Sample Date	03/05/08		03/05/08		03/05/08		03/05/08		03/05/08		03/05/08		03/05/08	
			Qc Code	FS		FS		FD		FS		FS		FS		FS	
			Lab Sample Delivery Group	360-15366		360-15366		360-15366		360-15366		360-15366		360-15366		360-15366	
Frac	Method	Analyte	Units	Final Resu	Final Qual	Final Resu	Final Qual	Final Resu	Final Qual	Final Resu	Final Qual	Final Resu	Final Qual	Final Resu	Final Qual	Final Resu	Final Qual
N	40CFR136A 300.0	Chloride	mg/L	46		71		61		91		130		26		130	
N	40CFR136A 300.0	Sulfate as SO4	mg/L	490		240		210		950		850		390		130	
N	QuickChem 350.1	Nitrogen, Ammonia	mg/L	85		66		64		170		180		53		23	
N	SM18 2510B	Specific Conductance	umhos/cm	1400		950		950		2200		2500		1200		840	
F	SW846 6010B	Aluminum, Filtered	mg/L	0.1	U	0.1	U	0.1	U	0.016	J	0.1	U	0.1	U	0.1	U
F	SW846 6010B	Chromium, Filtered	mg/L	0.004	J	0.0082		0.0082		0.012		0.0086		0.0022	J	0.0066	

Notes:
N = normal
F = filtered
FS = field sample
FD = field duplicate
U = not detected, value is the detection limit
J = value is estimated

Prepared by / Date: KJC 04/18/08
Checked by / Date: CSR 04/18/08

Table 2
Final Results Summary - 360-15366 & 360-15388
March 2008 Slurry Wall / Cap Surface Water and Groundater
Olin Chemical Superfund Site
Wilmington, Massachusetts

			Loc Name	ISCO1		ISCO2		ISCO3		PZ-16RR		PZ-17RR		PZ-18R		SD-17		SD-17	
			Field Sample Id	OC-ISCO-1		OC-ISCO-2		OC-ISCO-3		OC-PZ-16RR		OC-PZ-17RR		OC-PZ-18R		OC-SD-17		OC-SD-17 DUP	
			Field Sample Date	03/06/08		03/06/08		03/06/08		03/06/08		03/06/08		03/06/08		03/06/08		03/06/08	
			Qc Code	FS		FS		FS		FS		FS		FS		FS		FD	
			Lab Sample Delivery Group	360-15388		360-15388		360-15388		360-15388		360-15388		360-15388		360-15388		360-15388	
Frac	Method	Analyte	Units	Final Resu	Final Qual	Final Resu	Final Qual	Final Resu	Final Qual	Final Resu	Final Qual	Final Resu	Final Qual	Final Resu	Final Qual	Final Resu	Final Qual	Final Resu	Final Qual
N	40CFR136A 300.0	Chloride	mg/L	90		70		69		88		94		81		100		100	
N	40CFR136A 300.0	Sulfate as SO4	mg/L	97		160		160		160		170		88		190		190	
N	40CFR136A 300_4	Nitrate as N	mg/L	0.49		1.5		1.5		0.61		0.46		0.41		0.61		0.46	
N	40CFR136A 300_4	Nitrite as N	mg/L	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U
N	QuickChem 350.1	Nitrogen, Ammonia	mg/L	18		27		26		27		36		18		37		37	
N	SM18 2510B	Specific Conductance	umhos/cm	580		680		680		720		810		580		840		840	
F	SW846 6010B	Aluminum, Filtered	mg/L	0.33		0.84		1		0.8		1.2		0.29		1.6		1.6	
F	SW846 6010B	Chromium, Filtered	mg/L	0.046		0.093		0.12		0.19		0.3		0.042		0.35		0.35	
F	SW846 6010B	Sodium, Filtered	mg/L	69	J	68	J	67	J	81	J	89		69	J	93	J	91	
T	SW846 6010B	Aluminum, Total	mg/L	0.57		1.7		1.8		2.9		9.4		0.59		4.9	J	2.9	J
T	SW846 6010B	Chromium, Total	mg/L	0.063		0.26		0.29		0.61		2.3		0.064		1		0.72	
T	SW846 6010B	Sodium, Total	mg/L	59	J	61	J	60	J	72	J	81		62	J	77	J	84	

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 04/18/08
Checked by / Date: CSR 04/18/08

Level I review done
3/31/08
Tiye

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THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

Job Number: 360-15366-1

Job Description: PCMP

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

Attention: Mr. Steven Morrow

Joseph A. Clemens

Designee for
Becky C Mason
Project Manager II
becky.mason@testamericainc.com
03/14/2008

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 #:	**360-15366-1**
Project Location:	**PCMP**	MADEP RTN[1]:	

This form provides certifications for the following data set:[list Laboratory Sample ID Number(s)]
360-15366-(1-7)

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: S. Hartmann **Position:** Laboratory Director

Printed Name: Steven C. Hartmann **Date:** 3/14/08

CAM VII A, Rev 3.2 April-04

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MADEP MA014
NY DOH 10843
RI DOH 57
CT DPH 0494
VT DECWSD

NELAP FL E87912 TOX
NELAP NJ MA008 TOX
NELAP NY 10843
NH DES 253901-A

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148 Rangeway Rd
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MADEP MCP Analytical Method Report Certification Form

Laboratory Name:	**TestAmerica Westfield**	Project #:	**360-15366-1**
Project Location:	**PCMP**	MADEP RTN[1]:	

This form provides certifications for the following data set:[list Laboratory Sample ID Number(s)]
360-15366-(1-7)

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

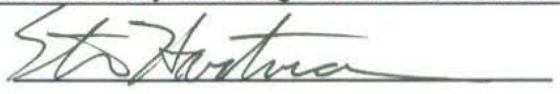
A	Were all samples received by the laboratory in a condition consistent with that described on the Chain-of-Custody documentation for the data set?	(Yes) No[1]
B	Were all QA/QC procedures required for the specified analytical method(s) included in this report followed, including the requirement to note 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:** 3/14/08

CAM VII A, Rev 3.2 April-04

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MADEP MA014
NY DOH 10843
RI DOH 57
CT DPH 0494
VT DECWSD

NELAP FL E87912 TOX
NELAP NJ MA008 TOX
NELAP NY 10843
NH DES 253901-A

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CASE NARRATIVE

Client: Olin Corporation

Project: PCMP

Report Number: 360-15366-1

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 03/05/2008; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 1.8°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 360-15366-1 through 360-15366-7 were analyzed for dissolved metals in accordance with EPA SW846 Method 6010B. The samples were analyzed on 03/06/2008.

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 360-15366-1 through 360-15366-7 were analyzed for ammonia in accordance with LACHAT 10-107-06-1. The samples were prepared and analyzed on 03/06/2008.

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

Samples 360-15366-1 through 360-15366-6(10X) and 360-15366-7(5X) required dilution prior to analysis. The reporting limits have been adjusted accordingly. Dilutions were due to high concentration.

ANIONS

Samples 360-15366-1 through 360-15366-7 were analyzed for anions in accordance with EPA Method 300.0. The samples were analyzed on 03/08/2008 and 03/11/2008.

All QC performance standards and recommendations for this specific method were achieved with the exception of:

Chloride and Sulfate failed the MS/MSD recovery criteria high for the matrix spike and matrix spike duplicate of sample 360-15366-5. The associated LCS recovered within control limits. Refer to the QC report for details.

Samples 360-15366-1 through 360-15366-7(10X) required dilution prior to analysis. The reporting limits have been adjusted accordingly. Dilutions were due to high target concentration.

For batch 29723, difficulties were encountered during this analysis, which caused the closing calibration standard to fail low. The samples were re-analyzed, at multiple dilutions, with similar results noted for the closing standard. The best possible data is being reported from these runs; however, the results may be biased low due to matrix interference.

SPECIFIC CONDUCTANCE (CONDUCTIVITY)

Samples 360-15366-1 through 360-15366-7 were analyzed for Specific Conductance (Conductivity) in accordance with SM 2510B. The samples were analyzed on 03/06/2008.

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: 360-15366-1

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-Nitrogen	TAL WFD	QuickChem 10-107-06-1	
Distillation/Ammonia	TAL WFD		Distill/Ammonia
Chloride & Sulfate	TAL WFD	40CFR136A 300.0	
Conductivity, Specific Conductance	TAL WFD	SM18 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

SM18 = "Standard Methods For The Examination Of Water And Wastewater", 18th Edition, 1992.

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: 360-15366-1

Method	Analyst	Analyst ID
SW846 6010B	Balicki, Charles W	CWB
QuickChem 10-107-06-1	Lalashius, Andrew L	ALL
40CFR136A 300.0	Lalashius, Andrew L	ALL
SM18 SM 2510B	Emerich, Rich W	RWE

SAMPLE SUMMARY

Client: Olin Corporation

Job Number: 360-15366-1

Lab Sample ID	Client Sample ID	Client Matrix	Date/Time Sampled	Date/Time Received
360-15366-1	OC-GW-202S	Ground Water	03/05/2008 1005	03/05/2008 1715
360-15366-2	OC-GW-79S	Ground Water	03/05/2008 1020	03/05/2008 1715
360-15366-3	OC-PZ-16RR	Ground Water	03/05/2008 1150	03/05/2008 1715
360-15366-4	OC-PZ-17RR	Ground Water	03/05/2008 1305	03/05/2008 1715
360-15366-5	OC-GW-25	Ground Water	03/05/2008 1240	03/05/2008 1715
360-15366-5MS	OC-GW-25 MS	Ground Water	03/05/2008 1240	03/05/2008 1715
360-15366-5MSD	OC-GW-25 MSD	Ground Water	03/05/2008 1240	03/05/2008 1715
360-15366-6	OC-GW-25DUP	Ground Water	03/05/2008 1240	03/05/2008 1715
360-15366-7	OC-PZ-18R	Ground Water	03/05/2008 1430	03/05/2008 1715

SAMPLE RESULTS

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

Job Number: 360-15366-1

Client Sample ID: OC-GW-202S
Lab Sample ID: 360-15366-1

Date Sampled: 03/05/2008 1005
Date Received: 03/05/2008 1715
Client Matrix: Ground Water

Analyte	Result/Qualifier		Unit	MDL	RL	Dilution
Method: Dissolved-6010B			Date Analyzed:		03/06/2008 1108	
Aluminum	ND		ug/L	6.0	100	1.0
Chromium	4.0	J	ug/L	0.68	5.0	1.0

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

Job Number: 360-15366-1

Client Sample ID: OC-GW-202S
Lab Sample ID: 360-15366-1

Date Sampled: 03/05/2008 1005
Date Received: 03/05/2008 1715
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 10-107-06-1		Date Analyzed:		03/06/2008 1203	
Prep Method: Distill/Ammonia		Date Prepared:		03/06/2008 0935	
Ammonia	85	mg/L	1.0	1.0	10
Method: 300.0		Date Analyzed:		03/08/2008 0041	
Sulfate	490	mg/L	20	20	10
Chloride	46	mg/L	10	10	10
Method: SM 2510B		Date Analyzed:		03/06/2008 1425	
Specific Conductance	1400	umhos/cm	1.0	1.0	1.0

Mr. Steven Morrow
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Cleveland, TN 37312-4441

Job Number: 360-15366-1

Client Sample ID: OC-GW-79S
Lab Sample ID: 360-15366-2

Date Sampled: 03/05/2008 1020
Date Received: 03/05/2008 1715
Client Matrix: Ground Water

Analyte	Result/Qualifier		Unit	MDL	RL	Dilution
Method: Dissolved-6010B			Date Analyzed:		03/06/2008 1110	
Aluminum	16	J	ug/L	6.0	100	1.0
Chromium	12		ug/L	0.68	5.0	1.0

Mr. Steven Morrow
Olin Corporation
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Cleveland, TN 37312-4441

Job Number: 360-15366-1

Client Sample ID: OC-GW-79S
Lab Sample ID: 360-15366-2

Date Sampled: 03/05/2008 1020
Date Received: 03/05/2008 1715
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 10-107-06-1		Date Analyzed:		03/06/2008 1204	
Prep Method: Distill/Ammonia		Date Prepared:		03/06/2008 0935	
Ammonia	170	mg/L	1.0	1.0	10
Method: 300.0		Date Analyzed:		03/08/2008 0141	
Sulfate	950	mg/L	20	20	10
Chloride	91	mg/L	10	10	10
Method: SM 2510B		Date Analyzed:		03/06/2008 1427	
Specific Conductance	2200	umhos/cm	1.0	1.0	1.0

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

Job Number: 360-15366-1

Client Sample ID: OC-PZ-16RR
Lab Sample ID: 360-15366-3

Date Sampled: 03/05/2008 1150
Date Received: 03/05/2008 1715
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B		Date Analyzed:	03/06/2008 1113		
Aluminum	ND	ug/L	6.0	100	1.0
Chromium	8.6	ug/L	0.68	5.0	1.0

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

Job Number: 360-15366-1

Client Sample ID: OC-PZ-16RR
Lab Sample ID: 360-15366-3

Date Sampled: 03/05/2008 1150
Date Received: 03/05/2008 1715
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 10-107-06-1		Date Analyzed:		03/06/2008 1205	
Prep Method: Distill/Ammonia		Date Prepared:		03/06/2008 0935	
Ammonia	180	mg/L	1.0	1.0	10
Method: 300.0		Date Analyzed:		03/08/2008 0212	
Sulfate	850	mg/L	20	20	10
Chloride	130	mg/L	10	10	10
Method: SM 2510B		Date Analyzed:		03/06/2008 1428	
Specific Conductance	2500	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: 360-15366-1

Client Sample ID: OC-PZ-17RR
Lab Sample ID: 360-15366-4

Date Sampled: 03/05/2008 1305
Date Received: 03/05/2008 1715
Client Matrix: Ground Water

Analyte	Result/Qualifier		Unit	MDL	RL	Dilution
Method: Dissolved-6010B			Date Analyzed:		03/06/2008 1115	
Aluminum	ND		ug/L	6.0	100	1.0
Chromium	2.2	J	ug/L	0.68	5.0	1.0

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

Job Number: 360-15366-1

Client Sample ID: OC-PZ-17RR
Lab Sample ID: 360-15366-4

Date Sampled: 03/05/2008 1305
Date Received: 03/05/2008 1715
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 10-107-06-1		Date Analyzed:		03/06/2008 1208	
Prep Method: Distill/Ammonia		Date Prepared:		03/06/2008 0935	
Ammonia	53	mg/L	1.0	1.0	10
Method: 300.0		Date Analyzed:		03/08/2008 0227	
Chloride	26	mg/L	1.0	1.0	1.0
Method: 300.0		Date Analyzed:		03/08/2008 0242	
Sulfate	390	mg/L	20	20	10
Method: SM 2510B		Date Analyzed:		03/06/2008 1430	
Specific Conductance	1200	umhos/cm	1.0	1.0	1.0

Mr. Steven Morrow
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3855 North Ocoee Street
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Cleveland, TN 37312-4441

Job Number: 360-15366-1

Client Sample ID: OC-GW-25
Lab Sample ID: 360-15366-5

Date Sampled: 03/05/2008 1240
Date Received: 03/05/2008 1715
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B		Date Analyzed:		03/06/2008 1052	
Aluminum	ND	ug/L	6.0	100	1.0
Chromium	8.2	ug/L	0.68	5.0	1.0

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

Job Number: 360-15366-1

Client Sample ID: OC-GW-25
Lab Sample ID: 360-15366-5

Date Sampled: 03/05/2008 1240
Date Received: 03/05/2008 1715
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 10-107-06-1		Date Analyzed:		03/06/2008 1209	
Prep Method: Distill/Ammonia		Date Prepared:		03/06/2008 0935	
Ammonia	66	mg/L	1.0	1.0	10
Method: 300.0		Date Analyzed:		03/11/2008 1726	
Sulfate	240	mg/L	20	20	10
Chloride	71	mg/L	10	10	10
Method: SM 2510B		Date Analyzed:		03/06/2008 1431	
Specific Conductance	950	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: 360-15366-1

Client Sample ID: OC-GW-25DUP
Lab Sample ID: 360-15366-6

Date Sampled: 03/05/2008 1240
Date Received: 03/05/2008 1715
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B		Date Analyzed:	03/06/2008 1118		
Aluminum	ND	ug/L	6.0	100	1.0
Chromium	8.2	ug/L	0.68	5.0	1.0

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

Job Number: 360-15366-1

Client Sample ID: OC-GW-25DUP
Lab Sample ID: 360-15366-6

Date Sampled: 03/05/2008 1240
Date Received: 03/05/2008 1715
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 10-107-06-1		Date Analyzed:		03/06/2008 1212	
Prep Method: Distill/Ammonia		Date Prepared:		03/06/2008 0935	
Ammonia	64	mg/L	1.0	1.0	10
Method: 300.0		Date Analyzed:		03/08/2008 0312	
Sulfate	210	mg/L	20	20	10
Chloride	61	mg/L	10	10	10
Method: SM 2510B		Date Analyzed:		03/06/2008 1434	
Specific Conductance	950	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: 360-15366-1

Client Sample ID: OC-PZ-18R
Lab Sample ID: 360-15366-7

Date Sampled: 03/05/2008 1430
Date Received: 03/05/2008 1715
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B		Date Analyzed:	03/06/2008 1121		
Aluminum	ND	ug/L	6.0	100	1.0
Chromium	6.6	ug/L	0.68	5.0	1.0

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

Job Number: 360-15366-1

Client Sample ID: OC-PZ-18R
Lab Sample ID: 360-15366-7

Date Sampled: 03/05/2008 1430
Date Received: 03/05/2008 1715
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 10-107-06-1		Date Analyzed:		03/06/2008 1213	
Prep Method: Distill/Ammonia		Date Prepared:		03/06/2008 0935	
Ammonia	23	mg/L	0.50	0.50	5.0
Method: 300.0		Date Analyzed:		03/08/2008 0342	
Sulfate	130	mg/L	20	20	10
Chloride	130	mg/L	10	10	10
Method: SM 2510B		Date Analyzed:		03/06/2008 1436	
Specific Conductance	840	umhos/cm	1.0	1.0	1.0

DATA REPORTING QUALIFIERS

Client: Olin Corporation

Job Number: 360-15366-1

Lab Section	Qualifier	Description
Metals		
	J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
General Chemistry		
	F	MS or MSD exceeds the control limits
	4	MS, MSD: The analyte present in the original sample is 4 times greater than the matrix spike concentration; therefore, control limits are not applicable.

QUALITY CONTROL RESULTS

Client: Olin Corporation

Job Number: 360-15366-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
Metals					
Analysis Batch:360-29487					
LCS 360-29487/13	Lab Control Spike	T	Water	6010B	
LCSD 360-29487/25	Lab Control Spike Duplicate	T	Water	6010B	
MB 360-29487/14	Method Blank	T	Water	6010B	
360-15366-1	OC-GW-202S	D	Water	6010B	
360-15366-2	OC-GW-79S	D	Water	6010B	
360-15366-3	OC-PZ-16RR	D	Water	6010B	
360-15366-4	OC-PZ-17RR	D	Water	6010B	
360-15366-5	OC-GW-25	D	Water	6010B	
360-15366-5MS	Matrix Spike	D	Water	6010B	
360-15366-5MSD	Matrix Spike Duplicate	D	Water	6010B	
360-15366-6	OC-GW-25DUP	D	Water	6010B	
360-15366-7	OC-PZ-18R	D	Water	6010B	

Report Basis
D = Dissolved
T = Total

Client: Olin Corporation

Job Number: 360-15366-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
General Chemistry					
Prep Batch: 360-29456					
LCS 360-29456/2-A	Lab Control Spike	T	Water	Distill/Ammonia	
MB 360-29456/1-A	Method Blank	T	Water	Distill/Ammonia	
360-15366-1	OC-GW-202S	T	Water	Distill/Ammonia	
360-15366-2	OC-GW-79S	T	Water	Distill/Ammonia	
360-15366-3	OC-PZ-16RR	T	Water	Distill/Ammonia	
360-15366-4	OC-PZ-17RR	T	Water	Distill/Ammonia	
360-15366-5	OC-GW-25	T	Water	Distill/Ammonia	
360-15366-5MS	Matrix Spike	T	Water	Distill/Ammonia	
360-15366-5MSD	Matrix Spike Duplicate	T	Water	Distill/Ammonia	
360-15366-6	OC-GW-25DUP	T	Water	Distill/Ammonia	
360-15366-7	OC-PZ-18R	T	Water	Distill/Ammonia	
Analysis Batch:360-29466					
LCS 360-29456/2-A	Lab Control Spike	T	Water	10-107-06-1	360-29456
MB 360-29456/1-A	Method Blank	T	Water	10-107-06-1	360-29456
360-15366-1	OC-GW-202S	T	Water	10-107-06-1	360-29456
360-15366-2	OC-GW-79S	T	Water	10-107-06-1	360-29456
360-15366-3	OC-PZ-16RR	T	Water	10-107-06-1	360-29456
360-15366-4	OC-PZ-17RR	T	Water	10-107-06-1	360-29456
360-15366-5	OC-GW-25	T	Water	10-107-06-1	360-29456
360-15366-5MS	Matrix Spike	T	Water	10-107-06-1	360-29456
360-15366-5MSD	Matrix Spike Duplicate	T	Water	10-107-06-1	360-29456
360-15366-6	OC-GW-25DUP	T	Water	10-107-06-1	360-29456
360-15366-7	OC-PZ-18R	T	Water	10-107-06-1	360-29456
Analysis Batch:360-29480					
LCS 360-29480/1	Lab Control Spike	T	Water	SM 2510B	
MB 360-29480/3	Method Blank	T	Water	SM 2510B	
360-15366-1	OC-GW-202S	T	Water	SM 2510B	
360-15366-2	OC-GW-79S	T	Water	SM 2510B	
360-15366-3	OC-PZ-16RR	T	Water	SM 2510B	
360-15366-4	OC-PZ-17RR	T	Water	SM 2510B	
360-15366-5	OC-GW-25	T	Water	SM 2510B	
360-15366-5DU	Duplicate	T	Water	SM 2510B	
360-15366-6	OC-GW-25DUP	T	Water	SM 2510B	
360-15366-7	OC-PZ-18R	T	Water	SM 2510B	

Client: Olin Corporation

Job Number: 360-15366-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
General Chemistry					
Analysis Batch:360-29600					
LCS 360-29600/37	Lab Control Spike	T	Water	300.0	
MB 360-29600/36	Method Blank	T	Water	300.0	
360-15366-1	OC-GW-202S	T	Water	300.0	
360-15366-2	OC-GW-79S	T	Water	300.0	
360-15366-3	OC-PZ-16RR	T	Water	300.0	
360-15366-4	OC-PZ-17RR	T	Water	300.0	
360-15366-6	OC-GW-25DUP	T	Water	300.0	
360-15366-7	OC-PZ-18R	T	Water	300.0	
Analysis Batch:360-29723					
LCS 360-29723/2	Lab Control Spike	T	Water	300.0	
MB 360-29723/1	Method Blank	T	Water	300.0	
360-15366-5	OC-GW-25	T	Water	300.0	
360-15366-5MS	Matrix Spike	T	Water	300.0	
360-15366-5MSD	Matrix Spike Duplicate	T	Water	300.0	

Report Basis
T = Total

Client: Olin Corporation

Job Number: 360-15366-1

Method Blank - Batch: 360-29487

Method: 6010B
Preparation: N/A

Lab Sample ID: MB 360-29487/14
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 03/06/2008 1007
Date Prepared: N/A

Analysis Batch: 360-29487
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: mL

Analyte	Result	Qual	MDL	RL
Aluminum	ND		6.0	100
Chromium	ND		0.68	5.0

Lab Control Spike/
Lab Control Spike Duplicate Recovery Report - Batch: 360-29487

Method: 6010B
Preparation: N/A

LCS Lab Sample ID: LCS 360-29487/13
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 03/06/2008 1004
Date Prepared: N/A

Analysis Batch: 360-29487
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: mL

LCSD Lab Sample ID: LCSD 360-29487/25
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 03/06/2008 1102
Date Prepared: N/A

Analysis Batch: 360-29487
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: mL

	% Rec.						
Analyte	LCS	LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Aluminum	102	103	80 - 120	1	20		
Chromium	102	102	80 - 120	0	20		

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

Client: Olin Corporation

Job Number: 360-15366-1

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 360-29487

Method: 6010B
Preparation: N/A

MS Lab Sample ID:	360-15366-5	Analysis Batch:	360-29487	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:	03/06/2008 1054			Final Weight/Volume:	mL
Date Prepared:	N/A				

MSD Lab Sample ID:	360-15366-5	Analysis Batch:	360-29487	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:	03/06/2008 1057			Final Weight/Volume:	mL
Date Prepared:	N/A				

	% Rec.						
Analyte	MS	MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Aluminum	110	111	75 - 125	1	20		
Chromium	108	109	75 - 125	1	20		

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

Client: Olin Corporation

Job Number: 360-15366-1

Method Blank - Batch: 360-29456

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

Lab Sample ID: MB 360-29456/1-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 03/06/2008 1144
Date Prepared: 03/06/2008 0935

Analysis Batch: 360-29466
Prep Batch: 360-29456
Units: mg/L

Instrument ID: Lachat 8000 FIA
Lab File ID: N/A
Initial Weight/Volume: mL
Final Weight/Volume: 50 mL

Analyte	Result	Qual	RL	RL
Ammonia	ND		0.10	0.10

Lab Control Spike - Batch: 360-29456

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

Lab Sample ID: LCS 360-29456/2-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 03/06/2008 1145
Date Prepared: 03/06/2008 0935

Analysis Batch: 360-29466
Prep Batch: 360-29456
Units: mg/L

Instrument ID: Lachat 8000 FIA
Lab File ID: N/A
Initial Weight/Volume: mL
Final Weight/Volume: 50 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Ammonia	10.0	9.60	96	85 - 115	

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 360-29456

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

MS Lab Sample ID: 360-15366-5
Client Matrix: Water
Dilution: 10
Date Analyzed: 03/06/2008 1210
Date Prepared: 03/06/2008 0935

Analysis Batch: 360-29466
Prep Batch: 360-29456

Instrument ID: Lachat 8000 FIA
Lab File ID: N/A
Initial Weight/Volume: mL
Final Weight/Volume: 50 mL

MSD Lab Sample ID: 360-15366-5
Client Matrix: Water
Dilution: 10
Date Analyzed: 03/06/2008 1211
Date Prepared: 03/06/2008 0935

Analysis Batch: 360-29466
Prep Batch: 360-29456

Instrument ID: Lachat 8000 FIA
Lab File ID: N/A
Initial Weight/Volume: mL
Final Weight/Volume: 50 mL

Analyte	% Rec. MS	% Rec. MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Ammonia	113	97	75 - 125	2	20	4	4

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

Client: Olin Corporation

Job Number: 360-15366-1

Method Blank - Batch: 360-29600

Method: 300.0
Preparation: N/A

Lab Sample ID: MB 360-29600/36
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 03/07/2008 2155
Date Prepared: N/A

Analysis Batch: 360-29600
Prep Batch: N/A
Units: mg/L

Instrument ID: Lachat 8500 Ion
Lab File ID: OM_3-7-2008_01-05-13PM
Initial Weight/Volume:
Final Weight/Volume: mL

Analyte	Result	Qual	RL	RL
Sulfate	ND		2.0	2.0
Chloride	ND		1.0	1.0

Lab Control Spike - Batch: 360-29600

Method: 300.0
Preparation: N/A

Lab Sample ID: LCS 360-29600/37
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 03/07/2008 2210
Date Prepared: N/A

Analysis Batch: 360-29600
Prep Batch: N/A
Units: mg/L

Instrument ID: Lachat 8500 Ion
Lab File ID: OM_3-7-2008_01-05-13PM
Initial Weight/Volume:
Final Weight/Volume: mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Sulfate	80.0	83.5	104	85 - 115	
Chloride	40.0	42.1	105	85 - 115	

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

Client: Olin Corporation

Job Number: 360-15366-1

Method Blank - Batch: 360-29723

Method: 300.0
Preparation: N/A

Lab Sample ID: MB 360-29723/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 03/11/2008 1626
Date Prepared: N/A

Analysis Batch: 360-29723
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: mL
Final Weight/Volume: mL

Analyte	Result	Qual	RL	RL
Sulfate	ND		2.0	2.0
Chloride	ND		1.0	1.0

Lab Control Spike - Batch: 360-29723

Method: 300.0
Preparation: N/A

Lab Sample ID: LCS 360-29723/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 03/11/2008 1711
Date Prepared: N/A

Analysis Batch: 360-29723
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: mL
Final Weight/Volume: mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Sulfate	80.0	86.1	108	85 - 115	
Chloride	40.0	42.8	107	85 - 115	

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

Client: Olin Corporation

Job Number: 360-15366-1

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 360-29723

Method: 300.0
Preparation: N/A

MS Lab Sample ID:	360-15366-5	Analysis Batch: 360-29723	Instrument ID: No Equipment Assigned
Client Matrix:	Water	Prep Batch: N/A	Lab File ID: N/A
Dilution:	10		Initial Weight/Volume: mL
Date Analyzed:	03/11/2008 1742		Final Weight/Volume: 10 mL
Date Prepared:	N/A		

MSD Lab Sample ID:	360-15366-5	Analysis Batch: 360-29723	Instrument ID: No Equipment Assigned
Client Matrix:	Water	Prep Batch: N/A	Lab File ID: N/A
Dilution:	10		Initial Weight/Volume: mL
Date Analyzed:	03/11/2008 1757		Final Weight/Volume: 10 mL
Date Prepared:	N/A		

	% Rec.						
Analyte	MS	MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Sulfate	134	134	75 - 125	0	20	F	F
Chloride	130	129	75 - 125	0	20	F	F

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

Client: Olin Corporation

Job Number: 360-15366-1

Method Blank - Batch: 360-29480

Method: SM 2510B
Preparation: N/A

Lab Sample ID: MB 360-29480/3
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 03/06/2008 1422
Date Prepared: N/A

Analysis Batch: 360-29480
Prep Batch: N/A
Units: umhos/cm

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

Analyte	Result	Qual	RL	RL
Specific Conductance	ND		1.0	1.0

Lab Control Spike - Batch: 360-29480

Method: SM 2510B
Preparation: N/A

Lab Sample ID: LCS 360-29480/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 03/06/2008 1420
Date Prepared: N/A

Analysis Batch: 360-29480
Prep Batch: N/A
Units: umhos/cm

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

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Specific Conductance	1400	1410	101	85 - 115	

Duplicate - Batch: 360-29480

Method: SM 2510B
Preparation: N/A

Lab Sample ID: 360-15366-5
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 03/06/2008 1433
Date Prepared: N/A

Analysis Batch: 360-29480
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: mL

Analyte	Sample Result/Qual	Result	RPD	Limit	Qual
Specific Conductance	950	946	1	20	

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

Login Sample Receipt Check List

Client: Olin Corporation

Job Number: 360-15366-1

Login Number: 15366
List Source: TestAmerica Westfield
Creator: Rinard, Kimberley A
List Number: 1

Question	T / F/ NA	Comment
Radioactivity either was not measured or, if measured, is at or below background	N/A	
The cooler's custody seal, if present, is intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	1.8 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

•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: 339-927-3793 Fax: 781-246-5060

Project #: 61000800016/04
Project Manager: Peter Thompson
Work ID: PCMP
Contact: David Chapman

Job# 360-15366 | 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
GW-202S	GW	DLC	3/5/08 10:05	X		3	P		X	X				X	X	X	X		X								
GW-79S	GW	TRH ~~DLC~~	3/5/08 10:30	X		3	P		X	X				X	X	X	X		X								
PZ-16RR	GW	DLC	3/5/08 11:50	X		3	P		X	X				X	X	X	X		X								
PZ-17RR	GW	DLC	3/5/08 13:05	X		3	P		X	X				X	X	X	X		X								
GW-25	GW	TRH	3/5/08 12:40	X		3	P		X	X				X	X	X	X		X								
GW-25DUP	GW	TRH	3/5/08 12:40	X		3	P		X	X				X	X	X	X		X								
GW-25MS	GW	TRH	3/5/08 12:40	X		3	P		X	X				X	X	X	X		X								
GW-25MSD	GW	TRH	3/5/08 12:40	X		3	P		X	X				X	X	X	X		X								
PZ-18R	GW	TRH	3/5/08 1430	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

3/5/08 cm

Sampled by (print): David Chapman / Tom Hanlon
Signature:

Relinquished by: David Chapman Date: 3/5/08 Time: 1500
Received by: Jerry Dahl Date: 3/5/08 Time: 1500

Relinquished by: Jerry Dahl Date: 3/5/08 Time: 1715
Received by: Date: 3/5/08 Time: 1715

Method of shipment:

TestAmerica-Westfield

Cooler? (Y) N Samples Iced? (Y) N
Temp @ receipt: 1.8 °C
Preservation/pH checked
By: cm Date: 3/5/08

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

OLIN-WILMINGTON
LEVEL I DATA QUALITY EVALUATION
STANDARD OPERATING PROCEDURE AND CHECKLIST
WET CHEMISTRY PARAMETERS BY VARIOUS METHODS

Reviewer/Date Tige Cunningham 3/31/08
Sr. Review/Date Chas Ricardi 4/14/08
Lab Report # TestAmerica - 360-15366 ; 360-15388
Project # 610008001G-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.

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 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
- [✓] 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
- [✓] Laboratory duplicate results (where applicable)

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

2.0 Holding Times Yes [ ] **No** [ ] N/A [ ] Comments:

Have any technical holding times, determined from date of collection to date of analysis, been exceeded? The holding times are as follows:

28 days = ammonia, chemical oxygen demand, chloride, organic carbon, oil & grease, specific conductance, total organic carbon and sulfate

Alkalinity = 14 days

Sulfide, TDS, TSS = 7 days

pH = analyze immediately

Nitrate nitrogen as N = 48 hrs (TC)

Nitrite nitrogen as N = 48 hrs (TC)

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 ☐ 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 <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**☑ = 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.

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: Only one spike was out (Low) for ammonia. Out high for Cl, Sulfate

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*(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

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

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:

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.

Version 1.2, Nov 2002

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

Reviewer/Date Tige Cunningham 3/28/07
Sr. Review/Date
Lab Report # Test America 360-15366 ; 360-15358
Project # 610008001G - 15A

NO Qualifiers Added to groundwater metals

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.

Aluminum Qualified (J) in sample OC-SD-17 & OC-SD-17 Dup Total fraction only.

☑ *Name of Laboratory* ☑ *Address* ☑ *Project ID* ☑ *Phone #* ☑ *Sample identification – Field and Laboratory*

Client Information: ☑ *Name* ☑ *Address* ☑ *Client Contact* *(IDs must be cross-referenced)*

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

1.2 Laboratory Report Certification Statement ***Yes*** [✓] *No* [ ] *N/A* [ ] *Comments:*

Does the laboratory report include a completed Analytical Report Certification in the required format?

***ACTION**: If no, contact lab for submission of missing certification or certification with correct format.*

1.3 Laboratory Case Narrative: ***Yes*** [✓] *No* [ ] *N/A* [ ] *Comments:*

☑ *Narrative serves as an exception report for the project and method QA/QC performance.* ☐ *Narrative includes an explanation of each discrepancy on the*

Certification Statement.

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

1.4 Chain of Custody (COC) copy present with all documentation completed **Yes** [✓] No [ ] N/A [ ] Comments:

NOTE: Olin receives and maintains the *original COC.*

ACTION: If no, contact lab for submission of copy of completed *COC.*

1.5 Sample Receipt Information (*Cooler Receipt Form present?*): **Yes** [✓] No [ ] N/A [ ] Comments:

Were each of the following tasks completed and recorded upon receipt of the sample(s) into the laboratory?

☑ Sample temperature confirmed: must be 1° – 10° C. (If samples were sent by courier and delivered on the same day as collection, temperature requirement does not apply).

☑ Container type noted ☑ sample condition observed ☑ pH verified (where applicable) ☑ Field and lab IDs cross referenced

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

1.5.1 Were all samples delivered to the laboratory without breakage? **Yes** [✓] No [ ] N/A [ ] Comments:

1.5.2 Does the *Cooler Receipt Form* or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data? Yes [ ] **No** [✓] N/A [ ] Comments:

1.6 Sample Results Section: *Was each of the following requirements supplied in the laboratory report for each sample?* **Yes** [✓] No [ ] N/A [ ] Comments:

☑ Field ID and Lab ID ☑ *Date and time collected* ☑ Analyst Initials ☑ *Dilution Factor* 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 each of the following information supplied in the laboratory report for each sample batch? **Yes** [✓] No [ ] N/A [ ] Comments:

☑ Method blank results ☑ LCS recoveries ☑ MS/MSD recoveries and RPDs ☑ Laboratory duplicate results (where applicable)

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

2.0 Holding Times

Have any technical holding times, determined from date of collection to date of analysis, been exceeded? Holding time for metals is 180 days from sample collection to analysis for both water and soil.

Yes [ ] **No** [✓] N/A [ ] Comments:

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

ACTION: If technical holding times are exceeded, qualify all positive results (J) and non-detects (UJ). If grossly exceeded (2X holding time) reject (R) all non-detect results.

