Jolly, Becky <becky.jolly@dnr.iowa.gov>

Fwd: Fall 2025 Wellman MW Sampling and Analyses

1 message

Davison, Brad <brad.davison@dnr.iowa.gov> Tue, Aug 5, 2025 at 3:39 PM
To: Becky Jolly <becky.jolly@dnr.iowa.gov>

Becky could you please add this for 88-SDP-04-86?

Thanks!

Brad Davison | Environmental Specialist
Solid Waste & Contaminated Sites Section
P: 515-415-1331 | F: 515-725-8202
Department of Natural Resources

---------- Forwarded message ---------
From: **Matt Thelen** <matt.thelen@wellmandynamics.com>
Date: Tue, Aug 5, 2025 at 3:12 PM
Subject: Fall 2025 Wellman MW Sampling and Analyses
To: Randy Gavin (oatech@netins.net) <oatech@netins.net>, Conner Calhoun <conner.calhoun@et.eurofinsus.com>
Cc: Roach, Robert <rroach@penn-er.com>, brad.davison@dnr.iowa.gov <brad.davison@dnr.iowa.gov>, Pat Murrow (murrow.patricia@epa.gov) <murrow.patricia@epa.gov>, Doumont, Ronald <rdoumont@penn-er.com>, Tyler Merritt <merritt.tyler730@gmail.com>

Randy/Conner:

The Fall 2025 Wellman sampling event will cover the IDNR Landfill Permit, RCRA and IHHS requirements.

The RCRA sampling is for ongoing additional information, not part of the RFI.

Please see the attached matrix 2025 FALL WELLMAN MW SAP for sampling requirements.

We tried to make it as clear as possible.

Brad/Pat: If you notice any issues regarding the program, please reply all so we can address ASAP.

As with the Spring 2025 event, you will follow the SAP/QAPP from the RCRA project.

This is because the RCRA sampling protocols have been adopted in the IDNR Landfill Permit and the data generated under the IDNR program may be used in the RCRA work in the future.

The October 2024 REV SAP/QAPP with updated Table 3 is the most recent approved version and is attached for reference.

Please review the October 2024 REV SAP/QAPP and contact me with any questions.

Things to remember:

1. Low flow and no purge are approved - follow your protocols (see Appendix H (pg. 408) and Appendix I (pg. 411)).
2. Eurofins Cedar Falls is the lab – **Conner please follow Table 3 (pg. 71) of SAP/QAPP; we need to hit the PQLs and MDLs specified previously.**
3. Eurofins Quality Assurance/Quality Control Manual is found in Appendix B (pg. 170).
4. Follow labeling protocols.
5. Follow QA/QC sampling per Table 5 (pg. 79).
6. Need records of field equipment calibration and identification serial numbers, calibrate start each day.
7. HAZWOPER 8 hour refresher up to date for field staff.
8. Review Health and Safety Site Plan before field work.
9. Tailgate safety meetings before field work with all PPE required.
10. Pay particular attention to the Appendix D Standard Field Procedures (pg. 272) for specifics on groundwater sampling.
11. **Randy, after sampling please manually track water level recovery versus time in sampled wells for biennial recharge evaluation.**

If you have any questions, please reply all and we can track resolution for future reference.

Thanks,

Matt

Matt Thelen | Environmental Engineer

WDC Acquisition LLC

1746 Commerce Road, Creston, IA 50801

Phone: 641-782-0283

Email: matt.thelen@wellmandynamics.com

2 attachments

2025 FALL WELLMAN MW SAP.xlsx
21K

WDC SAPQAPP 10.31.24 with updated Table 3.pdf
14063K

2025 Fall Wellman GW/SW Sampling and Analytical Program

Aug-25

+ IDNR HMSP Landfill Well/SW; # USEPA Well; * IDNR Requirement; ** IDNR and USEPA Requirement; *** USEPA Requirement; **** IDPH Requirement

		VOCs **	1,4-Dioxane ***	Chromium Hex ***	Chromium Total ***	Aluminum Total *	Arsenic (Inorganic) Total **	Beryllium Total **	Boron Total **	Cobalt Total *	Cadmium (Water) Total ***	Fluoride (Total) **	Fluoride (Dissolved) *	Iron Total ***	Iron Dissolved *	Lead Total ***	Lithium Total *	Magnesium Total *	Manganese Total *	Nickel Total *	Strontium Total *	Vanadium Total ***	Nitrate-N ***	Nitrite-N ***	Chloride **	Sulfate**	Ammonia Nitrogen *	COD *	Total Organic Halogens *	Phenols *	Liquid Levels + LF Piezometers **	Recovery Elevations *	Specifc Conductance Field **	pH Field **	Temp Field **	Thorium Isotopes ****	Uranium Isotopes ****	Gross Alpha ****
SW	SW1+	X				X	X	X	X	X		X	X		X		X	X	X	X	X				X	X	X	X	X	X			X	X	X			
Chrome Area	MW1																																					
	MW2																																					
	MW3R																																					
	MWA #	X	X	X	X		X		X		X	X	X	X		X							X	X	X	X					X		X	X	X			
Landfill Wells	MW6																														X							
	MW7 +	X				X	X	X	X	X		X	X		X		X	X	X	X	X				X	X	X	X	X	X	X	X	X	X	X			
	MW8 +	X				X	X	X	X	X		X	X		X		X	X	X	X	X				X	X	X	X	X	X	X	X	X	X	X	X	X	X
	MW9																														X							
	MW10																														X							
	MW11 +#	X	X			X	X	X	X	X	X	X	X	X	X		X	X	X	X	X				X	X	X	X	X	X	X	X	X	X	X	X	X	X
	MW12 +	X				X	X	X	X	X		X	X		X		X	X	X	X	X				X	X	X	X	X	X	X	X	X	X	X			
	MW13 +	X				X	X	X	X	X		X	X		X		X	X	X	X	X				X	X	X	X	X	X	X	X	X	X	X	X	X	X
	MW14																														X							
	MW15																														X							
	MW16 +	X				X	X	X	X	X		X	X		X		X	X	X	X	X				X	X	X	X	X	X	X	X	X	X	X			
	MW17 +	X				X	X	X	X	X		X	X		X		X	X	X	X	X				X	X	X	X	X	X	X	X	X	X	X			
	MW18																														X							
Rad	MW19																														X		X	X	X	X	X	X
	MW20 #	X	X				X		X			X	X	X											X	X					X		X	X	X	X	X	X
Dross	MW27																																					
New RCRA Landfill	MW28																																					
	MW29																																					
	MW30 #	X	X		X		X		X			X	X	X											X	X					X		X	X	X			
	MW31																																					
	MW32																																					
	MW33																																					
VOC	MW34																																					
	MW35 #	X	X	X	X		X	X	X		X	X	X	X											X	X					X		X	X	X			
	MW36R																																					
	MW37 #	X	X						X			X	X	X											X	X					X		X	X	X			
	MW38R #	X	X	X	X		X		X			X	X	X									X	X	X	X					X		X	X	X			
	MW39 #	X	X						X			X	X	X											X	X					X		X	X	X			
	MW40																																					
	MW41 #	X	X				X		X			X	X	X											X	X					X		X	X	X			
New Up	MW42 #	X	X		X		X	X	X		X	X	X	X		X						X			X	X					X		X	X	X			
	MW43 #	X	X		X		X	X	X		X	X	X	X		X						X			X	X					X		X	X	X			
New Down OffSite	MW44 +#	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X	X	X	X	X	X	X		
	MW45 +#	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X	X	X	X	X	X	X		
	MW46 +#	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X	X	X	X	X	X	X		
	MW47 +#	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X	X	X	X	X	X	X		
	MW48 +#	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X	X	X	X	X	X	X		
	MW49 +#	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X	X	X	X	X	X	X		

Sampling and Analysis Plan/
Quality Assurance Project Plan
WDC Acquisition, LLC
Creston, Iowa
USEPA ID No. IAD065218737

August 2024
Revised October 2024

Prepared For:

WDC Acquisition, LLC
1746 Commerce Road
Creston, Iowa 50801

Prepared By:

Penn Environmental & Remediation, Inc.
100 Ryan Court, Suite 20
Pittsburgh, PA 15205

BT^2, Inc.
2830 Dairy Drive
Madison, Wisconsin 53718

TITLE/SIGNATURE PAGE

Sampling and Analysis Plan/
Quality Assurance Project Plan
RCRA Facility Investigation
WDC Acquisition, LLC
Creston, Iowa
USEPA ID No. IAD065218737

August 2024

Prepared by: Penn E&R (Original BT^2, Inc.)

Prepared for: WDC Acquisition, LLC

Matt Thelen, WDC Acquisition, LLC Facility Project Coordinator	10/29/2024 Date
Robert J. Roach, P.E., Penn E&R Project Manager	8/23/2024 Date
Ronald F. Doumont, Penn E&R QA Officer	8/23/2024 Date
PATRICIA MURROW Digitally signed by PATRICIA MURROW Date: 2024.11.01 12:01:20 -05'00' Patricia Murrow, USEPA Project Manager	11/1/2024 Date
DIANE HARRIS Digitally signed by DIANE HARRIS Date: 2024.12.02 09:02:18 -06'00' Diane Harris, USEPA Regional QA Manager	Date

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FIGURES

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APPENDICES

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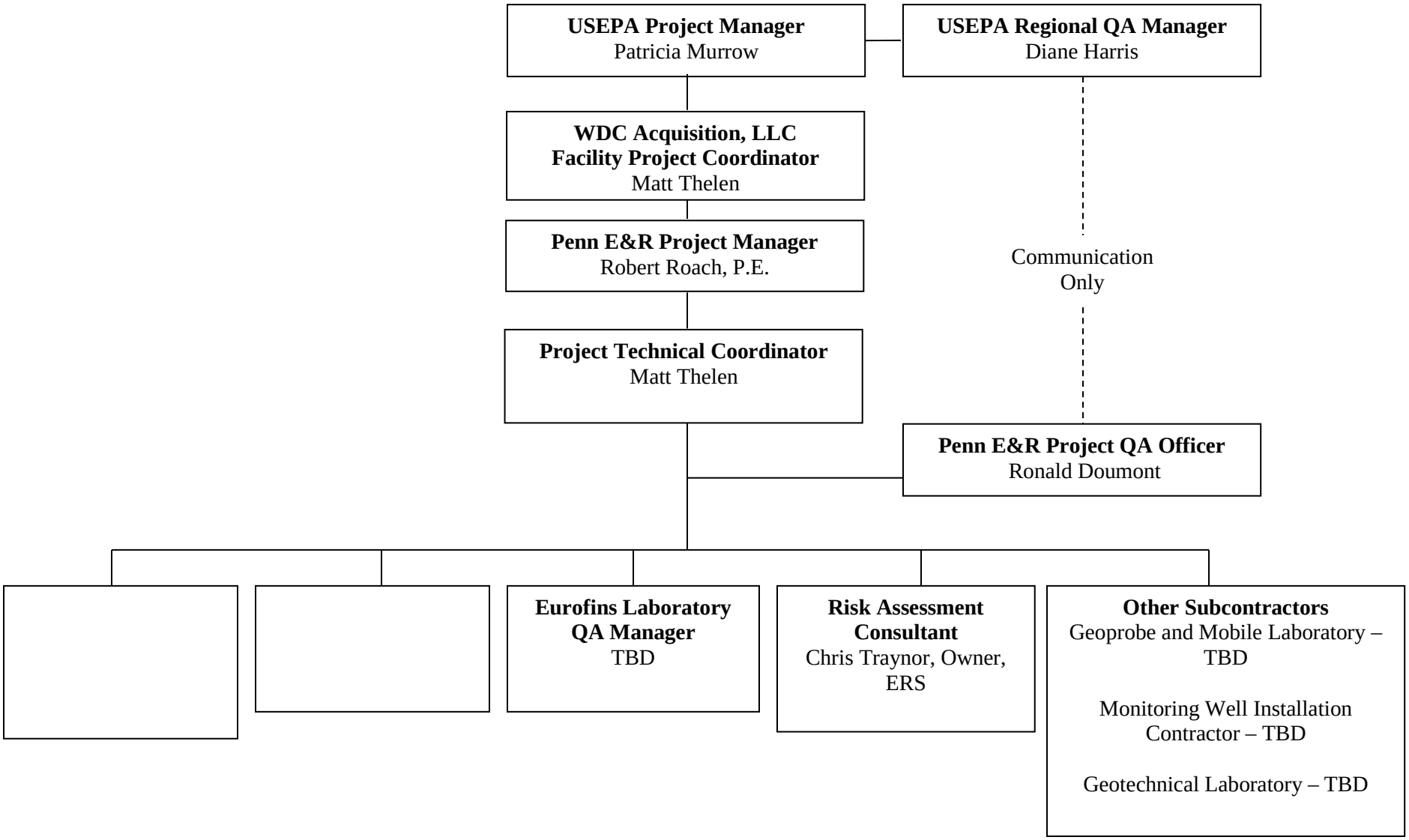
PROJECT ORGANIZATIONAL CHART
RCRA Facility Investigation Workplan
WDC Acquisition, LLC, Creston, Iowa



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GROUP A: PROJECT MANAGEMENT

The purpose of this document is to describe the personnel, procedures, and methods for assuring the quality, accuracy, and precision of data associated with the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) of the WDC Acquisition, LLC (WDC) facility in Creston, Iowa. Adhering to the procedures detailed in this Sampling and Analysis Plan/Quality Assurance and Project Plan (SAP/QAPP) will ensure that the collected data meets the decision-making needs of the project. This SAP/QAPP is organized to follow the order of the required QAPP elements in the USEPA's *Guidance for Quality Assurance Project Plans*, *EPA/QA/G-5*. The SAP/QAPP was also prepared in accordance with the requirements of the Administrative Order on Consent (Order) issued by the United States Environmental Protection Agency (USEPA) that became effective on January 23, 2004. A copy of the Order is provided in the Project Management Plan that accompanies this SAP/QAPP.
Please note the RFI was approved by USEPA in 2021.

A.1 Title and Approval Sheet

The Title and Approval Sheet is page ii of this document.

A.2 Table of Contents and Document Control Format

The Table of Contents begins on page iii of this document. The document version and date are provided in the header at the top of each page.

This SAP/QAPP is one of six documents that comprise the WDC RFI Workplan. The other five Workplan component documents include:

- Project Management Plan
- Data Management Plan
- Health and Safety Plan
- Community Relations Plan
- Risk Assessment Workplan

These component documents reference each other and should be reviewed in combination to obtain a complete understanding of the RFI.

A.3 Distribution List

SAP/QAPP Distribution List	Telephone Number
Patricia Murrow, USEPA Project Manager	(913) 551-7627
Diane Harris, USEPA Regional Quality Assurance Manager	
Matt Thelen, WDC Acquisition, LLC Project Coordinator	(641) 782-9881
Michael B. "Mick" Leat, Iowa Department of Natural Resources, (informational purposes only)	(515) 725-8200
EPA Regional Quality Assurance Manager (RQAM)	(913) 551-7258
Robert J. Roach, P.E., Penn E&R Project Manager	(412) 722-1222
Ronald F. Doumont, Penn E&R QA Officer	(412) 722-1222
Matt Thelen, Project Technical Coordinator	(641) 782-9881

A.4 Project/Task Organization

A project organization chart is provided on page viii of this document, immediately following the Table of Contents. The individuals participating in the WDC project, and their specific roles and responsibilities are outlined below:

Patricia Murrow, USEPA Project Manager – The USEPA Project Manager is the primary decision maker for the project and the primary data user. Responsibilities include:

1. Overall coordination of the project.
2. Review and approve the SAP/QAPP and subsequent revisions in terms of project scope and objectives.
3. Provide technical consultation.
4. Review progress reports.
5. Ensure SAP/QAPP implementation.

Diane Harris, USEPA Quality Assurance Manager – Responsibilities include:

1. Final review and approval of the SAP/QAPP and subsequent revisions.
2. Provide Quality Assurance (QA) technical assistance to the USEPA Project Manager.

Matt Thelen, WDC Acquisition, LLC Project Coordinator – Mr. Thelen is the designated WDC Project Coordinator. Responsibilities include:

1. Review and approval of the SAP/QAPP and subsequent revisions.

2. Provide primary point of contact with USEPA Project Manager.
3. Prepare progress reports to the USEPA Project Manager.
4. Coordinate field and laboratory activities.
5. Conduct project activities in accordance with the SAP/QAPP.

Robert J. Roach, P.E., Penn E&R Project Manager – Mr. Roach's responsibilities are:

1. Develop the SAP/QAPP and revisions.
2. Coordinate field and laboratory activities.
3. Conduct project activities in accordance with the SAP/QAPP.
4. Evaluate data usability.

Ronald F. Doumont, Penn E&R QA Officer – The Penn E&R QA Officer is not involved with data generation activities. Mr. Doumont's responsibilities are:

1. Review and approve the SAP/QAPP.
2. Provide QA technical assistance to the Penn E&R Project Manager.
3. Conduct internal QA audits.
4. Report results of internal QA audits to the Penn E&R Project Manager.
5. Validate field and laboratory data.

Matt Thelen, Project Technical Coordinator – Mr. Thelen's responsibilities are:

1. Direct the sampling operations in accordance with the SAP/QAPP.
2. Distribute the approved SAP/QAPP and subsequent revisions to the members of the field sampling team.
3. Report problems in the field to the Penn E&R Project Manager.
4. Review and verify field data.

TBD, Eurofins QA Officer – The responsibilities of the laboratory QA Officer include:

1. Manage laboratory QA program.
2. Review and verify laboratory data.

A.5 Problem Definition/Background

A complete description of the site history, operations, and environmental conditions at the facility can be found in the Final Current Conditions Report (CCR) (BT^2, 2005). The CCR was prepared with the objective of streamlining the RFI process by consolidating the previously acquired site data from various

sources. This information has been used to focus the scope of the RFI. The following discussion provides a summary of the site background and environmental issues.
Revision 1 of the SAP/QAPP was approved with modifications in a letter from USEPA dated September 25, 2006. The modified Revision 1 (identified as Revision 2, Final) was issued in October 2006. Revision 3 incorporates requested 2006 modifications and 2017 updates due to personnel, company, and miscellaneous changes.

This site SAP/QAPP was first revised in September and October 2006 and approved as Revisions 1 and 2. In March 2009, an addendum was submitted specifying additional offsite up- and downgradient groundwater monitoring wells. In September 2015 an addendum was submitted to modify offsite downgradient groundwater monitoring well locations per USEPA request in August 2015.

In November 2015 a USEPA letter was issued approving the revised offsite downgradient groundwater monitoring well locations. The remainder of the addendum remained under review by USEPA. In July 2017 WDC sent USEPA an e-mail referencing groundwater monitoring well installation specifications and requesting authorization to install downgradient wells only. USEPA approved the groundwater monitoring well installation specifications and provided authorization to install downgradient wells only. In July 2017 a SAP/QAPP Addendum was submitted to USEPA requesting limited groundwater sampling events using proposed offsite downgradient and existing landfill groundwater monitoring wells. USEPA responded with comments on the Addendum among other comments regarding the SAP/QAPP updates. The Addendum was updated to address the comments and was approved by USEPA in August 2017 as Revision 3.

In October 2017 a schedule for additional RFI work was submitted to USEPA and approved in February 2018 with a modification for a schedule for completing the additional RFI work. The RFI Report (Revision 0) was submitted to USEPA on January 31, 2020. Revision 1 was submitted as a response to USEPA comments on October 25, 2021 and was accepted by USEPA.

In September 2020 SAP/QAPP Addendum updates were made to tables to address changes in Fluoride methods and submitted to USEPA. USEPA approved this as Revision 4 and updates the plan to address lab changes in Fluoride testing methods. In August 2021 USEPA approved switching 8270E samples to 250-mL amber bottles, as requested by Eurofins. In April 2024 USEPA requested a complete stand-alone updated SAP/QAPP since the current version was approved in August 2017, and subsequently revised with the last revision approval in October 2020, is more than 5 years old.

A.5.1 Facility Description and History

WDC is located at the northwest corner of the intersection of U.S. Highway 34 and Osage Street in the Creston Industrial Park in Union County, Iowa. The facility is located just outside of the City of Creston (City) corporate limits in the Township of Highland but is served by City water and sewer. The WDC property is approximately 42 acres. The site location is shown in **Figure 1**. The site layout and features are shown in **Figure 2**.

The facility was originally constructed in 1965 as an aluminum and magnesium foundry and has been used for the same purpose since that time. The facility was initially owned by Hills McCanna Corporation of Chicago, Illinois, and then was operated by a variety of owners from 1971 to 1985. In 1985, Beatrice Corporation sold the facility to Fansteel, Inc. Fansteel, Inc. operated the Creston, Iowa site as Wellman Dynamics Corp. and later filed voluntary case under chapter 11 of title 11 of the United States Bankruptcy Code in September 2016. In March 2018 the Bankruptcy court approved the sale of certain assets of Wellman Dynamics Corp. to TCTM Financial FS LLC, who then assigned all rights and obligations under the asset purchase agreement to WDC Acquisition LLC (WDC).

WDC manufactures magnesium and aluminum alloy castings primarily for the aerospace industry. Products include complex components for helicopters, missiles, rocket engines, jet engines, and structural parts for both military and commercial aircraft. Non-aerospace applications have included 1,600-pound magnesium transfer pumps for the oilfield industry and porosity-free castings for computer chip manufacturing. Various magnesium and aluminum alloys are cast to achieve specific final properties.

The facility includes two main buildings and several smaller outbuildings. The main production building is approximately 285,000 square feet in area, and houses the administrative offices, foundry, and supporting operations. The second major building is the pattern storage and warehouse building, located north of the main production building. Outbuildings include several storage sheds, the effluent sewer shed, and the guard shack.

Foundry operations are conducted in the main production building. Foundry operations include melting the solid metal, pouring the liquid metal into a mold, and allowing the metal to solidify. The solidified metal part, known as a casting, goes through several cleaning, inspection, and testing steps prior to shipment to the customer.

A.5.2 Environmental Issues and RFI Areas of Investigation

The CCR describes in detail the known contaminants in soil and groundwater at the WDC facility and the areas in which the contaminants are found. The RFI will focus on investigating the degree and extent of contamination at the facility and evaluating the risk posed to human health and the environment by site contaminants.

The RCRA Facility Assessment (RFA) performed by a USEPA contractor in 1993 identified 12 solid waste management units (SWMUs) at the WDC facility. The CCR includes a preliminary evaluation of the status and the need for further action at the 12 SWMUs plus two additional areas of concern (AOCs) identified since the RFA was performed. Of the 12 SWMUs, nine are proposed to be included in the RFI. The SWMUs and AOCs are summarized in **Table 1**. The locations of the SWMUs and AOCs are shown in **Figure 2**. Potential exposure pathways are summarized in **Figure 3**.

A.5.3 RFI Objectives

The objectives of the RFI are:

1) To determine the nature and extent of any release of hazardous wastes and/or hazardous constituents at or from the facility
2) To determine whether environmental contamination related to any releases poses an unacceptable risk to human health or the environment
3) To gather data to support a Corrective Measures Study, if required

A.6 Project/Task Description

The RFI will include the investigations necessary to:

- Characterize the facility
- Define the source(s) of contamination
- Define the degree and extent of contamination
- Identify actual or potential receptors
- Support completion of a risk assessment
- Support development and evaluation of corrective measure alternatives, if required

The RFI will focus on filling data gaps identified in the CCR. The new site investigation data will supplement the previously generated data.

The following discussion provides a general outline of the types of field measurements and sampling to be completed during the RFI. Primary equipment to be used in the RFI will include:

- Direct-push soil/groundwater sampling equipment (Geoprobe™ or equivalent)
- Hollow-stem auger drilling rig
- Surface soil and sediment sampling equipment (trowels, shovels, bowls)
- Groundwater and surface sampling equipment (pumps, bailers, dippers)
- Groundwater field monitoring equipment (pH, conductivity, temperature, turbidity, dissolved oxygen, oxidation-reduction potential, temperature)
- Photo-ionization detector (PID)
- Water level monitoring equipment
- Slug testing equipment
- Survey equipment

More specific information is provided in **Section B.1**. Sampling personnel will be trained in accordance with OSHA requirements as described in **Section A.8**.

A.6.1 Environmental Setting

The RFI will characterize the environmental setting of the WDC facility, including the site hydrogeology, geology, hydrology, and climate. In addition to existing data for the facility, field measurement and sampling tasks to support the environmental setting characterization will include:

- Geologic logging of borings advanced for contaminant characterization tasks
- Water level measurements at existing and new monitoring wells
- Sampling major soil type(s) for physical/chemical laboratory analysis (e.g., hydraulic conductivity, bulk density, sorptive capacity, cation exchange capacity, organic content, pH, grain size distribution)

Climate data will be obtained from the National Climatic Data Center or other appropriate sources.

A.6.2 Source Characterization

The RFI will characterize the potential source areas (SWMUs, AOCs), including the type, quantity, physical form, disposition, and facility characteristics affecting a potential release. The potential source characterization has been largely completed through the RFA and CCR process. However, limited

additional sampling tasks will be performed as needed to support this characterization, including sampling waste materials for physical/chemical laboratory analysis.

A.6.3 Contamination Characterization

The RFI will characterize the extent, origin, direction, and rate of movement of contaminant plumes on site and off site. The RFI will address groundwater, soil, surface water, and sediment contamination, as well as any immiscible phase originating from the facility.

In addition to existing data for the facility, field measurement and sampling tasks to support the contamination characterization will include:

- Collecting and analyzing surface water samples
- Collecting and analyzing sediment samples
- Collecting and analyzing surface soil samples
- Collecting and analyzing subsurface soil samples from direct-push or drilled soil borings
- Installing monitoring wells
- Collecting and analyzing groundwater samples from monitoring wells (existing or new)
- Collecting and analyzing groundwater samples from temporary wells in direct-push soil borings

The quality of previously collected data for use in the RFI will also be assessed.

A.6.4 Receptor Characterization and Risk Assessment Support

The RFI will characterize the human populations and environmental systems that may be susceptible to contaminant exposure from the facility, including groundwater use, surface water use, land use, surface water biota, ecology, and endangered or threatened species. Field investigations for these characterizations will be limited to field observations by knowledgeable persons to supplement information available from public sources. The receptor characterization will be documented in the risk assessment.

A.6.5 Corrective Measures Alternatives Support

The RFI data will be used to support evaluation of corrective measures alternatives if corrective measures are determined to be necessary. In general, the data collected to characterize the environmental setting, contaminant sources, extent of contamination, and receptors will be used to evaluate corrective measures, if needed. If additional data needs are identified, they will be outlined in the Corrective Measures Study Work Plan.

A.6.6 Applicable Technical, Regulatory, or Program-Specific Standards, Criteria, or Objectives

The RFI will identify potentially applicable standards and support the selection of Preliminary Remediation Goals appropriate to the facility. Applicable standards may include the following:

- Groundwater
  - Maximum Contaminant Levels established by USEPA
  - Background levels determined based on site-specific and/or regional data
  - USEPA Preliminary Remediation Goals (PRGs) and Risk-Based Concentrations (RBCs)
  - EPA-approved Alternate Concentration Limits
  - Site-specific PRGs developed as described in the Risk Assessment Work Plan
  - IDNR Statewide Health Standards
- Soil
  - Soil Screening Levels (SSLs) calculated following USEPA Soil Screening Guidance
  - Ecological Soil Screening Levels (Eco-SSLs) developed in accordance with USEPA Guidance
  - Background levels determined based on site-specific and/or regional data
  - Site-specific PRGs developed as described in the Risk Assessment Work Plan
  - IDNR Statewide Health Standards
- Air
  - National Ambient Air Quality Standards

Site-specific background concentrations for groundwater will be determined based on results from upgradient monitoring well nest MW6/MW7/MW8. Site-specific background concentrations for soil will be evaluated as needed for parameters where background concentrations may exceed risk-based screening levels or contribute significantly to site concentrations above risk-based screening levels. The approach for site-specific background soil sampling is outlined in **Section B.1.8**.

A.6.7 Proposed Schedule

To maximize the efficiency of the RFI, a phased approach is proposed. For some areas of investigation, the proposed RFI work scope described in **Section B.1** includes multiple steps, with "if-then" statements outlining the conditions under which the additional work will be done. As the field activities outlined in this SAP/QAPP are performed, the data will be evaluated to determine if it is adequate to meet the RFI objectives. If additional data are needed beyond the investigation steps described in this document, a SAP/QAPP addendum will be submitted and additional data will be collected prior to completion.

The original project schedule is shown in **Figure 4**. The QAPP is for a long-term project, including sampling and monitoring, and thus will be valid for five years. It will be updated and resubmitted for approval after five years. The QAPP will be reviewed annually and updated and resubmitted for approval whenever any significant changes that could impact data quality or usability are made. When the QAPP is next submitted for re-approval (2029 or sooner), it will be reviewed against the July 2023 QAPP Standard. The future work and project schedule is determined and annually provided to the EPA during the Environmental Settlement Agreement conference between WDC Acquisition and the attending state and federal agency regulators.

The schedule includes all the specifically proposed initial investigation work as outlined in **Section B.1**. If additional work is required, such as additional soil borings, then the schedule may need to be modified. However, the proposed schedule includes time between the first and second rounds of groundwater sampling (planned to coincide with the semiannual landfill sampling) when additional investigation tasks could potentially be completed without affecting the ultimate RFI completion data. Any required schedule modifications will be discussed in the quarterly progress reports to USEPA.

The Order requires that the RFI Report be submitted to USEPA within 90 days of completion of RFI activities. The final RFI activity will be completion of the risk assessment. The risk assessment is scheduled to be completed within 90 days of the completion of data validation. Data validation will be completed within 90 days of the last field sampling event. Therefore, the due date for the RFI Report will be 270 days from the date of the last field sampling event.

A.7 Quality Objectives and Criteria for Measurement Data

A.7.1 Data Quality Objectives

Data Quality Objectives (DQOs) are comprehensive statements that specify the quality and quantity of the data required to support decisions made during investigation activities. The DQOs are based on the ultimate use of the data to be collected. Because of this, different data uses may require different quantities of data and different levels of quality. The DQO process for the RFI is described below, following the general steps outlined in the USEPA's *Guidance for the Data Quality Objectives Process, EPA/QA/G-4*.

A.7.1.1 Problem Statement

The DQO planning team members include the Penn E&R Project Manager, Project QA Officer, and the Laboratory QA Officer. The DQOs will be reviewed by the WDC Facility Project Coordinator and the USEPA Project Manager and Regional QA Manager.

The problem is to determine whether environmental contamination related to any releases from the facility poses an unacceptable risk to human health or the environment. For each area of investigation (one or more SWMUs or AOCs), the questions to be answered for each contaminant of concern include:

- What exposure pathways are potentially complete now or in the future?
- For those potentially complete exposure pathways, are contaminant concentrations at a level that poses an unacceptable risk to human health or the environment?

Potential exposure pathways were evaluated in the CCR based on existing information. The preliminary exposure evaluations are discussed with respect to the sampling design in **Section B.1**.

To minimize project costs, the RFI needs to be completed in an efficient and cost-effective manner. A phased approach focused on providing the data needed to complete the risk assessment is proposed. The original project schedule is shown in **Figure 4**. A revised schedule will be submitted to USEPA later.

A.7.1.2 Decision Identification

The decision statement for the RFI is to determine whether environmental contamination related to any releases from the facility poses an unacceptable risk to human health or the environment. If unacceptable risks are present, then corrective measures are needed.

As described above, this decision statement can be broken down to the level of an individual SWMU, contaminant, and exposure pathway.

A.7.1.3 Decision Inputs

Decision inputs for the evaluation of the environmental contamination questions identified in the problem statement will include the following types of information:

- What exposure pathways are potentially complete now or in the future?
    - Extent of contamination
    - Depth of contamination
    - Receptor locations

  - Rate and direction of contaminant movement
- For those potentially complete exposure pathways, are contaminant concentrations at a level that poses an unacceptable risk to human health or the environment?
  - Contaminant concentrations in soil, groundwater, or other affected media at the point of exposure
  - Preliminary remediation goals developed as described in the Risk Assessment Workplan

Because the site-specific preliminary remediation goals will be developed as part of the RFI, they are not available yet to be used in the DQO process. To provide a conservative basis for selecting appropriate sampling and analytical methods, existing screening action levels will be used. Because the site-specific preliminary remediation goals are expected to be similar to or higher than the screening action levels, data that meets the quality objectives for the screening action levels will be more than adequate for comparison with the preliminary remediation goals.

Screening action levels to be used in selecting sampling and analytical methods include the following:

- USEPA Regional PRGs or RBCs
- USEPA Eco-SSLs
- Typical soil background concentrations
- USEPA Maximum Contaminant Levels for Drinking Water
- IDNR Statewide Health Standards

The screening action levels for soil and groundwater are summarized in **Tables 2** and **3**. The proposed analytical methods and the anticipated method detection limits are also provided in these tables. The analytical methods were selected such that the anticipated limit of quantitation is less than the lowest of the possible screening action levels where possible. If this objective could not be achieved, the lowest detection limit that could be obtained with a reasonably available standard method was selected.

A.7.1.4 Investigation Boundary

The geographic limits of the RFI include the WDC facility and adjacent off-site properties to which contaminant releases may have spread. More specific investigation areas are described for each area of investigation in the discussion of sampling process design in **Section B.1**. If off-site investigation is needed, it will be subject to the constraint of obtaining access permission from the property owner(s).

The time period for sampling will be as outlined in the current schedule. There are no anticipated time constraints on sampling, except that it may not be feasible to collect surface soil samples when the ground is frozen in the winter. For the assessment of current or potential risk associated with the contaminants released from the facility, the time period will include future conditions and use as well as present.

A.7.1.5 Decision Rule

The overall decision rule for the RFI is:

- If contaminant releases from the facility pose unacceptable risks to public health or the environment, then corrective measures are required.

This decision comprises many individual decisions to be made through the risk assessment process, as outlined in the Risk Assessment Work Plan and in the sampling process design in **Section B.1**. To make this decision, the extent and degree of contamination must be adequately defined, and the contaminant releases adequately characterized to allow evaluation of the public health or environmental risk.

A.7.1.6 Decision Error Limits

The baseline condition (null hypothesis) is that the facility does not pose an unacceptable risk to public health or the environment. The two types of potential decision errors are:

- False rejection: Decide that the facility does pose an unacceptable risk when in fact it does not.
- False acceptance: Decide that the facility does not pose an unacceptable risk when in fact it does.

Decision errors can be minimized by appropriate sampling process design and good quality assurance for field and laboratory data.

A.7.2 Measurement Data Quality Criteria

Field and laboratory measurement data for this project will be assessed in terms of precision, accuracy, representativeness, completeness, and comparability.

Field measurements will include the following types of information:

- Sampling locations and depths
- Depth to water in monitoring wells
- Temperature, specific conductance, dissolved oxygen content, oxidation-reduction potential, turbidity, and pH of groundwater and surface water

- Photo-ionization detector screening for volatile organic compounds (VOCs) (sample headspace and breathing zone)

Laboratory analysis will be based on the sampling process design outlined in **Section B.1** and will include the contaminants of concern listed in **Tables 2** and **3**.

A.7.3 Precision

Precision is a measure of the reproducibility of measurement under a given set of conditions. It is a quantitative measure of the variability of a group of measurements compared to their average value. Depending on the end use of the data, precision is reported as Relative Percent Difference (RPD) or standard deviation. For a sample and a duplicate, relative percent difference is calculated as:

$$RPD = 100 \times Abs\left(\left(R_1 - R_2\right) \times 2\right) / \left(R_1 + R_2\right)$$

where R_1 and R_2 are the two results and "Abs" denotes the absolute value.

A.7.3.1 Field Measurement Precision Objectives

The objectives for field measurement precision are summarized in **Table 4**. Field measurement precision is a function of the equipment used, so the proposed equipment is also listed in **Table 4**.

Field sampling precision will also be assessed through the collection and analysis of field duplicate samples. The frequency of duplicate samples is shown in **Table 5**, along with other quality control (QC) sample collection and analysis frequencies. For monitoring well groundwater samples, a minimum of one field duplicate will be collected for each 20 samples collected. Duplicate samples will also be collected for geoprobe boring water samples at a rate of one duplicate per 20 samples, if sufficient sample volume for a duplicate sample is reasonably available. However, if low permeability soils make it difficult to collect groundwater samples in a reasonable period of time, then field duplicates will not be collected for the geoprobe groundwater samples. For groundwater samples, the RPD objective is less than 20%.

Duplicate samples will also be collected for soil samples at a rate of one duplicate per 20 samples. Due to soil heterogeneity, the agreement between soil duplicate sample results is generally lower than for water samples. For geoprobe boring samples, duplicate samples will be collected by splitting the core lengthwise and collecting the sample and duplicate from the two halves at the same depth. For surface soil samples (non-VOCs), the duplicate will be collected by placing soil for both samples in a mixing

bowl, mixing, and collecting the two samples from the bowl. For soil samples, the RPD objective is less than 35%.

A.7.3.2 Laboratory Precision Objectives

The precision of laboratory analyses will be measured based upon laboratory matrix spike/matrix spike duplicate (MS/MSD) analyses. Precision is reported as RPD. MS/MSD analyses will be either at a rate of 1 per 20 samples received by the laboratory or in accordance with laboratory Standard Operating Procedures (SOPs). Eurofins's laboratory precision objectives for specific analyses are provided in **Appendix B**.

A.7.4 Accuracy

A.7.4.1 Definition

The definition of accuracy is the degree of agreement between a measurement or observed value and an accepted reference or true value. The field and laboratory accuracy objectives are identified below.

A.7.4.2 Field Accuracy Objectives

Sampling accuracy will be assessed by evaluating the results of field and trip blank samples for contamination. A trip blank will consist of a laboratory-prepared sample of reagent grade water. Trip blanks will accompany sample containers and be subjected to the same procedures as the investigative samples. Trip blanks are only required when VOCs are analyzed. Trip blanks will be submitted for analysis at the rate of one trip blank per shipping container containing investigative samples for VOC analyses.

Field equipment blanks will be collected by pouring laboratory-grade water over or through the sampling equipment and collecting the rinsate in the proper analytical containers. Field equipment blanks for soil VOC sampling will be collected with methanol rather than water. Field equipment blanks are required at the rate of one per 20 investigative samples with a minimum of one per soil or groundwater sampling event.

Field bottle blanks will be collected by pouring laboratory-grade water into the proper VOC sample containers at the field sampling location. Field bottle blanks are required for VOC analysis in water samples. Field bottle blanks are required at the rate of one per 20 investigative samples, with a minimum of one per groundwater sampling event.

Methanol blanks will be collected by pouring methanol into the proper VOC soil sample containers at the field sampling location. Methanol blanks are required only when soil samples collected for VOC analysis are preserved with methanol. Methanol blanks are required at the rate of one per 20 investigative samples, with a minimum of one per soil VOC sampling event.

Accuracy in the field will be evaluated with trip blanks and/or field blanks. These blanks should contain no target analytes above the reporting limit. If target analytes are detected above reporting limits, an assessment of the field sampling program will be completed to determine if corrective action is needed. Corrective action may include additional training of field personnel, replacement of sampling container supplier, revisions to sampling techniques, or other actions considered appropriate. In addition, associated analytical results will be assessed for impact. If sample integrity has been compromised, additional sampling and analyses may be required.

A.7.4.3 Laboratory Accuracy Objectives

The analysis of MS/MSD samples can be utilized to determine laboratory accuracy. In addition, the analysis of reference standard samples, laboratory control samples, surrogate compounds, and percent recoveries are also utilized for laboratory accuracy determinations. Eurofins's laboratory accuracy objectives for specific analyses are provided in **Appendix B**.

A.7.5 Representativeness

A.7.5.1 Definition

The degree to which data accurately and precisely represents a characteristic of a population, parameter variations at a sampling point, or an environmental condition, defines representativeness. Field and laboratory representativeness are described below.

A.7.5.2 Measures to Ensure Representativeness

Representativeness is dependent upon the proper design and implementation of the sampling program. The QA goal will be to have all samples and measurements representative of the media sampled. The sampling design is discussed in **Section B.1** and sampling procedures are outlined in **Section B.2** and **Appendix D**. Factors that may affect representativeness and proposed strategies to enhance representativeness include the following:

1. Environmental conditions at the time of sampling

a. Collect at least two rounds of groundwater samples from monitoring wells to allow for temporal variations (minimum of 3 months apart).
b. Do not collect surface soil samples when the ground is frozen.
c. For any subsurface soil samples or water samples, minimize the time that samples are exposed to the atmosphere.
d. Record environmental conditions so that possible effects can be considered during data validation.

2. Number of sampling points
    a. Use a phased approach to avoid under-sampling or over-sampling, because the required number of sample points cannot always be known in advance.
    b. Use existing data to guide the design of the additional sampling program.
3. Representativeness of selected media
    a. Choose sampling media based on potential exposure pathway analysis and conceptual site model.
    b. Consider geologic characteristics observed in soil borings when selecting final depths (e.g., look for preferential pathways such as sand seams when trying to define maximum extent of VOC contamination).
    c. Purge monitoring wells prior to sampling to obtain representative groundwater.
4. Representativeness of selected analytical parameters
    a. Choose analytical parameters based on previous sampling that indicates a potential concern.
    b. Add parameters as needed based on known release parameters (e.g., expand groundwater monitoring parameter list for former chromium aboveground storage tank (AST) area to include other metals that may have been mobilized by lowered pH due to acid releases).
    c. Choose parameters needed for risk assessment (e.g., analyze chromium VI in addition to total chromium to account for widely differing toxicity of chromium III versus chromium VI).

A.7.6 Completeness

A.7.6.1 Definition

Completeness provides a measure of the quantity of valid data obtained from a measurement system compared to the quantity that was expected under normal conditions. Although a completeness goal of

100 percent is desirable, a realistic criterion of less than 100% allows for acceptance of the sampling program results even if some data are unavailable or not valid due to sampling or analytical problems.

A.7.6.2 Completeness Objectives

Completeness will be a measure of the quantity of valid data measurements and analyses obtained from all the measurements and analyses completed for the project. The laboratory completeness objective is for 90 percent of the samples analyzed to be valid data. The significance of incomplete data will depend on the specific locations and parameters missing and will be evaluated further as part of the data validation process.

A.7.7 Comparability

A.7.7.1 Definition

The confidence with which one data set can be compared to another is a measure of comparability. The ability to compare data sets is critical for the RFI because RFI data will be gathered using a phased approach and existing data will be used to the maximum extent feasible.

A.7.7.2 Measures to Ensure Comparability

The comparability of field data will be ensured by adhering to the SAP/QAPP and following field and laboratory SOPs. Verification and validation of new and existing data in accordance with the procedures outlined in **Section D.2** will also help ensure comparability. In addition to following standard procedures, specific strategies for ensuring comparability of existing data and data gathered for the RFI include:

- Using a consistent field sampling team to the extent reasonably possible
- Using field sampling procedures consistent with past sampling for monitoring wells where feasible
- Using the same laboratory to the extent feasible
- Using the same laboratory for the RFI that has performed previous analysis of groundwater samples from the landfill monitoring wells and former chromic acid AST area wells (Eurofins, Cedar Rapids office)
- Using consistent laboratory methods

A.8 Special Training Requirements and Certifications

The OSHA 40-hour HAZWOPER certification and subsequent annual 8-hour refresher courses will be required of all personnel conducting or supervising sampling activities. No other special training requirements have been identified for this project.

A.9 Documentation and Records

Records that will be generated as part of the subsurface investigation are a critical aspect of a successful project. Field personnel will use select documents for recording information during project activities. Records to be a part of the project documentation for the investigation include field forms, field logbooks, laboratory data sheets, COC forms, calculations, correspondence and reports. (Refer to Appendix B for Test America's Quality Control Manual for information on laboratory deliverables.) In accordance with the Order, the records will be maintained by WDC for a minimum of six years following the termination of the Order.

In accordance with the Order, quarterly progress reports will be submitted to the USEPA Project Manager. The quarterly progress reports summarize work completed, contacts made, problems encountered, actions taken, changes in project personnel, projected work, and data generated during the reporting period.

The draft and final RCRA Facility Investigation Report submittal packages will include the information outlined under Task 3 in Attachment 2 to the Order, including the following major elements:

- Environmental Setting
- Source Characterization
- Contamination Characterization
- Potential Receptors/Risk Assessment

The contaminant characterization will address the direction and velocity of both horizontal and vertical contaminant movement, as well as extrapolation of likely future contaminant movement for groundwater, soil, surface water, and sediment.

Data will be provided in tables and figures as described in the Data Management Plan. Appendices will include laboratory reports, soil boring logs, monitoring well construction forms, borehole abandonment reports, monitoring well development forms, and other relevant data.

Penn E&R's Project Manager is responsible for ensuring the most current approved version of the SAP/QAPP, with addenda, are readily available to interested parties. This will be accomplished by copying the interested parties via electronic mail to provide real-time updates to the appropriate project documentation.

GROUP B: MEASUREMENT DATA ACQUISITION

This section of the SAP/QAPP outlines the specific sampling approach, field procedures, and laboratory procedures to be used in the RFI.

B.1 Sampling Process Design

To streamline the investigation process and meet the objectives of the RFI, investigation areas will be defined at the WDC facility. These investigation areas include the nine SWMUs and two AOCs identified in the CCR as requiring additional investigation, grouped into investigation areas based on location and waste type. The following sections provide sampling plans for each investigation area.

B.1.1 Former Chromic Acid AST/Dump Pit Area (SWMU 4 and SWMU 11)

(As of July 2017, the work described in the section has been completed except for continued ground water monitoring.)

The objectives of sampling in the former chromic acid AST/dump pit area are to determine the degree and extent of chromium contamination in soil and groundwater, to characterize the contamination with respect to the type of chromium contamination (chromium III or chromium VI) and other contaminants that may be present, and to evaluate the risk associated with contaminated soil and groundwater.

The exposure pathway evaluation for the former chromic acid AST/dump pit area is shown in **Figure 5**. For soil, the only potential exposure pathways appear to be ingestion or dermal contact by a construction worker during excavation in the area, or by a future industrial/commercial worker, if contaminated soils are not covered by an asphalt or clean soil cap in the future. Current site workers are protected by the asphalt paving over the areas where soil contamination remains. Additional soil sampling will include sampling in the depth interval from the surface to approximately 6 feet below ground surface (bgs), which is the approximate depth of the water table in this area of the site.

For groundwater, surface water, or sediment, a complete exposure pathway will be present only if groundwater contamination associated with this source extends off-site to residential water users or discharges to surface water at the Middle Platte River, or if construction workers are exposed to groundwater during on-site excavation (e.g., for utility installation). The groundwater sampling objective will be to determine the type and extent of groundwater contamination associated with this source.
To satisfy the objectives for soil in this investigation area, four Geoprobe ™ (geoprobe) soil borings will be advanced in the area to a depth of 6 feet bgs. The proposed boring locations are shown in **Figure 6**. The boring locations are selected to provide sufficient information, in addition to existing data for the area, to determine the extent of chromium soil contamination above the water table. It is anticipated that the water table will be encountered at a depth of approximately 6 feet bgs in this area.

Soil will be sampled continuously using geoprobe sampling tools. Soil samples will be described by a field geologist on a soil boring log in terms of color, soil type (Unified Soil Classification System), odor, and any soil structures that may exist.

Three soil samples will be collected for laboratory analysis from each soil boring. One soil sample will be collected from a depth of 0 – 6 inches bgs (surface), one soil sample will be collected from a depth of 2 to 4 feet bgs, and one will be collected from a depth of 4 – 6 feet bgs in each of the four soil borings. These depths were selected to characterize the potential risk to a construction worker. The samples will be submitted for laboratory analysis for chromium VI and total chromium.

To satisfy the objectives for groundwater in this investigation area, existing monitoring wells will be sampled. Four monitoring wells (MW1 through MW3 and MWA) currently exist in this investigation area (**Figure 6**). These four wells will be sampled in three events. In the first two events, groundwater samples will be collected from the wells and submitted for laboratory analysis for chromium VI, all inorganic compounds found in Appendix IX of 40 CFR Part 264 (see **Appendix E** for list), nitrate + nitrite as nitrogen, sulfate, fluoride, chloride, and VOCs. These parameters were selected to include components of the acids that were potentially released in the area plus additional metals that could potentially have been mobilized due to acidic conditions (low pH). In the third sampling event, the samples will be analyzed only for inorganics detected above the risk-based screening levels in **Table 3** in at least one of the first two sampling events, and samples will be collected for VOC analysis only at wells where VOCs were detected above a risk-based screening level in at least one of the first two sampling events. The complete monitoring well sampling program is summarized in **Table 8**.

In addition to sampling these four wells, the existing monitoring well network around the site landfill will be used to determine the extent of groundwater contamination related to the former chromic acid AST and dump pit area. The landfill wells are downgradient of this investigation area. There are currently 21 monitoring wells (MW6 through MW20 and MW44 through MW49, see **Figure 2**) for the landfill, 13 of which are sampled on a semiannual schedule as part of the routine landfill groundwater monitoring required by the Iowa Department of Natural Resources (IDNR). After the results of the first round of source area well sampling have been reviewed, the next two semiannual groundwater sampling events at the existing landfill wells will be modified to include analysis for parameters associated with potential contamination from the chromic acid AST and dump pit area. The groundwater monitoring program for the landfill monitoring wells is discussed in **Section B.1.4** and the complete groundwater monitoring well sampling program is summarized in **Table 8**.

If needed to achieve the sampling objectives for the former chromic acid AST and dump pit area, additional sampling could include:

- Additional geoprobe soil borings to define the extent of soil contamination
- Additional monitoring well installation or sampling of monitoring wells installed in other investigation areas for the chromic acid AST area analytical parameters

B.1.2 Magnesium Dross Storage and Treatment Areas (SWMU 8 and SWMU 9)

(As of July 2017, the work described in the section has been completed except for continued ground water monitoring.)

The objectives of sampling in the magnesium dross storage and treatment areas are:

- To characterize the untreated dross and evaluate the potential for dross to cause contamination
- To evaluate whether soil has been contaminated above applicable standards
- To evaluate whether surface water has been contaminated above applicable standards
- To evaluate whether sediments have been contaminated above applicable standards
- To evaluate whether groundwater is contaminated above applicable standards due to dross
- To evaluate whether petroleum contamination is present in the used oil tank area

The exposure pathway evaluation for the magnesium dross storage and treatment area is shown on **Figure 7**. Potentially complete pathways include industrial worker or construction worker exposure to surface soil or wind-blown dust. To evaluate the risk associated with this potential pathway, surface soil

contaminant concentrations need to be evaluated. Possible ecological risk to terrestrial biota will depend on the surface soil concentrations and the biota present in the area.

For groundwater, surface water, or sediment, a complete exposure pathway will be present only if groundwater has been contaminated by this source and contamination extends off site to residential water users or discharges to surface water at the Middle Platte River, or if contamination is present in stormwater drainage (surface water or sediment) from the dross storage and treatment areas. The groundwater, surface water, and sediment sampling objectives will be to determine the type and extent of contamination of these media associated with this source, if any.

To characterize the untreated dross, a composite sample will be collected from stockpiles and storage containers in the dross storage area. The composite dross sample will be submitted for laboratory analysis for the complete list of metals found in **Table 5-13** in **Appendix B**.

The first step in evaluating the soil for potential dross contamination will be the collection of surface soil samples in the area. Sample locations will be located on a 50-foot by 50-foot grid, as shown on **Figure 8**. The sampling grid will exclude paved areas and the radiological investigation area. Soil samples will be collected from each of the 18 grid nodes. If a sample location cannot be accessed, the sample location will be moved to the nearest accessible area. Soil samples will be collected at each sample location from depth of 0 to 2 inches bgs and from a depth of 6 to 12 inches bgs. The samples will be submitted for laboratory analysis for barium, chromium VI, and total chromium, as well as any other metals detected in the dross sample at concentrations greater than the lowest risk-based screening level for that metal as indicated in **Table 2**.

If the results of the surface soil sampling indicate that soil contamination from dross is present at the site at concentrations exceeding the applicable soil screening levels, then geoprobe soil borings will be installed to investigate the extent of the soil contamination. The purpose of the borings in the dross area is to evaluate the vertical extent of soil contamination above the water table at locations where the surface soil sampling indicates contamination is present above risk-based screening levels. We estimate that five soil borings will be adequate to determine the vertical distribution of contamination in the primary contamination areas, if encountered, and to provide general information on the tendency for surface contamination is the dross area to migrate vertically through the soil.

The five soil borings will be advanced to a depth of 8 feet bgs. The borings will be in areas where contamination was detected in the surface soil sampling results. Three soil samples will be collected from each boring for laboratory analysis for barium, chromium VI, and/or total chromium, as well as any other metals detected in the surface soil samples at concentrations greater than the lowest risk-based screening level for that metal as indicated in **Table 2**. The three soil samples from each boring will be collected from depths of 0 to 6 inches bgs (to evaluate industrial worker exposure), 2 to 4 feet bgs, and 4 to 6 feet bgs (to evaluate construction worker exposure).

If the results of the surface sampling and initial geoprobe borings are not adequate to define the horizontal and vertical extent of soil contamination above risk-based screening levels, then additional boring locations and sampling depths will be selected based on the initial sampling results. If the results of the soil sampling indicate that contaminants are not present in the soil at concentrations exceeding the applicable soil screening levels, no further soil investigation will take place.

To investigate the potential for groundwater contamination, one water table monitoring well will be installed in the dross treatment area to assess the groundwater quality. The monitoring well will be installed upgradient from the landfill. The proposed well location is shown in **Figure 8**. The well will be sampled twice in conjunction with other groundwater samplings at the facility. The groundwater samples will be submitted for laboratory analysis for Appendix IX inorganics, chromium VI, chloride, sulfate, fluoride, nitrate + nitrite, and VOCs, except that the second-round sample will be analyzed for VOCs only if VOCs are detected in the well at concentrations exceeding the risk-based screening levels in **Table 3** during the first round.

To investigate the potential for surface water contamination, one surface water sample will be collected from stormwater in the vicinity of the dross treatment area during a stormwater runoff event. The proposed sampling location is in a drainage ditch receiving stormwater runoff from the dross treatment area, as shown on **Figure 8**. The analytical parameters will include those parameters detected above a risk-based screening level in the dross sample and/or soil sample analysis. The analytical results for the surface water sample will be used to determine if further surface water sampling in the area is warranted.

To investigate the potential for sediment contamination, one sediment sample will be collected from the same location as the surface water sample. The analytical parameters will include those parameters detected above a risk-based screening level in the dross sample and/or soil sample analysis. The

analytical results of the sediment sample will be used to determine if further sediment sampling in the area is warranted.

Although the used oil AST is located within the magnesium dross storage and treatment area, it is a separate potential contamination source. Initial investigation of this source will include three geoprobe borings located approximately as shown on **Figure 8**. The boring locations may be adjusted in the field based on access limitations or field observations indicating possible contamination (e.g., stained soil or stressed vegetation). The geoprobe borings will be advanced to a total depth of approximately 12 feet bgs. Soil samples will be collected continuously, and field screened using a photo-ionization detector (PID). Two soil samples will be collected from each boring for laboratory analysis for VOCs, polynuclear aromatic hydrocarbons (PAHs), lead, cadmium, total chromium, and chromium VI. The two soil samples from each boring will be collected from depths of 0 to 6 inches and 4 to 6 feet, unless alternative depths are chosen based on field screening results or visual observations. The water table is anticipated to be at a depth of approximately 6-8 feet in this area. A groundwater sample will be collected from each boring location unless this is impracticable due to low permeability soils. The groundwater sample will be analyzed for VOCs, PAHs, lead, cadmium, total chromium, and chromium VI.

If needed to achieve the sampling objectives for the magnesium dross storage and treatment area, including the used oil AST area, additional sampling could include:

- Additional surface soil sampling or geoprobe soil borings to define the extent of soil contamination
- Sampling of additional monitoring wells installed in other investigation areas, such as the landfill, for the magnesium dross area analytical parameters
- Installation and sampling of one or more monitoring wells in the used oil AST area

If a monitoring well is installed in the used oil AST area, it will be screened at the water table because this is the depth where oil contamination is most likely to be encountered. If petroleum contamination is present in groundwater in this area, additional geoprobe sampling and/or monitoring well installation will be completed as needed to define the extent of contamination.

B.1.3 Current Wastewater Treatment Sludge Storage Area (SWMU 2)

(As of July 2017, the work described in the section has been completed.)

The objectives of sampling in the Current Wastewater Treatment Sludge Storage Area are to determine if there has been a release to the environment, and if so, whether the release poses a risk to human health or

the environment. An exposure pathway analysis diagram was not prepared for this area, because there is no evidence of a release, and the likelihood of contamination appears low. If surface spills have occurred, the potential pathways are similar to those for the dross storage area (**Figure 7**).

To determine if there has been a release to the environment in this area, soil samples will be collected from four locations as shown on **Figure 9**. The number and location of samples for SWMU 2 was chosen as a reasonable initial sampling effort to determine if there has been a release from this SWMU. The wastewater treatment sludge is stored in a lined roll-off box and there have been no known releases. To investigate whether a release has occurred, one sample will be collected from each side of the roll-off box. Samples will be collected from unpaved areas and actual sample locations will be selected based on the likelihood of a spill or leak as determined by field observations. Two soil samples will be collected from each sample location at depths of 0 to 2 inches bgs and 6 to 12 inches bgs. The soil samples will be submitted for laboratory analysis for total chromium and chromium VI. Because the purpose of this sampling is to determine whether a release has occurred, and because chromium is the primary constituent of the waste in this area, total chromium and chromium VI will serve as indicators of a release. For these reasons, we do not propose analyzing these samples for additional metals.

If the shallow soil sampling indicates that a release has occurred and maximum chromium concentrations exceed the risk-based screening levels in **Table 2**, then geoprobe soil borings will be used to investigate the extent of contamination from SWMU 2. If geoprobe borings are necessary in this area, we propose to install two to four borings to 6 feet bgs (approximately the water table). The actual number and locations of borings will be dependent on the results of the shallow soil sampling and observed field conditions. Soil samples will be collected at 2-foot intervals from each boring. The shallow sample (0 to 2 feet bgs) from each boring will be submitted for laboratory analysis for the list of metals found in **Tables 5-13** of **Appendix B**. The intermediate (2 to 4 feet bgs) and deep (4 to 6 feet bgs) samples will be held frozen pending the results of the shallow samples. If metals are detected in the shallow samples at concentrations greater than the risk-based screening levels found in **Table 2**, then the intermediate and deep samples will be submitted for laboratory analysis for those metals.