3.0 Laboratory Method

3.1 Was the correct laboratory method used?

Yes [✓] No [ ] N/A [✓] (TC) Comments:

NO digestion was listed for groundwater

Water Digestion	3005A or 3010A or 3020A
Soil Digestion	3050B
Metals	6010B or 200.7

ACTION: If no, contact laboratory to provide justification for method change compared to the requested method. Contact senior chemist to inform Client of change and to request variance.

3.2 Are the practical quantitation limits the same as those specified by the ☐ SOW ☑ QAPP ☐ Lab ☐ MADEP

Yes [✓] No [ ] N/A [ ] Comments:

NOTE: *Verify that the reported metals match the target list specified on the COC.*

ACTION: If no, evaluate variation with respect to sample matrix, preparation, dilution, moisture, etc. If sample PQL is indeterminate, contact lab for explanation.

3.3 Are results present for each sample in the SDG? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, check Request for Analysis to verify if method was ordered and COC to verify that it was sent, and contact lab for resubmission of the missing data

3.4 If dilutions were required, were dilution factors reported? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact the lab for submission.

4.0 Method Blanks

4.1 Is the Method Blank Summary present? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, call the laboratory for submission of missing data.

4.2 Frequency of Analysis: Was a method blank analyzed for each digestion batch of < 20 field samples? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact laboratory for justification. Consult senior chemist for action needed. Narrate non-compliance.

4.3 Is the method blank less than the PQLs for all target elements? **Yes** [✓] No [ ] N/A [ ] Comments:

NOTE: *MADEP requires the method blank to be matrix matched and digested with the samples*

4.4 Do any method blanks have positive results for metals? Qualify data according to the following: Yes [ ] **No** [✓] N/A [ ] Comments:

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

ACTION: For any blank with positive results, list all contaminants for each method blank including the concentration detected and the flagging level (flagging level = 5x the blank value) and the associated samples and qualifiers.

5.0 Laboratory Control Standard

5.1 Was a laboratory control standard run with each analytical batch of 20 samples or less?

Yes [✓] No [ ] N/A [ ] Comments:

NOTE: *A full target, second source LCS is required by MADEP.*
ACTION: Call laboratory for LCS form submittal. If data are not available, use professional judgement to evaluate data accuracy associated with that batch.

5.2 Is a LCS Summary Form present?

Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact lab for resubmission of missing data.

5.3 Is the recovery of any analyte outside of MADEP control limits?

Yes [ ] **No** [✓] N/A [ ] Comments:

Sample Type	***MADEP % Rec***
Water	*80-120*
Soil	within Lab generated limits

ACTION: If recovery is above the upper limit, qualify all positive sample results within the batch as (J). If recovery is below the lower limit, qualify all positive and non-detects results within the batch as (J). If LCS recovery is <30%, positive and non-detect results are rejected (R).

Comments:

6.0 Matrix Spikes

Matrix spikes may be collected at different frequencies based on monthly, quarterly, or task specific schedules. Confirm spike requirements for each set with the senior chemist.

6.1 Were project-specific MS/MSDs collected? List project samples that were spiked.

Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact senior chemist to see if any were specified.

6.2 Is the Matrix Spike/Matrix Spike Duplicate Recovery Form present?

Yes [✓] No [ ] N/A [ ] Comments:

NOTE: *A full target, second source MS/MSD is required by MADEP.* only Al : Cr reported
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 [✓]** (TC) N/A [ ] Comments:

Spike on sample OC-SD-17
Sodium MS Recovery = 67%
MSD Recovery = 74%
J Qualify Sodium in OC-SD-17

Sample Type	***MADEP % Rec***	QAPP % Rec	Method
Water	*75-125*	N/A	6010B
Water	*N/A*	70-130	200.7
Soil	*75-125*	75-125	6010B

NOTE: $\%R = \frac{(SSR-SR)}{SA} \times 100\%$ Where: SSR = Spiked sample result, SR = Sample result, SA = Spike added

NOTE: If dilutions are required due to high sample concentrations (> 4X spike), the data are evaluated, but no flags are applied.

NOTE: If only one of the recoveries for an MS/MSD pair is outside of the control limits, no qualification is necessary. Use professional judgment for the MS/MSD flags.

ACTION: MS/MSD flags only apply to the sample spiked. If the recoveries of the MS and MSD exceed the upper control limit, qualify positive results as estimated (J). If the recoveries of the MS and MSD are lower than the lower control limit, qualify positive results and non-detects (J).

6.5 Are any RPDs for MS/MSD recoveries outside of the QC limits? Yes [ ] **No** [✓] N/A [ ] Comments:

NOTE: $RPD = \frac{S-D}{(S+D)/2} \times 100\%$ Where: S = MS sample result, D = MSD sample result

NOTE: If dilutions are required due to high sample concentrations, the data are evaluated, but no flags are applied.

ACTION: If the RPD exceeds the control limit, qualify positive results and non-detects (J).

7.0 Laboratory Duplicate

7.1 Was a laboratory duplicate sample analyzed? If so, is the Laboratory Duplicate Sample Form present? **Yes** [✓] No [ ] N/A [ ] Comments:

NOTE: *MADEP refers to this sample as a "matrix duplicate".*

ACTION: If not analyzed, qualification is not needed. If data is missing, contact laboratory for resubmission of report. Narrate non-compliance.

7.2 Is the RPD between the result for the laboratory duplicate sample and the result for the parent sample outside of the QA/QC limits? Yes [ ] **No** [✓] N/A [ ] Comments:

MADEP Laboratory Duplicate Sample RPD Criteria:	QAPP RPD
For aqueous results > 5× RL, RPD must be ± 20%	20
For aqueous results < 5× RL, RPD must be ≤ RL	20
For soil/sediment results > 5× RL, RPD must be ± 35%	20
For soil/sediment results < 5× RL, RPD must be ≤ 2× RL	20

ACTION: If the RPD exceeds the limits, qualify both positive results and non-detects as estimated and flag them J. Narrate non-compliance

8.0 Sampling Accuracy

The majority of ground water samples are collected directly from a tap, process stream, or with dedicated tubing. Rinse blanks will not be collected.

8.1 Were rinsate blanks collected? Prior to evaluating rinsate blanks, obtain a list of the associated samples from the senior chemist. **Yes** [ ] No [✓] N/A [ ] Comments:

8.2 Do any rinsate blanks have positive results? Yes [ ] **No** [ ] N/A [✓] Comments:

NOTE: *MADEP does not require the collection of rinsate blanks.*

ACTION: Evaluate rinsate results against blank results to determine if contaminant may be laboratory-derived. If results are not lab-related, qualify according to below.

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

9.0 Field Duplicates

9.1 Were field duplicate samples collected? Obtain a list of samples and their associated field duplicates. Yes [✓] **No** [ ] N/A [ ] Comments:

9.2 Were field duplicates collected per the required frequency? **Yes** [✓] No [ ] N/A [ ] Comments:

SOW ☐ QAPP *(1 per 10)* ☐ *MADEP Option 1 (1 per 20)* ☐ *MADEP Option 3 (1 per 10)* ☐

9.3 Was the RPD ≤ 50% for soils or waters? Calculate the RPD for all results and attach to this review. **Yes** [~~✓~~] (TC) No [✓] N/A [ ] Comments:

Sample OC-SD-17

ACTION: RPD must be ≤50% for soil and water. Qualify data (J) for both sample results if the RPD exceeds 50%.

Aluminum in total Fraction is 51.3%. J Qual Al in Total Fraction (estimated)

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** [~~✓~~] (TC) 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)

Sodium was >10% in Dissolved Fraction in Samples:

OC-PZ-16RR
OC-ISCO-1
OC-PZ-18R
OC-ISCO-3
OC-ISCO-2
OC-SD-17

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.

APPENDIX C

Weir Monthly Inspection Reports
December 2007 – May 2008

BSC GROUP
providing solutions that create value

15 Elkins Street
Boston, MA 02127

Tel: 617-896-4300
800-288-8123
Fax: 617-896-4301

www.bscgroup.com

January 3, 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
BSC Job #89241.00

Dear Commission:

This letter is part of the weekly weir inspections carried out at the Olin Property in Wilmington, Massachusetts by BSC Group, Inc. and Olin Corporation. Attached are the weekly weir inspection reports for the month of December 2007. BSC conducted an inspection on Friday, December 28, 2007.

West Ditch Off-Property
Station A was frozen over throughout most of the month. At the end of the month, the ice had mostly melted and several inches of clear water were present. The bottom of the channel was covered with leaves

Station B is located along the west ditch at the culvert leading under the railroad tracks to the weir. Station B was frozen over. The water and channel bottom were not visible during the inspections.

Weir
Station D, located upstream of the weir, was frozen over.

During most of the month, there was no flow from the outlet pipe and a low flow from the weir area. By the end of the month, there was a moderate flow of clear water from both sources due to recent rains and melting of snow. The main area of the weir was frozen over during the colder periods of December. A beige precipitate and green algae were observed along the bottom at the end of the month when the ice had melted in this area.

Wetland Areas South of the South Ditch
Stations H and I were both frozen over. The vegetation in both areas appeared healthy.

South Ditch Downstream of the Weir
Station E and Station F, located along the south ditch, had a low flow of clear water with some ice along the banks at the beginning of the month but was later frozen over. At the end of the month, there was a high flow of clear water through the ditch. A beige-colored precipitate was observed along the bottom.

Station G, the delta area, was frozen over.

Engineers
Environmental Scientists
GIS Consultants
Landscape Architects
Planners
Surveyors

Clear water was flowing through the center of the haybale line, located downstream of the delta area, during warmer periods of the month. The surrounding area was snow covered.

Wildlife
Tracks from deer and a small mammal, either a coyote or fox, were observed on the site.

If you have any questions or need additional information please contact me at 617-896-4351.

Sincerely,
BSC Group, Inc.

Heather Vaillant
Heather Vaillant
Environmental Planner

Enclosures:
12/07/2007 Inspection Report
12/21/2007 Inspection Report
12/28/2007 Inspection Report

cc: Mr. Steve Morrow, Olin Corp.
Mr. Joe Coyne, DEP (Electronically)
Mr. Brian Guichard, Olin Corp.
Mr. Peter Thompson, MACTEC
Mr. Jim DiLorenzo, EPA

\\Bsc\.HYDRA_PRJ0.Worcester.bsc\Prj\8924100\BSC Reports\Monthly Inspections\Weir 344-419\2007\December.doc

Olin Corporation

Wilmington Site

Interim Action Plan

South and West Ditch Precipitate Inspection Report

Date 12/7/2007 Time 1:15 Inspectors Leroy Johnson

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Stations A and B are frozen over.
	Station A		x	
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Station D is frozen over.
	Station D		x	
Weir - Downstream				Stations E and F have a low flow of clear water. Ice is beginning to build up along the stream banks.
	Station E	x		
	Station F	x		
	Station G		x	Station G is frozen over.
Unnamed Ditch				Stations H and I are frozen over and snow covered.
	Station H		x	
	Station I		x	
Supplemental Inspection Locations (designate station location on page 2 of 2)				
Staff Gauge Level				

Condition of Weir / Haybale Barriers: There is no flow from the outlet pipe, but there is a low flow from the weir are. The main area is mostly frozen over.

The Haybale line is frozen over except for a few small areas where there is a low flow of clear water.

Noticed lots of tracks and droppings in the snow along the path that appear to be from both a Deer, and either a Coyote or a Fox.

Olin Corporation

Wilmington Site

Interim Action Plan

South and West Ditch Precipitate Inspection Report

Date 12/21/2007 Time 10:45 Inspectors Leroy Johnson

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Stations A and B are frozen over and snow covered.
	Station A		x	
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	Filled in
Weir - Upstream				Frozen over and snow covered.
	Station D		x	
Weir - Downstream				Stations E, F and G are frozen over and snow
	Station E		x	covered.
	Station F		x	
	Station G		x	
Unnamed Ditch				Stations H and I are snow covered.
	Station H		x	
	Station I		x	
Supplemental Inspection Locations (designate station location on page 2 of 2)				
Staff Gauge Level				

Condition of Weir / Haybale Barriers: There is no flow from the outlet pipe. The main area is frozen over and snow covered except for a small area near the outlet pipe.

The Haybale line is frozen over and snow covered.

Olin Corporation
Wilmington Site
Interim Action Plan
South and West Ditch Precipitate Inspection Report

Date 12/28/2007 Time 9am Inspectors Heather Vaillant

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				A - several inches of clear water, bottom covered w/ leaves. Some ice on surface. B - mostly frozen over
	Station A		X	
	Station B		X	
West Ditch Foot Bridge				
	Station C		x	Filled in
Weir - Upstream				Mostly frozen over or snow covered
	Station D			
Weir - Downstream				E & F - high flow of clear water beige-colored bottom. G - mostly frozen over, clear water flowing near far bank
	Station E	X		
	Station F	X		
	Station G		X	
Unnamed Ditch				H & I - snow and/or ice covered
	Station H		X	
	Station I		X	
Supplemental Inspection Locations (designate station location on page 2 of 2)				
Staff Gauge Level		0.9		

Condition of Weir / Haybale Barriers:

Weir - moderate flow of clear water from weir and outlet pipe. Bottom is beige. Some green algae growing along bottom.

Haybale line - moderate flow of clear water through haybale line. Surrounding area is snow covered.

FILE COPY

MACTEC

engineering and constructing a better tomorrow

February 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 January 2008 are attached. MACTEC conducted an inspection on Friday, January 25, 2008.

West Ditch Off-Property

For the majority of the month, Station A had a clear ice layer on top of clear water with leaves covering the bottom. During one inspection, murky brown water was observed at Station A.

Throughout the month Station B was covered with ice and clear water was observed below the ice layer.

Weir

Station D had mostly clear water throughout the month and was covered with ice on two of the four inspections. The water was murky at the time of one inspection.

There was a moderate flow of water from the weir outlet pipe during the month. The water below the weir varied from clear to murky to bluish/greenish. Ice was present in the area below the weir for most of the month. A brown or beige colored precipitate was observed at the bottom of the channel.

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

Wetland Areas South of the South Ditch

Stations H and I were frozen and snow covered for the majority of the month of January.

South Ditch Downstream of the Weir

Station E and Station F, located along the south ditch, had a moderate to heavy flow volume throughout the month. A brownish coloring was observed on the bottom of the stream during all of the inspections. The water was slightly murky during one of the inspections. Station G, the delta area, was frozen for the majority of the month with clear water.

The haybale line was frozen for the majority of the month. A moderate volume of water was observed when the haybale line was not frozen.

Wildlife

Animal tracks (deer, small mammal) were observed in the snow during the inspections.

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. Joe Coyne, DEP – Boston
Mr. Brian Guichard, Olin Corp.
Mr. Jim DiLorenzo, EPA
MACTEC Project File [P:\OLIN\Wilmington\South Ditch\Monthly Inspections\January 2008\Jan 2008 South Ditch Inspection.doc]

Olin Corporation

Wilmington Site

Interim Action Plan

South and West Ditch Precipitate Inspection Report

Date 1/4/2008 Time 10:00 Inspectors Brian Guichard

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Station A has clear ice on top with clear water and leaves on the bottom. Station B is frozen over with white ice.
	Station A		x	
	Station B		x	
West Ditch Foot Bridge				Filled in
	Station C		x	
Weir - Upstream				Frozen over with clear ice. The water below is clear.
	Station D		x	
Weir - Downstream				Most of the stream is frozen over with white ice, the areas that are open are clear with a brownish coloring on the bottom. Station G is frozen over with clear ice.
	Station E	x		
	Station F	x		
	Station G		x	
Unnamed Ditch				Stations H and I are frozen over and snow covered.
	Station H		x	
	Station I		x	
Supplemental Inspection Locations (designate station location on page 2 of 2)				
Staff Gauge Level				

Condition of Weir / Haybale Barriers: There is a moderate flow of clear water from the outlet pipe to the main area which is mostly frozen over. A light bluish white cloudiness can be seen under the ice in the middle. The stream is mostly free of ice up to the first check dam. The water is clear with a brown colored bottom.

The Haybale line is frozen over and mostly snow covered.

Olin Corporation

Wilmington Site

Interim Action Plan

South and West Ditch Precipitate Inspection Report

Date 1/10/2008 Time 13:00 Inspectors Leroy Johnson

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Station A has clear water with leaves on the bottom.
	Station A		x	Station B is still frozen over with white ice.
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	Filled in
Weir - Upstream				Station D has clear water with rocks, mud and
	Station D		x	leaves on the bottom.
Weir - Downstream				Stations E and F have a moderate flow of clear water
	Station E	x		with a brown colored bottom. The water level is a
	Station F	x		little higher than normal. Station G has a moderate
	Station G		x	flow of clear water.
Unnamed Ditch				Stations H and I are frozen over and snow covered.
	Station H		x	
	Station I		x	
Supplemental Inspection Locations (designate station location on page 2 of 2)				
Staff Gauge Level				

Condition of Weir / Haybale Barriers: There is a moderate flow of clear water from the weir to the main. There is no flow from the outlet pipe at this time. The main area is clear with a brown colored bottom. The stream is mostly free of ice at this time. The water is clear with a brown colored bottom.

The Haybale line has a moderate flow of clear water flowing through the center.

Olin Corporation

Wilmington Site

Interim Action Plan

South and West Ditch Precipitate Inspection Report

Date 1/18/2008 Time 11:30 Inspectors Leroy Johnson

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Station A has murky brown water, the bottom is barely visible. Station B has a layer of ice over about half of the surface, the water is the same as Stn. A.
	Station A		x	
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	Filled in
Weir - Upstream				Station D has murky water, cannot see the bottom.
	Station D		x	
Weir - Downstream				Stations E and F have a heavy flow of murky water The water level is a little higher than normal. Station G has a moderate flow of murky water.
	Station E	x		
	Station F	x		
	Station G		x	
Unnamed Ditch				Stations H and I are a mix of slush 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 light flow of clear water from the outlet pipe to the main area which is a murky brown color, the bottom is not visible. There is a substantial flow of murky water from the weir area. The stream is free of ice at this time, the water is murky with a brown colored bottom.

The Haybale line has a heavy flow of murky water flowing through the center.

Olin Corporation
Wilmington Site
Interim Action Plan
South and West Ditch Precipitate Inspection Report

Date: 1/25/2008 Time: 8:15 Inspectors: Brian Roden
Tony Rodolakis

Station		Precipitate Obervation		Other Observations
		Yes	No	
Offiste Fenced Ditch System				Station A has clear ice with leaves on the bottom.
	Station A		X	Station B has a layer of thin ice covering half
	Station B		X	the area and a layer of thicker ice on the other half.
West Ditch Foot Bridge				
	Station C		X	Filled in
Weir - Upstream				Frozen with a thin layer of ice, water is clear
	Station D		X	below ice.
Wier - Downstream				The stream has a moderate flow, the water is
	Station E	X		slighly cloudy with a brownish coloring on the bottom.
	Station F	X		Foaming exists after the first check dam.
	Station G		X	Station G is frozen over.
Unnamed Ditch				Stations H and I are frozen over with snow cover.
	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 moderate flow from the weir to the main area. The main area is mostly covered in a thin layer of ice. The water beneath the ice has a blueish/green tint with a brown precipitate on the bottom.

The Haybale line is frozen over with clear ice.

FILE COPY

MACTEC

engineering and constructing a better tomorrow

March 11, 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 February 2008 are attached. MACTEC conducted an inspection on Friday, February 29, 2008.

West Ditch Off-Property

Station A was frozen over at the beginning and end of the month. Clear water with leaves covering the bottom were visible during the middle of the month.

Throughout the month Station B was covered with ice and clear water was observed below the ice layer.

Weir

Station D was frozen over at the beginning and end of the month. Clear water with leaves and rocks on the bottom were visible during the middle of the month.

There was no flow of water from the weir outlet pipe during the month. The water below the weir varied from clear to bluish/greenish. A beige or dark colored precipitate was observed at the bottom of the channel during most of February. Clear water was observed flowing from the weir area but at the end of the month this area was covered with ice.

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

Wetland Areas South of the South Ditch

Stations H and I were frozen and snow covered for the majority of the month of February.

South Ditch Downstream of the Weir

Station E and Station F, located along the south ditch, had a moderate to heavy flow volume throughout the month. A brownish coloring was observed on the bottom of the stream during all of the inspections. The water was slightly murky during one of the inspections. Station G, the delta area, was frozen for the majority of the month with clear water.

The haybale line was frozen for the majority of the month. A moderate volume of water was observed when the haybale line was not frozen.

Wildlife

Animal tracks (squirrel) were observed in the snow during the inspections. Chickadees and a red wing blackbird were observed or heard calling near the ditch area during the 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. Joe Coyne, DEP – Boston
Mr. Brian Guichard, Olin Corp.
Mr. Jim DiLorenzo, EPA
MACTEC Project File [P:\OLIN\Wilmington\South Ditch\Monthly Inspections\February 2008\Feb 2008 South Ditch Inspection.doc]

Olin Corporation
Wilmington Site
Interim Action Plan
South and West Ditch Precipitate Inspection Report

Date 2/1/2008 Time 9:30 Inspectors Leroy Johnson

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Station A has clear ice on top with clear water and leaves on the bottom. Station B is frozen over with ice.
	Station A		x	
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Frozen over with clear ice. The water below is clear.
	Station D		x	
Weir - Downstream				Stations E and F have a low flow of clear water with a brown colored bottom. Station G is frozen over with clear ice.
	Station E	x		
	Station F	x		
	Station G		x	
Unnamed Ditch				Stations H and I are frozen over.
	Station H		x	
	Station I		x	
Supplemental Inspection Locations (designate station location on page 2 of 2)				
Staff Gauge Level				

Condition of Weir / Haybale Barriers: There is no flow from the outlet pipe. The main area has clear water with a blue/green and beige colored precipitate on the bottom. There is a trickle flow of clear water from the weir area. The stream has a thin layer of ice over most of the surface except in the middle where the flow is.

The Haybale line has a low flow of clear water flowing through the center, the rest of the area is frozen over.

Olin Corporation

Wilmington Site

Interim Action Plan

South and West Ditch Precipitate Inspection Report

Date 2/8/2008 Time 9:30 Inspectors Leroy Johnson

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Station A has water and leaves on the bottom.
	Station A		x	Station B is frozen mostly over with ice.
	Station B		x	
West Ditch Foot Bridge				
	Station C		x	**Filled in**
Weir - Upstream				Clear water with leaves on the bottom.
	Station D		x	
Weir - Downstream				Stations E and F have a moderate flow of clear water
	Station E	x		with a brown colored bottom.
	Station F	x		Station G has a low flow of clear water.
	Station G		x	
Unnamed Ditch				Stations H and I are frozen over and snow covered.
	Station H		x	
	Station I		x	
Supplemental Inspection Locations (designate station location on page 2 of 2)				
Staff Gauge Level				

Condition of Weir / Haybale Barriers: There is no flow from the outlet pipe. The main area has clear water with a blue/green and beige colored precipitate on the bottom in the center. There is a moderate 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 2/15/2008 Time 9:30 Inspectors Brian Guichard

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Station A has clear water with leaves on the bottom.
	Station A		x	Station B is mostly frozen over with ice.
	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 and F have a heavy flow of lightly cloudy
	Station E	x		water with a brown colored bottom.
	Station F	x		Station G has a heavy flow of clear water detected
	Station G		x	throughout the whole delta area.
Unnamed Ditch				Stations H and I are frozen over.
	Station H		x	
	Station I		x	
Supplemental Inspection Locations (designate station location on page 2 of 2)				
Staff Gauge Level				

Condition of Weir / Haybale Barriers: There is no flow from the outlet pipe. The main area has clear water with a dark coloration on the bottom in the center. There is no noticeable blue or green color at this time. There is a heavy flow of clear water from the weir area. There is also some very light foaming just after the first check dam.

The Haybale line has a heavy flow of clear water flowing through the center.

Noticed dog tracks in the snow in the station A area that have not been noticed in this area before.

Olin Corporation
Wilmington Site
Interim Action Plan
South and West Ditch Precipitate Inspection Report

Date: 2/29/2008 Time: 7:45 Inspectors: Tony Rodolakis

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Station A has opaque ice, bottom not visible.
	Station A		X	Station B has a layer of thin ice covering half
	Station B		X	the area and a layer of thicker ice on the other half.
West Ditch Foot Bridge				
	Station C		X	Filled in
Weir - Upstream				Frozen with a thin layer of ice, water is clear
	Station D		X	below ice.
Weir - Downstream				The stream is frozen over at all locations except
	Station E	X		at the first checkdam and at the edge of the weir.
	Station F	X		Leafy bottom, clear ice.
	Station G		X	Station G is frozen over.
Unnamed Ditch				Stations H and I are frozen over with snow cover.
	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 weir to the main area.

The main area is almost completely covered in a moderate layer of ice. The water beneath the ice was largely not visible. Chickadees and a red wing blackbirds were observed. Squirrel tracks were visible in the snow.

The Haybale line is frozen over with clear ice.

MACTEC

engineering and constructing a better tomorrow

April 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 March 2008 are attached. MACTEC conducted an inspection on Friday, March 28, 2008.

West Ditch Off-Property

Station A was clear of ice throughout the month. Clear water and leaves covering the bottom were visible during all of the inspections.

Throughout the month clear water was observed at Station B. During one inspection the bottom was not visible due to the depth of the water.

Weir

Clear water, leaves and rocks on the bottom were visible during the month as Station D. Ice was observed during one inspection.

Throughout the month a moderate flow of water from the weir outlet pipe was observed. The flow from the weir outlet pipe appeared to be clear during all of the inspections. The water below the weir had a greenish precipitate in the center throughout the month with clear water on the edges.

Wetland Areas South of the South Ditch

Stations H and I were frozen at the beginning of the month. By the end of the month both stations were clear of ice and standing water was present.

South Ditch Downstream of the Weir

Station E and Station F, located along the south ditch, had a moderate to heavy 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.

The haybale line had a moderate volume of water flowing throughout the month.

Wildlife

Animal tracks were observed in the mud during the inspections. Chickadees were observed and heard calling near the ditch area during the inspection. During one inspection a duck was observed.

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. Joe Coyne, DEP – Boston
Mr. Brian Guichard, Olin Corp.
Mr. Jim DiLorenzo, EPA
MACTEC Project File [P:\OLIN\Wilmington\South Ditch\Monthly Inspections\March 2008\March 2008 South Ditch Inspection.doc]

Olin Corporation

Wilmington Site

Interim Action Plan
South and West Ditch Precipitate Inspection Report

Date 3/7/2008 Time 9:30 Inspectors Leroy Johnson

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Stations A and B are clear of ice, the water is clear and the bottom is visible.
	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 and F have a medium flow of clear water with a brown colored bottom. Station G has a medium flow of clear water detected throughout the whole delta area.
	Station E	x		
	Station F	x		
	Station G		x	
Unnamed Ditch				Stations H and I are beginning to thaw, but are still partially frozen.
	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 blue/green colored precipitation in the center. 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 3/14/2008 Time 10:30 Inspectors Leroy Johnson

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Stations A and B are clear of ice, the water is clear and the bottom is visible.
	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 and F have a medium flow of clear water with a brown colored bottom. Station G has a medium flow of clear water detected throughout the whole delta area.
	Station E	x		
	Station F	x		
	Station G		x	
Unnamed Ditch				Stations H and I are clear of ice. Station H has a small amount of free standing water, Sation I is just muddy 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 no flow from the outlet pipe. The main area has clear water with a blue/green colored precipitation in the center. Two bubbling events were noticed and one Duck was swimming in the water. 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 3/21/2008 Time 13:00 Inspectors Leroy Johnson

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Stations A and B are clear of ice, the water is clear and the bottom is visible.
	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. Some ice on the water surface
	Station D		x	
Weir - Downstream				Stations E and F have a medium flow of clear water with a brown colored bottom. Station G has a medium flow of clear water detected throughout the whole delta area.
	Station E	x		
	Station F	x		
	Station G		x	
Unnamed Ditch				Stations H and I are clear of ice and 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 with a blue/green colored precipitation in the center. 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: 3/28/2008 Time: 8:00 Inspectors: Brian Roden

Station		Precipitate Observation		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Station A has clear water and leaves are visible
	Station A		**X**	on bottom. Station B has clear water, too
	Station B		**X**	deep to see bottom
West Ditch Foot Bridge				
	Station C			Filled in
Weir - Upstream				
	Station D		**X**	Water is clear. Bottom is visible with leaves/rocks
Weir - Downstream				Stations E and F have a moderate flow of
	Station E	**X**		clear water with a brown colored bottom.
	Station F	**X**		Station G has clear water in the delta area
	Station G		**X**	
Unnamed Ditch				Stations H and I are flooded with clear water
	Station H		**X**	leaves are visible on the bottom
	Station I		**X**	
Supplemental Inspection Locations (designate station location on page 2 of 2)				
Staff Gauge Level				

Condition of Weir / Haybale Barriers: No flow from outlet pipe. Moderate flow from weir. The main area has a greenish tint to the water in the middle with clear water on the sides.

The Haybale line has a moderate to heavy from of clear water through the center. Water levels were higher most likely due to the rain over night and during the inspection period.

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		Other Observations
		Yes	No	
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		Other Observations
		Yes	No	
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		Other Observations
		Yes	No	
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		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Water surface at Station A and B was covered
	Station A		X	with pollen. Bottom not visible.
	Station B		X	
West Ditch Foot Bridge				
	Station C			Filled in
Weir - Upstream				Water surface covered with pollen.
	Station D		X	Bottom not visible.
Weir - Downstream				
	Station E	X		Stations E and F have a moderate flow of
	Station F	X		clear water with a brown colored bottom.
	Station G		X	Station G has no standing water.
Unnamed Ditch				
	Station H		X	Saturaed soil at Station H and I was covered
	Station I		X	with pollen. Bottom not visible.
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.

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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		Other Observations
		Yes	No	
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		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Station A has clear water with decomposing leaves
	Station A		x	on the bottom. The bottom at Station B cannot be
	Station B		x	seen due to tannic coloration and dark overcast skies.
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
	Station E	x		with a brown and beige colored bottom.
	Station F	x		Station G has a low flow of clear water wandering
	Station G		x	through the delta area.
Unnamed Ditch				Stations H and I both have free standing water with
	Station H		x	areas of saturated soil and mud.
	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		Other Observations
		Yes	No	
Offsite Fenced Ditch System				Station A has clear water with decomposing leaves
	Station A		x	on the bottom. The bottom at Station B has a
	Station B		x	tannic coloration with leaves on the bottom.
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
	Station E	x		with a brown and beige colored bottom.
	Station F	x		Station G has a low flow of clear water wandering
	Station G		x	through the delta area which is mostly mud.
Unnamed Ditch				Stations H and I both have free standing water with
	Station H		x	areas of saturated soil and mud.
	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		Other Observations
		Yes	No	
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

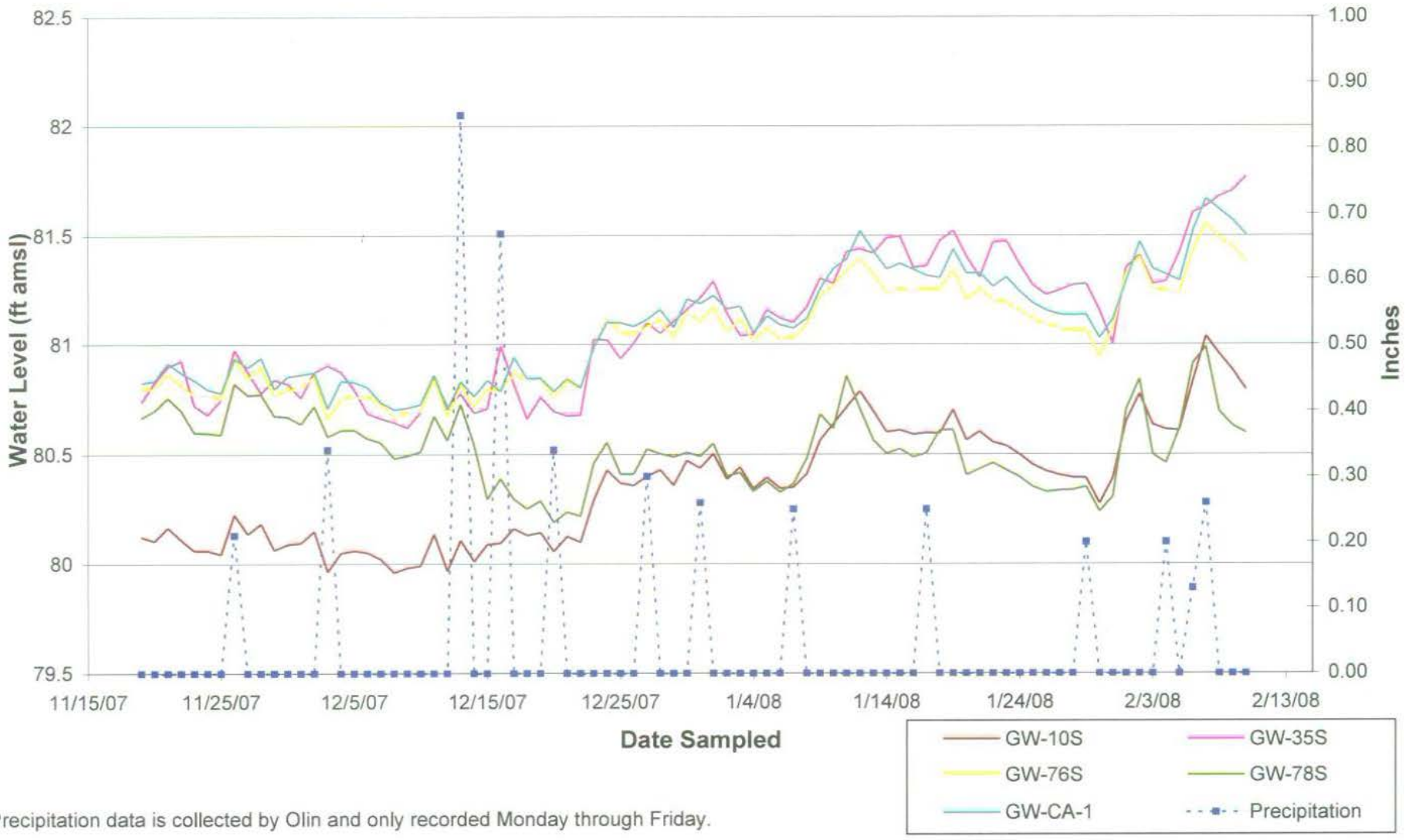
Date: 5/30/08 **Time:** 8:00 **Inspectors:** Tony Rodolakis

Station		Precipitate Observation		Other Observations
		Yes	No	
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.

APPENDIX E

Slurry Wall/Cap Data Logger Water Level Plots



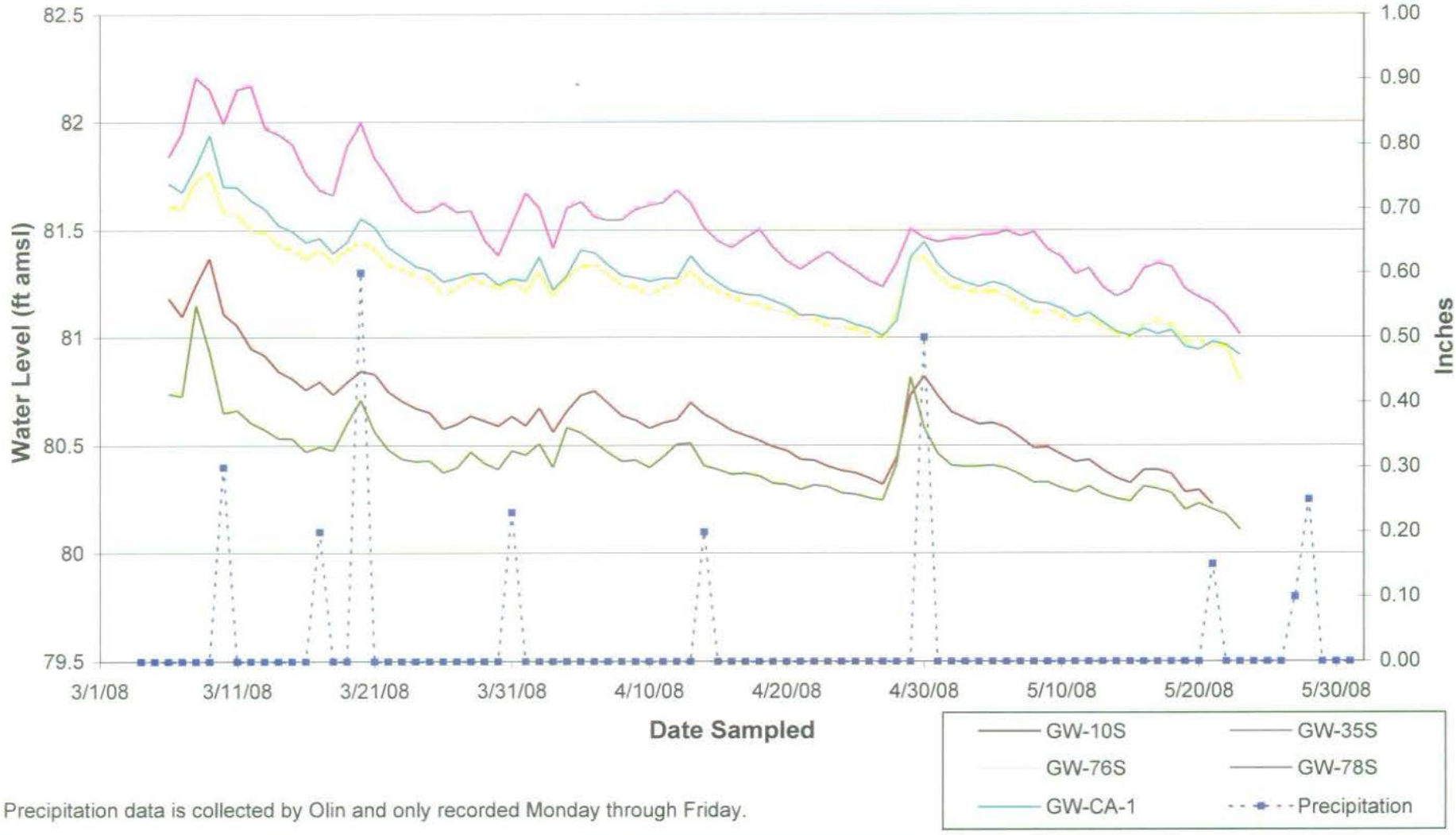
Precipitation data is collected by Olin and only recorded Monday through Friday.

Semi-Annual Status Report No. 2 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\2008 July\Appendix E\
Data Logger Corrections1st Quarter Fig

Prepared by: BJR
Checked by: PHT

SEB with permission from Peter Thornton



Precipitation data is collected by Olin and only recorded Monday through Friday.

Semi-Annual Status Report No. 2 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\2008 July\Appendix E\
Data Logger Corrections2nd Quarter Fig

Prepared by: BJR
Checked by: PHT

SEB w/ permission from

APPENDIX D

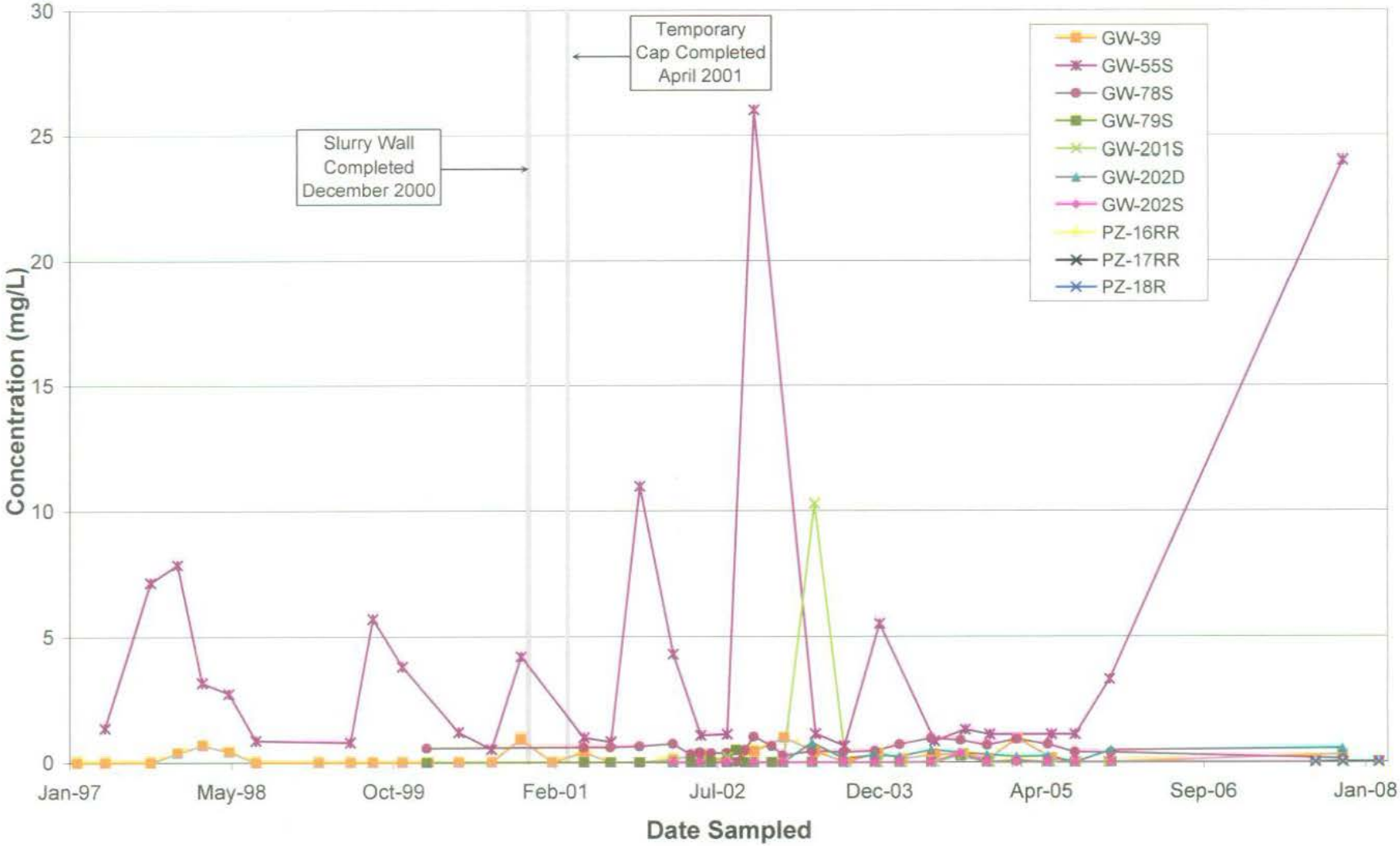
Slurry Wall/Cap Groundwater and Surface Water Quality Time Series Plots

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)



Semi-Annual Status Report No. 2
Olin Wilmington Superfund Site
Wilmington, Massachusetts

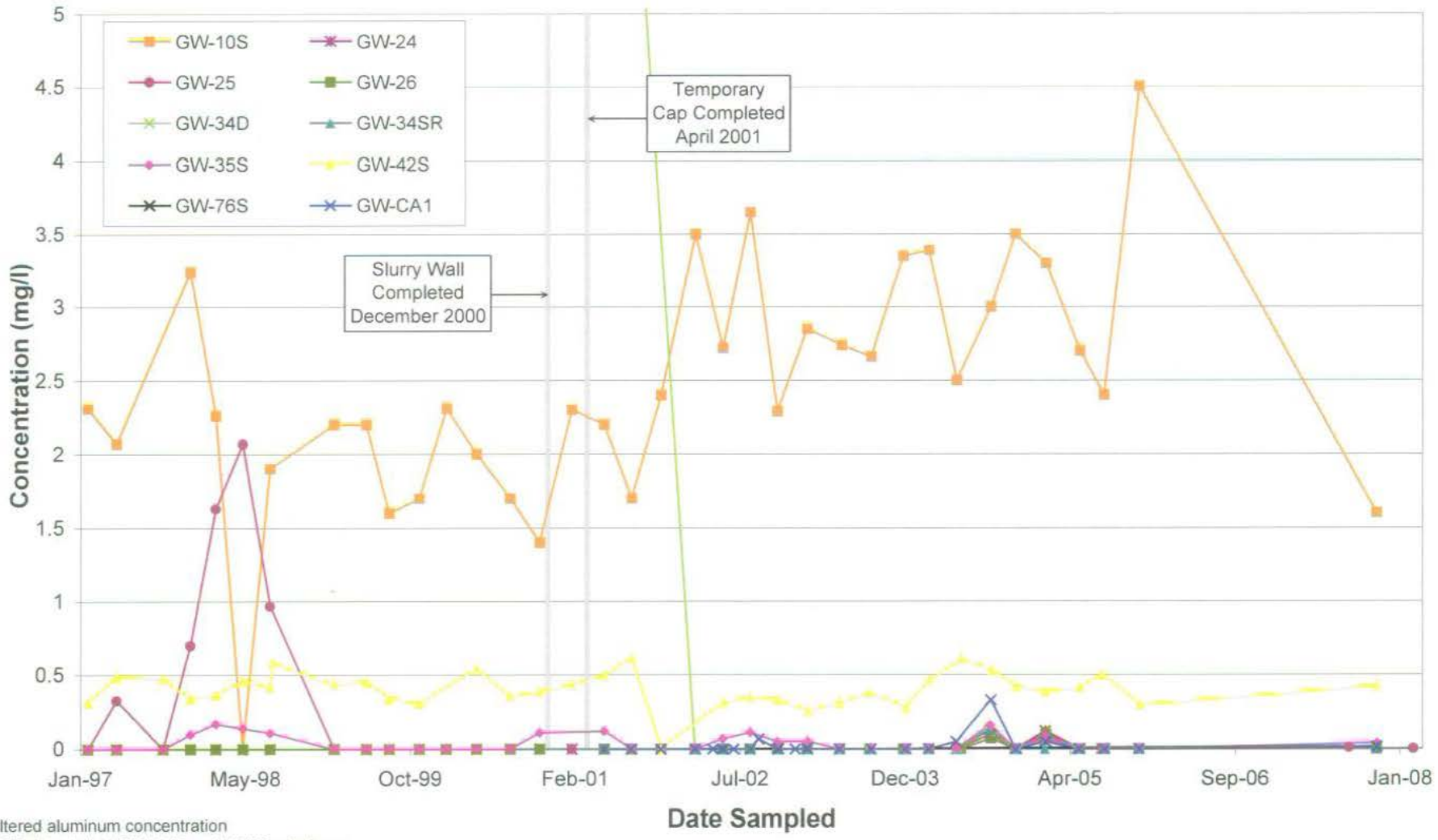
MACTEC

Filtered Aluminum in Groundwater South and East of Containment Structure

Figure D-1.1

Prepared by: BJR
Checked by: MJM

P:\OLIN\Wilmington\SemiAnnual Status Report\2008 July\Appendix D\
Time Series Plots DAPL constituents, Aluminum GW SE



Filtered aluminum concentration of 38 detected at GW-34D on 1/19/00 not shown.

Semi-Annual Status Report No. 2
Olin Wilmington Superfund Site
Wilmington, Massachusetts

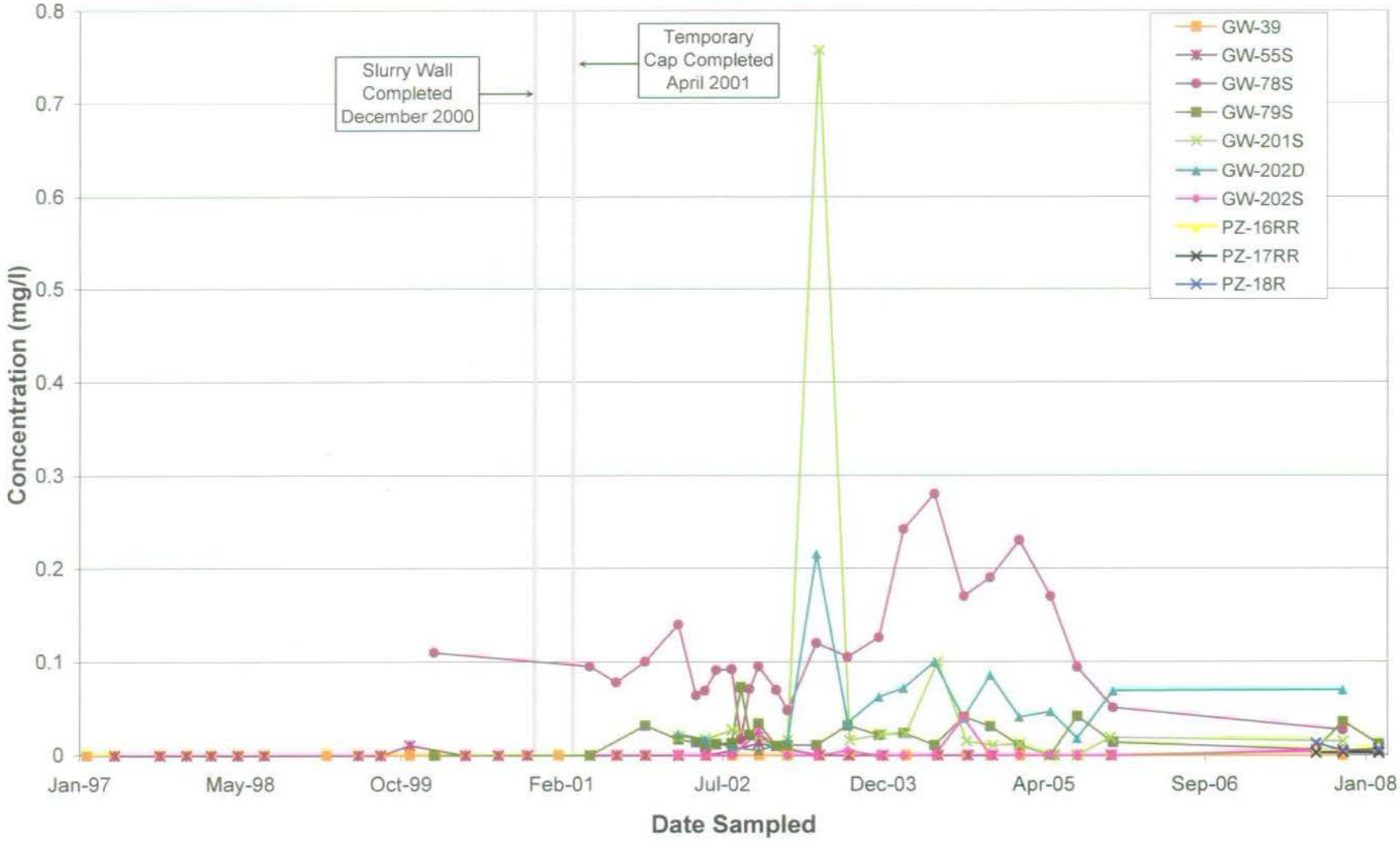
MACTEC

Filtered Aluminum in Groundwater North and West of Containment Structure

Figure D-1.2

Prepared by: BJR
Checked by: MJM

P:\OLIN\Wilmington\SemiAnnual Status Report\2008 July\Appendix D\
Time Series Plots DAPL constituents, Aluminum GW NW



Semi-Annual Status Report No. 2
Olin Wilmington Superfund Site
Wilmington, Massachusetts

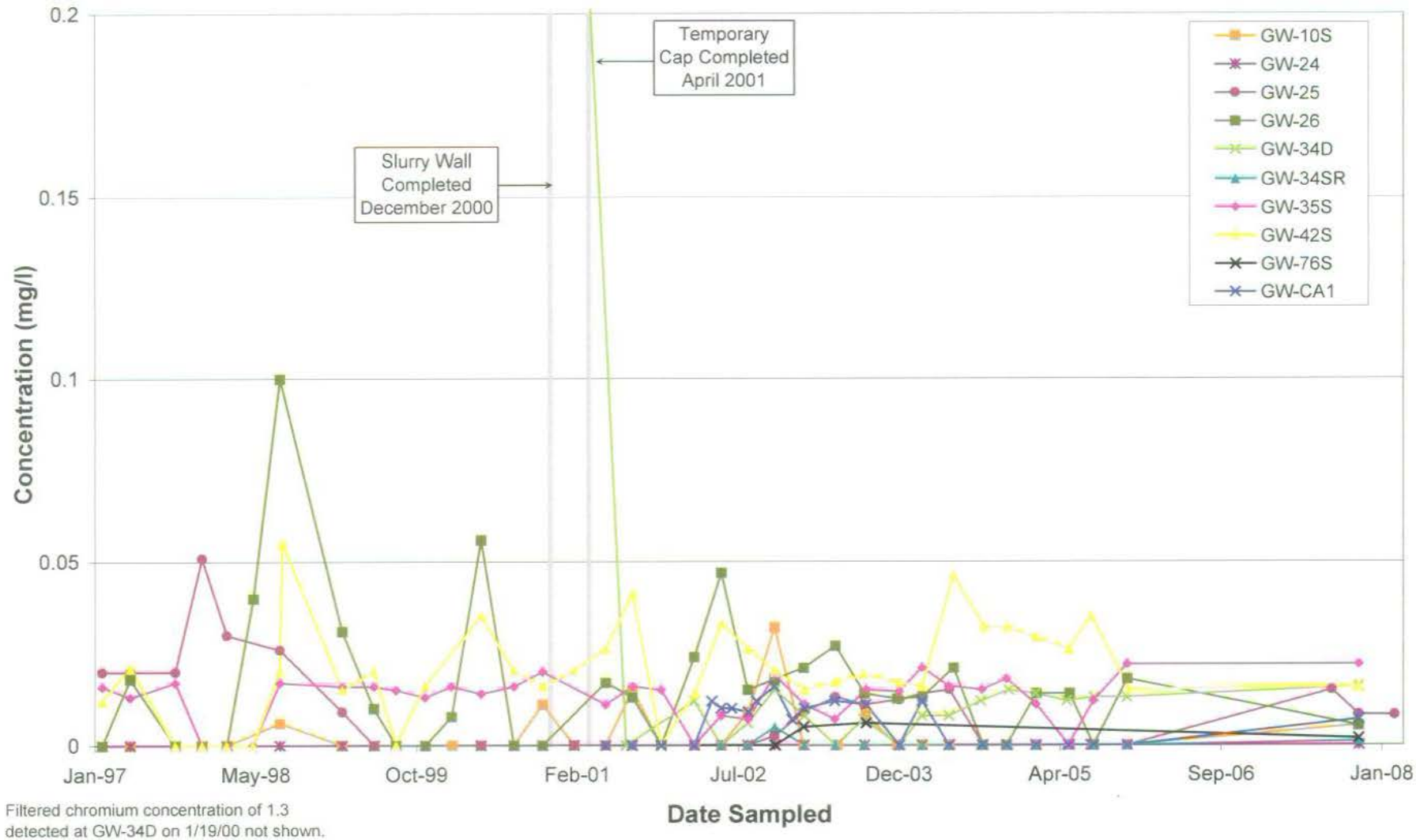
MACTEC

Filtered Chromium in Groundwater South and East of Containment Structure

Figure D-1.3

P:\OLIN\Wilmington\SemiAnnual Status Report\2008 July\Appendix D\
Time Series Plots DAPL constituents, Dissolved Chromium GW SE

Prepared by: BJR
Checked by: MJM



Filtered chromium concentration of 1.3 detected at GW-34D on 1/19/00 not shown.

Semi-Annual Status Report No. 2
Olin Wilmington Superfund Site
Wilmington, Massachusetts

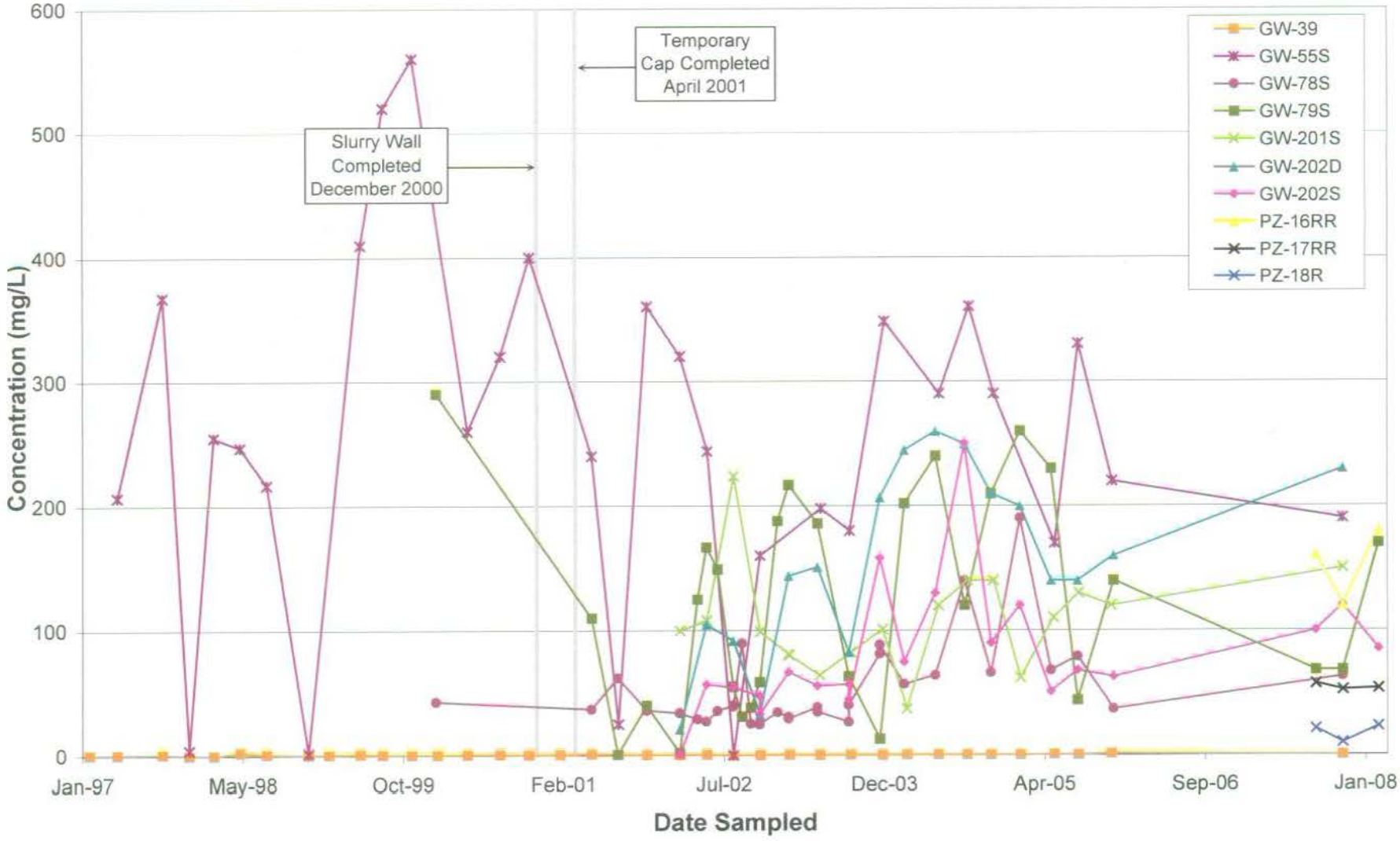
MACTEC

Filtered Chromium in Groundwater
North and West of Containment Structure

Figure D-1.4

Prepared by: BJR
Checked by: MJM

P:\OLIN\Wilmington\SemiAnnual Status Report\2008 July\Appendix D\
Time Series Plots DAPL constituents, Dissolved Chromium GW NW



Semi-Annual Status Report No. 2
Olin Wilmington Superfund Site
Wilmington, Massachusetts

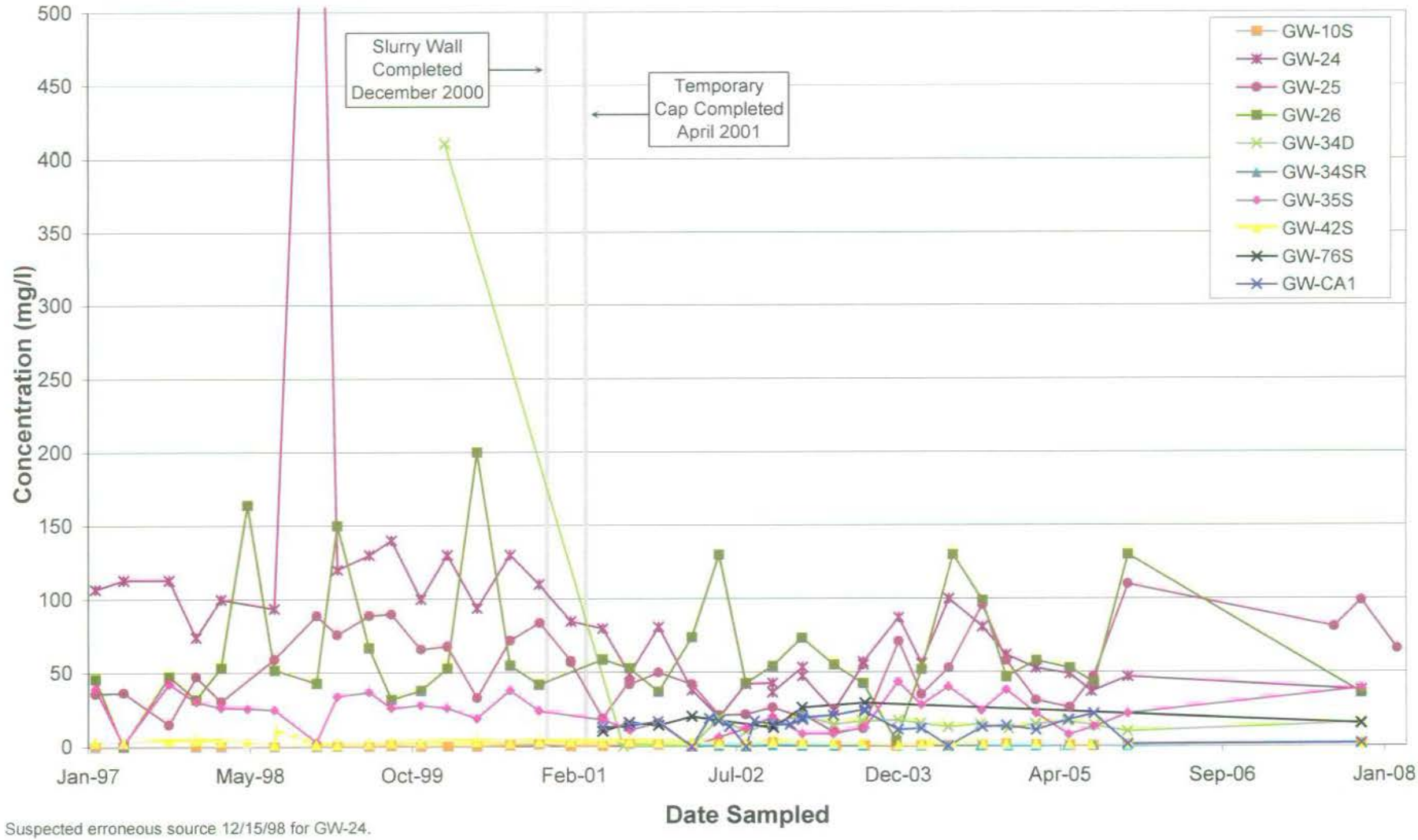
MACTEC

Ammonia in Groundwater South and East of Containment Structure

Figure D-1.5

Prepared by: BJR
Checked by: MJM

P:\OLIN\Wilmington\SemiAnnual Status Report\2008 July\Appendix D\
Time Series Plots DAPL constituents, Ammonia GW SE



Suspected erroneous source 12/15/98 for GW-24.

Semi-Annual Status Report No. 2
Olin Wilmington Superfund Site
Wilmington, Massachusetts

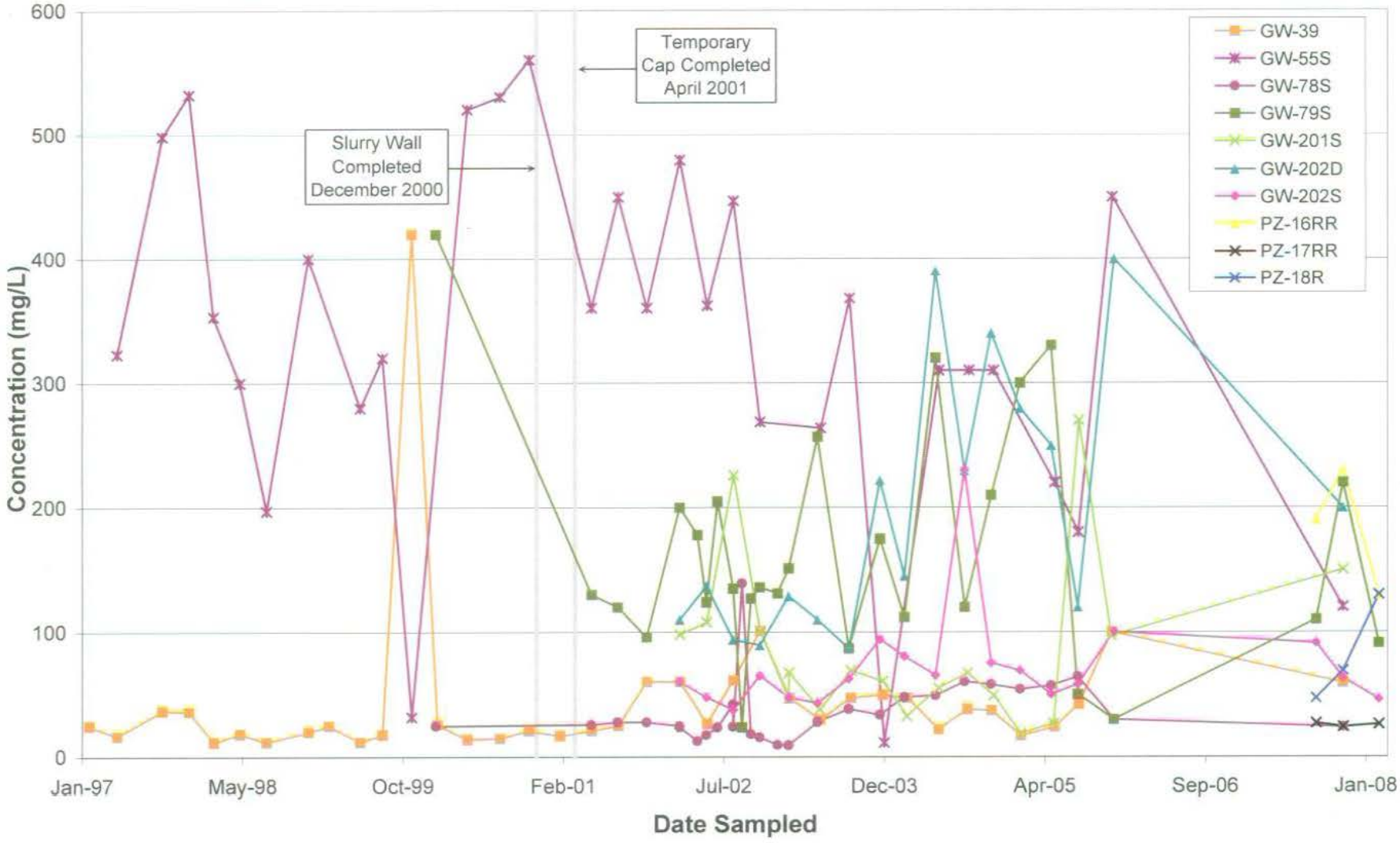
MACTEC

Ammonia in Groundwater North and West of Containment Structure

Figure D-1.6

Prepared by: BJR
Checked by: MJM

P:\OLIN\Wilmington\SemiAnnual Status Report\2008 July\Appendix D\
Time Series Plots DAPL constituents, Ammonia GW NW



Semi-Annual Status Report No. 2
Olin Wilmington Superfund Site
Wilmington, Massachusetts

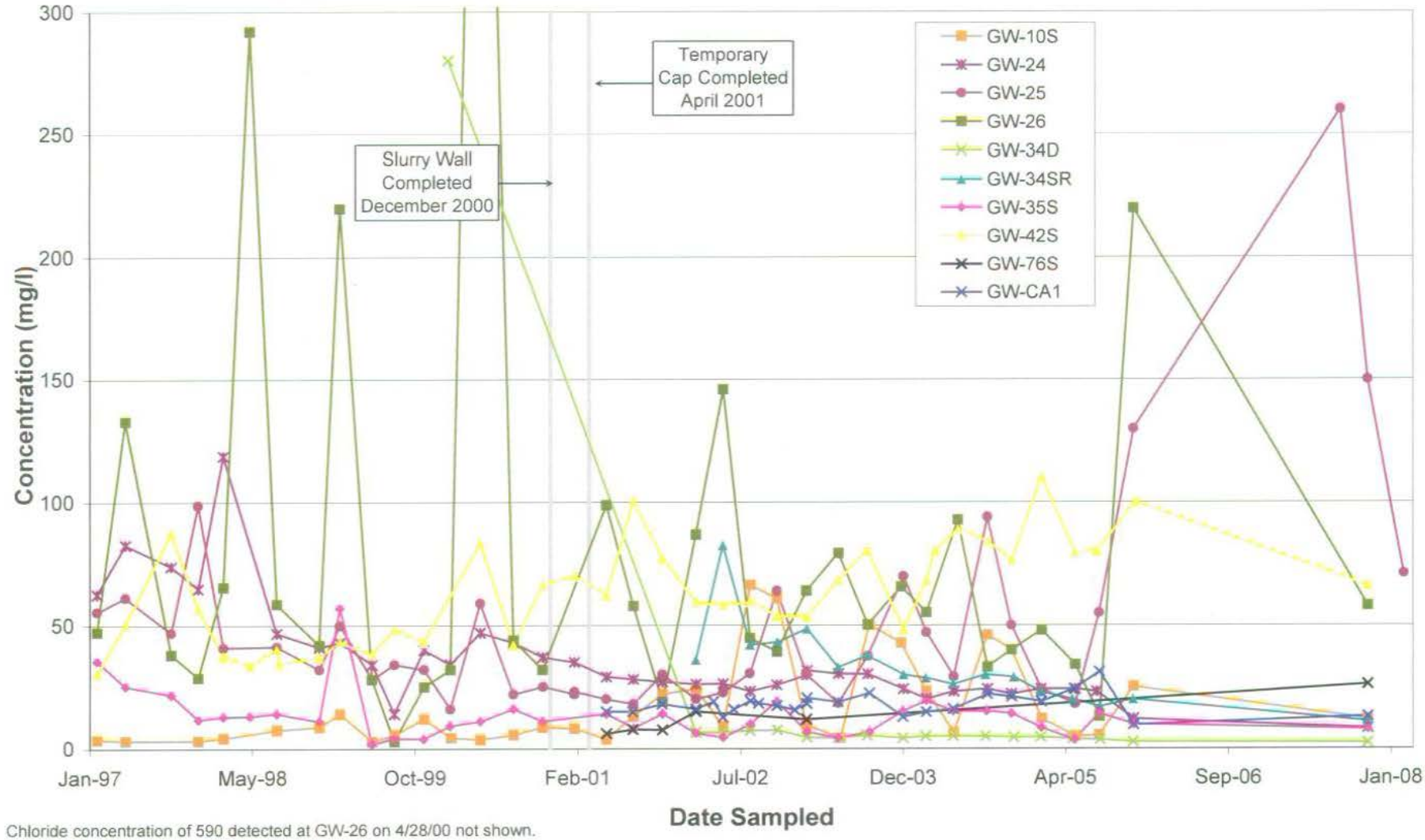
MACTEC

Chloride in Groundwater South and East of Containment Structure

Figure D-1.7

Prepared by: BJR
Checked by: MJM

P:\OLIN\Wilmington\SemiAnnual Status Report\2008 July\Appendix D\
Time Series Plots DAPL constituents, Chloride GW SE



Chloride concentration of 590 detected at GW-26 on 4/28/00 not shown.