If the surface soil sampling results indicate that a release from SWMU 2 has occurred, a groundwater sample will be collected from one of the geoprobe borings and submitted for laboratory analysis for the Appendix IX inorganic parameters (see list in **Appendix E**).

B.1.4 Landfill Groundwater Impacts (SWMU 12)

(As of July 2017, the work described in the section has yet to be completed.)

The objectives of sampling around landfill groundwater impacts are:

- To evaluate the risk associated with fluoride and sulfate impacts to groundwater as a result of landfill operations
- To determine the extent of landfill groundwater impacts
- To evaluate the potential for discharge of contaminants to surface water and sediment
- To evaluate background groundwater conditions to determine the degree of groundwater impacts, with specific attention paid to background sulfate concentrations

The exposure pathway evaluation for the landfill groundwater impacts is shown on **Figure 10**. The only potential on-site exposure pathway for landfill groundwater contamination is construction worker dermal contact in the event of excavation below the water table. Off-site exposure pathways will be complete only if groundwater contamination extends to residential water supply wells or if contaminated groundwater discharges to the Middle Platte River.

To evaluate potential analytical parameters for the landfill, we compiled available information regarding the foundry sand components and available analytical data for the sand and the landfill leachate. Both dry sand and green sand have been disposed of in the landfill. Dry sand is used exclusively today, but green sand was used predominantly at some time in the past. The dry sand contains 97% silica sand and 3% binders and inhibitors. A flow chart showing the mix ratios is provided in **Appendix G**, along with Safety Data Sheets (SDSs) for the binders and inhibitors used. The primary binder components include or have included phenols, naphthalene, 1,2,4- trimethlbenzene, cumene, aromatic hydrocarbons, ester solvents, and diisocyanates. The inhibitor components include potassium fluoroborate, graphite, and sulfur.

The green sand was mixed from approximately 99% sand and 1% binders. The binder components include Bondtone® (organophilic clay), potassium fluoroborate, heavy paraffinic petroleum oil, and sulfur. An MSDS for the oil used is provided in **Appendix G**. (WDC ended the use of green sand in its operations in 2011.)

Analytical results for testing of the dry sand for metals are summarized in **Table 9**. No metals were detected in the sand at levels exceeding risk-based screening levels, and no RCRA metals were detected in the leachate from a Toxicity Characteristic Leaching Procedure (TCLP) test.

Analytical results for the landfill leachate are summarized in **Table 10**. This table includes the leachate piezometer monitoring results that were in Table 8 in the CCR, plus some additional results for leachate samples analyzed for metals, VOCs, and semi volatile organic compounds (SVOCs). Table 9 of the CCR included additional monitoring results for the leachate discharge to the sanitary sewer, but this monitoring is for a limited parameter list. Based on the results in **Table 10**, only a few metals, VOCs, and SVOCs were detected above risk-based screening levels in the leachate, and many of those were detected in only one of several samples collected. In the SVOC analysis, the parameters detected in more than one leachate sampling event included only naphthalene and two phenols, and only naphthalene was above the risk-based screening level (EPA Region 9 PRGs for tap water). Based on these results, the potential for groundwater contamination with metals, VOCs, or SVOCs due to the leachate appears to be limited to a few parameters; however, we are proposing a limited source area sampling program to screen groundwater in the wells most likely the be affected by the landfill for a large list of analytical parameters.

The existing data from the routine semiannual landfill monitoring program will be supplemented by installing six new monitoring wells downgradient of the landfill along the east and south property lines to evaluate the potential for off-site groundwater contamination. The three proposed well locations are shown in **Figure 11**. At each location, one water table monitoring well will be installed along with a deeper well. WDC proposes to install the deeper wells to a depth of approximately 20 feet below the bottom of the water table wells. WDC proposes a depth difference of 20 feet because that separation will place the deeper wells in a separate geological unit (unweathered till) than the water table wells (alluvium or weathered till) at the site and because the separation is similar to the separation distances between existing shallow and intermediate wells.

The routine semiannual landfill groundwater monitoring program approved by the IDNR, which includes seven of the existing landfill monitoring wells, will continue to be implemented. For a minimum of two sampling events, boron will be added to the IDNR analytical parameter list. Sampling for boron is proposed because it has been detected at elevated concentrations in the landfill leachate in the past (see Table 8 in CCR). The routine landfill analytical parameter list includes magnesium, sodium, fluoride, sulfate, chemical oxygen demand, chloride, iron, ammonia, phenols, total organic halogens, pH, specific conductance, and temperature.

For the RFI, additional monitoring of the landfill wells will be performed to evaluate whether other contaminants may be present and investigate the extent of contamination associated with the landfill and other contamination sources potentially upgradient from the landfill, such as the former chromic acid AST area or the VOC release area. The first round of sampling, conducted at the same time as the initial source area well sampling for the chromic acid AST area, will include the four shallow downgradient landfill monitoring wells, where previous sampling indicates potential landfill impacts (MW11, MW12, MW16, and MW17). These wells will be sampled for the full list of Appendix IX inorganics, hexavalent chromium, chloride, fluoride, sulfate, nitrate+nitrite, and semivolatile organic compounds (SVOCs). These results will be used to narrow the list of analytical parameters for the additional landfill monitoring wells, where landfill impacts appear to be limited or not present.

The second and third rounds of sampling will be coordinated with the routine landfill monitoring program and will include all the landfill monitoring wells. The sampling program will be similar to that for the initial sampling of the shallow downgradient wells, except that sampling of the additional wells for Appendix IX inorganics, SVOCs, and VOCs will depend on the results in previous sampling rounds. In general, sampling parameters at the deeper or more distant monitoring wells will be limited to those detected above risk-based screening levels in the source area wells. The complete monitoring program, including the decision approach for sampling parameters, is outlined more specifically in **Table 8**.

If the results from the monitoring wells at the property line indicate that contamination likely extends off site at levels exceeding the preliminary remediation goals, then additional groundwater investigation will be performed. Additional investigation may include geoprobe groundwater sampling and/or additional monitoring well installation and sampling, depending on the specific results obtained and access to off-site properties.

If the groundwater monitoring results indicate a potential for contaminated groundwater to reach the Middle Platte River, five surface water samples and five sediment samples will be collected. The surface water and sediment sample locations will include:

- Existing surface water monitoring location SW01 (**Figure 2**)
- Middle Platte River upstream of the facility
- Middle Platte River at Highway 34
- Middle Platte River at Osage Street
- Middle Platte River downstream of the facility

Sampling of the upstream and downstream locations on the Middle Platte River is dependent upon obtaining access. Surface water and sediment samples will be submitted for laboratory analysis for fluoride, sulfate, barium, boron, and VOCs, as well as any metals detected in landfill monitoring well groundwater samples at concentrations exceeding risk-based screening levels (**Table 3**).

B.1.5 Chlorinated Solvents in Soil and Groundwater (AOC A), Petroleum ASTs (AOC B), and Waste Methanol Storage Area (SWMU 7)

(As of July 2017, the work described in the section has been completed except for continued ground water monitoring.)

The objectives of sampling in the areas of potential VOC contamination in soil or groundwater are:

- To evaluate the risk associated with VOC contamination in soil and groundwater
- To determine the extent of VOC contamination in soil and groundwater

The exposure pathway evaluation for the VOC contamination areas is shown on **Figure 12**. Potentially complete pathways include construction worker exposure to soil or groundwater contamination. For residential exposure to groundwater or ecological impacts via surface water or sediment, a complete exposure pathway will be present only if groundwater contamination associated with this source extends off site to residential water users or discharges to surface water at the Middle Platte River either under current conditions or likely future conditions. If groundwater contamination extends off site to residential areas, then vapor intrusion could also be a possible exposure pathway. The potential for significant vapor intrusion into the production building is low because there is no basement, and good ventilation is provided to ensure acceptable indoor air quality for the foundry operations.

The vapor intrusion exposure pathway will be evaluated in accordance with the *Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance)*, dated November 2002, with consideration for the property use. USEPA is working on a risk assessment for the facility and the vapor intrusion exposure pathway evaluation will be included in the assessment.

In occupational settings where chemicals forming hazardous vapors are generally not a known or well-recognized part of employment (e.g., non-industrial settings such as commercial office buildings); or other non-residential settings where the general public may be present or regularly visit (e.g., schools,

libraries, hospitals, hotels, and stores), the screening approaches in the draft vapor intrusion guidance will be used (typically with adjustments for appropriate non-residential parameters).

In occupational settings where chemicals forming hazardous vapors are routinely used as part of the regular operations (e.g., in industrial-type settings, such as operating chemical plants, refineries, and workplaces where solvents are widely used), it is generally expected, based on observations to-date, that vapor intrusion is likely to represent a minor contribution to the risk from vapor exposures that may already exist in the work place. These exposures are typically managed as routine occupational exposures under other authorities (particularly OSHA's). Where the lead regulatory agency for cleanup concludes that the facts of the situation indicate that vapor intrusion is not likely to contribute significantly to risk, EPA generally believes it unnecessary for the regulatory agency to address vapor intrusion as a pathway of concern.

To achieve the objectives for soil contamination, approximately 20 geoprobe borings will be advanced and sampled in the areas of potential VOC contamination. Preliminary boring locations are shown on **Figure 13**; however, final locations will be chosen based on the results of field screening, field laboratory analysis, and field observations. Only 17 proposed boring locations are shown on **Figure 13**. The remaining three locations will be determined based on field results of the initial borings. Soil samples for VOC analysis will generally be collected at depths of 1 to 2 feet and 4 to 6 feet to evaluate the potential construction worker exposure pathway and define the extent of soil contamination above the water table. Alternate depths may be selected if field screening indicates higher levels of contamination deeper or shallower.

The soil samples will be analyzed in the field using a mobile laboratory operated by Matrix Environmental, LLC, of Osseo, Minnesota. Duplicates of approximately 25% of the geoprobe samples analyzed by the mobile laboratory will be sent to Eurofins for confirmation analysis.

In addition, soil samples will be visually examined for the presence of non-aqueous phase liquids (NAPL).

Groundwater samples will be collected with the geoprobe sampler at all boring locations except those that are in the immediate vicinity of existing monitoring wells. The groundwater samples will be analyzed for VOCs using the Matrix Environmental mobile laboratory, and duplicates of 25% of the samples will be sent to Eurofins for confirmation.

Up to five water table monitoring wells and two piezometers will be installed and sampled in the VOC investigation area. Preliminary well locations are shown on **Figure 13**; however, final locations will be determined based on the results of the geoprobe soil and groundwater sampling and field observations. If sampling results or field observations suggest the potential presence of NAPL in an area, a monitoring well will be installed in that area to further investigate the potential NAPL.

An additional monitoring well will be installed in the vicinity of SWMU 7 if the groundwater results from the four geoprobe borings proposed in that area indicate that VOC concentrations are greater than the risk-based screening levels in **Table 3**.

Two of the new wells to be installed as part of the investigation of SWMU 12 will be located downgradient from the existing MW11 (**Figure 13**). Based on existing groundwater flow direction data for the facility, MW11 and the two new landfill wells will be located downgradient of the VOC investigation area. Soil and groundwater data collected during geoprobe soil boring activities in the VOC area will also be evaluated prior to well installation activities to ensure that the two new wells are located downgradient from VOC contamination. The two new wells will serve as sentinel wells to monitor groundwater quality near the downgradient property boundary.

The new wells will be sampled twice in conjunction with other facility groundwater sampling. During the first VOC groundwater sampling round, groundwater samples will be collected from all the 33 site monitoring wells and submitted for laboratory analysis for VOCs and 1,4-dioxane. The second round will include only those wells where VOCs were detected in the first round or in the March 2005 VOC sampling of selected landfill monitoring wells (see **Figure 13**), and wells where 1,4-dioxane was detected in the first sampling round. Groundwater samples from the second VOC sampling round will be submitted for laboratory analysis for 1,4-dioxane only for wells where 1,4-dioxane was detected in the first round.

Sampling of the existing well network as well as installing and sampling new wells is intended to provide horizontal and vertical delineation of the extent of VOC contamination. If sampling results indicate that horizontal or vertical extent have not been adequately defined, additional wells and sampling will be designed to achieve the objectives of the RFI.

If needed to achieve the sampling objectives for the VOC areas, additional sampling could include:

- Additional geoprobe soil borings to define the extent of soil contamination

- Additional monitoring well installation or sampling of monitoring wells installed in other investigation areas for VOCs

B.1.6 Wastewater Treatment System (SWMU 6) and Waste Acid Collection Pit Area (SWMU 10)

(As of July 2017, the work described in this section has been completed except for continued ground water monitoring.)

The initial objective of sampling in the wastewater treatment system and waste acid collection pit area is to evaluate whether a release has occurred from either of these operation areas. If a release has occurred, then additional objectives will include determination of the extent of contamination and evaluation of the associated risk.

The exposure pathway evaluation for the waste acid collection pit area is shown on **Figure 14**. If a release has occurred, the potential for human or ecological exposure is very limited because the contamination would be below the building.

To evaluate whether a release has occurred, approximately four geoprobe borings will be advanced through the floor of the production building around the waste acid collection pit. Three geoprobe borings will be advanced around the wastewater treatment system. Potential boring locations are shown on **Figure 15**, but final locations will be determined based on access and underground utility locations. The numbers and locations of borings for the wastewater treatment system (SWMU 6) and the waste acid collection pit (SWMU 10) were chosen as a reasonable initial sampling effort to determine if there has been a release from these SWMUs. There are no known releases from these SWMUs. To evaluate whether a release has occurred from the waste acid collection pit (SWMU 10), four borings are proposed to cover the four sides of the pit and collect samples upgradient and downgradient from the pit. To evaluate whether a release has occurred from the wastewater treatment system (SWMU 6), the three proposed borings include one in the likely upgradient direction (northwest), one in the likely downgradient direction (southeast), and one in the vicinity of the buried sanitary sewer line carrying the treated wastewater.

Two soil samples will be collected from each boring. One sample will be collected from 0 to 6 inches below the bottom of the floor and a second sample will be collected above the water table at each boring location, typically 2 to 4 feet bgs. Soil samples will be submitted for laboratory analysis for the list of metals found in **Tables 5-13** in **Appendix B**. One groundwater sample will be collected from each

geoprobe boring and analyzed for the same metals plus chloride, fluoride, sulfate, and nitrite + nitrate. The groundwater samples will also be field analyzed for pH and conductivity. Additional borings may be completed if the field pH results suggest that a release has occurred.

If laboratory results from the initial geoprobe sampling locations around these two SWMUs indicate that a release has occurred and the extent of contamination above risk-based screening levels has not been defined, then additional geoprobe borings and/or monitoring wells will be used to complete the investigation.

B.1.7 Geologic and Hydrogeologic Characterization

(As of July 2017, the work described in the section has been completed except for continued groundwater monitoring.)

In addition to the contamination characterization activities described above, additional field tasks will be performed to characterize the geologic and hydrogeologic setting. Specific field tasks to be performed include the following:

- Document the soils encountered in all geoprobe and monitoring well soil borings on soil boring logs in accordance with the procedures outlined in **Appendix D**
- Collect a total of three to five soil samples from the major soil types encountered at the facility and analyze for grain size distribution (sieve and hydrometer), Atterberg limits (fine-grained soil only), natural moisture content, total organic carbon, and cation exchange capacity
- Perform single-well hydraulic conductivity tests (slug tests) on all new monitoring wells installed for the RFI
- Collect at least two full rounds of water level measurements from all monitoring wells at the site including new wells to be installed for the RFI and existing monitoring wells

Water table maps, potentiometric surface maps, and geologic cross sections with water level information will be included in the RFI report. A table of vertical hydraulic gradient calculations will also be included. The total organic carbon and cation exchange capacity results will be used to evaluate the contamination attenuation capacity of the soils.

B.1.8 Background Soil Sampling

(As of July 2017, the work described in the section has been completed.)

To evaluate the role of background in contributing to concentrations of inorganic parameters in on-site soils, a limited background soil sampling program is proposed. Background soil samples will be collected at the six locations shown on **Figure 16**. These borings will be advanced with a hollow-stem auger and sampled with a split-spoon sampler. These borings were originally planned as part of a geotechnical investigation related to the landfill, not as part of the RFI; however, the location of the borings north of the active areas of the WDC facility is appropriate for background soil sampling, so we plan to also use these borings for background sampling.

The background sampling parameters will be selected based on the results of the initial geoprobe soil sampling. Background samples will be collected for parameters that exceed risk-based screening levels in one or more on-site sampling locations, if published regional background concentration data indicate that background levels may be similar to or higher that the risk-based screening levels. For example, it is likely that background sampling will be performed for arsenic, because background concentrations typically exceed risk-based screening levels, as shown in **Table 2**. On the other hand, background sampling may not be performed for boron even if site concentrations exceed the risk-based screening level, because typical background levels are much lower than the risk-based screening level.

The background sampling depths will correspond to the depths at which concentrations above risk-based screening levels were detected in the site samples.

Background soil sampling will be performed during the same mobilization as the monitoring well installation, after the results of the geoprobe soil and groundwater sampling have been reviewed.

B.2 Sampling Methods Requirements

Sample collection activities will conform to the standard field procedures as presented in **Appendix D**, unless other project-specific procedures are specified in the SAP/QAPP. The following sections provide additional information for sampling and field activities not specifically described in **Appendix D**.

B.2.1 Dross Sampling

(Dross sampling was completed in 2007. Aboveground dross storage has been properly disposed of and removed from the site.)

To characterize untreated dross, a composite sample will be collected from stockpiles and storage containers in the dross storage area. Because the quantity and location of untreated dross that will be available for RFI sampling cannot be known at this time, the specific compositing approach will be

selected when the sampling is performed. The location(s) of stored untreated dross will be mapped and a random sampling approach including at least three and no more than ten sub-sampling locations will be used to create the composite.

Once the sub-sampling locations have been determined, an equal amount of dross will be collected from each location and placed in a clean, stainless-steel bowl. The dross will be stirred with a stainless-steel trowel or spatula to homogenize the sample. Following stirring, an amount of dross appropriate for the required laboratory analysis will be transferred to the appropriate sample container provided by the laboratory.

B.2.2 Soil Sampling

(Soil borings and sampling was completed in 2007 and the 1990's

Soil boring installation, soil boring logging, and soil sample collection from soil borings will be completed as described in **Appendix D**. Subsurface soil samples will be collected from soil borings as described in **Appendix D**.

Surface soil samples to be collected from a depth of 0 to 2 inches will not be collected from soil borings. The procedure for collecting 0- to 2-inch surface soil samples will be to use a clean stainless steel hand trowel or shovel to remove surface vegetation. The shovel or trowel will then be used to transfer soil to a clean, stainless-steel bowl. The soil will be stirred with a stainless-steel trowel or spatula to homogenize the sample. Following stirring, an amount of soil appropriate for the required laboratory analysis will be transferred to the appropriate sample container provided by the laboratory. This method for surface soil sampling is not appropriate for soil samples to be analyzed for VOCs. Should it be necessary to collect surface soil samples for VOC analysis, soil will be placed directly into sample containers without stirring to prevent loss of volatiles.

B.2.3 Groundwater Sampling

Note: Historically, groundwater sampling at this site has been completed under the terms and conditions of the IDNR Sanitary Landfill Permit No. 88-SDP-04-86P and the applicable IAC regulations. To streamline and clarify ongoing groundwater sampling activities required for both the landfill groundwater sampling and the RCRA groundwater sampling, the following points are made:

1. **Groundwater and surface water analytical data from the IDNR Landfill Sampling Program may be used/referenced within the context of the USEPA RFI/CMS.**

2. **The sampling, analytical, and quality control protocols contained within this document will supersede those contained in Appendix 7, Attachment C of the WDC Sanitary Landfill Permit Renewal Application dated May 2015, once this document has been approved by the appropriate agencies. Therefore, Section IV and Appendix C of the Proposed Hydrologic Monitoring System Plan by Green Environmental Services, Inc., dated February 4, 1993, and incorporated by reference into the current IDNR Landfill Permit, will be rescinded and replaced accordingly.**
3. **The monitoring well system, the sampling schedule, the chemical parameters list, the statistical analysis and treatment of the data, the annual water quality report, and the monitoring well maintenance performance reevaluation plan, as specified in the current IDNR Landfill Permit, will remain in effect to satisfy the ongoing sampling requirements of the subject permit.**

WDC proposes to sample facility water table monitoring wells by low-flow sampling procedures as described in Yeskis and Zavala (2002). Low-flow sampling will be conducted with a peristaltic pump. The pumping rate will be adjusted so that drawdown stabilizes at less than 0.33 feet. Purge water will be monitored for DO, pH, temperature, specific conductance, ORP, and turbidity. When field parameter values have reached stable levels, groundwater samples will be collected directly into the appropriate field containers. Acceptable stabilization ranges for field parameters will be in accordance with Yeskis and Zavala (2002). If field conditions do not allow stabilization at less than 0.33 feet of drawdown at the lowest practical pumping rate, drawdown will continue to be monitored to determine if stabilization of drawdown can be reached. If drawdown in a well exceeds 2 feet prior to stabilization, low-flow sampling will not be used to sample that well. Specifics regarding the low-flow sampling procedure to be used for this project are provided in Appendix H.

No purge sampling may also be used in accordance with the standard operating procedure presented in Appendix I.

Existing landfill monitoring wells have dedicated inertial lift pumps manufactured by Waterra. For existing landfill wells that cannot be sampled by low-flow methods, these Waterra pumps will be used to purge the wells prior to sampling. These wells will be pumped dry and allowed to recover for up to 48 hours prior to sampling. The dedicated inertial lift pumps will be used to pump water directly into sample containers. For VOC sampling, a VOC sampling kit will be used as recommended by Waterra to minimize sample aeration.

New water table monitoring wells that are installed as part of the RFI and cannot be sampled by low-flow methods will have dedicated polyvinyl chloride (PVC) bailers. These bailers will be used to purge the wells prior to sampling. These wells will be bailed dry and allowed to recover for up to 48 hours prior to sampling. The dedicated bailer will be used to transfer water directly into sample containers. All VOC sampling conducted with bailers will use bottom-emptying devices to limit the loss of volatiles while water is transferred from the bailer to the sample container.

Previous data from the site indicate that wells screened below the water table (piezometers) are generally screened across formations having hydraulic conductivity (K) values of 10^{-6} cm/s or less. Given these low K values, low-flow sampling will not be possible in site piezometers, because water does not enter these wells rapidly enough to prevent excessive drawdown at practical pumping rates.

For this reason, all site piezometers will be sampled with dedicated Waterra pumps or dedicated bailers as described above. One exception, however, is that piezometers will not be bailed or pumped dry. To prevent exposing the screened interval to air, piezometers will be bailed or pumped until the water level is within one foot of the top of the screen.

All sampling activities will be conducted in a manner intended to minimize turbidity. In accordance with USEPA guidance, groundwater samples collected and submitted for laboratory analysis for the RFI will not be filtered. However, if significant turbidity is observed in samples, additional samples may be collected and field filtered to compare the results of filtered groundwater samples with unfiltered RFI groundwater data to assess the effects of filtering on the analytical results.

All groundwater sample containers will be provided by the laboratory.

B.2.4 Monitoring Well Construction

(Monitoring wells were installed in 1985, 1990-1992, 1995, and 2017. Landfill waste piezometers were installed in 1992.)

Groundwater monitoring wells installed for the RFI will be constructed in accordance with Iowa Administrative Code (IAC) Chapter 115.14-115.25. Monitoring wells will be installed in boreholes drilled by hollow-stem auger and will be constructed of 2-inch Schedule 40 PVC with flush-threaded (non-glued) joints. Well screens for water table monitoring wells will be ten feet long. Well screens for piezometers will generally be five feet long, unless field observations indicate permeable zones or

fractures are unlikely in the screened zone, in which case a 10-foot screen will be used. Screen lengths for all wells will not be greater than ten feet or less than five feet.

Monitoring wells will be installed with filter packs that extend 12 inches below the bottom of the screen and 18 inches above the top of the screen. An annular space seal consisting of at least three feet of expanding cement or bentonite grout will be placed above the filter pack. The annular space between the annular space seal and the frost line will be filled with expanding cement or bentonite. The remaining annular space will be filled with bentonite grout. Monitoring wells will be protected at the surface by metal casings that extend one foot below the frost line. Wells will be completed with vented well caps and locking protective caps.

B.2.5 Monitoring Well Surveying

(Installed monitoring wells and soil sampling locations were surveyed by a P.L.S. licensed in the State of Iowa)

Monitoring wells will be surveyed to determine casing elevation, ground surface elevation, and horizontal location. Accuracy for horizontal well locations will be $\pm$0.5 feet. Accuracy for ground surface and top-of-casing elevations will be $\pm$0.01 feet referenced to datum.

Soil sampling locations will be surveyed with equipment capable of less than 0.5-meter accuracy.

B.2.6 Investigative Waste Management

(This outlines the procedures followed and which will be followed as necessary)

Soil cuttings generated through soil boring and drilling activities will be placed in 55-gallon steel drums on site. Soil from different investigation areas will be kept separate. If analytical samples are collected through the process of soil generation (i.e., geoprobe soil borings), the results of those samples will be used to determine the appropriate disposal method for the soil cuttings. If analytical samples are not collected during soil generation (i.e., drilling for monitoring well installation), soil samples will be collected from the drummed soil for waste characterization.

If analytical results indicate that drummed soil has no detectable contaminants, the soil will be spread out on the site ground surface. If analytical results indicate that drummed soil contains detectable concentrations of contaminants but is not hazardous waste, the soil will be disposed at a sanitary landfill facility approved to accept this waste. If analytical results indicate that drummed soil contains listed

hazardous waste or is characteristically hazardous waste, the soil will be disposed at a hazardous waste facility.

If investigation results indicate that future excavation will likely be necessary for an investigation area as part of a corrective measure at the facility, drummed soil from that area may be stored on site for future disposal at the time excavated soils are disposed.

Groundwater generated through development and purging of monitoring wells and water generated by equipment decontamination will be contained in 55-gallon steel drums on site. Analytical results of groundwater samples collected from monitoring wells will be used to determine the appropriate disposal strategy for monitoring well development and purge water. Water samples will be collected from decontamination water drums for waste characterization. Laboratory analytical results for water samples will be used to obtain permission to discharge investigative wastewater to the Creston Sanitary Sewer System.

If analytical results indicate that water from a given well had no detectable organic compounds and no inorganic compounds present at concentrations greater than background concentrations during that sampling event, then contained water from that well will be discharged to the site ground surface. Purge water from all wells will be contained during each sampling event pending the most recent analytical results.

B.2.7 Equipment Decontamination

(This is an ongoing procedure during sampling)

Non-disposable sampling equipment, except dedicated sampling equipment, will be decontaminated before use at the site and between each use. Equipment used to sample media for laboratory analysis for inorganic constituents will be decontaminated by washing in Alconox™ and water, then rinsing with water from a municipal water supply. A final rinse will be conducted with commercial grade de-ionized water.

Equipment used to sample media for laboratory analysis for organic constituents will be decontaminated by washing in Alconox™ and water, then rinsing with water from a municipal water supply, followed by a methanol rinse. A final rinse will be conducted with commercial grade distilled water.

Water used for decontamination will be contained for disposal in accordance with the procedure described in **Section B.2.6**.

B.3 Sample Handling and Custody Requirements

(This outlines ongoing procedures during sampling)

Custody procedures will be used to document the relevance and authenticity of field samples collected during the RFI. A sample is considered in custody if it is:

- In a person's possession,
- In view of the person after being in possession,
- Sealed in a manner that it cannot be tampered with after having been in a physical possession, or
- In a secured area restricted to authorized personnel.

Custody will be documented using proper chain-of-custody (COC) procedures and forms. Various aspects of sample handling and shipment, as well as the proposed sample identification system and documentation, are discussed in the following subsections.

B.3.1 Sample Identification System

Sample containers will be labeled prior to being filled. Each sample label shall, at a minimum, indicate:

- Sample location ID
- Sample type
- Date/time of sample collection
- Sampler's initials
- Required analyses
- Type of preservative

All labels will be filled out with waterproof ink.

Sample locations will be identified with a prefix indicating the type of sample followed by a number indicating the specific location, as described in **Appendix D**. For the RFI geoprobe samples, the sample location ID will also denote the sample type (soil or water), the sample depth number, and the depth interval. Example sample location IDs include:

- Geoprobe boring soil sample: GB – Boring # - S – Sample Depth Number, Depth (e.g., GB-102-S-2, 4-6')
- Geoprobe boring groundwater sample: GB – Boring # - W – Sample Depth Number, Depth (e.g., GB-102-W-1, 8-10')
- Surface soil sample: SS – Sample Location # (e.g., SS-104)
- Monitoring well: MW – Well # (e.g., MW-12)
- Waste sample: WS – Waste Sample # (e.g., WS-105)

Sample locations for the RFI will be numbered beginning with 101 for each type of sample (e.g., SS-101) to avoid confusion with previous sample numbers.

B.3.2 Sample Handling

The possession and handling of samples will be documented from the time of collection to delivery to the laboratory. Field personnel are responsible for ensuring that COC procedures are implemented. Field personnel will maintain custody of all samples until they are relinquished to another custodian, the laboratory, or to the freight shipper.

B.3.3 Field-Specific Custody Procedures

The sample packaging and shipment procedures summarized below will ensure that the samples will arrive at the laboratory with the COC intact. An example COC is attached in **Appendix D**.

Transfer of COC and shipment procedures for samples shipped or delivered to Eurofins are as follows:

a) The field sampler is personally responsible for the care and custody of the samples until they are transferred or properly shipped. As few people as possible should handle the samples.
b) Samples to be shipped to a private laboratory are accompanied by a properly completed COC form. When transferring the possession of samples, the individuals relinquishing and receiving will sign, date, and note the time on the record. This procedure will be used to transfer custody samples from the sampler to another person, to a mobile laboratory, to the permanent laboratory, or to/from a secure storage area.
c) A COC record identifying the contents will accompany each cooler. Two copies of the COC form will be placed in a plastic bag and taped to the inside cover of the cooler. A third copy will be retained by the sampler.
d) Samples will be properly packaged for shipment and dispatched to Eurofins for analysis. Shipping containers will be secured with tape and custody seals. The preferred procedure

includes affixing custody seals to the front right and rear left corners of the cooler. The custody seals will be covered with clear plastic tape.

e) If the samples are sent by a common commercial carrier, a bill of lading will be used. Receipts of bills of lading will be retained as part of the permanent documentation. Commercial carriers are not required to sign off on the custody form as long as the custody forms are sealed inside the sample cooler and the custody seals remain intact.

f) Samples will be packaged using appropriate packing materials and water ice. Ice must be placed in immediate proximity to the sample container; avoid the placement of packing or insulating material between ice and the sample containers.

B.3.4 Documentation

Custody of samples shall be maintained and documented at all times. COC begins with the collection of the samples in the field. The documentation for each sample will include, at a minimum, the following information:

a) COC form
b) Sample Identification Label
c) Shipping Documents (including air bill #)

B.3.5 Laboratory Chain-of-Custody Procedures

Eurofins's laboratory COC procedures are described in **Appendix B**.

B.4 Analytical Methods Requirements

B.4.1 Eurofins

Analytical methods to be used by Eurofins for soil and groundwater sample analyses are summarized in **Tables 2** and **3** along with the anticipated quantification limits. Eurofins's Quality Assurance/Quality Control Manual, provided in **Appendix B**, outlines the analytical method requirements, QA/QC procedures, and responsible personnel. Samples will be analyzed on a standard lab turnaround schedule.

B.4.2 Omit

B.4.3 Geotechnical Samples

A total of three to five soil samples from the major soil types encountered at the facility will be collected and analyzed by a qualified laboratory for grain size distribution (sieve and hydrometer), Atterberg limits

(fine-grained soil only), and natural moisture content. The analysis procedures for these tests are described in the following American Society for Testing and Materials (ASTM) standards:

- D422-63: Standard Test Method for Particle-Size Analysis of Soils
- D2216-05: Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass
- D4318-00: Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils

B.5 Quality Control Requirements

B.5.1 Field QC Requirements

Where applicable, QC checks will be strictly followed during the investigation with replicate measurements, equipment calibration checks, and data verification by field personnel. Requirements for field QA/QC samples are summarized in **Table 5**.

Field sampling precision and data quality will be evaluated with sample duplicates, equipment blanks, VOC trip blanks, field bottle blanks, and methanol blanks. Sample duplicates provide precision information regarding homogeneity, handling, transportation, storage, and analyses. Equipment blanks will be used to assure that proper decontamination procedures have been performed and that no cross-contamination has occurred during sampling or transportation. VOC trip blanks will be used to assure that transportation of samples has not contaminated the samples with VOC constituents only. Methanol blanks will be collected to ensure the quality of the methanol used in the preparation of soil samples for VOC analysis.

If there is any discrepancy in the sample data, the WDC Project Coordinator and the Penn E&R Project Manager will be notified and resampling of the questionable point scheduled, if deemed necessary.

B.5.2 Laboratory QC Requirements

Laboratory QC requirements for Eurofins are outlined in **Appendix B**. The laboratory QA Manager will be responsible for reviewing QC data and implementing corrective action as necessary.

B.6 Instrument/Equipment Testing, Inspection, and Maintenance Requirements

The following field instruments will be used during RFI sampling activities:

- Thermo Environmental Instruments 580B Organic Vapor Meter with PID (or equivalent)
- Electric water level indicator

- YSI Model 556 Multi-Probe System (or equivalent) with sensors for DO, temperature, specific conductance, pH, and ORP
- LaMotte Model 2020 Turbidity Meter (or equivalent)

The PID will be used to screen soil samples for organic vapors. The PID requires daily calibration using a commercial calibration standard. Routine maintenance for the PID includes daily charging of the battery, daily checking of the particulate filter, and cleaning of the PID lamp as necessary (**Table 6**). The electric water level indicator requires daily testing. Routine maintenance for the water level indicator includes decontamination after each use and monthly cleaning of the electronic nodes.

The multi-probe meter and the turbidity meter will be used to monitor purge water from monitoring wells during low-flow sampling. These meters will also be used to measure field parameters of groundwater samples from wells that are not sampled by low-flow methods.

The multi-probe and turbidity meters require daily calibration using commercial calibration standards. Routine maintenance for the multi-probe meter includes daily inspection of the pH, specific conductance, temperature probes, DO, and ORP sensors (**Table 6**).

Inspections and maintenance of the laboratory equipment is the responsibility of the laboratory personnel and will be conducted in accordance with manufacturer specifications.

B.7 Instrument Calibration & Frequency

The calibration procedures to be employed for both the field and laboratory instruments used during the investigation at the WDC facility are referenced in this section.

The responsibility for the calibration of laboratory equipment rests with the laboratory. Field personnel are responsible for the calibration of field equipment and field equipment provided by subcontractors.

Documented and approved procedures will be used for calibrating measuring and testing equipment. Widely accepted procedures, such as those published by USEPA, ASTM, or procedures provided by manufacturers in equipment manuals, will be used.

Calibrated equipment will be uniquely identified either by the manufacturer's serial number, an equipment identification number, or other means. This identification, along with a label indicating when

the next calibration is due (only for equipment not requiring daily calibration), will be attached to the equipment. If this is not possible, records traceable to the equipment will be readily available for reference. It will be the responsibility of all equipment operators to check the calibration status from the due date labels or records prior to using the equipment.

Measuring and testing equipment will be calibrated at prescribed intervals and/or as part of operational use. Frequency will be based on the type of equipment, inherent stability, manufacturer's recommendations, values given in national standards, intended use, and experience. Equipment will be calibrated whenever possible, using reference standards having known relationships to nationally recognized standards (e.g., National Institute of Standards and Technology) or accepted values of physical constants. If national standards do not exist, the basis for calibration will be documented.

Physical and chemical reference standards will be used only for calibration. Equipment that fails calibration or becomes inoperable during use will be removed from service and segregated to prevent inadvertent use and will be tagged to indicate the fault. Such equipment will be recalibrated and repaired to the satisfaction of the laboratory personnel or field personnel, as applicable. Equipment that cannot be repaired will be replaced.

Records will be prepared and maintained for each piece of calibrated measuring and test equipment to document that established calibration procedures have been followed. Records for subcontractor field equipment and equipment used only for this specific project will be kept in the project files. Laboratory calibration records will be maintained by the laboratory.

B.8 Inspection/Acceptance Requirements for Supplies & Consumables

The Project Technical Coordinator will be responsible for inspecting supplies before field use. Only new sample containers accompanied by the manufacturer's certification of pre-cleaning will be used. Sample containers will be inspected for defects before use. Any sample container found to contain defects will be discarded.

The commercial laboratory will be responsible for inspecting laboratory supplies. The manufacturer's specifications for product performance and purity will be used as the acceptance criteria.

B.9 Data Acquisition Requirements for Non-direct Measurements

Soil and groundwater data have previously been collected at the WDC facility for a variety of investigation and remediation purposes. Previously collected facility data was summarized in the Final CCR (BT^2, 2005). Previously collected data include the following datasets:

- Soil and groundwater sampling results from the former chromic acid AST and dump pit area previously submitted to USEPA in support of SWMU closure (denied) and additional follow-up sampling
- Groundwater and leachate samples collected from the landfill monitoring wells and leachate piezometers in accordance with IDNR requirements
- Stormwater sampling performed in accordance with IDNR permit requirements
- RFA sampling performed by USEPA contractor
- Soil and groundwater sampling performed as part of the voluntary environmental assessment by WDC in 1998

Previously collected facility data, as well as facility data that will continue to be collected for purposes other than the RFI, will be reviewed by WDC and Penn E&R personnel for use in the RFI. In evaluating data for inclusion in the RFI process, the following criteria will be considered:

- Has the data already been accepted by the regulatory agency that required its generation (USEPA, IDNR, or Iowa Department of Public Health (IDPH))?
- Was the analysis performed using methods consistent with the RFI data quality objectives?
- Were the detection limits consistent with the RFI data quality objectives?
- Were the sampling methods consistent with the RFI sampling methods? If not, data may still be usable, but comparability issues may need to be addressed and discussed.
- Are the original laboratory reports available, or only data summary tables?
- Are the results consistent with the data collected for the RFI? Older data, particularly for parameters that biodegrade, may no longer be representative of site conditions.

Assessment of the existing data will be documented in the RFI report. Existing data will be accepted, rejected, or qualified for use in the RFI decision-making process.

Non-direct measurement data will also include literature review data regarding contaminant characteristics including chemical properties (e.g., density, solubility) and migration and dispersal processes (e.g., sorption, biodegradation). This data will be tabulated from USEPA and other sources in

accordance with Task III in Attachment 2 of the Order and used in the evaluation of current and future contaminant fate and transport.

B.10 Data Management

Details regarding the data, records management, and reporting are provided in the Data Management Plan (DMP).

The raw data obtained during field activities, such as lithologic logs, pH measurements, etc., will be recorded on the appropriate field forms or in individual site logbooks. This data will become part of the project files to be maintained as described previously in this SAP/QAPP.

GROUP C: ASSESSMENT/OVERSIGHT

Performance and system audits will be completed to ensure that the field sampling activities and laboratory analyses are performed following the procedures established in this SAP/QAPP. The audits may be both internally and externally led, as further described below.

C.1 Assessments & Response Actions

(This outlines ongoing procedures during sampling)

C.1.1 Field Audit

The Penn E&R Project QA Officer, or his authorized representative, will audit field activities. At least one field audit will be completed near the beginning of the sample collection activities under the investigation. If a second phase of field activities is necessary, and the second phase starts more than six months following the initial phase, then a second field audit will be completed. The field audit will include the following checklist:

Item	Description of Field Audit Task	QA Officer Initials
1.	Review of field sampling records	
2.	Review of field measurement procedures	
3.	Examination of the application of sample identifications following the specified protocol	
4.	Review of field instrument calibration records and procedures	
5.	Calibration check of field instruments to verify calibration to the manufacturer's specifications	

Item	Description of Field Audit Task	QA Officer Initials
6.	Review of the sample handling and packaging procedures	
7.	Review of COC procedures	

If deficiencies are observed during the audit, the deficiency will be noted in writing and a follow-up audit may be completed, if deemed necessary by the project QA Officer. Corrective action procedures may need to be implemented due to the findings from the audit. Such actions will be documented in the field logbook.

C.1.2 Laboratory Assessments

Laboratory assessments will be performed in accordance with the QA/QC procedures for Eurofins included in **Appendices B**.

C.2 Reports to Management

The Project Technical Coordinator, Penn E&R QA Officer, and the Laboratory QA Officer will report any significant QA problems encountered in the field or laboratory to the Penn E&R Project Manager immediately by telephone.

In accordance with the Order, quarterly progress reports will be submitted to the USEPA Project Manager. These reports will include a discussion of any problems encountered during the reporting period and the actions taken to rectify the problem. The results of each field audit will be reported in the next quarterly report. At the completion of the investigation, draft and final project reports will be issued.

GROUP D: DATA VALIDATION/USABILITY

(This outlines ongoing procedures during sampling)

This section describes the QA activities that will be performed to ensure that the collected data are scientifically defensible, properly documented, of known quality, and meet project objectives.

D.1 Data Review, Validation, and Verification Criteria

The following three steps will be followed to ensure that project data quality needs are met:

1. Data Verification - Data verification is a process of evaluating the completeness, correctness, and contractual compliance of a data set against the method standard, SOP, or contract requirements.

Data verification will be performed internally by the entity responsible for generating the data (e.g., WDC/Penn E&R for field data, Eurofins for analytical data).

2. Data Validation - Data validation is an analyte- and sample-specific process that extends the qualification of data beyond method, procedural, or contractual compliance (i.e., data verification) to determine the analytical quality of specific data sets. Data validation criteria are based on the measurement performance criteria of the project SAP/QAPP. Data validation will be performed by the Penn E&R QA Officer or his/her designee.

3. Data Usability Assessment - Data usability assessment is the process of evaluating validated data to determine if the data can be used for the purpose of the project (i.e., to answer the environmental questions or to make the environmental decision that must be made). Data usability will be assessed by the Penn E&R Project Manager.

The Penn E&R Project Manager will be responsible for resolving issues related to data verification and validation.

Criteria to be applied in the verification process include:

- Sample collection (WDC/Penn E&R)
    - Were the samples collected in accordance with the SAP/QAPP, SOPs or previously approved deviations?
    - Are the complete required sampling records available?
    - Were proper COC procedures followed?
- Field measurements (WDC/Penn E&R)
    - Were the field measurements collected in accordance with the SAP/QAPP, SOPs, or previously approved deviations?
    - Are the complete required measurement records available?
- Sample receipt (Eurofins)
    - Were the samples received within the holding times and properly preserved?
    - Were proper COC procedures followed?

Questions to be addressed in the data validation process include:

- What data or QC deficiencies were identified in the data set through the data verification process?
- What is the impact of the deficiencies on the quality of the overall data set?
- Are additional data qualifier flags or qualification statements needed prior to use of the data?

D.2 Validation and Verification Methods

This section describes the process that will be followed to verify and validate the project data.

D.2.1 Verification

For the sample collection and field measurements, the Penn E&R QA Officer or designee will perform the verification and will report the results to the Penn E&R Project Manager in a memorandum. For the sample receipt, preparation, and analysis, the Eurofins QA Manager will perform the verification and report the results in a narrative summary attached to the laboratory report. The laboratory report will also include sample receipt information, COC records, and laboratory QC sample results including blanks, standards, matrix spikes, and matrix spike duplicates.

The Penn E&R QA Officer will verify sample collection, handling, and field screening procedures as described in the SAP/QAPP and the standard procedures included in **Appendix D**.

D.2.2 Validation

The Penn E&R QA Officer will perform the data validation and will report the results in a memorandum to the Penn E&R Project Manager. The data validation memorandum will be forwarded to all data users following Project Manager review. Data qualifier flags will also be used to communicate data or QC deficiencies to data users.

The Penn E&R QA Officer will review the data verification reports and data prepared for the field and laboratory data and will evaluate the significance of any deficiencies with respect to overall data quality and data usability for the project. Data validation will also include an assessment of field QC sample results, including blanks and duplicates.

If significant issues are noted in the data validation process, the Penn E&R QA Officer and the Penn E&R Project Manager will evaluate the issues and determine the potential impact to the project. If the potential

impact is determined to be minor, the issues will be documented, and the project will continue. If the potential impact to the project is major, Penn E&R's representatives will discuss possible corrective actions with both WDC's Facility Project Coordinator and USEPA representatives to reach a decision regarding the appropriate course of action.

D.3 Reconciliation with User Requirements

The validated data will be reconciled with the project use requirements by evaluating whether the sampling objectives outlined in **Section B.1** have been met and whether the data are adequate to complete the risk assessment. If the number or location of samples, or the quality of the sampling data, are not adequate to meet the objectives, then additional sampling may be required.

Anticipated statistical analysis of the data includes calculation of basic summary statistics such as the mean, range, and sample count. These will be calculated for each parameter and each medium (e.g., subsurface soil, groundwater, etc.). For parameters where the maximum result exceeds the risk-based screening level, the upper confidence limit of the mean may also be calculated as part of the risk assessment. The calculated approach for the confidence limit will be selected based on the apparent underlying distribution (normal, lognormal, other) in accordance with the procedures discussed in the Risk Assessment Guidance for Superfund-Part A.

The need for and appropriateness of additional statistical analysis will be evaluated as part of the data evaluation and risk characterization process.

TABLES

Table 1
Solid Waste Management Units and Areas of Concern
Wellman Dynamics Corporation / Sampling and Analysis Plan/Quality Assurance Project Plan

SWMU or AOC Designation	Name	Environmental Issues Previously Identified	RFI Status
SWMU 1	Former Wastewater Treatment Sludge Storage Area	Wastewater treatment sludge formerly stored in this area contained chromium above regulatory levels.	No further action required. USEPA certified closure of this unit in 2003.
SWMU 2	Current Wastewater Treatment Sludge Storage Area	Wastewater treatment sludge currently stored in this area contains chromium above regulatory levels and is properly managed as a hazardous waste. There is no evidence of a release to the environment from this storage area.	No longer in use at the facility. Investigation work is complete.
SWMU 3	Spent Solvent Storage Area	A small number of drums of spent solvents, including tetrachloroethylene, were formerly stored at this location inside the main production building. There is no evidence of a release to the environment from this area and a very low potential that a release would have occurred.	No longer in use at the facility. No further action required.
SWMU 4	Spent Chromic Acid AST and Containment Structure	Spent chromic acid was formerly stored in this above-ground storage tank (AST). Past investigation has indicated that chromium contamination is present in the soil and groundwater in the immediate vicinity of the former AST. Contaminated soil has been excavated from this area and groundwater monitoring is ongoing.	No longer in use at the facility. Investigation work is complete.

Table 1 (continued)
Solid Waste Management Units and Areas of Concern
Wellman Dynamics Corporation / Sampling and Analysis Plan/Quality Assurance Project Plan

SWMU or AOC Designation	Name	Environmental Issues	RFI Status
SWMU 5	Spent Chromic Acid Transfer Tank	This mobile transfer tank was formerly used to transport spent chromic acid from the process tank where it was used in the plant to the spent chromic acid AST. There is no documentation of a release for the transfer tank.	No longer in use at the facility. Investigation work is complete.
SWMU 6	Wastewater Treatment System	The wastewater treatment system treats waste acids from the etch line prior to discharge to the city sewer system, including hydrofluoric, nitric, sulfuric, and chromic acids. There are no known releases to the soil or groundwater, but there may be a potential for a release depending on the integrity of the containment systems.	Investigation work is complete.
SWMU 7	Waste Methanol Drum Storage Area	A small number of drums of waste methanol (spent solvent) were formerly stored in this area. There is no evidence of a past release and a limited potential that a release would have occurred. Even if a release had occurred, methanol breaks down rapidly in the environment and would not likely be present today.	No longer in use at the facility. Investigation work is complete.

Table 1 (continued)
Solid Waste Management Units and Areas of Concern
Wellman Dynamics Corporation / Sampling and Analysis Plan/Quality Assurance Project Plan

SWMU or AOC Designation	Name	Environmental Issues	RFI Status
SWMU 8	Former Magnesium Dross Storage Area	A large number of drums of magnesium dross and magnesium-barium dross (foundry waste) were stored in this area awaiting treatment to reclaim magnesium, and spills of dross on the soil surface have been documented. Sampling during the RFA indicated that the soil contains barium and chromium. A portion of the dross storage area is regulated separately by the Iowa Department of Public Health (IDPH) due to radiological constituents.	No longer in use at the facility. Investigation work is complete.
SWMU 9	Magnesium Dross Treatment Area	The magnesium dross is treated to reclaim scrap magnesium. The treatment process produces a magnesium-hydroxide sludge as the final waste product, which is disposed of in the on-site landfill under a permit from the Iowa Department of Natural Resources (IDNR). Although the treatment is generally performed within a concrete confinement area, there is some potential for a release to the environment because the containment is not complete and because untreated dross is stockpiled in the surrounding area.	Investigation work is complete.

Table 1 (continued)
Solid Waste Management Units and Areas of Concern
Wellman Dynamics Corporation / Sampling and Analysis Plan/Quality Assurance Project Plan

SWMU or AOC Designation	Name	Environmental Issues	RFI Status
SWMU 10	Waste Acid Collection Pit	The waste acid collection pit is a concrete pit below the acid etch line in the plant. The pit collects overflow and wastewater from the process and rinse tanks. Acids collected include chromic, hydrofluoric, sulfuric, nitric, and acetic acids. There are no known releases to the environment, but the integrity of the concrete pit is not known.	Investigation work is complete.
SWMU 11	Waste Acid Dump Pit	Prior to 1971, waste acids were disposed of in the waste acid dump pit, which contained limestone intended to neutralize the acids. This area has been investigated in conjunction with SWMU 4 and it appears that both SWMUs have contributed to a merged area of chromium contamination in the soil and groundwater.	No longer in use at the facility. Investigation work is complete.
SWMU 12	Landfill	The landfill was used for disposal of foundry sand, baghouse dust, and treated magnesium dross. A portion of the landfill area is regulated by IDPH due to former underground disposal of low-level radioactive thorium process sludge. The landfill is permitted and regulated by the IDNR solid waste program. Previous sampling has indicated elevated concentrations of fluoride and sulfate downgradient of the landfill.	The landfill was closed in 2024 with an IDNR-approved cap. Investigation work is complete.

Table 1 (continued)
Solid Waste Management Units and Areas of Concern
Wellman Dynamics Corporation / Sampling and Analysis Plan/Quality Assurance Project Plan

SWMU or AOC Designation	Name	Environmental Issues	RFI Status
AOC A	Chlorinated Solvents in Soil and Groundwater	During a 1998 voluntary environmental assessment, chlorinated solvents including tetrachloroethylene (PCE), trichloroethylene, and other chlorinated compounds were detected in soil and groundwater samples collected on-site. In one of the areas where groundwater contamination was detected, a PCE spill occurred in 1998 after the samples were collected and may have added to the solvent contamination this area.	Investigation work is complete.
AOC B	Petroleum Product AST Area	ASTs are or were used to store gasoline, diesel fuel, and kerosene in this area. Sampling as part of the 1998 voluntary environmental assessment indicated very low levels of soil contamination and did not detect petroleum contamination in groundwater.	Investigation work is complete.

SWMU = Solid Waste Management Unit
AOC = Area of Concern

Table 2
Preliminary Soil Screening Levels
Wellman Dynamics RCRA Facility Investigation
(all concentrations are mg/kg)

Contaminant	Risk-Based Screening Levels (USEPA Region 9 Preliminary Remediation Goals)			USEPA Ecological Soil Screening Level				Typical Background Concentration**
	Direct Contact PRG for Residential Soil	Direct Contact PRG for Industrial Soil	Soil Screening Level for Migration to Groundwater (DAF=20)	Plants	Soil Inverte-brates	Avian Wildlife	Mammalian Wildlife	
Metals								
Aluminum	**76,000**	100,000	--	--	--	--	--	64,667 [1]
Antimony	31	410	**5**	--	78	--	0.27	1.0 [1]
Arsenic	**0.39**	1.6	29	18	--	43	46	7.3 [1]
Barium	5,400	67,000	**1,600**	--	330	--	2,000	617 [1]
Beryllium	150	1,900	**63**	--	40	--	21	1.3 [1]
Boron	**16,000**	100,000	--	--	--	--	--	26 [2]
Cadmium	37	450	**8**	32	140	0.77	0.36	--
Calcium	--	--	--	--	--	--	--	9,200 [2]
Chromium III	**100,000**	**100,000**	--	--	--	26	34	64.7 Total [1]
Chromium VI	**30**	64	38	--	--	--	130	
Cobalt	**900**	1,900	--	13	--	120	230	11 [1]
Copper	**3,100**	41,000	--	70	80	28	49	31 [1]
Iron	**23,000**	100,000	--	--	--	--	--	23,278 [1]
Lithium	**1,600**	20,000	--	--	--	--	--	20 [2]
Lead	**400**	800	--	120	1,700	11	56	19 [1]
Magnesium	--	--	--	--	--	--	--	4,400 [2]
Manganese	**1,800**	19,000	--	220	450	4,300	4,000	603 [1]
Mercury	**6.1***	62*	--	--	--	--	--	0.058 [2]
Molybdenum	**390**	5,100	--	--	--	--	--	0.59 [2]
Nickel	1,600	20,000	**130**	38	280	210	130	26 [1]
Potassium	--	--	--	--	--	--	--	15,000 [2]
Selenium	390	5,100	**5**	0.52	4.1	1.2	0.63	0.4 [1]
Silver	390	5,100	**34**	560	--	4.2	14	--
Sodium	--	--	--	--	--	--	--	5,900 [2]
Strontium	**47,000**	100,000	--	--	--	--	--	120 [2]
Thallium	**5.2**	67	--	--	--	--	--	--
Tin	**47,000**	100,000	--	--	--	--	--	0.89 [2]
Titanium	**100,000**	**100,000**	--	--	--	--	--	2,400 [2]
Vanadium	**78**	1,000	6,000	--	--	7.8	280	97 [1]
Zinc	23,000	100,000	**12,000**	160	120	46	79	57 [1]

Table 2
Preliminary Soil Screening Levels
Wellman Dynamics RCRA Facility Investigation
(all concentrations are mg/kg)

Contaminant	Risk-Based Screening Levels (USEPA Region 9 Preliminary Remediation Goals)			USEPA Ecological Soil Screening Level				Typical Background Concentration**
	Direct Contact PRG for Residential Soil	Direct Contact PRG for Industrial Soil	Soil Screening Level for Migration to Groundwater (DAF=20)	Plants	Soil Inverte-brates	Avian Wildlife	Mammalian Wildlife	
VOCs								
Acetone	14,000	54,000	**16**	--	--	--	--	--
Benzene	0.64	1.4	**0.03**	--	--	--	--	--
Bromomethane	3.9	13	**0.2**	--	--	--	--	--
2-Butanone (MEK)	**22,000**	110,000	--	--	--	--	--	--
4-Methyl-2-Pentanone (MIBK)	**5,300**	47,000	--	--	--	--	--	--
n-Butylbenzene	**240**	**240**	--	--	--	--	--	--
sec-Butylbenzene	**220**	**220**	--	--	--	--	--	--
tert-Butylbenzene	**390**	**390**	--	--	--	--	--	--
Carbon Disulfide	360	720	**32**	--	--	--	--	--
Chlorobenzene	150	530	**1**	--	--	--	--	--
Chloroethane	**3**	6.5	--	--	--	--	--	--
Chloroform	0.22	0.47	**0.6**	--	--	--	--	--
1,1-Dichloroethane	510	1,700	**23**	--	--	--	--	--
1,1-Dichloroethene	120	410	**0.06**	--	--	--	--	--
cis-1,2-Dichloroethene	43	150	**0.4**	--	--	--	--	--
trans-1,2-Dichloroethene	69	230	**0.7**	--	--	--	--	--
1,1-Dichloropropene	--	--	--	--	--	--	--	--
Ethylbenzene	400	400	**13**	--	--	--	--	--
Hexane	**110**	**110**	--	--	--	--	--	--
Isopropylbenzene	**570**	2,000	--	--	--	--	--	--
p-Isopropyltoluene	--	--	--	--	--	--	--	--
Methylene Chloride	9.1	21	**0.02**	--	--	--	--	--
n-Propylbenzene	**240**	**240**	--	--	--	--	--	--
Tetrachloroethene	0.48	1.3	**0.06**	--	--	--	--	--
Toluene	520	520	**12**	--	--	--	--	--
1,1,1-Trichloroethane	1,200	1,200	**2**	--	--	--	--	--
1,1,2-Trichloroethane	0.73	1.6	**0.02**	--	--	--	--	--
Trichloroethene	**0.053**	0.11	0.06	--	--	--	--	--
1,2,4-Trimethylbenzene	**52**	170	--	--	--	--	--	--
1,3,5-Trimethylbenzene	**21**	70	--	--	--	--	--	--
Vinyl Chloride	0.079	0.75	**0.01**	--	--	--	--	--
Xylenes, total	270	420	**210**	--	--	--	--	--

-- = Not Applicable
mg/kg = milligrams per kilogram or parts per million (ppm)
* Mercury values for Region 9 are for methyl mercury. There are no PRGs for elemental mercury.

[1] Mean reported background concentrations for Iowa reported in Table 2.3 in the USEPA Guidance for Developing Ecological Soil Screening Levels.

[2] Background concentrations taken from US geometric mean reported in Table 2 in Elemental Concentrations in Soils and Other Surficial Materials of the Conterminous United States by Shacklette and Boerngren, USGS Professional Paper 1270, 1984.

NOTE: Preliminary soil screening levels are used to select analytical methods that have adequately low detection levels. Project Preliminary Remediation Goals (PRGs) will be detemined as part of the RFI.