Semi-Annual Status Report No. 2
Olin Wilmington Superfund Site
Wilmington, Massachusetts

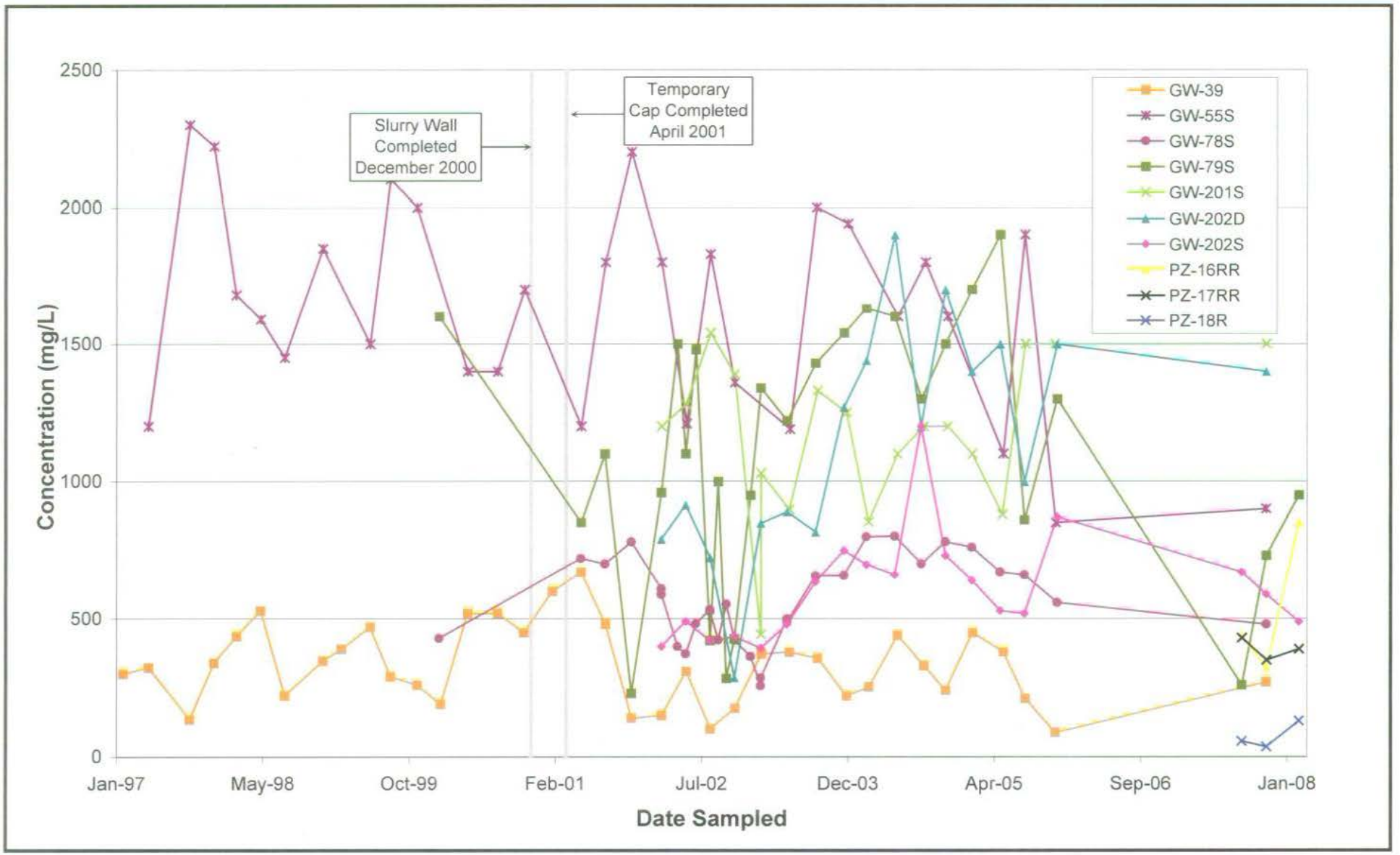
MACTEC

Chloride in Groundwater North and West of Containment Structure

Figure D-1.8

Prepared by: BJR
Checked by: MJM

P:\OLIN\Wilmington\SemiAnnual Status Report\2008 July\Appendix D\
Time Series Plots DAPL constituents. Chloride GW NW



Semi-Annual Status Report No. 2
Olin Wilmington Superfund Site
Wilmington, Massachusetts

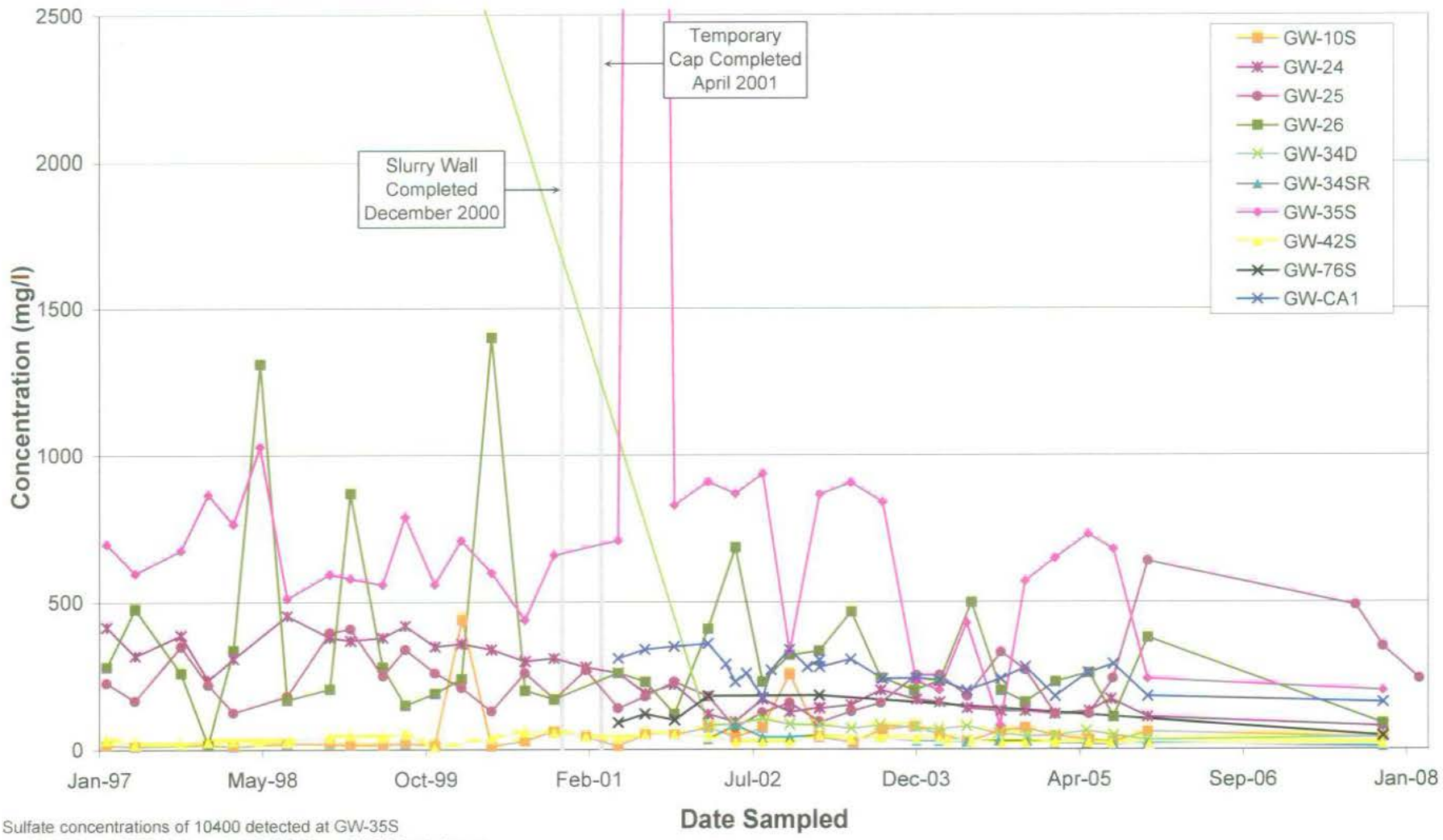
MACTEC

Sulfate in Groundwater South and East of Containment Structure

Figure D-1.9

P:\OLIN\Wilmington\SemiAnnual Status Report\2008 July\Appendix D\
Time Series Plots DAPL constituents, Sulfate GW SE

Prepared by: BJR
Checked by: MJM



Sulfate concentrations of 10400 detected at GW-35S on 8/17/01 and 2800 detected at GW-34D on 1/19/00 not shown.

Semi-Annual Status Report No. 2
Olin Wilmington Superfund Site
Wilmington, Massachusetts

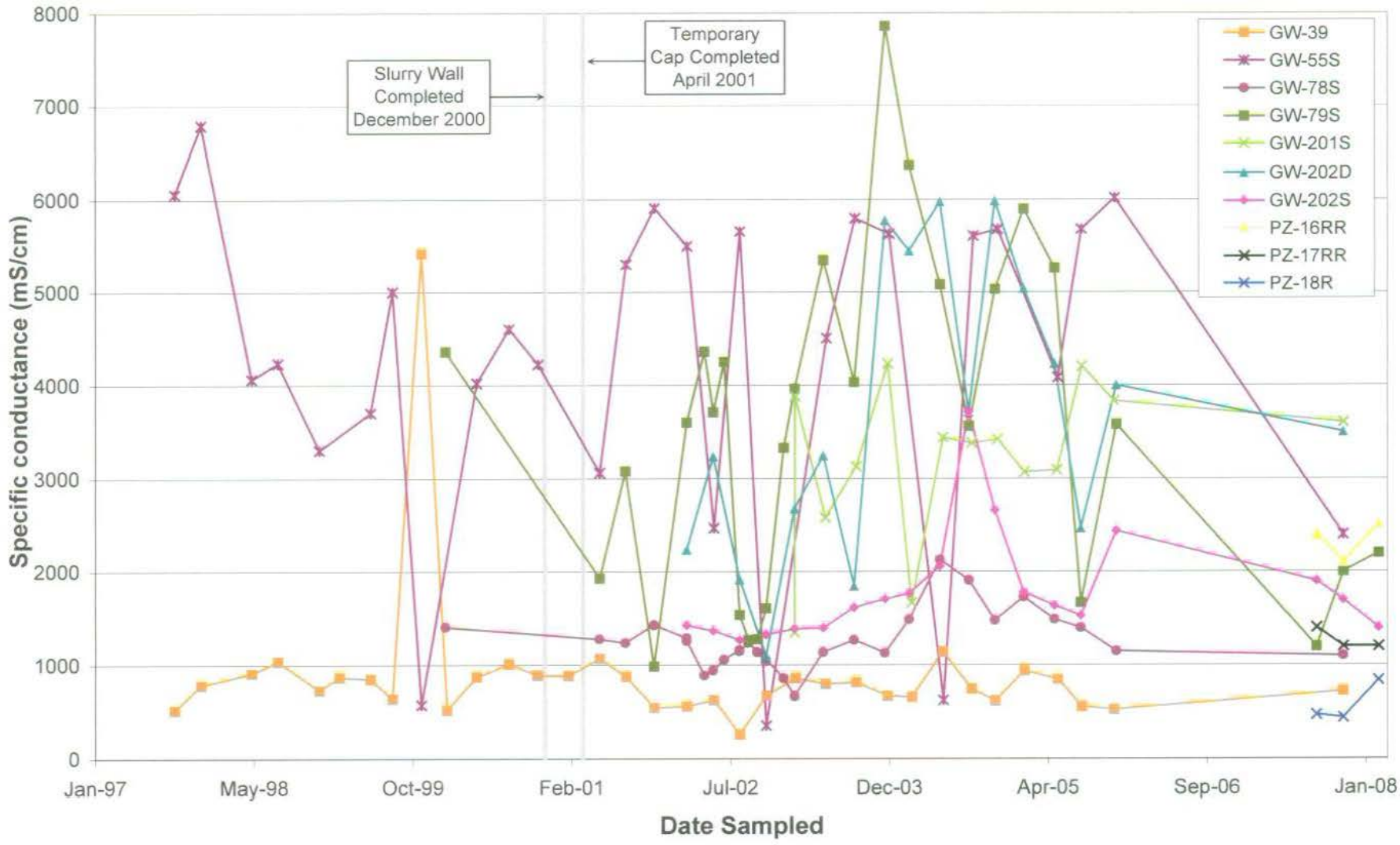
MACTEC

Sulfate in Groundwater North and West of Containment Structure

Figure D-1.10

Prepared by: BJR
Checked by: MJM

P:\OLIN\Wilmington\SemiAnnual Status Report\2008 July\Appendix D\
Time Series Plots DAPL constituents. Sulfate GW NW



Semi-Annual Status Report No. 2
Olin Wilmington Superfund Site
Wilmington, Massachusetts

MACTEC

Specific Conductance in Groundwater South and East of Containment Structure

Figure D-1.11

Prepared by: BJR
Checked by: MJM

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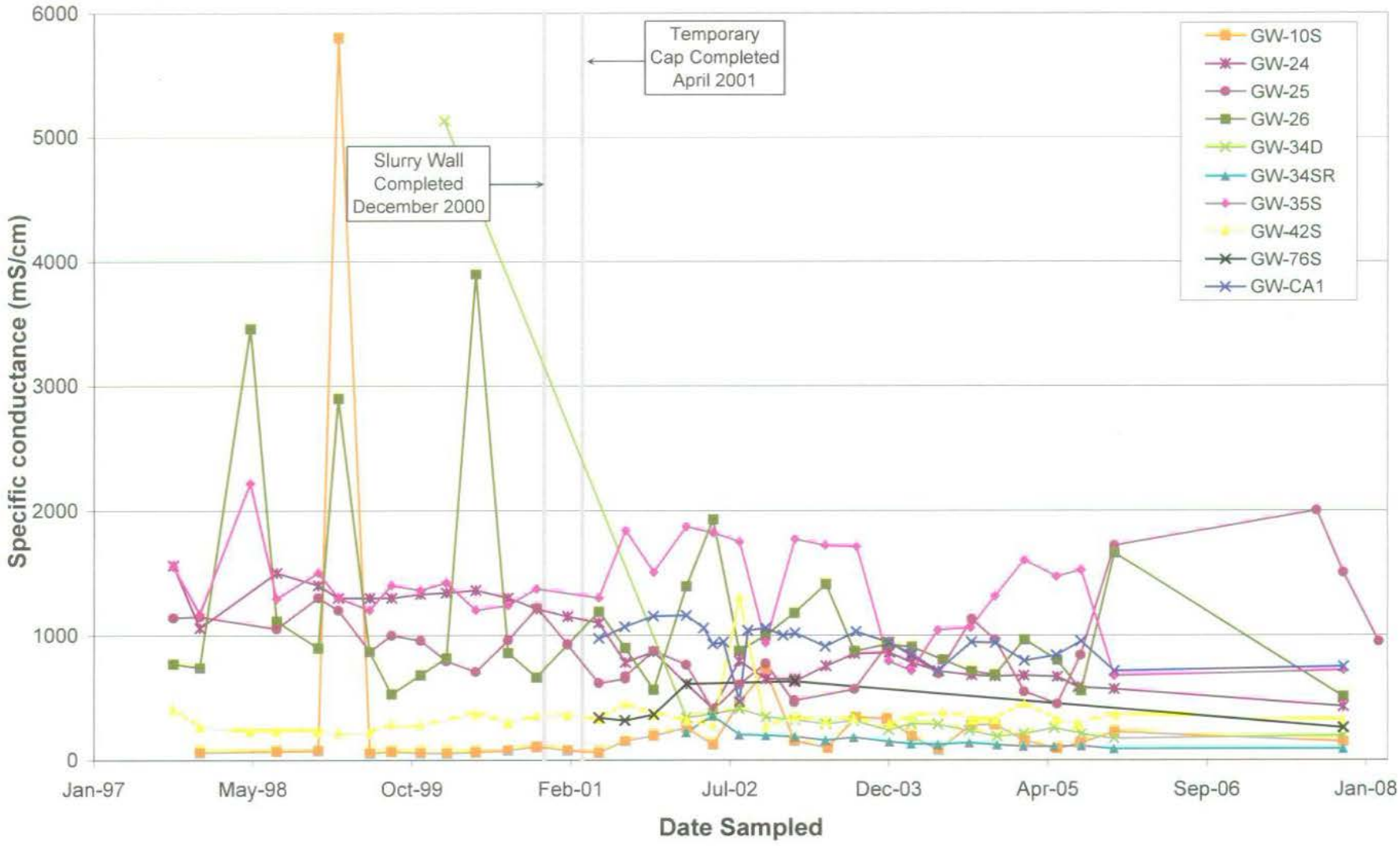
Time Series Plots DAPL constituents, Specific Conductance GW SE



Semi-Annual Status Report No. 2
Olin Wilmington Superfund Site
Wilmington, Massachusetts

MACTEC

Specific Conductance in Groundwater
North and West of Containment Structure

Figure D-1.12

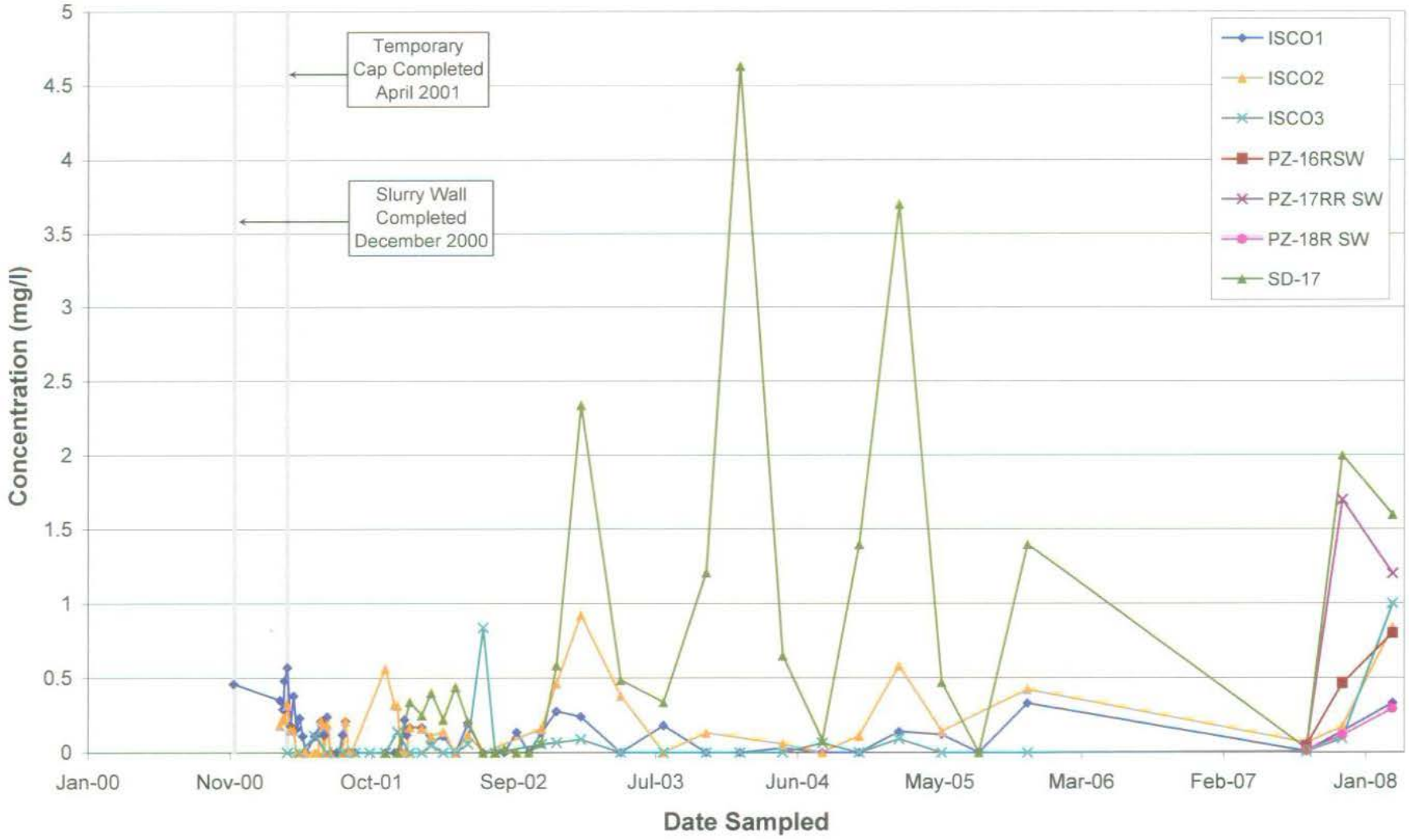
P:\OLIN\Wilmington\SemiAnnual Status Report\2008 July\Appendix D\
Time Series Plots DAPL constituents, Specific Conductance GW NW

Prepared by: BJR
Checked by: MJM

APPENDIX D

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

D-2 Surface Water (Aluminum, Ammonia, Chloride, Chromium, Sulfate)



Semi-Annual Status Report No. 2
Olin Wilmington Superfund Site
Wilmington, Massachusetts

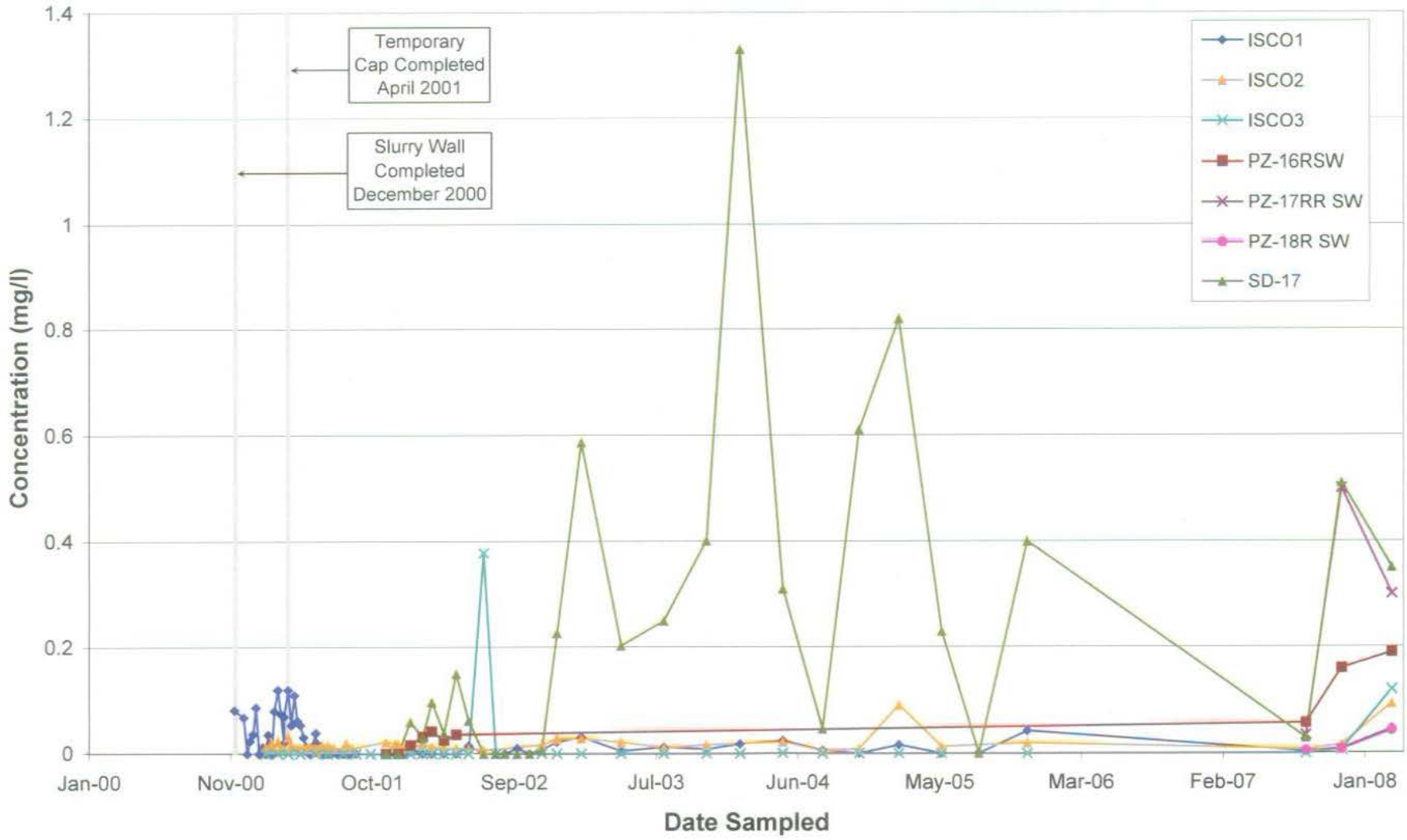
MACTEC

Filtered Aluminum in Surface Water in the South Ditch

Figure D-2.1

Prepared by: BJR
Checked by: MJM

P:\OLIN\Wilmington\SemiAnnual Status Report\2008 July\Appendix D\
Time Series Plots DAPL constituents, Aluminum SW



Semi-Annual Status Report No. 2
Olin Wilmington Superfund Site
Wilmington, Massachusetts

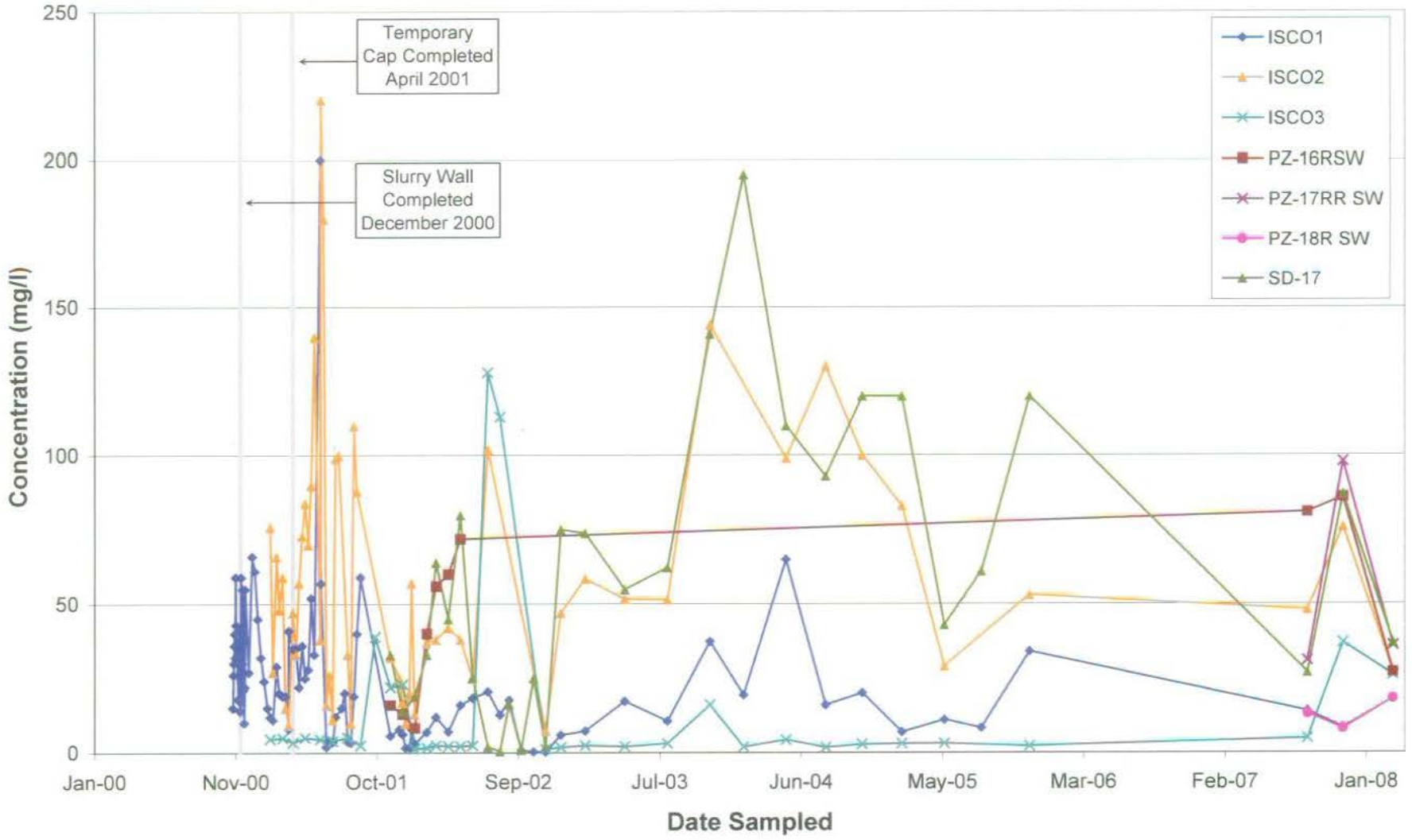
MACTEC

Filtered Chromium in Surface Water in the South Ditch

Figure D-2.2

Prepared by: BJR
Checked by: MJM

P:\OLIN\Wilmington\SemiAnnual Status Report\2008 July\Appendix D\
Time Series Plots DAPL constituents, Dissolved Chromium SW



Semi-Annual Status Report No. 2
Olin Wilmington Superfund Site
Wilmington, Massachusetts

MACTEC

Ammonia in Surface Water in the South Ditch

Figure D-2.3

Prepared by: BJR
Checked by: MJM

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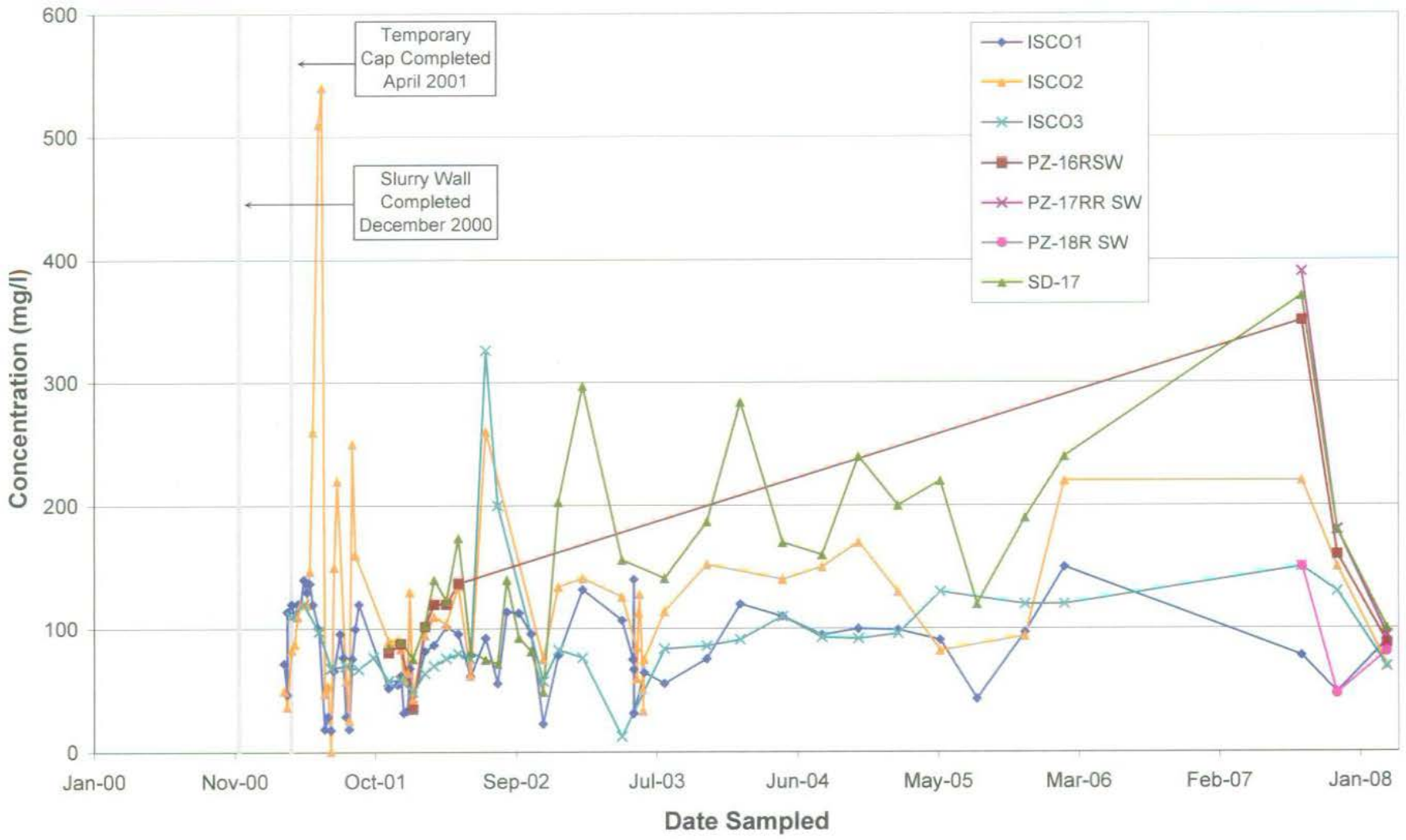
Time Series Plots DAPL constituents, Ammonia SW



Semi-Annual Status Report No. 2
Olin Wilmington Superfund Site
Wilmington, Massachusetts

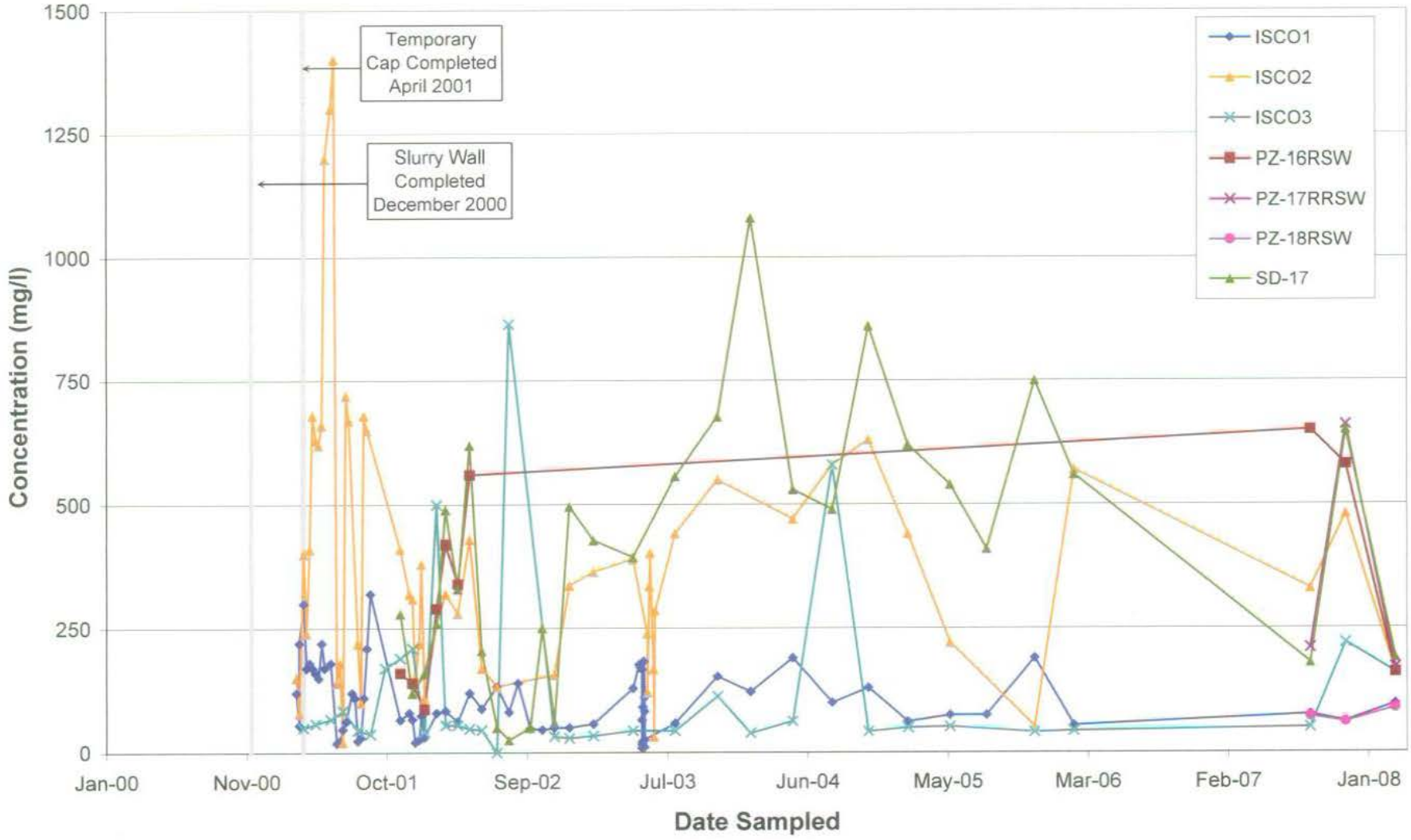
MACTEC

Chloride in Surface Water in the South Ditch

Figure D-2.4

Prepared by: BJR
Checked by: MJM

P:\OLIN\Wilmington\SemiAnnual Status Report\2008 July\Appendix D\
Time Series Plots DAPL constituents, Chloride SW



Semi-Annual Status Report No. 2
Olin Wilmington Superfund Site
Wilmington, Massachusetts

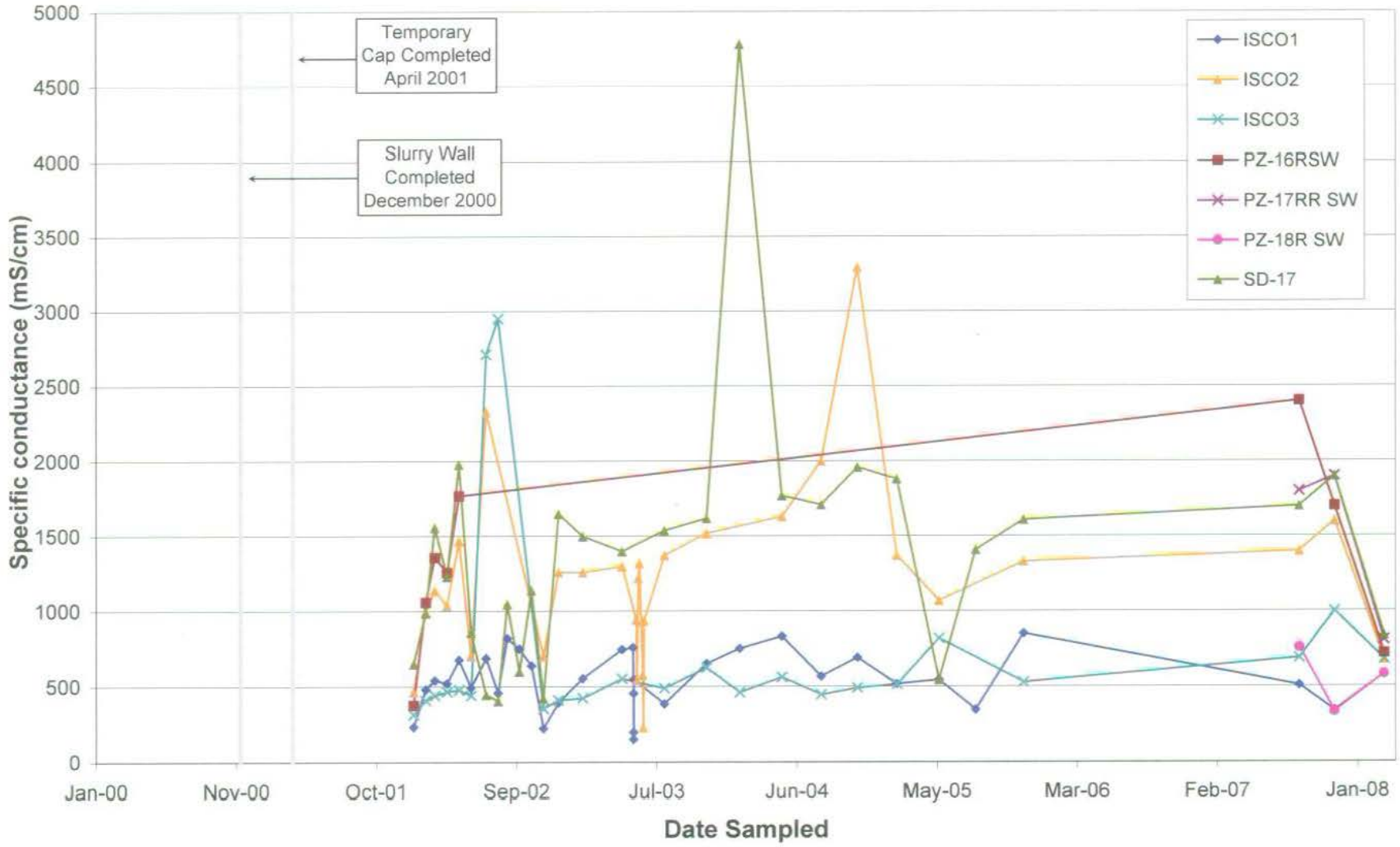
MACTEC

Sulfate in Surface Water in the South Ditch

Figure D-2.5

Prepared by: BJR
Checked by: MJM

P:\OLIN\Wilmington\SemiAnnual Status Report\2008 July\Appendix D\
Time Series Plots DAPL constituents. Sulfate SW



Semi-Annual Status Report No. 2
Olin Wilmington Superfund Site
Wilmington, Massachusetts

MACTEC

Specific Conductance in Surface Water in the South Ditch

Figure D-2.6

Prepared by: BJR
Checked by: MJM

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Time Series Plots DAPL constituents, Specific Conductance SW

APPENDIX F

USEPA Split Analysis Data Package

ALPHA ANALYTICAL LABORATORIES

Eight Walkup Drive
Westborough, Massachusetts 01581-1019
(508) 898-9220 www.alphalab.com
MA:M-MA086 NH:200301-A CT:PH-0574 ME:MA086 RI:65 NY:11148 NJ:MA935 Army:USACE

CERTIFICATE OF ANALYSIS

Client: U.S. EPA **Laboratory Job Number:** L0716999

Address: N.E. Regional Lab-Office of Env. Meas. **Date Received:** 14-NOV-2007
11 Technology Drive
North Chelmsford, MA 01863-2431 **Date Reported:** 20-NOV-2007

Attn: Mr. Dan Boudreau DB 11/29/07 **Delivery Method:** Alpha

Project Number: 07110022 **Site:** O CHEMICAL

ALPHA SAMPLE NUMBER	CLIENT IDENTIFICATION	SAMPLE LOCATION
L0716999-01	MW202D	
L0716999-02	MW10S	
L0716999-03	GW39	
L0716999-04	GW76S	
L0716999-05	GW55S	

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 report is, to the best of my knowledge and belief, accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized by: Phil L. Western
Technical Representative

ALPHA ANALYTICAL LABORATORIES
NARRATIVE REPORT

Laboratory Job Number: L0716999

The samples were received in accordance with the chain of custody and no significant deviations were encountered during preparation or analysis unless otherwise noted below.

Nitrogen, Ammonia

L0716999-01 has an elevated detection limit due to the 10x dilutions required by the high concentration of Nitrogen in the sample.

The MS % recovery is below the acceptance criteria for the method due to sample matrix.

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

MA:M-MA086 NH:200301-A CT:PH-0574 ME:MA086 RI:65 NY:11148 NJ:MA935 Army:USACE

Laboratory Sample Number: L0716999-01
MW202D
Sample Matrix: WATER

Date Collected: 13-NOV-2007 11:00
Date Received : 14-NOV-2007
Date Reported : 20-NOV-2007

Condition of Sample: Satisfactory

Field Prep: None

Number & Type of Containers: 1-Plastic

PARAMETER	RESULT	UNITS	RDL	REF METHOD	DATE PREP	DATE ANAL	ID
Nitrogen, Ammonia	137	mg/l	4.00	30 4500NH3-BE		1119 19:09	JL

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

MA:M-MA086 NH:200301-A CT:PH-0574 ME:MA086 RI:65 NY:11148 NJ:MA935 Army:USACE

Laboratory Sample Number: L0716999-02
MW10S
Sample Matrix: WATER

Date Collected: 13-NOV-2007 12:00
Date Received : 14-NOV-2007
Date Reported : 20-NOV-2007

Condition of Sample: Satisfactory

Field Prep: None

Number & Type of Containers: 1-Plastic

PARAMETER	RESULT	UNITS	RDL	REF METHOD	DATE PREP	DATE ANAL	ID
Nitrogen, Ammonia	1.85	mg/l	0.400	30 4500NH3-BE		1119 14:38	JL

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

MA:M-MA086 NH:200301-A CT:PH-0574 ME:MA086 RI:65 NY:11148 NJ:MA935 Army:USACE

Laboratory Sample Number: L0716999-03
GW39
Sample Matrix: WATER

Date Collected: 13-NOV-2007 14:00
Date Received : 14-NOV-2007
Date Reported : 20-NOV-2007

Condition of Sample: Satisfactory

Field Prep: None

Number & Type of Containers: 1-Plastic

PARAMETER	RESULT	UNITS	RDL	REF METHOD	DATE PREP	DATE ANAL	ID
Nitrogen, Ammonia	ND	mg/l	0.400	30 4500NH3-BE		1119 15:00	JL

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

MA:M-MA086 NH:200301-A CT:PH-0574 ME:MA086 RI:65 NY:11148 NJ:MA935 Army:USACE

Laboratory Sample Number: L0716999-04
GW76S
Sample Matrix: WATER

Date Collected: 13-NOV-2007 14:45
Date Received : 14-NOV-2007
Date Reported : 20-NOV-2007

Condition of Sample: Satisfactory

Field Prep: None

Number & Type of Containers: 1-Plastic

PARAMETER	RESULT	UNITS	RDL	REF METHOD	DATE PREP	DATE ANAL	ID
Nitrogen, Ammonia	8.74	mg/l	0.400	30 4500NH3-BE		1119 15:11	JL

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

MA:M-MA086 NH:200301-A CT:PH-0574 ME:MA086 RI:65 NY:11148 NJ:MA935 Army:USACE

Laboratory Sample Number: L0716999-05
GW55S
Sample Matrix: WATER

Date Collected: 13-NOV-2007 16:00
Date Received : 14-NOV-2007
Date Reported : 20-NOV-2007

Condition of Sample: Satisfactory

Field Prep: None

Number & Type of Containers: 1-Plastic

PARAMETER	RESULT	UNITS	RDL	REF METHOD	DATE PREP	DATE ANAL	ID
Nitrogen, Ammonia	118	mg/l	0.400	30 4500NH3-BE		1119 15:29	JL

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
QUALITY ASSURANCE BATCH DUPLICATE ANALYSIS

Laboratory Job Number: L0716999

Parameter	Value 1	Value 2	Units	RPD	RPD Limits
Nitrogen, Ammonia for sample(s) 01-05 (L0717115-01, WG302662-3)					
Nitrogen, Ammonia	ND	ND	mg/l	NC	20

ALPHA ANALYTICAL LABORATORIES
QUALITY ASSURANCE BATCH SPIKE ANALYSES

Laboratory Job Number: L0716999

Parameter	% Recovery	QC Criteria
Nitrogen, Ammonia LCS for sample(s) 01-05 (WG302662-2)		
Nitrogen, Ammonia	82	80-120
Nitrogen, Ammonia SPIKE for sample(s) 01-05 (L0716999-02, WG302662-4)		
Nitrogen, Ammonia	70	75-125

ALPHA ANALYTICAL LABORATORIES
QUALITY ASSURANCE BATCH BLANK ANALYSIS

Laboratory Job Number: L0716999

PARAMETER	RESULT	UNITS	RDL	REF METHOD	DATE PREP	DATE ANAL	ID
Blank Analysis for sample(s) 01-05 (WG302662-1)							
Nitrogen, Ammonia	ND	mg/l	0.400	30 4500NH3-BE		1119 17:29	JL

REFERENCES

30. Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WPCF. 18th Edition. 1992.

GLOSSARY OF TERMS AND SYMBOLS

REF	Reference number in which test method may be found.
METHOD	Method number by which analysis was performed.
ID	Initials of the analyst.
ND	Not detected in comparison to the reported detection limit.
NI	Not Ignitable.
ug/cart	Micrograms per Cartridge.
H	The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

LIMITATION OF LIABILITIES

Alpha Analytical, Inc. performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical, Inc., shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical, Inc. be held liable for any incidental consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical, Inc.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding times and splitting of samples in the field.

ENVIRONMENTAL PROTECTION AGENCY

REGION 1

ALPHA Job # L0716999

To Alpha Analytical Labs.

CHAIN OF CUSTODY RECORD

PROJ. NO.	PROJECT NAME
07110022	O CHEMICAL

SAMPLERS: (Signature)

STA. NO.	DATE	TIME	COMP	GRAB	STATION LOCATION	NO. OF CONTAINERS	NH_3 SN	REMARKS
MW202D	11/13/07	11:05		✓		1	✓	
MW10S		12:40		✓		1	✓	
GW39		14:00		✓		1	✓	
GW76S		14:45		✓		1	✓	
GW55S	↓	16:00		✓		1	✓	
						5		

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
	11/14/07 7:45AM	ESAT		11/14/07 11:05	
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
	11/14 1650				
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

1-16780

EPA
Region 1, New England

United States Environmental Protection Agency
Office of Environmental Measurement & Evaluation
11 Technology Drive
North Chelmsford, MA 01863-2431

Laboratory Report

November 28, 2007

Jim DiLorenzo - HBO
USEPA New England Region 1
One Congress Street
Boston, MA 02114 - 2023

Project Number: 07110022
Project: Olin Chemical - Wilmington, MA
Analysis: BNAs in Water
Analyst: Inna Germansderfer IG 11/28/07

Analytical Procedure:

All samples were received and logged in by the laboratory according to the USEPA New England Laboratory SOP for Sample Log-in.

Sample preparation and analysis was done following the EPA Region I SOP, EIASOP-BNAW1.

Samples were prepared using separatory funnel liquid-liquid extraction. The samples were analyzed using high resolution capillary column chromatography and quadrapole mass spectrometry (GC/MS). The SOP for this method is based on the US EPA SW-846 Methods 3510C, 8270, and Method 625.

Date Samples Received by the Laboratory: 11/14/07

Results relate only to the items tested or to the samples as received by the Laboratory. This analytical report shall not be reproduced except in full, without written approval of the laboratory.

Report may contain multiple sections and each section will be numbered independently.

If you have any questions please call me at 617-918-8340 .

Sincerely,

Daniel N. Boudreau 12/6/07
Daniel N. Boudreau
Chemistry Team Leader

Qualifiers

RL = Reporting limit
ND = Not Detected above Reporting limit
NA = Not Applicable due to high sample dilutions or sample interferences
NC = Not calculated since analyte concentration is ND.
J = Estimated value
E = Estimated value exceeds the calibration range
L = Estimated value is below the calibration range
B = Analyte is associated with the lab blank or trip blank contamination. Values are qualified when the observed concentration of the contamination in the sample extract is less than 5 times the concentration in the blank.
R = No recovery was calculated since the analyte concentration is greater than four times the spike level.

US ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND LABORATORY

Olin Chemical - Wilmington, MA

BNAs in Water

Client Sample ID:	MW202D	Lab Sample ID:	AA76878
Date of Collection:	11/13/2007	Matrix	Water
Date of Extraction:	11/15/07	Volume Extracted:	1000 mL
Date of Analysis:	11/15/07	Percent Solids:	N/A
Dry Weight Extracted:	N/A	Extract Dilution:	1
Wet Weight Extracted:	N/A	pH:	N/A
Final Volume:	1.0 mL	GPC Factor	N/A

CAS Number	Compound	Concentration ug/L	RL ug/L	Qualifier
95-94-3	1,2,4,5-Tetrachlorobenzene	ND	2.5	
120-82-1	1,2,4-Trichlorobenzene	ND	2.5	
95-50-1	1,2-Dichlorobenzene	ND	2.5	
541-73-1	1,3-Dichlorobenzene	ND	2.5	
99-65-0	1,3-Dinitrobenzene	ND	2.5	
106-46-7	1,4-Dichlorobenzene	ND	2.5	
130-15-4	1,4-Naphthoquinone	ND	5	
90-12-0	1-Methylnaphthalene	ND	2.5	
108-60-1	2,2'-oxybis(1-chloropropane)	ND	2.5	
58-90-2	2,3,4,6-Tetrachlorophenol	ND	2.5	
95-95-4	2,4,5-Trichlorophenol	ND	2.5	
88-06-2	2,4,6-Trichlorophenol	ND	2.5	
120-83-2	2,4-Dichlorophenol	ND	2.5	
51-28-5	2,4-Dinitrophenol	ND	5	
121-14-2	2,4-Dinitrotoluene	ND	2.5	
105-67-9	2,4-dimethylphenol	ND	2.5	
87-65-0	2,6-Dichlorophenol	ND	2.5	
606-20-2	2,6-Dinitrotoluene	ND	2.5	
91-58-7	2-Chloronaphthalene	ND	2.5	
95-57-8	2-Chlorophenol	ND	2.5	
91-57-6	2-Methylnaphthalene	ND	2.5	
95-48-7	2-Methylphenol	ND	2.5	
88-74-4	2-Nitroaniline	ND	2.5	
88-75-5	2-Nitrophenol	ND	2.5	
108-39-4/106-44-	3&4-Methylphenol	ND	5.0	
91-94-1	3,3'-Dichlorobenzidine	ND	2.5	
56-49-5	3-Methylcholanthrene	ND	2.5	
99-09-2	3-Nitroaniline	ND	2.5	
534-52-1	4,6-Dinitro-2-methylphenol	ND	5	
101-55-3	4-Bromophenyl-phenylether	ND	2.5	
59-50-7	4-Chloro-3-methylphenol	ND	2.5	
106-47-8	4-Chloroaniline	ND	2.5	
7005-72-3	4-Chlorophenyl-phenylether	ND	2.5	
100-01-6	4-Nitroaniline	ND	2.5	
100-02-7	4-Nitrophenol	ND	5	
56-57-5	4-nitroquinoline-1-oxide	ND	10	
83-32-9	Acenaphthene	ND	2.5	
208-96-8	Acenaphthylene	ND	2.5	
98-86-2	Acetophenone	ND	2.5	
62-53-3	Aniline	ND	2.5	
120-12-7	Anthracene	ND	2.5	

140-57-8	Aramite	ND	2.5
103-33-3	Azobenzene	ND	2.5
92-87-5	Benzidine	ND	2.5
56-55-3	Benzo(a)anthracene	ND	2.5
50-32-8	Benzo(a)pyrene	ND	2.5
205-99-2	Benzo(b)fluoranthene	ND	2.5
191-24-2	Benzo(g,h,i)perylene	ND	2.5
207-08-9	Benzo(k)fluoranthene	ND	2.5
65-85-0	Benzoic acid	ND	5
100-51-6	Benzyl alcohol	ND	2.5
111-44-4	Bis(2-Chloroethyl)ether	ND	2.5
117-81-7	Bis(2-ethylhexyl)phthalate	ND	2.5
85-68-7	Butylbenzylphthalate	ND	2.5
86-74-8	Carbazole	ND	2.5
510-15-6	Chlorobenzilate	ND	2.5
218-01-9	Chrysene	ND	2.5
84-74-2	Di-n-butylphthalate	ND	2.5
117-84-0	Di-n-octyl phthalate	ND	2.5
53-70-3	Dibenz(a,h)anthracene	ND	2.5
132-64-9	Dibenzofuran	ND	2.5
84-66-2	Diethylphthalate	ND	2.5
131-11-3	Dimethyl phthalate	ND	2.5
88-85-7	Dinoseb	ND	2.5
62-50-0	Ethyl methanesulfonate	ND	2.5
206-44-0	Fluoranthene	ND	2.5
86-73-7	Fluorene	ND	2.5
118-74-1	Hexachlorobenzene	ND	2.5
87-68-3	Hexachlorobutadiene	ND	2.5
77-47-4	Hexachlorocyclopentadiene	ND	2.5
67-72-1	Hexachloroethane	ND	2.5
1888-71-7	Hexachloropropene	ND	2.5
193-39-5	Indeno(1,2,3-cd)pyrene	ND	2.5
465-73-6	Isodrin	ND	2.5
78-59-1	Isophorone	ND	2.5
120-58-1	Isosafrole	ND	2.5
143-50-0	Kepone	ND	2.5
66-27-3	Methyl methanesulfonate	ND	2.5
86-30-6	N-Nitrosodiphenylamine	ND	2.5
621-64-7	N-nitroso-di-n-propylamine	ND	2.5
62-75-9	N-nitrosodimethylamine	ND	5
91-20-3	Naphthalene	ND	2.5
98-95-3	Nitrobenzene	ND	2.5
608-93-5	Pentachlorobenzene	ND	2.5
82-68-8	Pentachloronitrobenzene	ND	2.5
87-86-5	Pentachlorophenol	ND	10
62-44-2	Phenacetin	ND	2.5
85-01-8	Phenanthrene	ND	2.5
108-95-2	Phenol	ND	2.5
129-00-0	Pyrene	ND	2.5
110-86-1	Pyridine	ND	5
94-59-7	Safrole	ND	2.5
111-91-1	bis(-2-Chloroethoxy)methane	ND	2.5

Surrogate Compounds	Recoveries (%)	QC Ranges
2,4,6-Tribromophenol (SS5)	98	44 - 118
2-Fluorobiphenyl (SS4)	68	66 - 94
2-Fluorophenol (SS1)	45	21 - 78
Nitrobenzene-d5 (SS3)	61	63 - 95
Phenol-d6 (SS2)	37	7.9 - 50
p-Terphenyl-d14 (SS6)	75	59 - 119

Comments: Nitrobenzene- d5 recovery below QC limits.

Tentatively Identified non-Target Compounds, ppb

Decane, 3,3,4-trimethyl-	7.8 J

US ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND LABORATORY

Olin Chemical - Wilmington, MA

BNAs in Water

Client Sample ID:	MW10S	Lab Sample ID:	AA76879
Date of Collection:	11/13/2007	Matrix	Water
Date of Extraction:	11/15/07	Volume Extracted:	1000 mL
Date of Analysis:	11/15/07	Percent Solids:	N/A
Dry Weight Extracted:	N/A	Extract Dilution:	1
Wet Weight Extracted:	N/A	pH:	N/A
Final Volume:	1.0 mL	GPC Factor	N/A

CAS Number	Compound	Concentration ug/L	RL ug/L	Qualifier
95-94-3	1,2,4,5-Tetrachlorobenzene	ND	2.5	
120-82-1	1,2,4-Trichlorobenzene	ND	2.5	
95-50-1	1,2-Dichlorobenzene	ND	2.5	
541-73-1	1,3-Dichlorobenzene	ND	2.5	
99-65-0	1,3-Dinitrobenzene	ND	2.5	
106-46-7	1,4-Dichlorobenzene	ND	2.5	
130-15-4	1,4-Naphthoquinone	ND	5	
90-12-0	1-Methylnaphthalene	ND	2.5	
108-60-1	2,2'-oxybis(1-chloropropane)	ND	2.5	
58-90-2	2,3,4,6-Tetrachlorophenol	ND	2.5	
95-95-4	2,4,5-Trichlorophenol	ND	2.5	
88-06-2	2,4,6-Trichlorophenol	ND	2.5	
120-83-2	2,4-Dichlorophenol	ND	2.5	
51-28-5	2,4-Dinitrophenol	ND	5	
121-14-2	2,4-Dinitrotoluene	ND	2.5	
105-67-9	2,4-dimethylphenol	ND	2.5	
87-65-0	2,6-Dichlorophenol	ND	2.5	
606-20-2	2,6-Dinitrotoluene	ND	2.5	
91-58-7	2-Chloronaphthalene	ND	2.5	
95-57-8	2-Chlorophenol	ND	2.5	
91-57-6	2-Methylnaphthalene	ND	2.5	
95-48-7	2-Methylphenol	ND	2.5	
88-74-4	2-Nitroaniline	ND	2.5	
88-75-5	2-Nitrophenol	ND	2.5	
108-39-4/106-44-	3&4-Methylphenol	ND	5.0	
91-94-1	3,3'-Dichlorobenzidine	ND	2.5	
56-49-5	3-Methylcholanthrene	ND	2.5	
99-09-2	3-Nitroaniline	ND	2.5	
534-52-1	4,6-Dinitro-2-methylphenol	ND	5	
101-55-3	4-Bromophenyl-phenylether	ND	2.5	
59-50-7	4-Chloro-3-methylphenol	ND	2.5	
106-47-8	4-Chloroaniline	ND	2.5	
7005-72-3	4-Chlorophenyl-phenylether	ND	2.5	
100-01-6	4-Nitroaniline	ND	2.5	
100-02-7	4-Nitrophenol	ND	5	
56-57-5	4-nitroquinoline-1-oxide	ND	10	
83-32-9	Acenaphthene	ND	2.5	
208-96-8	Acenaphthylene	ND	2.5	
98-86-2	Acetophenone	ND	2.5	
62-53-3	Aniline	ND	2.5	
120-12-7	Anthracene	ND	2.5	

140-57-8	Aramite	ND	2.5
103-33-3	Azobenzene	ND	2.5
92-87-5	Benzidine	ND	2.5
56-55-3	Benzo(a)anthracene	ND	2.5
50-32-8	Benzo(a)pyrene	ND	2.5
205-99-2	Benzo(b)fluoranthene	ND	2.5
191-24-2	Benzo(g,h,i)perylene	ND	2.5
207-08-9	Benzo(k)fluoranthene	ND	2.5
65-85-0	Benzoic acid	ND	5
100-51-6	Benzyl alcohol	ND	2.5
111-44-4	Bis(2-Chloroethyl)ether	ND	2.5
117-81-7	Bis(2-ethylhexyl)phthalate	ND	2.5
85-68-7	Butylbenzylphthalate	ND	2.5
86-74-8	Carbazole	ND	2.5
510-15-6	Chlorobenzilate	ND	2.5
218-01-9	Chrysene	ND	2.5
84-74-2	Di-n-butylphthalate	ND	2.5
117-84-0	Di-n-octyl phthalate	ND	2.5
53-70-3	Dibenz(a,h)anthracene	ND	2.5
132-64-9	Dibenzofuran	ND	2.5
84-66-2	Diethylphthalate	ND	2.5
131-11-3	Dimethyl phthalate	ND	2.5
88-85-7	Dinoseb	ND	2.5
62-50-0	Ethyl methanesulfonate	ND	2.5
206-44-0	Fluoranthene	ND	2.5
86-73-7	Fluorene	ND	2.5
118-74-1	Hexachlorobenzene	ND	2.5
87-68-3	Hexachlorobutadiene	ND	2.5
77-47-4	Hexachlorocyclopentadiene	ND	2.5
67-72-1	Hexachloroethane	ND	2.5
1888-71-7	Hexachloropropene	ND	2.5
193-39-5	Indeno(1,2,3-cd)pyrene	ND	2.5
465-73-6	Isodrin	ND	2.5
78-59-1	Isophorone	ND	2.5
120-58-1	Isosafrole	ND	2.5
143-50-0	Kepone	ND	5.0
66-27-3	Methyl methanesulfonate	ND	2.5
86-30-6	N-Nitrosodiphenylamine	ND	2.5
621-64-7	N-nitroso-di-n-propylamine	ND	2.5
62-75-9	N-nitrosodimethylamine	ND	5
91-20-3	Naphthalene	ND	2.5
98-95-3	Nitrobenzene	ND	2.5
608-93-5	Pentachlorobenzene	ND	2.5
82-68-8	Pentachloronitrobenzene	ND	2.5
87-86-5	Pentachlorophenol	ND	10
62-44-2	Phenacetin	ND	2.5
85-01-8	Phenanthrene	ND	2.5
108-95-2	Phenol	ND	2.5
129-00-0	Pyrene	ND	2.5
110-86-1	Pyridine	ND	5
94-59-7	Safrole	ND	2.5
111-91-1	bis(-2-Chloroethoxy)methane	ND	2.5

Surrogate Compounds	Recoveries (%)	QC Ranges
2,4,6-Tribromophenol (SS5)	69	44 - 118
2-Fluorobiphenyl (SS4)	66	66 - 94
2-Fluorophenol (SS1)	41	21 - 78
Nitrobenzene-d5 (SS3)	58	63 - 95
Phenol-d6 (SS2)	26	7.9 - 50
p-Terphenyl-d14 (SS6)	73	59 - 119

Comments: Nitrobenzene- d5 recovery below QC limits.

Tentatively Identified non-Target Compounds, ppb

Cyclohexane, 1-methyl-2-propyl-	9.0 J

US ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND LABORATORY

Olin Chemical - Wilmington, MA

BNAs in Water

Client Sample ID:	GW39	Lab Sample ID:	AA76880
Date of Collection:	11/13/2007	Matrix	Water
Date of Extraction:	11/15/07	Volume Extracted:	1000 mL
Date of Analysis:	11/15/07	Percent Solids:	N/A
Dry Weight Extracted:	N/A	Extract Dilution:	1
Wet Weight Extracted:	N/A	pH:	N/A
Final Volume:	1.0 mL	GPC Factor	N/A

CAS Number	Compound	Concentration ug/L	RL ug/L	Qualifier
95-94-3	1,2,4,5-Tetrachlorobenzene	ND	2.5	
120-82-1	1,2,4-Trichlorobenzene	ND	2.5	
95-50-1	1,2-Dichlorobenzene	ND	2.5	
541-73-1	1,3-Dichlorobenzene	ND	2.5	
99-65-0	1,3-Dinitrobenzene	ND	2.5	
106-46-7	1,4-Dichlorobenzene	ND	2.5	
130-15-4	1,4-Naphthoquinone	ND	5	
90-12-0	1-Methylnaphthalene	ND	2.5	
108-60-1	2,2'-oxybis(1-chloropropane)	ND	2.5	
58-90-2	2,3,4,6-Tetrachlorophenol	ND	2.5	
95-95-4	2,4,5-Trichlorophenol	ND	2.5	
88-06-2	2,4,6-Trichlorophenol	ND	2.5	
120-83-2	2,4-Dichlorophenol	ND	2.5	
51-28-5	2,4-Dinitrophenol	ND	5	
121-14-2	2,4-Dinitrotoluene	ND	2.5	
105-67-9	2,4-dimethylphenol	ND	2.5	
87-65-0	2,6-Dichlorophenol	ND	2.5	
606-20-2	2,6-Dinitrotoluene	ND	2.5	
91-58-7	2-Chloronaphthalene	ND	2.5	
95-57-8	2-Chlorophenol	ND	2.5	
91-57-6	2-Methylnaphthalene	ND	2.5	
95-48-7	2-Methylphenol	ND	2.5	
88-74-4	2-Nitroaniline	ND	2.5	
88-75-5	2-Nitrophenol	ND	2.5	
108-39-4/106-44-	3&4-Methylphenol	ND	5.0	
91-94-1	3,3'-Dichlorobenzidine	ND	2.5	
56-49-5	3-Methylcholanthrene	ND	2.5	
99-09-2	3-Nitroaniline	ND	2.5	
534-52-1	4,6-Dinitro-2-methylphenol	ND	5	
101-55-3	4-Bromophenyl-phenylether	ND	2.5	
59-50-7	4-Chloro-3-methylphenol	ND	2.5	
106-47-8	4-Chloroaniline	ND	2.5	
7005-72-3	4-Chlorophenyl-phenylether	ND	2.5	
100-01-6	4-Nitroaniline	ND	2.5	
100-02-7	4-Nitrophenol	ND	5	
56-57-5	4-nitroquinoline-1-oxide	ND	10	
83-32-9	Acenaphthene	ND	2.5	
208-96-8	Acenaphthylene	ND	2.5	
98-86-2	Acetophenone	ND	2.5	
62-53-3	Aniline	ND	2.5	
120-12-7	Anthracene	ND	2.5	

140-57-8	Aramite	ND	2.5
103-33-3	Azobenzene	ND	2.5
92-87-5	Benzidine	ND	2.5
56-55-3	Benzo(a)anthracene	ND	2.5
50-32-8	Benzo(a)pyrene	ND	2.5
205-99-2	Benzo(b)fluoranthene	ND	2.5
191-24-2	Benzo(g,h,i)perylene	ND	2.5
207-08-9	Benzo(k)fluoranthene	ND	2.5
65-85-0	Benzoic acid	ND	5
100-51-6	Benzyl alcohol	ND	2.5
111-44-4	Bis(2-Chloroethyl)ether	ND	2.5
117-81-7	Bis(2-ethylhexyl)phthalate	ND	2.5
85-68-7	Butylbenzylphthalate	ND	2.5
86-74-8	Carbazole	ND	2.5
510-15-6	Chlorobenzilate	ND	2.5
218-01-9	Chrysene	ND	2.5
84-74-2	Di-n-butylphthalate	ND	2.5
117-84-0	Di-n-octyl phthalate	ND	2.5
53-70-3	Dibenz(a,h)anthracene	ND	2.5
132-64-9	Dibenzofuran	ND	2.5
84-66-2	Diethylphthalate	ND	2.5
131-11-3	Dimethyl phthalate	ND	2.5
88-85-7	Dinoseb	ND	2.5
62-50-0	Ethyl methanesulfonate	ND	2.5
206-44-0	Fluoranthene	ND	2.5
86-73-7	Fluorene	ND	2.5
118-74-1	Hexachlorobenzene	ND	2.5
87-68-3	Hexachlorobutadiene	ND	2.5
77-47-4	Hexachlorocyclopentadiene	ND	2.5
67-72-1	Hexachloroethane	ND	2.5
1888-71-7	Hexachloropropene	ND	2.5
193-39-5	Indeno(1,2,3-cd)pyrene	ND	2.5
465-73-6	Isodrin	ND	2.5
78-59-1	Isophorone	ND	2.5
120-58-1	Isosafrole	ND	2.5
143-50-0	Kepone	ND	5.0
66-27-3	Methyl methanesulfonate	ND	2.5
86-30-6	N-Nitrosodiphenylamine	ND	2.5
621-64-7	N-nitroso-di-n-propylamine	ND	2.5
62-75-9	N-nitrosodimethylamine	ND	5
91-20-3	Naphthalene	ND	2.5
98-95-3	Nitrobenzene	ND	2.5
608-93-5	Pentachlorobenzene	ND	2.5
82-68-8	Pentachloronitrobenzene	ND	2.5
87-86-5	Pentachlorophenol	ND	10
62-44-2	Phenacetin	ND	2.5
85-01-8	Phenanthrene	ND	2.5
108-95-2	Phenol	ND	2.5
129-00-0	Pyrene	ND	2.5
110-86-1	Pyridine	ND	5
94-59-7	Safrole	ND	2.5
111-91-1	bis(-2-Chloroethoxy)methane	ND	2.5

Surrogate Compounds	Recoveries (%)	QC Ranges
2,4,6-Tribromophenol (SS5)	68	44 - 118
2-Fluorobiphenyl (SS4)	68	66 - 94
2-Fluorophenol (SS1)	40	21 - 78
Nitrobenzene-d5 (SS3)	61	63 - 95
Phenol-d6 (SS2)	25	7.9 - 50
p-Terphenyl-d14 (SS6)	74	59 - 119

Comments: Nitrobenzene- d5 recovery below QC limits.

Tentatively Identified non-Target Compounds, ppb

Sulfurous acid, cyclohexylmethyl nonyl ester 9.0 J

US ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND LABORATORY

Olin Chemical - Wilmington, MA

BNAs in Water

Client Sample ID:	GW76S	Lab Sample ID:	AA76881
Date of Collection:	11/13/2007	Matrix	Water
Date of Extraction:	11/15/07	Volume Extracted:	1000 mL
Date of Analysis:	11/15/07	Percent Solids:	N/A
Dry Weight Extracted:	N/A	Extract Dilution:	1
Wet Weight Extracted:	N/A	pH:	N/A
Final Volume:	1.0 mL	GPC Factor	N/A

CAS Number	Compound	Concentration ug/L	RL ug/L	Qualifier
95-94-3	1,2,4,5-Tetrachlorobenzene	ND	2.5	
120-82-1	1,2,4-Trichlorobenzene	ND	2.5	
95-50-1	1,2-Dichlorobenzene	ND	2.5	
541-73-1	1,3-Dichlorobenzene	ND	2.5	
99-65-0	1,3-Dinitrobenzene	ND	2.5	
106-46-7	1,4-Dichlorobenzene	ND	2.5	
130-15-4	1,4-Naphthoquinone	ND	5	
90-12-0	1-Methylnaphthalene	ND	2.5	
108-60-1	2,2'-oxybis(1-chloropropane)	ND	2.5	
58-90-2	2,3,4,6-Tetrachlorophenol	ND	2.5	
95-95-4	2,4,5-Trichlorophenol	ND	2.5	
88-06-2	2,4,6-Trichlorophenol	ND	2.5	
120-83-2	2,4-Dichlorophenol	ND	2.5	
51-28-5	2,4-Dinitrophenol	ND	5	
121-14-2	2,4-Dinitrotoluene	ND	2.5	
105-67-9	2,4-dimethylphenol	ND	2.5	
87-65-0	2,6-Dichlorophenol	ND	2.5	
606-20-2	2,6-Dinitrotoluene	ND	2.5	
91-58-7	2-Chloronaphthalene	ND	2.5	
95-57-8	2-Chlorophenol	ND	2.5	
91-57-6	2-Methylnaphthalene	ND	2.5	
95-48-7	2-Methylphenol	ND	2.5	
88-74-4	2-Nitroaniline	ND	2.5	
88-75-5	2-Nitrophenol	ND	2.5	
108-39-4/106-44-	3&4-Methylphenol	ND	5.0	
91-94-1	3,3'-Dichlorobenzidine	ND	2.5	
56-49-5	3-Methylcholanthrene	ND	2.5	
99-09-2	3-Nitroaniline	ND	2.5	
534-52-1	4,6-Dinitro-2-methylphenol	ND	5	
101-55-3	4-Bromophenyl-phenylether	ND	2.5	
59-50-7	4-Chloro-3-methylphenol	ND	2.5	
106-47-8	4-Chloroaniline	ND	2.5	
7005-72-3	4-Chlorophenyl-phenylether	ND	2.5	
100-01-6	4-Nitroaniline	ND	2.5	
100-02-7	4-Nitrophenol	ND	5	
56-57-5	4-nitroquinoline-1-oxide	ND	10	
83-32-9	Acenaphthene	ND	2.5	
208-96-8	Acenaphthylene	ND	2.5	
98-86-2	Acetophenone	ND	2.5	
62-53-3	Aniline	ND	2.5	
120-12-7	Anthracene	ND	2.5	

Surrogate Compounds	Recoveries (%)	QC Ranges
2,4,6-Tribromophenol (SS5)	67	44 - 118
2-Fluorobiphenyl (SS4)	62	66 - 94
2-Fluorophenol (SS1)	41	21 - 78
Nitrobenzene-d5 (SS3)	56	63 - 95
Phenol-d6 (SS2)	27	7.9 - 50
p-Terphenyl-d14 (SS6)	66	59 - 119

Comments: Nitrobenzene- d5 and 2-fluorobiphenyl recovery below QC limits.