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Table 3
Groundwater Risk-Based Screening Levels, Analytical Methods, and Anticipated Detection Limits
WDC Acquisition LLC SAP/QAPP

Contaminant	CAS No.	Units	USEPA Drinking Water Maximum Contaminant Levels		Health Advisory Level	Iowa Protected Groundwater Source	Iowa Non-Protected Groundwater Source	Lowest Standard	Regional Screening Level (November 2019) Tap Water (10^{-6}, 0.1)	Anticipated TestAmerica Quantification Limit	Anticipated TestAmerica Method Detection Limit (MDL)	TestAmerica Laboratory Proposed Method
			Primary MCL (Health-Based)	Secondary MCL (Aesthetic)								
General Chemistry												
pH	-[1]	s.u.	-	6.5 - 8.5	-	-	-	6.5 - 8.5	-	-	-	-
Conductivity	-	umhos/cm	-	-	-	-	-	-	-	-	-	-
Temperature	-	ºC	-	-	-	-	-	-	-	-	-	-
Ammonia as N	-	mg/l	-	-	-	30	170	30	-	0.2	0.0933	350.1
Chemical Oxygen Demand	-	mg/l	-	-	-	-	-	-	-	5	4.68	5220D
Phenols	-	mg/l	-	-	11	2	10	2	-	0.02	0.0118	9066
Total Organic Halogens	-	mg/l	-	-	-	-	-	-	-	0.03	0.1	9020B
Metals												
Aluminum	7429-90-5	mg/l	-	0.05 - 0.2	-	-	-	0.05	2.0	0.05	0.0208	6020A
Antimony (metallic)	7440-36-0	mg/l	0.006	-	0.01	0.006	0.03	0.006	0.00078	0.001	0.000237	6020A
Arsenic, inorganic	7440-38-2	mg/l	0.01	-	0.01	0.01	0.05	0.01	0.000052	0.002	0.000672	6020A
Barium	7440-39-3	mg/l	2.0	-	7.0	2.0	10.0	2.0	0.38	0.002	0.000844	6020A
Beryllium	7440-41-7	mg/l	0.004	-	0.07	0.004	0.07	0.004	0.0025	0.001	0.000221	6020A
Boron	7440-42-8	mg/l	-	-	7.0	6.0	30	6.0	0.4	0.200	0.0434	6010C
Cadmium (water)	7440-43-9	mg/l	0.005	-	0.020	0.005	-	0.005	0.00092	0.0005	0.0000351	6020A
Calcium	7440-70-2	mg/l	-	-	-	-	-	-	-	NA[5]	NA	NA
Chromium III[4]	16065-83-1	mg/l	0.1	-	-	10	52	0.1	2.2	0.02	-	7196A_CR3
Chromium VI	18540-29-9	mg/l	0.1	-	-	0.021	0.1	0.021	0.000035	0.02	0.0050	7196A
Chromium (total)	7440-47-3	mg/l	0.1	-	0.1	0.1	0.5	0.1	-	0.005	0.000729	6020A
Cobalt	7440-48-4	mg/l	-	-	-	0.0021	0.010	0.0021	0.0006	0.0005	0.0000274	6020A
Copper	7440-50-8	mg/l	1.3	1.0	-	1.3	6.6	1.0	0.08	0.005	0.000122	6020A
Iron (total)	7439-89-6	mg/l	-	0.3	-	-	-	0.3	1.4	0.1	0.0394	6020A
Iron (dissolved)	7439-89-6	mg/l	-	0.3	-	-	-	0.3	1.4	0.1	0.0394	6020A
Lead	7439-92-1	mg/l	0.015	-	-	0.015	0.075	0.015	0.015	0.0005	0.000211	6020A
Lithium	7439-93-2	mg/l	-	-	-	0.014	0.07	0.014	0.004	0.01	0.00098	6010C
Magnesium	7439-95-4	mg/l	-	-	-	-	-	-	-	0.05	0.02	6020A
Manganese (non-diet)	7439-96-5	mg/l	-	0.05	1.6	0.03	4.9	0.03	0.430	0.01	0.00188	6020A
Mercury	7439-97-6	mg/l	0.002	-	0.01	0.002	0.010	0.002	0.0000063	NA	NA	NA
Molybdenum	7439-98-7	mg/l	-	-	0.2	0.04	0.2	0.04	0.01	0.002	0.000105	6020A
Nickel	7440-02-0	mg/l	-	-	0.7	0.1	0.7	0.1	0.039	0.005	0.00153	6020A
Silver	7440-22-4	mg/l	-	0.1	0.2	0.1	0.5	0.1	0.0094	0.001	0.000153	6020A
Sodium	7440-23-5	mg/l	-	-	20.0	-	-	20.0	-	NA	NA	NA
Strontium	7440-24-6	mg/l	-	-	20.0	4.0	21.0	4.0	1.2	0.001	0.00349	6020A
Thallium	7440-28-0	mg/l	0.002	-	-	0.002	0.01	0.002	0.00002	0.001	0.0000255	6020A
Tin	7440-31-5	mg/l	-	-	-	4.2	21	4.2	1.2	NA	NA	NA
Titanium	7440-32-6	mg/l	-	-	-	-	-	-	-	NA	NA	NA
Vanadium	7440-62-2	mg/l	-	-	-	0.035	0.18	0.035	0.0086	0.005	0.000255	6020A
Zinc	7440-66-6	mg/l	-	5.0	10.0	2.0	10.0	2.0	0.6	0.01	0.0521	6020A
Sulfide	18496-25-8	mg/l	-	-	-	-	-	-	-	NA	NA	NA

Table 3
Groundwater Risk-Based Screening Levels, Analytical Methods, and Anticipated Detection Limits
WDC Acquisition LLC SAP/QAPP

Contaminant	CAS No.	Units	USEPA Drinking Water Maximum Contaminant Levels		Health Advisory Level	Iowa Protected Groundwater Source	Iowa Non-Protected Groundwater Source	Lowest Standard	Regional Screening Level (November 2019) Tap Water (10^{-6}, 0.1)	Anticipated TestAmerica Quantification Limit	Anticipated TestAmerica Method Detection Limit (MDL)	TestAmerica Laboratory Proposed Method
			Primary MCL (Health-Based)	Secondary MCL (Aesthetic)								
Other Inorganics												
Bromate	15541-45-4	mg/l	0.01	-	0.14	0.01	0.05	0.01	0.00011	1	0.5	9056
Chloride	16887-00-6	mg/l	-	250	-	-	-	250	-	1	0.319	9056A
Fluoride (dissolved)	16984-48-8	mg/l	4	2	-	4	20	2	0.12	0.1	0.046	9056A
Fluoride (total)[9]	16984-48-8	mg/l	4	2	-	4	20	2	0.08	0.1	0.046	9056A
Nitrate/Nitrite - N	E701177	mg/l	-	-	-	1[6]	5[7]	1	0.2[8]	1	NA	EPA 353.3
Nitrate - N	14797-55-8	mg/l	10	-	-	10	56	10	3.2	NA	NA	NA
Nitrite - N	14797-65-0	mg/l	1	-	-	1	5	1	0.2	0.1	0.0333	9056A
Sulfate	14808-79-8	mg/l	-	250	500	-	-	250	-	1	0.469	9056A
VOCs												
1,4-Dioxane[3]	123-91-1	ug/l[2]	-	-	1,000	200	1,000	200	0.46	100	34	8260D_SIM
Acetone	67-64-1	ug/l	-	-	-	6,300	32,000	6,300	1,400	10	3.10	8260D_SIM
Acrylonitrile	107-13-1	ug/l	-	-	-	0.32	6.5	0.32	0.052	5	2.20	8260D
Benzene	71-43-2	ug/l	5	-	100	5	64	5	0.46	0.5	0.22	8260D_SIM
Bromochloromethane	74-97-5	ug/l	-	-	500	90	450	90	8.3	5	0.54	8260D_SIM
Bromodichloromethane	75-27-4	ug/l	80	-	100	80	400	80	0.13	1	0.39	8260D_SIM
Bromoform	75-25-2	ug/l	80	-	1,000	80	440	80	3.3	5	0.78	8260D_SIM
Bromomethane	74-83-9	ug/l	-	-	50	10	50	10	0.75	4	1.10	8260D_SIM
2-Butanone (MEK)	78-93-3	ug/l	-	-	20,000	4,000	21,000	4,000	560	10	2.10	8260D_SIM
Carbon Disulfide	75-15-0	ug/l	-	-	-	700	3,500	700	81	1	0.45	8260D
Carbon tetrachloride	56-23-5	ug/l	5	-	100	5	50	5	0.46	2	0.65	8260D_SIM
Chlorobenzene	108-90-7	ug/l	100	-	700	100	700	100	7.8	1	0.40	8260D_SIM
Chloroethane	75-00-3	ug/l	-	-	-	2,800	14,000	2,800	2,100	4	0.79	8260D_SIM
Chloroform	67-66-3	ug/l	80	-	350	80	-	80	0.22	3	1.30	8260D_SIM
Chlorodibromomethane	124-48-1	ug/l	80	-	700	80	400	80	0.87	5	0.75	8260D_SIM
Chloromethane	74-87-3	ug/l	-	-	-	-	-	-	19	3	0.61	8260D_SIM
Dibromomethane	74-95-3	ug/l	-	-	-	70	350	70	0.83	1	0.33	8260D_SIM
1,2-Dibromo-3-Chloropropane	96-12-8	ug/l	0.2	-	-	0.2	2.9	0.2	0.00033	5	1.20	8260D_SIM
1,2-Dibromoethane (EDB)	106-93-4	ug/l	0.05	-	300	0.05	1.8	0.05	0.0075	1	0.34	8260D_SIM
1,2-Dichlorobenzene	95-50-1	ug/l	600	-	3,000	600	3,200	600	30	1	0.37	8260D_SIM
1,4-Dichlorobenzene	106-46-7	ug/l	75	-	4,000	75	650	75	0.48	1	0.23	8260D_SIM
1,1-Dichloroethane	75-34-3	ug/l	-	-	-	140	700	140	2.8	1	0.22	8260D_SIM
1,1-Dichloroethene	75-35-4	ug/l	7	-	2,000	7	180	7	28	2	0.56	8260D_SIM
1,2-Dichloroethane	107-06-2	ug/l	5	-	-	5	38	5	0.17	1	0.39	8260D_SIM
1,2-Dichloropropane	78-87-5	ug/l	5	-	-	5	60	5	0.82	1	0.27	8260D_SIM
cis-1,2-Dichloroethene	156-59-2	ug/l	70	-	70	70	350	70	3.6	1	0.21	8260D_SIM
trans-1,2-Dichloroethene	156-60-5	ug/l	100	-	700	100	700	100	36	1	0.27	8260D_SIM

Table 3
Groundwater Risk-Based Screening Levels, Analytical Methods, and Anticipated Detection Limits
WDC Acquisition LLC SAP/QAPP

Contaminant	CAS No.	Units	USEPA Drinking Water Maximum Contaminant Levels		Health Advisory Level	Iowa Protected Groundwater Source	Iowa Non-Protected Groundwater Source	Lowest Standard	Regional Screening Level (November 2019) Tap Water (10^{-6}, 0.1)	Anticipated TestAmerica Quantification Limit	Anticipated TestAmerica Method Detection Limit (MDL)	TestAmerica Laboratory Proposed Method
			Primary MCL (Health-Based)	Secondary MCL (Aesthetic)								
1,1-Dichloropropene	563-58-6	ug/l	-	-	-	-	-	-	-	NA	NA	NA
cis-1,3-Dichloropropene	10061-01-5, 542-75-6	ug/l	-	-	1,000	1.8	35	1.8	0.47	5	0.25	8260D_SIM
trans-1,3-Dichloropropene	10061-02-6, 542-75-6	ug/l	-	-	1,000	1.8	35	1.8	0.47	5	0.56	8260D_SIM
trans-1,4-Dichloro-2-butene	110-57-6	ug/l	-	-	-	1.8	35	1.8	0.0013	10	1.10	8260D_SIM
Ethylbenzene	100-41-4	ug/l	700	-	3,000	700	3,500	700	1.5	1	0.31	8260D_SIM
Hexane	110-54-3	ug/l	-	-	-	420	2,100	420	150	NA	NA	8260D
2-Hexanone	591-78-6	ug/l	-	-	-	-	-	-	3.8	10	2.00	8260D_SIM
Iodomethane	74-88-4	ug/l	-	-	-	-	-	-	-	10	7.00	8260D_SIM
Isopropylbenzene	98-82-8	ug/l	-	-	4,000	700	3,500	700	45	1	0.35	8260D_SIM
p-Isopropyltoluene	99-87-6	ug/l	-	-	-	-	-	-	-	NA	NA	NA
Methylene Chloride	75-09-2	ug/l	5	-	2,000	5.0	1,800	5	11	5	1.70	8260D_SIM
4-Methyl-2-pentanone (MIBK)	108-10-1	ug/l	-	-	-	560	2,800	560	630	10	2.10	8260D_SIM
n-Butylbenzene	104-51-8	ug/l	-	-	-	350	1,800	350	100	1	0.44	8260D_SIM
sec-Butylbenzene	135-98-8	ug/l	-	-	-	-	-	-	200	NA	NA	NA
tert-Butylbenzene	98-06-6	ug/l	-	-	-	-	-	-	69	NA	NA	NA
Naphthalene	91-20-3	ug/l	-	-	700	100	-	100	0.17	5.0	3.00	8270E_SIM_LL
n-Propylbenzene	103-65-1	ug/l	-	-	-	3,400	17,000	3400	66	NA	NA	NA
Styrene	100-42-5	ug/l	100	-	7,000	100	-	100	120	1	0.37	8260D_SIM
1,1,1,2-Tetrachloroethane	630-20-6	ug/l	-	-	1,000	70	350	70	0.57	1	0.38	8260D_SIM
1,1,2,2-Tetrachloroethane	79-34-5	ug/l	-	-	400	0.3	18	0.3	0.076	1	0.47	8260D_SIM
Tetrachloroethene	127-18-4	ug/l	5	-	500	5	1,700	5	4.1	1	0.48	8260D_SIM
Toluene	108-88-3	ug/l	1,000	-	3,000	1,000	5,000	1,000	110	1	0.43	8260D_SIM
1,1,1-Trichloroethane	71-55-6	ug/l	200	-	70,000	200	70,000	200	800	1	0.19	8260D_SIM
1,1,2-Trichloroethane	79-00-5	ug/l	5	-	100	5	61	5	0.041	1	0.45	8260D_SIM
Trichloroethene	79-01-6	ug/l	5	-	200	5	76	5	0.28	1	0.43	8260D_SIM
Trichlorofluoromethane	75-69-4	ug/l	-	-	10,000	2,000	10,000	2,000	520	4	0.38	8260D_SIM
1,2,3-Trichloropropane	96-18-4	ug/l	-	-	100	0.0058	0.12	0.0058	0.00075	1	0.59	8260D_SIM
1,2,4-Trimethylbenzene	95-63-6	ug/l	-	-	-	70	350	70	5.6	1	0.42	8260D_SIM
1,3,5-Trimethylbenzene	108-67-8	ug/l	-	-	-	70	350	70	6	1	0.37	8260D_SIM
Vinyl Acetate	108-05-4	ug/l	-	-	-	-	-	-	41	10	2.5	8260D_SIM
Vinyl Chloride	75-01-4	ug/l	2	-	100	2	10	2	0.019	1	0.18	8260D_SIM
Xylenes (total)	1330-20-7	ug/l	10,000	-	7,000	10,000	50,000	7,000	19	3	0.4	8260D_SIM

Footnotes:
1. Not Applicable
2. ug/l = micrograms per liter or parts per billion (ppb)
3. Method 8270 gives lower reporting levels.
4. Calculated from Chromium (VI) and Total Chromium.
5. Not Available
6. Nitrite value is 1.0 mg/l, nitrate value is 10.0 mg/l.
7. Nitrite value is 5 mg/l, nitrate value is 56 mg/l.
8. Taken using the lowest RBSL from Nitrate and Nitrite.
9. As of 9/1/2020, flouride now reported as total instead of distilled per SW846 Method 9056A.

Test America RL or MDL is above Lowest Standard/RBSL
RBSL (Lesser of Lowest Standard and PRG)

Table 3
Groundwater Risk-Based Screening Levels, Analytical Methods, and Anticipated Detection Limits
WDC Acquisition LLC SAP/QAPP Addendum

Contaminant	CAS No.	Units	USEPA Drinking Water Maximum Contaminant Levels		Health Advisory Level	Iowa Protected Groundwater Source	Iowa Non-Protected Groundwater Source	Lowest Standard	Regional Screening Level (November 2019) Tap Water (10^{-6}, 0.1)	Anticipated TestAmerica Quantification Limit	Anticipated TestAmerica Method Detection Limit (MDL)	TestAmerica Laboratory Proposed Method
			Primary MCL (Health-Based)	Secondary MCL (Aesthetic)								
General Chemistry												
pH	-[1]	s.u.	-	6.5 - 8.5	-	-	-	6.5 - 8.5	-	-	-	-
Conductivity	-	umhos/cm	-	-	-	-	-	-	-	-	-	-
Temperature	-	ºC	-	-	-	-	-	-	-	-	-	-
Ammonia as N	-	mg/l	-	-	-	30	170	30	-	0.2	0.0933	350.1
Chemical Oxygen Demand	-	mg/l	-	-	-	-	-	-	-	5	4.68	5220D
Phenols	-	mg/l	-	-	11	2	10	2	-	0.02	0.0118	9066
Total Organic Halogens	-	mg/l	-	-	-	-	-	-	-	0.03	0.1	9020B
Metals												
Aluminum	7429-90-5	mg/l	-	0.05 - 0.2	-	-	-	0.05	2.0	0.05	0.0208	6020A
Antimony (metallic)	7440-36-0	mg/l	0.006	-	0.01	0.006	0.03	0.006	0.00078	0.001	0.000237	6020A
Arsenic, inorganic	7440-38-2	mg/l	0.01	-	0.01	0.01	0.05	0.01	0.000052	0.002	0.000672	6020A
Barium	7440-39-3	mg/l	2.0	-	7.0	2.0	10.0	2.0	0.38	0.002	0.000844	6020A
Beryllium	7440-41-7	mg/l	0.004	-	0.07	0.004	0.07	0.004	0.0025	0.001	0.000221	6020A
Boron	7440-42-8	mg/l	-	-	7.0	6.0	30	6.0	0.4	0.200	0.0434	6010C
Cadmium (water)	7440-43-9	mg/l	0.005	-	0.020	0.005	-	0.005	0.00092	0.0005	0.0000351	6020A
Calcium	7440-70-2	mg/l	-	-	-	-	-	-	-	NA[5]	NA	NA
Chromium III[4]	16065-83-1	mg/l	0.1	-	-	10	52	0.1	2.2	0.02	-	7196A_CR3
Chromium VI	18540-29-9	mg/l	0.1	-	-	0.021	0.1	0.021	0.000035	0.02	0.0050	7196A
Chromium (total)	7440-47-3	mg/l	0.1	-	0.1	0.1	0.5	0.1	-	0.005	0.000729	6020A
Cobalt	7440-48-4	mg/l	-	-	-	0.0021	0.010	0.0021	0.0006	0.0005	0.0000274	6020A
Copper	7440-50-8	mg/l	1.3	1.0	-	1.3	6.6	1.0	0.08	0.005	0.000122	6020A
Iron (total)	7439-89-6	mg/l	-	0.3	-	-	-	0.3	1.4	0.1	0.0394	6020A
Iron (dissolved)	7439-89-6	mg/l	-	0.3	-	-	-	0.3	1.4	0.1	0.0394	6020A
Lead	7439-92-1	mg/l	0.015	-	-	0.015	0.075	0.015	0.015	0.0005	0.000211	6020A
Lithium	7439-93-2	mg/l	-	-	-	0.014	0.07	0.014	0.004	0.01	0.00098	6010C
Magnesium	7439-95-4	mg/l	-	-	-	-	-	-	-	0.05	0.02	6020A
Manganese (non-diet)	7439-96-5	mg/l	-	0.05	1.6	0.03	4.9	0.03	0.430	0.01	0.00188	6020A
Mercury	7439-97-6	mg/l	0.002	-	0.01	0.002	0.010	0.002	0.0000063	NA	NA	NA
Molybdenum	7439-98-7	mg/l	-	-	0.2	0.04	0.2	0.04	0.01	0.002	0.000105	6020A
Nickel	7440-02-0	mg/l	-	-	0.7	0.1	0.7	0.1	0.039	0.005	0.00153	6020A
Silver	7440-22-4	mg/l	-	0.1	0.2	0.1	0.5	0.1	0.0094	0.001	0.000153	6020A
Sodium	7440-23-5	mg/l	-	-	20.0	-	-	20.0	-	NA	NA	NA
Strontium	7440-24-6	mg/l	-	-	20.0	4.0	21.0	4.0	1.2	0.001	0.00349	6020A
Thallium	7440-28-0	mg/l	0.002	-	-	0.002	0.01	0.002	0.00002	0.001	0.0000255	6020A
Tin	7440-31-5	mg/l	-	-	-	4.2	21	4.2	1.2	NA	NA	NA
Titanium	7440-32-6	mg/l	-	-	-	-	-	-	-	NA	NA	NA
Vanadium	7440-62-2	mg/l	-	-	-	0.035	0.18	0.035	0.0086	0.005	0.000255	6020A
Zinc	7440-66-6	mg/l	-	5.0	10.0	2.0	10.0	2.0	0.6	0.01	0.0521	6020A
Sulfide	18496-25-8	mg/l	-	-	-	-	-	-	-	NA	NA	NA

Table 3
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Contaminant	CAS No.	Units	USEPA Drinking Water Maximum Contaminant Levels		Health Advisory Level	Iowa Protected Groundwater Source	Iowa Non-Protected Groundwater Source	Lowest Standard	Regional Screening Level (November 2019) Tap Water (10^{-6}, 0.1)	Anticipated TestAmerica Quantification Limit	Anticipated TestAmerica Method Detection Limit (MDL)	TestAmerica Laboratory Proposed Method
			Primary MCL (Health-Based)	Secondary MCL (Aesthetic)								
Other Inorganics												
Bromate	15541-45-4	mg/l	0.01	-	0.14	0.01	0.05	0.01	0.00011	1	0.5	9056
Chloride	16887-00-6	mg/l	-	250	-	-	-	250	-	1	0.319	9056A
Fluoride (dissolved)	16984-48-8	mg/l	4	2	-	4	20	2	0.12	0.1	0.046	9056A
Fluoride (total)[9]	16984-48-8	mg/l	4	2	-	4	20	2	0.08	0.1	0.046	9056A
Nitrate/Nitrite - N	E701177	mg/l	-	-	-	1[6]	5[7]	1	0.2[8]	1	NA	EPA 353.3
Nitrate - N	14797-55-8	mg/l	10	-	-	10	56	10	3.2	NA	NA	NA
Nitrite - N	14797-65-0	mg/l	1	-	-	1	5	1	0.2	0.1	0.0333	9056A
Sulfate	14808-79-8	mg/l	-	250	500	-	-	250	-	1	0.469	9056A
VOCs												
1,4-Dioxane[3]	123-91-1	ug/l[2]	-	-	1,000	200	1,000	200	0.46	100	34	8260D_SIM
Acetone	67-64-1	ug/l	-	-	-	6,300	32,000	6,300	1,400	10	3.10	8260D_SIM
Acrylonitrile	107-13-1	ug/l	-	-	-	0.32	6.5	0.32	0.052	5	2.20	8260D
Benzene	71-43-2	ug/l	5	-	100	5	64	5	0.46	0.5	0.22	8260D_SIM
Bromochloromethane	74-97-5	ug/l	-	-	500	90	450	90	8.3	5	0.54	8260D_SIM
Bromodichloromethane	75-27-4	ug/l	80	-	100	80	400	80	0.13	1	0.39	8260D_SIM
Bromoform	75-25-2	ug/l	80	-	1,000	80	440	80	3.3	5	0.78	8260D_SIM
Bromomethane	74-83-9	ug/l	-	-	50	10	50	10	0.75	4	1.10	8260D_SIM
2-Butanone (MEK)	78-93-3	ug/l	-	-	20,000	4,000	21,000	4,000	560	10	2.10	8260D_SIM
Carbon Disulfide	75-15-0	ug/l	-	-	-	700	3,500	700	81	1	0.45	8260D
Carbon tetrachloride	56-23-5	ug/l	5	-	100	5	50	5	0.46	2	0.65	8260D_SIM
Chlorobenzene	108-90-7	ug/l	100	-	700	100	700	100	7.8	1	0.40	8260D_SIM
Chloroethane	75-00-3	ug/l	-	-	-	2,800	14,000	2,800	2,100	4	0.79	8260D_SIM
Chloroform	67-66-3	ug/l	80	-	350	80	-	80	0.22	3	1.30	8260D_SIM
Chlorodibromomethane	124-48-1	ug/l	80	-	700	80	400	80	0.87	5	0.75	8260D_SIM
Chloromethane	74-87-3	ug/l	-	-	-	-	-	-	19	3	0.61	8260D_SIM
Dibromomethane	74-95-3	ug/l	-	-	-	70	350	70	0.83	1	0.33	8260D_SIM
1,2-Dibromo-3-Chloropropane	96-12-8	ug/l	0.2	-	-	0.2	2.9	0.2	0.00033	5	1.20	8260D_SIM
1,2-Dibromoethane (EDB)	106-93-4	ug/l	0.05	-	300	0.05	1.8	0.05	0.0075	1	0.34	8260D_SIM
1,2-Dichlorobenzene	95-50-1	ug/l	600	-	3,000	600	3,200	600	30	1	0.37	8260D_SIM
1,4-Dichlorobenzene	106-46-7	ug/l	75	-	4,000	75	650	75	0.48	1	0.23	8260D_SIM
1,1-Dichloroethane	75-34-3	ug/l	-	-	-	140	700	140	2.8	1	0.22	8260D_SIM
1,1-Dichloroethene	75-35-4	ug/l	7	-	2,000	7	180	7	28	2	0.56	8260D_SIM
1,2-Dichloroethane	107-06-2	ug/l	5	-	-	5	38	5	0.17	1	0.39	8260D_SIM
1,2-Dichloropropane	78-87-5	ug/l	5	-	-	5	60	5	0.82	1	0.27	8260D_SIM
cis-1,2-Dichloroethene	156-59-2	ug/l	70	-	70	70	350	70	3.6	1	0.21	8260D_SIM
trans-1,2-Dichloroethene	156-60-5	ug/l	100	-	700	100	700	100	36	1	0.27	8260D_SIM

Table 3
Groundwater Risk-Based Screening Levels, Analytical Methods, and Anticipated Detection Limits
WDC Acquisition LLC SAP/QAPP Addendum

Contaminant	CAS No.	Units	USEPA Drinking Water Maximum Contaminant Levels		Health Advisory Level	Iowa Protected Groundwater Source	Iowa Non-Protected Groundwater Source	Lowest Standard	Regional Screening Level (November 2019) Tap Water (10^{-6}, 0.1)	Anticipated TestAmerica Quantification Limit	Anticipated TestAmerica Method Detection Limit (MDL)	TestAmerica Laboratory Proposed Method
			Primary MCL (Health-Based)	Secondary MCL (Aesthetic)								
1,1-Dichloropropene	563-58-6	ug/l	-	-	-	-	-	-	-	NA	NA	NA
cis-1,3-Dichloropropene	10061-01-5, 542-75-6	ug/l	-	-	1,000	1.8	35	1.8	0.47	5	0.25	8260D_SIM
trans-1,3-Dichloropropene	10061-02-6, 542-75-6	ug/l	-	-	1,000	1.8	35	1.8	0.47	5	0.56	8260D_SIM
trans-1,4-Dichloro-2-butene	110-57-6	ug/l	-	-	-	1.8	35	1.8	0.0013	10	1.10	8260D_SIM
Ethylbenzene	100-41-4	ug/l	700	-	3,000	700	3,500	700	1.5	1	0.31	8260D_SIM
Hexane	110-54-3	ug/l	-	-	-	420	2,100	420	150	NA	NA	8260D
2-Hexanone	591-78-6	ug/l	-	-	-	-	-	-	3.8	10	2.00	8260D_SIM
Iodomethane	74-88-4	ug/l	-	-	-	-	-	-	-	10	7.00	8260D_SIM
Isopropylbenzene	98-82-8	ug/l	-	-	4,000	700	3,500	700	45	1	0.35	8260D_SIM
p-Isopropyltoluene	99-87-6	ug/l	-	-	-	-	-	-	-	NA	NA	NA
Methylene Chloride	75-09-2	ug/l	5	-	2,000	5.0	1,800	5	11	5	1.70	8260D_SIM
4-Methyl-2-pentanone (MIBK)	108-10-1	ug/l	-	-	-	560	2,800	560	630	10	2.10	8260D_SIM
n-Butylbenzene	104-51-8	ug/l	-	-	-	350	1,800	350	100	1	0.44	8260D_SIM
sec-Butylbenzene	135-98-8	ug/l	-	-	-	-	-	-	200	NA	NA	NA
tert-Butylbenzene	98-06-6	ug/l	-	-	-	-	-	-	69	NA	NA	NA
Naphthalene	91-20-3	ug/l	-	-	700	100	-	100	0.17	5.0	3.00	8270E_SIM_LL
n-Propylbenzene	103-65-1	ug/l	-	-	-	3,400	17,000	3400	66	NA	NA	NA
Styrene	100-42-5	ug/l	100	-	7,000	100	-	100	120	1	0.37	8260D_SIM
1,1,1,2-Tetrachloroethane	630-20-6	ug/l	-	-	1,000	70	350	70	0.57	1	0.38	8260D_SIM
1,1,2,2-Tetrachloroethane	79-34-5	ug/l	-	-	400	0.3	18	0.3	0.076	1	0.47	8260D_SIM
Tetrachloroethene	127-18-4	ug/l	5	-	500	5	1,700	5	4.1	1	0.48	8260D_SIM
Toluene	108-88-3	ug/l	1,000	-	3,000	1,000	5,000	1,000	110	1	0.43	8260D_SIM
1,1,1-Trichloroethane	71-55-6	ug/l	200	-	70,000	200	70,000	200	800	1	0.19	8260D_SIM
1,1,2-Trichloroethane	79-00-5	ug/l	5	-	100	5	61	5	0.041	1	0.45	8260D_SIM
Trichloroethene	79-01-6	ug/l	5	-	200	5	76	5	0.28	1	0.43	8260D_SIM
Trichlorofluoromethane	75-69-4	ug/l	-	-	10,000	2,000	10,000	2,000	520	4	0.38	8260D_SIM
1,2,3-Trichloropropane	96-18-4	ug/l	-	-	100	0.0058	0.12	0.0058	0.00075	1	0.59	8260D_SIM
1,2,4-Trimethylbenzene	95-63-6	ug/l	-	-	-	70	350	70	5.6	1	0.42	8260D_SIM
1,3,5-Trimethylbenzene	108-67-8	ug/l	-	-	-	70	350	70	6	1	0.37	8260D_SIM
Vinyl Acetate	108-05-4	ug/l	-	-	-	-	-	-	41	10	2.50	8260D_SIM
Vinyl Chloride	75-01-4	ug/l	2	-	100	2	10	2	0.019	1	0.18	8260D_SIM
Xylenes (total)	1330-20-7	ug/l	10,000	-	7,000	10,000	50,000	7,000	19	3	0.40	8260D_SIM

Footnotes:
1. Not Applicable
2. ug/l = micrograms per liter or parts per billion (ppb)
3. Method 8270 gives lower reporting levels.
4. Calculated from Chromium (VI) and Total Chromium.
5. Not Available
6. Nitrite value is 1.0 mg/l, nitrate value is 10.0 mg/l.
7. Nitrite value is 5 mg/l, nitrate value is 56 mg/l.
8. Taken using the lowest RBSL from Nitrate and Nitrite.
9. As of 9/1/2020, flouride now reported as total instead of distilled per SW846 Method 9056A.

Test America RL or MDL is above Lowest Standard/RBSL
RBSL (Lesser of Lowest Standard and PRG)

Table 4
QA Objectives for Field Measurements
Wellman Dynamics Corporation / Quality Assurance Project Plan

Parameter	Equipment[1]	Manufacturer's Reported Equipment Resolution	Manufacturer's Reported Equipment Accuracy	Field Use Precision Objective for Groundwater Stabilization Parameters[2]	Field Use Accuracy Objective[3]	Complete-ness Objective
WATER						
Depth to groundwater	Solinist Water Level Indicator or equivalent	0.01 ft	±0.01 ft	--	±0.01 ft.	90%
Turbidity	LaMotte Model 2020 or equivalent	0.1% of range maximum (e.g., 0.1 at 11-110 range)	±2% of reading if below 100 NTU, ±3% above 100 NTU	±5%	±5%	90%
Temperature	YSI Model 556 Multi-Probe or equivalent	0.1°C	±0.15°C	±0.2°C	±0.2°C	90%
Conductivity	YSI Model 556 Multi-Probe or equivalent	0.001 to 0.1 mS/cm	±0.5%	±1.5%	±2%	90%
Dissolved Oxygen	YSI Model 556 Multi-Probe or equivalent	0.01 mg/l	±2%	±1.5 mg/l	±1.5 mg/l	90%
Oxidation-Reduction Potential	YSI Model 556 Multi-Probe or equivalent	0.1 mV	±20 mV	±5 mV	±20 mV	90%
pH	YSI Model 556 Multi-Probe or equivalent	0.01 pH units	±0.2 pH units	±0.5 pH units	±0.2 pH units	90%
SOIL						
Field Screening for VOCs[4]	Thermo Environmental Model 580B Photoionization Detector	0.1 ppm as isobutylene in range 0.1-200 ppm, 1 ppm in range 200-2000 ppm	Not specified	--	approximately ± 10 % of actual concentration as isobutylene	90%

Table 4
QA Objectives for Field Measurements
Wellman Dynamics Corporation / Quality Assurance Project Plan

Parameter	Equipment[1]	Manufacturer's Reported Equipment Resolution	Manufacturer's Reported Equipment Accuracy	Field Use Precision Objective for Groundwater Stabilization Parameters[2]	Field Use Accuracy Objective[3]	Complete-ness Objective
LOCATION						
Sampling Location	Trimble GeoXT GPS with Pathfinder Pro XRS receiver or equivalent	Not specified	±0.5 meters Northing or Easting	--	±0.5 meters Northing or Easting	90%
Monitoring well top-of-casing elevations	Automatic survey level or equivalent	±0.01 ft	±0.01 ft	--	±0.01 ft.	90%
Monitoring Well Ground Surface Elevation	Automatic survey level or equivalent	±0.01 ft	±0.01 ft	--	±0.1 ft.	90%
Soil Sample Depth	Measuring tape	±0.01 ft	±0.01 ft	--	10% of sample depth for sample depth <5 ft, 0.5 ft for sample depth >4 ft	90%

NOTES:

1. Proposed equipment is shown. Alternate equipment may be substituted if it can meet the QA objectives.
2. Field precision objectives for groundwater stabilization parameters are set at approximately 50% of the stabilization criteria, so that the data are adequate to evaluate stabilization within the required stabilization range.
3. Field accuracy objectives are set based on the anticipated use of the data and the accuracy available from readily available field instruments.
4. Field screening with a PID does not provide a direct measurement of VOCs in soil and results are dependent on many factors including contaminant, soil type, ambient temperature, and soil temperature. Results should be used only as an approximate relative indication of contamination.

Table 5
Field QA/QC Sampling Requirements
Wellman Dynamics Corporation / Quality Assurance Project Plan

QA/QC Sample Type	Sample Matrix	Frequency of Sample/Analysis	Details
Equipment Rinse Blank	Water	1 per 20 investigative samples	Distilled water placed into contact with sampling equipment. Used to assess potential contaminantion associated with field sampling and decontamination procedures.
Equipment Rinse Blank	Soil - VOC Analysis	1 per 20 investigative samples	Methanol placed into contact with sampling equipment. Used to assess potential contamination associated with field sampling and decontamination precedures.
Equipment Rinse Blank	Soil - Inorganic Analysis	1 per 20 investigative samples	Distilled water placed into contact with sampling equipment. Used to assess potential contaminantion associated with field sampling and decontamination procedures.
Field Bottle Blank	Water - VOC Analysis	1 per 20 investigative samples	Laboratory reagent-grade water poured into VOC vials while sampling to assess potential contamination associated with sample containers, sampling environment, sample shipment, storage, or analysis
Trip Blank	Water - VOC Analysis	1 per sample cooler	Laboratory-prepared, organic-free blank to assess potential contamination associated with sample containers, shipment, storage, or analysis.
Methanol Blank	Soil - VOC Analysis	1 per day	A sample of methanol used to preserve soil/sediment samples for VOC analyses will be shipped each day that these samples are collected.
Duplicate Sample	All	1 per 20 investigative samples	Duplicate sample collected by the same methods and at the same time as original sample to assess verify sampling and analytical reproducibility.

Table 6
Preventive Maintenance of Field Screening Instruments
Wellman Dynamics Corporation / Quality Assurance Project Plan

Instruments	Maintenance Procedures/Schedule*	Spare Parts in Stock
Thermo Environmental Model 580B Photo-ionization Detector or equivalent	1. Calibrate beginning of each day, and as necessary during use. 2. Check battery, and recharge when low. 3. Clean lamp and dust filter in accordance with manufacturer requirements. 4. Replace water traps if they become wet.	1. Spare lamps 2. Spare dust filters 3. Spare water traps
YSI Model 556 Multi-Probe or equivalent	1. Calibrate beginning of each day, and as necessary during use. 2. Replace electrodes and membranes in accordance with manufacturer requirements.	1. pH buffers and calibration standards 2. Batteries 3. Spare electrodes and membranes
LaMotte Model 2020 Turbidity Meter or equivalent	1. Calibrate beginning of each day, and as necessary during use. 2. Replace batteries as needed.	1.Calibration standards 2. Batteries

*Specific maintenance procedures and schedules will be conducted in accordance with the manufacturer requirements for the specific instrument.

Table 7
Sample Container, Preservation, and Holding Time Requirements
Wellman Dynamics Corporation / BT^2 Project #2631

Matrix	Analysis	Container	Minimum Volume	Preservation	Holding Time
Soil / Sediment / Dross	Metals	1-4 oz widemouth glass jar	Varies	Cool to 4°C	6 months, mercury: 28 days, chromium VI: 30 days
	Volatiles	1-2 ounce widemouth glass jar plus 1-4 oz jar for % solids	25 to 35 grams	Cool to 4°, 25 mL methanol	14 days
	Semivolatiles	1-4 oz widemouth glass jar	100 grams	Cool to 4°C	14 days until extraction, 40 days after extraction
Water	Volatiles	3-40 mL septum cap vials	80 mL	HCl to pH<2, cool to 4°C	14 days
	Semivolatiles	1-1 liter amber glass bottle	1 liter	Cool to 4°C	7 days until extraction, 40 days after extraction
	Metals	1-1 liter polyethylene bottle	Varies	HNO_3 to pH<2	6 months, mercury: 28 days, **chromium VI: 24 hours**
	Sulfate	1-1 liter polyethylene bottle	100 mL	Cool to 4°C	28 days
	Nitrate+nitrite-N	1-1 liter polyethylene bottle	100 mL	Cool to 4°C, H_2SO_4 to pH<2	28 days
	Fluoride	1-1 liter polyethylene bottle	300 mL	Not applicable	28 days
	Chloride	1-1 liter polyethylene bottle	100 mL	Cool to 4°C	28 days

Table 8
Groundwater Monitoring Well Sampling Program Summary
Wellman Dynamics Corporation / Quality Assurance Project Plan

Monitoring Well Group	Appendix IX Inorganics + Cr VI			Target Anions (Cl, SO4, F, NO3)			Other Routine Landfill Parameters			Volatile Organic Compounds (VOCs)			1,4 Dioxane			Semivolatile Organic Compounds (SVOCs)			Other			Comments
	Rd 0	Rd 1	Rd 2	Rd 0	Rd 1	Rd 2	Rd 0	Rd 1	Rd 2	Rd 0	Rd 1	Rd 2	Rd 0	Rd 1	Rd 2	Rd 0	Rd 1	Rd 2	Rd 0	Rd 1	Rd 2	
Chromic Acid AST Area: MW1 -MW3, MWA	X	X	X*	X	X	X				X	X	X**		X	14D							X* = Sample only for inorganics detected above RBSLs in Rd 0 or 1 chromic acid AST source area well sampling X** = Sample for VOCs only if detected above RBSL at that well in Rd 0 or 1 14D = Sample for 1,4-dioxane only if detected at that well in Rd 1
Landfill Wells																						
Shallow Downgradient Wells: MW11, MW12, MW16, MW17	X	X	X*	X	X	X		X	X		X	X**		X	14D	X	X	X*	B	B	B*	X* = Sample only for inorganics or SVOCs detected above RBSLs in Rd 0 or 1 source area well sampling (shallow downgradient landfill wells, dross area well, or chromic acid AST wells) X** = Resample for VOCs or SVOCs only if detected above RBSL at that well in Rd 0 or 3/05 VOC sampling B* = Sample for boron only if detected in shallow downgradient wells above RBSL in Rd 0 or 1 14D = Sample for 1,4-dioxane only if detected at that well in Rd 1
Other Wells in Current Monitoring Program: MW7, MW8, MW12		X*	X*		X	X		X	X		X	X**		X	14D		X*	X**		B*	B*	
Wells Not in Current Monitoring Program: MW6, MW9, MW10, MW14, MW15, MW18		X*	X*		X	X		X			X	X**		X	14D		X*	X**		B*	B*	
Radiological Investigation Wells: MW19, MW20											X	X**		X	14D							X** and 14D = Same as for landfill wells
Dross Area Well: MW27		X	X		X	X					X	X**		X	14D							X** and 14D = Same as for landfill wells
New Property Line Wells: MW28-MW33		X*	X*		X	X		X			X	X		X	14D		X*	X**		B*	B*	X*, X**, 14D, and B* = Same as for landfill wells
New VOC Area Wells: MW34-MW40											X	X		X	14D							14D = Sample for 1,4-dioxane only if detected at that well in Rd 1

ABBREVIATIONS:

CrVI = Hexavalent chromium	Cl = Chloride	SO4 = Sulfate	F = Fluoride	VOCs = Volatile organic compounds
B = Boron	NO3 = Nitrate+nitrite	RBSL = Risk-based screening level	Rd = Sampling Round	AST = Above-ground storage tank

NOTES:

1. Round 0 is the initial source area well sampling of existing wells to identify key inorganic parameters. Rounds 1 and 2 will be coordinated with the routine semiannual landfill monitoring.
2. Other routine landfill monitoring parameters include magnesium, sodium, chemical oxygen demand, iron, ammonia, phenols, and total organic halogens.
3. All montoring well samples will also be field-tested for pH, specific conductance, temperature, turbidity, dissolved oxygen, and oxidation-reduction potential.

Table 9
Foundry Sand Metals Analysis
Wellman Dynamics Corporation / BT^2 Project #2631
(concentrations are in mg/kg)

Parameter	Foundry Sand -Dry 3/29/2005	Direct Contact PRG for Residential Soil	Direct Contact PRG for Industrial Soil	Soil Screening Level for Migration to Groundwater (DAF=20)
Antimony	<5.0	31	410	5
Arsenic	<1.0	0.39	1.6	29
Barium	3.7	5,400	67,000	1,600
Beryllium	<0.50	150	1,900	63
Boron	110	16,000	100,000	--
Cadmium	<1.0	37	450	8
Chromium	10	30 (Cr VI)	64 (Cr VI)	38 (Cr VI)
Copper	15	3,100	41,000	--
Lead	<5.0	400	800	--
Manganese	92	1,800	19,000	--
Mercury	<0.020	6.1	62	--
Molybdenum	3.1	390	5,100	--
Nickel	5.9	1,600	20,000	130
Selenium	<7.5	390	5,100	5
Silver	<1.0	390	5,100	34
Thallium	<1.0	5.2	67	--
Vanadium	<2.5	78	1,000	6,000
Zinc	14	23,000	100,000	12,000

-- = Not Applicable
mg/kg = milligrams per kilogram or parts per million (ppm)
Note: The foundry sand sample was also tested for TCLP metals. None of the eight RCRA metals were detected in the leachate.

Table 10
Landfill Leachate Monitoring Results
Wellman Dynamics Corporation - Creston, Iowa / BT2 Project #2631
(Results are in mg/l, except where otherwise noted)

Parameter	USEPA Region 9 PRG for Tap Water	Leachate Piezometer Monitoring Results								Other Leachate Samples			
		Sample S3 7/16/1992					Comp2 3/22/1996	Comp2 6/19/1996	Comp2 10/3/1996	Unfiltered 9/24/1998	Filtered 12/29/1998	Unfiltered 12/29/1998	Landfill Leachate 12/27/2005
Total Solids	--	7,200	--	--	--	--	--	--	--	7,300	2,500	7,380	9,140
Dissolved Solids	--	4,000	--	--	--	--	--	--	--	6,160	2,520	6,270	7,720
Suspended Solids	--	2,400	--	--	--	--	--	--	--	70.0	30.2	270	7.00
Alkalinity, total	--	--	--	--	--	--	--	--	--	700	597	634	644
Chloride	--	340	--	--	--	--	640	730	1,400	1,510	1,640	1,630	3,000
Fluoride	2.2	**120**	--	--	--	--	--	--	--	**83.2**	**66.5**	**66.5**	**110**
Fluoride, dissolved	2.2	--	--	--	--	--	**91**	**99**	**88**	--	--	--	--
Fluoride, distilled	2.2	--	--	--	--	--	**320**	**410**	**310**	--	--	--	--
Sulfate	--	1,100	--	--	--	--	860	**1,400**	**1,100**	**1,270**	**1,530**	**1,510**	1,070 M1
Bromide	--	1.8 (1)	--	--	--	--	--	--	--	--	--	--	--
Sulfite	--	<1	--	--	--	--	--	--	--	--	--	--	--
Sulfide	--	0.2	--	--	--	--	--	--	--	--	--	--	--
Ammonia (as N)	--	25	--	--	--	--	25	26	20	18.1	17.5	17.9	10.5
Nitrite+Nitrate (as N)	1	<0.1	--	--	--	--	--	--	--	**3.8**	<0.4	<0.4	<1.00
Phosphorous, Total	--	35	--	--	--	--	--	--	--	<0.1	<0.1	0.11	0.109
BOD	--	80 (2)	--	--	--	--	--	--	--	14.0	1.3	17.5	<12
COD	--	270	--	--	--	--	160	49	120	75.9	140	189	219
Cyanide, Total	0.73	<0.01	--	--	--	--	--	--	--	--	--	--	--
Phenols	--	0.14	--	--	--	--	--	--	--	--	--	--	--
Aluminum, Total	36	**43**	--	--	--	--	--	--	--	1.46	1.45	4.97	0.293
Antimony, Total	0.015	<0.01	--	--	--	--	--	--	--	--	--	--	--
Arsenic, Total	0.000045	<0.01	--	--	--	--	--	--	--	<0.005	<0.005	<0.005	**0.149**
Barium, Total	2.6	0.95	--	--	--	--	--	--	--	<0.02	<0.02	<0.02	0.121
Beryllium, Total	0.073	<0.02	--	--	--	--	--	--	--	--	--	--	--
Boron, Total	7.3	**260**	--	--	--	--	--	--	--	--	--	--	--
Cadmium, Total	0.018	<0.02	--	--	--	--	--	--	--	<0.01	<0.01	<0.01	<0.02
Chromium, Total	0.11	**0.11**	--	--	--	--	--	--	--	<0.01	<0.01	0.033	<0.02
Chromium, Hexavalent	0.11	<0.05	--	--	--	--	--	--	--	--	--	--	--
Cobalt, Total	0.73	<0.05	--	--	--	--	--	--	--	--	--	--	--
Copper, Total	1.5	<0.05	--	--	--	--	--	--	--	<0.02	<0.02	<0.02	0.502
Iron, Dissolved	11	--	--	--	--	--	--	--	**70**	**25.6**	**16.9**	**71.9**	1.99
Iron, Total	11	**120**	--	--	--	--	**320**	**110**	--	--	--	--	--
Lead, Total	--	<0.1	--	--	--	--	--	--	--	<0.005	<0.005	<0.005	0.136
Magnesium, Dissolved	--	--	--	--	--	--	300	470	520	598	708	399	798
Magnesium, Total	--	300	--	--	--	--	370	410	460	--	--	--	--
Manganese, total	0.88	**6.0**	--	--	--	--	--	--	--	**8.3**	**8.07**	**5.85**	**7.89**
Mercury, Total	--	<0.001	--	--	--	--	--	--	--	<0.0002	<0.0002	<0.0002	<0.0002
Nickel, Total	0.73	0.14	--	--	--	--	--	--	--	<0.02	<0.02	0.03	0.0529
Potassium	--	--	--	--	--	--	--	--	--	600	1,140	661	821

Table 10
Landfill Leachate Monitoring Results
Wellman Dynamics Corporation - Creston, Iowa / BT2 Project #2631
(Results are in mg/l, except where otherwise noted)

Parameter	USEPA Region 9 PRG for Tap Water	Leachate Piezometer Monitoring Results								Other Leachate Samples			
		Sample S3 7/16/1992					Comp2 3/22/1996	Comp2 6/19/1996	Comp2 10/3/1996	Unfiltered 9/24/1998	Filtered 12/29/1998	Unfiltered 12/29/1998	Landfill Leachate 12/27/2005
Selenium, Total	0.18	<0.01	--	--	--	--	--	--	--	<0.005	<0.01	<0.01	**0.508**
Silver, Total	0.18	0.01	--	--	--	--	--	--	--	<0.01	<0.01	<0.01	<0.02
Sodium, Dissolved	--	--	--	--	--	--	83	110	250	--	--	--	--
Sodium, Total	--	--	--	--	--	--	110	93	230	--	--	--	--
Thallium, Total	0.0024	<0.001	--	--	--	--	--	--	--	--	--	--	--
Tin, Total	22	<0.5	--	--	--	--	--	--	--	--	--	--	--
Zinc, Total	11	0.97	--	--	--	--	--	--	--	0.239	<0.02	1.42	0.490
GC/MS Extractables (semivolatiles)(ug/l)													
Phenol	11000	<4	--	--	--	--	--	--	--	28	--	75	<10.0
2-Methylphenol	--	<10	--	--	--	--	--	--	--	23.1	--	54.8	<10.0
Naphthalene	6.2	<4	--	--	--	--	--	--	--	**217**	--	**527**	<10.0
2-Methylnaphthalene	--	<4	--	--	--	--	--	--	--	<10	--	17.9	<10.0
Bis(2-ethylhexyl)phthalate	4.8	<10	--	--	--	--	--	--	--	**23.2**	--	<10	<10.0
Other SVOCs	--	ND	--	--	--	--	--	--	--	ND	--	ND	ND
Herbicides, Pesticides, and PCBs	--	ND	--	--	--	--	--	--	--	ND	--	--	ND
VOCs (ug/l)													
1,1-Dichloroethane	810	60	58	61	58	69	--	--	--	54.1	--	36.4	14.7
cis 1,2-Dichloroethene	61	14	14	15	15	16	--	--	--	<10.0	--	<5	7.34
1,1,1-Trichloroethane	3200	54	54	61	55	37	--	--	--	<10.0	--	<5	<1
Vinyl Chloride	0.02	<5	<5	<5	<5	<5	--	--	--	<10.0	--	<5	**5.06**
Benzene	0.35	<5	<5	<5	<5	<5	--	--	--	<10.0	--	<5	**0.610**
Toluene	720	<5	<5	<5	6	<5	--	--	--	210	--	35.8	--
Acetone	5500	40	44	39	45	49	--	--	--	<50.0	--	<15	<10.0
2-Butanone	7000	21	20	18	11	23	--	--	--	<10.0	--	<5	<10.0
Xylenes, Total	210	19	23	20	25	23	--	--	--	11.2	--	<5	2.53
Other VOCs	--	ND	ND	ND	ND	ND	--	--	--	ND	--	ND	ND

ABBREVIATIONS:
mg/l = milligrams per liter or parts per million (ppm)
ug/l = micrograms per liter or parts per billion (ppb)
-- = Not analyzed
ND = None detected
BOD = biological oxygen demand
COD = chemical oxygen demand
VOCs = volatile organic compounds
Bold indicates result exceeds PRG

NOTES:
1. Data compiled from laboratory reports in Final Groundwater Quality Assessment Report prepared by Howard R. Green Company, March 1997, and individual laboratory reports provided by WDC.
2. Leachate piezometer samples are composites, except for VOC results believed to be from individual leachate piezometers.
3. "Other Leachate Samples" may have been collected from the leachate sewer discharge monitoring point or from other locations in the leachate collection system.

LABORATORY NOTES:
1. Due to chloride interference, bromide was analyzed on a diluted portion of the original sample.
2. BOD missed and reset. Value may be low.
M1 = The MS and/or MSD were outside control limits.

Created by: SCC 5/20/04 Revised by: LH 4/14/06
Checked by: SMS 5/20/04 Checked by: SCC 4/17/06

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Table 11 - Preliminary
Groundwater Inorganic Analytical Results
from Monitoring Wells
Wellman Dynamics RCRA Facility Investigation

ANALYTE	Report Units	USEPA Drinking Water Maximum Contaminant Levels		Risk-Based Screening Levels	MWA 3/20/2007	MWA 9/26/2007	MWA 3/20/2008	MW01 3/19/2007	MW01 10/3/2007	MW01 3/21/2008	MW02 3/19/2007
		Primary MCL (Health-Based)	Secondary MCL (Aesthetic)	USEPA Region 9 Preliminary Remediation Goal for Tap Water	CQC0959-05	CQI1500-09	CRC0967-05	CQC0899-04	CQJ0240-03	CRC1016-03	CQC0899-02
Ammonia as N	mg/L	NE	NE	NE	--	--	--	--	**7.37**	--	--
Antimony	mg/L	0.006	NE	0.015	<0.00600	<0.00600	--	<0.00600	<0.00600	--	<0.00600
Arsenic	mg/L	0.01	NE	0.000045	**0.0208**	**0.0119**	**0.00923**	**0.0461**	**0.0962**	**0.0836**	**0.110 M1**
Barium	mg/L	2	NE	2.6	**0.349**	**0.325**	--	**0.734**	**0.847**	--	**0.517**
Beryllium	mg/L	0.004	NE	0.073	<0.0100	<0.00100	<0.001	<0.0100	<0.00100	<0.001	<0.0100
Boron	mg/L	NE	NE	7.3	--	--	--	--	**3.22**	--	--
Cadmium	mg/L	0.005	NE	0.018	**0.0252**	**0.026**	**0.014**	<0.000500	<0.000500	<0.0005	<0.000500
Chemical Oxygen Demand	mg/L	NE	NE	NE	--	--	--	--	**55.9**	--	--
Chloride	mg/L	NE	250	NE	**371**	**297**	**298**	**243**	**272**	**235**	**48.3**
Chromium	mg/L	0.100 Total	NE	55 (3)	**0.158**	**1.11**	**0.229**	<0.0200	<0.0200	<0.02	<0.0200
Chromium, Hexavalent	mg/L		NE	0.11	<0.0200	**1.45**	**0.0339**	<0.0200	<0.0200	<0.02	<0.0200
Cobalt	mg/L	NE	NE	0.73	<0.0200	<0.0200	--	<0.0200	<0.0200	--	<0.0200
Copper	mg/L	1.3	1	1.5	**0.231**	**0.344**	--	<0.0200	<0.0200	--	<0.0200
Fluoride	mg/L	4	2	2.2	**2.26**	**10.3**	**57.5**	**1.44**	**1.53**	**1.65**	**0.869**
Iron	mg/L	NE	0.3	11	--	--	**8.2**	--	**89.4**	**72.2**	--
Lead	mg/L	0.015	NE	NE	**0.0207**	**0.0327**	**0.0111**	<0.00400	<0.00400	<0.004	<0.00400
Magnesium	mg/L	NE	NE	NE	--	--	--	--	**66.2**	--	--
Mercury	mg/L	0.002(1)	NE	0.0036 (4)	<0.000200	<0.000200	--	<0.000200	<0.000200	--	<0.000200
Nickel	mg/L	NE	NE	0.73	<0.0500	<0.0500	--	<0.0500	<0.0500	--	<0.0500
Nitrate/Nitrite as N	mg/L	1.0 (2)	NE	1.0 (2)	**3.8**	**10.8**	**16.4**	<1.00	<0.100	<0.1	<1.00
Phenol	mg/L	NE	NE	NE	--	--	--	--	--	--	--
Selenium	mg/L	0.05	NE	0.18	<0.00500	<0.00500	--	<0.00500	<0.00500	--	<0.00500
Silver	mg/L	NE	0.1	0.18	<0.00100	<0.00100	--	<0.00100	<0.00100	--	<0.00100
Sodium	mg/L	NE	NE	NE	--	--	--	--	**43**	--	--
Sulfate	mg/L	NE	250	NE	**153**	**603**	**472**	**61.8**	**22.4**	**86.4**	<10.0
Sulfide	mg/L	NE	NE	NE	<1.00	<2.00	--	<1.00	<2.00	--	<1.00
Thallium	mg/L	0.002	NE	0.0024	<0.00200	<0.00200	--	<0.00200	<0.00200	--	<0.00200 M1
Tin	mg/L	NE	NE	22	<0.100	<0.100	--	<0.100	<0.100	--	<0.100
Total Organic Halides	mg/L	NE	NE	NE	--	--	--	--	--	--	--
Vanadium	mg/L	NE	NE	0.036	<0.0500	<0.0500	--	<0.0500	<0.0500	--	<0.0500
Zinc	mg/L	NE	5	11	**0.299**	**0.369**	--	<0.0200	**0.0244**	--	**0.0348**

See notes on page 10.

Table 11 - Preliminary
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ANALYTE	Report Units	MW02 10/3/2007 CQJ0240-05	MW02 3/21/2008 CRC1016-04	MW03 3/20/2007 CQC0959-02	MW03 10/3/2007 CQJ0240-02	MW03 3/20/2008 CRC0967-10	MW06 9/27/2007 CQI1583-04	MW06 3/18/2008 CRC0807-02	MW07 9/26/2007 CQI1500-08	MW07 9/26/2007 CQI1547	MW07 3/18/2008 CRC0807-04
Ammonia as N	mg/L	**1.04**	--	--	**11.5**	--	**0.351**	--	--	<0.200	--
Antimony	mg/L	<0.00600	--	<0.00600	<0.00600	--	--	--	--	--	--
Arsenic	mg/L	**0.0919**	**0.399**	**0.0166**	**0.0108**	<0.001	<0.00100	**0.00284**	**0.00678**	--	**0.0613**
Barium	mg/L	**0.648**	--	**0.027**	**0.0572**	--	--	--	--	--	--
Beryllium	mg/L	<0.00100	**0.0029**	<0.0100	**0.00727**	<0.001	--	<0.001	--	--	**0.00751**
Boron	mg/L	**4.21**	--	--	**6.97**	--	**10.5**	**8.35**	**3.93**	--	**1.64**
Cadmium	mg/L	**0.000849**	**0.0122**	**0.00298**	**0.000765**	<0.0005	<0.000500	<0.0005	**0.000527**	--	**0.00416**
Chemical Oxygen Demand	mg/L	**36.1**	--	--	**32.3**	--	**5.6**	--	--	**11.7**	--
Chloride	mg/L	**57.6**	**59.8**	**326**	**298**	**192**	**41.5**	**39.1**	--	**12.3**	--
Chromium	mg/L	<0.0200	**0.0707**	**2.18**	**27.4**	**0.186**	<0.0200	<0.02	**0.0299**	--	**0.199**
Chromium, Hexavalent	mg/L	<0.0200	<0.02	**1.51**	**16.5**	<0.02	<0.0200	<0.02	<0.0200	--	<0.02
Cobalt	mg/L	<0.0200	--	**0.043**	**0.0738**	--	--	--	--	--	--
Copper	mg/L	<0.0200	--	<0.0200	<0.0200	--	--	--	--	--	--
Fluoride	mg/L	**1.06**	**3.12**	**16.9**	**38.5**	**198**	**1.26**	<1	**1.19**	--	**4.49**
Iron	mg/L	**25.9**	**141**	--	**4.24**	**1.28**	**0.778**	**9.75**	**18.9**	<0.100	**177**
Lead	mg/L	0.00428	**0.0777**	<0.00400	<0.00400	<0.004	<0.00400	<0.004	**0.00705**	--	**0.0362**
Magnesium	mg/L	**48.7**	--	--	**293**	--	**173**	--	**72.8**	--	--
Mercury	mg/L	<0.000200	--	<0.000200 M1	<0.000200 M1	--	--	--	--	--	--
Nickel	mg/L	<0.0500	--	**0.139**	0.195	--	--	--	--	--	--
Nitrate/Nitrite as N	mg/L	<0.100	<0.1	<0.100	<0.100	<0.1	**2.16**	**1.12**	**1.85**	--	**1.26**
Phenol	mg/L	--	--	--	--	--	<0.0200	--	--	<0.0200	--
Selenium	mg/L	<0.00500	--	<0.00500	<0.00500	--	--	--	--	--	--
Silver	mg/L	<0.00100	--	<0.00100	<0.00100	--	--	--	--	--	--
Sodium	mg/L	**63.9**	--	--	**84.7**	--	**222**	--	**81.5**	--	--
Sulfate	mg/L	<10.0	**2.43**	**1050**	**1400**	**262**	**2490**	**2170**	--	**1100**	--
Sulfide	mg/L	<2.00	--	<1.00	<2.00	--	--	--	--	--	--
Thallium	mg/L	<0.00200	--	<0.00200	<0.00200	--	--	--	--	--	--
Tin	mg/L	<0.100	--	<0.100	<0.100	--	--	--	--	--	--
Total Organic Halides	mg/L	--	--	--	--	--	**0.0119**	--	--	<0.0100	--
Vanadium	mg/L	<0.0500	--	<0.0500	<0.0500	--	--	<0.05	--	--	**0.339**
Zinc	mg/L	**0.0223**	--	**0.143**	**0.267**	--	--	--	--	--	--

See notes on page 10.

Table 11 - Preliminary
Groundwater Inorganic Analytical Results
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Wellman Dynamics RCRA Facility Investigation

ANALYTE	Report Units	MW07 3/18/2008 CRC0960-03	MW08 9/27/2007 CQI1583-03	MW08 9/27/2007 CQI1547	MW08 3/18/2008 CRC0807-03	MW8 3/18/2008 CRC0960-02	MW09 9/26/2007 CQI1500-04	MW09 3/17/2008 CRC0752-04	MW10 9/26/2007 CQI1500-05	MW10 3/17/2008 CRC0752-05	MW11 3/20/2007 CQC0959-03
Ammonia as N	mg/L	<0.200 M1	--	<0.200	--	<0.200	**0.371**	--	<0.200	--	--
Antimony	mg/L	--	--	--	--	--	--	--	--	--	<0.00600
Arsenic	mg/L	--	<0.00100	--	<0.001	--	<0.00100	<0.00100	**0.00155**	<0.00100	**0.0066**
Barium	mg/L	--	--	--	--	--	--	--	--	--	0.0959
Beryllium	mg/L	--	--	--	<0.001	--	--	<0.00100	--	<0.00100	<0.0100
Boron	mg/L	--	**0.37**	--	0.147	--	**4.28**	**4.92**	**5.24**	**4.38**	**4.92**
Cadmium	mg/L	--	<0.000500	--	<0.0005	--	<0.000500	<0.000500	**0.000766**	<0.000500	<0.000500
Chemical Oxygen Demand	mg/L	<5.00	--	**10.0**	--	<5.00	**13.8**	--	**13.1**	--	--
Chloride	mg/L	**12.5**	--	**8.65**	--	**8.88**	**41**	**41.6**	**18.6**	**20.7**	**93.5**
Chromium	mg/L	--	<0.0200	--	<0.02	--	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200
Chromium, Hexavalent	mg/L	--	<0.0200	--	<0.02	--	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200
Cobalt	mg/L	--	--	--	--	--	--	--	--	--	<0.0200
Copper	mg/L	--	--	--	--	--	--	--	--	--	<0.0200
Fluoride	mg/L	--	<1.00	**1.19**	--	<1.00	**1.52**	<1.00	<1.00	<1.00	**11.5**
Iron	mg/L	<0.100	<0.100	<0.100	<0.1	<0.100	**4.99**	**6.73**	**5.2**	**1.44**	--
Lead	mg/L	--	<0.00400	--	<0.004	--	<0.00400	<0.00400	<0.00400	<0.00400	<0.00400
Magnesium	mg/L	--	**14.2**	--	--	--	**180**	--	**156**	--	--
Mercury	mg/L	--	--	--	--	--	--	--	--	--	<0.000200
Nickel	mg/L	--	--	--	--	--	--	--	--	--	<0.0500
Nitrate/Nitrite as N	mg/L	--	**12.5**	--	**8.24**	--	**0.811**	**1.3**	**0.954**	**2.17**	**2.52**
Phenol	mg/L	--	--	<0.0180	--	--	<0.0200	--	<0.0200	--	--
Selenium	mg/L	--	--	--	--	--	--	--	--	--	<0.00500
Silver	mg/L	--	--	--	--	--	--	--	--	--	<0.00100
Sodium	mg/L	--	**15.8**	--	--	--	**264**	--	**150**	--	--
Sulfate	mg/L	**1180**	--	**45.4**	--	**42.3**	**1940**	**2140**	**2100**	**2030**	**137**
Sulfide	mg/L	--	--	--	--	--	--	--	--	--	<1.00
Thallium	mg/L	--	--	--	--	--	--	--	--	--	<0.00200
Tin	mg/L	--	--	--	--	--	--	--	--	--	<0.100
Total Organic Halides	mg/L	--	--	<0.0100	--	--	**0.0473**	--	<0.0100	--	--
Vanadium	mg/L	--	--	--	<0.05	--	--	<0.0500	--	<0.0500	<0.0500
Zinc	mg/L	--	--	--	--	--	--	--	--	--	<0.0200

See notes on page 10.

Table 11 - Preliminary
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ANALYTE	Report Units	MW11 9/26/2007 CQI1500-02	MW11 9/26/2007 CQI1547	MW11 9/27/2007 CRA0502-01	MW11 3/19/2008 CRC0886-05	MW11 3/19/2008 CRC0960-07	MW11 Dup 3/20/2007 CQC0959-04	MW11 Dup 9/26/2007 CQI1500-03	MW11 Dup 9/27/2007 CRA0502-02	MW12 9/26/2007 CQI1500-06	MW12 9/26/2007 CQI1547
Ammonia as N	mg/L	--	<0.200	--	--	<0.200	--	<0.200	--	--	<0.200
Antimony	mg/L	<0.00600	--	--	--	--	<0.00600	<0.00600	--	--	--
Arsenic	mg/L	<0.00100	--	--	<0.001	--	**0.0077**	<0.00100	--	**0.00235**	--
Barium	mg/L	0.115	--	--	--	--	**0.0922**	**0.122**	--	--	--
Beryllium	mg/L	<0.00100	--	--	<0.001	--	<0.0100	<0.00100	--	--	--
Boron	mg/L	--	--	**5.48**	**6.54**	--	**4.75**	--	**5.59**	**44.2**	--
Cadmium	mg/L	0.000632	--	--	<0.0005	--	<0.000500	**0.000778**	--	<0.000500	--
Chemical Oxygen Demand	mg/L	--	**12.8**	--	--	**9.7**	--	**8.1**	--	--	**19.4**
Chloride	mg/L	--	**65.1**	--	--	**101 M1**	**94.6 M1**	**64.1**	--	--	**361**
Chromium	mg/L	<0.0200	--	--	<0.02	--	<0.0200	<0.0200	--	<0.0200	--
Chromium, Hexavalent	mg/L	<0.0200	--	--	<0.02	--	<0.0200	<0.0200	--	<0.0200	--
Cobalt	mg/L	<0.0200	--	--	--	--	<0.0200	<0.0200	--	--	--
Copper	mg/L	<0.0200	--	--	--	--	<0.0200	<0.0200	--	--	--
Fluoride	mg/L	**13.3**	**13.8**	--	--	**11.7**	**11.6**	**14.2**	--	<1.00	--
Iron	mg/L	<0.100	<0.100	--	**0.419**	<0.100	--	**0.161**	--	**5.41**	<0.100
Lead	mg/L	<0.00400	--	--	<0.004	--	<0.00400	<0.00400	--	<0.00400	--
Magnesium	mg/L	**50**	--	--	--	--	--	**51.2**	--	**159**	--
Mercury	mg/L	<0.000200	--	--	--	--	<0.000200	<0.000200	--	--	--
Nickel	mg/L	<0.0500	--	--	--	--	<0.0500	<0.0500	--	--	--
Nitrate/Nitrite as N	mg/L	**1.26**	--	--	**2.87**	--	**2.73**	**1.32**	--	**1.68**	--
Phenol	mg/L	--	<0.0200	--	--	--	--	<0.0200	--	--	<0.0200
Selenium	mg/L	<0.00500	--	--	--	--	<0.00500	<0.00500	--	--	--
Silver	mg/L	<0.00100	--	--	--	--	<0.00100	<0.00100	--	--	--
Sodium	mg/L	**20.4**	--	--	--	--	--	**20.2**	--	**179**	--
Sulfate	mg/L	--	**124**	--	--	**109**	**141**	**130**	--	--	**1980**
Sulfide	mg/L	<2.00	--	--	--	--	<1.00	<2.00	--	--	--
Thallium	mg/L	<0.00200	--	--	--	--	<0.00200	<0.00200	--	--	--
Tin	mg/L	<0.100	--	--	--	--	<0.100	<0.100	--	--	--
Total Organic Halides	mg/L	--	**0.0338**	--	--	--	--	0.0303	--	--	**0.0222**
Vanadium	mg/L	<0.0500	--	--	<0.05	--	<0.0500	<0.0500	--	--	--
Zinc	mg/L	0.0238	--	--	--	--	**0.0205**	0.0585	--	--	--

See notes on page 10.

Table 11 - Preliminary
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from Monitoring Wells
Wellman Dynamics RCRA Facility Investigation

ANALYTE	Report Units	MW12 3/17/2008 CRC0752-02	MW12 3/17/2008 CRC0960-01	MW13 3/21/2007 CQC1000-02	MW13 9/26/2007 CQI1500-07	MW13 9/26/2007 CQI1547	MW13 3/19/2008 CRC0886-04	MW13 3/19/2008 CRC0960-06	MW13 DUP 3/19/2008 CRC0886-06	MW14 9/28/2007 CQI1614-03	MW14 3/17/2008 CRC0752-03
Ammonia as N	mg/L	--	<0.200	--	--	**13.0**	--	**8.71**	--	**1.57**	--
Antimony	mg/L	--	--	<0.0600 RL1	<0.00600	--	--	--	--	--	--
Arsenic	mg/L	**0.00285**	--	**0.00241**	**0.00247**	--	**0.00174**	--	**0.00196**	<0.00100	<0.00100
Barium	mg/L	--	--	**0.257**	**0.315**	--	--	--	--	--	--
Beryllium	mg/L	<0.00100	--	<0.0100	**0.0013**	--	**0.00126**	--	**0.00132**	--	<0.00100
Boron	mg/L	**43.6**	--	**222**	--	--	**205**	--	**211**	**44.3**	**59.3 MHA**
Cadmium	mg/L	<0.000500	--	<0.000500	<0.000500	--	<0.0005	--	<0.0005	**0.000679**	<0.000500
Chemical Oxygen Demand	mg/L	--	**10**	--	--	**58.6**	--	**66.2**	--	**15.7**	--
Chloride	mg/L	--	**355**	**2280**	--	**2840**	--	**2890**	**2910**	**247**	**394**
Chromium	mg/L	<0.0200	--	<0.0200	<0.0200	--	<0.02	--	<0.02	<0.0200	<0.0200
Chromium, Hexavalent	mg/L	<0.0200	--	<0.0200	<0.0200	--	<0.02	--	<0.02	<0.0200	<0.0200
Cobalt	mg/L	--	--	<0.0200	<0.0200	--	--	--	--	--	--
Copper	mg/L	--	--	<0.0200	<0.0200	--	--	--	--	--	--
Fluoride	mg/L	<1.00	--	**44.4**	**127**	**119**	--	**182 M1**	**10.1**	**0.926**	**1.2**
Iron	mg/L	**4.08**	<0.100	--	**1.56**	**1.39**	**3.22**	**1.19**	**3.66**	**1.21**	**0.221**
Lead	mg/L	<0.00400	--	<0.00400	<0.00400	--	<0.004 M1	--	**0.0156**	<0.00400	<0.00400
Magnesium	mg/L	--	--	--	**678**	--	--	--	--	**167**	--
Mercury	mg/L	--	--	<0.000200	<0.000200	--	--	--	--	--	--
Nickel	mg/L	--	--	<0.0500	<0.0500	--	--	--	--	--	--
Nitrate/Nitrite as N	mg/L	**1.8**	--	<0.100	<0.100	--	<0.1	--	<0.1	**3.89**	**3.34**
Phenol	mg/L	--	--	--	--	**0.0216**	--	--	--	<0.0200	--
Selenium	mg/L	--	--	<0.0500 RL1	<0.00600 RL1	--	--	--	--	--	--
Silver	mg/L	--	--	<0.00100 M1	<0.00100	--	--	--	--	--	--
Sodium	mg/L	--	--	--	**632**	--	--	--	--	**243**	--
Sulfate	mg/L	--	**1790**	**923**	--	**1350**	--	**1410**	**1350**	**1730**	**1790**
Sulfide	mg/L	--	--	<1.00	<2.00		--	--	--	--	--
Thallium	mg/L	--	--	<0.00200	<0.00200	--	--	--	--	--	--
Tin	mg/L	--	--	<0.100	<0.100	--	--	--	--	--	--
Total Organic Halides	mg/L	--	--	--	--	**0.0369**	--	--	--	**0.0333**	--
Vanadium	mg/L	<0.0500	--	<0.0500	**0.0548**	--	**0.0513**	--	**0.0526**	--	<0.0500
Zinc	mg/L	--	--	<0.0200	<0.0800 IE	--	--	--	--	--	--

See notes on page 10.

Table 11 - Preliminary
Groundwater Inorganic Analytical Results
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ANALYTE	Report Units	MW15 9/27/2007 CQI1583-02	MW15 3/18/2008 CRC0807-06	MW16 3/21/2007 CQC1000-04	MW16 9/27/2007 CQI1583-01	MW16 9/27/2007 CQI1547	MW16 3/19/2008 CRC0886-02	MW16 3/19/2008 CRC0960-05	MW17 3/21/2007 CQC1000-05	MW17 9/27/2007 CQI1583-06	MW17 9/27/2007 CQI1547
Ammonia as N	mg/L	<0.200	--	--	--	<0.200	--	<0.200	--	--	<0.200
Antimony	mg/L	--	--	<0.00600	<0.00600	--	--	--	<0.00600	<0.00600	--
Arsenic	mg/L	**0.00451**	**0.00569 pH>2**	**0.00215**	**0.00215**	--	**0.00131**	--	<0.00100	<0.00100	--
Barium	mg/L	--	--	0.0659	0.0582	--	--	--	**0.0374**	**0.05**	--
Beryllium	mg/L	--	<0.001 pH>2	<0.0100	<0.00100	--	<0.001	--	<0.0100	**0.00112**	--
Boron	mg/L	**0.964**	**0.579 pH>2**	**96.1**	**72.3 MHA**	--	**81.1 MHA**	--	**50.7**	**60.5**	--
Cadmium	mg/L	**0.000704**	0.000836 pH>2	<0.000500	<0.000500	--	<0.0005	--	<0.000500	<0.000500	--
Chemical Oxygen Demand	mg/L	**8**	--	--	--	**37.8**	--	**48.1**	--	--	**26.7**
Chloride	mg/L	**217**	**209**	**2350**	--	**2270**	--	**2390**	**1090**	--	**1120**
Chromium	mg/L	<0.0200	<0.02 pH>2	<0.0200	<0.0200	--	<0.02	--	<0.0200	<0.0200	--
Chromium, Hexavalent	mg/L	<0.0200	<0.02	<0.0200	<0.0200 M1	--	<0.02	--	<0.0200	<0.0200	--
Cobalt	mg/L	--	--	<0.0200	<0.0200	--	--	--	<0.0200	<0.0200	--
Copper	mg/L	--	--	<0.0200	<0.0200	--	--	--	<0.0200	<0.0200	--
Fluoride	mg/L	**5.7**	<1	**1.84**	**2.83**	**15.5**	--	**1.63**	**6.05**	**10.7**	**9.12**
Iron	mg/L	**9.4**	**13.3 pH>2**	--	**0.776**	**0.531**	**0.875**	**0.235**	--	<0.100	<0.100
Lead	mg/L	<0.00400	<0.004	<0.00400	<0.00400	--	<0.004	--	<0.00400	<0.00400	--
Magnesium	mg/L	**116**	--	--	**328 MHA**	--	--	--	--	**198**	--
Mercury	mg/L	--	--	<0.000200	<0.000200	--	--	--	<0.000200	<0.000200	--
Nickel	mg/L	--	--	**0.21**	**0.141**	--	--	--	<0.0500	**0.0501**	--
Nitrate/Nitrite as N	mg/L	**1.66**	**0.191**	<0.100	<0.100	--	<0.1	--	**0.122**	**0.189**	--
Phenol	mg/L	<0.0200	--	--	--	<0.0200	--	--	--	--	<0.0200
Selenium	mg/L	--	--	<0.00500	<0.00500 M1	--	--	--	<0.00500	<0.00500	--
Silver	mg/L	--	--	<0.00100	<0.00100	--	--	--	<0.00100	<0.00100	--
Sodium	mg/L	**140**	--	--	**171 MHA**	--	--	--	--	**211**	--
Sulfate	mg/L	**1360**	**1620**	**940**	--	**923**	--	**803**	**548**	--	**599**
Sulfide	mg/L	--	--	<1.00	<2.00	--	--	--	<1.00	<2.00	--
Thallium	mg/L	--	--	<0.00200	<0.00200 M1	--	--	--	<0.00200	<0.00200	--
Tin	mg/L	--	--	**0.358**	<0.100	--	--	--	<0.100	<0.100	--
Total Organic Halides	mg/L	<0.0100	--	--	--	**0.0294**	--	--	--	--	**0.0595**
Vanadium	mg/L	--	<0.05 pH>2	<0.0500	<0.0500	--	<0.05	--	<0.0500	<0.0500	--
Zinc	mg/L	--	--	<0.0200	**0.227**	--	--	--	<0.0200	0.116	--

See notes on page 10.

Table 11 - Preliminary
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ANALYTE	Report Units	MW17 3/18/2008 CRC0807-07	MW17 3/18/2008 CRC0960-04	MW18 9/27/2007 CQI1583-05	MW18 3/18/2008 CRC0807-08	MW27 9/28/2007 CQI1614-05	MW27 3/17/2008 CRC0752-06	MW28 9/28/2007 CQI1614-02	MW28 3/20/2008 CRC0967-02	MW29 10/4/2007 CQJ0343-02	MW29 3/19/2008 CRC0886-03
Ammonia as N	mg/L	--	<0.200	<0.200	--	--	--	**0.222**	--	<0.200 M1	--
Antimony	mg/L	--	--	--	--	<0.00600	<0.00600	--	--	--	--
Arsenic	mg/L	<0.001	--	<0.00100	<0.001	<0.00100	<0.00300 RL1	**0.0231**	**0.0196**	<0.00100	**0.0764**
Barium	mg/L	--	--	--	--	**0.752**	**0.87**	--	--	--	--
Beryllium	mg/L	<0.001	--	--	<0.001	<0.00100	<0.00100	--	<0.001	--	**0.0104**
Boron	mg/L	**48**	--	**2.48**	**1.8**	--	--	**28**	**31.6**	**12.7**	**8.3**
Cadmium	mg/L	<0.0005	--	<0.000500	<0.0005	**0.00488**	**0.00784**	<0.000500	**0.000594**	**0.00456**	**0.0154**
Chemical Oxygen Demand	mg/L	--	**25.7**	**8.6**	--	**104**	--	**51**	--	**26.5**	--
Chloride	mg/L	--	**1050**	**85.4**	**88.9**	**3240**	**3530**	**1450**	**1630**	**787**	**414**
Chromium	mg/L	<0.02	--	<0.0200	<0.02	<0.0200	<0.0200	<0.0200	<0.02	<0.0200	**0.227**
Chromium, Hexavalent	mg/L	<0.02	--	<0.0200	<0.02	<0.0200	<0.0200	<0.0200 M1	<0.02 M1	<0.0200	<0.02
Cobalt	mg/L	--	--	--	--	<0.0200	<0.0200	--	--	--	--
Copper	mg/L	--	--	--	--	<0.0200	<0.0200	--	--	--	--
Fluoride	mg/L	--	**6.77**	<1.00	**1.3**	**3.16**	**22**	<1.00	<1	<1.00	**1.79**
Iron	mg/L	<0.1	<0.100	**1.49**	**2.28**	--	--	**19.1**	**16.5**	**0.145**	**209**
Lead	mg/L	<0.004	--	<0.00400	<0.004	<0.00400	<0.00400	<0.00400	<0.004	<0.00400	**0.163**
Magnesium	mg/L	--	--	**134**	--	--	--	**232**	--	**169**	--
Mercury	mg/L	--	--	--	--	<0.000200	<0.000200	--	--	--	--
Nickel	mg/L	--	--	--	--	**0.0547**	**0.0704**	--	--	--	--
Nitrate/Nitrite as N	mg/L	**0.173**	--	**1.93**	**0.713**	**8.66**	**9.9**	<0.100	<0.1	**1.31**	**1.63**
Phenol	mg/L	--	--	<0.0200	--	--	--	<0.0200	--	<0.0180	--
Selenium	mg/L	--	--	--	--	<0.0100 RL1	<0.00500	--	--	--	--
Silver	mg/L	--	--	--	--	<0.00100	<0.00100	--	--	--	--
Sodium	mg/L	--	--	**136**	--	--	--	**111**	--	**422**	--
Sulfate	mg/L	--	**547**	**1950**	**1870**	**118**	**106**	**409**	**682**	**1530**	**2040**
Sulfide	mg/L	--	--	--	--	<2.00	<2.00 R	--	--	--	--
Thallium	mg/L	--	--	--	--	<0.00200	<0.00200	--	--	--	--
Tin	mg/L	--	--	--	--	<0.100	<0.100	--	--	--	--
Total Organic Halides	mg/L	--	--	**0.0157**	--	--	--	**0.0303**	--	**0.0202**	--
Vanadium	mg/L	<0.05	--	--	<0.05	<0.0500	<0.0500	--	<0.05	--	**0.346**
Zinc	mg/L	--	--	--	--	**0.0578**	<0.0200	--	--	--	--

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Table 11 - Preliminary
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ANALYTE	Report Units	MW30 9/25/2007 CQI1376-04	MW30 3/20/2008 CRC0967-06	MW30 Dup 3/20/2008 CRC0967-07	MW31 10/4/2007 CQJ0343-03	MW31 3/20/2008 CRC0967-08	MW31 Dup 3/20/2008 CRC0967-11	MW32 9/25/2007 CQI1376-05	MW32 3/20/2008 CRC0967-09	MW33 9/28/2007 CQI1614-06	MW33 3/18/2008 CRC0807-09
Ammonia as N	mg/L	<0.200	--	--	--	**0.418**	**0.451**	<0.200	--	**0.525**	--
Antimony	mg/L	--	--	--	--	--	--	--	--	--	--
Arsenic	mg/L	<0.00100	**0.00325**	**0.00309**	--	<0.001	--	<0.00100	<0.001	<0.00100	<0.001
Barium	mg/L	--	--	--	--	--	--	--	--	--	--
Beryllium	mg/L	--	<0.001	<0.001	--	<0.001	--	--	<0.001	--	<0.001
Boron	mg/L	**2.7**	**3.09**	**2.75**	--	**1.03**	--	**2.26**	**2.16**	**11.3**	**9.66**
Cadmium	mg/L	<0.000500	<0.0005	<0.0005	--	<0.0005	--	<0.000500	<0.0005	<0.000500	<0.0005
Chemical Oxygen Demand	mg/L	**20.1**	--	--	--	**10.8**	**5.5**	**9.3**	--	**12.8**	--
Chloride	mg/L	**127**	**81.8**	**82.6**	**32.9**	**18.8**	--	**45.7**	**35.5**	**87.2**	**61.4**
Chromium	mg/L	<0.0200	**0.0294**	**0.0298**	--	**0.0235**	--	<0.0200	<0.02	<0.0200	<0.02
Chromium, Hexavalent	mg/L	<0.0200	<0.02	<0.02	<0.0200	<0.02	--	<0.0200	<0.02	<0.0200	<0.02
Cobalt	mg/L	--	--	--	--	--	--	--	--	--	--
Copper	mg/L	--	--	--	--	--	--	--	--	--	--
Fluoride	mg/L	**0.481**	**10.9**	**12.4**	**0.32**	<1	--	**0.612**	**1.19**	<1.00	<1
Iron	mg/L	<0.100	**9.17**	**7.21**	--	**5.56**	--	<0.100	**0.344**	**0.113**	**0.649**
Lead	mg/L	<0.00400	<0.004	<0.004	--	<0.004	--	<0.00400	<0.004	<0.00400	<0.004
Magnesium	mg/L	**49.0 MHA**	--	--	--	**175**	**172**	**25.1**	--	**88**	--
Mercury	mg/L	--	--	--	--	--	--	--	--	--	--
Nickel	mg/L	--	--	--	--	--	--	--	--	--	--
Nitrate/Nitrite as N	mg/L	**1.8**	<0.1	<0.1	--	**0.155**	--	**1.64**	**0.691**	<0.100	**0.151**
Phenol	mg/L	<0.0200	--	--	--	<0.02	<0.02	<0.0200	--	<0.0200	--
Selenium	mg/L	--	--	--	--	--	--	--	--	--	--
Silver	mg/L	--	--	--	--	--	--	--	--	--	--
Sodium	mg/L	**35.3 MHA**	--	--	--	**155**	**162**	**17.7**	--	**492**	--
Sulfate	mg/L	**273**	**129**	**139**	**2300**	**2060**	--	**50.1**	**47**	**2160**	**2140**
Sulfide	mg/L	--	--	--	--	--	--	--	--	--	--
Thallium	mg/L	--	--	--	--	--	--	--	--	--	--
Tin	mg/L	--	--	--	--	--	--	--	--	--	--
Total Organic Halides	mg/L	**0.570 S7**	--	--	--	**0.0180 M1, R**	<0.01	<0.0100	--	**0.0309**	--
Vanadium	mg/L	--	<0.05	<0.05	--	<0.05	--	--	<0.05	--	<0.05
Zinc	mg/L	--	--	--	--	--	--	--	--	--	--

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Table 11 - Preliminary
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ANALYTE	Report Units	MW34 10/2/2007 CQJ0169-04	MW34 3/26/2008 CRC1204-04	MW35 10/2/2007 CQJ0169-05	MW35 3/26/2008 CRC1204-02	MW36 10/1/2007 CQJ0061-02	MW36 3/26/2008 CRC1204-03	MW37 9/25/2007 CQI1376-07	MW37 3/25/2008 CRC1117-04	MW38 10/2/2007 CQJ0169-02	MW38 3/25/2008 CRC1117-03
Ammonia as N	mg/L	--	--	--	--	--	--	--	--	--	--
Antimony	mg/L	--	--	--	--	--	--	--	--	--	--
Arsenic	mg/L	**0.00581**	**0.00132**	**0.029**	**0.0268**	**0.0102**	--	<0.00100	<0.00100	<0.00100	<0.00100
Barium	mg/L	--	--	--	--	--	--	--	--	--	--
Beryllium	mg/L	--	<0.001	--	<0.001	--	--	--	<0.00100	--	<0.00100
Boron	mg/L	**2**	**4.34**	**1.89**	**1.82**	**2.47**	**12.6 pH>2**	<0.100	**0.137**	<0.100	<0.100
Cadmium	mg/L	**0.000912**	<0.0005	<0.000500	<0.0005	<0.000500	--	<0.000500	<0.000500	<0.000500	<0.000500
Chemical Oxygen Demand	mg/L	--	--	--	--	--	--	--	--	--	--
Chloride	mg/L	**681**	**565**	**373**	**375**	**224**	**188**	**171**	**274**	**145**	**170**
Chromium	mg/L	<0.0200	<0.02	**0.147**	**0.0279**	<0.0200	0.0776 pH>2	<0.0200	<0.0200	<0.0200	<0.0200
Chromium, Hexavalent	mg/L	<0.0200	<0.02	<0.0200	<0.02	<0.0200 M1	--	<0.0200	<0.0200	<0.0200	<0.0200
Cobalt	mg/L	--	--	--	--	--	--	--	--	--	--
Copper	mg/L	--	--	--	--	--	--	--	--	--	--
Fluoride	mg/L	<1.00	**1.47**	**1.46**	<1	**1.71**	**57**	**0.414**	<1.00	<1.00	<1.00
Iron	mg/L	--	**0.412**	--	**78.2**	--	--	--	**3.27**	--	<0.100
Lead	mg/L	<0.00400	<0.004	<0.00400	<0.004 M1	<0.00400	--	<0.00400	<0.00400	<0.00400	<0.00400
Magnesium	mg/L	--	--	--	--	--	--	--	--	--	--
Mercury	mg/L	--	--	--	--	--	--	--	--	--	--
Nickel	mg/L	--	--	--	--	--	--	--	--	--	--
Nitrate/Nitrite as N	mg/L	<0.100	<0.1	**0.328**	<0.1	**0.395**	--	**0.703**	**0.746**	**1.67**	**0.846**
Phenol	mg/L	--	--	--	--	--	--	--	--	--	--
Selenium	mg/L	--	--	--	--	--	--	--	--	--	--
Silver	mg/L	--	--	--	--	--	--	--	--	--	--
Sodium	mg/L	--	--	--	--	--	--	--	--	--	--
Sulfate	mg/L	**104**	**160**	**716**	**630**	**994**	--	**36.1**	**32**	**29**	**23**
Sulfide	mg/L	--	--	--	--	--	--	--	--	--	--
Thallium	mg/L	--	--	--	--	--	--	--	--	--	--
Tin	mg/L	--	--	--	--	--	--	--	--	--	--
Total Organic Halides	mg/L	--	--	--	--	--	--	--	--	--	--
Vanadium	mg/L	--	--	--	--	--	--	--	--	--	--
Zinc	mg/L	--	--	--	--	--	--	--	--	--	--

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Table 11 - Preliminary
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ANALYTE	Report Units	MW38 Dup 10/2/2007 CQJ0169-03	MW39 9/25/2007 CQI1376-06	MW39 3/20/2008 CRC0967-03	MW40 10/1/2007 CQJ0061-03	MW40 3/20/2008 CRC0967-04	MW41 9/28/2007 CQI1614-04	MW41 3/25/2008 CRC1117-05	Equipment Blank 3/20/2007 CQC0959-06	Equipment Blank 10/1/2007 CQJ0061-04	Equipment Blank 3/21/2008 CRC1016-05	Equipment Blank 3/26/2008 CRC1204-05
Ammonia as N	mg/L	--	--	--	--	--	--	--	--	<0.200	<0.2 M1	--
Antimony	mg/L	--	--	--	--	--	--	--	<0.00600	<0.00600	--	--
Arsenic	mg/L	<0.00100	<0.00100	<0.001	<0.00100	<0.001	**0.00105**	**0.00582**	**0.0048**	<0.00100	<0.001	<0.001
Barium	mg/L	--	--	--	--	--	--	--	<0.0100	<0.0100	--	--
Beryllium	mg/L	--	--	<0.001	--	<0.001	--	<0.00100	<0.0100	<0.00100	<0.001	<0.001
Boron	mg/L	<0.100	**0.334**	**0.782**	**0.383**	**0.618**	**49.5**	**14.1**	**0.145**	<0.100	0.101	<0.1
Cadmium	mg/L	<0.000500	<0.000500	<0.0005	<0.000500	<0.0005	<0.000500	<0.000500	<0.000500	<0.000500	<0.0005	<0.0005
Chemical Oxygen Demand	mg/L	--	--	--	--	--	28.7	--	--	<5.00	**9.3**	--
Chloride	mg/L	**144**	**222**	**185**	**28.2**	**14.3**	**84.3**	**191**	**11.6**	<5.00	**25**	**29.1**
Chromium	mg/L	<0.0200	<0.0200	<0.02	<0.0200	<0.02	<0.0200	<0.0200	<0.0200	<0.0200	<0.02	<0.02
Chromium, Hexavalent	mg/L	<0.0200	<0.0200	<0.02	<0.0200	<0.02	<0.0200	<0.0200	<0.0200	<0.0200	<0.02	<0.02
Cobalt	mg/L	--	--	--	--	--	--	--	<0.0200	<0.0200	--	--
Copper	mg/L	--	--	--	--	--	--	--	**0.021**	<0.0200	--	--
Fluoride	mg/L	<1.00	**0.3**	<1	<0.850	**1.14**	<1.00	**56.6**	**0.961**	<1.00	**1.03**	**2.62**
Iron	mg/L	--	--	**0.112**	--	**0.134**	--	**7.03**	--	<0.100	<0.1	**0.448**
Lead	mg/L	<0.00400	<0.00400	<0.004	<0.00400	<0.004	<0.00400	<0.00400	<0.00400	<0.00400	<0.004	<0.004
Magnesium	mg/L	--	--	--	--	--	--	--	--	<1.00	<1	--
Mercury	mg/L	--	--	--	--	--	--	--	<0.000200	<0.000200	--	--
Nickel	mg/L	--	--	--	--	--	--	--	<0.0500	<0.0500	--	--
Nitrate/Nitrite as N	mg/L	**1.71**	**6.43**	**6.26**	**0.158**	**0.267**	<0.100	**0.348**	**0.579**	<0.100	**2.49**	**0.23**
Phenol	mg/L	--	--	--	--	--	--	--	--	<0.0180	<0.02	--
Selenium	mg/L	--	--	--	--	--	--	--	<0.00500	<0.00500	--	--
Silver	mg/L	--	--	--	--	--	--	--	<0.00100	<0.00100	--	--
Sodium	mg/L	--	--	--	--	--	--	--	--	<1.00	140 MHA	--
Sulfate	mg/L	**29.3**	**29.7**	**34.6**	**2310**	**1890**	**146**	**109**	**30.1**	**<10.0**	**31.1**	**30.5**
Sulfide	mg/L	--	--	--	--	--	--	--	<1.00	<2.00	--	--
Thallium	mg/L	--	--	--	--	--	--	--	<0.00200	<0.00200	--	--
Tin	mg/L	--	--	--	--	--	--	--	<0.100	<0.100	--	--
Total Organic Halides	mg/L	--	--	--	--	--	--	--	--	<0.0100	**0.0141**	--
Vanadium	mg/L	--	--	--	--	--	--	--	<0.0500	<0.0500	<0.05	--
Zinc	mg/L	--	--	--	--	--	--	--	<0.0200	**0.0475**	--	--

NOTES:
(1) Mercury MCL is for inorganic mercury.
(2) Nitrite value is 1.0 mg/l, nitrate value is 10.0 mgl.
(3) Chromium III risk-based screening level shown.
(4) Mercury value for Region 9 is for methyl mercury. There is no PRG for elemental mercury in tap water.
NE = no established screening level

--	Not analyzed
17.5	Result exceeds detection limit
2.13	Result exceeds lowest Risk Based Screening Level

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See notes on page 10.

Table 12 - Preliminary
Groundwater VOC Analytical Results From Geoprobe™ Borings
Wellman Dynamics RCRA Facility Investigation

ANALYTE	Report Units	USEPA Drinking Water Maximum Contaminant Levels		Risk-Based Screening Levels	GB-101-W-1, 7-12' 05/17/2007 (MATRIX)	GB-102-W-1, 7-12' 05/18/2007 (TA) CQE1016-02
		Primary MCL (Health-Based)	Secondary MCL (Aesthetic)	USEPA Region 9 Preliminary Remediation Goal for Tap Water)		
1,1,1,2-Tetrachloroethane	ug/L	NE	NE	0.43	<1	<1
1,1,1-Trichloroethane	ug/L	200	NE	3,200	<1	<1
1,1,2,2-Tetrachloroethane	ug/L	NE	NE	0.055	<1	<1
1,1,2-Trichloroethane	ug/L	5	NE	0.2	<1	<1
1,1-Dichloroethane	ug/L	NE	NE	810	<1	<1
1,1-Dichloroethene	ug/L	7	NE	340	<2	<2
1,1-Dichloropropene	ug/L	NE	NE	NE	--	<1
1,2,3-Trichlorobenzene	ug/L	NE	NE	NE	--	<5
1,2,3-Trichloropropane	ug/L	NE	NE	0.0056	--	<1
1,2,4-Trichlorobenzene	ug/L	70	NE	7.2	--	<5
1,2,4-Trimethylbenzene	ug/L	NE	NE	12	<1	<1
1,2-Dibromo-3-chloropropane	ug/L	0.2	NE	0.048	--	<10
1,2-Dibromoethane (EDB)	ug/L	0.05	NE	0.0056	<3	<10
1,2-Dichlorobenzene	ug/L	600	NE	370	<1	<1
1,2-Dichloroethane	ug/L	5	NE	0.12	<1	<1
1,2-Dichloropropane	ug/L	5	NE	0.16	<1	<1
1,3,5-Trimethylbenzene	ug/L	NE	NE	12	<1	<1
1,3-Dichlorobenzene	ug/L	NE	NE	180	<1	<1
1,3-Dichloropropane	ug/L	NE	NE	120	--	<1
1,4-Dichlorobenzene	ug/L	75	NE	0.5	<1	<1
1,4-Dioxane	ug/L	NE	NE	6.1	--	--
2,2-Dichloropropane	ug/L	NE	NE	NE	--	<4
2-Butanone (MEK)	ug/L	NE	NE	7,000	<5	<10
2-Chlorotoluene	ug/L	NE	NE	120	--	<1
4-Chlorotoluene	ug/L	NE	NE	NE	--	<1

See notes on page 12

Table 12 - Preliminary
Groundwater VOC Analytical Results From Geoprobe™ Borings
Wellman Dynamics RCRA Facility Investigation

ANALYTE	Report Units	USEPA Drinking Water Maximum Contaminant Levels		Risk-Based Screening Levels	GB-101-W-1, 7-12' 05/17/2007 (MATRIX)	GB-102-W-1, 7-12' 05/18/2007 (TA) CQE1016-02
		Primary MCL (Health-Based)	Secondary MCL (Aesthetic)	USEPA Region 9 Preliminary Remediation Goal for Tap Water)		
4-Methyl-2-Pentanone (MIBK)	ug/L	NE	NE	2,000	<1	--
Acetone	ug/L	NE	NE	5,500	**16**	**21.4**
Acrylonitrile	ug/L	NE	NE	0.039	--	<10
Benzene	ug/L	5	NE	0.35	<1	<0.5
Bromobenzene	ug/L	NE	NE	20	--	<1
Bromochloromethane	ug/L	NE	NE	NE	--	<5
Bromodichloromethane	ug/L	NE	NE	0.18	<1	<1
Bromoform	ug/L	NE	NE	8.5	<2	<5
Bromomethane	ug/L	NE	NE	8.7	--	<4
Carbon disulfide	ug/L	NE	NE	1,000	--	<1
Carbon Tetrachloride	ug/L	5	NE	0.17	<1	<2
Chlorobenzene	ug/L	100	NE	110	<2	<1
Chlorodibromomethane	ug/L	NE	NE	0.13	<2	<5
Chloroethane	ug/L	NE	NE	4.6	<4	<4
Chloroform	ug/L	NE	NE	0.17	<1	<1
Chloromethane	ug/L	NE	NE	160	--	<3
cis-1,2-Dichloroethene	ug/L	70	NE	61	**480**	<1
Cis-1,3-Dichloropropene	ug/L	NE	NE	NE	<1	<5
Dibromomethane	ug/L	NE	NE	61	--	<1
Dichlorodifluoromethane	ug/L	NE	NE	390	--	<3
Ethylbenzene	ug/L	700	NE	1,300	<1	<1
Hexachlorobutadiene	ug/L	NE	NE	0.86	--	<5 L5
Hexane	ug/L	NE	NE	420	--	<1
Isopropylbenzene	ug/L	NE	NE	660	--	<1
Methyl tert-Butyl Ether	ug/L	NE	NE	11	<1	<1

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Table 12 - Preliminary
Groundwater VOC Analytical Results From Geoprobe™ Borings
Wellman Dynamics RCRA Facility Investigation

ANALYTE	Report Units	USEPA Drinking Water Maximum Contaminant Levels		Risk-Based Screening Levels	GB-101-W-1, 7-12' 05/17/2007 (MATRIX)	GB-102-W-1, 7-12' 05/18/2007 (TA) CQE1016-02
		Primary MCL (Health-Based)	Secondary MCL (Aesthetic)	USEPA Region 9 Preliminary Remediation Goal for Tap Water)		
Methylene Chloride	ug/L	5	NE	4.3	<1	<5
Naphthalene	ug/L	NE	NE	6.2	<6	<5
n-Butylbenzene	ug/L	NE	NE	240	--	<1
n-Propylbenzene	ug/L	NE	NE	240	--	<1
p-Isopropyltoluene	ug/L	NE	NE	NE	--	<1
sec-Butylbenzene	ug/L	NE	NE	240	--	<1
Styrene	ug/L	100	NE	1,600	<1	<1
tert-Butylbenzene	ug/L	NE	NE	240	--	<1
Tetrachloroethene	ug/L	5	NE	0.1	**18**	**56.8**
Tetrahydrofuran	ug/L	NE	NE	1.6	<1	--
Toluene	ug/L	1,000	NE	720	<1	**1.33**
Trans-1,2-Dichloroethene	ug/L	100	NE	120	**6**	<1
Trans-1,3-Dichloropropene	ug/L	NE	NE	NE	<1	<5
Trichloroethene	ug/L	5	NE	0.028	**5**	<1
Trichlorofluoromethane	ug/L	NE	NE	1,300	--	<4
Vinyl Chloride	ug/L	2	NE	0.02	**2**	<1
Xylene, M&P	ug/L	NE	NE	NE	<1	--
Xylene, O-	ug/L	NE	NE	NE	<1	--
Xylenes, total	ug/L	10,000	NE	210	--	<3

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Table 12 - Preliminary
Groundwater VOC Analytical Results From Geoprobe™ Borings
Wellman Dynamics RCRA Facility Investigation

ANALYTE	Report Units	GB-104-W-1, 8-12' 05/15/2007 (MATRIX)	GB-105-W-1, 8-12' 05/15/2007 (MATRIX)	GB-110-W-1, 8-11' 05/17/2007 (MATRIX)	GB-110-W-1, 8-12' 05/17/2007 (TA) CQE1014-09	GB-111-W-1, 9_5-11' 05/17/2007 (MATRIX)	GB-113-W-1, 7-12' 05/17/2007 (MATRIX)
1,1,1,2-Tetrachloroethane	ug/L	<1	<1	<1	<1	<1	<1
1,1,1-Trichloroethane	ug/L	<1	<1	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	ug/L	<1	<1	<1	<1	<1	<1
1,1,2-Trichloroethane	ug/L	<1	<1	<1	<1	<1	<1
1,1-Dichloroethane	ug/L	<1	<1	**14**	**12.4**	**21**	<1
1,1-Dichloroethene	ug/L	<2	<2	<2	<2	**14**	<2
1,1-Dichloropropene	ug/L	--	--	--	<1	--	--
1,2,3-Trichlorobenzene	ug/L	--	--	--	<5	--	--
1,2,3-Trichloropropane	ug/L	--	--	--	<1	--	--
1,2,4-Trichlorobenzene	ug/L	--	--	--	<5	--	--
1,2,4-Trimethylbenzene	ug/L	<1	<1	<1	<1	<1	<1
1,2-Dibromo-3-chloropropane	ug/L	--	--	--	<10	--	--
1,2-Dibromoethane (EDB)	ug/L	<3	<3	<3	<10	<3	<3
1,2-Dichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1
1,2-Dichloroethane	ug/L	<1	<1	<1	<1	<1	<1
1,2-Dichloropropane	ug/L	<1	<1	<1	<1	<1	<1
1,3,5-Trimethylbenzene	ug/L	<1	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1
1,3-Dichloropropane	ug/L	--	--	--	<1	--	--
1,4-Dichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1
1,4-Dioxane	ug/L	--	--	--	--	--	--
2,2-Dichloropropane	ug/L	--	--	--	<4	--	--
2-Butanone (MEK)	ug/L	<5	<5	<5	<10	<5	<5
2-Chlorotoluene	ug/L	--	--	--	<1	--	--
4-Chlorotoluene	ug/L	--	--	--	<1	--	--

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Table 12 - Preliminary
Groundwater VOC Analytical Results From Geoprobe™ Borings
Wellman Dynamics RCRA Facility Investigation

ANALYTE	Report Units	GB-104-W-1, 8-12' 05/15/2007 (MATRIX)	GB-105-W-1, 8-12' 05/15/2007 (MATRIX)	GB-110-W-1, 8-11' 05/17/2007 (MATRIX)	GB-110-W-1, 8-12' 05/17/2007 (TA) CQE1014-09	GB-111-W-1, 9_5-11' 05/17/2007 (MATRIX)	GB-113-W-1, 7-12' 05/17/2007 (MATRIX)
4-Methyl-2-Pentanone (MIBK)	ug/L	<1	<1	<1	--	<1	<1
Acetone	ug/L	**41**	**22**	**110**	**45**	**240**	**67**
Acrylonitrile	ug/L	--	--	--	<10	--	--
Benzene	ug/L	<1	<1	**5**	**3.37**	**15**	**1**
Bromobenzene	ug/L	--	--	--	<1	--	--
Bromochloromethane	ug/L	--	--	--	<5	--	--
Bromodichloromethane	ug/L	<1	<1	<1	<1	<1	<1
Bromoform	ug/L	<2	<2	<2	<5	<2	<2
Bromomethane	ug/L	--	--	--	<4	--	--
Carbon disulfide	ug/L	--	--	--	<1	--	--
Carbon Tetrachloride	ug/L	<1	<1	<1	<2	<1	<1
Chlorobenzene	ug/L	<2	<2	<2	<1	<2	<2
Chlorodibromomethane	ug/L	<2	<2	<2	<5	<2	<2
Chloroethane	ug/L	<4	<4	<4	<4	**12**	<4
Chloroform	ug/L	<1	<1	<1	<1	<1	<1
Chloromethane	ug/L	--	--	--	<3	--	--
cis-1,2-Dichloroethene	ug/L	**360**	<1	**12**	**7.33**	**6,700**	**89**
Cis-1,3-Dichloropropene	ug/L	<1	<1	<1	<5	<1	<1
Dibromomethane	ug/L	--	--	--	<1	--	--
Dichlorodifluoromethane	ug/L	--	--	--	<3	--	--
Ethylbenzene	ug/L	<1	<1	<1	<1	<1	<1
Hexachlorobutadiene	ug/L	--	--	--	<5 L5	--	--
Hexane	ug/L	--	--	--	<1	--	--
Isopropylbenzene	ug/L	--	--	--	<1	--	--
Methyl tert-Butyl Ether	ug/L	<1	<1	<1	<1	<1	<1

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Table 12 - Preliminary
Groundwater VOC Analytical Results From Geoprobe™ Borings
Wellman Dynamics RCRA Facility Investigation

ANALYTE	Report Units	GB-104-W-1, 8-12' 05/15/2007 (MATRIX)	GB-105-W-1, 8-12' 05/15/2007 (MATRIX)	GB-110-W-1, 8-11' 05/17/2007 (MATRIX)	GB-110-W-1, 8-12' 05/17/2007 (TA) CQE1014-09	GB-111-W-1, 9_5-11' 05/17/2007 (MATRIX)	GB-113-W-1, 7-12' 05/17/2007 (MATRIX)
Methylene Chloride	ug/L	<1	<1	<1	<5	<1	<1
Naphthalene	ug/L	<6	<6	<6	<5	<6	<6
n-Butylbenzene	ug/L	--	--	--	<1	--	--
n-Propylbenzene	ug/L	--	--	--	<1	--	--
p-Isopropyltoluene	ug/L	--	--	--	<1	--	--
sec-Butylbenzene	ug/L	--	--	--	<1	--	--
Styrene	ug/L	<1	<1	<1	<1	<1	<1
tert-Butylbenzene	ug/L	--	--	--	<1	--	--
Tetrachloroethene	ug/L	**640**	**2**	<1	<1	**4**	**3**
Tetrahydrofuran	ug/L	<1	<1	<1	--	<1	<1
Toluene	ug/L	<1	<1	**1**	**1.08**	**12**	**3**
Trans-1,2-Dichloroethene	ug/L	**44**	<1	**5**	**1.58**	**110**	**17**
Trans-1,3-Dichloropropene	ug/L	<1	<1	<1	<5	<1	<1
Trichloroethene	ug/L	**170**	<1	<1	<1	**14**	**2**
Trichlorofluoromethane	ug/L	--	--	--	<4	--	--
Vinyl Chloride	ug/L	<3	<3	**450**	**226**	**600**	**410**
Xylene, M&P	ug/L	<1	<1	<1	--	<1	<1
Xylene, O-	ug/L	<1	<1	<1	--	<1	<1
Xylenes, total	ug/L	--	--	--	<3	--	--

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Table 12 - Preliminary
Groundwater VOC Analytical Results From Geoprobe™ Borings
Wellman Dynamics RCRA Facility Investigation

ANALYTE	Report Units	GB-113-W-1, 7-12' 05/17/2007 (TA) CQE1014-10	GB-114 W1 7'-12' 05/17/2007 (MATRIX)	GB-114 W1 7'-12' Duplicate 05/17/2007 (MATRIX)	Equipment Rinse Blank 2 05/18/2007 (TA) CQE1016-03	Matrix Blank 5/15/2007 05/15/2007 (MATRIX)	Matrix Blank 5/16/2007 05/16/2007 (MATRIX)
1,1,1,2-Tetrachloroethane	ug/L	<1	<1	<1	<1	<1	<1
1,1,1-Trichloroethane	ug/L	<1	<1	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	ug/L	<1	<1	<1	<1	<1	<1
1,1,2-Trichloroethane	ug/L	<1	<1	<1	<1	<1	<1
1,1-Dichloroethane	ug/L	<1	<1	<1	<1	<1	<1
1,1-Dichloroethene	ug/L	<2	<2	<2	<2	<2	<2
1,1-Dichloropropene	ug/L	<1	--	--	<1	--	--
1,2,3-Trichlorobenzene	ug/L	<5	--	--	<5	--	--
1,2,3-Trichloropropane	ug/L	<1	--	--	<1	--	--
1,2,4-Trichlorobenzene	ug/L	<5	--	--	<5	--	--
1,2,4-Trimethylbenzene	ug/L	<1	**3**	<1	<1	<1	<1
1,2-Dibromo-3-chloropropane	ug/L	<10	--	--	<10	--	--
1,2-Dibromoethane (EDB)	ug/L	<10	<3	<3	<10	<3	<3
1,2-Dichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1
1,2-Dichloroethane	ug/L	<1	<1	<1	<1	<1	<1
1,2-Dichloropropane	ug/L	<1	<1	<1	<1	<1	<1
1,3,5-Trimethylbenzene	ug/L	<1	**2**	**4**	<1	<1	<1
1,3-Dichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1
1,3-Dichloropropane	ug/L	<1	--	--	<1	--	--
1,4-Dichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1
1,4-Dioxane	ug/L	--	--	--	--	--	--
2,2-Dichloropropane	ug/L	<4	--	--	<4	--	--
2-Butanone (MEK)	ug/L	<10	<5	<5	<10	<5	<5
2-Chlorotoluene	ug/L	<1	--	--	<1	--	--
4-Chlorotoluene	ug/L	<1	--	--	<1	--	--

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Table 12 - Preliminary
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ANALYTE	Report Units	GB-113-W-1, 7-12' 05/17/2007 (TA) CQE1014-10	GB-114 W1 7'-12' 05/17/2007 (MATRIX)	GB-114 W1 7'-12' Duplicate 05/17/2007 (MATRIX)	Equipment Rinse Blank 2 05/18/2007 (TA) CQE1016-03	Matrix Blank 5/15/2007 05/15/2007 (MATRIX)	Matrix Blank 5/16/2007 05/16/2007 (MATRIX)
4-Methyl-2-Pentanone (MIBK)	ug/L	--	<1	<1	--	<1	<1
Acetone	ug/L	**38.1**	**18**	**12**	<10	<12	<12
Acrylonitrile	ug/L	<10	--	--	<10	--	--
Benzene	ug/L	**1**	**2**	**1**	<0.5	<1	<1
Bromobenzene	ug/L	<1	--	--	<1	--	--
Bromochloromethane	ug/L	<5	--	--	<5	--	--
Bromodichloromethane	ug/L	<1	<1	<1	<1	<1	<1
Bromoform	ug/L	<5	<2	<2	<5	<2	<2
Bromomethane	ug/L	<4	--	--	<4	--	--
Carbon disulfide	ug/L	<1	--	--	<1	--	--
Carbon Tetrachloride	ug/L	<2	<1	<1	<2	<1	<1
Chlorobenzene	ug/L	<1	<2	<2	<1	<2	<2
Chlorodibromomethane	ug/L	<5	<2	<2	<5	<2	<2
Chloroethane	ug/L	<4	<4	<4	<4	<4	<4
Chloroform	ug/L	<1	<1	<1	<1	<1	<1
Chloromethane	ug/L	<3	--	--	<3	--	--
cis-1,2-Dichloroethene	ug/L	**54.3**	**34**	**32**	<1	<1	<1
Cis-1,3-Dichloropropene	ug/L	<5	<1	<1	<5	<1	<1
Dibromomethane	ug/L	<1	--	--	<1	--	--
Dichlorodifluoromethane	ug/L	<3	--	--	<3	--	--
Ethylbenzene	ug/L	<1	**5**	**4**	<1	<1	<1
Hexachlorobutadiene	ug/L	<5 L5	--	--	<5 L5	--	--
Hexane	ug/L	<1	--	--	<1	--	--
Isopropylbenzene	ug/L	<1	--	--	<1	--	--
Methyl tert-Butyl Ether	ug/L	<1	<1	<1	<1	<1	<1

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Table 12 - Preliminary
Groundwater VOC Analytical Results From Geoprobe™ Borings
Wellman Dynamics RCRA Facility Investigation

ANALYTE	Report Units	GB-113-W-1, 7-12' 05/17/2007 (TA) CQE1014-10	GB-114 W1 7'-12' 05/17/2007 (MATRIX)	GB-114 W1 7'-12' Duplicate 05/17/2007 (MATRIX)	Equipment Rinse Blank 2 05/18/2007 (TA) CQE1016-03	Matrix Blank 5/15/2007 05/15/2007 (MATRIX)	Matrix Blank 5/16/2007 05/16/2007 (MATRIX)
Methylene Chloride	ug/L	<5	<1	<1	<5	<1	<1
Naphthalene	ug/L	<5	<6	<6	<5	<6	<6
n-Butylbenzene	ug/L	<1	--	--	<1	--	--
n-Propylbenzene	ug/L	<1	--	--	<1	--	--
p-Isopropyltoluene	ug/L	<1	--	--	<1	--	--
sec-Butylbenzene	ug/L	<1	--	--	<1	--	--
Styrene	ug/L	<1	<1	<1	<1	<1	<1
tert-Butylbenzene	ug/L	<1	--	--	<1	--	--
Tetrachloroethene	ug/L	**1.63**	<1	<1	<1	<1	<1
Tetrahydrofuran	ug/L	--	<1	<1	--	<1	<1
Toluene	ug/L	**2.46**	**7**	**6**	<1	<1	<1
Trans-1,2-Dichloroethene	ug/L	**9.06**	**2**	**2**	<1	<1	<1
Trans-1,3-Dichloropropene	ug/L	<5	<1	<1	<5	<1	<1
Trichloroethene	ug/L	<1	**4**	**4**	<1	<1	<1
Trichlorofluoromethane	ug/L	<4	--	--	<4	--	--
Vinyl Chloride	ug/L	**176**	**130**	**130**	<1	<3	<3
Xylene, M&P	ug/L	--	**3**	**3**	--	<1	<1
Xylene, O-	ug/L	--	**2**	**2**	--	<1	<1
Xylenes, total	ug/L	<3	--	--	<3	--	--

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Wellman Dynamics RCRA Facility Investigation

ANALYTE	Report Units	Matrix Blank 5/17/2007 05/17/2007 (MATRIX)	Matrix Blank 5/18/2007 05/18/2007 (MATRIX)	Trip Blank 1 05/17/2007 (TA) CQE1014-11	Trip Blank 2 05/18/2007 (TA) CQE1016-01
1,1,1,2-Tetrachloroethane	ug/L	<1	<1	<1	<1
1,1,1-Trichloroethane	ug/L	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	ug/L	<1	<1	<1	<1
1,1,2-Trichloroethane	ug/L	<1	<1	<1	<1
1,1-Dichloroethane	ug/L	<1	<1	<1	<1
1,1-Dichloroethene	ug/L	<2	<2	<2	<2
1,1-Dichloropropene	ug/L	--	--	<1	<1
1,2,3-Trichlorobenzene	ug/L	--	--	<5	<5
1,2,3-Trichloropropane	ug/L	--	--	<1	<1
1,2,4-Trichlorobenzene	ug/L	--	--	<5	<5
1,2,4-Trimethylbenzene	ug/L	<1	<1	<1	<1
1,2-Dibromo-3-chloropropane	ug/L	--	--	<10	<10
1,2-Dibromoethane (EDB)	ug/L	<3	<3	<10	<10
1,2-Dichlorobenzene	ug/L	<1	<1	<1	<1
1,2-Dichloroethane	ug/L	<1	<1	<1	<1
1,2-Dichloropropane	ug/L	<1	<1	<1	<1
1,3,5-Trimethylbenzene	ug/L	<1	<1	<1	<1
1,3-Dichlorobenzene	ug/L	<1	<1	<1	<1
1,3-Dichloropropane	ug/L	--	--	<1	<1
1,4-Dichlorobenzene	ug/L	<1	<1	<1	<1
1,4-Dioxane	ug/L	--	--	--	--
2,2-Dichloropropane	ug/L	--	--	<4	<4
2-Butanone (MEK)	ug/L	**18**	<5	<10	<10
2-Chlorotoluene	ug/L	--	--	<1	<1
4-Chlorotoluene	ug/L	--	--	<1	<1

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Table 12 - Preliminary
Groundwater VOC Analytical Results From Geoprobe™ Borings
Wellman Dynamics RCRA Facility Investigation

ANALYTE	Report Units	Matrix Blank 5/17/2007 05/17/2007 (MATRIX)	Matrix Blank 5/18/2007 05/18/2007 (MATRIX)	Trip Blank 1 05/17/2007 (TA) CQE1014-11	Trip Blank 2 05/18/2007 (TA) CQE1016-01
4-Methyl-2-Pentanone (MIBK)	ug/L	**3**	**3**	--	--
Acetone	ug/L	**22**	<12	<10	<10
Acrylonitrile	ug/L	--	--	<10	<10
Benzene	ug/L	<1	<1	<0.5	<0.5
Bromobenzene	ug/L	--	--	<1	<1
Bromochloromethane	ug/L	--	--	<5	<5
Bromodichloromethane	ug/L	<1	<1	<1	<1
Bromoform	ug/L	<2	<2	<5	<5
Bromomethane	ug/L	--	--	<4	<4
Carbon disulfide	ug/L	--	--	<1	<1
Carbon Tetrachloride	ug/L	<1	<1	<2	<2
Chlorobenzene	ug/L	<2	<2	<1	<1
Chlorodibromomethane	ug/L	<2	<2	<5	<5
Chloroethane	ug/L	<4	<4	<4	<4
Chloroform	ug/L	<1	<1	<1	<1
Chloromethane	ug/L	--	--	<3	<3
cis-1,2-Dichloroethene	ug/L	<1	<1	<1	<1
Cis-1,3-Dichloropropene	ug/L	<1	<1	<5	<5
Dibromomethane	ug/L	--	--	<1	<1
Dichlorodifluoromethane	ug/L	--	--	<3	<3
Ethylbenzene	ug/L	<1	<1	<1	<1
Hexachlorobutadiene	ug/L	--	--	<5 L5	<5 L5
Hexane	ug/L	--	--	<1	<1
Isopropylbenzene	ug/L	--	--	<1	<1
Methyl tert-Butyl Ether	ug/L	<1	<1	<1	<1

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Table 12 - Preliminary
Groundwater VOC Analytical Results From Geoprobe™ Borings
Wellman Dynamics RCRA Facility Investigation

ANALYTE	Report Units	Matrix Blank 5/17/2007 05/17/2007 (MATRIX)	Matrix Blank 5/18/2007 05/18/2007 (MATRIX)	Trip Blank 1 05/17/2007 (TA) CQE1014-11	Trip Blank 2 05/18/2007 (TA) CQE1016-01
Methylene Chloride	ug/L	<1	<1	<5	<5
Naphthalene	ug/L	<6	<6	<5	<5
n-Butylbenzene	ug/L	--	--	<1	<1
n-Propylbenzene	ug/L	--	--	<1	<1
p-Isopropyltoluene	ug/L	--	--	<1	<1
sec-Butylbenzene	ug/L	--	--	<1	<1
Styrene	ug/L	<1	<1	<1	<1
tert-Butylbenzene	ug/L	--	--	<1	<1
Tetrachloroethene	ug/L	<1	<1	<1	<1
Tetrahydrofuran	ug/L	<1	<1	--	--
Toluene	ug/L	<1	1	<1	<1
Trans-1,2-Dichloroethene	ug/L	<1	<1	<1	<1
Trans-1,3-Dichloropropene	ug/L	<1	<1	<5	<5
Trichloroethene	ug/L	<1	<1	<1	<1
Trichlorofluoromethane	ug/L	--	--	<4	<4
Vinyl Chloride	ug/L	<3	<3	<1	<1
Xylene, M&P	ug/L	<1	<1	--	--
Xylene, O-	ug/L	<1	<1	--	--
Xylenes, total	ug/L	--	--	<3	<3

--	Not analyzed
17.5	Result exceeds detection limit
2.13	Result exceeds lowest Risk Based Screening Level

NE = no established screening level

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Table 13 - Preliminary
Groundwater VOC Analytical Results From Monitoring Wells
Well Dynamics RCRA Facility Investigation

Analyte	Report Units	USEPA Drinking Water Maximum Contaminant Levels		Risk-Based Screening Levels	MWA 3/20/2007	MWA 3/20/2007	MWA 9/26/2007	MWA 9/26/2007	MWA 3/20/2008	MWA 3/20/2008
		Primary MCL (Health-Based)	Secondary MCL (Aesthetic)	Preliminary Remediation Goal for Tap Water	CQC0959-05	CQC0959-05RE1	CQI1500-09	CQI1500-09RE1	CRC0967-05	CRC0967-05RE1
1,1,1,2-Tetrachloroethane	ug/L	NE	NE	0.43	<1.00	--	<1.00	--	<1	--
1,1,1-Trichloroethane	ug/L	200	NE	3,200	<1.00	--	<1.00	--	<1	--
1,1,2,2-Tetrachloroethane	ug/L	NE	NE	0.055	<1.00	--	<1.00	--	<1	--
1,1,2-Trichloroethane	ug/L	5	NE	0.2	<1.00	--	<1.00	--	<1	--
1,1-Dichloroethane	ug/L	NE	NE	810	**27.2**	--	**34.8**	--	**25.4**	--
1,1-Dichloroethene	ug/L	7	NE	340	**9.57**	--	**11.6**	--	**9.09**	--
1,1-Dichloropropene	ug/L	NE	NE	NE	<1.00	--	<1.00	--	<1	--
1,2,3-Trichlorobenzene	ug/L	NE	NE	NE	<5.00	--	<5.00	--	<5	--
1,2,3-Trichloropropane	ug/L	NE	NE	0.0056	<1.00	--	<1.00	--	<1	--
1,2,4-Trichlorobenzene	ug/L	70	NE	7.2	<5.00	--	<5.00	--	<5	--
1,2,4-Trimethylbenzene	ug/L	NE	NE	12	<1.00	--	<1.00	--	<1	--
1,2-Dibromo-3-chloropropane	ug/L	0.2	NE	0.048	<10.0	--	<10.0	--	<10	--
1,2-Dibromoethane (EDB)	ug/L	0.05	NE	0.0056	<10.0	--	<10.0	--	<10	--
1,2-Dichlorobenzene	ug/L	600	NE	370	<1.00	--	<1.00	--	<1	--
1,2-Dichloroethane	ug/L	5	NE	0.12	<1.00	--	**5.86**	--	<1	--
1,2-Dichloropropane	ug/L	5	NE	0.16	<1.00	--	<1.00	--	<1	--
1,3,5-Trimethylbenzene	ug/L	NE	NE	12	<1.00	--	<1.00	--	<1	--
1,3-Dichlorobenzene	ug/L	NE	NE	180	<1.00	--	<1.00	--	<1	--
1,3-Dichloropropane	ug/L	NE	NE	120	<1.00	--	<1.00	--	<1	--
1,4-Dichlorobenzene	ug/L	75	NE	0.5	<1.00	--	<1.00	--	<1	--
1,4-Dioxane	ug/l	NE	NE	6.1	--	--	**310**	--	**380**	--
2,2-Dichloropropane	ug/L	NE	NE	NE	<4.00	--	<4.00	--	<4	--
2-Butanone (MEK)	ug/L	NE	NE	7,000	<10.0	--	<10.0	--	<10	--
2-Chlorotoluene	ug/L	NE	NE	120	<1.00	--	<1.00	--	<1	--
4-Chlorotoluene	ug/L	NE	NE	NE	<1.00	--	<1.00	--	<1	--
4-methyl-2-Pentanone (MIBK)	ug/L	NE	NE	2,000	--	--	--	--	--	--
Acetone	ug/L	NE	NE	5,500	<10.0	--	<10.0	--	**16.6**	--
Acrylonitrile	ug/L	NE	NE	0.039	<10.0	--	<10.0	--	<10	--

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Well Dynamics RCRA Facility Investigation

Analyte	Report Units	USEPA Drinking Water Maximum Contaminant Levels		Risk-Based Screening Levels	MWA 3/20/2007	MWA 3/20/2007	MWA 9/26/2007	MWA 9/26/2007	MWA 3/20/2008	MWA 3/20/2008
		Primary MCL (Health-Based)	Secondary MCL (Aesthetic)	Preliminary Remediation Goal for Tap Water	CQC0959-05	CQC0959-05RE1	CQI1500-09	CQI1500-09RE1	CRC0967-05	CRC0967-05RE1
Benzene	ug/L	5	NE	0.35	**1.11**	--	**1.20**	--	**1.10**	--
Bromobenzene	ug/L	NE	NE	20	<1.00	--	<1.00	--	<1	--
Bromochloromethane	ug/L	NE	NE	NE	<5.00	--	<5.00	--	<5	--
Bromodichloromethane	ug/L	NE	NE	0.18	<1.00	--	<1.00	--	<1	--
Bromoform	ug/L	NE	NE	8.5	<5.00	--	<5.00	--	<5	--
Bromomethane	ug/L	NE	NE	8.7	<4.00	--	<4.00	--	<4	--
Carbon disulfide	ug/L	NE	NE	1,000	<1.00	--	<1.00	--	<1	--
Carbon Tetrachloride	ug/L	5	NE	0.17	<2.00	--	<2.00	--	<2	--
Chlorobenzene	ug/L	100	NE	110	<1.00	--	<1.00	--	<1	--
Chlorodibromomethane	ug/L	NE	NE	0.13	<5.00	--	<5.00	--	<5	--
Chloroethane	ug/L	NE	NE	4.6	<4.00	--	<4.00	--	<4	--
Chloroform	ug/L	NE	NE	0.17	<1.00	--	<1.00	--	<1 L5	--
Chloromethane	ug/L	NE	NE	160	<3.00	--	<3.00	--	<3	--
cis-1,2-Dichloroethene	ug/L	70	NE	61	--	**2330**	--	**4640**	--	**3370**
cis-1,3-Dichloropropene	ug/L	NE	NE	NE	<5.00	--	<5.00	--	<5	--
Dibromomethane	ug/L	NE	NE	61	<1.00	--	<1.00	--	<1	--

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Analyte	Report Units	USEPA Drinking Water Maximum Contaminant Levels		Risk-Based Screening Levels	MWA 3/20/2007	MWA 3/20/2007	MWA 9/26/2007	MWA 9/26/2007	MWA 3/20/2008	MWA 3/20/2008
		Primary MCL (Health-Based)	Secondary MCL (Aesthetic)	Preliminary Remediation Goal for Tap Water	CQC0959-05	CQC0959-05RE1	CQI1500-09	CQI1500-09RE1	CRC0967-05	CRC0967-05RE1
Dichlorodifluoromethane	ug/L	NE	NE	390	<3.00	--	<3.00	--	<3	--
Ethylbenzene	ug/L	700	NE	1,300	<1.00	--	<1.00	--	<1 L5, R	--
Hexachlorobutadiene	ug/L	NE	NE	0.86	<5.00	--	<5.00	--	<5	--
Hexane	ug/L	NE	NE	420	<1.00	--	<1.00	--	<1 CIN	--
Isopropylbenzene	ug/L	NE	NE	660	<1.00	--	<1.00	--	<1	--
Methyl tert-Butyl Ether	ug/L	NE	NE	11	<1.00	--	<1.00	--	<1	--
Methylene Chloride	ug/L	5	NE	4.3	<5.00	--	<5.00	--	<5	--
Naphthalene	ug/L	NE	NE	6.2	<5.00	--	<5.00	--	<5	--
n-Butylbenzene	ug/L	NE	NE	240	<1.00	--	<1.00	--	<1	--
n-Propylbenzene	ug/L	NE	NE	240	<1.00	--	<1.00	--	<1	--
p-Isopropyltoluene	ug/L	NE	NE	NE	<1.00	--	<1.00	--	<1	--
sec-Butylbenzene	ug/L	NE	NE	240	<1.00	--	<1.00	--	<1	--
Styrene	ug/L	100	NE	1,600	<1.00	--	<1.00	--	<1	--
tert-Butylbenzene	ug/L	NE	NE	240	<1.00	--	<1.00	--	<1	--
Tetrachloroethene	ug/L	5	NE	0.1	**89.4**	--	**97.3**	--	**89.4 M1**	--
Toluene	ug/L	1,000	NE	720	<1.00	--	<1.00	--	<1	--
trans-1,2-Dichloroethene	ug/L	100	NE	120	**90.4**	--	**120**	--	**78.5 M1**	--
trans-1,3-Dichloropropene	ug/L	NE	NE	NE	<5.00	--	<5.00	--	<5	--
Trichloroethene	ug/L	5	NE	0.028	**153**	--	**198**	--	**140 M1**	--
Trichlorofluoromethane	ug/L	NE	NE	1,300	<4.00	--	<4.00	--	<4	--
Vinyl chloride	ug/L	2	NE	0.02	**486**	--	--	**422**	**474 M1**	--
Xylenes, total	ug/L	10,000	NE	210	<3.00	--	<3.00	--	<3	--

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Analyte	Report Units	MW01 3/19/2007 CQC0899-04	MW01 10/3/2007 CQJ0240-03	MW01 3/21/2008 CRC1016-03	MW02 3/19/2007 CQC0899-02	MW02 Dup 3/19/2007 CQC0899-03	MW02 10/3/2007 CQJ0240-05	MW02 3/21/2008 CRC1016-04	MW03 3/20/2007 CQC0959-02	MW03 3/20/2007 CQC0959-02RE1	MW03 10/3/2007 CQJ0240-02
1,1,1,2-Tetrachloroethane	ug/L	<1.00	<1.00	<1	<1.00	<1.00	<1.00	<1	<1.00	--	<1.00
1,1,1-Trichloroethane	ug/L	<1.00	<1.00	<1	<1.00	<1.00	<1.00 M1	<1	<1.00	--	<1.00
1,1,2,2-Tetrachloroethane	ug/L	<1.00	<1.00	<1	<1.00	<1.00	<1.00	<1	<1.00	--	<1.00
1,1,2-Trichloroethane	ug/L	<1.00	<1.00	<1	<1.00	<1.00	<1.00	<1	<1.00	--	<1.00
1,1-Dichloroethane	ug/L	<1.00	<1.00	<1	<1.00	<1.00	<1.00 M1	**1.52**	**3.22**	--	**4.13**
1,1-Dichloroethene	ug/L	<2.00	<2.00	<2	<2.00	<2.00	<2.00	<2	<2.00	--	<2.00
1,1-Dichloropropene	ug/L	<1.00	<1.00	<1	<1.00	<1.00	<1.00	<1	<1.00	--	<1.00
1,2,3-Trichlorobenzene	ug/L	<5.00	<5.00	<5	<5.00	<5.00	<5.00	<5	<5.00	--	<5.00
1,2,3-Trichloropropane	ug/L	<1.00	<1.00	<1	<1.00	<1.00	<1.00	<1	<1.00	--	<1.00
1,2,4-Trichlorobenzene	ug/L	<5.00	<5.00	<5	<5.00	<5.00	<5.00	<5	<5.00	--	<5.00
1,2,4-Trimethylbenzene	ug/L	<1.00	<1.00	<1	<1.00	<1.00	<1.00	<1	<1.00	--	<1.00
1,2-Dibromo-3-chloropropane	ug/L	<10.0	<10.0	<10	<10.0	<10.0	<10.0	<10	<10.0	--	<10.0
1,2-Dibromoethane (EDB)	ug/L	<10.0	<10.0	<10	<10.0	<10.0	<10.0	<10	<10.0	--	<10.0
1,2-Dichlorobenzene	ug/L	<1.00	<1.00	<1	<1.00	<1.00	<1.00	<1	<1.00	--	<1.00
1,2-Dichloroethane	ug/L	<1.00	<1.00 C, L	<1	<1.00	<1.00	<1.00 C	<1	<1.00	--	**6.46**
1,2-Dichloropropane	ug/L	<1.00	<1.00	<1	<1.00	<1.00	<1.00	<1	<1.00	--	<1.00
1,3,5-Trimethylbenzene	ug/L	<1.00	<1.00	<1	<1.00	<1.00	<1.00	<1	<1.00	--	<1.00
1,3-Dichlorobenzene	ug/L	<1.00	<1.00	<1	<1.00	<1.00	<1.00	<1	<1.00	--	<1.00
1,3-Dichloropropane	ug/L	<1.00	<1.00	<1	<1.00	<1.00	<1.00	<1	<1.00	--	<1.00
1,4-Dichlorobenzene	ug/L	<1.00	<1.00	<1	<1.00	<1.00	<1.00	<1	<1.00	--	<1.00
1,4-Dioxane	ug/l	--	**6.7**	**14**	--	--	**42**	**40**	--	--	**18**
2,2-Dichloropropane	ug/L	<4.00	<4.00 CIN	<4	<4.00	<4.00	<4.00 C, CIN	<4	<4.00	--	<4.00
2-Butanone (MEK)	ug/L	<10.0	<10.0	<10	<10.0	<10.0	<10.0	<10	<10.0	--	<10.0
2-Chlorotoluene	ug/L	<1.00	<1.00	<1	<1.00	<1.00	<1.00	<1	<1.00	--	<1.00
4-Chlorotoluene	ug/L	<1.00	<1.00	<1	<1.00	<1.00	<1.00	<1	<1.00	--	<1.00
4-methyl-2-Pentanone (MIBK)	ug/L	--	--	--	--	--	--	--	--	--	--
Acetone	ug/L	<10.0	<10.0	<10	<10.0	<10.0	<10.0	<10	**11.3**	--	**17.1**
Acrylonitrile	ug/L	<10.0	<10.0	<10	<10.0 M1	<10.0	<10.0	<10	<10.0	--	<10.0

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Groundwater VOC Analytical Results From Monitoring Wells
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Analyte	Report Units	MW01 3/19/2007 CQC0899-04	MW01 10/3/2007 CQJ0240-03	MW01 3/21/2008 CRC1016-03	MW02 3/19/2007 CQC0899-02	MW02 Dup 3/19/2007 CQC0899-03	MW02 10/3/2007 CQJ0240-05	MW02 3/21/2008 CRC1016-04	MW03 3/20/2007 CQC0959-02	MW03 3/20/2007 CQC0959-02RE1	MW03 10/3/2007 CQJ0240-02
Benzene	ug/L	**1.37**	**1.38**	**1.11**	**2.08**	**1.90**	**5.05**	**3.92**	**2.86**	--	**4.28**
Bromobenzene	ug/L	<1.00	<1.00	<1	<1.00	<1.00	<1.00	<1	<1.00	--	<1.00
Bromochloromethane	ug/L	<5.00	<5.00	<5	<5.00	<5.00	<5.00	<5	<5.00	--	<5.00
Bromodichloromethane	ug/L	<1.00	<1.00	<1	<1.00	<1.00	<1.00 L5	<1	<1.00	--	<1.00
Bromoform	ug/L	<5.00	<5.00	<5	<5.00	<5.00	<5.00	<5	<5.00	--	<5.00
Bromomethane	ug/L	<4.00	<4.00	<4	<4.00	<4.00	<4.00	<4	<4.00	--	<4.00
Carbon disulfide	ug/L	<1.00	<1.00	<1	<1.00	<1.00	<1.00	<1	<1.00	--	<1.00
Carbon Tetrachloride	ug/L	<2.00	<2.00	<2	<2.00	<2.00	<2.00 M1	<2	<2.00	--	<2.00
Chlorobenzene	ug/L	<1.00	<1.00	<1	<1.00	<1.00	<1.00	<1	<1.00	--	<1.00
Chlorodibromomethane	ug/L	<5.00	<5.00	<5	<5.00	<5.00	<5.00	<5	<5.00	--	<5.00
Chloroethane	ug/L	<4.00	<4.00	<4	<4.00	<4.00	<4.00	<4	<4.00	--	<4.00
Chloroform	ug/L	<1.00	<1.00	<1 L5	<1.00	<1.00	<1.00	<1 L5	<1.00	--	<1.00
Chloromethane	ug/L	<3.00	<3.00	<3	<3.00	<3.00	<3.00	<3	<3.00	--	<3.00
cis-1,2-Dichloroethene	ug/L	**156**	**57.3**	**179**	**5.10**	**5.39**	**43.4**	**8.09**	--	**770**	--
cis-1,3-Dichloropropene	ug/L	<5.00	<5.00	<5	<5.00	<5.00	<5.00	<5	<5.00	--	<5.00
Dibromomethane	ug/L	<1.00	<1.00	<1	<1.00	<1.00	<1.00 L5	<1	<1.00	--	<1.00

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Table 13 - Preliminary
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Analyte	Report Units	MW01 3/19/2007 CQC0899-04	MW01 10/3/2007 CQJ0240-03	MW01 3/21/2008 CRC1016-03	MW02 3/19/2007 CQC0899-02	MW02 Dup 3/19/2007 CQC0899-03	MW02 10/3/2007 CQJ0240-05	MW02 3/21/2008 CRC1016-04	MW03 3/20/2007 CQC0959-02	MW03 3/20/2007 CQC0959-02RE1	MW03 10/3/2007 CQJ0240-02
Dichlorodifluoromethane	ug/L	<3.00	<3.00	<3	<3.00	<3.00	<3.00	<3	<3.00	--	<3.00
Ethylbenzene	ug/L	<1.00	<1.00	<1 L5	<1.00	<1.00	<1.00	<1 L5	<1.00	--	<1.00
Hexachlorobutadiene	ug/L	<5.00	<5.00	<5	<5.00	<5.00	<5.00	<5	<5.00	--	<5.00
Hexane	ug/L	<1.00	<1.00	<1 CIN	<1.00	<1.00	<1.00	<1 CIN	<1.00	--	<1.00
Isopropylbenzene	ug/L	<1.00	<1.00	<1	<1.00	<1.00	<1.00	<1	<1.00	--	<1.00
Methyl tert-Butyl Ether	ug/L	<1.00	<1.00 C, L	<1	<1.00	<1.00	<1.00 C	<1	<1.00	--	<1.00
Methylene Chloride	ug/L	<5.00	<5.00	<5	<5.00	<5.00	<5.00	<5	<5.00	--	<5.00
Naphthalene	ug/L	<5.00	<5.00	<5	<5.00	<5.00	<5.00	<5	<5.00	--	<5.00
n-Butylbenzene	ug/L	<1.00	<1.00	<1	<1.00	<1.00	<1.00	<1	<1.00	--	<1.00
n-Propylbenzene	ug/L	<1.00	<1.00	<1	<1.00	<1.00	<1.00	<1	<1.00	--	<1.00
p-Isopropyltoluene	ug/L	<1.00	<1.00	<1	<1.00	<1.00	<1.00	<1	<1.00	--	<1.00
sec-Butylbenzene	ug/L	<1.00	<1.00	<1	<1.00	<1.00	<1.00	<1	<1.00	--	<1.00
Styrene	ug/L	<1.00	<1.00	<1	<1.00	<1.00	<1.00 M1	<1	<1.00	--	<1.00
tert-Butylbenzene	ug/L	<1.00	<1.00	<1	<1.00	<1.00	<1.00	<1	<1.00	--	<1.00
Tetrachloroethene	ug/L	<1.00	<1.00	<1	<1.00	<1.00	<1.00	<1	**22.8**	--	**45.4**
Toluene	ug/L	**2.57**	**2.86**	<1	<1.00	<1.00	**1.20**	**1.23**	<1.00	--	**1.79**
trans-1,2-Dichloroethene	ug/L	**9.88**	**6.76**	**8.46**	**5.75**	**5.82**	**8.03**	**6.27**	**57.2**	--	**49.9**
trans-1,3-Dichloropropene	ug/L	<5.00	<5.00	<5	<5.00	<5.00	<5.00	<5	<5.00	--	<5.00
Trichloroethene	ug/L	<1.00	<1.00	<1	<1.00	<1.00	<1.00	<1	**11.4**	--	**20.9**
Trichlorofluoromethane	ug/L	<4.00	<4.00	<4	<4.00	<4.00	<4.00	<4	<4.00	--	<4.00
Vinyl chloride	ug/L	**265**	**196**	**170**	**210 M1**	**207**	**234 M1**	**186**	**273**	--	**191**
Xylenes, total	ug/L	<3.00	<3.00	<3	<3.00	<3.00	<3.00	<3	<3.00	--	**3.86**

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Analyte	Report Units	MW03 10/3/2007 CQJ0240-02RE1	MW03 3/20/2008 CRC0967-10	MW06 9/27/2007 CQI1583-04	MW06 3/18/2008 CRC0807-02	MW07 9/26/2007 CQI1500-08	MW07 3/18/2008 CRC0807-04	MW08 9/27/2007 CQI1583-03	MW08 3/18/2008 CRC0807-03	MW09 9/26/2007 CQI1500-04	MW09 9/26/2007 CQI1500-04RE1
1,1,1,2-Tetrachloroethane	ug/L	--	<5	<1.00	<1	<1.00	<1	<1.00	<1	<1.00	--
1,1,1-Trichloroethane	ug/L	--	<5	<1.00	<1	<1.00	<1	<1.00	<1	<1.00	--
1,1,2,2-Tetrachloroethane	ug/L	--	<5	<1.00	<1	<1.00	<1	<1.00	<1	<1.00	--
1,1,2-Trichloroethane	ug/L	--	<5	<1.00	<1	<1.00	<1	<1.00	<1	<1.00	--
1,1-Dichloroethane	ug/L	--	<5	<1.00	<1	<1.00	<1	<1.00	<1	<1.00	--
1,1-Dichloroethene	ug/L	--	<10	<2.00	<2	<2.00	<2	<2.00	<2	<2.00	--
1,1-Dichloropropene	ug/L	--	<5	<1.00	<1	<1.00	<1	<1.00	<1	<1.00	--
1,2,3-Trichlorobenzene	ug/L	--	<25	<5.00	<5	<5.00	<5	<5.00	<5	<5.00	--
1,2,3-Trichloropropane	ug/L	--	<5	<1.00	<1	<1.00	<1	<1.00	<1	<1.00	--
1,2,4-Trichlorobenzene	ug/L	--	<25	<5.00	<5	<5.00	<5	<5.00	<5	<5.00	--
1,2,4-Trimethylbenzene	ug/L	--	**9.30**	<1.00	<1	<1.00	<1	<1.00	<1	<1.00	--
1,2-Dibromo-3-chloropropane	ug/L	--	<50	<10.0	<10	<10.0	<10	<10.0	<10	<10.0	--
1,2-Dibromoethane (EDB)	ug/L	--	<50	<10.0	<10	<10.0	<10	<10.0	<10	<10.0	--
1,2-Dichlorobenzene	ug/L	--	<5	<1.00	<1	<1.00	<1	<1.00	<1	<1.00	--
1,2-Dichloroethane	ug/L	--	<5	<1.00	<1	<1.00	<1	<1.00	<1	<1.00	--
1,2-Dichloropropane	ug/L	--	<5	<1.00	<1	<1.00	<1	<1.00	<1	<1.00	--
1,3,5-Trimethylbenzene	ug/L	--	<5	<1.00	<1	<1.00	<1	<1.00	<1	<1.00	--
1,3-Dichlorobenzene	ug/L	--	<5	<1.00	<1	<1.00	<1	<1.00	<1	<1.00	--
1,3-Dichloropropane	ug/L	--	<5	<1.00	<1	<1.00	<1	<1.00	<1	<1.00	--
1,4-Dichlorobenzene	ug/L	--	<5	<1.00	<1	<1.00	<1	<1.00	<1	<1.00	--
1,4-Dioxane	ug/l	--	**6.3**	<2.0	--	<2.0	--	<2.0	--	<2.0	--
2,2-Dichloropropane	ug/L	--	<20	<4.00	<4	<4.00	<4	<4.00	<4	<4.00	--
2-Butanone (MEK)	ug/L	--	<50	<10.0	<10	<10.0	<10	<10.0	<10	<10.0	--
2-Chlorotoluene	ug/L	--	<5	<1.00	<1	<1.00	<1	<1.00	<1	<1.00	--
4-Chlorotoluene	ug/L	--	<5	<1.00	<1	<1.00	<1	<1.00	<1	<1.00	--
4-methyl-2-Pentanone (MIBK)	ug/L	--	--	--	--	--	--	--	--	--	--
Acetone	ug/L	--	**208**	<10.0	<10	<10.0	<10	<10.0	<10	<10.0	--
Acrylonitrile	ug/L	--	<50	<10.0	<10	<10.0	<10	<10.0	<10	<10.0	--

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Analyte	Report Units	MW03 10/3/2007 CQJ0240-02RE1	MW03 3/20/2008 CRC0967-10	MW06 9/27/2007 CQI1583-04	MW06 3/18/2008 CRC0807-02	MW07 9/26/2007 CQI1500-08	MW07 3/18/2008 CRC0807-04	MW08 9/27/2007 CQI1583-03	MW08 3/18/2008 CRC0807-03	MW09 9/26/2007 CQI1500-04	MW09 9/26/2007 CQI1500-04RE1
Benzene	ug/L	--	<2.5	<0.500	<0.5	<0.500	<0.5	<0.500	<0.5	<0.500	--
Bromobenzene	ug/L	--	<5	<1.00	<1	<1.00	<1	<1.00	<1	<1.00	--
Bromochloromethane	ug/L	--	<25	<5.00	<5	<5.00	<5	<5.00	<5	<5.00	--
Bromodichloromethane	ug/L	--	<5	<1.00	<1	<1.00	<1	<1.00	<1	<1.00	--
Bromoform	ug/L	--	<25	<5.00	<5	<5.00	<5	<5.00	<5	<5.00	--
Bromomethane	ug/L	--	<20	<4.00	<4	<4.00	<4	<4.00	<4	<4.00	--
Carbon disulfide	ug/L	--	<5	<1.00	<1	<1.00	<1	<1.00	<1	<1.00	--
Carbon Tetrachloride	ug/L	--	<10	<2.00	<2	<2.00	<2	<2.00	<2	<2.00	--
Chlorobenzene	ug/L	--	<5	<1.00	<1	<1.00	<1	<1.00	<1	<1.00	--
Chlorodibromomethane	ug/L	--	<25	<5.00	<5	<5.00	<5	<5.00	<5	<5.00	--
Chloroethane	ug/L	--	<20	<4.00	<4	<4.00	<4	<4.00	<4	<4.00	--
Chloroform	ug/L	--	<5 L5	<1.00	<1	<1.00	<1	<1.00	<1	<1.00	--
Chloromethane	ug/L	--	<15	<3.00	<3	<3.00 M1	<3	<3.00	<3	<3.00	--
cis-1,2-Dichloroethene	ug/L	**584**	**223**	<1.00	<1	<1.00	<1	<1.00	<1	<1.00	--
cis-1,3-Dichloropropene	ug/L	--	<25	<5.00	<5	<5.00	<5	<5.00	<5	<5.00	--
Dibromomethane	ug/L	--	<5	<1.00	<1	<1.00	<1	<1.00	<1	<1.00	--

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Analyte	Report Units	MW03 10/3/2007 CQJ0240-02RE1	MW03 3/20/2008 CRC0967-10	MW06 9/27/2007 CQI1583-04	MW06 3/18/2008 CRC0807-02	MW07 9/26/2007 CQI1500-08	MW07 3/18/2008 CRC0807-04	MW08 9/27/2007 CQI1583-03	MW08 3/18/2008 CRC0807-03	MW09 9/26/2007 CQI1500-04	MW09 9/26/2007 CQI1500-04RE1
Dichlorodifluoromethane	ug/L	--	<15	<3.00	<3	<3.00	<3	<3.00	<3	<3.00	--
Ethylbenzene	ug/L	--	<5 L5	<1.00	<1	<1.00	<1	<1.00	<1	<1.00	--
Hexachlorobutadiene	ug/L	--	<25	<5.00	<5	<5.00	<5	<5.00	<5	<5.00	--
Hexane	ug/L	--	<5 CIN	<1.00	<1 CIN	<1.00	<1 CIN	<1.00	<1 CIN	<1.00	--
Isopropylbenzene	ug/L	--	<5	<1.00	<1	<1.00	<1	<1.00	<1	<1.00	--
Methyl tert-Butyl Ether	ug/L	--	<5	<1.00	<1	<1.00	<1	<1.00	<1	<1.00	--
Methylene Chloride	ug/L	--	<25	<5.00	<5	<5.00	<5	<5.00	<5	<5.00	--
Naphthalene	ug/L	--	<25	<5.00	<5	<5.00	<5	<5.00	<5	<5.00	--
n-Butylbenzene	ug/L	--	<5	<1.00	<1	<1.00	<1	<1.00	<1	<1.00	--
n-Propylbenzene	ug/L	--	<5	<1.00	<1	<1.00	<1	<1.00	<1	<1.00	--
p-Isopropyltoluene	ug/L	--	<5	<1.00	<1	<1.00	<1	<1.00	<1	<1.00	--
sec-Butylbenzene	ug/L	--	**9.70**	<1.00	<1	<1.00	<1	<1.00	<1	<1.00	--
Styrene	ug/L	--	<5	<1.00	<1	<1.00	<1	<1.00	<1	<1.00	--
tert-Butylbenzene	ug/L	--	<5	<1.00	<1	<1.00	<1	<1.00	<1	<1.00	--
Tetrachloroethene	ug/L	--	**12.6**	**1.13**	<1	<1.00	<1	**1.19**	<1	--	<1.00
Toluene	ug/L	--	**7.10**	<1.00	<1	<1.00	<1	<1.00	<1	<1.00	--
trans-1,2-Dichloroethene	ug/L	--	**15.0**	<1.00	<1	<1.00	<1	<1.00	<1	<1.00	--
trans-1,3-Dichloropropene	ug/L	--	<25	<5.00	<5	<5.00	<5	<5.00	<5	<5.00	--
Trichloroethene	ug/L	--	<5	<1.00	<1	<1.00	<1	<1.00	<1	<1.00	--
Trichlorofluoromethane	ug/L	--	<20	<4.00	<4	<4.00	<4	<4.00	<4	<4.00	--
Vinyl chloride	ug/L	--	**57.2**	<1.00 C	<1	<1.00	<1	<1.00 C	<1	<1.00	--
Xylenes, total	ug/L	--	<15	<3.00	<3	<3.00	<3	<3.00	<3	<3.00	--

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Analyte	Report Units	MW09 3/17/2008 CRC0752-04	MW10 9/26/2007 CQI1500-05	MW10 9/26/2007 CQI1500-05RE1	MW10 3/17/2008 CRC0752-05	MW11 9/26/2007 CQI1500-02	MW11 Dup 9/26/2007 CQI1500-03	MW11 3/19/2008 CRC0886-05	MW12 9/26/2007 CQI1500-06	MW12 3/17/2008 CRC0752-02	MW13 9/26/2007 CQI1500-07
1,1,1,2-Tetrachloroethane	ug/L	<1.00	<1.00	--	<1.00	<1.00	<1.00	<1	<1.00	<1.00	<1.00
1,1,1-Trichloroethane	ug/L	<1.00	<1.00	--	<1.00	<1.00	<1.00	<1	<1.00	<1.00	<1.00
1,1,2,2-Tetrachloroethane	ug/L	<1.00	<1.00	--	<1.00	<1.00	<1.00	<1	<1.00	<1.00	<1.00
1,1,2-Trichloroethane	ug/L	<1.00	<1.00	--	<1.00	<1.00	<1.00	<1	<1.00	<1.00	<1.00
1,1-Dichloroethane	ug/L	<1.00	<1.00	--	<1.00	<1.00	<1.00	<1	**2.06**	**1.87**	**22.1**
1,1-Dichloroethene	ug/L	<2.00	<2.00	--	<2.00	<2.00	<2.00	<2	<2.00	<2.00	<2.00
1,1-Dichloropropene	ug/L	<1.00	<1.00	--	<1.00	<1.00	<1.00	<1	<1.00	<1.00	<1.00
1,2,3-Trichlorobenzene	ug/L	<5.00	<5.00	--	<5.00	<5.00	<5.00	<5	<5.00	<5.00	<5.00
1,2,3-Trichloropropane	ug/L	<1.00	<1.00	--	<1.00	<1.00	<1.00	<1	<1.00	<1.00	<1.00
1,2,4-Trichlorobenzene	ug/L	<5.00	<5.00	--	<5.00	<5.00	<5.00	<5	<5.00	<5.00	<5.00
1,2,4-Trimethylbenzene	ug/L	<1.00	<1.00	--	<1.00	<1.00	<1.00	<1	<1.00	<1.00	<1.00
1,2-Dibromo-3-chloropropane	ug/L	<10.0	<10.0	--	<10.0	<10.0	<10.0	<10	<10.0	<10.0	<10.0
1,2-Dibromoethane (EDB)	ug/L	<10.0	<10.0	--	<10.0	<10.0	<10.0	<10	<10.0	<10.0	<10.0
1,2-Dichlorobenzene	ug/L	<1.00	<1.00	--	<1.00	<1.00	<1.00	<1	<1.00	<1.00	<1.00
1,2-Dichloroethane	ug/L	<1.00	<1.00	--	<1.00	<1.00	<1.00	<1	<1.00	<1.00	<1.00
1,2-Dichloropropane	ug/L	<1.00	<1.00	--	<1.00	<1.00	<1.00	<1	<1.00	<1.00	<1.00
1,3,5-Trimethylbenzene	ug/L	<1.00	<1.00	--	<1.00	<1.00	<1.00	<1	<1.00	<1.00	<1.00
1,3-Dichlorobenzene	ug/L	<1.00	<1.00	--	<1.00	<1.00	<1.00	<1	<1.00	<1.00	<1.00
1,3-Dichloropropane	ug/L	<1.00	<1.00	--	<1.00	<1.00	<1.00	<1	<1.00	<1.00	<1.00
1,4-Dichlorobenzene	ug/L	<1.00	<1.00	--	<1.00	<1.00	<1.00	<1	<1.00	<1.00	<1.00
1,4-Dioxane	ug/l	--	<2.0	--	--	<2.0	<2.0	--	**24**	**32**	**28**
2,2-Dichloropropane	ug/L	<4.00	<4.00	--	<4.00	<4.00 C, L	<4.00	<4	<4.00	<4.00	<4.00
2-Butanone (MEK)	ug/L	<10.0	<10.0	--	<10.0	<10.0 C, L	<10.0	<10	<10.0	<10.0	<10.0
2-Chlorotoluene	ug/L	<1.00	<1.00	--	<1.00	<1.00	<1.00	<1	<1.00	<1.00	<1.00
4-Chlorotoluene	ug/L	<1.00	<1.00	--	<1.00	<1.00	<1.00	<1	<1.00	<1.00	<1.00
4-methyl-2-Pentanone (MIBK)	ug/L	--	--	--	--	--	--	--	--	--	--
Acetone	ug/L	<10.0	<10.0	--	<10.0	<10.0 C	<10.0	<10	<10.0	<10.0	<10.0
Acrylonitrile	ug/L	<10.0	<10.0	--	<10.0	<10.0	<10.0	<10	<10.0	<10.0	<10.0

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Groundwater VOC Analytical Results From Monitoring Wells
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Analyte	Report Units	MW09 3/17/2008 CRC0752-04	MW10 9/26/2007 CQI1500-05	MW10 9/26/2007 CQI1500-05RE1	MW10 3/17/2008 CRC0752-05	MW11 9/26/2007 CQI1500-02	MW11 Dup 9/26/2007 CQI1500-03	MW11 3/19/2008 CRC0886-05	MW12 9/26/2007 CQI1500-06	MW12 3/17/2008 CRC0752-02	MW13 9/26/2007 CQI1500-07
Benzene	ug/L	<0.500	<0.500	--	<0.500	<0.500	<0.500	<0.5	<0.500	<0.500	**0.780**
Bromobenzene	ug/L	<1.00	<1.00	--	<1.00	<1.00	<1.00	<1	<1.00	<1.00	<1.00
Bromochloromethane	ug/L	<5.00	<5.00	--	<5.00	<5.00 C	<5.00	<5	<5.00	<5.00	<5.00
Bromodichloromethane	ug/L	<1.00	<1.00	--	<1.00	<1.00	<1.00	<1	<1.00	<1.00	<1.00
Bromoform	ug/L	<5.00	<5.00	--	<5.00	<5.00 C	<5.00	<5	<5.00	<5.00	<5.00
Bromomethane	ug/L	<4.00	<4.00	--	<4.00	<4.00	<4.00	<4	<4.00	<4.00	<4.00
Carbon disulfide	ug/L	<1.00	<1.00	--	<1.00	<1.00	<1.00	<1	<1.00	<1.00	<1.00
Carbon Tetrachloride	ug/L	<2.00	<2.00	--	<2.00	<2.00	<2.00	<2	<2.00	<2.00	<2.00
Chlorobenzene	ug/L	<1.00	<1.00	--	<1.00	<1.00	<1.00	<1	<1.00	<1.00	<1.00
Chlorodibromomethane	ug/L	<5.00	<5.00	--	<5.00	<5.00	**15.1**	<5	<5.00	<5.00	<5.00
Chloroethane	ug/L	<4.00	<4.00	--	<4.00	<4.00	<4.00	<4	<4.00	<4.00	<4.00
Chloroform	ug/L	<1.00	<1.00	--	<1.00	<1.00	<1.00	<1	<1.00	<1.00	<1.00
Chloromethane	ug/L	<3.00	<3.00	--	<3.00	<3.00	<3.00	<3	<3.00	<3.00	<3.00
cis-1,2-Dichloroethene	ug/L	<1.00	<1.00	--	<1.00	<1.00	<1.00	**3.30**	**5.17**	**4.26**	<1.00
cis-1,3-Dichloropropene	ug/L	<5.00	<5.00	--	<5.00	<5.00	<5.00	<5	<5.00	<5.00	<5.00
Dibromomethane	ug/L	<1.00	<1.00	--	<1.00	<1.00	<1.00	<1	<1.00	<1.00	<1.00

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Table 13 - Preliminary
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Analyte	Report Units	MW09 3/17/2008 CRC0752-04	MW10 9/26/2007 CQI1500-05	MW10 9/26/2007 CQI1500-05RE1	MW10 3/17/2008 CRC0752-05	MW11 9/26/2007 CQI1500-02	MW11 Dup 9/26/2007 CQI1500-03	MW11 3/19/2008 CRC0886-05	MW12 9/26/2007 CQI1500-06	MW12 3/17/2008 CRC0752-02	MW13 9/26/2007 CQI1500-07
Dichlorodifluoromethane	ug/L	<3.00	<3.00	--	<3.00	<3.00	<3.00	<3	<3.00	<3.00	<3.00
Ethylbenzene	ug/L	<1.00	<1.00	--	<1.00	<1.00	<1.00	<1	<1.00	<1.00	<1.00
Hexachlorobutadiene	ug/L	<5.00	<5.00	--	<5.00	<5.00	<5.00	<5	<5.00	<5.00	<5.00
Hexane	ug/L	<1.00 CIN	<1.00	--	<1.00 CIN, R	<1.00	<1.00	<1 CIN, R	<1.00	<1.00 CIN	<1.00
Isopropylbenzene	ug/L	<1.00	<1.00	--	<1.00	<1.00	<1.00	<1	<1.00	<1.00	**1.22**
Methyl tert-Butyl Ether	ug/L	<1.00	<1.00	--	<1.00	<1.00 C, L	<1.00	<1	<1.00	<1.00	<1.00
Methylene Chloride	ug/L	<5.00	<5.00	--	<5.00	<5.00	<5.00	<5	<5.00	<5.00	<5.00
Naphthalene	ug/L	<5.00	<5.00	--	<5.00	<5.00	<5.00	<5	<5.00	<5.00	<5.00
n-Butylbenzene	ug/L	<1.00	<1.00	--	<1.00	<1.00	<1.00	<1	<1.00	<1.00	**1.90**
n-Propylbenzene	ug/L	<1.00	<1.00	--	<1.00	<1.00	<1.00	<1	<1.00	<1.00	<1.00
p-Isopropyltoluene	ug/L	<1.00	<1.00	--	<1.00	<1.00	<1.00	<1	<1.00	<1.00	<1.00
sec-Butylbenzene	ug/L	<1.00	<1.00	--	<1.00	<1.00	<1.00	<1	<1.00	<1.00	<1.00
Styrene	ug/L	<1.00	<1.00	--	<1.00	<1.00	<1.00	<1	<1.00	<1.00	<1.00
tert-Butylbenzene	ug/L	<1.00	<1.00	--	<1.00	<1.00	<1.00	<1	<1.00	<1.00	<1.00
Tetrachloroethene	ug/L	<1.00	--	<1.00	<1.00	**26.9**	**27.9**	**39.2**	<1.00	<1.00	<1.00
Toluene	ug/L	<1.00	<1.00	--	<1.00	<1.00	<1.00	<1	<1.00	<1.00	<1.00
trans-1,2-Dichloroethene	ug/L	<1.00	<1.00	--	<1.00	<1.00	<1.00	<1	<1.00	<1.00	**1.31**
trans-1,3-Dichloropropene	ug/L	<5.00	<5.00	--	<5.00	<5.00	<5.00	<5	<5.00	<5.00	<5.00
Trichloroethene	ug/L	<1.00	<1.00	--	<1.00	<1.00	<1.00	**3.23**	<1.00	<1.00	<1.00
Trichlorofluoromethane	ug/L	<4.00	<4.00	--	<4.00	<4.00	<4.00	<4	<4.00	<4.00	<4.00
Vinyl chloride	ug/L	<1.00	<1.00	--	<1.00	<1.00	<1.00	<1	<1.00	<1.00	**36.9**
Xylenes, total	ug/L	<3.00	<3.00	--	<3.00	<3.00	<3.00	<3	<3.00	<3.00	<3.00

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Table 13 - Preliminary
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Well Dynamics RCRA Facility Investigation

Analyte	Report Units	MW13 3/19/2008 CRC0886-04	MW13 DUP 3/19/2008 CRC0886-06	MW14 9/28/2007 CQI1614-03	MW14 3/17/2008 CRC0752-03	MW15 9/27/2007 CQI1583-02	MW15 3/18/2008 CRC0807-06	MW16 9/27/2007 CQI1583-01	MW16 3/19/2008 CRC0886-02	MW17 9/27/2007 CQI1583-06	MW17 3/18/2008 CRC0807-07
1,1,1,2-Tetrachloroethane	ug/L	<1	<1	<1.00	<1.00	<1.00	<1	<1.00	<1	<1.00	<1
1,1,1-Trichloroethane	ug/L	<1	<1	<1.00	<1.00	<1.00	<1	<1.00	<1	<1.00	<1
1,1,2,2-Tetrachloroethane	ug/L	<1	<1	<1.00	<1.00	<1.00	<1	<1.00	<1	<1.00	<1
1,1,2-Trichloroethane	ug/L	<1	<1	<1.00	<1.00	<1.00	<1	<1.00	<1	<1.00	<1
1,1-Dichloroethane	ug/L	**18.0**	**17.8**	**2.85**	**4.15**	<1.00	<1	**1.79**	**1.86**	<1.00	<1
1,1-Dichloroethene	ug/L	<2	<2	<2.00	<2.00	<2.00	<2	<2.00	<2	<2.00	<2
1,1-Dichloropropene	ug/L	<1	<1	<1.00	<1.00	<1.00	<1	<1.00	<1	<1.00	<1
1,2,3-Trichlorobenzene	ug/L	<5	<5	<5.00	<5.00	<5.00	<5	<5.00	<5	<5.00	<5
1,2,3-Trichloropropane	ug/L	<1	<1	<1.00	<1.00	<1.00	<1	<1.00	<1	<1.00	<1
1,2,4-Trichlorobenzene	ug/L	<5	<5	<5.00	<5.00	<5.00	<5	<5.00	<5	<5.00	<5
1,2,4-Trimethylbenzene	ug/L	<1	<1	<1.00	<1.00	<1.00	<1	<1.00	<1	<1.00	<1
1,2-Dibromo-3-chloropropane	ug/L	<10	<10	<10.0	<10.0	<10.0	<10	<10.0	<10	<10.0	<10
1,2-Dibromoethane (EDB)	ug/L	<10	<10	<10.0	<10.0	<10.0	<10	<10.0	<10	<10.0	<10
1,2-Dichlorobenzene	ug/L	<1	<1	<1.00	<1.00	<1.00	<1	<1.00	<1	<1.00	<1
1,2-Dichloroethane	ug/L	<1	<1	<1.00	<1.00	<1.00	<1	<1.00	<1	<1.00	<1
1,2-Dichloropropane	ug/L	<1	<1	<1.00	<1.00	<1.00	<1	<1.00	<1	<1.00	<1
1,3,5-Trimethylbenzene	ug/L	**1.06**	**1.00**	<1.00	<1.00	<1.00	<1	<1.00	<1	<1.00	<1
1,3-Dichlorobenzene	ug/L	<1	<1	<1.00	<1.00	<1.00	<1	<1.00	<1	<1.00	<1
1,3-Dichloropropane	ug/L	<1	<1	<1.00	<1.00	<1.00	<1	<1.00	<1	<1.00	<1
1,4-Dichlorobenzene	ug/L	<1	<1	<1.00	<1.00	<1.00	<1	<1.00	<1	<1.00	<1
1,4-Dioxane	ug/l	**36**	--	**22**	**36**	<2.0	--	**35**	**52**	**24**	**26**
2,2-Dichloropropane	ug/L	<4	<4	<4.00	<4.00	<4.00	<4	<4.00	<4	<4.00	<4
2-Butanone (MEK)	ug/L	<10	<10	<10.0	<10.0	<10.0	<10	<10.0	<10	<10.0	<10
2-Chlorotoluene	ug/L	<1	<1	<1.00	<1.00	<1.00	<1	<1.00	<1	<1.00	<1
4-Chlorotoluene	ug/L	<1	<1	<1.00	<1.00	<1.00	<1	<1.00	<1	<1.00	<1
4-methyl-2-Pentanone (MIBK)	ug/L	--	--	--	--	--	--	--	--	--	--
Acetone	ug/L	<10	<10	<10.0	<10.0	<10.0	<10	<10.0	<10	<10.0	<10
Acrylonitrile	ug/L	<10	<10	<10.0	<10.0	<10.0	<10	<10.0	<10	<10.0	<10

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Analyte	Report Units	MW13 3/19/2008 CRC0886-04	MW13 DUP 3/19/2008 CRC0886-06	MW14 9/28/2007 CQI1614-03	MW14 3/17/2008 CRC0752-03	MW15 9/27/2007 CQI1583-02	MW15 3/18/2008 CRC0807-06	MW16 9/27/2007 CQI1583-01	MW16 3/19/2008 CRC0886-02	MW17 9/27/2007 CQI1583-06	MW17 3/18/2008 CRC0807-07
Benzene	ug/L	**0.650**	**0.640**	<0.500	<0.500	<0.500	<0.5	<0.500	<0.5	<0.500	<0.5
Bromobenzene	ug/L	<1	<1	<1.00	<1.00	<1.00	<1	<1.00	<1	<1.00	<1
Bromochloromethane	ug/L	<5	<5	<5.00	<5.00	<5.00	<5	<5.00	<5	<5.00	<5
Bromodichloromethane	ug/L	<1	<1	<1.00	<1.00	<1.00	<1	<1.00	<1	<1.00	<1
Bromoform	ug/L	<5	<5	<5.00	<5.00	<5.00	<5	<5.00	<5	<5.00	<5
Bromomethane	ug/L	<4	<4	<4.00	<4.00	<4.00	<4	<4.00	<4	<4.00	<4
Carbon disulfide	ug/L	<1	<1	<1.00	<1.00	<1.00	<1	<1.00	<1	<1.00	<1
Carbon Tetrachloride	ug/L	<2	<2	<2.00	<2.00	<2.00	<2	<2.00	<2	<2.00	<2
Chlorobenzene	ug/L	<1	<1	<1.00	<1.00	<1.00	<1	<1.00	<1	<1.00	<1
Chlorodibromomethane	ug/L	<5	<5	<5.00	<5.00	<5.00	<5	<5.00	<5	<5.00	<5
Chloroethane	ug/L	<4	<4	<4.00	<4.00	<4.00	<4	<4.00	<4	<4.00	<4
Chloroform	ug/L	<1	<1	<1.00	<1.00	<1.00	<1	<1.00	<1	<1.00	<1
Chloromethane	ug/L	<3	<3	<3.00	<3.00	<3.00	<3	<3.00	<3	<3.00	<3
cis-1,2-Dichloroethene	ug/L	<1	<1	**7.39**	**8.97**	<1.00	<1	**1.25**	**1.62**	<1.00	<1
cis-1,3-Dichloropropene	ug/L	<5	<5	<5.00	<5.00	<5.00	<5	<5.00	<5	<5.00	<5
Dibromomethane	ug/L	<1	<1	<1.00	<1.00	<1.00	<1	<1.00	<1	<1.00	<1

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Analyte	Report Units	MW13 3/19/2008 CRC0886-04	MW13 DUP 3/19/2008 CRC0886-06	MW14 9/28/2007 CQI1614-03	MW14 3/17/2008 CRC0752-03	MW15 9/27/2007 CQI1583-02	MW15 3/18/2008 CRC0807-06	MW16 9/27/2007 CQI1583-01	MW16 3/19/2008 CRC0886-02	MW17 9/27/2007 CQI1583-06	MW17 3/18/2008 CRC0807-07
Dichlorodifluoromethane	ug/L	<3	<3	<3.00	<3.00	<3.00	<3	<3.00	<3	<3.00	<3
Ethylbenzene	ug/L	<1	<1	<1.00	<1.00	<1.00	<1	<1.00	<1	<1.00	<1
Hexachlorobutadiene	ug/L	<5	<5	<5.00	<5.00	<5.00	<5	<5.00	<5	<5.00	<5
Hexane	ug/L	<1 CIN, R	<1 CIN	<1.00	<1.00 CIN, R	<1.00	<1 CIN	<1.00	<1 CIN	<1.00	<1 CIN
Isopropylbenzene	ug/L	**1.06**	**1.00**	<1.00	<1.00	<1.00	<1	<1.00	<1	<1.00	<1
Methyl tert-Butyl Ether	ug/L	<1	<1	<1.00	<1.00	<1.00	<1	<1.00	<1	<1.00	<1
Methylene Chloride	ug/L	<5	<5	<5.00	<5.00	<5.00	<5	<5.00	<5	<5.00	<5
Naphthalene	ug/L	<5	<5	<5.00	<5.00	<5.00	<5	<5.00	<5	<5.00	<5
n-Butylbenzene	ug/L	**5.01**	<1	<1.00	<1.00	<1.00	<1	<1.00	<1	<1.00	<1
n-Propylbenzene	ug/L	<1	<1	<1.00	<1.00	<1.00	<1	<1.00	<1	<1.00	<1
p-Isopropyltoluene	ug/L	<1	<1	<1.00	<1.00	<1.00	<1	<1.00	<1	<1.00	<1
sec-Butylbenzene	ug/L	<1	<1	<1.00	<1.00	<1.00	<1	<1.00	<1	<1.00	<1
Styrene	ug/L	<1	<1	<1.00	<1.00	<1.00	<1	<1.00	<1	<1.00	<1
tert-Butylbenzene	ug/L	<1	<1	<1.00	<1.00	<1.00	<1	<1.00	<1	<1.00	<1
Tetrachloroethene	ug/L	<1	<1	<1.00	<1.00	**1.01**	<1	**1.03**	<1	<1.00	<1
Toluene	ug/L	<1	<1	<1.00	<1.00	<1.00	<1	<1.00	<1	<1.00	<1
trans-1,2-Dichloroethene	ug/L	**1.03**	<1	<1.00	<1.00	<1.00	<1	<1.00	<1	<1.00	<1
trans-1,3-Dichloropropene	ug/L	<5	<5	<5.00	<5.00	<5.00	<5	<5.00	<5	<5.00	<5
Trichloroethene	ug/L	<1	<1	<1.00	<1.00	<1.00	<1	<1.00	<1	<1.00	<1
Trichlorofluoromethane	ug/L	<4	<4	<4.00	<4.00	<4.00	<4	<4.00	<4	<4.00	<4
Vinyl chloride	ug/L	**26.9**	**26.4**	<1.00	<1.00	<1.00 C	<1	<1.00 C	<1	<1.00	<1
Xylenes, total	ug/L	<3	<3	<3.00	<3.00	<3.00	<3	<3.00	<3	<3.00	<3

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Analyte	Report Units	MW18 9/27/2007 CQI1583-05	MW18 3/18/2008 CRC0807-08	MW19 9/24/2007 CQI1376-02	MW19 9/24/2007 CQI1376-02RE1	MW19 3/24/2008 CRC1117-02	MW20 9/24/2007 CQI1376-03	MW20 9/24/2007 CQI1376-03RE1	MW20 9/24/2007 CQI1376-03RE2	MW20 3/21/2008 CRC1016-02	MW27 9/28/2007 CQI1614-05
1,1,1,2-Tetrachloroethane	ug/L	<1.00	<1	<1.00	--	<1.00	<1.00	--	--	<5	<1.00
1,1,1-Trichloroethane	ug/L	<1.00	<1	<1.00 L1	--	<1.00	<1.00 L1	--	--	<5	<1.00
1,1,2,2-Tetrachloroethane	ug/L	<1.00	<1	<1.00 L, C	--	<1.00	<1.00 L, C	--	--	<5	<1.00
1,1,2-Trichloroethane	ug/L	<1.00	<1	<1.00 L, C	--	<1.00	<1.00 L, C	--	--	<5	<1.00
1,1-Dichloroethane	ug/L	<1.00	<1	**4.22**	--	**6.52**	<1.00	--	--	**12.4**	<1.00
1,1-Dichloroethene	ug/L	<2.00	<2	**2.43**	--	**2.95**	<2.00	--	--	**14.0**	<2.00
1,1-Dichloropropene	ug/L	<1.00	<1	<1.00	--	<1.00	<1.00	--	--	<5	<1.00
1,2,3-Trichlorobenzene	ug/L	<5.00	<5	<5.00	--	<5.00	<5.00	--	--	<25	<5.00
1,2,3-Trichloropropane	ug/L	<1.00	<1	<1.00	--	<1.00	<1.00	--	--	<5	<1.00
1,2,4-Trichlorobenzene	ug/L	<5.00	<5	<5.00	--	<5.00	<5.00	--	--	<25	<5.00
1,2,4-Trimethylbenzene	ug/L	<1.00	<1	<1.00	--	<1.00	<1.00	--	--	<5	<1.00
1,2-Dibromo-3-chloropropane	ug/L	<10.0	<10	<10.0 L, C	--	<10.0	<10.0 C, L	--	--	<50	<10.0
1,2-Dibromoethane (EDB)	ug/L	<10.0	<10	<10.0	--	<10.0	<10.0	--	--	<50	<10.0
1,2-Dichlorobenzene	ug/L	<1.00	<1	<1.00	--	<1.00	<1.00	--	--	<5	<1.00
1,2-Dichloroethane	ug/L	<1.00	<1	<1.00 C	--	<1.00	<1.00 C	--	--	<5	<1.00
1,2-Dichloropropane	ug/L	<1.00	<1	<1.00	--	<1.00	<1.00	--	--	<5	<1.00
1,3,5-Trimethylbenzene	ug/L	<1.00	<1	<1.00	--	<1.00	<1.00	--	--	<5	<1.00
1,3-Dichlorobenzene	ug/L	<1.00	<1	<1.00	--	<1.00	<1.00	--	--	<5	<1.00
1,3-Dichloropropane	ug/L	<1.00	<1	<1.00 L5, C	--	<1.00	<1.00 L5, C	--	--	<5	<1.00
1,4-Dichlorobenzene	ug/L	<1.00	<1	<1.00	--	<1.00	<1.00	--	--	<5	<1.00
1,4-Dioxane	ug/l	<2.0	--	**7.3**	--	**9.1**	**200**	--	--	**250**	<2.0
2,2-Dichloropropane	ug/L	<4.00	<4	<4.00 L, C	--	<4.00	<4.00 L, C	--	--	<20	<4.00
2-Butanone (MEK)	ug/L	<10.0	<10	<10.0 L5	--	<10.0	<10.0 L5	--	--	<50	<10.0
2-Chlorotoluene	ug/L	<1.00	<1	<1.00	--	<1.00	<1.00	--	--	<5	<1.00
4-Chlorotoluene	ug/L	<1.00	<1	<1.00	--	<1.00	<1.00	--	--	<5	<1.00
4-methyl-2-Pentanone (MIBK)	ug/L	--	--	--	--	--	--	--	--	--	--
Acetone	ug/L	<10.0	<10	<10.0 L5, C	--	<10.0	<10.0 L5, C	--	--	<50	<10.0
Acrylonitrile	ug/L	<10.0	<10	<10.0	--	<10.0	<10.0	--	--	<50	<10.0

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Table 13 - Preliminary
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Analyte	Report Units	MW18 9/27/2007 CQI1583-05	MW18 3/18/2008 CRC0807-08	MW19 9/24/2007 CQI1376-02	MW19 9/24/2007 CQI1376-02RE1	MW19 3/24/2008 CRC1117-02	MW20 9/24/2007 CQI1376-03	MW20 9/24/2007 CQI1376-03RE1	MW20 9/24/2007 CQI1376-03RE2	MW20 3/21/2008 CRC1016-02	MW27 9/28/2007 CQI1614-05
Benzene	ug/L	<0.500	<0.5	<0.500	--	<0.500	**2.36**	--	--	<2.5	<0.500
Bromobenzene	ug/L	<1.00	<1	<1.00	--	<1.00	<1.00	--	--	<5	<1.00
Bromochloromethane	ug/L	<5.00	<5	<5.00 L5, C	--	<5.00	<5.00 L5, C	--	--	<25	<5.00
Bromodichloromethane	ug/L	<1.00	<1	<1.00	--	<1.00	<1.00	--	--	<5	<1.00
Bromoform	ug/L	<5.00	<5	<5.00 L5, C	--	<5.00	<5.00 L5, C	--	--	<25	<5.00
Bromomethane	ug/L	<4.00	<4	<4.00	--	<4.00	<4.00	--	--	<20	<4.00
Carbon disulfide	ug/L	<1.00	<1	<1.00	--	<1.00	<1.00	--	--	<5	<1.00
Carbon Tetrachloride	ug/L	<2.00	<2	<2.00 L5	--	<2.00	<2.00 L5	--	--	<10	<2.00
Chlorobenzene	ug/L	<1.00	<1	<1.00	--	<1.00	<1.00	--	--	<5	<1.00
Chlorodibromomethane	ug/L	<5.00	<5	<5.00 L	--	<5.00	<5.00 L	--	--	<25	<5.00
Chloroethane	ug/L	<4.00	<4	<4.00	--	<4.00	<4.00	--	--	<20	<4.00
Chloroform	ug/L	<1.00	<1	<1.00	--	<1.00	<1.00	--	--	<5 L5	<1.00
Chloromethane	ug/L	<3.00	<3	<3.00	--	<3.00	<3.00	--	--	<15	<3.00
cis-1,2-Dichloroethene	ug/L	<1.00	<1	--	**1.34**	**1.24**	--	**1750**	--	**1740**	**59.3**
cis-1,3-Dichloropropene	ug/L	<5.00	<5	<5.00	--	<5.00	<5.00	--	--	<25	<5.00
Dibromomethane	ug/L	<1.00	<1	<1.00 L, C	--	<1.00	<1.00 L, C	--	--	<5	<1.00

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Table 13 - Preliminary
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Analyte	Report Units	MW18 9/27/2007 CQI1583-05	MW18 3/18/2008 CRC0807-08	MW19 9/24/2007 CQI1376-02	MW19 9/24/2007 CQI1376-02RE1	MW19 3/24/2008 CRC1117-02	MW20 9/24/2007 CQI1376-03	MW20 9/24/2007 CQI1376-03RE1	MW20 9/24/2007 CQI1376-03RE2	MW20 3/21/2008 CRC1016-02	MW27 9/28/2007 CQI1614-05
Dichlorodifluoromethane	ug/L	<3.00	<3	<3.00	--	<3.00	<3.00	--	--	<15	<3.00
Ethylbenzene	ug/L	<1.00	<1	<1.00	--	<1.00	<1.00	--	--	<5 L5	<1.00
Hexachlorobutadiene	ug/L	<5.00	<5	<5.00	--	<5.00	<5.00	--	--	<25	<5.00
Hexane	ug/L	<1.00	<1 CIN	<1.00	--	<1.00	<1.00	--	--	<5 CIN	<1.00
Isopropylbenzene	ug/L	<1.00	<1	<1.00	--	<1.00	<1.00	--	--	<5	<1.00
Methyl tert-Butyl Ether	ug/L	<1.00	<1	<1.00 L, C	--	<1.00	<1.00 L, C	--	--	<5	<1.00
Methylene Chloride	ug/L	<5.00	<5	<5.00	--	<5.00	<5.00	--	--	<25	<5.00
Naphthalene	ug/L	<5.00	<5	<5.00 L, C	--	<5.00	<5.00 L, C	--	--	<25	<5.00
n-Butylbenzene	ug/L	<1.00	<1	<1.00	--	<1.00	<1.00	--	--	<5	<1.00
n-Propylbenzene	ug/L	<1.00	<1	<1.00	--	<1.00	<1.00	--	--	<5	<1.00
p-Isopropyltoluene	ug/L	<1.00	<1	<1.00	--	<1.00	<1.00	--	--	<5	<1.00
sec-Butylbenzene	ug/L	<1.00	<1	<1.00	--	<1.00	<1.00	--	--	<5	<1.00
Styrene	ug/L	<1.00	<1	<1.00	--	<1.00	<1.00	--	--	<5	<1.00
tert-Butylbenzene	ug/L	<1.00	<1	<1.00	--	<1.00	<1.00	--	--	<5	<1.00
Tetrachloroethene	ug/L	<1.00	<1	--	<1.00	<1.00	--	--	**2.62**	<5	**157**
Toluene	ug/L	<1.00	<1	<1.00	--	<1.00	<1.00	--	--	<5	<1.00
trans-1,2-Dichloroethene	ug/L	<1.00	<1	<1.00	--	<1.00	<1.00	--	--	**51.8**	**2.27**
trans-1,3-Dichloropropene	ug/L	<5.00	<5	<5.00	--	<5.00	<5.00	--	--	<25	<5.00
Trichloroethene	ug/L	<1.00	<1	<1.00	--	<1.00	**1.23**	--	--	<5	**8.37**
Trichlorofluoromethane	ug/L	<4.00	<4	<4.00 C	--	<4.00	<4.00 C	--	--	<20	<4.00
Vinyl chloride	ug/L	<1.00 C	<1	**1.08**	--	<1.00	<1.00	--	--	**525**	**2.58 C9**
Xylenes, total	ug/L	<3.00	<3	<3.00	--	<3.00	<3.00	--	--	<15	<3.00

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Analyte	Report Units	MW27 3/17/2008 CRC0752-06	MW28 9/28/2007 CQI1614-02	MW28 3/20/2008 CRC0967-02	MW29 10/4/2007 CQJ0343-02	MW29 3/19/2008 CRC0886-03	MW30 9/25/2007 CQI1376-04	MW30 9/25/2007 CQI1376-04RE1	MW30 3/20/2008 CRC0967-06	MW30 Dup 3/20/2008 CRC0967-07	MW31 10/4/2007 CQJ0343-03
1,1,1,2-Tetrachloroethane	ug/L	<1.00	<1.00	<1	<1.00	<1	<1.00	--	<5	<5	<1.00
1,1,1-Trichloroethane	ug/L	<1.00	<1.00	<1	<1.00	<1	**1.22 L1**	--	<5	<5	<1.00
1,1,2,2-Tetrachloroethane	ug/L	<1.00	<1.00	<1	<1.00	<1	<1.00 L, C	--	<5	<5	<1.00
1,1,2-Trichloroethane	ug/L	<1.00	<1.00	<1	<1.00	<1	<1.00 L, C	--	<5	<5	<1.00
1,1-Dichloroethane	ug/L	<1.00	<1.00	<1	<1.00	<1	<1.00	--	<5	<5	<1.00
1,1-Dichloroethene	ug/L	<2.00	<2.00	<2	<2.00	<2	**2.95**	--	<10	<10	<2.00
1,1-Dichloropropene	ug/L	<1.00	<1.00	<1	<1.00	<1	<1.00	--	<5	<5	<1.00
1,2,3-Trichlorobenzene	ug/L	<5.00	<5.00	<5	<5.00	<5	<5.00	--	<25	<25	<5.00
1,2,3-Trichloropropane	ug/L	<1.00	<1.00	<1	<1.00	<1	<1.00	--	<5	<5	<1.00
1,2,4-Trichlorobenzene	ug/L	<5.00	<5.00	<5	<5.00	<5	<5.00	--	<25	<25	<5.00
1,2,4-Trimethylbenzene	ug/L	<1.00	<1.00	<1	<1.00	<1	<1.00	--	<5	<5	<1.00
1,2-Dibromo-3-chloropropane	ug/L	<10.0	<10.0	<10	<10.0	<10	<10.0 C, L	--	<50	<50	<10.0
1,2-Dibromoethane (EDB)	ug/L	<10.0	<10.0	<10	<10.0	<10	<10.0	--	<50	<50	<10.0
1,2-Dichlorobenzene	ug/L	<1.00	<1.00	<1	<1.00	<1	<1.00	--	<5	<5	<1.00
1,2-Dichloroethane	ug/L	<1.00	<1.00	<1	<1.00	<1	<1.00 C	--	<5	<5	<1.00
1,2-Dichloropropane	ug/L	<1.00	<1.00	<1	<1.00	<1	<1.00	--	<5	<5	<1.00
1,3,5-Trimethylbenzene	ug/L	<1.00	<1.00	<1	<1.00	<1	<1.00	--	<5	<5	<1.00
1,3-Dichlorobenzene	ug/L	<1.00	<1.00	<1	<1.00	<1	<1.00	--	<5	<5	<1.00
1,3-Dichloropropane	ug/L	<1.00	<1.00	<1	<1.00	<1	<1.00 L5, C	--	<5	<5	<1.00
1,4-Dichlorobenzene	ug/L	<1.00	<1.00	<1	<1.00	<1	<1.00	--	<5	<5	<1.00
1,4-Dioxane	ug/l	--	**27**	**58**	**4.8**	**3.2**	**4.1**	--	**3.5**	**3.8**	--
2,2-Dichloropropane	ug/L	<4.00	<4.00	<4	<4.00	<4	<4.00 L, C	--	<20	<20	<4.00
2-Butanone (MEK)	ug/L	<10.0	<10.0	<10	<10.0	<10	<10.0 L5	--	<50	<50	<10.0
2-Chlorotoluene	ug/L	<1.00	<1.00	<1	<1.00	<1	<1.00	--	<5	<5	<1.00
4-Chlorotoluene	ug/L	<1.00	<1.00	<1	<1.00	<1	<1.00	--	<5	<5	<1.00
4-methyl-2-Pentanone (MIBK)	ug/L	--	--	--	--	--	--	--	--	--	--
Acetone	ug/L	<10.0	<10.0	<10	<10.0	<10	<10.0 L5, C	--	<50	<50	<10.0
Acrylonitrile	ug/L	<10.0	<10.0	<10	<10.0	<10	<10.0	--	<50	<50	<10.0

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Analyte	Report Units	MW27 3/17/2008 CRC0752-06	MW28 9/28/2007 CQI1614-02	MW28 3/20/2008 CRC0967-02	MW29 10/4/2007 CQJ0343-02	MW29 3/19/2008 CRC0886-03	MW30 9/25/2007 CQI1376-04	MW30 9/25/2007 CQI1376-04RE1	MW30 3/20/2008 CRC0967-06	MW30 Dup 3/20/2008 CRC0967-07	MW31 10/4/2007 CQJ0343-03
Benzene	ug/L	<0.500	<0.500	<0.5	<0.500	<0.5	<0.500	--	<2.5	<2.5	<0.500
Bromobenzene	ug/L	<1.00	<1.00	<1	<1.00	<1	<1.00	--	<5	<5	<1.00
Bromochloromethane	ug/L	<5.00	<5.00	<5	<5.00	<5	<5.00 L5, C	--	<25	<25	<5.00
Bromodichloromethane	ug/L	<1.00	<1.00	<1	<1.00	<1	<1.00	--	<5	<5	<1.00
Bromoform	ug/L	<5.00	<5.00	<5	<5.00	<5	<5.00 L5, C	--	<25	<25	<5.00
Bromomethane	ug/L	<4.00	<4.00	<4	<4.00	<4	<4.00	--	<20	<20	<4.00
Carbon disulfide	ug/L	<1.00	<1.00	<1	<1.00	<1	<1.00	--	<5	<5	<1.00
Carbon Tetrachloride	ug/L	<2.00	<2.00	<2	<2.00	<2	<2.00 L5	--	<10	<10	<2.00
Chlorobenzene	ug/L	<1.00	<1.00	<1	<1.00	<1	<1.00	--	<5	<5	<1.00
Chlorodibromomethane	ug/L	<5.00	<5.00	<5	<5.00	<5	<5.00 L	--	<25	<25	<5.00
Chloroethane	ug/L	<4.00	<4.00	<4	<4.00	<4	<4.00	--	<20	<20	<4.00
Chloroform	ug/L	<1.00	<1.00	<1 L5	<1.00	<1	<1.00	--	<5 L5	<5 L5	<1.00
Chloromethane	ug/L	<3.00	<3.00	<3	<3.00	<3	<3.00	--	<15	<15	<3.00
cis-1,2-Dichloroethene	ug/L	**39.9**	<1.00	<1	<1.00	<1	**94.8**	--	**46.4**	**60.8**	<1.00
cis-1,3-Dichloropropene	ug/L	<5.00	<5.00	<5	<5.00	<5	<5.00	--	<25	<25	<5.00
Dibromomethane	ug/L	<1.00	<1.00	<1	<1.00	<1	<1.00 L, C	--	<5	<5	<1.00

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Analyte	Report Units	MW27 3/17/2008 CRC0752-06	MW28 9/28/2007 CQI1614-02	MW28 3/20/2008 CRC0967-02	MW29 10/4/2007 CQJ0343-02	MW29 3/19/2008 CRC0886-03	MW30 9/25/2007 CQI1376-04	MW30 9/25/2007 CQI1376-04RE1	MW30 3/20/2008 CRC0967-06	MW30 Dup 3/20/2008 CRC0967-07	MW31 10/4/2007 CQJ0343-03
Dichlorodifluoromethane	ug/L	<3.00	<3.00	<3	<3.00	<3	<3.00	--	<15	<15	<3.00
Ethylbenzene	ug/L	<1.00	<1.00	<1 L5	<1.00	<1	<1.00	--	<5 L5	<5 L5	<1.00
Hexachlorobutadiene	ug/L	<5.00	<5.00	<5	<5.00	<5	<5.00	--	<25	<25	<5.00
Hexane	ug/L	<1.00 CIN, R	<1.00	<1 CIN	<1.00	<1 CIN	<1.00	--	<5 CIN	<5 CIN	<1.00
Isopropylbenzene	ug/L	<1.00	<1.00	<1	<1.00	<1	<1.00	--	<5	<5	<1.00
Methyl tert-Butyl Ether	ug/L	<1.00	<1.00	<1	<1.00	<1	<1.00 L, C	--	<5	<5	<1.00
Methylene Chloride	ug/L	<5.00	<5.00	<5	<5.00	<5	<5.00	--	<25	<25	<5.00
Naphthalene	ug/L	<5.00	<5.00	<5	<5.00	<5	<5.00 L, C	--	<25	<25	<5.00
n-Butylbenzene	ug/L	<1.00	<1.00	<1	<1.00	<1	<1.00	--	<5	<5	<1.00
n-Propylbenzene	ug/L	<1.00	<1.00	<1	<1.00	<1	<1.00	--	<5	<5	<1.00
p-Isopropyltoluene	ug/L	<1.00	<1.00	<1	<1.00	<1	<1.00	--	<5	<5	<1.00
sec-Butylbenzene	ug/L	<1.00	<1.00	<1	<1.00	<1	<1.00	--	<5	<5	<1.00
Styrene	ug/L	<1.00	<1.00	<1	<1.00	<1	<1.00	--	<5	<5	<1.00
tert-Butylbenzene	ug/L	<1.00	<1.00	<1	<1.00	<1	<1.00	--	<5	<5	<1.00
Tetrachloroethene	ug/L	**182**	**1.01**	<1	<1.00	<1	--	**940**	**354**	**458**	<1.00
Toluene	ug/L	<1.00	<1.00	<1	<1.00	<1	<1.00	--	<5	<5	<1.00
trans-1,2-Dichloroethene	ug/L	**2.79**	<1.00	<1	<1.00	<1	**1.56**	--	<5	<5	<1.00
trans-1,3-Dichloropropene	ug/L	<5.00	<5.00	<5	<5.00	<5	<5.00	--	<25	<25	<5.00
Trichloroethene	ug/L	**7.32**	<1.00	<1	<1.00	<1	**191**	--	**92.1**	**120**	<1.00
Trichlorofluoromethane	ug/L	<4.00	<4.00	<4	<4.00	<4	<4.00 C	--	<20	<20	<4.00
Vinyl chloride	ug/L	**2.82**	<1.00 C9	<1	<1.00	<1	<1.00	--	<5	<5	<1.00
Xylenes, total	ug/L	<3.00	<3.00	<3	<3.00	<3	<3.00	--	<15	<15	<3.00

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Analyte	Report Units	MW31 3/20/2008 CRC0967-08	MW32 9/25/2007 CQI1376-05	MW32 9/25/2007 CQI1376-05RE1	MW32 3/20/2008 CRC0967-09	MW33 9/28/2007 CQI1614-06	MW33 3/18/2008 CRC0807-09	MW34 10/2/2007 CQJ0169-04	MW34 3/26/2008 CRC1204-04	MW35 10/2/2007 CQJ0169-05	MW35 10/2/2007 CQJ0169-05RE1
1,1,1,2-Tetrachloroethane	ug/L	<1	<1.00	--	<1	<1.00	<1	<1.00	<1	<1.00	--
1,1,1-Trichloroethane	ug/L	<1	<1.00 L1	--	<1	<1.00	<1	<1.00	<1	<1.00	--
1,1,2,2-Tetrachloroethane	ug/L	<1	<1.00 C, L	--	<1	<1.00	<1	<1.00	<1	<1.00	--
1,1,2-Trichloroethane	ug/L	<1	<1.00 C, L	--	<1	<1.00	<1	<1.00	<1	<1.00	--
1,1-Dichloroethane	ug/L	<1	<1.00	--	<1	<1.00	<1	<1.00	<1	**3.84**	--
1,1-Dichloroethene	ug/L	<2	<2.00	--	<2	<2.00	<2	<2.00	<2	**2.47**	--
1,1-Dichloropropene	ug/L	<1	<1.00	--	<1	<1.00	<1	<1.00	<1	<1.00	--
1,2,3-Trichlorobenzene	ug/L	<5	<5.00	--	<5	<5.00	<5	<5.00	<5	<5.00	--
1,2,3-Trichloropropane	ug/L	<1	<1.00	--	<1	<1.00	<1	<1.00	<1	<1.00	--
1,2,4-Trichlorobenzene	ug/L	<5	<5.00	--	<5	<5.00	<5	<5.00	<5	<5.00	--
1,2,4-Trimethylbenzene	ug/L	<1	<1.00	--	<1	<1.00	<1	<1.00	<1	<1.00	--
1,2-Dibromo-3-chloropropane	ug/L	<10	<10.0 L, C	--	<10	<10.0	<10	<10.0	<10	<10.0	--
1,2-Dibromoethane (EDB)	ug/L	<10	<10.0	--	<10	<10.0	<10	<10.0	<10	<10.0	--
1,2-Dichlorobenzene	ug/L	<1	<1.00	--	<1	<1.00	<1	<1.00	<1	<1.00	--
1,2-Dichloroethane	ug/L	<1	<1.00 C	--	<1	<1.00	<1	<1.00 C, L	<1	<1.00	--
1,2-Dichloropropane	ug/L	<1	<1.00	--	<1	<1.00	<1	<1.00	<1	<1.00	--
1,3,5-Trimethylbenzene	ug/L	<1	<1.00	--	<1	<1.00	<1	<1.00	<1	<1.00	--
1,3-Dichlorobenzene	ug/L	<1	<1.00	--	<1	<1.00	<1	<1.00	<1	<1.00	--
1,3-Dichloropropane	ug/L	<1	<1.00 L5, C	--	<1	<1.00	<1	<1.00	<1	<1.00	--
1,4-Dichlorobenzene	ug/L	<1	<1.00	--	<1	<1.00	<1	<1.00	<1	<1.00	--
1,4-Dioxane	ug/l	<2	<2.0	--	--	<2.0	--	<2.0	--	**46**	--
2,2-Dichloropropane	ug/L	<4	<4.00 L, C	--	<4	<4.00	<4	<4.00 CIN	<4	<4.00	--
2-Butanone (MEK)	ug/L	<10	<10.0 L5	--	<10	<10.0	<10	<10.0	<10	<10.0	--
2-Chlorotoluene	ug/L	<1	<1.00	--	<1	<1.00	<1	<1.00	<1	<1.00	--
4-Chlorotoluene	ug/L	<1	<1.00	--	<1	<1.00	<1	<1.00	<1	<1.00	--
4-methyl-2-Pentanone (MIBK)	ug/L	--	--	--	--	--	--	--	--	--	--
Acetone	ug/L	<10	<10.0 L5, C	--	<10	<10.0	<10	<10.0	<10	<10.0	--
Acrylonitrile	ug/L	<10	<10.0	--	<10	<10.0	<10	<10.0	<10	<10.0	--

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Analyte	Report Units	MW31 3/20/2008 CRC0967-08	MW32 9/25/2007 CQI1376-05	MW32 9/25/2007 CQI1376-05RE1	MW32 3/20/2008 CRC0967-09	MW33 9/28/2007 CQI1614-06	MW33 3/18/2008 CRC0807-09	MW34 10/2/2007 CQJ0169-04	MW34 3/26/2008 CRC1204-04	MW35 10/2/2007 CQJ0169-05	MW35 10/2/2007 CQJ0169-05RE1
Benzene	ug/L	<0.5	<0.500	--	<0.5	<0.500	<0.5	<0.500	<0.5	**5.68**	--
Bromobenzene	ug/L	<1	<1.00	--	<1	<1.00	<1	<1.00	<1	<1.00	--
Bromochloromethane	ug/L	<5	<5.00 L5, C	--	<5	<5.00	<5	<5.00	<5	<5.00	--
Bromodichloromethane	ug/L	<1	<1.00	--	<1	**1.01**	<1	<1.00	<1	<1.00	--
Bromoform	ug/L	<5	<5.00 L5, C	--	<5	<5.00	<5	<5.00	<5	<5.00	--
Bromomethane	ug/L	<4	<4.00	--	<4	<4.00	<4	<4.00	<4	<4.00	--
Carbon disulfide	ug/L	<1	<1.00	--	<1	<1.00	<1	<1.00	<1	<1.00	--
Carbon Tetrachloride	ug/L	<2	<2.00 L5	--	<2	<2.00	<2	<2.00	<2	<2.00	--
Chlorobenzene	ug/L	<1	<1.00	--	<1	<1.00	<1	<1.00	<1	<1.00	--
Chlorodibromomethane	ug/L	<5	<5.00 L	--	<5	<5.00	<5	<5.00	<5	<5.00	--
Chloroethane	ug/L	<4	<4.00	--	<4	<4.00	<4	<4.00	<4	<4.00	--
Chloroform	ug/L	<1	<1.00	--	<1 L5	**6.47**	**3.92**	<1.00	<1	<1.00	--
Chloromethane	ug/L	<3	<3.00	--	<3	<3.00	<3	<3.00	<3	<3.00	--
cis-1,2-Dichloroethene	ug/L	<1	<1.00	--	<1	<1.00	<1	**63.0**	**29.0**	--	**1510**
cis-1,3-Dichloropropene	ug/L	<5	<5.00	--	<5	<5.00	<5	<5.00	<5	<5.00	--
Dibromomethane	ug/L	<1	<1.00 L, C	--	<1	<1.00	<1	<1.00	<1	<1.00	--

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Analyte	Report Units	MW31 3/20/2008 CRC0967-08	MW32 9/25/2007 CQI1376-05	MW32 9/25/2007 CQI1376-05RE1	MW32 3/20/2008 CRC0967-09	MW33 9/28/2007 CQI1614-06	MW33 3/18/2008 CRC0807-09	MW34 10/2/2007 CQJ0169-04	MW34 3/26/2008 CRC1204-04	MW35 10/2/2007 CQJ0169-05	MW35 10/2/2007 CQJ0169-05RE1
Dichlorodifluoromethane	ug/L	<3	<3.00	--	<3	<3.00	<3	<3.00	<3	<3.00	--
Ethylbenzene	ug/L	<1	<1.00	--	<1 L5	<1.00	<1	<1.00	<1	<1.00	--
Hexachlorobutadiene	ug/L	<5	<5.00	--	<5	<5.00	<5	<5.00	<5	<5.00	--
Hexane	ug/L	<1 CIN	<1.00	--	<1 CIN	<1.00	<1 CIN	<1.00	<1 CIN	<1.00	--
Isopropylbenzene	ug/L	<1	<1.00	--	<1	<1.00	<1	<1.00	<1	<1.00	--
Methyl tert-Butyl Ether	ug/L	<1	<1.00 L, C	--	<1	<1.00	<1	<1.00 C, L	<1	<1.00	--
Methylene Chloride	ug/L	<5	<5.00	--	<5	<5.00	<5	<5.00	<5	<5.00	--
Naphthalene	ug/L	<5	<5.00 L, C	--	<5	<5.00	<5	<5.00	<5	<5.00	--
n-Butylbenzene	ug/L	<1	<1.00	--	<1	<1.00	<1	<1.00	<1	<1.00	--
n-Propylbenzene	ug/L	<1	<1.00	--	<1	<1.00	<1	<1.00	<1	<1.00	--
p-Isopropyltoluene	ug/L	<1	<1.00	--	<1	<1.00	<1	<1.00	<1	<1.00	--
sec-Butylbenzene	ug/L	<1	<1.00	--	<1	<1.00	<1	<1.00	<1	<1.00	--
Styrene	ug/L	<1	<1.00	--	<1	<1.00	<1	<1.00	<1	<1.00	--
tert-Butylbenzene	ug/L	<1	<1.00	--	<1	<1.00	<1	<1.00	<1	<1.00	--
Tetrachloroethene	ug/L	<1	--	**1.40**	<1	**1.23**	<1	**30.2**	**6.97**	<1.00	--
Toluene	ug/L	<1	<1.00	--	<1	<1.00	<1	<1.00	<1	**1.21**	--
trans-1,2-Dichloroethene	ug/L	<1	<1.00	--	<1	<1.00	<1	**4.69**	**2.25**	**99.0**	--
trans-1,3-Dichloropropene	ug/L	<5	<5.00	--	<5	<5.00	<5	<5.00	<5	<5.00	--
Trichloroethene	ug/L	<1	<1.00	--	<1	<1.00	<1	**32.8**	**8.67**	<1.00	--
Trichlorofluoromethane	ug/L	<4	<4.00 C	--	<4	<4.00	<4	<4.00	<4	<4.00	--
Vinyl chloride	ug/L	<1	<1.00	--	<1	<1.00 C9	<1	<1.00	<1	**378**	--
Xylenes, total	ug/L	<3	<3.00	--	<3	<3.00	<3	<3.00	<3	**4.88**	--

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Analyte	Report Units	MW35 3/26/2008 CRC1204-02	MW36 10/1/2007 CQJ0061-02	MW36 10/1/2007 CQJ0061-02RE1	MW36 3/26/2008 CRC1204-03	MW37 9/25/2007 CQI1376-07	MW37 9/25/2007 CQI1376-07RE1	MW37 3/25/2008 CRC1117-04	MW37 3/25/2008 CRC1117-04RE1	MW37 3/25/2008 CRC1117-04RE2	MW38 10/2/2007 CQJ0169-02
1,1,1,2-Tetrachloroethane	ug/L	<5	<1.00	--	<5 FM	<20.0	--	**8.06**	--	--	<1.00
1,1,1-Trichloroethane	ug/L	<5	<1.00	--	<5 FM	<20.0 L1	--	**9.74**	--	--	<1.00
1,1,2,2-Tetrachloroethane	ug/L	<5	<1.00	--	<5 FM	<20.0 L, C	--	<1.00	--	--	<1.00
1,1,2-Trichloroethane	ug/L	<5	<1.00	--	<5 FM	<20.0 L, C, M1	--	**6.16**	--	--	<1.00
1,1-Dichloroethane	ug/L	<5	<1.00	--	<5 FM	<20.0	--	**6.62**	--	--	<1.00
1,1-Dichloroethene	ug/L	<10	<2.00	--	<10 FM	**549 M1**	--	--	--	--	<2.00
1,1-Dichloropropene	ug/L	<5	<1.00	--	<5 FM	<20.0	--	<1.00	--	--	<1.00
1,2,3-Trichlorobenzene	ug/L	<25	<5.00	--	<25 FM	<100 M1	--	<5.00	--	--	<5.00
1,2,3-Trichloropropane	ug/L	<5	<1.00	--	<5 FM	<20.0	--	<1.00	--	--	<1.00
1,2,4-Trichlorobenzene	ug/L	<25	<5.00	--	<25 FM	<100 M1	--	<5.00	--	--	<5.00
1,2,4-Trimethylbenzene	ug/L	<5	<1.00	--	<5 FM	<20.0 M1	--	<1.00	--	--	<1.00
1,2-Dibromo-3-chloropropane	ug/L	<50	<10.0	--	<50 FM	<200 C, L, M1	--	<10.0	--	--	<10.0
1,2-Dibromoethane (EDB)	ug/L	<50	<10.0	--	<50 FM	<200	--	<10.0	--	--	<10.0
1,2-Dichlorobenzene	ug/L	<5	<1.00	--	<5 FM	<20.0 M1	--	<1.00	--	--	<1.00
1,2-Dichloroethane	ug/L	<5	<1.00 C	--	<5 FM	<20.0 C, M1	--	<1.00	--	--	<1.00 C, L
1,2-Dichloropropane	ug/L	<5	<1.00	--	<5 FM	<20.0	--	<1.00	--	--	<1.00
1,3,5-Trimethylbenzene	ug/L	<5	<1.00	--	<5 FM	<20.0	--	<1.00	--	--	<1.00
1,3-Dichlorobenzene	ug/L	<5	<1.00	--	<5 FM	<20.0 M1	--	<1.00	--	--	<1.00
1,3-Dichloropropane	ug/L	<5	<1.00	--	<5 FM	<20.0 L5, C	--	<1.00	--	--	<1.00
1,4-Dichlorobenzene	ug/L	<5	<1.00	--	<5 FM	<20.0 M1	--	<1.00	--	--	<1.00
1,4-Dioxane	ug/l	**76**	**53**	--	--	**3.3**	--	**3.9**	--	--	**6.2**
2,2-Dichloropropane	ug/L	<20	<4.00 C, CIN	--	<20 FM	M1, RL8, ICV,	--	<4.00	--	--	<4.00 CIN
2-Butanone (MEK)	ug/L	<50	<10.0	--	<50 FM	<200 L5	--	<10.0	--	--	<10.0
2-Chlorotoluene	ug/L	<5	<1.00	--	<5 FM	<20.0	--	<1.00	--	--	<1.00
4-Chlorotoluene	ug/L	<5	<1.00	--	<5 FM	<20.0	--	<1.00	--	--	<1.00
4-methyl-2-Pentanone (MIBK)	ug/L	--	--	--	--	--	--	--	--	--	--
Acetone	ug/L	<50	<10.0	--	<50 FM	ICV	--	<10.0	--	--	<10.0
Acrylonitrile	ug/L	<50	<10.0	--	<50 FM	<200	--	<10.0	--	--	<10.0

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Analyte	Report Units	MW35 3/26/2008 CRC1204-02	MW36 10/1/2007 CQJ0061-02	MW36 10/1/2007 CQJ0061-02RE1	MW36 3/26/2008 CRC1204-03	MW37 9/25/2007 CQI1376-07	MW37 9/25/2007 CQI1376-07RE1	MW37 3/25/2008 CRC1117-04	MW37 3/25/2008 CRC1117-04RE1	MW37 3/25/2008 CRC1117-04RE2	MW38 10/2/2007 CQJ0169-02
Benzene	ug/L	**4.80**	**0.830**	--	<2.5 FM	**17.8 M1**	--	<0.500	--	--	<0.500
Bromobenzene	ug/L	<5	<1.00	--	<5 FM	<20.0	--	<1.00	--	--	<1.00
Bromochloromethane	ug/L	<25	<5.00	--	<25 FM	<100 L5, C	--	<5.00	--	--	<5.00
Bromodichloromethane	ug/L	<5	<1.00 L5	--	<5 FM	<20.0	--	<1.00	--	--	<1.00
Bromoform	ug/L	<25	<5.00	--	<25 FM	<100 L5, C	--	<5.00	--	--	<5.00
Bromomethane	ug/L	<20	<4.00	--	<20 FM	<80.0 CIN	--	<4.00	--	--	<4.00
Carbon disulfide	ug/L	<5	<1.00	--	**9.70 FM**	<20.0	--	<1.00	--	--	<1.00
Carbon Tetrachloride	ug/L	<10	<2.00	--	<10 FM	<40.0 L5	--	<2.00	--	--	<2.00
Chlorobenzene	ug/L	<5	<1.00	--	<5 FM	<20.0	--	<1.00	--	--	<1.00
Chlorodibromomethane	ug/L	<25	<5.00	--	<25 FM	<100 L	--	<5.00	--	--	<5.00
Chloroethane	ug/L	<20	<4.00	--	<20 FM	<80.0	--	<4.00	--	--	<4.00
Chloroform	ug/L	<5	<1.00	--	<5 FM	<20.0	--	**1.98**	--	--	<1.00
Chloromethane	ug/L	<15	<3.00	--	<15 FM	<60.0	--	<3.00	--	--	<3.00
cis-1,2-Dichloroethene	ug/L	**1410**	--	**744**	**214 FM**	**1970 M1**	--	--	**2460**	--	<1.00
cis-1,3-Dichloropropene	ug/L	<25	<5.00	--	<25 FM	<100	--	<5.00	--	--	<5.00
Dibromomethane	ug/L	<5	<1.00 L5	--	<5 FM	<20.0 L, C, M1	--	<1.00	--	--	<1.00

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Analyte	Report Units	MW35 3/26/2008 CRC1204-02	MW36 10/1/2007 CQJ0061-02	MW36 10/1/2007 CQJ0061-02RE1	MW36 3/26/2008 CRC1204-03	MW37 9/25/2007 CQI1376-07	MW37 9/25/2007 CQI1376-07RE1	MW37 3/25/2008 CRC1117-04	MW37 3/25/2008 CRC1117-04RE1	MW37 3/25/2008 CRC1117-04RE2	MW38 10/2/2007 CQJ0169-02
Dichlorodifluoromethane	ug/L	<15	<3.00	--	<15 FM	<60.0 R	--	<3.00	--	--	<3.00
Ethylbenzene	ug/L	<5	<1.00	--	<5 FM	<20.0	--	<1.00	--	--	<1.00
Hexachlorobutadiene	ug/L	<25	<5.00	--	<25 FM	<100 M1	--	<5.00	--	--	<5.00
Hexane	ug/L	<5 CIN	<1.00	--	<5 FMCIN	<20.0 R, ICV	--	<1.00	--	--	<1.00
Isopropylbenzene	ug/L	<5	<1.00	--	<5 FM	<20.0	--	<1.00	--	--	<1.00
Methyl tert-Butyl Ether	ug/L	<5	<1.00 C	--	<5 FM	<20.0 L, C	--	<1.00	--	--	<1.00 C, L
Methylene Chloride	ug/L	<25	<5.00	--	<25 FM	<100 M1	--	<5.00	--	--	<5.00
Naphthalene	ug/L	<25	<5.00	--	<25 FM	<100 M1, L, C	--	<5.00	--	--	<5.00
n-Butylbenzene	ug/L	<5	<1.00	--	<5 FM	<20.0 M1	--	<1.00	--	--	<1.00
n-Propylbenzene	ug/L	<5	<1.00	--	<5 FM	<20.0	--	<1.00	--	--	<1.00
p-Isopropyltoluene	ug/L	<5	<1.00	--	<5 FM	<20.0	--	<1.00	--	--	<1.00
sec-Butylbenzene	ug/L	<5	<1.00	--	<5 FM	<20.0	--	<1.00	--	--	<1.00
Styrene	ug/L	<5	<1.00	--	<5 FM	<20.0 M1	--	<1.00	--	--	<1.00
tert-Butylbenzene	ug/L	<5	<1.00	--	<5 FM	<20.0 M1	--	<1.00	--	--	<1.00
Tetrachloroethene	ug/L	<5	**1.02**	--	<5 FM	--	**24200 MHA**	--	--	**19500**	**116**
Toluene	ug/L	<5	<1.00	--	<5 FM	<20.0 M1	--	**1.23**	--	--	<1.00
trans-1,2-Dichloroethene	ug/L	**75.9**	**43.7**	--	**7.35 FM**	**54.4 M1**	--	**62.9**	--	--	<1.00
trans-1,3-Dichloropropene	ug/L	<25	<5.00	--	<25 FM	<100	--	<5.00	--	--	<5.00
Trichloroethene	ug/L	<5	**1.42**	--	<5 FM	**1220**	--	--	**1450**	--	<1.00
Trichlorofluoromethane	ug/L	<20	<4.00	--	<20 FM	<80.0 C	--	<4.00	--	--	**33.0**
Vinyl chloride	ug/L	**279**	**24.6**	--	**5.20 FM**	<20.0 C	--	**1.25**	--	--	<1.00
Xylenes, total	ug/L	<15	<3.00	--	<15 FM	<60.0	--	<3.00	--	--	<3.00

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Analyte	Report Units	MW38 Dup 10/2/2007 CQJ0169-03	MW38 3/25/2008 CRC1117-03	MW39 9/25/2007 CQI1376-06	MW39 9/25/2007 1376-06RE1	MW39 3/20/2008 CRC0967-03	MW40 10/1/2007 CQJ0061-03	MW40 3/20/2008 CRC0967-04	MW41 9/28/2007 CQI1614-04	MW41 9/28/2007 CQI1614-04RE1	MW41 3/25/2008 CRC1117-05
1,1,1,2-Tetrachloroethane	ug/L	<1.00	<1.00 M1	<1.00	--	<5	<1.00	<1	<1.00	--	<1.00
1,1,1-Trichloroethane	ug/L	<1.00	<1.00	<1.00 L1	--	<5	<1.00	<1	<1.00	--	**6.13**
1,1,2,2-Tetrachloroethane	ug/L	<1.00	<1.00 M1	<1.00 L, C	--	<5	<1.00	<1	<1.00	--	<1.00
1,1,2-Trichloroethane	ug/L	<1.00	<1.00 M1	<1.00 L, C	--	<5	<1.00	<1	<1.00	--	<1.00
1,1-Dichloroethane	ug/L	<1.00	<1.00	<1.00	--	<5	<1.00	<1	**2.61**	--	**9.55**
1,1-Dichloroethene	ug/L	<2.00	<2.00	**3.11**	--	<10	<2.00	<2	<2.00	--	**3.68**
1,1-Dichloropropene	ug/L	<1.00	<1.00	<1.00	--	<5	<1.00	<1	<1.00	--	<1.00
1,2,3-Trichlorobenzene	ug/L	<5.00	<5.00	<5.00	--	<25	<5.00	<5	<5.00	--	<5.00
1,2,3-Trichloropropane	ug/L	<1.00	<1.00	<1.00	--	<5	<1.00	<1	<1.00	--	<1.00
1,2,4-Trichlorobenzene	ug/L	<5.00	<5.00	<5.00	--	<25	<5.00	<5	<5.00	--	<5.00
1,2,4-Trimethylbenzene	ug/L	<1.00	<1.00	<1.00	--	<5	<1.00	<1	<1.00	--	<1.00
1,2-Dibromo-3-chloropropane	ug/L	<10.0	<10.0	<10.0 C, L	--	<50	<10.0	<10	<10.0	--	<10.0
1,2-Dibromoethane (EDB)	ug/L	<10.0	<10.0 M1	<10.0	--	<50	<10.0	<10	<10.0	--	<10.0
1,2-Dichlorobenzene	ug/L	<1.00	<1.00 M1	<1.00	--	<5	<1.00	<1	<1.00	--	<1.00
1,2-Dichloroethane	ug/L	<1.00 L, C	<1.00	<1.00 C	--	<5	<1.00 C	<1	<1.00	--	<1.00
1,2-Dichloropropane	ug/L	<1.00	<1.00 M1	<1.00	--	<5	<1.00	<1	<1.00	--	<1.00
1,3,5-Trimethylbenzene	ug/L	<1.00	<1.00	<1.00	--	<5	<1.00	<1	<1.00	--	<1.00
1,3-Dichlorobenzene	ug/L	<1.00	<1.00 M1	<1.00	--	<5	<1.00	<1	<1.00	--	<1.00
1,3-Dichloropropane	ug/L	<1.00	<1.00 M1	<1.00 L5, C	--	<5	<1.00	<1	<1.00	--	<1.00
1,4-Dichlorobenzene	ug/L	<1.00	<1.00 M1	<1.00	--	<5	<1.00	<1	<1.00	--	<1.00
1,4-Dioxane	ug/l	**6.0**	**4.6**	<2.0	--	--	<2.0	--	**5.5**	--	**130**
2,2-Dichloropropane	ug/L	<4.00 CIN	<4.00	<4.00 L, C	--	<20	<4.00 C, CIN	<4	<4.00	--	<4.00
2-Butanone (MEK)	ug/L	<10.0	<10.0	<10.0 L5	--	<50	<10.0	<10	<10.0	--	<10.0
2-Chlorotoluene	ug/L	<1.00	<1.00 M1	<1.00	--	<5	<1.00	<1	<1.00	--	<1.00
4-Chlorotoluene	ug/L	<1.00	<1.00	<1.00	--	<5	<1.00	<1	<1.00	--	<1.00
4-methyl-2-Pentanone (MIBK)	ug/L	--	--	--	--	--	--	--	--	--	--
Acetone	ug/L	<10.0	<10.0	<10.0 L5, C	--	<50	<10.0	<10	<10.0	--	**13.1**
Acrylonitrile	ug/L	<10.0	<10.0	<10.0	--	<50	<10.0	<10	<10.0	--	<10.0

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Analyte	Report Units	MW38 Dup 10/2/2007 CQJ0169-03	MW38 3/25/2008 CRC1117-03	MW39 9/25/2007 CQI1376-06	MW39 9/25/2007 1376-06RE1	MW39 3/20/2008 CRC0967-03	MW40 10/1/2007 CQJ0061-03	MW40 3/20/2008 CRC0967-04	MW41 9/28/2007 CQI1614-04	MW41 9/28/2007 CQI1614-04RE1	MW41 3/25/2008 CRC1117-05
Benzene	ug/L	<0.500	<0.500	<0.500	--	<2.5	<0.500	<0.5	**1.17**	--	**0.620**
Bromobenzene	ug/L	<1.00	<1.00 M1	<1.00	--	<5	<1.00	<1	<1.00	--	<1.00
Bromochloromethane	ug/L	<5.00	<5.00	<5.00 L5, C	--	<25	<5.00	<5	<5.00	--	<5.00
Bromodichloromethane	ug/L	<1.00	<1.00 M1	<1.00	--	<5	<1.00 L5	<1	<1.00	--	<1.00
Bromoform	ug/L	<5.00	<5.00 M1	<5.00 L5, C	--	<25	<5.00	<5	<5.00	--	<5.00
Bromomethane	ug/L	<4.00	<4.00	<4.00	--	<20	<4.00	<4	<4.00	--	<4.00
Carbon disulfide	ug/L	<1.00	<1.00	<1.00	--	<5	<1.00	<1	<1.00	--	<1.00
Carbon Tetrachloride	ug/L	<2.00	<2.00	<2.00 L5	--	<10 M1	<2.00	<2	<2.00	--	<2.00
Chlorobenzene	ug/L	<1.00	<1.00 M1	<1.00	--	<5	<1.00	<1	<1.00	--	<1.00
Chlorodibromomethane	ug/L	<5.00	<5.00 M1	<5.00 L	--	<25 M1	<5.00	<5	<5.00	--	<5.00
Chloroethane	ug/L	<4.00	<4.00	<4.00	--	<20	<4.00	<4	<4.00	--	<4.00
Chloroform	ug/L	<1.00	<1.00	<1.00	--	<5	<1.00	<1	<1.00	--	<1.00
Chloromethane	ug/L	<3.00	<3.00	<3.00	--	<15	<3.00	<3	<3.00	--	<3.00
cis-1,2-Dichloroethene	ug/L	<1.00	<1.00	**108**	--	**106 M1**	<1.00	<1	--	**563**	--
cis-1,3-Dichloropropene	ug/L	<5.00	<5.00 M1	<5.00	--	<25	<5.00	<5	<5.00	--	<5.00
Dibromomethane	ug/L	<1.00	<1.00	<1.00 L, C	--	<5	<1.00 L5	<1	<1.00	--	<1.00

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Table 13 - Preliminary
Groundwater VOC Analytical Results From Monitoring Wells
Well Dynamics RCRA Facility Investigation

Analyte	Report Units	MW38 Dup 10/2/2007 CQJ0169-03	MW38 3/25/2008 CRC1117-03	MW39 9/25/2007 CQI1376-06	MW39 9/25/2007 1376-06RE1	MW39 3/20/2008 CRC0967-03	MW40 10/1/2007 CQJ0061-03	MW40 3/20/2008 CRC0967-04	MW41 9/28/2007 CQI1614-04	MW41 9/28/2007 CQI1614-04RE1	MW41 3/25/2008 CRC1117-05
Dichlorodifluoromethane	ug/L	<3.00	<3.00	<3.00	--	<15 M1, R	<3.00	<3	<3.00	--	<3.00
Ethylbenzene	ug/L	<1.00	<1.00	<1.00	--	<5	<1.00	<1	<1.00	--	<1.00
Hexachlorobutadiene	ug/L	<5.00	<5.00	<5.00	--	<25	<5.00	<5	<5.00	--	<5.00
Hexane	ug/L	<1.00	<1.00	<1.00	--	<5 CIN, R	<1.00	<1 CIN	<1.00	--	<1.00
Isopropylbenzene	ug/L	<1.00	<1.00	<1.00	--	<5	<1.00	<1	<1.00	--	<1.00
Methyl tert-Butyl Ether	ug/L	<1.00 C, L	<1.00	<1.00 L, C	--	<5	<1.00 C	<1	<1.00	--	<1.00
Methylene Chloride	ug/L	<5.00	<5.00	<5.00	--	<25	<5.00	<5	<5.00	--	<5.00
Naphthalene	ug/L	<5.00	<5.00	<5.00 L, C	--	<25	<5.00	<5	<5.00	--	<5.00
n-Butylbenzene	ug/L	<1.00	<1.00	<1.00	--	<5	<1.00	<1	<1.00	--	<1.00
n-Propylbenzene	ug/L	<1.00	<1.00	<1.00	--	<5	<1.00	<1	<1.00	--	<1.00
p-Isopropyltoluene	ug/L	<1.00	<1.00	<1.00	--	<5 M1	<1.00	<1	<1.00	--	<1.00
sec-Butylbenzene	ug/L	<1.00	<1.00	<1.00	--	<5 M1	<1.00	<1	<1.00	--	<1.00
Styrene	ug/L	<1.00	<1.00	<1.00	--	<5	<1.00	<1	<1.00	--	<1.00
tert-Butylbenzene	ug/L	<1.00	<1.00	<1.00	--	<5	<1.00	<1	<1.00	--	<1.00
Tetrachloroethene	ug/L	**115**	**93.8 M1**	--	**1550**	**1400 M1**	**1.45**	<1	**1.29**	--	**28.9**
Toluene	ug/L	<1.00	<1.00	<1.00	--	<5	<1.00	<1	<1.00	--	**59.5**
trans-1,2-Dichloroethene	ug/L	<1.00	<1.00	**1.19**	--	<5	<1.00	<1	**5.46**	--	**25.3**
trans-1,3-Dichloropropene	ug/L	<5.00	<5.00	<5.00	--	<25	<5.00	<5	<5.00	--	<5.00
Trichloroethene	ug/L	<1.00	<1.00	**53.7**	--	**42.4 M1**	<1.00	<1	<1.00	--	**3.21**
Trichlorofluoromethane	ug/L	**33.9**	**26.0 M1**	<4.00 C	--	<20 M1, R	<4.00	<4	<4.00	--	<4.00
Vinyl chloride	ug/L	<1.00	<1.00	<1.00	--	<5	<1.00	<1	<1.00	--	**8.59**
Xylenes, total	ug/L	<3.00	<3.00	<3.00	--	<15	<3.00	<3	<3.00	--	<3.00

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Table 13 - Preliminary
Groundwater VOC Analytical Results From Monitoring Wells
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Analyte	Report Units	MW41 3/25/2008 CRC1117-05RE1	Trip Blank 01 9/24/2007 CQI1376-01	Trip Blank 02 3/18/2008 CRC0807-01	Trip Blank 03 3/19/2008 CRC0886-01	Trip Blank 3/17/2008 CRC0752-01	Trip Blank 3/19/2007 CQC0899-01	Trip Blank 3/20/2007 CQC0959-01	Trip Blank 3/21/2007 CQC1000-01	Trip Blank 3/26/2008 CRC1204-01	Trip Blank 04 3/20/2008 CRC0967-01
1,1,1,2-Tetrachloroethane	ug/L	--	<1.00	<1	<1	<1.00	<1.00	<1.00	<1.00	<1	<1
1,1,1-Trichloroethane	ug/L	--	<1.00	<1	<1	<1.00	<1.00	<1.00	<1.00	<1	<1
1,1,2,2-Tetrachloroethane	ug/L	--	<1.00	<1	<1	<1.00	<1.00	<1.00	<1.00	<1	<1
1,1,2-Trichloroethane	ug/L	--	<1.00	<1	<1	<1.00	<1.00	<1.00	<1.00	<1	<1
1,1-Dichloroethane	ug/L	--	<1.00	<1	<1	<1.00	<1.00	<1.00	<1.00	<1	<1
1,1-Dichloroethene	ug/L	--	<2.00	<2	<2	<2.00	<2.00	<2.00	<2.00	<2	<2
1,1-Dichloropropene	ug/L	--	<1.00	<1	<1	<1.00	<1.00	<1.00	<1.00	<1	<1
1,2,3-Trichlorobenzene	ug/L	--	<5.00	<5	<5	<5.00	<5.00	<5.00	<5.00	<5	<5
1,2,3-Trichloropropane	ug/L	--	<1.00	<1	<1	<1.00	<1.00	<1.00	<1.00	<1	<1
1,2,4-Trichlorobenzene	ug/L	--	<5.00	<5	<5	<5.00	<5.00	<5.00	<5.00	<5	<5
1,2,4-Trimethylbenzene	ug/L	--	<1.00	<1	<1	<1.00	<1.00	<1.00	<1.00	<1	<1
1,2-Dibromo-3-chloropropane	ug/L	--	<10.0	<10	<10	<10.0	<10.0	<10.0	<10.0	<10	<10
1,2-Dibromoethane (EDB)	ug/L	--	<10.0	<10	<10	<10.0	<10.0	<10.0	<10.0	<10	<10
1,2-Dichlorobenzene	ug/L	--	<1.00	<1	<1	<1.00	<1.00	<1.00	<1.00	<1	<1
1,2-Dichloroethane	ug/L	--	<1.00	<1	<1	<1.00	<1.00	<1.00	<1.00	<1	<1
1,2-Dichloropropane	ug/L	--	<1.00	<1	<1	<1.00	<1.00	<1.00	<1.00	<1	<1
1,3,5-Trimethylbenzene	ug/L	--	<1.00	<1	<1	<1.00	<1.00	<1.00	<1.00	<1	<1
1,3-Dichlorobenzene	ug/L	--	<1.00	<1	<1	<1.00	<1.00	<1.00	<1.00	<1	<1
1,3-Dichloropropane	ug/L	--	<1.00	<1	<1	<1.00	<1.00	<1.00	<1.00	<1	<1
1,4-Dichlorobenzene	ug/L	--	<1.00	<1	<1	<1.00	<1.00	<1.00	<1.00	<1	<1
1,4-Dioxane	ug/l	--	--	<2	<2	<2.0	--	--	--	<2	<2
2,2-Dichloropropane	ug/L	--	<4.00	<4	<4	<4.00	<4.00	<4.00	<4.00	<4	<4
2-Butanone (MEK)	ug/L	--	<10.0	<10	<10	<10.0	<10.0	<10.0	<10.0	<10	<10
2-Chlorotoluene	ug/L	--	<1.00	<1	<1	<1.00	<1.00	<1.00	<1.00	<1	<1
4-Chlorotoluene	ug/L	--	<1.00	<1	<1	<1.00	<1.00	<1.00	<1.00	<1	<1
4-methyl-2-Pentanone (MIBK)	ug/L	--	--	--	--	--	--	--	--	--	--
Acetone	ug/L	--	<10.0 C9	<10	<10	<10.0	<10.0	<10.0	<10.0	<10	<10
Acrylonitrile	ug/L	--	<10.0	<10	<10	<10.0	<10.0	<10.0	<10.0	<10	<10

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Table 13 - Preliminary
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Analyte	Report Units	MW41 3/25/2008 CRC1117-05RE1	Trip Blank 01 9/24/2007 CQI1376-01	Trip Blank 02 3/18/2008 CRC0807-01	Trip Blank 03 3/19/2008 CRC0886-01	Trip Blank 3/17/2008 CRC0752-01	Trip Blank 3/19/2007 CQC0899-01	Trip Blank 3/20/2007 CQC0959-01	Trip Blank 3/21/2007 CQC1000-01	Trip Blank 3/26/2008 CRC1204-01	Trip Blank 04 3/20/2008 CRC0967-01
Benzene	ug/L	--	<0.500	<0.5	<0.5	<0.500	<0.500	<0.500	<0.500	<0.5	<0.5
Bromobenzene	ug/L	--	<1.00	<1	<1	<1.00	<1.00	<1.00	<1.00	<1	<1
Bromochloromethane	ug/L	--	<5.00	<5	<5	<5.00	<5.00	<5.00	<5.00	<5	<5
Bromodichloromethane	ug/L	--	<1.00	<1	<1	<1.00	<1.00	<1.00	<1.00	<1	<1
Bromoform	ug/L	--	<5.00	<5	<5	<5.00	<5.00	<5.00	<5.00	<5	<5
Bromomethane	ug/L	--	<4.00	<4	<4	<4.00	<4.00	<4.00	<4.00	<4	<4
Carbon disulfide	ug/L	--	<1.00	<1	<1	<1.00	<1.00	<1.00	<1.00	<1	<1
Carbon Tetrachloride	ug/L	--	<2.00	<2	<2	<2.00	<2.00	<2.00	<2.00	<2	<2
Chlorobenzene	ug/L	--	<1.00	<1	<1	<1.00	<1.00	<1.00	<1.00	<1	<1
Chlorodibromomethane	ug/L	--	<5.00	<5	<5	<5.00	<5.00	<5.00	<5.00	<5	<5
Chloroethane	ug/L	--	<4.00	<4	<4	<4.00	<4.00	<4.00	<4.00	<4	<4
Chloroform	ug/L	--	<1.00	<1	<1	<1.00	<1.00	<1.00	<1.00	<1	<1
Chloromethane	ug/L	--	<3.00	<3	<3	<3.00	<3.00	<3.00	<3.00	<3	<3
cis-1,2-Dichloroethene	ug/L	**3040**	<1.00	<1	<1	<1.00	<1.00	<1.00	<1.00	<1	<1
cis-1,3-Dichloropropene	ug/L	--	<5.00	<5	<5	<5.00	<5.00	<5.00	<5.00	<5	<5
Dibromomethane	ug/L	--	<1.00	<1	<1	<1.00	<1.00	<1.00	<1.00	<1	<1

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Table 13 - Preliminary
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Analyte	Report Units	MW41 3/25/2008 CRC1117-05RE1	Trip Blank 01 9/24/2007 CQI1376-01	Trip Blank 02 3/18/2008 CRC0807-01	Trip Blank 03 3/19/2008 CRC0886-01	Trip Blank 3/17/2008 CRC0752-01	Trip Blank 3/19/2007 CQC0899-01	Trip Blank 3/20/2007 CQC0959-01	Trip Blank 3/21/2007 CQC1000-01	Trip Blank 3/26/2008 CRC1204-01	Trip Blank 04 3/20/2008 CRC0967-01
Dichlorodifluoromethane	ug/L	--	<3.00	<3	<3	<3.00	<3.00	<3.00	<3.00	<3	<3
Ethylbenzene	ug/L	--	<1.00	<1	<1	<1.00	<1.00	<1.00	<1.00	<1	<1
Hexachlorobutadiene	ug/L	--	<5.00	<5	<5	<5.00	<5.00	<5.00	<5.00	<5	<5
Hexane	ug/L	--	<1.00	<1 CIN	<1 CIN	<1.00 CIN	<1.00	<1.00	<1.00	<1 CIN	<1 CIN
Isopropylbenzene	ug/L	--	<1.00	<1	<1	<1.00	<1.00	<1.00	<1.00	<1	<1
Methyl tert-Butyl Ether	ug/L	--	<1.00	<1	<1	<1.00	<1.00	<1.00	<1.00	<1	<1
Methylene Chloride	ug/L	--	<5.00	<5	<5	<5.00	<5.00	<5.00	<5.00	<5	<5
Naphthalene	ug/L	--	<5.00	<5	<5	<5.00	<5.00	<5.00	<5.00	<5	<5
n-Butylbenzene	ug/L	--	<1.00	<1	<1	<1.00	<1.00	<1.00	<1.00	<1	<1
n-Propylbenzene	ug/L	--	<1.00	<1	<1	<1.00	<1.00	<1.00	<1.00	<1	<1
p-Isopropyltoluene	ug/L	--	<1.00	<1	<1	<1.00	<1.00	<1.00	<1.00	<1	<1
sec-Butylbenzene	ug/L	--	<1.00	<1	<1	<1.00	<1.00	<1.00	<1.00	<1	<1
Styrene	ug/L	--	<1.00	<1	<1	<1.00	<1.00	<1.00	<1.00	<1	<1
tert-Butylbenzene	ug/L	--	<1.00	<1	<1	<1.00	<1.00	<1.00	<1.00	<1	<1
Tetrachloroethene	ug/L	--	<1.00	<1	<1	<1.00	<1.00	<1.00	<1.00	<1	--
Toluene	ug/L	--	<1.00	<1	<1	<1.00	<1.00	<1.00	<1.00	<1	<1
trans-1,2-Dichloroethene	ug/L	--	<1.00	<1	<1	<1.00	<1.00	<1.00	<1.00	<1	<1
trans-1,3-Dichloropropene	ug/L	--	<5.00	<5	<5	<5.00	<5.00	<5.00	<5.00	<5	<5
Trichloroethene	ug/L	--	<1.00	<1	<1	<1.00	<1.00	<1.00	<1.00	<1	<1
Trichlorofluoromethane	ug/L	--	<4.00	<4	<4	<4.00	<4.00	<4.00	<4.00	<4	<4
Vinyl chloride	ug/L	--	<1.00	<1	<1	<1.00	<1.00	<1.00	<1.00	<1	<1
Xylenes, total	ug/L	--	<3.00	<3	<3	<3.00	<3.00	<3.00	<3.00	<3	<3

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Table 13 - Preliminary
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Analyte	Report Units	Trip Blank 04 3/20/2008 CRC0967-01RE1	Trip Blank 05 3/21/2008 CRC1016-01	Trip Blank 05 3/21/2008 CRC1016-01RE1	Trip Blank 06 3/24/2008 CRC1117-01	Trip Blank 08 10/4/2007 CQJ0343-01	Trip Blank 9/26/2007 CQI1500-01	Trip Blank 9/27/2007 CQI1583-07	Trip Blank 9/28/2007 CQI1614-01	Trip Blank 10/1/2007 CQJ0061-01	Trip Blank 10/2/2007 CQJ0169-01	Trip Blank 10/3/2007 CQJ0240-01
1,1,1,2-Tetrachloroethane	ug/L	--	<1	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
1,1,1-Trichloroethane	ug/L	--	<1	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
1,1,2,2-Tetrachloroethane	ug/L	--	<1	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
1,1,2-Trichloroethane	ug/L	--	<1	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
1,1-Dichloroethane	ug/L	--	<1	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
1,1-Dichloroethene	ug/L	--	<2	--	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00
1,1-Dichloropropene	ug/L	--	<1	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
1,2,3-Trichlorobenzene	ug/L	--	<5	--	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00
1,2,3-Trichloropropane	ug/L	--	<1	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
1,2,4-Trichlorobenzene	ug/L	--	<5	--	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00
1,2,4-Trimethylbenzene	ug/L	--	<1	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
1,2-Dibromo-3-chloropropane	ug/L	--	<10	--	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
1,2-Dibromoethane (EDB)	ug/L	--	<10	--	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
1,2-Dichlorobenzene	ug/L	--	<1	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
1,2-Dichloroethane	ug/L	--	<1	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00 C, L	<1.00 C, L
1,2-Dichloropropane	ug/L	--	<1	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
1,3,5-Trimethylbenzene	ug/L	--	<1	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
1,3-Dichlorobenzene	ug/L	--	<1	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
1,3-Dichloropropane	ug/L	--	<1	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
1,4-Dichlorobenzene	ug/L	--	<1	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
1,4-Dioxane	ug/l	--	<2	--	<2.0	--	--	--	--	--	--	--
2,2-Dichloropropane	ug/L	--	<4	--	<4.00	<4.00	<4.00	<4.00	<4.00	<4.00	<4.00 CIN	<4.00 CIN
2-Butanone (MEK)	ug/L	--	<10	--	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
2-Chlorotoluene	ug/L	--	<1	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
4-Chlorotoluene	ug/L	--	<1	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
4-methyl-2-Pentanone (MIBK)	ug/L	--	--	--	--	--	--	--	--	--	--	--
Acetone	ug/L	--	<10	--	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
Acrylonitrile	ug/L	--	<10	--	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0

See notes on page 36

Table 13 - Preliminary
Groundwater VOC Analytical Results From Monitoring Wells
Well Dynamics RCRA Facility Investigation

Analyte	Report Units	Trip Blank 04 3/20/2008 CRC0967-01RE1	Trip Blank 05 3/21/2008 CRC1016-01	Trip Blank 05 3/21/2008 CRC1016-01RE1	Trip Blank 06 3/24/2008 CRC1117-01	Trip Blank 08 10/4/2007 CQJ0343-01	Trip Blank 9/26/2007 CQI1500-01	Trip Blank 9/27/2007 CQI1583-07	Trip Blank 9/28/2007 CQI1614-01	Trip Blank 10/1/2007 CQJ0061-01	Trip Blank 10/2/2007 CQJ0169-01	Trip Blank 10/3/2007 CQJ0240-01
Benzene	ug/L	--	<0.5	--	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
Bromobenzene	ug/L	--	<1	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Bromochloromethane	ug/L	--	<5	--	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00
Bromodichloromethane	ug/L	--	<1	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Bromoform	ug/L	--	<5	--	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00
Bromomethane	ug/L	--	<4	--	<4.00	<4.00	<4.00	<4.00	<4.00	<4.00	<4.00	<4.00
Carbon disulfide	ug/L	--	<1	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Carbon Tetrachloride	ug/L	--	<2	--	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00
Chlorobenzene	ug/L	--	<1	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Chlorodibromomethane	ug/L	--	<5	--	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00
Chloroethane	ug/L	--	<4	--	<4.00	<4.00	<4.00	<4.00	<4.00	<4.00	<4.00	<4.00
Chloroform	ug/L	--	<1 L5	--	<1.00 L	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Chloromethane	ug/L	--	<3	--	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00
cis-1,2-Dichloroethene	ug/L	--	--	<1	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
cis-1,3-Dichloropropene	ug/L	--	<5	--	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00
Dibromomethane	ug/L	--	<1	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00

See notes on page 36

Table 13 - Preliminary
Groundwater VOC Analytical Results From Monitoring Wells
Well Dynamics RCRA Facility Investigation

Analyte	Report Units	Trip Blank 04 3/20/2008 CRC0967-01RE1	Trip Blank 05 3/21/2008 CRC1016-01	Trip Blank 05 3/21/2008 CRC1016-01RE1	Trip Blank 06 3/24/2008 CRC1117-01	Trip Blank 08 10/4/2007 CQJ0343-01	Trip Blank 9/26/2007 CQI1500-01	Trip Blank 9/27/2007 CQI1583-07	Trip Blank 9/28/2007 CQI1614-01	Trip Blank 10/1/2007 CQJ0061-01	Trip Blank 10/2/2007 CQJ0169-01	Trip Blank 10/3/2007 CQJ0240-01
Dichlorodifluoromethane	ug/L	--	<3	--	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00
Ethylbenzene	ug/L	--	<1 L5	--	<1.00 L5	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Hexachlorobutadiene	ug/L	--	<5	--	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00
Hexane	ug/L	--	<1 CIN	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Isopropylbenzene	ug/L	--	<1	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Methyl tert-Butyl Ether	ug/L	--	<1	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00 C, L	<1.00 C, L
Methylene Chloride	ug/L	--	<5	--	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00
Naphthalene	ug/L	--	<5	--	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00
n-Butylbenzene	ug/L	--	<1	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
n-Propylbenzene	ug/L	--	<1	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
p-Isopropyltoluene	ug/L	--	<1	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
sec-Butylbenzene	ug/L	--	<1	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Styrene	ug/L	--	<1	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
tert-Butylbenzene	ug/L	--	<1	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Tetrachloroethene	ug/L	<1	<1	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	**1.11**	<1.00
Toluene	ug/L	--	<1	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
trans-1,2-Dichloroethene	ug/L	--	<1	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
trans-1,3-Dichloropropene	ug/L	--	<5	--	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00
Trichloroethene	ug/L	--	<1	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Trichlorofluoromethane	ug/L	--	<4	--	<4.00	<4.00	<4.00	<4.00	<4.00	<4.00	<4.00	<4.00
Vinyl chloride	ug/L	--	<1	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Xylenes, total	ug/L	--	<3	--	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00

--	Not analyzed
17.5	Result exceeds detection limit
2.13	Result exceeds lowest Risk Based Screening Level

NE = no established screening level

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See notes on page 36

Table 14 - Preliminary
Sediment Metals Analytical Results
Wellman Dynamics RCRA Facility Investigation

ANALYTE	Report Units	Risk-Based Screening Levels (USEPA Region 9 Preliminary Remediation Goals)			Sed-101 05/15/2007 CQE0913-02	Sed-102 05/15/2007 CQE0913-04	Sed-103 05/15/2007 CQE0913-06	Sed-104 07/29/2007 CQH0078-01	Sed-105 07/29/2007 CQH0078-02
		Direct Contact PRG for Residential Soil	Direct Contact PRG for Industrial Soil	Soil Screening Level for Migration to Groundwater (DAF=20)					
Arsenic	mg/kg	0.39	1.6	29	**2.45**	**6.87**	**8.27**	**5.97**	**7.87**
Barium	mg/kg	5,400	67,000	1,600	**11300**	**1710**	**1890**	**959 MHA**	**266**
Zinc	mg/kg	23,000	100,000	12,000	**3880**	**542**	**619**	--	--

--	Not analyzed
17.5	Result exceeds detection limit
2.13	Result exceeds lowest Risk Based Screening Level

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Table 15 - Preliminary
Surface Water Metals Analytical Results
Wellman Dynamics RCRA Facility Investigation

ANALYTE	Report Units	USEPA Drinking Water Maximum Contaminant Levels (mg/l)		Risk-Based Screening Levels	SW-101 05/15/2007 CQE0913-01	SW-102 05/15/2007 CQE0913-03	SW-103 05/15/2007 CQE0913-05	SW-104 07/29/2007 CQH0078-03
		Primary MCL (Health-Based)	Secondary MCL (Aesthetic)	USEPA Region 9 Preliminary Remediation Goal for Tap Water (mg/l)				
Arsenic	mg/L	0.01	NE	0.000045	<0.001	<0.001	**0.00145**	**0.0113**
Barium	mg/L	2	NE	2.6	**3.24**	**2.42**	**0.298**	**0.287**
Zinc	mg/L	NE	5	11	**1.03**	**0.0479**	**0.0506**	--

--	Not analyzed
17.5	Result exceeds detection limit
2.13	Result exceeds lowest Risk Based Screening Level

NE = no established screening level

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Table 16
Proposed Groundwater Sampling Scope Summary
WDC Acquistion LLC / SAP/QAPP Addendum

		Organics		Inorganics													
	Well	VOCs	1,4 Dioxane	Chromium (hex.)	Chromium (total)	Arsenic	Beryllium	Boron	Cadmium	Fluoride (total) **	Iron	Lead	Vanadium	Nitrate-N	Nitrite-N	Chloride	Sulfate
Chrome Area Wells	MW1	X	X			X		X		X	X					X	X
	MW2	X	X	X	X	X	X	X	X	X	X	X				X	X
	MW3	X	X	X	X	X	X	X	X	X	X					X	X
	MWA	X	X	X	X	X		X	X	X	X	X		X	X	X	X
Landfill Wells	MW6	X				X		X		X	X				X	X	X
	MW7			X	X	X	X	X	X	X	X	X	X		X	X	X
	MW8	X						X		X	X			X	X	X	X
	MW9							X		X	X					X	X
	MW10					X		X	X	X	X				X	X	X
	MW11	X	X			X		X	X	X	X				X	X	X
	MW12	X	X			X		X		X	X				X	X	X
	MW13	X	X			X	X	X		X	X	X	X			X	X
	MW14	X	X					X	X	X	X				X	X	X
	MW15	X				X		X	X	X	X				X	X	X
	MW16	X	X			X		X		X	X					X	X
	MW17	X	X				X	X		X	X					X	X
	MW18							X		X	X				X	X	X
Rad.Wells	MW19	X	X			X		X		X	X			X	X	X	X
	MW20	X	X			X		X		X	X					X	X
Dross	MW27	X	X					X	X	X	X			X	X	X	X
New Landfill Wells	MW28	X	X			X		X	X	X	X					X	X
	MW29	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X
	MW30	X	X	X	X	X		X		X	X				X	X	X
	MW31			X	X	X		X		X	X					X	X
	MW32	X						X		X	X				X	X	X
	MW33	X						X		X	X					X	X
VOC Wells	MW34	X	X			X		X	X	X	X					X	X
	MW35	X	X	X	X	X	X	X	X	X	X					X	X
	MW36R	X	X	X	X	X	X	X	X	X	X					X	X
	MW37	X	X					X		X	X					X	X
	MW38R	X	X	X	X	X		X		X	X			X	X	X	X
	MW39	X	X					X		X	X				X	X	X
	MW40	X						X		X	X					X	X
	MW41	X	X			X		X		X	X					X	X
Upgradient	MW42*	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	MW43*	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Table 16
Proposed Groundwater Sampling Scope Summary
WDC Acquistion LLC / SAP/QAPP Addendum

		Organics		Inorganics													
	Well	VOCs	1,4 Dioxane	Chromium (hex.)	Chromium (total)	Arsenic	Beryllium	Boron	Cadmium	Fluoride (total) **	Iron	Lead	Vanadium	Nitrate-N	Nitrite-N	Chloride	Sulfate
Off Site Downgradient Wells	MW44*	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X
	MW45*	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X
	MW46*	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X
	MW47*	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X
	MW48*	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X
	MW49*	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X

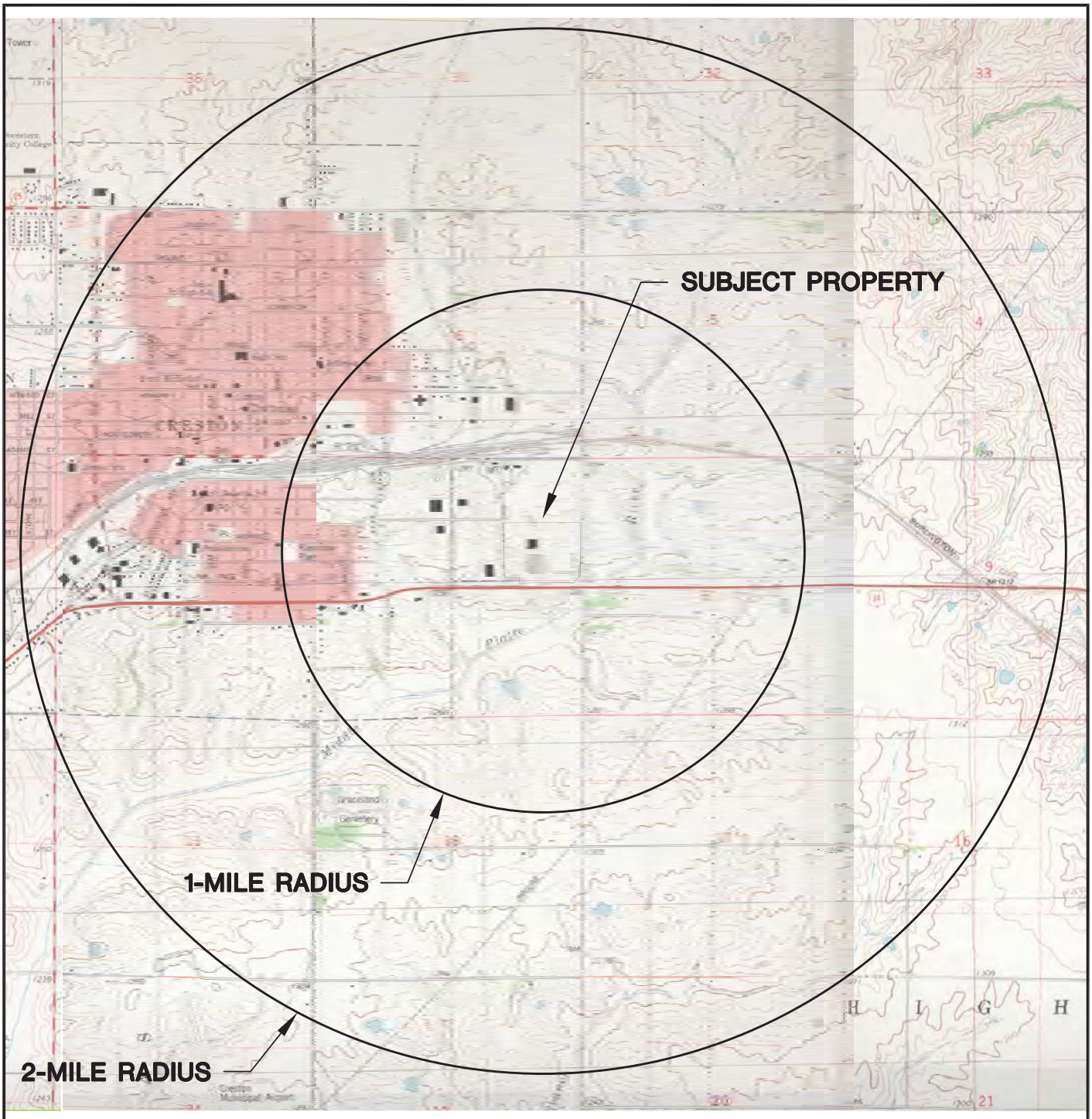
TABLE LEGEND:

X = Proposed for additional sampling
* Proposed well
** As of 9/1/2020, flouride now reported as total instead of distilled per SW846 Method 9056.

SAMPLING PROGRAM APPROACH

	= No sampling proposed, not previously detected above RBSL or not sampled for this parameter
X	= Previously detected above RBSL, resampling proposed
X	= Previously detected below RBSL but proposed for sampling based on results at other wells (potential contaminant of concern)
X	= New well
X	= Not previously detected but strategic to sample based on other results
X	= Not previously sampled but strategic to sample based on other results

FIGURES



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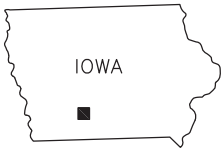
CRESTON EAST QUADRANGLE
IOWA
7.5 MINUTE SERIES (TOPOGRAPHIC)

SCALE: 1" = 3,000'



PROJECT NO.	2631
DRAWN BY:	KP
CHECKED BY:	SC
APPROVED BY:	SC
DRAWN:	02/09/04
REVISED:	05/20/04

FIGURE 1
SITE LOCATION MAP
RCRA FACILITY INVESTIGATION WORKPLAN
WELLMAN DYNAMICS CORPORATION
CRESTON, IOWA

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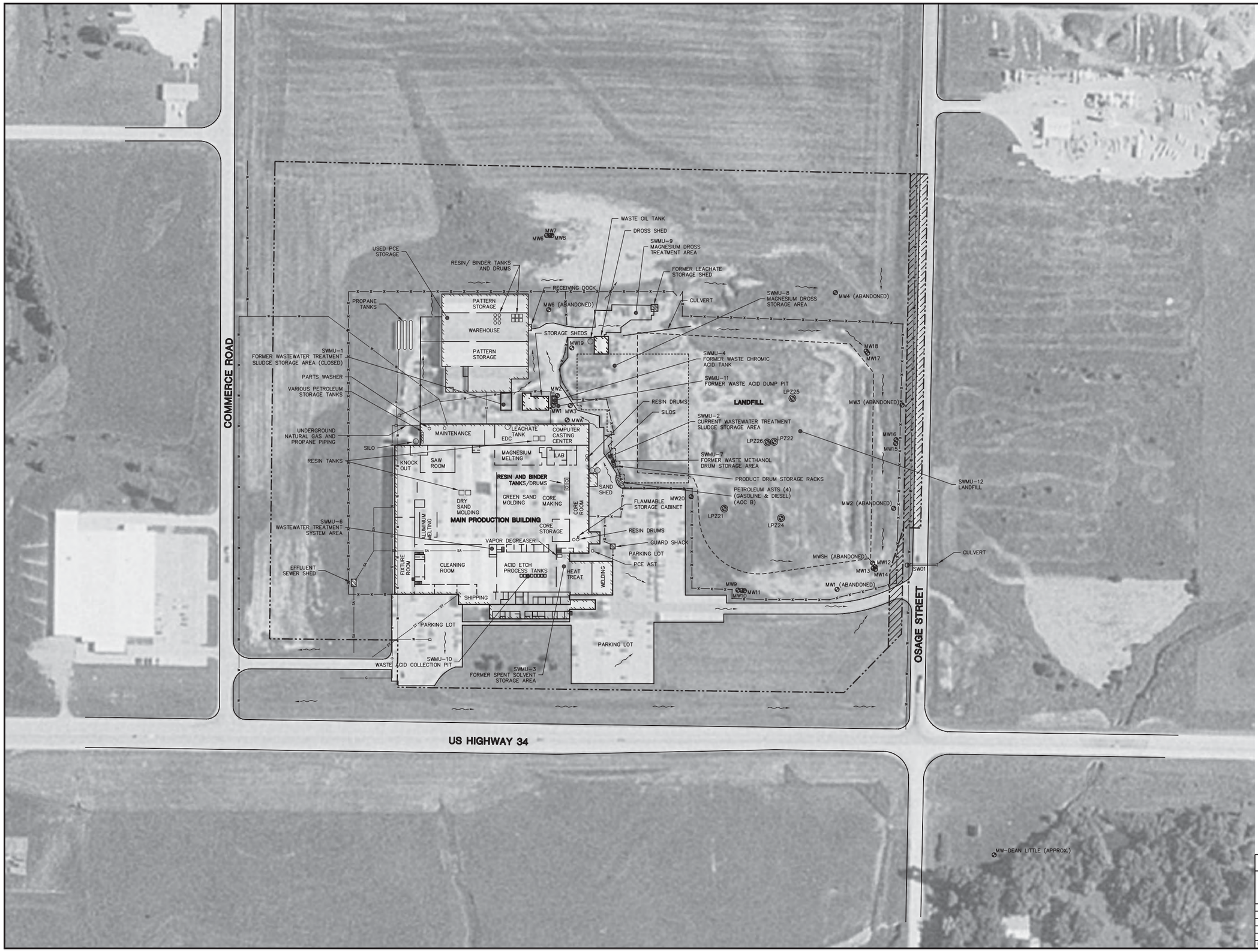

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LEGEND

MW12	MONITORING WELL
LPZ24	LEACHATE PIEZOMETER
SW01	SURFACE WATER MONITORING POINT
	APPROXIMATE LANDFILL BOUNDARY
	APPROXIMATE RADIOLOGICAL INVESTIGATION AREA BOUNDARY
	APPROXIMATE PROPERTY LINE
	FACILITY PROPERTY WITH GRANTED EASEMENT
	FENCE
	GAS MAIN
	ABOVEGROUND PROPANE PIPING
	SANITARY SEWER
	STORM SEWER
	WATER MAIN
	HYDRANT
	SURFACE DRAINAGE
SWMU	SOLID WASTE MANAGEMENT UNIT (NOTE: SWMU 5 NOT SHOWN BECAUSE IT IS A FORMER PORTABLE TANK)
AOC	AREA OF CONCERN (NOTE: AOC A IS NOT IDENTIFIED AS A SPECIFIC POINT BECAUSE IT INCLUDES SEVERAL LOCATIONS OF VOC GROUNDWATER CONTAMINATION EAST AND NORTH OF THE MAIN BUILDING, SEE FIGURES 5 AND 6)

NOTES:

1. BASE MAP SOURCE IS 3.75 MINUTE DIGITAL ORTHOPHOTO QUAD, CRESTON EAST, SW, USGS. DATE OF IMAGE IS JULY 28, 1995.
2. PROPERTY LINE AND EASEMENT INFORMATION IS FROM CORPORATE WARRANTY DEED DATED JUNE 20, 1985, DOC #2115 BOOK 436 P.30-31, UNION COUNTY, AND FROM CORPORATE WARRANTY DEED DATED FEBRUARY 23, 1971.
3. INTERIOR BUILDING FEATURES ARE FROM TIER TWO EMERGENCY AND HAZARDOUS CHEMICAL INVENTORY, REPORTING PERIOD FROM JANUARY 1 TO DECEMBER 31, 2003.
4. SURFACE DRAINAGE INFORMATION IS FROM INDIVIDUAL STORM WATER DISCHARGE PERMIT APPLICATION, AUGUST 13, 2002.
5. LANDFILL BOUNDARY FROM CURRENT SITE MAP PREPARED BY BARKER LEMAR ENGINEERING CONSULTANTS, MARCH 10, 2004.
6. RADIOLOGICAL INVESTIGATION AREA FROM SITE CHARACTERIZATION SURVEY REPORT, SEPTEMBER 2003, EARTH SCIENCES CONSULTANTS, INC.
7. WELL LOCATIONS ARE FROM SITE TOPOGRAPHIC AND WELL LOCATION MAP, MAY 1992, GREEN ENVIRONMENTAL SERVICES, INC.
8. UTILITY LOCATIONS ARE FROM PLANS PROVIDED BY FWD. ALL UTILITY LOCATIONS ARE APPROXIMATE AND HAVE NOT BEEN FIELD VERIFIED.

100 0 100

SCALE: 1" = 100'

SITE PLAN

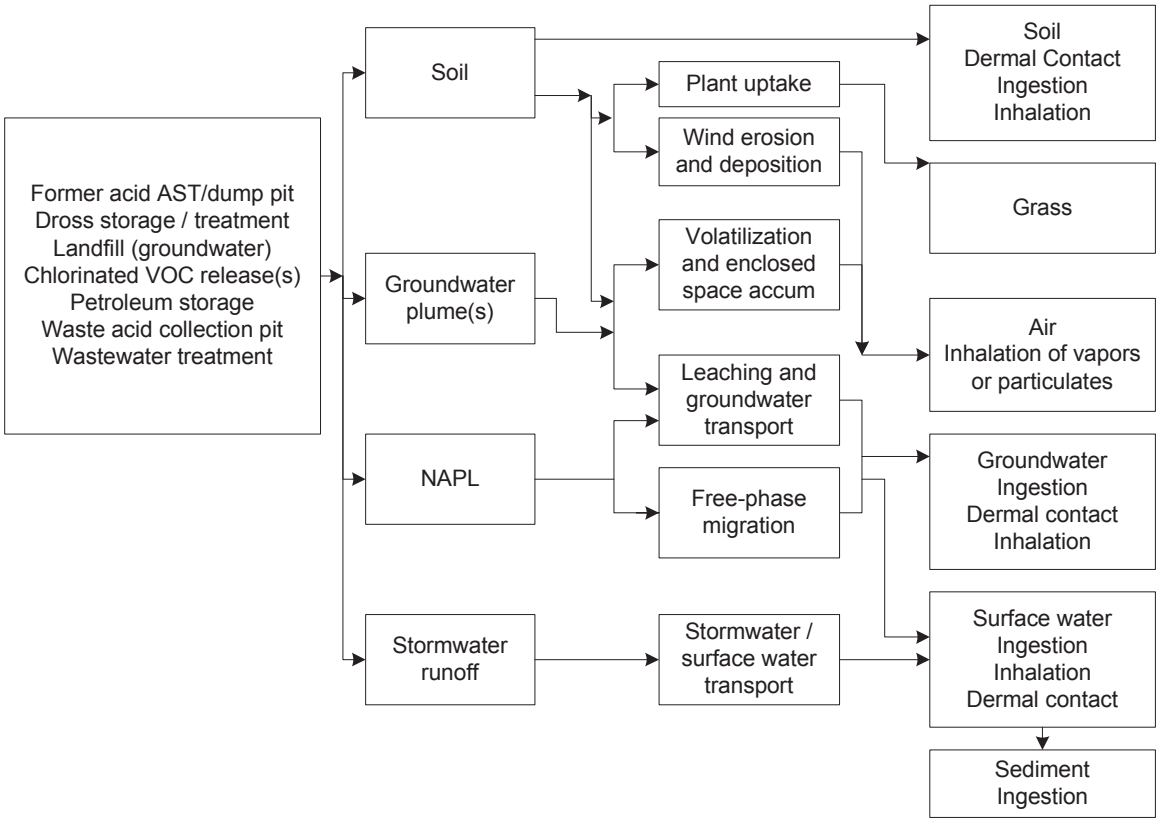
CURRENT CONDITIONS REPORT
FANSTEEL/WELLMAN DYNAMICS CORPORATION
CRESTON, IOWA

PROJECT NO.	2631
DRAWN BY:	KP
CHECKED BY:	SMS
APPROVED BY:	
DRAWN:	03/24/04
REVISED:	05/14/04

BEI inc

FIGURE 2

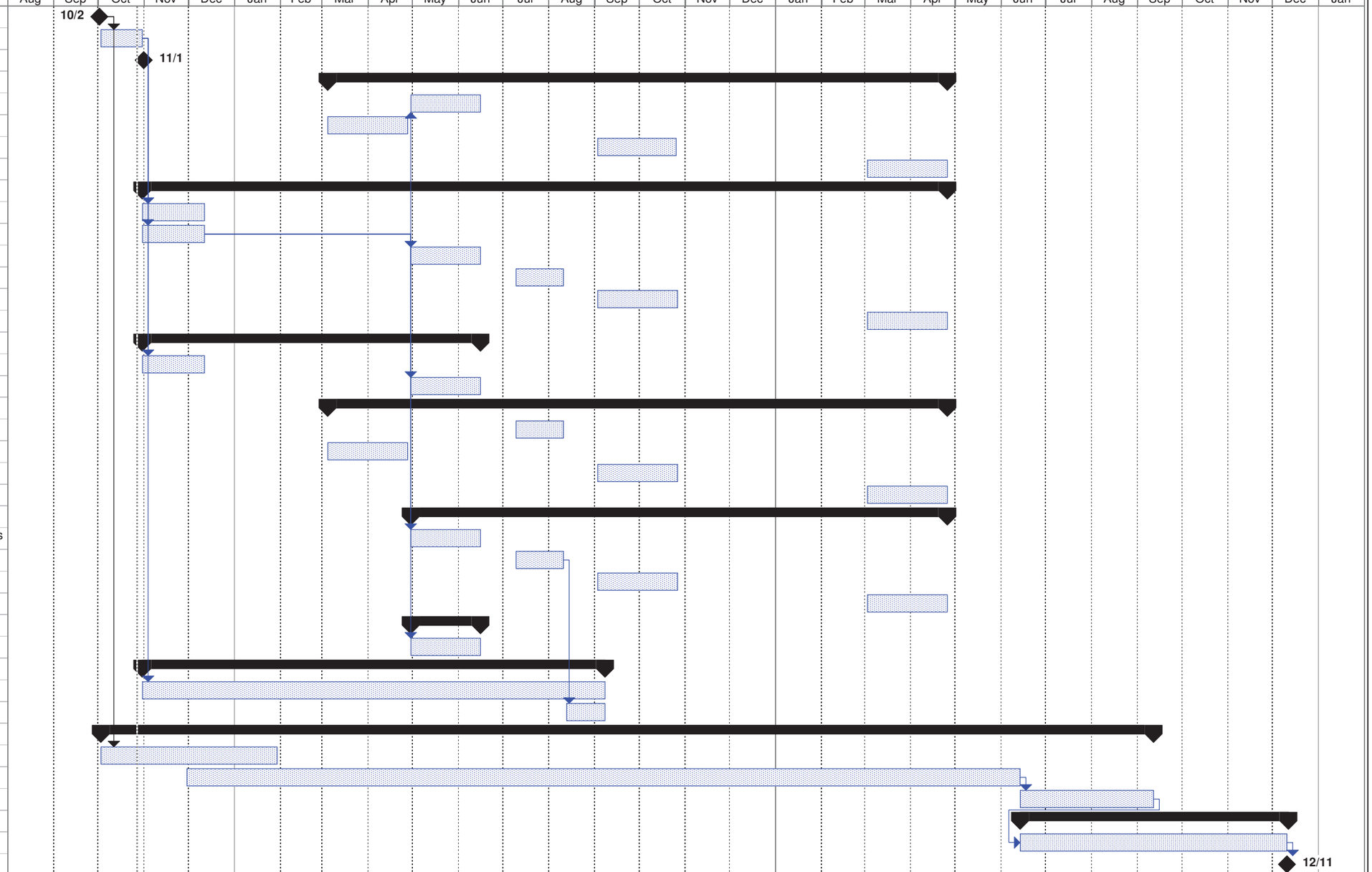
Figure 3
Potential Exposure Pathway Summary
Sampling and Analysis Plan / Quality Assurance Project Plan
Wellman Dynamics, Creston, Iowa



Potential Receptors Based on Current Data	Receptors with Additional Information Needed
• Industrial • Construction worker	• Residential • Terrestrial Biota
• None	• Terrestrial Biota
• Construction worker	• Residential • Industrial
• Construction worker	• Residential
• None	• Aquatic biota • Terrestrial biota
• None	• Aquatic biota • Terrestrial biota

Figure 4
Proposed Project Schedule
RCRA Facility Investigation Workplan
Wellman Dynamics Corporation

ID	Task Name
1	RFI Workplan Approval Received by WDC
2	Planning and contracting
3	Final RFI Workplan to USEPA
4	**Chromic Acid AST/Dump Pit sampling**
5	Geoprobe soil sampling and analysis
6	Groundwater sampling and analysis - Round 0
7	Groundwater sampling and analysis - Round 1
8	Groundwater sampling and analysis - Round 2
9	**Magnesium Dross Storage/Treatment Area**
10	Dross sampling and analysis
11	Surface soil sampling and analysis
12	Geoprobe sampling and analysis, if needed
13	Monitoring well installation
14	Groundwater sampling and analysis - Round 1
15	Groundwater sampling and analysis - Round 2
16	**Current Wastewater Treatment Sludge Storage Area**
17	Surface soil sampling
18	Geoprobe sampling, if needed
19	**Landfill Groundwater Impacts Evaluation**
20	Monitoring Well Installation
21	Groundwater sampling and analysis - Round 0
22	Groundwater sampling and analysis - Round 1
23	Groundwater sampling and analysis - Round 2
24	**VOC Investigation**
25	Geoprobe soil and groundwater sampling and analysis
26	Monitoring well installation
27	Groundwater sampling and analysis - Round 1
28	Groundwater sampling and analysis - Round 2
29	**Waste Acid Collection Pit and WWTS Investigation**
30	Geoprobe sampling and analysis
31	**Geologic and Hydrogeologic Characterization**
32	Soil logging and testing
33	Slug tests
34	**Data Analysis**
35	Existing data review and validation
36	New data review and validation
37	Risk Assessment
38	**RFI Report**
39	Draft RFI Report
40	Draft RFI Report to USEPA

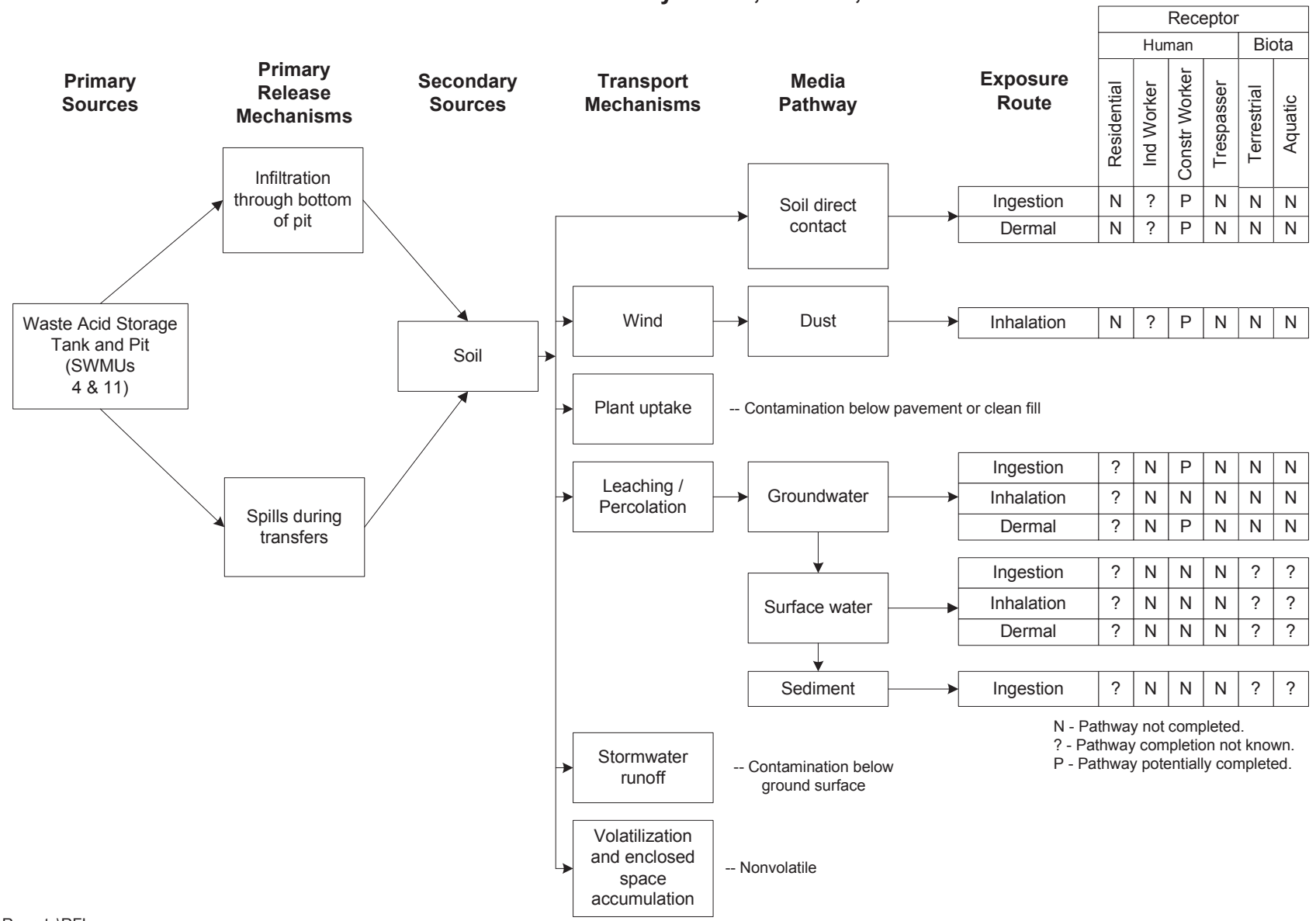


Project: 2631_ProjSchedule_060929_
Date: Fri 10/27/06

Task — Progress — Summary — External Tasks — Deadline

Split — Milestone — Project Summary — External Milestone

Figure 5
Exposure Pathway Evaluation
Former Chromic Acid AST and Dump Pit Area (SWMUs 4 & 11)
Sampling and Analysis Plan / Quality Assurance Project Plan
Wellman Dynamics, Creston, Iowa



N

MW2 – CR (mg/l)

DATE	MW2	MW2–1
06/07/95	<0.040	<0.040

MW2 – 05/09/95

DEPTH	CR (mg/kg)
1.5'	16
7'	16
14'	12
20'	12

B14 – 06/94

DEPTH	CR (mg/kg)
3'	23

B3/4 – 06/94

DEPTH	CR (mg/kg)
7'	**1000**
DUP	**570**

B11 – 06/94

DEPTH	CR (mg/kg)
2'	20

B5 – 06/94

DEPTH	CR (mg/kg)
4'	**1300**

B5 – 05/09/95

DEPTH	CR (mg/kg)
4.5'	17
8'	**3,700**
13'	**910**
20'	**470**

B12/13 – 06/94

DEPTH	CR (mg/kg)
1'	20
DUP	26

MW1 – CR (mg/l)

DATE	MW1	MW1–1
06/07/95	<0.040	<0.040

MW1 – 05/09/95

DEPTH	CR (mg/kg)
4.5'	20
7.5'	18
14.5'	13
20'	8.9

B7 – 06/94

DEPTH	CR (mg/kg)
12'	**1200**

MW3 – CR (mg/l)

DATE	MW3	MW3–1
06/07/95	**41**	**56**
08/24/95	**36**	**36**
03/22/96	**17**	**14**
10/03/96	**39**	**47**
03/27/97	**42**	**37**
09/11/97	**32**	**41**
03/26/98	**47**	**42**
09/23/98	**34**	**36**
03/25/99	**40**	**43**
09/30/99	**25**	**36**
03/17/00	**33**	**25**
09/23/00	**32**	**25**
03/23/01	**30.5**	**30.9**
09/28/01	**14.2**	**14.9**
04/10/02	**20**	**24**
09/21/02	**17**	**19**
09/08/03	**29.3**	NA
03/29/04	**13**	NA
03/15/05	**9.4**	NA

MW3 – 05/09/95

DEPTH	CR (mg/kg)
1.5'	15
6'	16
10.5'	18
20'	**340**

SWMU–4
FORMER WASTE CHROMIC ACID TANK

WeG–B1 – 01/08/98

DEPTH	CR (mg/kg)
12–16'	4.1

WeC–CS – 01/08/98

DEPTH	CR (mg/kg)
0–2.5'	32

WeC–B1 – METALS (mg/l)

DATE	ALUMINUM	ARSENIC	BARIUM	CADMIUM	CHROMIUM	LEAD	MAGNESIUM	MERCURY	SELENIUM	SILVER
01/08/98	0.61	**0.032**	0.087	<0.0010	**0.13**	0.0020	180	0.00040	<0.0010	0.0020

WeC–B1 – 01/08/98

DEPTH	CR (mg/kg)
2–6'	5.3

STORAGE SHEDS

SWMU–11
FORMER WASTE ACID DUMP PIT

HATE TANK

COMPUTER CASTING CENTER

B2 – 06/94

DEPTH	CR (mg/kg)
4'	**750**

B1 – 06/94

DEPTH	CR (mg/kg)
6'	**380**

B9 – 06/94

DEPTH	CR (mg/kg)
3'	44

B10 – 06/94

DEPTH	CR (mg/kg)
8'	**8000**

B6 – 06/94

DEPTH	CR (mg/kg)
9'	**2900**

B4 – 05/09/95

DEPTH	CR (mg/kg)
3'	14
7'	15
13'	15
20'	14

B3 – 05/09/95

DEPTH	CR (mg/kg)
2'	16
6.5'	14
12'	33
20'	**390**

B8 – 06/94

DEPTH	CR (mg/kg)
4'	40

MWA – CR (mg/l)

DATE	MWA	MWA–1
12/15/93	**0.23**	NA
07/28/94	**4.7**	NA
08/29/94	**1.7**	0.079
11/16/94	**0.431**	0.086
03/09/95	**0.354**	0.035
06/07/95	**0.981**	**1.3**
08/24/95	**2.9**	0.088
03/22/96	**0.148**	0.048
10/03/96	**1.1**	**0.122**
03/27/97	**0.178**	0.094
09/11/97	**0.872**	**0.390**
03/26/98	**0.369**	**0.418**
09/23/98	**1.2**	**0.211**
03/25/99	**0.345**	**0.128**
09/30/99	**1.4**	**0.304**
03/17/00	**0.429**	**0.202**
09/23/00	**1.3**	**0.371**
03/23/01	**0.440**	**0.304**
09/28/01	**2.36**	**0.402**
04/10/02	**0.576**	**0.260**
09/21/02	<0.020	**0.136**
09/08/03	**0.839**	NA
03/29/04	**0.164**	NA
03/15/05	**0.268**	NA

LEGEND

- APPROXIMATE RADIOLOGICAL INVESTIGATION AREA BOUNDARY
- GEOPROBE BORING
- MONITORING WELL
- APPROXIMATE LIMITS OF EXCAVATION
- EXCAVATION SOIL SAMPLE
- SURFACE COMPOSITE SAMPLE
- PROPOSED GEOPROBE BORING

NOTES:

1. BOLD SOIL RESULT INDICATES VALUE IS ABOVE USEPA REGION 9 PRELIMINARY REMEDIATION GOAL FOR INDUSTRIAL DIRECT CONTACT (64 mg/kg).
2. BOLD GROUNDWATER RESULT INDICATES VALUE IS ABOVE MCL.
3. SOIL DATA TAKEN FROM DECEMBER 1994 CLOSURE CERTIFICATION REPORT AND JUNE 22, 1995 SOIL BORINGS/MONITORING WELLS RESULTS LETTER, BOTH PREPARED BY H.R. GREEN CO. AND FROM ANTECH, LTD. LABORATORY REPORT DATED JANUARY 29, 1999.
4. GROUNDWATER DATA COMPILED FROM LABORATORY REPORTS AND CORRESPONDENCE BETWEEN GREEN ENVIRONMENTAL SERVICES, INC. AND FANSTEEL/WELLMAN DYNAMICS PERSONNEL.

30 0 30

SCALE: 1" = 30'

FIGURE 6
SAMPLING PLAN – FORMER CHROMIC ACID AST AND DUMP PIT AREA
RCRA FACILITY INVESTIGATION WORKPLAN
WELLMAN DYNAMICS CORPORATION
CRESTON, IOWA

PROJECT NO.	2631
DRAWN BY:	KP
CHECKED BY:	SC
APPROVED BY:	SC
DRAWN:	8/15/05
REVISED:	09/08/05

BT² inc.

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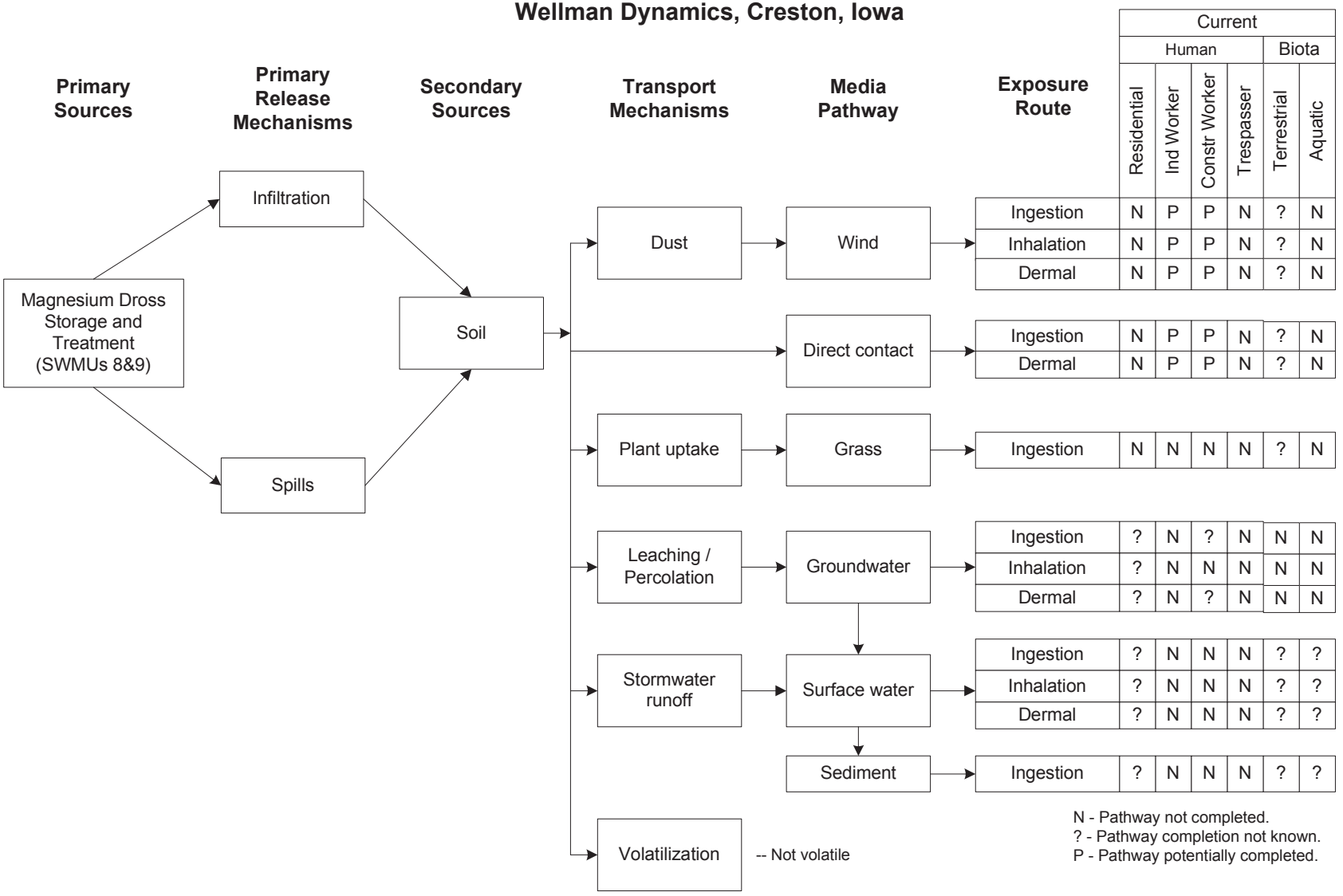
Figure 7
Exposure Pathway Evaluation
Magnesium Dross Storage and Treatment Area (SWMUs 8 & 9)
Sampling and Analysis Plan / Quality Assurance Project Plan
Wellman Dynamics, Creston, Iowa



NOTES:

1. SURFACE SOIL SAMPLING LOCATIONS ARE APPROXIMATE AND MAY BE MODIFIED BASED ON ACCESS. IF A PROPOSED SAMPLING LOCATION IS IN AREA OF ASPHALT OR CONCRETE PAVING, THEN THE SAMPLE WILL BE COLLECTED FROM THE CLOSEST UNPAVED LOCATION THAT MAY RECEIVE STORMWATER RUNOFF FROM THE INITIAL PROPOSED LOCATION.
2. GEOPROBE BORING LOCATIONS AROUND USED OIL AST MAY BE MODIFIED BASED ON ACCESS OR FIELD OBSERVATIONS INDICATING A POSSIBLE RELEASE.
3. AS DESCRIBED IN THE SAP/QAPP, GEOPROBE BORINGS MAY BE INSTALLED IN THIS AREA DEPENDING ON THE SURFACE SOIL SAMPLING RESULTS.
4. NO SAMPLES WILL BE COLLECTED WITHIN THE RADIOLOGICAL INVESTIGATION AREA.
5. PROPOSED MONITORING WELL LOCATION IS APPROXIMATE AND WILL BE ADJUSTED BASED ON ACCESS AND FIELD CONDITIONS.

APPROXIMATE LIMITS OF POSSIBLE DROSS STORAGE

SWMU-9
MAGNESIUM DROSS
TREATMENT AREA

FORMER LEACHATE
STORAGE SHED

RECEIVING DOCK

WASTE OIL TANK

CULVERT

DROSS SHED

MW27

MW19

SWMU-8
MAGNESIUM DROSS
STORAGE AREA

SWMU-4
FORMER WASTE CHROMIC
ACID TANK

MW2

STORAGE SHEDS

MW3

MW1

MWA

SWMU-11
FORMER WASTE ACID DUMP PIT

LEGEND

- APPROXIMATE LANDFILL BOUNDARY
- APPROXIMATE RADIOLOGICAL INVESTIGATION AREA BOUNDARY
- EXISTING MONITORING WELL
- PROPOSED SURFACE SOIL SAMPLE
- PROPOSED GEOPROBE BORING
- SURFACE WATER AND SEDIMENT SAMPLE LOCATION
- SURFACE DRAINAGE
- PROPOSED WATER TABLE MONITORING WELL

40 0 40

SCALE: 1" = 40'

N

FIGURE 8
SAMPLING PLAN – MAGNESIUM DROSS
STORAGE AND TREATMENT AREA
RCRA FACILITY INVESTIGATION WORKPLAN
WELLMAN DYNAMICS CORPORATION
CRESTON, IOWA

PROJECT NO.	2631
DRAWN BY:	KP
CHECKED BY:	SC
APPROVED BY:	SC
DRAWN:	08/15/05
REVISED:	04/21/06

BT² inc.

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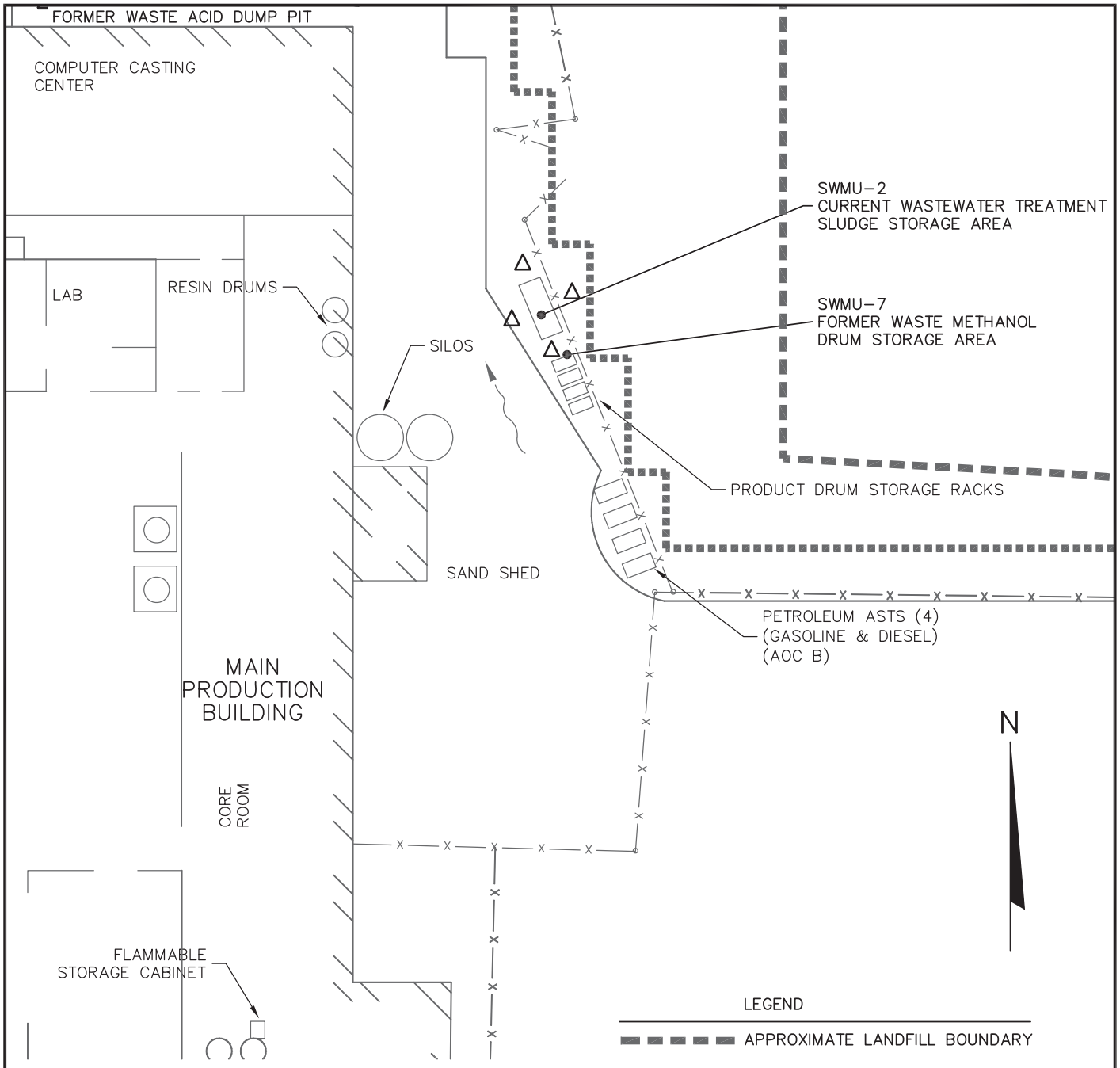

NOTES:

1. SURFACE SOIL SAMPLING LOCATIONS ARE APPROXIMATE AND MAY BE ADJUSTED BASED ON ACCESS OR FIELD OBSERVATIONS INDICATING A POTENTIAL RELEASE AREA.
2. IF ANY OF THE PROPOSED SAMPLING LOCATIONS ARE IN PAVED AREAS, THE SAMPLE WILL INSTEAD BE COLLECTED FROM THE NEAREST UNPAVED AREA LIKELY TO RECEIVE STORMWATER RUNOFF FROM THE INITIAL PROPOSED SAMPLING LOCATION.

40 0 40

SCALE: 1" = 40'

PROJECT NO.	2631
DRAWN BY:	KP
CHECKED BY:	SC
APPROVED BY:	SC
DRAWN:	8/15/05
REVISED:	8/23/05

FIGURE 9
SAMPLING PLAN – CURRENT WASTEWATER TREATMENT SLUDGE STORAGE AREA
RCRA FACILITY INVESTIGATION WORKPLAN
WELLMAN DYNAMICS CORPORATION
CRESTON, IOWA

BT² inc.

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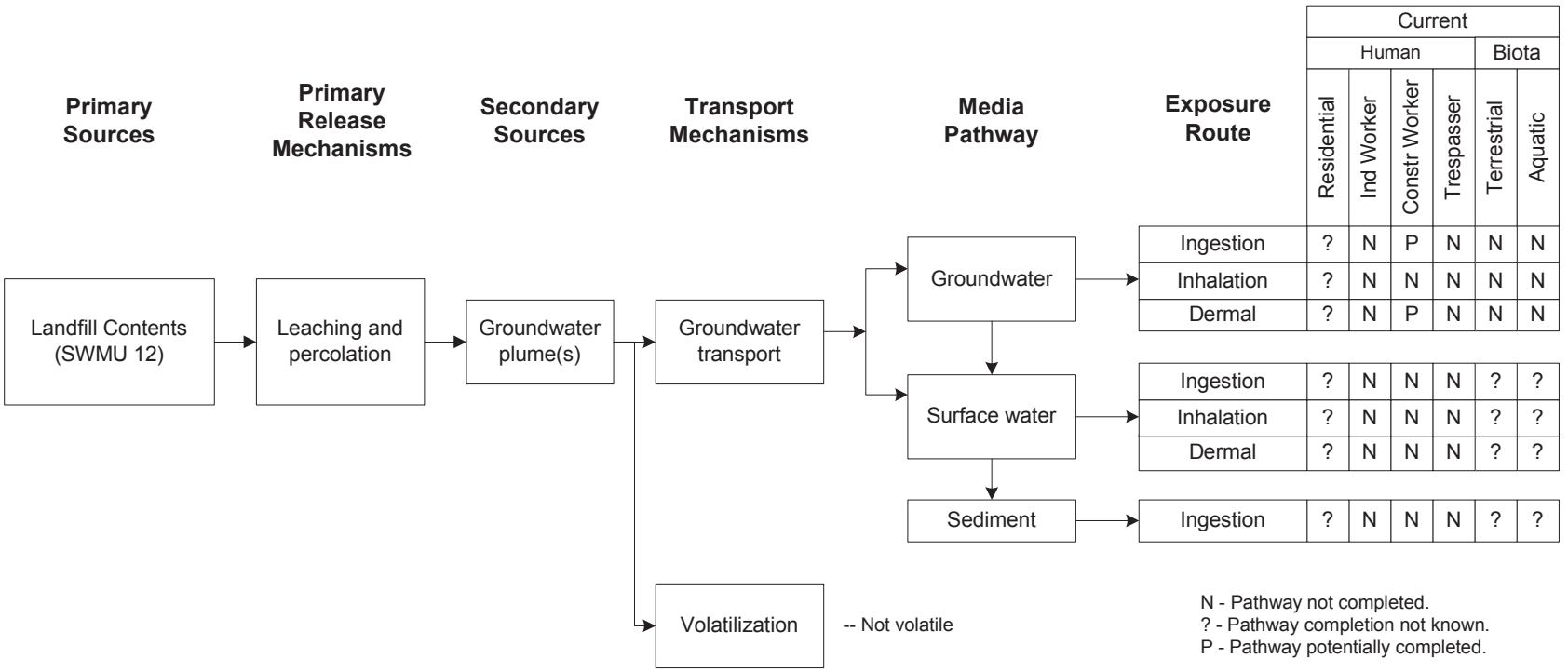
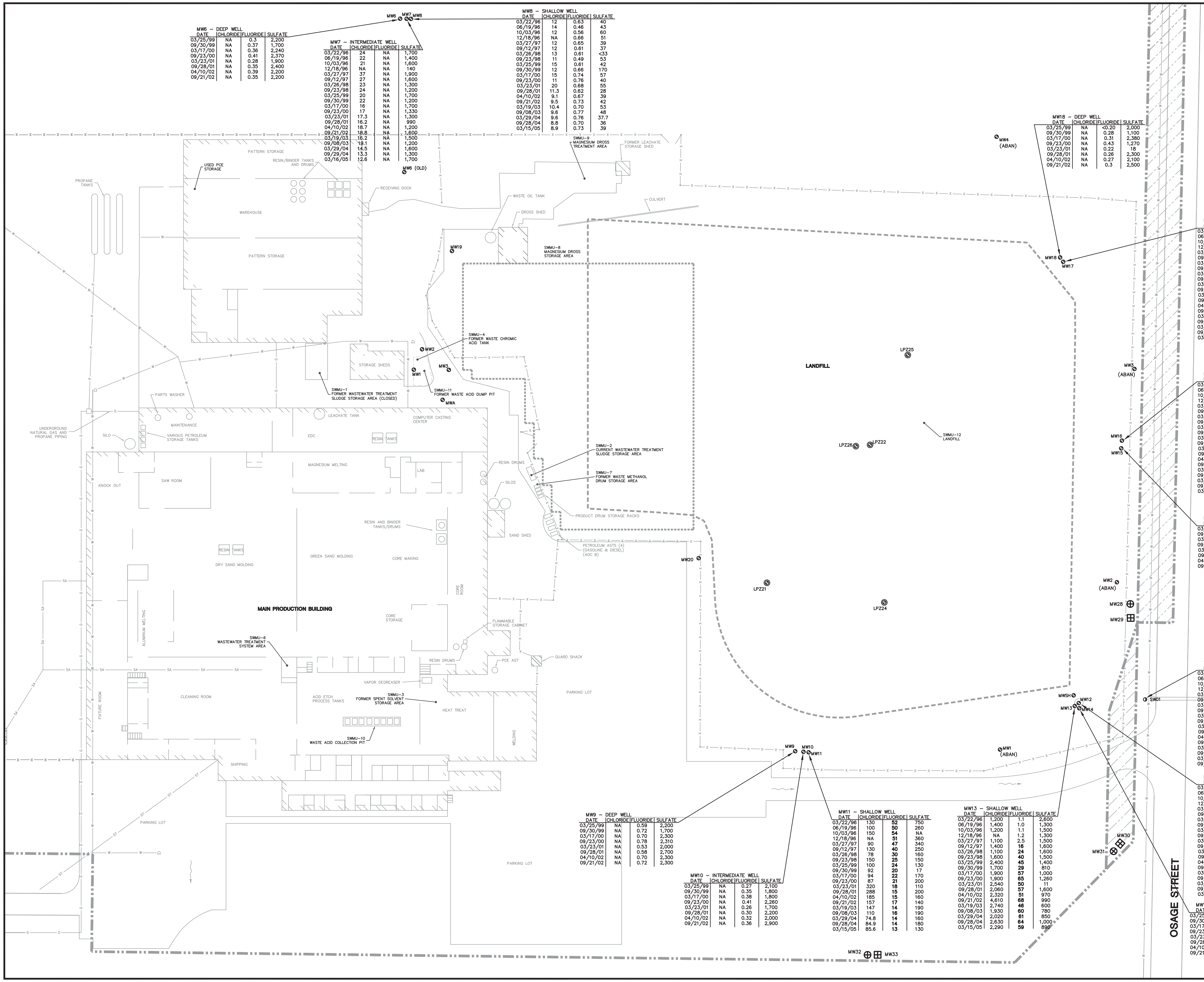
Figure 10
Exposure Pathway Evaluation
Landfill Groundwater Impact Area (SWMU 12)
Sampling and Analysis Plan / Quality Assurance Project Plan
Wellman Dynamics, Creston, Iowa



	Current					
	Human				Biota	
	Residential	Ind Worker	Constr Worker	Trespasser	Terrestrial	Aquatic
Groundwater – Ingestion	?	N	P	N	N	N
Groundwater – Inhalation	?	N	N	N	N	N
Groundwater – Dermal	?	N	P	N	N	N
Surface water – Ingestion	?	N	N	N	?	?
Surface water – Inhalation	?	N	N	N	?	?
Surface water – Dermal	?	N	N	N	?	?
Sediment – Ingestion	?	N	N	N	?	?

N - Pathway not completed.
? - Pathway completion not known.
P - Pathway potentially completed.

Note: Pathways other than groundwater are not part of the RFI and are addressed under the IDNR sanitary landfill permit program.



MW6 – DEEP WELL

DATE	CHLORIDE	FLUORIDE	SULFATE
03/25/99	NA	0.3	2,200
09/30/99	NA	0.37	1,700
03/17/00	NA	0.36	2,240
09/23/00	NA	0.41	2,370
03/23/01	NA	0.28	1,900
09/28/01	NA	0.35	2,400
04/10/02	NA	0.39	2,200
09/21/02	NA	0.35	2,200

MW7 – INTERMEDIATE WELL

DATE	CHLORIDE	FLUORIDE	SULFATE
03/22/96	24	NA	1,700
06/19/96	22	NA	1,400
10/03/96	21	NA	1,600
12/18/96	NA	NA	140
03/27/97	37	NA	1,900
09/12/97	27	NA	1,600
03/26/98	23	NA	1,300
09/23/98	24	NA	1,200
03/25/99	20	NA	1,700
09/30/99	22	NA	1,200
03/17/00	16	NA	1,700
09/23/00	17	NA	1,330
03/23/01	17.3	NA	1,300
09/28/01	16.2	NA	990
04/10/02	18.7	NA	1,200
09/21/02	18.8	NA	1,600
03/19/03	16.2	NA	1,500
09/08/03	19.1	NA	1,200
03/29/04	14.5	NA	1,600
09/29/04	13.3	NA	1,300
03/16/05	12.6	NA	1,700

MW8 – SHALLOW WELL

DATE	CHLORIDE	FLUORIDE	SULFATE
03/22/96	12	0.63	40
06/19/96	14	0.46	43
10/03/96	12	0.56	60
12/18/96	NA	0.66	51
03/27/97	12	0.65	39
09/12/97	12	0.61	37
03/26/98	13	0.61	<33
09/23/98	11	0.49	53
03/25/99	15	0.61	42
09/30/99	12	0.66	170
03/17/00	15	0.74	57
09/23/00	11	0.76	40
03/23/01	20	0.68	55
09/28/01	11.3	0.62	28
04/10/02	9.1	0.67	39
09/21/02	9.5	0.73	42
03/19/03	10.4	0.70	53
09/08/03	9.6	0.77	48
03/29/04	9.6	0.76	37.7
09/28/04	8.8	0.70	36
03/15/05	8.9	0.73	39

MW18 – DEEP WELL

DATE	CHLORIDE	FLUORIDE	SULFATE
03/25/99	NA	<0.20	2,000
09/30/99	NA	0.28	1,100
03/17/00	NA	0.31	2,380
09/23/00	NA	0.43	1,270
03/23/01	NA	0.22	18
09/28/01	NA	0.26	2,300
04/10/02	NA	0.27	2,100
09/21/02	NA	0.3	2,500

MW17 – SHALLOW WELL

DATE	CHLORIDE	FLUORIDE	SULFATE
03/22/96	7,900	3.6	1,200
06/19/96	3,600	**10.0**	1,400
10/03/96	5,200	NA	1,400
12/18/96	NA	**6.9**	1,200
03/27/97	4,200	**5.9**	1,100
09/12/97	2,800	**7.8**	1,000
03/26/98	1,400	**9.2**	1,700
09/23/98	2,000	**10.0**	1,000
03/25/99	4,800	**8.0**	870
09/30/99	1,900	**11**	630
03/17/00	2,400	**9.9**	700
09/23/00	2,600	**7.9**	750
03/23/01	1,890	**9.8**	730
09/28/01	1,850	**8.8**	1,500
04/10/02	1,920	**8.8**	780
09/21/02	1,640	**9.2**	680
03/19/03	1,950	**7.8**	680
09/08/03	1,550	**8.9**	690
03/29/04	1,170	**9.3**	690
09/28/04	1,350	**7.9**	770
03/15/05	1,300	**7.9**	710

MW16 – SHALLOW WELL

DATE	CHLORIDE	FLUORIDE	SULFATE
03/22/96	3,100	2.1	450
06/19/96	2,800	2.3	310
10/03/96	3,100	2.3	340
12/18/96	NA	2.2	300
03/27/97	2,600	2	310
09/12/97	2,700	2	310
03/26/98	1,800	**4.5**	500
09/23/98	2,500	3.6	510
03/25/99	4,100	3.2	820
09/30/99	4,200	3.2	430
03/17/00	4,500	2.9	600
09/23/00	4,800	2.8	650
03/23/01	5,170	2.4	660
09/28/01	5,080	2.4	910
04/10/02	5,020	2.3	630
09/21/02	3,520	2.7	650
03/19/03	4,950	2.2	650
09/08/03	3,970	2.6	890
03/29/04	3,200	2.3	840
09/28/04	3,650	2.2	840
03/15/05	2,860	2.2	920

MW15 – DEEP WELL

DATE	CHLORIDE	FLUORIDE	SULFATE
03/25/99	NA	0.28	1,500
09/30/99	NA	0.36	1,600
03/17/00	NA	0.39	1,350
09/23/00	NA	0.43	1,210
03/23/01	NA	0.29	13
09/28/01	NA	0.34	1,500
04/10/02	NA	0.32	1,300
09/21/02	NA	0.38	1,600

SW01

DATE	CHLORIDE	FLUORIDE	SULFATE
03/22/96	320	**9.6**	180
06/19/96	190	**10**	110
10/03/96	1,300	**28**	600
12/17/96	NA	1.2	65
03/26/98	120	3.8	98
09/23/98	1,300	**67**	1,300
03/25/99	70	0.7	62
09/30/99	NS	NS	NS
03/17/00	NS	NS	NS
09/23/00	1,300	**13**	61
03/23/01	121	**11**	75
09/28/01	NS	NS	NS
04/10/02	1,270	**49**	840
09/21/02	NS	NS	NS
03/19/03	332	**9.1**	120
09/08/03	NS	NS	NS
03/29/04	165	3.2	76
09/29/04	505	**28**	290

MW12 – INTERMEDIATE WELL

DATE	CHLORIDE	FLUORIDE	SULFATE
03/22/96	110	NA	2,200
06/19/96	130	NA	1,800
10/03/96	1,300	NA	2,000
12/18/96	NA	NA	2,000
03/27/97	160	NA	2,000
09/12/97	140	NA	1,900
03/26/98	150	NA	1,900
09/23/98	150	NA	1,900
03/25/99	150	NA	1,900
09/30/99	160	NA	1,400
03/17/00	150	NA	2,300
09/23/00	180	NA	2,200
03/23/01	191	NA	1,700
09/28/01	192	NA	2,300
04/10/02	194	NA	1,900
09/21/02	213	NA	2,300
03/19/03	206	NA	1,800
09/08/03	234	NA	1,700
03/29/04	227	NA	1,900
09/29/04	249	NA	2,400
03/16/05	211	NA	1,900

MW14 – DEEP WELL

DATE	CHLORIDE	FLUORIDE	SULFATE
03/25/99	NA	0.28	1,900
09/30/99	NA	0.3	1,700
03/17/00	NA	0.44	2,420
09/23/00	NA	0.45	2,210
03/23/01	NA	0.31	1,400
09/28/01	NA	0.34	2,100
04/10/02	NA	0.37	1,800
09/21/02	NA	0.40	1,900

MW9 – DEEP WELL

DATE	CHLORIDE	FLUORIDE	SULFATE
03/25/99	NA	0.59	2,200
09/30/99	NA	0.72	1,700
03/17/00	NA	0.70	2,300
09/23/00	NA	0.78	2,310
03/23/01	NA	0.53	2,000
09/28/01	NA	0.58	2,700
04/10/02	NA	0.70	2,300
09/21/02	NA	0.72	2,300

MW10 – INTERMEDIATE WELL

DATE	CHLORIDE	FLUORIDE	SULFATE
03/25/99	NA	0.27	2,100
09/30/99	NA	0.35	1,800
03/17/00	NA	0.38	1,800
09/23/00	NA	0.41	2,260
03/23/01	NA	0.26	1,700
09/28/01	NA	0.30	2,200
04/10/02	NA	0.32	2,000
09/21/02	NA	0.36	2,900

MW11 – SHALLOW WELL

DATE	CHLORIDE	FLUORIDE	SULFATE
03/22/96	130	**52**	750
06/19/96	100	**50**	260
10/03/96	150	**54**	NA
12/18/96	NA	**51**	360
03/27/97	90	**47**	340
09/12/97	130	**40**	250
03/26/98	78	**30**	160
09/23/98	150	**25**	150
03/25/99	100	**24**	130
09/30/99	92	**20**	17
03/17/00	94	**22**	170
09/23/00	87	**21**	200
03/23/01	320	**18**	110
09/28/01	288	**15**	200
04/10/02	185	**15**	160
09/21/02	157	**17**	140
03/19/03	147	**14**	190
09/08/03	110	**16**	190
03/29/04	74.8	**14**	160
09/28/04	84.9	**14**	180
03/15/05	85.6	**13**	130

MW13 – SHALLOW WELL

DATE	CHLORIDE	FLUORIDE	SULFATE
03/22/96	1,200	1.1	2,600
06/19/96	1,400	1.0	1,300
10/03/96	1,200	1.1	1,500
12/18/96	NA	1.2	1,300
03/27/97	1,100	2.5	1,500
09/12/97	1,400	**16**	1,600
03/26/98	1,100	**24**	1,600
09/23/98	1,600	**40**	1,500
03/25/99	2,400	**45**	1,400
09/30/99	1,700	**29**	810
03/17/00	1,900	**57**	1,000
09/23/00	1,900	**65**	1,260
03/23/01	2,540	**50**	11
09/28/01	2,060	**57**	1,600
04/10/02	2,320	**51**	970
09/21/02	4,610	**68**	990
03/19/03	2,740	**46**	600
09/08/03	1,930	**60**	780
03/29/04	2,020	**61**	850
09/28/04	2,630	**64**	1,000
03/15/05	2,290	**59**	890

LEGEND

Wel-B1	SOIL BORING
MW12	MONITORING WELL
LPZ24	LEACHATE PIEZOMETER
SW01	SURFACE WATER MONITORING POINT
⊕	PROPOSED WATER TABLE MONITORING WELL
⊞	PROPOSED PIEZOMETER
	APPROXIMATE LANDFILL BOUNDARY
	APPROXIMATE RADIOLOGICAL INVESTIGATION AREA BOUNDARY
	APPROXIMATE PROPERTY LINE
	FACILITY PROPERTY WITH GRANTED EASEMENT
—x—x—x—	FENCE
—G—	GAS MAIN
—P—	ABOVEGROUND PROPANE PIPING
—SA—	SANITARY SEWER
—ST—	STORM SEWER
—W—	WATER MAIN
	HYDRANT
	SURFACE DRAINAGE
SWMU	SOLID WASTE MANAGEMENT UNIT (NOTE: SWMU 5 NOT SHOWN BECAUSE IT IS A FORMER PORTABLE TANK)
AOC	AREA OF CONCERN (NOTE: AOC A IS NOT IDENTIFIED AS A SPECIFIC POINT BECAUSE IT INCLUDES SEVERAL LOCATIONS OF VOC GROUNDWATER CONTAMINATION EAST AND NORTH OF THE MAIN BUILDING)
NA	NOT ANALYZED
(ABAN)	ABANDONED MONITORING WELL

NOTES:

1. SEE FIGURE 2 FOR BASE MAP NOTES.
2. NOT ALL RESULTS SHOWN. DISPLAYED RESULTS ARE PRIMARY LANDFILL CONTAMINANTS OF CONCERN.
3. RESULTS IN MG/L EXCEPT WHERE NOTED OTHERWISE.
4. BOLD VALUES EXCEED UNITED STATED ENVIRONMENTAL PROTECTION AGENCY PRIMARY DRINKING WATER MAXIMUM CONTAMINANT LEVELS.
5. DATA FROM WELLS MW6–MW18 FROM ANNUAL WATER QUALITY REPORTS AND SEMIANNUAL WATER QUALITY REPORTS PREPARED BY EARTH SCIENCE CONSULTANTS, INC. OR FROM TEST AMERICA LABORATORY REPORTS (3/04–3/05).
6. PROPOSED WELL LOCATIONS ARE APPROXIMATE AND WILL BE ADJUSTED BASED ON ACCESS AND FIELD CONDITIONS.

50 0 50

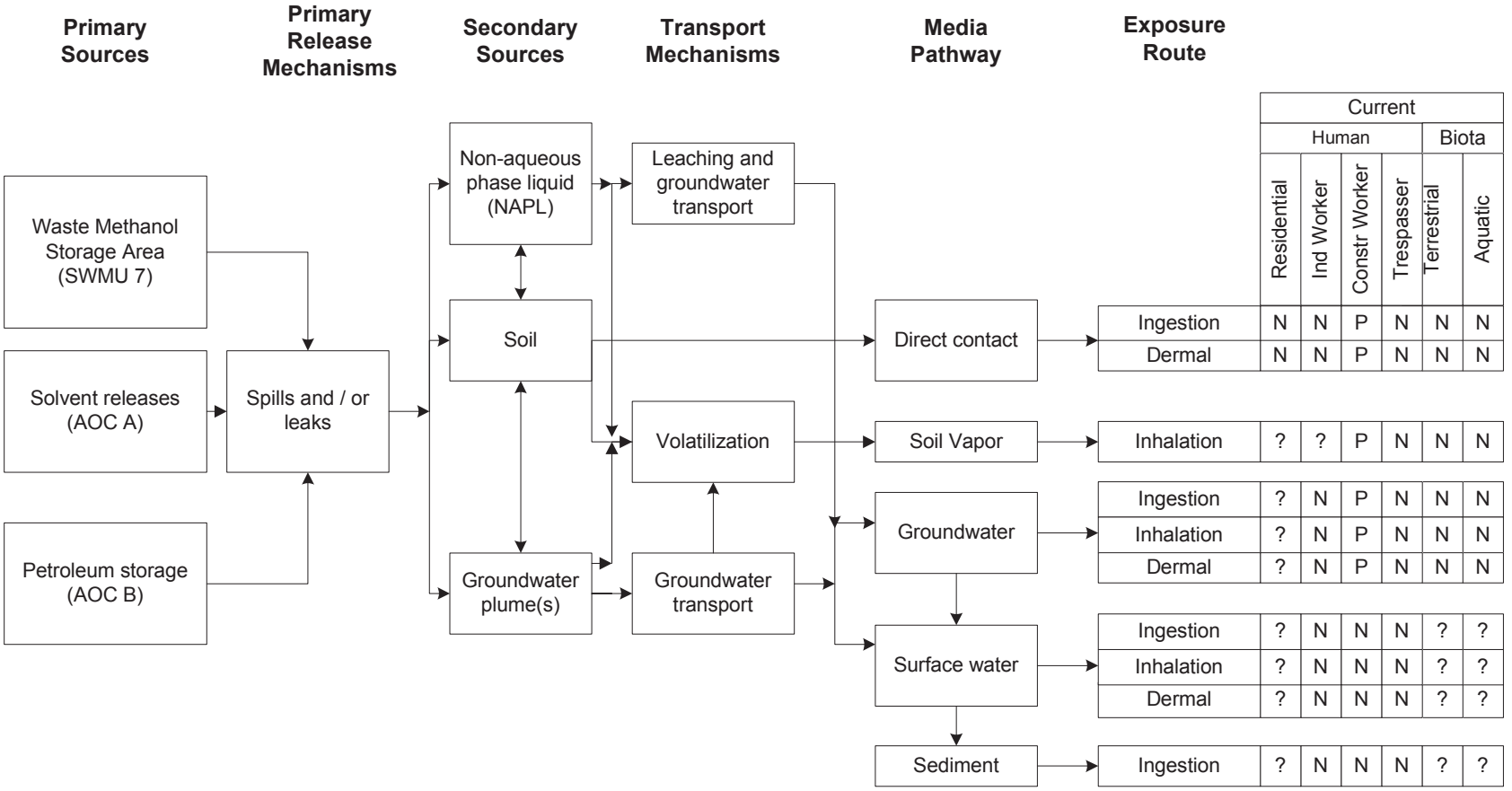
SCALE: 1" = 50'

FIGURE 11
SAMPLING PLAN–LANDFILL GROUNDWATER IMPACTS
RCRA FACILITY INVESTIGATION WORKPLAN
WELLMAN DYNAMICS CORPORATION
CRESTON, IOWA

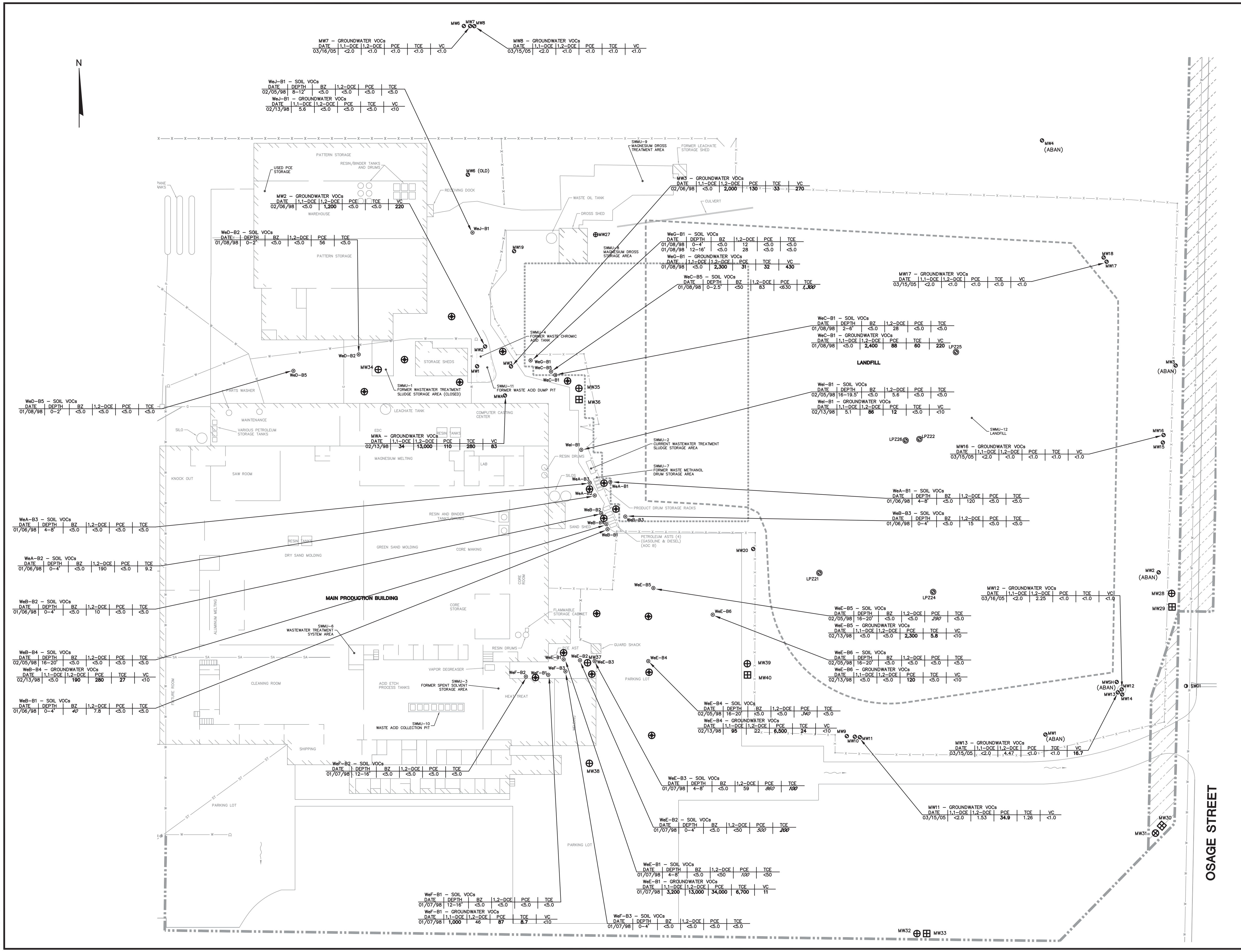
PROJECT NO. 2631
DRAWN BY: KP
CHECKED BY: SC
APPROVED BY:
DRAWN: 08/22/05
REVISED: 04/04/06

BT² inc.

Figure 12
Exposure Pathway Evaluation
VOC Release Areas (AOCs A&B and SMWU 7)
Sampling and Analysis Plan / Quality Assurance Project Plan
Wellman Dynamics, Creston, Iowa



N - Pathway not completed.
? - Pathway completion not known.
P - Pathway potentially completed.



LEGEND

Symbol	Description
WeI-B1	SOIL BORING
WeC-CS	COMPOSITE SAMPLE
MW12	MONITORING WELL
LPZ24	LEACHATE PIEZOMETER
SW01	SURFACE WATER MONITORING POINT
	PROPOSED WATER TABLE MONITORING WELL
	PROPOSED PIEZOMETER
	PROPOSED GEOPROBE BORING
	APPROXIMATE LANDFILL BOUNDARY
	APPROXIMATE RADIOLOGICAL INVESTIGATION AREA BOUNDARY
	APPROXIMATE PROPERTY LINE
	FACILITY PROPERTY WITH GRANTED EASEMENT
	FENCE
	GAS MAIN
	ABOVEGROUND PROPANE PIPING
	SANITARY SEWER
	STORM SEWER
	WATER MAIN
	HYDRANT
	SURFACE DRAINAGE
SWMU	SOLID WASTE MANAGEMENT UNIT (NOTE: SWMU 5 NOT SHOWN BECAUSE IT IS A FORMER PORTABLE TANK)
AOC	AREA OF CONCERN (NOTE: AOC A IS NOT IDENTIFIED AS A SPECIFIC POINT BECAUSE IT INCLUDES SEVERAL LOCATIONS OF VOC GROUNDWATER CONTAMINATION EAST AND NORTH OF THE MAIN BUILDING)
(ABAN)	ABANDONED MONITORING WELL

SOIL ANALYTICAL RESULTS LEGEND

BZ	BENZENE (μg/kg)
1,2-DCE	cis-1,2-DICHLOROETHENE (μg/kg)
PCE	TETRACHLOROETHENE (μg/kg)
TCE	TRICHLOROETHENE (μg/kg)

GROUNDWATER ANALYTICAL RESULTS LEGEND

1,1-DCE	1,1-DICHLOROETHENE (μg/l)
1,2-DCE	cis-1,2-DICHLOROETHENE (μg/l)
PCE	TETRACHLOROETHENE (μg/l)
TCE	TRICHLOROETHENE (μg/l)
VC	VINYL CHLORIDE (μg/l)

NOTES:

1. SEE FIGURE 2 FOR BASE MAP NOTES.
2. NOT ALL RESULTS SHOWN. DISPLAYED RESULTS ARE PRIMARY CONTAMINANTS OF CONCERN.
3. BOLD SOIL VALUES EXCEED INGESTION OR INHALATION EPA GENERIC SSLs.
4. BOLD GROUNDWATER VALUES EXCEED PRIMARY MCL.
5. ITALIC SOIL VALUES EXCEED MIGRATION TO GROUNDWATER EPA GENERIC SSLs.
6. BOLD AND ITALIC SOIL VALUES EXCEED INGESTION OR INHALATION PATHWAY AND MIGRATION TO GROUNDWATER EPA GENERIC SSLs.
7. DATA COMPILED FROM LABORATORY ANALYTICAL REPORTS DATED JANUARY 29, 1998; FEBRUARY 24, 1998; AND FEBRUARY 25, 1998, ANTECH, LTD., EXPORT, PENNSYLVANIA; MARCH 24, 2005, TEST AMERICA, CEDAR RAPIDS, IOWA.
8. GEOPROBE BORING AND MONITORING WELL LOCATIONS ARE APPROXIMATE AND ARE INTENDED TO SHOW THE CONCEPTUAL APPROACH. ACTUAL LOCATIONS WILL DEPEND ON SOIL SAMPLING RESULTS AS SAMPLING PROCEEDS AND ON ACCESS LIMITATIONS.
9. 17 OF 20 PROPOSED BORINGS SHOWN FOR VOC INVESTIGATION. REMAINING 3 BORING LOCATIONS WILL BE DETERMINED BASED ON FIELD RESULTS FROM THE FIRST 17 BORINGS.

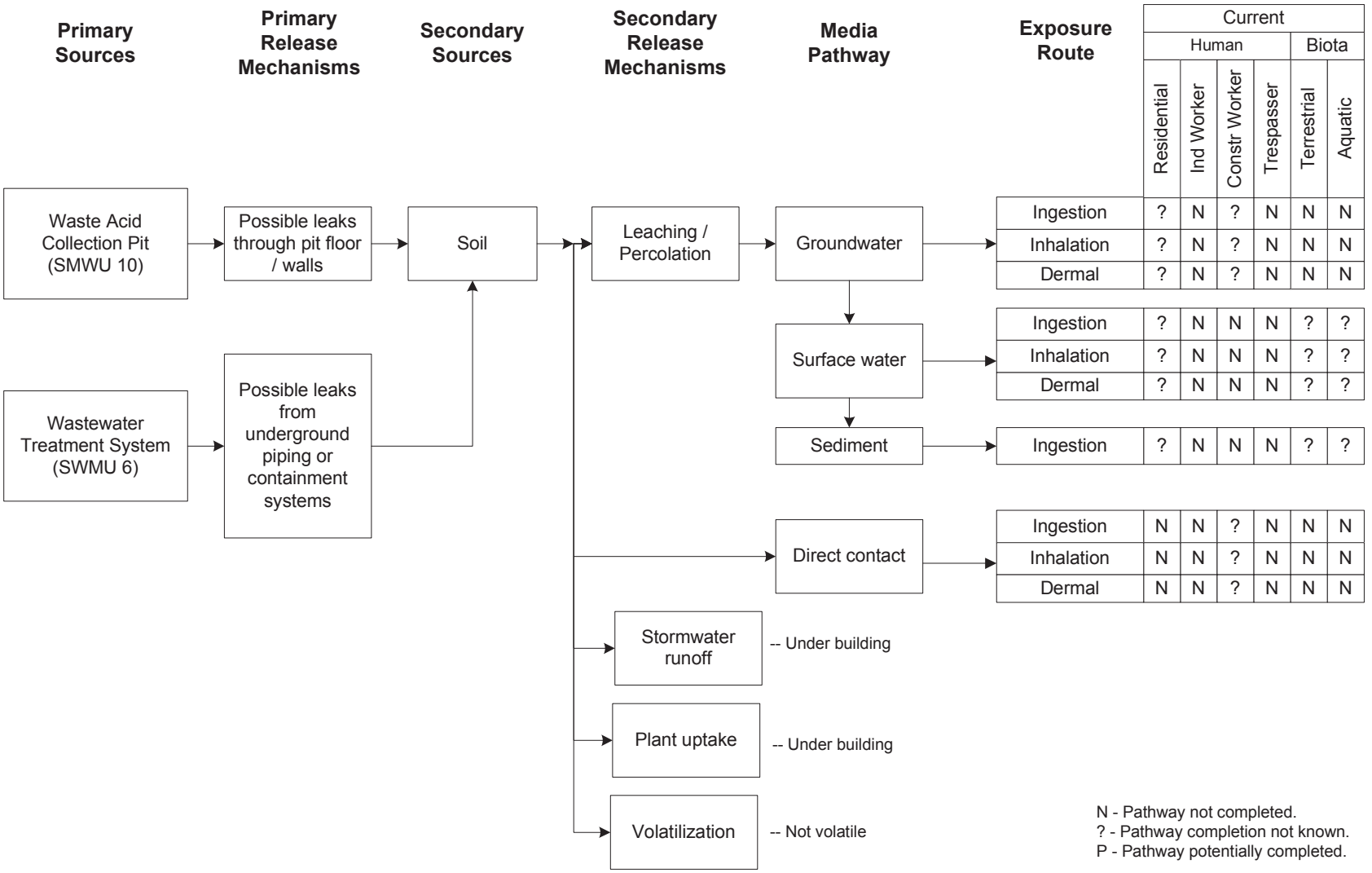
50 0 50

SCALE: 1" = 50'

FIGURE 13
SAMPLING PLAN – VOC RELEASE AREAS
RCRA FACILITY INVESTIGATION WORKPLAN
WELLMAN DYNAMICS CORPORATION
CRESTON, IOWA

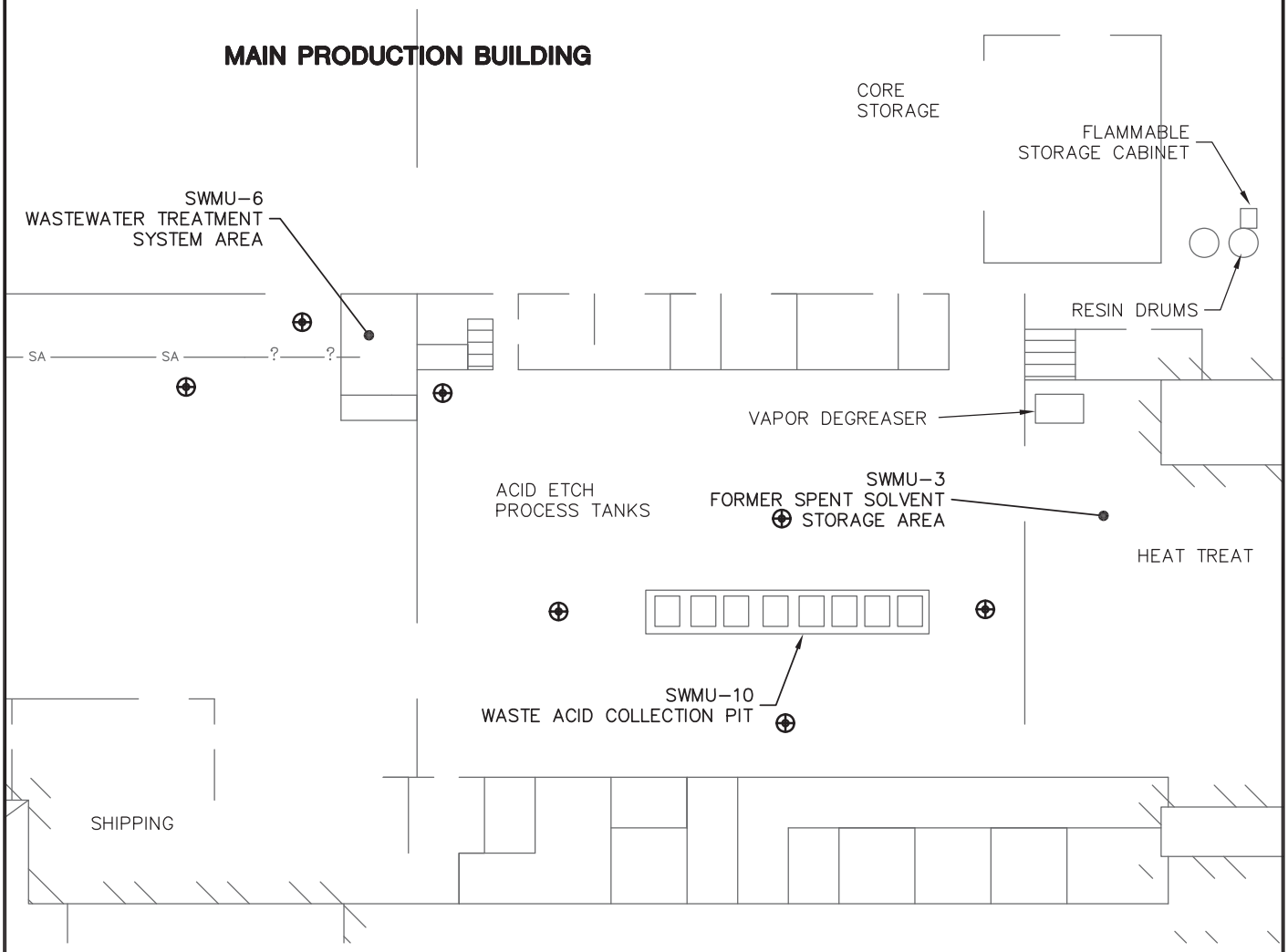
PROJECT NO. 2631	BT² inc.
DRAWN BY: KP	
CHECKED BY: SC	
APPROVED BY: SC	
DRAWN: 08/22/05	
REVISED: 04/04/06	

Figure 14
Exposure Pathway Evaluation
Wastewater Treatment System and Waste Acid Collection Pit Area (SMWUs 6 & 10)
Sampling and Analysis Plan / Quality Assurance Project Plan
Wellman Dynamics, Creston, Iowa



Exposure Route	Current					
	Human				Biota	
	Residential	Ind Worker	Constr Worker	Trespasser	Terrestrial	Aquatic
Groundwater – Ingestion	?	N	?	N	N	N
Groundwater – Inhalation	?	N	?	N	N	N
Groundwater – Dermal	?	N	?	N	N	N
Surface water – Ingestion	?	N	N	N	?	?
Surface water – Inhalation	?	N	N	N	?	?
Surface water – Dermal	?	N	N	N	?	?
Sediment – Ingestion	?	N	N	N	?	?
Direct contact – Ingestion	N	N	?	N	N	N
Direct contact – Inhalation	N	N	?	N	N	N
Direct contact – Dermal	N	N	?	N	N	N

N - Pathway not completed.
? - Pathway completion not known.
P - Pathway potentially completed.



N

LEGEND

⊕ PROPOSED GEOPROBE BORING

NOTES:

1. BORING LOCATIONS ARE APPROXIMATE. FINAL LOCATIONS WILL DEPEND ON ACCESS AND UNDERGROUND UTILITY LOCATIONS.
2. ADDITIONAL BORINGS MAY BE PERFORMED IF FIELD SCREENING OF PH IN GROUNDWATER INDICATES POTENTIAL CONTAMINATION.

40 0 40

SCALE: 1" = 40'

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CHECKED BY:	SC
APPROVED BY:	SC
DRAWN:	08/15/05
REVISED:	09/08/05

FIGURE 15
SAMPLING PLAN – WASTEWATER TREATMENT SYSTEM AND WASTE ACID COLLECTION PIT AREA
RCRA FACILITY INVESTIGATION WORKPLAN
WELLMAN DYNAMICS CORPORATION
CRESTON, IOWA

BT² inc.

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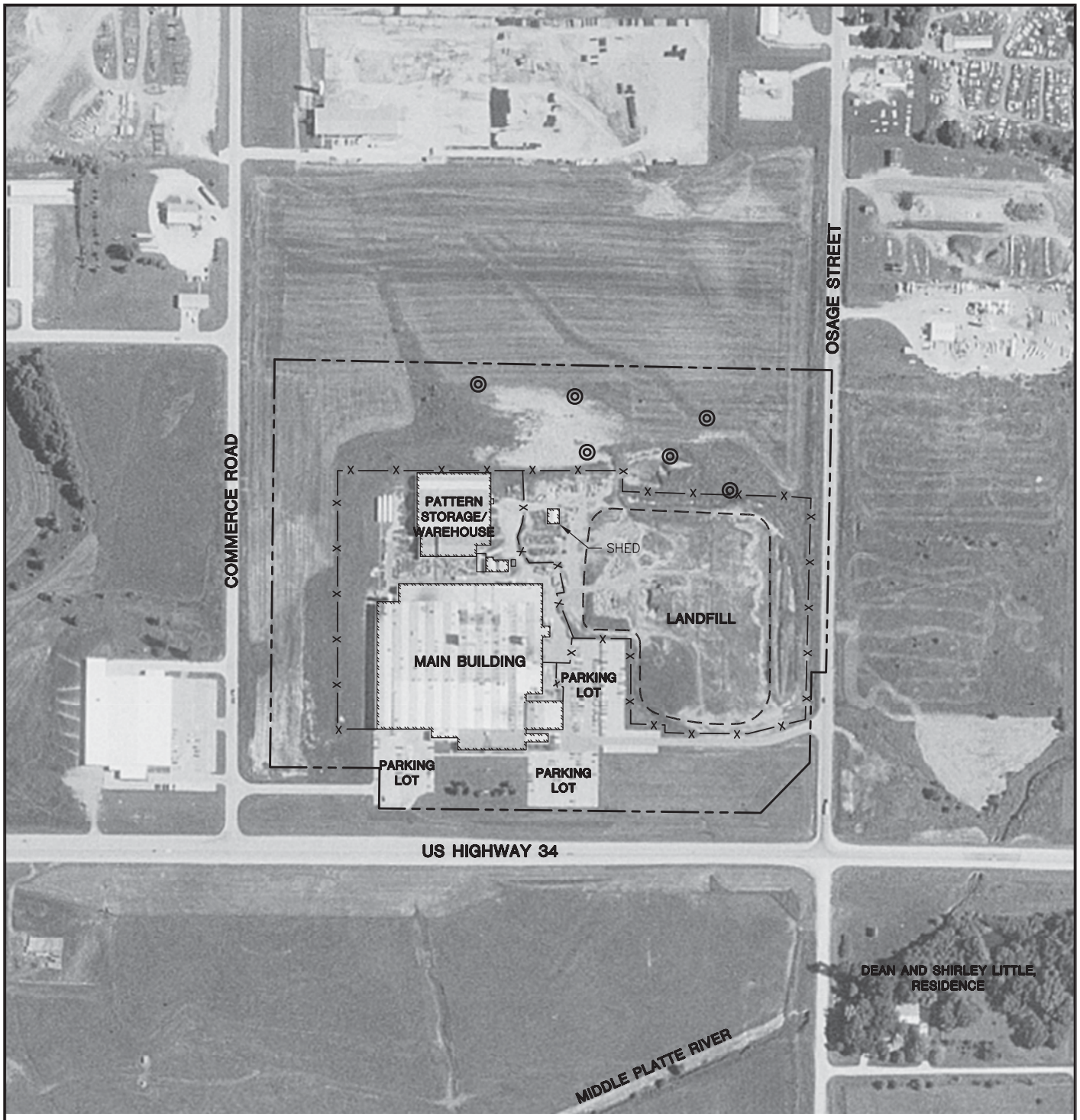

LEGEND

◎ PROPOSED BORING

N

400 0 400

SCALE: 1" = 400'

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APPROVED BY:	SC
DRAWN:	04/18/06
REVISED:	04/18/06

FIGURE 16
BACKGROUND SAMPLING LOCATIONS
RCRA FACILITY INVESTIGATION WORKPLAN
WELLMAN DYNAMICS CORPORATION
CRESTON, IOWA

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APPENDIX A

Resumes of Key Personnel

Penn E&R
Environmental & Remediation, Inc.

PROFESSIONAL PROFILE

RONALD F. DOUMONT, M.Agr.
DIRECTOR OF ENVIRONMENTAL SERVICES

Fields of Competence

- RCRA Facility Closure Activities including Planning, Implementation, and Certification Reporting.
- RCRA Corrective Action Programs – Facility Investigations, Corrective Measures Studies, and Risk Assessments.
- Expert Witness and Litigation Support.
- Routine Groundwater Monitoring and Reporting
- Low-Level Radiological Site Decommissioning and Final Status Surveys (SDMP Action Plan Criteria and MARSSIM Based)
- Coal Mining Services including Underground Mine and Associated Surface Activity Site Design and Permitting, Water Resource and Structure Inventories, Pre-Mining Property Surveys (Structure and Water Supplies); Geotechnical Studies, Subsidence Modeling and Mitigation Planning, and Site Construction QA Oversight

Credentials

- M.Agr., Agronomy/Soil Science, Pennsylvania State University.
- B.S., Environmental Resources Management, Pennsylvania State University – Soil Science Emphasis
- Radiation Worker Safety Training.
- OSHA 40-hour HAZWOPER Certification.
- OSHA 8-hour HAZWOPER Refresher Certifications.
- Troxler Nuclear Density Gauge Training Course

Experience Summary

Mr. Doumont has 29 years of environmental consulting experience in the areas of low-level radiological site characterization and decommissioning; state voluntary and Resource Conservation and Recovery Act (RCRA) programs including site facility investigation, corrective measures studies, risk assessment, and facility closure; Phase II environmental assessment; permitting and operational aspects of municipal, residual, and hazardous waste management; underground and surface activity site coal mine site design and permitting; and soil science studies. Mr. Doumont has considerable experience negotiating with local, state and federal agencies.

He has managed projects with budgets exceeding $1 million involving RCRA corrective actions and facility closures, low-level radiological site decommissioning activities, and coal mining site design and permitting. Mr. Doumont is also thoroughly experienced in the management of project staff. He has served as a project manager, group manager, and manager of technical services for a highly recognized western Pennsylvania environmental consulting firm.

Key Projects

Mr. Doumont has managed the RCRA facility investigation and closure of several former hazardous waste drum storage areas and two F019 surface impoundments located in central and northeastern Ohio.

He has managed the RCRA Corrective Action Programs (Facility Investigations, Corrective Measures Studies, and Risk Assessments) for former steel manufacturing facilities located in northwestern Pennsylvania and northeastern Ohio as well as a chemical processing facility located in southeastern Pennsylvania.

He has managed the low-level radiological decommissioning of an analytical testing facility located in New Jersey, two confidential research and testing facilities located in Pennsylvania, and a former aluminum processing plant located in Oklahoma.

He has managed a national routine groundwater monitoring and reporting contract for a client with over 30 industrial sites.

Mr. Doumont has managed and directed numerous underground and associated surface activity site coal mining site design and permitting projects over the last ten years for a major mining concern in southwestern Pennsylvania.

ROBERT ROACH, PE

SENIOR PROJECT ENGINEER

Mr. Roach is a Senior Project Engineer with more than six years of diversified experience serving the environmental and civil industries. His areas of expertise include site engineering and permitting, oral and written communication, report and presentation preparation, erosion and sediment (E&S) control and stormwater management design and inspections, and client relations.

AREAS OF EXPERTISE

Civil site design for public and private improvement projects

E&S control design, permitting and compliance inspections and reporting

Stormwater management plans, calculations and inspections and reporting

Waterline extension and replacement design

Underground and Surface Mining Permit Applications

Construction management

Funding applications and management

Report preparation and presentation

Field observations and inspections

Facility Investigation and Site Characterization

Water and soil sampling

EDUCATION/CREDENTIALS

Licensed Professional Engineer, PA, IA, OH

B.S., Environmental Engineering, Gannon University

OSHA 10-hour Construction Safety & Health Training

OSHA Confined Space Entry Construction Industry Certified

OSHA 24-Hour HAZWOPER Training

NASSCO PACP LACP MACP Certified

American Red Cross First Aid/CPR/AED Training

PROJECT EXPERIENCE

Project Management Experience

Mr. Roach has led and managed multiple infrastructure and industrial projects in Southwest Pennsylvania. He has taken these projects from conceptual discussions through securing project funding, design and permitting, bidding, and construction management. He has extensive experience with public grant applications, including PENNVEST. He has prepared technical specifications and bid documents and awarded projects to Contractors. Construction management has included submittal review, construction inspection, pay request review and submission, budget management, and client management.

Permitting Experience

Mr. Roach is experienced in helping design and permit many water, wastewater, and stormwater projects throughout southwest Pennsylvania. He is experienced with PADEP Joint, General, NPDES, SMCRA, and Public Water Supply Permit applications. He also has completed multiple PennDOT HOP's in multiple PennDOT districts. He provided technical design and field assistance for each project and communicated with the client, project managers, reviewing agency, and local officials.

Field Work Experience

Mr. Roach has inspected multiple infrastructure projects in southwest Pennsylvania. He is NASSCO certified and has inspected multiple sewer televising, lining, and separation projects. He has conducted soil, groundwater, and surface water sampling

Coal Mining Industry Experience

Mr. Roach has designed two waterline extensions for a coal client. The public water extensions provided water to air shafts, as needed. He also is experienced with SMCRA permitting, including the NPDES and E&S components of the applications. These projects include mine pool dewatering and slurry pipeline design.

Report and Plan Preparation

Mr. Roach has prepared, reviewed, and updated many reports and plans for public and private clients in multiple states. These include Act 537 Plans, Drought Contingency Plans, PPC Plans, SPCC Plans, SWPP Plans, Water Allocation Reports, MS4 Reporting, Municipal Wasteload Management Reports, and Emergency Response Plans

MATTHEW L. THELEN

1746 Commerce Road, Creston, Iowa 50801 | (641) 782-0283 | matt.thelen@wellmandynamics.com

PROFESSIONAL EXPERIENCE

Wellman Dynamics Corporation — Creston, IA

Industry leader in the production of highly complex precision aluminum and magnesium sand castings for the military and commercial aerospace industry.

Environmental Engineer **2007 – Present**

Facility Operations

- Manages Environmental activities within company policies and procedures while promoting business growth and development.
- Manages materials, staffing, machinery, and methods to ensure compliance with local, state, and federal Environmental regulations.
- Serves as the Company's liaison to local, state, and federal Environmental agencies.
- Active member of the facility Emergency Response Team

Landfill Operations

- Manages an onsite industrial landfill in accordance with state and permit requirements including; waste management, semi-annual compliance reviews, groundwater monitoring, leachate control, and reporting.
- Coordinates regulatory audits, monitoring, surveying, and reporting.
- Manages the facility landfill leachate collection and discharge system.
- Developed and directed ongoing beneficial use programs for utilizing previously landfilled materials. These programs have led to the excavation and removal of more than 80,000 tons of previously landfilled materials.
- Administers closure and post-closure landfill financial assurance requirements and coordinates compliance with facility management and financial controllers.

Water Quality

- Manages the facility waste water discharges in accordance with local municipal treatment agreements including; water treatment, landfill leachate, and total effluent.
- Manages the facility storm water discharges in accordance with the state discharge permit including; run-off prevention, sampling, and reporting.
- Manages the facility waste water treatment operations including; materials management, personnel management, sampling, and reporting.
- Manages the facility total effluent discharges including; equipment management, personnel management, sampling, and reporting.

Air Quality

- Manages the facility air quality and emissions in accordance with state and federal requirements including; construction permitting, Title V air permitting, emission reporting, and compliance reviews.
- Ensures all appropriate licenses, permits, and approvals are received for installing or modifying facility equipment.

Radioactive Materials

- Manages radioactive material activities in accordance with state regulations and license requirements including; material management, personnel training, compliance audits, groundwater monitoring, personnel monitoring, and waste disposal planning.
- Radiation Safety Officer and director of the facility Radiation Safety Committee.
- Administers the radioactive material decommissioning financial assurance requirements and coordinates compliance with facility management and financial controllers.

Waste and Material Management

- Manages EPCRA programs including; release reporting, Tier II reporting, and Toxic Release Inventory reporting.
- Manages facility solid waste and hazardous wastes programs in accordance with local, state, and federal requirements including; material management, training, disposal planning, and reporting.
- Manages scrap metal programs including; material management, sales, and scheduling.
- Manages recycling activities including; material management, sales, and scheduling.
- Directed the removal of hexavalent chromium from facility etching operations resulting in elimination of a hazardous material and hazardous waste stream.

RCRA Facility Investigation

- Facility and Technical Project Coordinator
- Coordinates project activities with state and federal authorities in accordance with approved workplans
- Directs, reviews, and verifies field activities and data in accordance with approved workplans.
- Prepares progress reports and coordinates data development and reporting.
- Administers the closure care financial assurance requirements and coordinates compliance with facility management and financial controllers.

EDUCATION, CERTIFICATIONS & PROFESSIONAL DEVELOPMENT

Education:

- Iowa State University — Ames, IA
  Bachelor of Science, Agricultural Engineering
  Graduated, May 2007

Certifications & Professional Development:

- State of Iowa Landfill Operator Certification
- DOT Hazmat Training
- RCRA Hazardous Waste and Emergency Response Training

APPENDIX B

Eurofins Quality Assurance/Quality Control Manual

eurofins | Environment Testing

Quality Assurance Manual Cover Page

Eurofins Cedar Falls

3019 Venture Way

Cedar Falls, IA 50613

Phone No. 319-277-2401

Fax No. 319-277-2425

https://www.eurofinsus.com/env

1) INTRODUCTION, SCOPE AND APPLICABILITY

1.1) Introduction and Compliance References

Eurofins Cedar Falls' Quality Assurance (QA) Manual is a document prepared to define the overall policies, organization objectives and functional responsibilities for maintaining the laboratory's Quality Management Program. Governing SOPs are in place within the organization to ensure the proper execution of this QA Manual. This manual is required reading for all personnel. Supporting SOPs are assigned reading for relevant personnel.

The laboratory is a team of people who work together to serve the health and environmental needs of society through science and technology. We offer comprehensive expertise in environmental laboratory applications and client relations with a focus on quality.

As such, this QA Manual has been prepared to assure compliance with the applicable versions of The NELAC Institute (TNI) Standard and ISO/IEC Guide 17025. Policies and procedures referenced in this document are compliant with the Eurofins Environment Testing (EET) National Business Line Support Center (NBLSC) procedures (refer to Appendix 1) and the various accreditation and certification programs which are held by the laboratory to support environmental work (refer to Appendix 2).

Refer to Appendix 3 for a list of additional references for which this QA Manual is compliant; and Appendix 4 for the compliance crosswalk of this manual to the TNI Standard & ISO/IEC Guide 17025 requirements.

1.2) Terms and Definitions

A Quality Management Program is a system designed to ensure that data produced by