Tentatively Identified non-Target Compounds, ppb

Cyclohexane, 1-methyl-2-propyl- 9.0 J

140-57-8	Aramite	ND	2.5
103-33-3	Azobenzene	ND	2.5
92-87-5	Benzidine	ND	2.5
56-55-3	Benzo(a)anthracene	ND	2.5
50-32-8	Benzo(a)pyrene	ND	2.5
205-99-2	Benzo(b)fluoranthene	ND	2.5
191-24-2	Benzo(g,h,i)perylene	ND	2.5
207-08-9	Benzo(k)fluoranthene	ND	2.5
65-85-0	Benzoic acid	ND	5
100-51-6	Benzyl alcohol	ND	2.5
111-44-4	Bis(2-Chloroethyl)ether	ND	2.5
117-81-7	Bis(2-ethylhexyl)phthalate	ND	2.5
85-68-7	Butylbenzylphthalate	ND	2.5
86-74-8	Carbazole	ND	2.5
510-15-6	Chlorobenzilate	ND	2.5
218-01-9	Chrysene	ND	2.5
84-74-2	Di-n-butylphthalate	ND	2.5
117-84-0	Di-n-octyl phthalate	ND	2.5
53-70-3	Dibenz(a,h)anthracene	ND	2.5
132-64-9	Dibenzofuran	ND	2.5
84-66-2	Diethylphthalate	ND	2.5
131-11-3	Dimethyl phthalate	ND	2.5
88-85-7	Dinoseb	ND	2.5
62-50-0	Ethyl methanesulfonate	ND	2.5
206-44-0	Fluoranthene	ND	2.5
86-73-7	Fluorene	ND	2.5
118-74-1	Hexachlorobenzene	ND	2.5
87-68-3	Hexachlorobutadiene	ND	2.5
77-47-4	Hexachlorocyclopentadiene	ND	2.5
67-72-1	Hexachloroethane	ND	2.5
1888-71-7	Hexachloropropene	ND	2.5
193-39-5	Indeno(1,2,3-cd)pyrene	ND	2.5
465-73-6	Isodrin	ND	2.5
78-59-1	Isophorone	ND	2.5
120-58-1	Isosafrole	ND	2.5
143-50-0	Kepone	ND	5.0
66-27-3	Methyl methanesulfonate	ND	2.5
86-30-6	N-Nitrosodiphenylamine	**4.1**	2.5
621-64-7	N-nitroso-di-n-propylamine	ND	2.5
62-75-9	N-nitrosodimethylamine	ND	5
91-20-3	Naphthalene	ND	2.5
98-95-3	Nitrobenzene	ND	2.5
608-93-5	Pentachlorobenzene	ND	2.5
82-68-8	Pentachloronitrobenzene	ND	2.5
87-86-5	Pentachlorophenol	ND	10
62-44-2	Phenacetin	ND	2.5
85-01-8	Phenanthrene	ND	2.5
108-95-2	Phenol	ND	2.5
129-00-0	Pyrene	ND	2.5
110-86-1	Pyridine	ND	5
94-59-7	Safrole	ND	2.5
111-91-1	bis(-2-Chloroethoxy)methane	ND	2.5

US ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND LABORATORY

Olin Chemical - Wilmington, MA

BNAs in Water

Client Sample ID:	GW55S	Lab Sample ID:	AA76882
Date of Collection:	11/13/2007	Matrix	Water
Date of Extraction:	11/15/07	Volume Extracted:	1000 mL
Date of Analysis:	11/15/07	Percent Solids:	N/A
Dry Weight Extracted:	N/A	Extract Dilution:	1
Wet Weight Extracted:	N/A	pH:	N/A
Final Volume:	1.0 mL	GPC Factor	N/A

CAS Number	Compound	Concentration ug/L	RL ug/L	Qualifier
95-94-3	1,2,4,5-Tetrachlorobenzene	ND	2.5	
120-82-1	1,2,4-Trichlorobenzene	ND	2.5	
95-50-1	1,2-Dichlorobenzene	ND	2.5	
541-73-1	1,3-Dichlorobenzene	ND	2.5	
99-65-0	1,3-Dinitrobenzene	ND	2.5	
106-46-7	1,4-Dichlorobenzene	ND	2.5	
130-15-4	1,4-Naphthoquinone	ND	5	
90-12-0	1-Methylnaphthalene	ND	2.5	
108-60-1	2,2'-oxybis(1-chloropropane)	ND	2.5	
58-90-2	2,3,4,6-Tetrachlorophenol	ND	2.5	
95-95-4	2,4,5-Trichlorophenol	ND	2.5	
88-06-2	2,4,6-Trichlorophenol	ND	2.5	
120-83-2	2,4-Dichlorophenol	ND	2.5	
51-28-5	2,4-Dinitrophenol	ND	5	
121-14-2	2,4-Dinitrotoluene	ND	2.5	
105-67-9	2,4-dimethylphenol	ND	2.5	
87-65-0	2,6-Dichlorophenol	ND	2.5	
606-20-2	2,6-Dinitrotoluene	ND	2.5	
91-58-7	2-Chloronaphthalene	ND	2.5	
95-57-8	2-Chlorophenol	ND	2.5	
91-57-6	2-Methylnaphthalene	ND	2.5	
95-48-7	2-Methylphenol	ND	2.5	
88-74-4	2-Nitroaniline	ND	2.5	
88-75-5	2-Nitrophenol	ND	2.5	
108-39-4/106-44-	3&4-Methylphenol	ND	5.0	
91-94-1	3,3'-Dichlorobenzidine	ND	2.5	
56-49-5	3-Methylcholanthrene	ND	2.5	
99-09-2	3-Nitroaniline	ND	2.5	
534-52-1	4,6-Dinitro-2-methylphenol	ND	5	
101-55-3	4-Bromophenyl-phenylether	ND	2.5	
59-50-7	4-Chloro-3-methylphenol	ND	2.5	
106-47-8	4-Chloroaniline	ND	2.5	
7005-72-3	4-Chlorophenyl-phenylether	ND	2.5	
100-01-6	4-Nitroaniline	ND	2.5	
100-02-7	4-Nitrophenol	ND	5	
56-57-5	4-nitroquinoline-1-oxide	ND	10	
83-32-9	Acenaphthene	ND	2.5	
208-96-8	Acenaphthylene	ND	2.5	
98-86-2	Acetophenone	ND	2.5	
62-53-3	Aniline	ND	2.5	
120-12-7	Anthracene	ND	2.5	

140-57-8	Aramite	ND	2.5
103-33-3	Azobenzene	ND	2.5
92-87-5	Benzidine	ND	2.5
56-55-3	Benzo(a)anthracene	ND	2.5
50-32-8	Benzo(a)pyrene	ND	2.5
205-99-2	Benzo(b)fluoranthene	ND	2.5
191-24-2	Benzo(g,h,i)perylene	ND	2.5
207-08-9	Benzo(k)fluoranthene	ND	2.5
65-85-0	Benzoic acid	ND	5
100-51-6	Benzyl alcohol	ND	2.5
111-44-4	Bis(2-Chloroethyl)ether	ND	2.5
117-81-7	Bis(2-ethylhexyl)phthalate	ND	2.5
85-68-7	Butylbenzylphthalate	ND	2.5
86-74-8	Carbazole	ND	2.5
510-15-6	Chlorobenzilate	ND	2.5
218-01-9	Chrysene	ND	2.5
84-74-2	Di-n-butylphthalate	ND	2.5
117-84-0	Di-n-octyl phthalate	ND	2.5
53-70-3	Dibenz(a,h)anthracene	ND	2.5
132-64-9	Dibenzofuran	ND	2.5
84-66-2	Diethylphthalate	ND	2.5
131-11-3	Dimethyl phthalate	ND	2.5
88-85-7	Dinoseb	ND	2.5
62-50-0	Ethyl methanesulfonate	ND	2.5
206-44-0	Fluoranthene	ND	2.5
86-73-7	Fluorene	ND	2.5
118-74-1	Hexachlorobenzene	ND	2.5
87-68-3	Hexachlorobutadiene	ND	2.5
77-47-4	Hexachlorocyclopentadiene	ND	2.5
67-72-1	Hexachloroethane	ND	2.5
1888-71-7	Hexachloropropene	ND	2.5
193-39-5	Indeno(1,2,3-cd)pyrene	ND	2.5
465-73-6	Isodrin	ND	2.5
78-59-1	Isophorone	ND	2.5
120-58-1	Isosafrole	ND	2.5
143-50-0	Kepone	ND	5.0
66-27-3	Methyl methanesulfonate	ND	2.5
86-30-6	N-Nitrosodiphenylamine	ND	2.5
621-64-7	N-nitroso-di-n-propylamine	ND	2.5
62-75-9	N-nitrosodimethylamine	ND	5
91-20-3	Naphthalene	ND	2.5
98-95-3	Nitrobenzene	ND	2.5
608-93-5	Pentachlorobenzene	ND	2.5
82-68-8	Pentachloronitrobenzene	ND	2.5
87-86-5	Pentachlorophenol	ND	10
62-44-2	Phenacetin	ND	2.5
85-01-8	Phenanthrene	ND	2.5
108-95-2	Phenol	ND	2.5
129-00-0	Pyrene	ND	2.5
110-86-1	Pyridine	ND	5
94-59-7	Safrole	ND	2.5
111-91-1	bis(-2-Chloroethoxy)methane	ND	2.5

Surrogate Compounds	Recoveries (%)	QC Ranges
2,4,6-Tribromophenol (SS5)	69	44 - 118
2-Fluorobiphenyl (SS4)	65	66 - 94
2-Fluorophenol (SS1)	40	21 - 78
Nitrobenzene-d5 (SS3)	57	63 - 95
Phenol-d6 (SS2)	28	7.9 - 50
p-Terphenyl-d14 (SS6)	70	59 - 119

Comments: Nitrobenzene- d5 and 2-fluorobiphenyl recovery below QC limits.

Tentatively Identified non-Target Compounds, ppb

2-Pentane, 2,3,4ptrimethyl- 13.0 J

US ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND LABORATORY

Olin Chemical - Wilmington, MA

Laboratory Blank Results

Client Sample ID:	N/A	Lab Sample ID:	N/A
Date of Collection:	N/A	Matrix	Water
Date of Extraction:	11/15/07	Volume Extracted:	1000 mL
Date of Analysis:	11/15/07	Percent Solids:	N/A
Dry Weight Extracted:	N/A	Extract Dilution:	1
Wet Weight Extracted:	N/A	pH:	N/A
Final Volume:	1 mL	GPC Factor	N/A

CAS Number	Compound	Concentration ug/L	RL ug/L	Qualifier
95-94-3	1,2,4,5-Tetrachlorobenzene	ND	2.5	
120-82-1	1,2,4-Trichlorobenzene	ND	2.5	
95-50-1	1,2-Dichlorobenzene	ND	2.5	
541-73-1	1,3-Dichlorobenzene	ND	2.5	
99-65-0	1,3-Dinitrobenzene	ND	2.5	
106-46-7	1,4-Dichlorobenzene	ND	2.5	
130-15-4	1,4-Naphthoquinone	ND	5	
90-12-0	1-Methylnaphthalene	ND	2.5	
108-60-1	2,2'-oxybis(1-chloropropane)	ND	2.5	
58-90-2	2,3,4,6-Tetrachlorophenol	ND	2.5	
95-95-4	2,4,5-Trichlorophenol	ND	2.5	
88-06-2	2,4,6-Trichlorophenol	ND	2.5	
120-83-2	2,4-Dichlorophenol	ND	2.5	
51-28-5	2,4-Dinitrophenol	ND	5	
121-14-2	2,4-Dinitrotoluene	ND	2.5	
105-67-9	2,4-dimethylphenol	ND	2.5	
87-65-0	2,6-Dichlorophenol	ND	2.5	
606-20-2	2,6-Dinitrotoluene	ND	2.5	
91-58-7	2-Chloronaphthalene	ND	2.5	
95-57-8	2-Chlorophenol	ND	2.5	
91-57-6	2-Methylnaphthalene	ND	2.5	
95-48-7	2-Methylphenol	ND	2.5	
88-74-4	2-Nitroaniline	ND	2.5	
88-75-5	2-Nitrophenol	ND	2.5	
108-39-4/106-44-	3&4-Methylphenol	ND	5.0	
91-94-1	3,3'-Dichlorobenzidine	ND	2.5	
56-49-5	3-Methylcholanthrene	ND	2.5	
99-09-2	3-Nitroaniline	ND	2.5	
534-52-1	4,6-Dinitro-2-methylphenol	ND	5	
101-55-3	4-Bromophenyl-phenylether	ND	2.5	
59-50-7	4-Chloro-3-methylphenol	ND	2.5	
106-47-8	4-Chloroaniline	ND	2.5	
7005-72-3	4-Chlorophenyl-phenylether	ND	2.5	
100-01-6	4-Nitroaniline	ND	2.5	
100-02-7	4-Nitrophenol	ND	5	
56-57-5	4-nitroquinoline-1-oxide	ND	10	
83-32-9	Acenaphthene	ND	2.5	
208-96-8	Acenaphthylene	ND	2.5	
98-86-2	Acetophenone	ND	2.5	
62-53-3	Aniline	ND	2.5	
120-12-7	Anthracene	ND	2.5	

140-57-8	Aramite	ND	2.5
103-33-3	Azobenzene	ND	2.5
92-87-5	Benzidine	ND	2.5
56-55-3	Benzo(a)anthracene	ND	2.5
50-32-8	Benzo(a)pyrene	ND	2.5
205-99-2	Benzo(b)fluoranthene	ND	2.5
191-24-2	Benzo(g,h,i)perylene	ND	2.5
207-08-9	Benzo(k)fluoranthene	ND	2.5
65-85-0	Benzoic acid	ND	5
100-51-6	Benzyl alcohol	ND	2.5
111-44-4	Bis(2-Chloroethyl)ether	ND	2.5
117-81-7	Bis(2-ethylhexyl)phthalate	ND	2.5
85-68-7	Butylbenzylphthalate	ND	2.5
86-74-8	Carbazole	ND	2.5
510-15-6	Chlorobenzilate	ND	2.5
218-01-9	Chrysene	ND	2.5
84-74-2	Di-n-butylphthalate	ND	2.5
117-84-0	Di-n-octyl phthalate	ND	2.5
53-70-3	Dibenz(a,h)anthracene	ND	2.5
132-64-9	Dibenzofuran	ND	2.5
84-66-2	Diethylphthalate	ND	2.5
131-11-3	Dimethyl phthalate	ND	2.5
88-85-7	Dinoseb	ND	2.5
62-50-0	Ethyl methanesulfonate	ND	2.5
206-44-0	Fluoranthene	ND	2.5
86-73-7	Fluorene	ND	2.5
118-74-1	Hexachlorobenzene	ND	2.5
87-68-3	Hexachlorobutadiene	ND	2.5
77-47-4	Hexachlorocyclopentadiene	ND	2.5
67-72-1	Hexachloroethane	ND	2.5
1888-71-7	Hexachloropropene	ND	2.5
193-39-5	Indeno(1,2,3-cd)pyrene	ND	2.5
465-73-6	Isodrin	ND	2.5
78-59-1	Isophorone	ND	2.5
120-58-1	Isosafrole	ND	2.5
143-50-0	Kepone	ND	2.5
66-27-3	Methyl methanesulfonate	ND	2.5
86-30-6	N-Nitrosodiphenylamine	ND	2.5
621-64-7	N-nitroso-di-n-propylamine	ND	2.5
62-75-9	N-nitrosodimethylamine	ND	5
91-20-3	Naphthalene	ND	2.5
98-95-3	Nitrobenzene	ND	2.5
608-93-5	Pentachlorobenzene	ND	2.5
82-68-8	Pentachloronitrobenzene	ND	2.5
87-86-5	Pentachlorophenol	ND	10
62-44-2	Phenacetin	ND	2.5
85-01-8	Phenanthrene	ND	2.5
108-95-2	Phenol	ND	2.5
129-00-0	Pyrene	ND	2.5
110-86-1	Pyridine	ND	5
94-59-7	Safrole	ND	2.5
111-91-1	bis(-2-Chloroethoxy)methane	ND	2.5

Surrogate Compounds	Recoveries (%)	QC Ranges
2,4,6-Tribromophenol (SS5)	62	44 - 118
2-Fluorobiphenyl (SS4)	65	66 - 94
2-Fluorophenol (SS1)	42	21 - 78
Nitrobenzene-d5 (SS3)	60	63 - 95
Phenol-d6 (SS2)	27	7.9 - 49
p-Terphenyl-d14 (SS6)	75	59 - 119

Comments: Nitrobenzene- d5 and 2-fluorobiphenyl recovery below QC limits.

US ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND LABORATORY

BNA MATRIX SPIKE (MS)

Olin Chemical - Wilmington, MA

Sample ID: AA76879

PARAMETER	SPIKE ADDED ug/L	SAMPLE CONCENTRATION ug/L	MS CONCENTRATION ug/L	MS % REC	QC LIMITS (% REC)
1,2,4,5-Tetrachlorobenzene	40	ND	25	62	36 - 120
1,2,4-Trichlorobenzene	40	ND	22	55	24 - 111
1,2-Dichlorobenzene	40	ND	20	50	23 - 106
1,3-Dichlorobenzene	40	ND	18	45	18 - 104
1,3-Dinitrobenzene	40	ND	31	78	48 - 131
1,4-Dichlorobenzene	40	ND	19	48	19 - 106
1,4-Naphthoquinone	40	ND	26	65	50 - 119
1-Methylnaphthalene	40	ND	27	68	41 - 116
2,2'-oxybis(1-chloropropane)	40	ND	24	60	32 - 126
2,3,4,6-Tetrachlorophenol	40	ND	31	78	34 - 137
2,4,5-Trichlorophenol	40	ND	30	75	44 - 132
2,4,6-Trichlorophenol	40	ND	29	72	38 - 128
2,4-Dichlorophenol	40	ND	29	72	39 - 128
2,4-Dinitrophenol	40	ND	23	58	15 - 146
2,4-Dinitrotoluene	40	ND	31	78	44 - 130
2,4-dimethylphenol	40	ND	26	65	37 - 120
2,6-Dichlorophenol	40	ND	27	68	34 - 129
2,6-Dinitrotoluene	40	ND	30	75	54 - 121
2-Chloronaphthalene	40	ND	25	62	41 - 117
2-Chlorophenol	40	ND	26	65	10 - 137
2-Methylnaphthalene	40	ND	26	65	39 - 113
2-Methylphenol	40	ND	24	60	38 - 110
2-Nitroaniline	40	ND	25	62	56 - 129
2-Nitrophenol	40	ND	27	68	30 - 120
3&4-Methylphenol	80	ND	47	59	33 - 103
3,3'-Dichlorobenzidine	40	ND	28	70	1.8 - 137
3-Methylcholanthrene	40	ND	27	68	7 - 178
3-Nitroaniline	40	ND	29	72	40 - 120
4,6-Dinitro-2-methylphenol	40	ND	24	60	11 - 145
4-Bromophenyl-phenylether	40	ND	29	72	54 - 120
4-Chloro-3-methylphenol	40	ND	29	72	54 - 118
4-Chloroaniline	40	ND	26	65	22 - 143
4-Chlorophenyl-phenylether	40	ND	30	75	55 - 121
4-Nitroaniline	40	ND	28	70	34 - 136
4-Nitrophenol	40	ND	14	35	11 - 122
4-nitroquinoline-1-oxide	40	ND	23	58	24 - 149
Acenaphthene	40	ND	28	70	50 - 115
Acenaphthylene	40	ND	28	70	54 - 116
Acetophenone	40	ND	26	65	20 - 144
Aniline	40	ND	22	55	15 - 113
Anthracene	40	ND	29	72	57 - 128
Aramite	40	ND	28	70	37 - 144
Azobenzene	40	ND	25	62	58 - 124
Benzidine	40	ND	6	15	4.9 - 66
Benzo(a)anthracene	40	ND	31	78	60 - 131
Benzo(a)pyrene	40	ND	29	72	48 - 138

Benzo(b)fluoranthene	40	ND	32	80	41 - 145
Benzo(g,h,i)perylene	40	ND	29	72	49 - 132
Benzo(k)fluoranthene	40	ND	30	75	62 - 130
Benzoic acid	40	ND	9	22	10 - 122
Benzyl alcohol	40	ND	24	60	33 - 107
Bis(2-Chloroethyl)ether	40	ND	25	62	35 - 120
Bis(2-ethylhexyl)phthalate	40	ND	28	70	17 - 185
Butylbenzylphthalate	40	ND	28	70	41 - 150
Carbazole	40	ND	30	75	63 - 120
Chlorobenzilate	40	ND	29	72	44 - 146
Chrysene	40	ND	30	75	58 - 136
Di-n-butylphthalate	40	ND	30	75	64 - 133
Di-n-octyl phthalate	40	ND	29	72	29 - 159
Dibenz(a,h)anthracene	40	ND	27	68	45 - 137
Dibenzofuran	40	ND	29	72	49 - 123
Diethylphthalate	40	ND	30	75	54 - 128
Dimethyl phthalate	40	ND	29	72	45 - 129
Dinoseb	40	ND	25	62	44 - 126
Ethyl methanesulfonate	40	ND	25	62	39 - 122
Fluoranthene	40	ND	31	78	64 - 123
Fluorene	40	ND	30	75	56 - 122
Hexachlorobenzene	40	ND	29	72	56 - 122
Hexachlorobutadiene	40	ND	17	42	12 - 109
Hexachlorocyclopentadiene	40	ND	13	32	5.2 - 134
Hexachloroethane	40	ND	15	38	14 - 101
Hexachloropropene	40	ND	18	45	14 - 115
Indeno(1,2,3-cd)pyrene	40	ND	30	75	58 - 131
Isodrin	40	ND	28	70	59 - 122
Isophorone	40	ND	27	68	43 - 126
Isosafrole	40	ND	29	72	37 - 122
Kepone	40	ND	18	45	14 - 131
Methyl methanesulfonate	40	ND	21	52	37 - 116
N-Nitrosodiphenylamine	40	ND	28	70	62 - 123
N-nitroso-di-n-propylamine	40	ND	26	65	44 - 128
N-nitrosodimethylamine	40	ND	17	42	19 - 86
Naphthalene	40	ND	25	62	36 - 115
Nitrobenzene	40	ND	25	62	43 - 127
Pentachlorobenzene	40	ND	29	72	49 - 122
Pentachloronitrobenzene	40	ND	30	75	64 - 124
Pentachlorophenol	40	ND	25	62	11 - 145
Phenacetin	40	ND	27	68	46 - 140
Phenanthrene	40	ND	29	72	66 - 120
Phenol	40	ND	13	32	21 - 56
Pyrene	40	ND	30	75	56 - 142
Pyridine	40	ND	14	35	9 - 84
Safrole	40	ND	26	65	46 - 122
bis(-2-Chloroethoxy)methane	40	ND	26	65	27 - 127

Comments:

US ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND LABORATORY

Laboratory Duplicate Results

Olin Chemical - Wilmington, MA

Sample ID: AA76878

PARAMETER	SAMPLE RESULT ug/L	SAMPLE DUPLICATE RESULT ug/L	PRECISION RPD %	QC LIMITS
1,2,4,5-Tetrachlorobenzene	ND	ND	ND	50
1,2,4-Trichlorobenzene	ND	ND	ND	50
1,2-Dichlorobenzene	ND	ND	ND	50
1,3-Dichlorobenzene	ND	ND	ND	50
1,3-Dinitrobenzene	ND	ND	ND	50
1,4-Dichlorobenzene	ND	ND	ND	50
1,4-Naphthoquinone	ND	ND	ND	50
1-Methylnaphthalene	ND	ND	ND	50
2,2'-oxybis(1-chloropropane)	ND	ND	ND	50
2,3,4,6-Tetrachlorophenol	ND	ND	ND	50
2,4,5-Trichlorophenol	ND	ND	ND	50
2,4,6-Trichlorophenol	ND	ND	ND	50
2,4-Dichlorophenol	ND	ND	ND	50
2,4-Dinitrophenol	ND	ND	ND	50
2,4-Dinitrotoluene	ND	ND	ND	50
2,4-dimethylphenol	ND	ND	ND	50
2,6-Dichlorophenol	ND	ND	ND	50
2,6-Dinitrotoluene	ND	ND	ND	50
2-Chloronaphthalene	ND	ND	ND	50
2-Chlorophenol	ND	ND	ND	50
2-Methylnaphthalene	ND	ND	ND	50
2-Methylphenol	ND	ND	ND	50
2-Nitroaniline	ND	ND	ND	50
2-Nitrophenol	ND	ND	ND	50
3&4-Methylphenol	ND	ND	ND	50
3,3'-Dichlorobenzidine	ND	ND	ND	50
3-Methylcholanthrene	ND	ND	ND	50
3-Nitroaniline	ND	ND	ND	50
4,6-Dinitro-2-methylphenol	ND	ND	ND	50
4-Bromophenyl-phenylether	ND	ND	ND	50
4-Chloro-3-methylphenol	ND	ND	ND	50
4-Chloroaniline	ND	ND	ND	50
4-Chlorophenyl-phenylether	ND	ND	ND	50
4-Nitroaniline	ND	ND	ND	50
4-Nitrophenol	ND	ND	ND	50
4-nitroquinoline-1-oxide	ND	ND	ND	50
Acenaphthene	ND	ND	ND	50
Acenaphthylene	ND	ND	ND	50
Acetophenone	ND	ND	ND	50
Aniline	ND	ND	ND	50
Anthracene	ND	ND	ND	50
Aramite	ND	ND	ND	50
Azobenzene	ND	ND	ND	50
Benzidine	ND	ND	ND	50
Benzo(a)anthracene	ND	ND	ND	50
Benzo(a)pyrene	ND	ND	ND	50
Benzo(b)fluoranthene	ND	ND	ND	50
Benzo(g,h,i)perylene	ND	ND	ND	50
Benzo(k)fluoranthene	ND	ND	ND	50
Benzoic acid	ND	ND	ND	50

Benzyl alcohol	ND	ND	ND	50
Bis(2-Chloroethyl)ether	ND	ND	ND	50
Bis(2-ethylhexyl)phthalate	ND	ND	ND	50
Butylbenzylphthalate	ND	ND	ND	50
Carbazole	ND	ND	ND	50
Chlorobenzilate	ND	ND	ND	50
Chrysene	ND	ND	ND	50
Di-n-butylphthalate	ND	ND	ND	50
Di-n-octyl phthalate	ND	ND	ND	50
Dibenz(a,h)anthracene	ND	ND	ND	50
Dibenzofuran	ND	ND	ND	50
Diethylphthalate	ND	ND	ND	50
Dimethyl phthalate	ND	ND	ND	50
Dinoseb	ND	ND	ND	50
Ethyl methanesulfonate	ND	ND	ND	50
Fluoranthene	ND	ND	ND	50
Fluorene	ND	ND	ND	50
Hexachlorobenzene	ND	ND	ND	50
Hexachlorobutadiene	ND	ND	ND	50
Hexachlorocyclopentadiene	ND	ND	ND	50
Hexachloroethane	ND	ND	ND	50
Hexachloropropene	ND	ND	ND	50
Indeno(1,2,3-cd)pyrene	ND	ND	ND	50
Isodrin	ND	ND	ND	50
Isophorone	ND	ND	ND	50
Isosafrole	ND	ND	ND	50
Kepone	ND	ND	ND	50
Methyl methanesulfonate	ND	ND	ND	50
N-Nitrosodiphenylamine	ND	ND	ND	50
N-nitroso-di-n-propylamine	ND	ND	ND	50
N-nitrosodimethylamine	ND	ND	ND	50
Naphthalene	ND	ND	ND	50
Nitrobenzene	ND	ND	ND	50
Pentachlorobenzene	ND	ND	ND	50
Pentachloronitrobenzene	ND	ND	ND	50
Pentachlorophenol	ND	ND	ND	50
Phenacetin	ND	ND	ND	50
Phenanthrene	ND	ND	ND	50
Phenol	ND	ND	ND	50
Pyrene	ND	ND	ND	50
Pyridine	ND	ND	ND	50
Safrole	ND	ND	ND	50
bis(-2-Chloroethoxy)methane	ND	ND	ND	50

US ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND LABORATORY

Laboratory Fortified Blank (LFB) Results

Olin Chemical - Wilmington, MA

PARAMETER	LFB AMOUNT SPIKED ug/L	LFB RESULT ug/L	LFB RECOVERY %	QC LIMITS %
1,2,4,5-Tetrachlorobenzene	40	23	58	37 - 109
1,2,4-Trichlorobenzene	40	20	50	25 - 95
1,2-Dichlorobenzene	40	19	48	23 - 93
1,3-Dichlorobenzene	40	17	42	23 - 86
1,3-Dinitrobenzene	40	31	78	50 - 137
1,4-Dichlorobenzene	40	18	45	19 - 89
1,4-Naphthoquinone	40	26	65	46 - 170
1-Methylnaphthalene	40	26	65	38 - 114
2,2'-oxybis(1-chloropropane)	40	24	60	36 - 123
2,3,4,6-Tetrachlorophenol	40	28	70	44 - 141
2,4,5-Trichlorophenol	40	28	70	44 - 133
2,4,6-Trichlorophenol	40	28	70	53 - 128
2,4-Dichlorophenol	40	27	68	47 - 128
2,4-Dinitrophenol	40	19	48	4.4 - 135
2,4-Dinitrotoluene	40	31	78	48 - 133
2,4-dimethylphenol	40	26	65	35 - 128
2,6-Dichlorophenol	40	26	65	47 - 123
2,6-Dinitrotoluene	40	30	75	50 - 133
2-Chloronaphthalene	40	24	60	41 - 117
2-Chlorophenol	40	25	62	37 - 126
2-Methylnaphthalene	40	25	62	16 - 127
2-Methylphenol	40	24	60	42 - 114
2-Nitroaniline	40	25	62	50 - 138
2-Nitrophenol	40	26	65	43 - 124
3&4-Methylphenol	80	48	60	34 - 115
3,3'-Dichlorobenzidine	40	29	72	49 - 134
3-Methylcholanthrene	40	26	65	48 - 177
3-Nitroaniline	40	29	72	46 - 128
4,6-Dinitro-2-methylphenol	40	23	58	36 - 137
4-Bromophenyl-phenylether	40	28	70	49 - 127
4-Chloro-3-methylphenol	40	28	70	48 - 129
4-Chloroaniline	40	27	68	49 - 115
4-Chlorophenyl-phenylether	40	29	72	53 - 126
4-Nitroaniline	40	28	70	38 - 139
4-Nitrophenol	40	13	32	1.2 - 111
4-nitroquinoline-1-oxide	40	20	50	6.2 - 153
Acenaphthene	40	27	68	46 - 122
Acenaphthylene	40	27	68	49 - 122
Acetophenone	40	25	62	37 - 127
Aniline	40	21	52	40 - 109
Anthracene	40	28	70	52 - 135
Aramite	40	27	68	31 - 152
Azobenzene	40	25	62	53 - 130
Benzidine	40	11	28	17 - 118
Benzo(a)anthracene	40	30	75	59 - 134
Benzo(a)pyrene	40	29	72	47 - 143
Benzo(b)fluoranthene	40	29	72	43 - 148
Benzo(g,h,i)perylene	40	27	68	40 - 143
Benzo(k)fluoranthene	40	29	72	47 - 144

Benzoic acid	40	ND	0	17 - 110
Benzyl alcohol	40	23	58	30 - 123
Bis(2-Chloroethyl)ether	40	24	60	40 - 120
Bis(2-ethylhexyl)phthalate	40	27	68	30 - 174
Butylbenzylphthalate	40	27	68	44 - 151
Carbazole	40	29	72	26 - 152
Chlorobenzilate	40	28	70	35 - 153
Chrysene	40	29	72	57 - 137
Di-n-butylphthalate	40	29	72	48 - 148
Di-n-octyl phthalate	40	28	70	22 - 173
Dibenz(a,h)anthracene	40	25	62	38 - 150
Dibenzofuran	40	28	70	51 - 124
Diethylphthalate	40	29	72	32 - 148
Dimethyl phthalate	40	29	72	18 - 153
Dinoseb	40	24	60	44 - 130
Ethyl methanesulfonate	40	25	62	42 - 123
Fluoranthene	40	31	78	48 - 137
Fluorene	40	29	72	55 - 128
Hexachlorobenzene	40	29	72	51 - 127
Hexachlorobutadiene	40	16	40	10 - 89
Hexachlorocyclopentadiene	40	12	30	1.5 - 107
Hexachloroethane	40	14	35	11 - 82
Hexachloropropene	40	17	42	13 - 89
Indeno(1,2,3-cd)pyrene	40	27	68	47 - 138
Isodrin	40	27	68	47 - 131
Isophorone	40	26	65	52 - 124
Isosafrole	40	28	70	45 - 115
Kepone	40	24	60	45 - 138
Methyl methanesulfonate	40	20	50	28 - 128
N-Nitrosodiphenylamine	40	27	68	47 - 143
N-nitroso-di-n-propylamine	40	26	65	48 - 127
N-nitrosodimethylamine	40	16	40	24 - 87
Naphthalene	40	24	60	37 - 110
Nitrobenzene	40	24	60	52 - 117
Pentachlorobenzene	40	29	72	49 - 124
Pentachloronitrobenzene	40	29	72	53 - 138
Pentachlorophenol	40	21	52	23 - 132
Phenacetin	40	26	65	44 - 141
Phenanthrene	40	28	70	56 - 130
Phenol	40	13	32	16 - 69
Pyrene	40	29	72	54 - 144
Pyridine	40	14	35	19 - 85
Safrole	40	25	62	50 - 121
bis(-2-Chloroethoxy)methane	40	26	65	40 - 128

Comments: Benzoic acid was not detected.

EPA
Region 1, New England

United States Environmental Protection Agency
Office of Environmental Measurement & Evaluation
11 Technology Drive
North Chelmsford, MA 01863-2431

Laboratory Report

December 04, 2007

Jim DiLorenzo - HBO
USEPA New England Region 1
One Congress Street
Boston, MA 02114 - 2023

Project Number: 07110022
Project: Olin Chemical - Wilmington, MA
Analysis: Ion Chromatography Anions
Analyst: Jeremy O'Kelly 12/4

Analytical Procedure:

All samples were received and logged in by the laboratory according to the USEPA New England Laboratory SOP for Sample Log-in.

Samples were analyzed following the EPA Region I SOP, EIASOP-INGDXIC9.

The analysis was performed using either a Dionex ICS-2000 or DX120 Ion Chromatograph.

Date Samples Received by the Laboratory: 11/14/07

Results relate only to the items tested or to the samples as received by the Laboratory. This analytical report shall not be reproduced except in full, without written approval of the laboratory.

Report may contain multiple sections and each section will be numbered independently.

If you have any questions please call me at 617-918-8340 .

Sincerely,

Daniel N. Boudreau 12/13/07
Daniel N. Boudreau
Chemistry Team Leader

Oualifiers:

RL = Reporting limit
ND = Not Detected above reporting limit
NA = Not Applicable
NC = Not calculated since analyte concentration is ND
J1 = Estimated value due to MS recovery outside accceptance criteria
J2 = Estimated value due to LFB result outside acceptance criteria
J3 = Estimated value due to RPD result outside acceptance criteria
J4 = Estimated value due to LCS result outside acceptance criteria
B = Analyte is associated with the lab blank or trip blank contamination. Values are qualified when the observed concentration of the contamination in the sample extract is less than 10 times the concentration in the blank.
R = No recovery was calculated since the analyte concentration is greater than four times the spike level.

US ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND LABORATORY

Olin Chemical - Wilmington, MA

Ion Chromatography Anions

Client Sample ID:	MW202D	Lab Sample ID:	AA76878
Date of Collection:	11/13/2007 11:00	Matrix	Water
Date of Analysis:	11/14/2007 21:46	Final Volume:	N/A

CAS Number	Parameter	Concentration mg/L	RL mg/L	Qualifier
	Bromide	**1.1**	0.50	
	Chloride	**210**	10	
	Fluoride	**1.7**	0.20	
	Nitrate	ND	0.50	
	Nitrite	ND	4.0	
	Sulfate	**1400**	25	

Comments: Fluoride, bromide, and nitrate reported from 1x solution. Chloride and nitrite reported from 20x dilution, and sulfate reported from 50x dilution.

US ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND LABORATORY

Olin Chemical - Wilmington, MA

Ion Chromatography Anions

Client Sample ID:	MW10S	Lab Sample ID:	AA76879
Date of Collection:	11/13/2007 12:00	Matrix	Water
Date of Analysis:	11/14/2007 20:28	Final Volume:	N/A

CAS Number	Parameter	Concentration mg/L	RL mg/L	Qualifier
	Bromide	ND	0.50	
	Chloride	**12**	0.50	
	Fluoride	ND	0.20	
	Nitrate	**1.8**	0.50	
	Nitrite	ND	0.20	
	Sulfate	**38**	0.50	

Comments:

US ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND LABORATORY

Olin Chemical - Wilmington, MA

Laboratory Blank

Client Sample ID:	N/A	Lab Sample ID:	N/A
Date of Collection:	N/A	Matrix	Water
Date of Analysis:	11/14/2007 19:36	Final Volume:	N/A

CAS Number	Parameter	Concentration mg/L	RL mg/L	Qualifier
	Bromide	ND	0.50	
	Chloride	ND	0.50	
	Fluoride	ND	0.20	
	Nitrate	ND	0.50	
	Nitrite	ND	0.20	
	Sulfate	ND	0.50	

Comments:

US ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND LABORATORY

Olin Chemical - Wilmington, MA

Ion Chromatography Anions

Client Sample ID:	GW39	Lab Sample ID:	AA76880
Date of Collection:	11/13/2007 14:00	Matrix	Water
Date of Analysis:	12/04/2007 22:13	Final Volume:	N/A

CAS Number	Parameter	Concentration mg/L	RL mg/L	Qualifier
	Bromide	ND	0.50	
	Chloride	**62**	10	
	Fluoride	ND	0.20	
	Nitrate	**3.2**	0.50	
	Nitrite	ND	0.20	
	Sulfate	**270**	10	

Comments: Chloride and sulfate are reported from a 20x dilution.

US ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND LABORATORY

Olin Chemical - Wilmington, MA

Ion Chromatography Anions

Client Sample ID:	GW55S	Lab Sample ID:	AA76882
Date of Collection:	11/13/2007 16:00	Matrix	Water
Date of Analysis:	12/04/2007 23:05	Final Volume:	N/A

CAS Number	Parameter	Concentration mg/L	RL mg/L	Qualifier
	Bromide	**0.82**	0.50	
	Chloride	**110**	5.0	
	Fluoride	**1.3**	0.20	
	Nitrate	**160**	5.0	
	Nitrite	ND	0.20	
	Sulfate	**880**	10	

Comments: Fluoride, nitrite, and bromide are reported from the 1x sample. Chloride and nitrate are reported from a 10x dilution, and sufate is reported from a 20x dilution.

US ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND LABORATORY

Olin Chemical - Wilmington, MA

Ion Chromatography Anions

Client Sample ID:	GW76S	Lab Sample ID:	AA76881
Date of Collection:	11/13/2007 14:45	Matrix	Water
Date of Analysis:	12/04/2007 22:39	Final Volume:	N/A

CAS Number	Parameter	Concentration mg/L	RL mg/L	Qualifier
	Bromide	ND	0.50	
	Chloride	**26**	0.50	
	Fluoride	ND	0.20	
	Nitrate	**7.7**	0.50	
	Nitrite	ND	0.20	
	Sulfate	**46**	0.50	

Comments:

US ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND LABORATORY

MATRIX SPIKE (MS) RESULTS

Olin Chemical - Wilmington, MA

COMPOUND	SPIKE ADDED mg/L	SAMPLE CONCENTRATION mg/L	MS CONCENTRATION mg/L	MS % REC	QC LIMITS (% REC)
Sample ID: AA76879					
Bromide	5.0	ND	5.0	100	80 - 120
Chloride	1.5	12	13.2	120	80 - 120
Fluoride	1.0	ND	1.2	120	80 - 120
Nitrate	5.0	1.8	6.5	96	80 - 120
Nitrite	5.0	ND	5.4	108	80 - 120
Sulfate	7.5	38	43.1	93	80 - 120

US ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND LABORATORY

LABORATORY DUPLICATE RESULTS

Olin Chemical - Wilmington, MA

COMPOUND	SAMPLE RESULT mg/L	SAMPLE DUPLICATE RESULT mg/L	PRECISION RPD %	QC LIMITS RPD (%)
Sample ID: AA76879				
Bromide	ND	ND	ND	20
Chloride	12	12	0.0	20
Fluoride	ND	ND	ND	20
Nitrate	1.8	1.8	0.0	20
Nitrite	ND	ND	ND	20
Sulfate	38	39	2.6	20

Comments:

US ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND LABORATORY

Laboratory Fortified Blank (LFB) Results

Olin Chemical - Wilmington, MA

COMPOUND	LFB AMOUNT SPIKED mg/L	LFB RESULT mg/L	LFB RECOVERY %	QC LIMITS %
Sample ID: AA76879				
Bromide	5.0	4.9	98	90 - 110
Chloride	1.5	1.5	100	90 - 110
Fluoride	1.0	1.1	110	90 - 110
Nitrate	5.0	5.3	106	90 - 110
Nitrite	5.0	5.0	100	90 - 110
Sulfate	7.5	7.5	100	90 - 110

Samples in Batch: AA76878, AA76879, AA76880, AA76881, AA76882

EPA
Region 1, New England

United States Environmental Protection Agency
Office of Environmental Measurement & Evaluation
11 Technology Drive
North Chelmsford, MA 01863-2431

Laboratory Report

December 4, 2007

Jim DiLorenzo - HBO
USEPA New England Region 1
One Congress Street
Boston, MA 02114 - 2023

Project Number: 07110022
Project: Olin Chemical - Wilmington, MA
Analysis: Total Recoverable Metals in Water by ICP
EPA Chemist: Michael Dowling
MD 12/27/07

Analytical Procedure:

All samples were received and logged in by the laboratory according to the USEPA New England Laboratory SOP for Sample Log-in.

Samples were analyzed following the EPA Region I SOP, EIASOP-INGDVICP0.

The sample preparation and analysis SOP's are based on Methods 3005A and 6010B as stated in "Test Methods for Evaluating Solid Waste," 3rd ed., Final Update III, 7/92 and 12/96.

The samples were analyzed on a Perkin Elmer 4300 Dual View Inductively Coupled Plasma Optical Emission Spectrometer.

Date Samples Received by the Laboratory: 11/14/07

Results relate only to the items tested or to the samples as received by the Laboratory. This analytical report shall not be reproduced except in full, without written approval of the laboratory.

Report may contain multiple sections and each section will be numbered independently.

If you have any questions please call me at 617-918-8340

Sincerely,

Daniel N. Boudreau 1/3/08

Daniel N. Boudreau
Chemistry Team Leader

Qualifiers:

RL	Reporting limit
ND	Not Detected above reporting limit
NA	Not Applicable
NC	Not calculated since analyte concentration is ND
J1	Estimated value due to MS recovery outside accceptance criteria
J2	Estimated value due to LFB result outside acceptance criteria
J3	Estimated value due to RPD result outside acceptance criteria
J4	Estimated value due to LCS result outside acceptance criteria
B	Analyte is associated with the lab blank or trip blank contamination. Values are qualified when the observed concentration of the contamination in the sample extract is less than 10 times the concentration in the blank.
R	No recovery was calculated since the analyte concentration is greater than four times the spike level.

Comments:

The samples were prepared and analyzed by ESAT contractors.

US ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND LABORATORY

Olin Chemical - Wilmington, MA

Total Recoverable Metals in Water by ICP

Client Sample ID:	MW202D	Lab Sample ID:	AA76878
Date of Collection:	11/13/2007	Matrix	Water
Date of Preparation:	11/28/2007	Final Volume:	50 mL
Date of Analysis:	11/30/2007	Sample Dilution:	1
Volume Prepared:	50 mL	pH:	<2

CAS Number	Parameter	Concentration ug/L	RL ug/L	Qualifier
7429-90-5	Aluminum	**590**	440	
7440-36-0	Antimony	ND	40	
7440-38-2	Arsenic	ND	20	
7440-39-3	Barium	ND	20	
7440-41-7	Beryllium	ND	8	
7440-43-9	Cadmium	ND	10	
7440-70-2	Calcium	**130000**	400	
7440-47-3	Chromium	**78**	20	
7440-48-4	Cobalt	**47**	20	
7440-50-8	Copper	ND	20	
7439-89-6	Iron	**2700**	40	
7439-92-1	Lead	ND	20	
7439-95-4	Magnesium	**25000**	100	
7439-96-5	Manganese	**2300**	20	
7440-02-0	Nickel	**73**	20	
7782-49-2	Selenium	ND	20	
7440-22-4	Silver	ND	10	
7440-28-0	Thallium	ND	20	
7440-62-2	Vanadium	ND	10	
7440-66-6	Zinc	**56**	20	

Comments:

US ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND LABORATORY

Olin Chemical - Wilmington, MA

Total Recoverable Metals in Water by ICP

Client Sample ID:	MW10S	Lab Sample ID:	AA76879
Date of Collection:	11/13/2007	Matrix	Water
Date of Preparation:	11/28/2007	Final Volume:	50 mL
Date of Analysis:	11/30/2007	Sample Dilution:	1
Volume Prepared:	50 mL	pH:	<2

CAS Number	Parameter	Concentration ug/L	RL ug/L	Qualifier
7429-90-5	Aluminum	**1500**	440	
7440-36-0	Antimony	ND	40	
7440-38-2	Arsenic	ND	20	
7440-39-3	Barium	**47**	20	
7440-41-7	Beryllium	ND	8	
7440-43-9	Cadmium	ND	10	
7440-70-2	Calcium	**4800**	400	
7440-47-3	Chromium	ND	20	
7440-48-4	Cobalt	ND	20	
7440-50-8	Copper	ND	20	
7439-89-6	Iron	**590**	40	
7439-92-1	Lead	ND	20	
7439-95-4	Magnesium	**580**	100	
7439-96-5	Manganese	**53**	20	
7440-02-0	Nickel	ND	20	
7782-49-2	Selenium	ND	20	
7440-22-4	Silver	ND	10	
7440-28-0	Thallium	ND	20	
7440-62-2	Vanadium	ND	10	
7440-66-6	Zinc	**79**	20	

Comments:

US ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND LABORATORY

Olin Chemical - Wilmington, MA

Total Recoverable Metals in Water by ICP

Client Sample ID:	GW39	Lab Sample ID:	AA76880
Date of Collection:	11/13/2007	Matrix	Water
Date of Preparation:	11/28/2007	Final Volume:	50 mL
Date of Analysis:	11/30/2007	Sample Dilution:	1
Volume Prepared:	50 mL	pH:	<2

CAS Number	Parameter	Concentration ug/L	RL ug/L	Qualifier
7429-90-5	Aluminum	ND	440	
7440-36-0	Antimony	ND	40	
7440-38-2	Arsenic	ND	20	
7440-39-3	Barium	**27**	20	
7440-41-7	Beryllium	ND	8	
7440-43-9	Cadmium	ND	10	
7440-70-2	Calcium	**110000**	400	
7440-47-3	Chromium	ND	20	
7440-48-4	Cobalt	ND	20	
7440-50-8	Copper	ND	20	
7439-89-6	Iron	ND	40	
7439-92-1	Lead	ND	20	
7439-95-4	Magnesium	**1700**	100	
7439-96-5	Manganese	**110**	20	
7440-02-0	Nickel	ND	20	
7782-49-2	Selenium	ND	20	
7440-22-4	Silver	ND	10	
7440-28-0	Thallium	ND	20	
7440-62-2	Vanadium	ND	10	
7440-66-6	Zinc	ND	20	

Comments:

US ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND LABORATORY

Olin Chemical - Wilmington, MA

Total Recoverable Metals in Water by ICP

Client Sample ID:	GW76S	Lab Sample ID:	AA76881
Date of Collection:	11/13/2007	Matrix	Water
Date of Preparation:	11/28/2007	Final Volume:	50 mL
Date of Analysis:	11/30/2007	Sample Dilution:	1
Volume Prepared:	50 mL	pH:	<2

CAS Number	Parameter	Concentration ug/L	RL ug/L	Qualifier
7429-90-5	Aluminum	ND	440	
7440-36-0	Antimony	ND	40	
7440-38-2	Arsenic	ND	20	
7440-39-3	Barium	ND	20	
7440-41-7	Beryllium	ND	8	
7440-43-9	Cadmium	ND	10	
7440-70-2	Calcium	**6600**	400	
7440-47-3	Chromium	ND	20	
7440-48-4	Cobalt	ND	20	
7440-50-8	Copper	ND	20	
7439-89-6	Iron	**42**	40	
7439-92-1	Lead	ND	20	
7439-95-4	Magnesium	**490**	100	
7439-96-5	Manganese	**82**	20	
7440-02-0	Nickel	ND	20	
7782-49-2	Selenium	ND	20	
7440-22-4	Silver	ND	10	
7440-28-0	Thallium	ND	20	
7440-62-2	Vanadium	ND	10	
7440-66-6	Zinc	ND	20	

Comments:

US ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND LABORATORY

Olin Chemical - Wilmington, MA

Total Recoverable Metals in Water by ICP

Client Sample ID:	GW55S	Lab Sample ID:	AA76882
Date of Collection:	11/13/2007	Matrix	Water
Date of Preparation:	11/28/2007	Final Volume:	50 mL
Date of Analysis:	11/30/2007	Sample Dilution:	1
Volume Prepared:	50 mL	pH:	<2

CAS Number	Parameter	Concentration ug/L	RL ug/L	Qualifier
7429-90-5	Aluminum	**21000**	440	
7440-36-0	Antimony	ND	40	
7440-38-2	Arsenic	ND	20	
7440-39-3	Barium	**58**	20	
7440-41-7	Beryllium	ND	8	
7440-43-9	Cadmium	ND	10	
7440-70-2	Calcium	**50000**	400	
7440-47-3	Chromium	ND	20	
7440-48-4	Cobalt	**53**	20	
7440-50-8	Copper	ND	20	
7439-89-6	Iron	**9400**	40	
7439-92-1	Lead	ND	20	
7439-95-4	Magnesium	**5700**	100	
7439-96-5	Manganese	**1400**	20	
7440-02-0	Nickel	**67**	20	
7782-49-2	Selenium	ND	20	
7440-22-4	Silver	ND	10	
7440-28-0	Thallium	ND	40	
7440-62-2	Vanadium	ND	10	
7440-66-6	Zinc	**74**	20	

Comments:

US ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND LABORATORY

Olin Chemical - Wilmington, MA

Laboratory Reagent Blank

Client Sample ID:	N/A	Lab Sample ID:	N/A
Date of Collection:	N/A	Matrix	Water
Date of Preparation:	11/28/2007	Final Volume:	50 mL
Date of Analysis:	11/30/2007	Sample Dilution:	1
Volume Prepared:	50 mL	pH:	<2

CAS Number	Parameter	Concentration ug/L	RL ug/L	Qualifier
7429-90-5	Aluminum	ND	440	
7440-36-0	Antimony	ND	40	
7440-38-2	Arsenic	ND	20	
7440-39-3	Barium	ND	20	
7440-41-7	Beryllium	ND	8	
7440-43-9	Cadmium	ND	10	
7440-70-2	Calcium	ND	400	
7440-47-3	Chromium	ND	20	
7440-48-4	Cobalt	ND	20	
7440-50-8	Copper	ND	20	
7439-89-6	Iron	ND	40	
7439-92-1	Lead	ND	20	
7439-95-4	Magnesium	ND	100	
7439-96-5	Manganese	ND	20	
7440-02-0	Nickel	ND	20	
7782-49-2	Selenium	ND	20	
7440-22-4	Silver	ND	10	
7440-28-0	Thallium	ND	20	
7440-62-2	Vanadium	ND	10	
7440-66-6	Zinc	ND	20	

Comments:

US ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND LABORATORY

METALS MATRIX SPIKE (MS) RESULTS

Olin Chemical - Wilmington, MA

Sample ID: AA76882

COMPOUND	SPIKE ADDED ug/L	SAMPLE CONCENTRATION ug/L	MS CONCENTRATION ug/L	MS % REC	QC LIMITS (% REC)
Aluminum	500	21000	21800	R	75 - 125
Antimony	500	ND	543	109	75 - 125
Arsenic	500	ND	533	107	75 - 125
Barium	500	58	559	100	75 - 125
Beryllium	200	ND	209	105	75 - 125
Cadmium	250	ND	251	100	75 - 125
Chromium	500	ND	508	102	75 - 125
Cobalt	500	53	568	103	75 - 125
Copper	500	ND	520	104	75 - 125
Iron	500	9400	9790	R	75 - 125
Lead	500	ND	504	101	75 - 125
Manganese	500	1400	1850	90	75 - 125
Nickel	500	67	578	102	75 - 125
Selenium	500	ND	525	105	75 - 125
Silver	100	ND	98.0	98	75 - 125
Thallium	500	ND	494	99	75 - 125
Vanadium	500	ND	515	103	75 - 125
Zinc	500	74	597	105	75 - 125

US ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND LABORATORY

Laboratory Duplicate Results

Olin Chemical - Wilmington, MA

Sample ID: AA76878

COMPOUND	SAMPLE RESULT ug/L	SAMPLE DUPLICATE RESULT ug/L	PRECISION RPD %	QC LIMITS RPD (%)
Aluminum	590	580	1.7	20
Antimony	ND	ND	NC	20
Arsenic	ND	ND	NC	20
Barium	ND	ND	NC	20
Beryllium	ND	ND	NC	20
Cadmium	ND	ND	NC	20
Calcium	130000	130000	0	20
Chromium	78	78	0	20
Cobalt	47	47	0	20
Copper	ND	ND	NC	20
Iron	2700	2700	0	20
Lead	ND	ND	NC	20
Magnesium	25000	25000	0	20
Manganese	2300	2300	0	20
Nickel	73	73	0	20
Selenium	ND	ND	NC	20
Silver	ND	ND	NC	20
Thallium	ND	ND	NC	20
Vanadium	ND	ND	NC	20
Zinc	56	50	11	20

Comments:

US ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND LABORATORY

Laboratory Fortified Blank (LFB) Results

Olin Chemical - Wilmington, MA

COMPOUND	LFB AMOUNT SPIKED ug/L	LFB RESULT ug/L	LFB RECOVERY %	QC LIMITS %
Aluminum	500	505	101	85 - 115
Antimony	500	531	106	85 - 115
Arsenic	500	508	102	85 - 115
Barium	500	507	101	85 - 115
Beryllium	200	202	101	85 - 115
Cadmium	250	248	99	85 - 115
Calcium	5000	5100	102	85 - 115
Chromium	500	509	102	85 - 115
Cobalt	500	524	105	85 - 115
Copper	500	503	101	85 - 115
Iron	500	523	105	85 - 115
Lead	500	512	102	85 - 115
Magnesium	5000	5100	102	85 - 115
Manganese	500	513	103	85 - 115
Nickel	500	517	103	85 - 115
Selenium	500	518	104	85 - 115
Silver	100	101	101	85 - 115
Thallium	500	527	105	85 - 115
Vanadium	500	502	100	85 - 115
Zinc	500	515	103	85 - 115

Samples in Batch: AA76878, AA76879, AA76880, AA76881, AA76882

EPA
Region 1, New England

United States Environmental Protection Agency
Office of Environmental Measurement & Evaluation
11 Technology Drive
North Chelmsford, MA 01863-2431

Laboratory Report

November 29, 2007

Jim DiLorenzo - HBO
USEPA New England Region 1
One Congress Street
Boston, MA 02114 - 2023

Project Number: 07110022
Project: Olin Chemical - Wilmington, MA
Analysis: VOAs in Water
Analyst: Joseph Montanaro 11/29/07

Analytical Procedure:

All samples were received and logged in by the laboratory according to the USEPA New England Laboratory SOP for Sample Log-in.

Sample preparation and analysis was done following the EPA Region I SOP, EIASOP-VOAGCMS8.

Samples were analyzed by GC/MS. Samples were introduced to the GC via a Tekmar pre-concentrator and an Archon autosampler. The analysis SOP is based on US EPA Method 8260B, SW-846, Rev 2.0,1996. Method 624, 40CFR Part 136 Appendix A, July 1, 1992, and USEPA CLP SOW for Organic Analysis OLM04.2, 1999.

Date Samples Received by the Laboratory: 11/14/07

Results relate only to the items tested or to the samples as received by the Laboratory. This analytical report shall not be reproduced except in full, without written approval of the laboratory.

Report may contain multiple sections and each section will be numbered independently.

If you have any questions please call me at 617-918-8340 .

Sincerely,

Daniel N. Boudreau 12/3/07
Daniel N. Boudreau
Chemistry Team Leader

Qualifiers:

RL = Reporting limit
ND = Not Detected above Reporting limit
NA = Not Applicable due to high sample dilutions or sample interferences
NC = Not calculated since analyte concentration is ND.
J = Estimated value
E = Estimated value exceeds the calibration range
L = Estimated value is below the calibration range
B = Analyte is associated with the lab blank or trip blank contamination. Values are qualified when the observed concentration of the contamination in the sample extract is less than 5 times the concentration in the blank.
R = No recovery was calculated since the analyte concentration is greater than four times the spike level.

US ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND LABORATORY

Olin Chemical - Wilmington, MA

VOAs in Water

Client Sample ID:	TRIP 01	Lab Sample ID:	AA76877
Date of Collection:	11/13/2007	Matrix	Water
Date of Extraction:	11/14/07	Volume Purged:	5 mL
Date of Analysis:	11/14/07	Percent Solids:	N/A
Dry Weight Extracted:	N/A	Extract Dilution:	1
Wet Weight Extracted:	N/A	pH:	<2

CAS Number	Compound	Concentration ug/L	RL ug/L	Qualifier
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	
71-55-6	1,1,1-Trichloroethane	ND	1.0	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	
76-13-1	1,1,2-Trichloro-1,2,2-Trifluoroeth	ND	1.0	
79-00-5	1,1,2-Trichloroethane	ND	1.0	
75-35-4	1,1-Dichloroethylene	ND	1.0	
563-58-6	1,1-Dichloropropene	ND	1.0	
75-34-3	1,1-dichloroethane	ND	1.0	
87-61-6	1,2,3-Trichlorobenzene	ND	1.0	
96-18-4	1,2,3-Trichloropropane	ND	1.0	
120-82-1	1,2,4-Trichlorobenzene	ND	1.0	
95-63-6	1,2,4-Trimethylbenzene	ND	1.0	
96-12-8	1,2-Dibromo-3-Chloropropane	ND	1.0	
106-93-4	1,2-Dibromoethane	ND	1.0	
95-50-1	1,2-Dichlorobenzene	ND	1.0	
107-06-2	1,2-Dichloroethane	ND	1.0	
78-87-5	1,2-Dichloropropane	ND	1.0	
108-67-8	1,3,5-Trimethylbenzene	ND	1.0	
541-73-1	1,3-Dichlorobenzene	ND	1.0	
142-28-9	1,3-Dichloropropane	ND	1.0	
106-46-7	1,4-Dichlorobenzene	ND	1.0	
594-20-7	2,2-Dichloropropane	ND	1.0	
78-93-3	2-Butanone (MEK)	ND	1.0	
95-49-8	2-Chlorotoluene	ND	1.0	
591-78-6	2-Hexanone	ND	1.0	
67-64-1	2-Propanone (acetone)	ND	1.0	
106-43-4	4-Chlorotoluene	ND	1.0	
108-10-1	4-Methyl-2-Pentanone(MIBK)	ND	1.0	
107-13-1	Acrylonitrile	ND	1.0	
71-43-2	Benzene	ND	1.0	
108-86-1	Bromobenzene	ND	1.0	
74-97-5	Bromochloromethane	ND	1.0	
75-27-4	Bromodichloromethane	ND	1.0	
75-25-2	Bromoform	ND	1.0	
74-83-9	Bromomethane	ND	1.0	
75-15-0	Carbon Disulfide	ND	1.0	
56-23-5	Carbon tetrachloride	ND	1.0	
108-90-7	Chlorobenzene	ND	1.0	
75-00-3	Chloroethane	ND	1.0	
67-66-3	Chloroform	ND	1.0	

74-87-3	Chloromethane	ND	1.0
124-48-1	Dibromochloromethane	ND	1.0
74-95-3	Dibromomethane	ND	1.0
75-71-8	Dichlorodifluoromethane	ND	1.0
60-29-7	Ethyl Ether	ND	1.0
100-41-4	Ethylbenzene	ND	1.0
87-68-3	Hexachlorobutadiene	ND	1.0
98-82-8	Isopropylbenzene	ND	1.0
108-38-3/106-42-	M/P Xylene	ND	2.0
1634-04-4	Methyl-t-Butyl Ether	ND	1.0
75-09-2	Methylene Chloride	ND	1.0
104-51-8	N-Butylbenzene	ND	1.0
103-65-1	N-Propylbenzene	ND	1.0
91-20-3	Naphthalene	ND	1.0
95-47-6	Ortho Xylene	ND	1.0
99-87-6	Para-Isopropyltoluene	ND	1.0
135-98-8	Sec-Butylbenzene	ND	1.0
100-42-5	Styrene	ND	1.0
98-06-6	Tert-Butylbenzene	ND	1.0
127-18-4	Tetrachloroethylene	ND	1.0
109-99-9	Tetrahydrofuran	ND	1.0
108-88-3	Toluene	ND	1.0
156-60-5	Trans-1,2-Dichloroethylene	ND	1.0
79-01-6	Trichloroethylene	ND	1.0
75-69-4	Trichlorofluoromethane	ND	1.0
108-05-4	Vinyl Acetate	ND	1.0
75-01-4	Vinyl Chloride	ND	1.0
10061-01-5	c-1,3-dichloropropene	ND	1.0
156-59-2	cis-1,2-Dichloroethylene	ND	1.0
10061-02-6	t-1,3-Dichloropropene	ND	1.0

Surrogate Compounds	**Recoveries (%)**	**QC Ranges**
1,2-Dichloroethane-D4	93	74 - 136
Toluene-D8	98	85 - 118
1,4-Bromofluorobenzene	97	78 - 111

Comments:

US ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND LABORATORY

Olin Chemical - Wilmington, MA

VOAs in Water

Client Sample ID:	MW202D	Lab Sample ID:	AA76878
Date of Collection:	11/13/2007	Matrix	Water
Date of Extraction:	11/14/07	Volume Purged:	5 mL
Date of Analysis:	11/14/07	Percent Solids:	N/A
Dry Weight Extracted:	N/A	Extract Dilution:	1
Wet Weight Extracted:	N/A	pH:	<2

CAS Number	Compound	Concentration ug/L	RL ug/L	Qualifier
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	
71-55-6	1,1,1-Trichloroethane	ND	1.0	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	
76-13-1	1,1,2-Trichloro-1,2,2-Trifluoroeth	ND	1.0	
79-00-5	1,1,2-Trichloroethane	ND	1.0	
75-35-4	1,1-Dichloroethylene	ND	1.0	
563-58-6	1,1-Dichloropropene	ND	1.0	
75-34-3	1,1-dichloroethane	ND	1.0	
87-61-6	1,2,3-Trichlorobenzene	ND	1.0	
96-18-4	1,2,3-Trichloropropane	ND	1.0	
120-82-1	1,2,4-Trichlorobenzene	**1.4**	1.0	
95-63-6	1,2,4-Trimethylbenzene	ND	1.0	
96-12-8	1,2-Dibromo-3-Chloropropane	ND	1.0	
106-93-4	1,2-Dibromoethane	ND	1.0	
95-50-1	1,2-Dichlorobenzene	ND	1.0	
107-06-2	1,2-Dichloroethane	**1.1**	1.0	
78-87-5	1,2-Dichloropropane	ND	1.0	
108-67-8	1,3,5-Trimethylbenzene	ND	1.0	
541-73-1	1,3-Dichlorobenzene	**1.2**	1.0	
142-28-9	1,3-Dichloropropane	ND	1.0	
106-46-7	1,4-Dichlorobenzene	ND	1.0	
594-20-7	2,2-Dichloropropane	ND	1.0	
78-93-3	2-Butanone (MEK)	ND	1.0	
95-49-8	2-Chlorotoluene	ND	1.0	
591-78-6	2-Hexanone	ND	1.0	
67-64-1	2-Propanone (acetone)	ND	1.0	
106-43-4	4-Chlorotoluene	ND	1.0	
108-10-1	4-Methyl-2-Pentanone(MIBK)	ND	1.0	
107-13-1	Acrylonitrile	ND	1.0	
71-43-2	Benzene	ND	1.0	
108-86-1	Bromobenzene	ND	1.0	
74-97-5	Bromochloromethane	ND	1.0	
75-27-4	Bromodichloromethane	**1.2**	1.0	
75-25-2	Bromoform	**4.7**	1.0	
74-83-9	Bromomethane	ND	1.0	
75-15-0	Carbon Disulfide	ND	1.0	
56-23-5	Carbon tetrachloride	ND	1.0	
108-90-7	Chlorobenzene	ND	1.0	
75-00-3	Chloroethane	ND	1.0	
67-66-3	Chloroform	**3.0**	1.0	

74-87-3	Chloromethane	ND	1.0
124-48-1	Dibromochloromethane	**1.7**	1.0
74-95-3	Dibromomethane	**1.5**	1.0
75-71-8	Dichlorodifluoromethane	ND	1.0
60-29-7	Ethyl Ether	ND	1.0
100-41-4	Ethylbenzene	ND	1.0
87-68-3	Hexachlorobutadiene	ND	1.0
98-82-8	Isopropylbenzene	ND	1.0
108-38-3/106-42-	M/P Xylene	ND	2.0
1634-04-4	Methyl-t-Butyl Ether	ND	1.0
75-09-2	Methylene Chloride	ND	1.0
104-51-8	N-Butylbenzene	ND	1.0
103-65-1	N-Propylbenzene	ND	1.0
91-20-3	Naphthalene	ND	1.0
95-47-6	Ortho Xylene	ND	1.0
99-87-6	Para-Isopropyltoluene	ND	1.0
135-98-8	Sec-Butylbenzene	ND	1.0
100-42-5	Styrene	ND	1.0
98-06-6	Tert-Butylbenzene	ND	1.0
127-18-4	Tetrachloroethylene	ND	1.0
109-99-9	Tetrahydrofuran	ND	1.0
108-88-3	Toluene	ND	1.0
156-60-5	Trans-1,2-Dichloroethylene	ND	1.0
79-01-6	Trichloroethylene	ND	1.0
75-69-4	Trichlorofluoromethane	ND	1.0
108-05-4	Vinyl Acetate	ND	1.0
75-01-4	Vinyl Chloride	ND	1.0
10061-01-5	c-1,3-dichloropropene	ND	1.0
156-59-2	cis-1,2-Dichloroethylene	ND	1.0
10061-02-6	t-1,3-Dichloropropene	ND	1.0

Surrogate Compounds	**Recoveries (%)**	**QC Ranges**
1,2-Dichloroethane-D4	96	74 - 136
Toluene-D8	97	85 - 118
1,4-Bromofluorobenzene	99	78 - 111

Comments:

US ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND LABORATORY

Olin Chemical - Wilmington, MA

VOAs in Water

Client Sample ID:	MW10S	Lab Sample ID:	AA76879
Date of Collection:	11/13/2007	Matrix	Water
Date of Extraction:	11/14/07	Volume Purged:	5 mL
Date of Analysis:	11/14/07	Percent Solids:	N/A
Dry Weight Extracted:	N/A	Extract Dilution:	1
Wet Weight Extracted:	N/A	pH:	<2

CAS Number	Compound	Concentration ug/L	RL ug/L	Qualifier
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	
71-55-6	1,1,1-Trichloroethane	ND	1.0	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	
76-13-1	1,1,2-Trichloro-1,2,2-Trifluoroeth	ND	1.0	
79-00-5	1,1,2-Trichloroethane	ND	1.0	
75-35-4	1,1-Dichloroethylene	ND	1.0	
563-58-6	1,1-Dichloropropene	ND	1.0	
75-34-3	1,1-dichloroethane	ND	1.0	
87-61-6	1,2,3-Trichlorobenzene	ND	1.0	
96-18-4	1,2,3-Trichloropropane	ND	1.0	
120-82-1	1,2,4-Trichlorobenzene	ND	1.0	
95-63-6	1,2,4-Trimethylbenzene	ND	1.0	
96-12-8	1,2-Dibromo-3-Chloropropane	ND	1.0	
106-93-4	1,2-Dibromoethane	ND	1.0	
95-50-1	1,2-Dichlorobenzene	ND	1.0	
107-06-2	1,2-Dichloroethane	ND	1.0	
78-87-5	1,2-Dichloropropane	ND	1.0	
108-67-8	1,3,5-Trimethylbenzene	ND	1.0	
541-73-1	1,3-Dichlorobenzene	ND	1.0	
142-28-9	1,3-Dichloropropane	ND	1.0	
106-46-7	1,4-Dichlorobenzene	ND	1.0	
594-20-7	2,2-Dichloropropane	ND	1.0	
78-93-3	2-Butanone (MEK)	ND	1.0	
95-49-8	2-Chlorotoluene	ND	1.0	
591-78-6	2-Hexanone	ND	1.0	
67-64-1	2-Propanone (acetone)	ND	1.0	
106-43-4	4-Chlorotoluene	ND	1.0	
108-10-1	4-Methyl-2-Pentanone(MIBK)	ND	1.0	
107-13-1	Acrylonitrile	ND	1.0	
71-43-2	Benzene	ND	1.0	
108-86-1	Bromobenzene	ND	1.0	
74-97-5	Bromochloromethane	ND	1.0	
75-27-4	Bromodichloromethane	ND	1.0	
75-25-2	Bromoform	ND	1.0	
74-83-9	Bromomethane	ND	1.0	
75-15-0	Carbon Disulfide	ND	1.0	
56-23-5	Carbon tetrachloride	ND	1.0	
108-90-7	Chlorobenzene	ND	1.0	
75-00-3	Chloroethane	ND	1.0	
67-66-3	Chloroform	ND	1.0	

74-87-3	Chloromethane	ND	1.0
124-48-1	Dibromochloromethane	ND	1.0
74-95-3	Dibromomethane	ND	1.0
75-71-8	Dichlorodifluoromethane	ND	1.0
60-29-7	Ethyl Ether	ND	1.0
100-41-4	Ethylbenzene	ND	1.0
87-68-3	Hexachlorobutadiene	ND	1.0
98-82-8	Isopropylbenzene	ND	1.0
108-38-3/106-42-	M/P Xylene	ND	2.0
1634-04-4	Methyl-t-Butyl Ether	ND	1.0
75-09-2	Methylene Chloride	ND	1.0
104-51-8	N-Butylbenzene	ND	1.0
103-65-1	N-Propylbenzene	ND	1.0
91-20-3	Naphthalene	ND	1.0
95-47-6	Ortho Xylene	ND	1.0
99-87-6	Para-Isopropyltoluene	ND	1.0
135-98-8	Sec-Butylbenzene	ND	1.0
100-42-5	Styrene	ND	1.0
98-06-6	Tert-Butylbenzene	ND	1.0
127-18-4	Tetrachloroethylene	ND	1.0
109-99-9	Tetrahydrofuran	ND	1.0
108-88-3	Toluene	ND	1.0
156-60-5	Trans-1,2-Dichloroethylene	ND	1.0
79-01-6	Trichloroethylene	ND	1.0
75-69-4	Trichlorofluoromethane	ND	1.0
108-05-4	Vinyl Acetate	ND	1.0
75-01-4	Vinyl Chloride	ND	1.0
10061-01-5	c-1,3-dichloropropene	ND	1.0
156-59-2	cis-1,2-Dichloroethylene	ND	1.0
10061-02-6	t-1,3-Dichloropropene	ND	1.0

Surrogate Compounds	**Recoveries (%)**	**QC Ranges**
1,2-Dichloroethane-D4	92	74 - 136
Toluene-D8	98	85 - 118
1,4-Bromofluorobenzene	99	78 - 111

Comments: Tentatively Identified Compounds

Compound	Concentration (ug/L)	Qualifier
2,4,4-trimethyl-1-pentene	30	J
3,4,4-trimethyl-1-pentene	16	J

US ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND LABORATORY

Olin Chemical - Wilmington, MA

Laboratory Blank for $VOAMW

Client Sample ID:	N/A	Lab Sample ID:	N/A
Date of Collection:	N/A	Matrix	Water
Date of Extraction:	11/14/07	Volume Purged:	5.0 mL
Date of Analysis:	11/14/07	Percent Solids:	N/A
Dry Weight Extracted:	N/A	Extract Dilution:	1
Wet Weight Extracted:	N/A	pH:	6

CAS Number	Compound	Concentration ug/L	RL ug/L	Qualifier
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	
71-55-6	1,1,1-Trichloroethane	ND	1.0	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	
76-13-1	1,1,2-Trichloro-1,2,2-Trifluoroeth	ND	1.0	
79-00-5	1,1,2-Trichloroethane	ND	1.0	
75-35-4	1,1-Dichloroethylene	ND	1.0	
563-58-6	1,1-Dichloropropene	ND	1.0	
75-34-3	1,1-dichloroethane	ND	1.0	
87-61-6	1,2,3-Trichlorobenzene	ND	1.0	
96-18-4	1,2,3-Trichloropropane	ND	1.0	
120-82-1	1,2,4-Trichlorobenzene	ND	1.0	
95-63-6	1,2,4-Trimethylbenzene	ND	1.0	
96-12-8	1,2-Dibromo-3-Chloropropane	ND	1.0	
106-93-4	1,2-Dibromoethane	ND	1.0	
95-50-1	1,2-Dichlorobenzene	ND	1.0	
107-06-2	1,2-Dichloroethane	ND	1.0	
78-87-5	1,2-Dichloropropane	ND	1.0	
108-67-8	1,3,5-Trimethylbenzene	ND	1.0	
541-73-1	1,3-Dichlorobenzene	ND	1.0	
142-28-9	1,3-Dichloropropane	ND	1.0	
106-46-7	1,4-Dichlorobenzene	ND	1.0	
594-20-7	2,2-Dichloropropane	ND	1.0	
78-93-3	2-Butanone (MEK)	ND	1.0	
95-49-8	2-Chlorotoluene	ND	1.0	
591-78-6	2-Hexanone	ND	1.0	
67-64-1	2-Propanone (acetone)	ND	1.0	
106-43-4	4-Chlorotoluene	ND	1.0	
108-10-1	4-Methyl-2-Pentanone(MIBK)	ND	1.0	
107-13-1	Acrylonitrile	ND	1.0	
71-43-2	Benzene	ND	1.0	
108-86-1	Bromobenzene	ND	1.0	
74-97-5	Bromochloromethane	ND	1.0	
75-27-4	Bromodichloromethane	ND	1.0	
75-25-2	Bromoform	ND	1.0	
74-83-9	Bromomethane	ND	1.0	
75-15-0	Carbon Disulfide	ND	1.0	
56-23-5	Carbon tetrachloride	ND	1.0	
108-90-7	Chlorobenzene	ND	1.0	
75-00-3	Chloroethane	ND	1.0	
67-66-3	Chloroform	ND	1.0	

74-87-3	Chloromethane	ND	1.0
124-48-1	Dibromochloromethane	ND	1.0
74-95-3	Dibromomethane	ND	1.0
75-71-8	Dichlorodifluoromethane	ND	1.0
60-29-7	Ethyl Ether	ND	1.0
100-41-4	Ethylbenzene	ND	1.0
87-68-3	Hexachlorobutadiene	ND	1.0
98-82-8	Isopropylbenzene	ND	1.0
108-38-3/106-42-	M/P Xylene	ND	2.0
1634-04-4	Methyl-t-Butyl Ether	ND	1.0
75-09-2	Methylene Chloride	ND	1.0
104-51-8	N-Butylbenzene	ND	1.0
103-65-1	N-Propylbenzene	ND	1.0
91-20-3	Naphthalene	ND	1.0
95-47-6	Ortho Xylene	ND	1.0
99-87-6	Para-Isopropyltoluene	ND	1.0
135-98-8	Sec-Butylbenzene	ND	1.0
100-42-5	Styrene	ND	1.0
98-06-6	Tert-Butylbenzene	ND	1.0
127-18-4	Tetrachloroethylene	ND	1.0
109-99-9	Tetrahydrofuran	ND	1.0
108-88-3	Toluene	ND	1.0
156-60-5	Trans-1,2-Dichloroethylene	ND	1.0
79-01-6	Trichloroethylene	ND	1.0
75-69-4	Trichlorofluoromethane	ND	1.0
108-05-4	Vinyl Acetate	ND	1.0
75-01-4	Vinyl Chloride	ND	1.0
10061-01-5	c-1,3-dichloropropene	ND	1.0
156-59-2	cis-1,2-Dichloroethylene	ND	1.0
10061-02-6	t-1,3-Dichloropropene	ND	1.0

Surrogate Compounds	**Recoveries (%)**	**QC Ranges**
1,2-Dichloroethane-D4	92	74 - 136
Toluene-D8	98	85 - 118
1,4-Bromofluorobenzene	99	78 - 111

Comments: Laboratory blank is associated with all samples in this project.

US ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND LABORATORY

Olin Chemical - Wilmington, MA

VOAs in Water

Client Sample ID:	GW39	Lab Sample ID:	AA76880
Date of Collection:	11/13/2007	Matrix	Water
Date of Extraction:	11/14/07	Volume Purged:	5 mL
Date of Analysis:	11/14/07	Percent Solids:	N/A
Dry Weight Extracted:	N/A	Extract Dilution:	1
Wet Weight Extracted:	N/A	pH:	<2

CAS Number	Compound	Concentration ug/L	RL ug/L	Qualifier
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	
71-55-6	1,1,1-Trichloroethane	ND	1.0	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	
76-13-1	1,1,2-Trichloro-1,2,2-Trifluoroeth	ND	1.0	
79-00-5	1,1,2-Trichloroethane	ND	1.0	
75-35-4	1,1-Dichloroethylene	ND	1.0	
563-58-6	1,1-Dichloropropene	ND	1.0	
75-34-3	1,1-dichloroethane	ND	1.0	
87-61-6	1,2,3-Trichlorobenzene	ND	1.0	
96-18-4	1,2,3-Trichloropropane	ND	1.0	
120-82-1	1,2,4-Trichlorobenzene	ND	1.0	
95-63-6	1,2,4-Trimethylbenzene	ND	1.0	
96-12-8	1,2-Dibromo-3-Chloropropane	ND	1.0	
106-93-4	1,2-Dibromoethane	ND	1.0	
95-50-1	1,2-Dichlorobenzene	ND	1.0	
107-06-2	1,2-Dichloroethane	ND	1.0	
78-87-5	1,2-Dichloropropane	ND	1.0	
108-67-8	1,3,5-Trimethylbenzene	ND	1.0	
541-73-1	1,3-Dichlorobenzene	ND	1.0	
142-28-9	1,3-Dichloropropane	ND	1.0	
106-46-7	1,4-Dichlorobenzene	ND	1.0	
594-20-7	2,2-Dichloropropane	ND	1.0	
78-93-3	2-Butanone (MEK)	ND	1.0	
95-49-8	2-Chlorotoluene	ND	1.0	
591-78-6	2-Hexanone	ND	1.0	
67-64-1	2-Propanone (acetone)	ND	1.0	
106-43-4	4-Chlorotoluene	ND	1.0	
108-10-1	4-Methyl-2-Pentanone(MIBK)	ND	1.0	
107-13-1	Acrylonitrile	ND	1.0	
71-43-2	Benzene	ND	1.0	
108-86-1	Bromobenzene	ND	1.0	
74-97-5	Bromochloromethane	ND	1.0	
75-27-4	Bromodichloromethane	ND	1.0	
75-25-2	Bromoform	ND	1.0	
74-83-9	Bromomethane	ND	1.0	
75-15-0	Carbon Disulfide	ND	1.0	
56-23-5	Carbon tetrachloride	ND	1.0	
108-90-7	Chlorobenzene	ND	1.0	
75-00-3	Chloroethane	ND	1.0	
67-66-3	Chloroform	ND	1.0	

74-87-3	Chloromethane	ND	1.0
124-48-1	Dibromochloromethane	ND	1.0
74-95-3	Dibromomethane	ND	1.0
75-71-8	Dichlorodifluoromethane	ND	1.0
60-29-7	Ethyl Ether	ND	1.0
100-41-4	Ethylbenzene	ND	1.0
87-68-3	Hexachlorobutadiene	ND	1.0
98-82-8	Isopropylbenzene	ND	1.0
108-38-3/106-42-	M/P Xylene	ND	2.0
1634-04-4	Methyl-t-Butyl Ether	ND	1.0
75-09-2	Methylene Chloride	ND	1.0
104-51-8	N-Butylbenzene	ND	1.0
103-65-1	N-Propylbenzene	ND	1.0
91-20-3	Naphthalene	ND	1.0
95-47-6	Ortho Xylene	ND	1.0
99-87-6	Para-Isopropyltoluene	ND	1.0
135-98-8	Sec-Butylbenzene	ND	1.0
100-42-5	Styrene	ND	1.0
98-06-6	Tert-Butylbenzene	ND	1.0
127-18-4	Tetrachloroethylene	ND	1.0
109-99-9	Tetrahydrofuran	ND	1.0
108-88-3	Toluene	ND	1.0
156-60-5	Trans-1,2-Dichloroethylene	ND	1.0
79-01-6	Trichloroethylene	ND	1.0
75-69-4	Trichlorofluoromethane	ND	1.0
108-05-4	Vinyl Acetate	ND	1.0
75-01-4	Vinyl Chloride	ND	1.0
10061-01-5	c-1,3-dichloropropene	ND	1.0
156-59-2	cis-1,2-Dichloroethylene	ND	1.0
10061-02-6	t-1,3-Dichloropropene	ND	1.0

Surrogate Compounds	**Recoveries (%)**	**QC Ranges**
1,2-Dichloroethane-D4	92	74 - 136
Toluene-D8	98	85 - 118
1,4-Bromofluorobenzene	98	78 - 111

Comments:

US ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND LABORATORY

Olin Chemical - Wilmington, MA

VOAs in Water

Client Sample ID:	GW76S	Lab Sample ID:	AA76881
Date of Collection:	11/13/2007	Matrix	Water
Date of Extraction:	11/14/07	Volume Purged:	5 mL
Date of Analysis:	11/14/07	Percent Solids:	N/A
Dry Weight Extracted:	N/A	Extract Dilution:	1
Wet Weight Extracted:	N/A	pH:	<2

CAS Number	Compound	Concentration ug/L	RL ug/L	Qualifier
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	
71-55-6	1,1,1-Trichloroethane	ND	1.0	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	
76-13-1	1,1,2-Trichloro-1,2,2-Trifluoroeth	ND	1.0	
79-00-5	1,1,2-Trichloroethane	ND	1.0	
75-35-4	1,1-Dichloroethylene	ND	1.0	
563-58-6	1,1-Dichloropropene	ND	1.0	
75-34-3	1,1-dichloroethane	ND	1.0	
87-61-6	1,2,3-Trichlorobenzene	ND	1.0	
96-18-4	1,2,3-Trichloropropane	ND	1.0	
120-82-1	1,2,4-Trichlorobenzene	ND	1.0	
95-63-6	1,2,4-Trimethylbenzene	ND	1.0	
96-12-8	1,2-Dibromo-3-Chloropropane	ND	1.0	
106-93-4	1,2-Dibromoethane	ND	1.0	
95-50-1	1,2-Dichlorobenzene	ND	1.0	
107-06-2	1,2-Dichloroethane	ND	1.0	
78-87-5	1,2-Dichloropropane	ND	1.0	
108-67-8	1,3,5-Trimethylbenzene	ND	1.0	
541-73-1	1,3-Dichlorobenzene	ND	1.0	
142-28-9	1,3-Dichloropropane	ND	1.0	
106-46-7	1,4-Dichlorobenzene	ND	1.0	
594-20-7	2,2-Dichloropropane	ND	1.0	
78-93-3	2-Butanone (MEK)	ND	1.0	
95-49-8	2-Chlorotoluene	ND	1.0	
591-78-6	2-Hexanone	ND	1.0	
67-64-1	2-Propanone (acetone)	ND	1.0	
106-43-4	4-Chlorotoluene	ND	1.0	
108-10-1	4-Methyl-2-Pentanone(MIBK)	ND	1.0	
107-13-1	Acrylonitrile	ND	1.0	
71-43-2	Benzene	ND	1.0	
108-86-1	Bromobenzene	ND	1.0	
74-97-5	Bromochloromethane	ND	1.0	
75-27-4	Bromodichloromethane	ND	1.0	
75-25-2	Bromoform	ND	1.0	
74-83-9	Bromomethane	ND	1.0	
75-15-0	Carbon Disulfide	ND	1.0	
56-23-5	Carbon tetrachloride	ND	1.0	
108-90-7	Chlorobenzene	ND	1.0	
75-00-3	Chloroethane	ND	1.0	
67-66-3	Chloroform	ND	1.0	

74-87-3	Chloromethane	ND	1.0
124-48-1	Dibromochloromethane	ND	1.0
74-95-3	Dibromomethane	ND	1.0
75-71-8	Dichlorodifluoromethane	ND	1.0
60-29-7	Ethyl Ether	ND	1.0
100-41-4	Ethylbenzene	ND	1.0
87-68-3	Hexachlorobutadiene	ND	1.0
98-82-8	Isopropylbenzene	ND	1.0
108-38-3/106-42-	M/P Xylene	ND	2.0
1634-04-4	Methyl-t-Butyl Ether	ND	1.0
75-09-2	Methylene Chloride	ND	1.0
104-51-8	N-Butylbenzene	ND	1.0
103-65-1	N-Propylbenzene	ND	1.0
91-20-3	Naphthalene	ND	1.0
95-47-6	Ortho Xylene	ND	1.0
99-87-6	Para-Isopropyltoluene	ND	1.0
135-98-8	Sec-Butylbenzene	ND	1.0
100-42-5	Styrene	ND	1.0
98-06-6	Tert-Butylbenzene	ND	1.0
127-18-4	Tetrachloroethylene	ND	1.0
109-99-9	Tetrahydrofuran	ND	1.0
108-88-3	Toluene	ND	1.0
156-60-5	Trans-1,2-Dichloroethylene	ND	1.0
79-01-6	Trichloroethylene	ND	1.0
75-69-4	Trichlorofluoromethane	ND	1.0
108-05-4	Vinyl Acetate	ND	1.0
75-01-4	Vinyl Chloride	ND	1.0
10061-01-5	c-1,3-dichloropropene	ND	1.0
156-59-2	cis-1,2-Dichloroethylene	ND	1.0
10061-02-6	t-1,3-Dichloropropene	ND	1.0

Surrogate Compounds	**Recoveries (%)**	**QC Ranges**
1,2-Dichloroethane-D4	92	74 - 136
Toluene-D8	98	85 - 118
1,4-Bromofluorobenzene	97	78 - 111

Comments: Tentatively Identified Compounds

Compound	Concentration (ug/L)	Qualifier
2,4,4-trimethyl-1-pentene	48	J

US ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND LABORATORY

Olin Chemical - Wilmington, MA

VOAs in Water

Client Sample ID:	GW55S	Lab Sample ID:	AA76882
Date of Collection:	11/13/2007	Matrix	Water
Date of Extraction:	11/14/07	Volume Purged:	5 mL
Date of Analysis:	11/14/07	Percent Solids:	N/A
Dry Weight Extracted:	N/A	Extract Dilution:	1
Wet Weight Extracted:	N/A	pH:	<2

CAS Number	Compound	Concentration ug/L	RL ug/L	Qualifier
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	
71-55-6	1,1,1-Trichloroethane	ND	1.0	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	
76-13-1	1,1,2-Trichloro-1,2,2-Trifluoroeth	ND	1.0	
79-00-5	1,1,2-Trichloroethane	ND	1.0	
75-35-4	1,1-Dichloroethylene	ND	1.0	
563-58-6	1,1-Dichloropropene	ND	1.0	
75-34-3	1,1-dichloroethane	ND	1.0	
87-61-6	1,2,3-Trichlorobenzene	ND	1.0	
96-18-4	1,2,3-Trichloropropane	ND	1.0	
120-82-1	1,2,4-Trichlorobenzene	ND	1.0	
95-63-6	1,2,4-Trimethylbenzene	ND	1.0	
96-12-8	1,2-Dibromo-3-Chloropropane	ND	1.0	
106-93-4	1,2-Dibromoethane	ND	1.0	
95-50-1	1,2-Dichlorobenzene	ND	1.0	
107-06-2	1,2-Dichloroethane	ND	1.0	
78-87-5	1,2-Dichloropropane	ND	1.0	
108-67-8	1,3,5-Trimethylbenzene	ND	1.0	
541-73-1	1,3-Dichlorobenzene	ND	1.0	
142-28-9	1,3-Dichloropropane	ND	1.0	
106-46-7	1,4-Dichlorobenzene	ND	1.0	
594-20-7	2,2-Dichloropropane	ND	1.0	
78-93-3	2-Butanone (MEK)	ND	1.0	
95-49-8	2-Chlorotoluene	ND	1.0	
591-78-6	2-Hexanone	ND	1.0	
67-64-1	2-Propanone (acetone)	ND	1.0	
106-43-4	4-Chlorotoluene	ND	1.0	
108-10-1	4-Methyl-2-Pentanone(MIBK)	ND	1.0	
107-13-1	Acrylonitrile	ND	1.0	
71-43-2	Benzene	ND	1.0	
108-86-1	Bromobenzene	ND	1.0	
74-97-5	Bromochloromethane	ND	1.0	
75-27-4	Bromodichloromethane	ND	1.0	
75-25-2	Bromoform	ND	1.0	
74-83-9	Bromomethane	ND	1.0	
75-15-0	Carbon Disulfide	**1.7**	1.0	
56-23-5	Carbon tetrachloride	ND	1.0	
108-90-7	Chlorobenzene	ND	1.0	
75-00-3	Chloroethane	ND	1.0	
67-66-3	Chloroform	ND	1.0	

74-87-3	Chloromethane	ND	1.0
124-48-1	Dibromochloromethane	ND	1.0
74-95-3	Dibromomethane	ND	1.0
75-71-8	Dichlorodifluoromethane	ND	1.0
60-29-7	Ethyl Ether	ND	1.0
100-41-4	Ethylbenzene	ND	1.0
87-68-3	Hexachlorobutadiene	ND	1.0
98-82-8	Isopropylbenzene	ND	1.0
108-38-3/106-42-	M/P Xylene	ND	2.0
1634-04-4	Methyl-t-Butyl Ether	ND	1.0
75-09-2	Methylene Chloride	ND	1.0
104-51-8	N-Butylbenzene	ND	1.0
103-65-1	N-Propylbenzene	ND	1.0
91-20-3	Naphthalene	ND	1.0
95-47-6	Ortho Xylene	ND	1.0
99-87-6	Para-Isopropyltoluene	ND	1.0
135-98-8	Sec-Butylbenzene	ND	1.0
100-42-5	Styrene	ND	1.0
98-06-6	Tert-Butylbenzene	ND	1.0
127-18-4	Tetrachloroethylene	ND	1.0
109-99-9	Tetrahydrofuran	ND	1.0
108-88-3	Toluene	ND	1.0
156-60-5	Trans-1,2-Dichloroethylene	ND	1.0
79-01-6	Trichloroethylene	ND	1.0
75-69-4	Trichlorofluoromethane	ND	1.0
108-05-4	Vinyl Acetate	ND	1.0
75-01-4	Vinyl Chloride	ND	1.0
10061-01-5	c-1,3-dichloropropene	ND	1.0
156-59-2	cis-1,2-Dichloroethylene	ND	1.0
10061-02-6	t-1,3-Dichloropropene	ND	1.0

Surrogate Compounds	**Recoveries (%)**	**QC Ranges**
1,2-Dichloroethane-D4	92	74 - 136
Toluene-D8	98	85 - 118
1,4-Bromofluorobenzene	98	78 - 111

Comments:

US ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND LABORATORY

Laboratory Duplicate Results

Olin Chemical - Wilmington, MA

Sample ID: AA76879

PARAMETER	SAMPLE RESULT ug/L	SAMPLE DUPLICATE RESULT ug/L	PRECISION RPD %	QC LIMITS
1,1,1,2-Tetrachloroethane	ND	ND	ND	30
1,1,1-Trichloroethane	ND	ND	ND	30
1,1,2,2-Tetrachloroethane	ND	ND	ND	30
1,1,2-Trichloro-1,2,2-Trifluoroeth	ND	ND	ND	30
1,1,2-Trichloroethane	ND	ND	ND	30
1,1-Dichloroethylene	ND	ND	ND	30
1,1-Dichloropropene	ND	ND	ND	30
1,1-dichloroethane	ND	ND	ND	30
1,2,3-Trichlorobenzene	ND	ND	ND	30
1,2,3-Trichloropropane	ND	ND	ND	30
1,2,4-Trichlorobenzene	ND	ND	ND	30
1,2,4-Trimethylbenzene	ND	ND	ND	30
1,2-Dibromo-3-Chloropropane	ND	ND	ND	30
1,2-Dibromoethane	ND	ND	ND	30
1,2-Dichlorobenzene	ND	ND	ND	30
1,2-Dichloroethane	ND	ND	ND	30
1,2-Dichloropropane	ND	ND	ND	30
1,3,5-Trimethylbenzene	ND	ND	ND	30
1,3-Dichlorobenzene	ND	ND	ND	30
1,3-Dichloropropane	ND	ND	ND	30
1,4-Dichlorobenzene	ND	ND	ND	30
2,2-Dichloropropane	ND	ND	ND	30
2-Butanone (MEK)	ND	ND	ND	30
2-Chlorotoluene	ND	ND	ND	30
2-Hexanone	ND	ND	ND	30
2-Propanone (acetone)	ND	ND	ND	30
4-Chlorotoluene	ND	ND	ND	30
4-Methyl-2-Pentanone(MIBK)	ND	ND	ND	30
Acrylonitrile	ND	ND	ND	30
Benzene	ND	ND	ND	30
Bromobenzene	ND	ND	ND	30
Bromochloromethane	ND	ND	ND	30
Bromodichloromethane	ND	ND	ND	30
Bromoform	ND	ND	ND	30
Bromomethane	ND	ND	ND	30
Carbon Disulfide	ND	ND	ND	30
Carbon tetrachloride	ND	ND	ND	30
Chlorobenzene	ND	ND	ND	30
Chloroethane	ND	ND	ND	30
Chloroform	ND	ND	ND	30
Chloromethane	ND	ND	ND	30
Dibromochloromethane	ND	ND	ND	30
Dibromomethane	ND	ND	ND	30
Dichlorodifluoromethane	ND	ND	ND	30
Ethyl Ether	ND	ND	ND	30
Ethylbenzene	ND	ND	ND	30
Hexachlorobutadiene	ND	ND	ND	30
Isopropylbenzene	ND	ND	ND	30
M/P Xylene	ND	ND	ND	30
Methyl-t-Butyl Ether	ND	ND	ND	30
Methylene Chloride	ND	ND	ND	30

N-Butylbenzene	ND	ND	ND	30
N-Propylbenzene	ND	ND	ND	30
Naphthalene	ND	ND	ND	30
Ortho Xylene	ND	ND	ND	30
Para-Isopropyltoluene	ND	ND	ND	30
Sec-Butylbenzene	ND	ND	ND	30
Styrene	ND	ND	ND	30
Tert-Butylbenzene	ND	ND	ND	30
Tetrachloroethylene	ND	ND	ND	30
Tetrahydrofuran	ND	ND	ND	30
Toluene	ND	ND	ND	30
Trans-1,2-Dichloroethylene	ND	ND	ND	30
Trichloroethylene	ND	ND	ND	30
Trichlorofluoromethane	ND	ND	ND	30
Vinyl Acetate	ND	ND	ND	30
Vinyl Chloride	ND	ND	ND	30
c-1,3-dichloropropene	ND	ND	ND	30
cis-1,2-Dichloroethylene	ND	ND	ND	30
t-1,3-Dichloropropene	ND	ND	ND	30

US ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND LABORATORY

LABORATORY FORTIFIED BLANK (LFB) AND DUPLICATE (LFB Dup) RECOVERY

Olin Chemical - Wilmington, MA

COMPOUND	SPIKE ADDED ug/mL	LFB CONCENTRATION ug/mL	LFB RECOVERY %	QC LIMITS (% REC)
1,1,1,2-Tetrachloroethane	20	19	95	79 - 136
1,1,1-Trichloroethane	20	18	90	75 - 146
1,1,2,2-Tetrachloroethane	20	18	90	62 - 141
1,1,2-Trichloro-1,2,2-Trifluoroeth	20	20	100	56 - 130
1,1,2-Trichloroethane	20	17	85	75 - 138
1,1-Dichloroethylene	20	18	90	75 - 136
1,1-Dichloropropene	20	18	90	77 - 137
1,1-dichloroethane	20	18	90	76 - 142
1,2,3-Trichlorobenzene	20	18	90	64 - 143
1,2,3-Trichloropropane	20	19	95	66 - 133
1,2,4-Trichlorobenzene	20	19	95	80 - 131
1,2,4-Trimethylbenzene	20	18	90	74 - 155
1,2-Dibromo-3-Chloropropane	20	17	85	37 - 139
1,2-Dibromoethane	20	18	90	72 - 135
1,2-Dichlorobenzene	20	18	90	85 - 128
1,2-Dichloroethane	20	18	90	74 - 138
1,2-Dichloropropane	20	18	90	83 - 124
1,3,5-Trimethylbenzene	20	18	90	80 - 145
1,3-Dichlorobenzene	20	19	95	84 - 130
1,3-Dichloropropane	20	18	90	77 - 129
1,4-Dichlorobenzene	20	19	95	82 - 128
2,2-Dichloropropane	20	19	95	32 - 171
2-Butanone (MEK)	20	12	60	38 - 179
2-Chlorotoluene	20	18	90	78 - 134
2-Hexanone	20	14	70	45 - 158
2-Propanone (acetone)	20	9.9	50	14 - 209
4-Chlorotoluene	20	18	90	75 - 144
4-Methyl-2-Pentanone(MIBK)	20	16	80	40 - 144
Acrylonitrile	20	15	75	52 - 154
Benzene	20	18	90	83 - 130
Bromobenzene	20	19	95	85 - 126
Bromochloromethane	20	19	95	69 - 137
Bromodichloromethane	20	19	95	70 - 143
Bromoform	20	18	90	51 - 136
Bromomethane	20	18	90	65 - 140
Carbon Disulfide	20	17	85	68 - 140
Carbon tetrachloride	20	20	100	70 - 144
Chlorobenzene	20	18	90	84 - 131
Chloroethane	20	17	85	70 - 134
Chloroform	20	18	90	76 - 141
Chloromethane	20	16	80	63 - 123
Dibromochloromethane	20	19	95	39 - 154
Dibromomethane	20	18	90	79 - 124
Dichlorodifluoromethane	20	23	115	37 - 117
Ethyl Ether	20	14	70	67 - 140

Ethylbenzene	20	19	95	81 - 133
Hexachlorobutadiene	20	18	90	68 - 146
Isopropylbenzene	20	20	100	78 - 137
M/P Xylene	40	37	93	68 - 155
Methyl-t-Butyl Ether	20	18	90	63 - 144
Methylene Chloride	20	16	80	75 - 140
N-Butylbenzene	20	18	90	69 - 147
N-Propylbenzene	20	18	90	76 - 138
Naphthalene	20	17	85	53 - 155
Ortho Xylene	20	18	90	85 - 135
Para-Isopropyltoluene	20	19	95	77 - 141
Sec-Butylbenzene	20	19	95	80 - 141
Styrene	20	18	90	82 - 139
Tert-Butylbenzene	20	19	95	75 - 144
Tetrachloroethylene	20	19	95	32 - 173
Tetrahydrofuran	20	16	80	47 - 149
Toluene	20	18	90	85 - 134
Trans-1,2-Dichloroethylene	20	15	75	80 - 138
Trichloroethylene	20	19	95	76 - 135
Trichlorofluoromethane	20	21	105	60 - 149
Vinyl Acetate	20	17	85	38 - 187
Vinyl Chloride	20	18	90	66 - 133
c-1,3-dichloropropene	20	19	95	68 - 149
cis-1,2-Dichloroethylene	20	18	90	76 - 143
t-1,3-Dichloropropene	20	18	90	62 - 160

PARAMETER	MSD SPIKE ADDED	MSD CONCENTRATION ug/L	MSD % REC	RPD %	QC LIMITS RPD
1,1,1,2-Tetrachloroethane	20	18	89	10	40
1,1,1-Trichloroethane	20	18	88	9	16
1,1,2,2-Tetrachloroethane	20	18	90	4	40
1,1,2-Trichloro-1,2,2-Trif	20	20	102	8	40
1,1,2-Trichloroethane	20	17	83	6	40
1,1-Dichloroethylene	20	17	86	11	35
1,1-Dichloropropene	20	17	84	9	40
1,1-dichloroethane	20	17	85	8	40
1,2,3-Trichlorobenzene	20	18	90	6	40
1,2,3-Trichloropropane	20	19	97	4	40
1,2,4-Trichlorobenzene	20	18	90	9	40
1,2,4-Trimethylbenzene	20	17	87	8	40
1,2-Dibromo-3-Chloropro	20	16	81	7	40
1,2-Dibromoethane	20	17	87	6	40
1,2-Dichlorobenzene	20	17	86	8	40
1,2-Dichloroethane	20	18	90	6	23
1,2-Dichloropropane	20	17	84	10	40
1,3,5-Trimethylbenzene	20	18	88	8	40
1,3-Dichlorobenzene	20	18	89	8	40
1,3-Dichloropropane	20	17	86	5	40
1,4-Dichlorobenzene	20	18	89	7	21
2,2-Dichloropropane	20	18	89	11	40
2-Butanone (MEK)	20	12	61	2	40
2-Chlorotoluene	20	17	86	8	40
2-Hexanone	20	14	70	2	40
2-Propanone (acetone)	20	8.9	45	5	40
4-Chlorotoluene	20	17	87	8	40
4-Methyl-2-Pentanone(M	20	16	81	0	40
Acrylonitrile	20	15	75	5	40
Benzene	20	18	88	8	14
Bromobenzene	20	18	91	6	40
Bromochloromethane	20	18	89	9	40
Bromodichloromethane	20	17	86	8	21
Bromoform	20	17	84	2	40
Bromomethane	20	19	96	9	40
Carbon Disulfide	20	16	81	8	40
Carbon tetrachloride	20	19	94	8	19
Chlorobenzene	20	18	90	7	40
Chloroethane	20	17	87	10	40
Chloroform	20	18	88	8	16
Chloromethane	20	16	78	12	40
Dibromochloromethane	20	17	87	6	36
Dibromomethane	20	18	89	5	40
Dichlorodifluoromethane	20	23	116	7	40
Ethyl Ether	20	15	74	8	40
Ethylbenzene	20	18	89	9	40
Hexachlorobutadiene	20	17	87	15	40
Isopropylbenzene	20	19	95	7	40
M/P Xylene	40	36	90	8	40
Methyl-t-Butyl Ether	20	18	91	5	40
Methylene Chloride	20	15	77	9	40
N-Butylbenzene	20	17	84	10	40
N-Propylbenzene	20	17	87	8	40

Naphthalene	20	17	87	2	40
Ortho Xylene	20	17	87	9	40
Para-Isopropyltoluene	20	18	91	9	40
Sec-Butylbenzene	20	17	87	9	40
Styrene	20	17	86	8	40
Tert-Butylbenzene	20	18	88	9	40
Tetrachloroethylene	20	17	85	11	40
Tetrahydrofuran	20	15	73	5	40
Toluene	20	18	90	8	40
Trans-1,2-Dichloroethyle	20	15	75	35	40
Trichloroethylene	20	17	87	10	22
Trichlorofluoromethane	20	22	110	9	40
Vinyl Acetate	20	17	87	7	40
Vinyl Chloride	20	19	94	10	19
c-1,3-dichloropropene	20	19	93	9	40
cis-1,2-Dichloroethylene	20	17	85	10	40
t-1,3-Dichloropropene	20	17	86	8	40

Comments:

Samples in Batch: AA76877, AA76878, AA76879, AA76880, AA76881, AA76882

US ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND LABORATORY

VOA MATRIX SPIKE (MS) / MATRIX SPIKE DUPLICATE (MSD) RECOVERY

Olin Chemical - Wilmington, MA

Sample ID: AA76879

PARAMETER	SPIKE ADDED ug/L	SAMPLE CONCENTRATION ug/L	MS CONCENTRATION ug/L	MS % REC	QC LIMITS (% REC)
1,1,1,2-Tetrachloroethane	20	ND	20	98	67 - 129
1,1,1-Trichloroethane	20	ND	19	97	75 - 139
1,1,2,2-Tetrachloroethane	20	ND	19	93	50 - 142
1,1,2-Trichloro-1,2,2-Trifluoro	20	ND	22	110	55 - 135
1,1,2-Trichloroethane	20	ND	18	89	62 - 142
1,1-Dichloroethylene	20	ND	19	96	80 - 138
1,1-Dichloropropene	20	ND	18	92	73 - 131
1,1-dichloroethane	20	ND	19	93	61 - 152
1,2,3-Trichlorobenzene	20	ND	19	95	49 - 143
1,2,3-Trichloropropane	20	ND	20	101	53 - 135
1,2,4-Trichlorobenzene	20	ND	20	99	63 - 131
1,2,4-Trimethylbenzene	20	ND	19	94	79 - 142
1,2-Dibromo-3-Chloropropane	20	ND	17	87	28 - 122
1,2-Dibromoethane	20	ND	18	92	53 - 139
1,2-Dichlorobenzene	20	ND	19	93	74 - 129
1,2-Dichloroethane	20	ND	19	96	61 - 142
1,2-Dichloropropane	20	ND	19	93	71 - 126
1,3,5-Trimethylbenzene	20	ND	19	96	77 - 140
1,3-Dichlorobenzene	20	ND	19	97	78 - 127
1,3-Dichloropropane	20	ND	18	91	63 - 130
1,4-Dichlorobenzene	20	ND	19	96	72 - 131
2,2-Dichloropropane	20	ND	20	99	50 - 139
2-Butanone (MEK)	20	ND	12	60	29 - 163
2-Chlorotoluene	20	ND	19	93	74 - 134
2-Hexanone	20	ND	14	68	36 - 141
2-Propanone (acetone)	20	ND	8.5	43	29 - 164
4-Chlorotoluene	20	ND	19	94	68 - 141
4-Methyl-2-Pentanone(MIBK)	20	ND	16	81	35 - 139
Acrylonitrile	20	ND	16	78	42 - 150
Benzene	20	ND	19	96	78 - 134
Bromobenzene	20	ND	19	97	76 - 126
Bromochloromethane	20	ND	19	97	62 - 140
Bromodichloromethane	20	ND	19	93	62 - 133
Bromoform	20	ND	17	85	31 - 133
Bromomethane	20	ND	21	105	58 - 148
Carbon Disulfide	20	ND	18	88	66 - 135
Carbon tetrachloride	20	ND	20	102	62 - 146
Chlorobenzene	20	ND	19	96	74 - 139
Chloroethane	20	ND	19	96	65 - 145
Chloroform	20	ND	19	95	60 - 144
Chloromethane	20	ND	18	88	58 - 134
Dibromochloromethane	20	ND	18	92	34 - 140
Dibromomethane	20	ND	19	93	67 - 125
Dichlorodifluoromethane	20	ND	25	124	30 - 132

Ethyl Ether	20	ND	16	80	58 - 145
Ethylbenzene	20	ND	19	97	73 - 143
Hexachlorobutadiene	20	ND	20	101	56 - 144
Isopropylbenzene	20	ND	20	102	73 - 139
M/P Xylene	40	ND	39	98	79 - 136
Methyl-t-Butyl Ether	20	ND	19	96	50 - 144
Methylene Chloride	20	ND	17	84	70 - 144
N-Butylbenzene	20	ND	19	93	68 - 143
N-Propylbenzene	20	ND	19	94	72 - 149
Naphthalene	20	ND	18	89	33 - 154
Ortho Xylene	20	ND	19	96	80 - 129
Para-Isopropyltoluene	20	ND	20	100	71 - 140
Sec-Butylbenzene	20	ND	19	95	75 - 148
Styrene	20	ND	19	94	61 - 148
Tert-Butylbenzene	20	ND	19	96	71 - 139
Tetrachloroethylene	20	ND	19	95	45 - 145
Tetrahydrofuran	20	ND	15	77	37 - 143
Toluene	20	ND	20	98	77 - 142
Trans-1,2-Dichloroethylene	20	ND	21	106	79 - 139
Trichloroethylene	20	ND	19	96	65 - 143
Trichlorofluoromethane	20	ND	24	120	58 - 161
Vinyl Acetate	20	ND	19	93	22 - 173
Vinyl Chloride	20	ND	21	104	68 - 139
c-1,3-dichloropropene	20	ND	20	101	51 - 144
cis-1,2-Dichloroethylene	20	ND	19	94	59 - 154
t-1,3-Dichloropropene	20	ND	19	93	47 - 145

Comments:

COMPOUND	LFB Dup CONCENTRATION ug/L	LFB Dup RECOVERY %	RPD %	QC LIMITS RPD
1,1,1,2-Tetrachloroethane	18	89	7	40
1,1,1-Trichloroethane	18	89	2	16
1,1,2,2-Tetrachloroethane	18	88	2	40
1,1,2-Trichloro-1,2,2-Trifluo	20	98	3	40
1,1,2-Trichloroethane	17	83	2	40
1,1-Dichloroethylene	18	90	1	35
1,1-Dichloropropene	16	81	11	40
1,1-dichloroethane	17	85	6	40
1,2,3-Trichlorobenzene	18	92	2	40
1,2,3-Trichloropropane	19	97	2	40
1,2,4-Trichlorobenzene	18	91	5	40
1,2,4-Trimethylbenzene	18	88	2	40
1,2-Dibromo-3-Chloropropa	16	80	6	40
1,2-Dibromoethane	17	86	5	40
1,2-Dichlorobenzene	17	87	3	40
1,2-Dichloroethane	18	89	1	23
1,2-Dichloropropane	17	85	6	40
1,3,5-Trimethylbenzene	18	89	2	40
1,3-Dichlorobenzene	18	90	6	40
1,3-Dichloropropane	17	87	3	40
1,4-Dichlorobenzene	18	88	8	21
2,2-Dichloropropane	16	82	15	40
2-Butanone (MEK)	12	60	0	40
2-Chlorotoluene	17	86	5	40
2-Hexanone	14	72	2	40
2-Propanone (acetone)	9.7	49	2	40
4-Chlorotoluene	17	87	3	40
4-Methyl-2-Pentanone(MIB	16	81	1	40
Acrylonitrile	15	73	3	40
Benzene	18	89	2	14
Bromobenzene	18	90	5	40
Bromochloromethane	18	90	6	40
Bromodichloromethane	17	85	11	21
Bromoform	15	76	18	40
Bromomethane	19	94	4	40
Carbon Disulfide	16	80	6	40
Carbon tetrachloride	19	93	8	19
Chlorobenzene	18	90	1	40
Chloroethane	17	84	2	40
Chloroform	18	88	3	16
Chloromethane	16	78	3	40
Dibromochloromethane	16	82	15	36
Dibromomethane	18	88	3	40
Dichlorodifluoromethane	22	109	6	40
Ethyl Ether	15	74	5	40
Ethylbenzene	18	91	5	40
Hexachlorobutadiene	18	91	1	40
Isopropylbenzene	19	96	4	40
M/P Xylene	36	90	3	40
Methyl-t-Butyl Ether	18	89	1	40
Methylene Chloride	15	77	5	40
N-Butylbenzene	17	86	5	40

N-Propylbenzene	18	88	3	40
Naphthalene	17	86	1	40
Ortho Xylene	18	89	1	40
Para-Isopropyltoluene	19	94	2	40
Sec-Butylbenzene	18	89	7	40
Styrene	17	87	3	40
Tert-Butylbenzene	18	90	5	40
Tetrachloroethylene	21	107	11	40
Tetrahydrofuran	14	72	11	40
Toluene	18	91	1	40
Trans-1,2-Dichloroethylene	15	75	1	40
Trichloroethylene	18	88	8	22
Trichlorofluoromethane	21	103	2	40
Vinyl Acetate	15	77	11	40
Vinyl Chloride	19	94	4	19
c-1,3-dichloropropene	19	93	2	40
cis-1,2-Dichloroethylene	17	86	5	40
t-1,3-Dichloropropene	17	85	6	40

Samples in Batch: AA76877, AA76878, AA76879, AA76880, AA76881, AA76882

Comments: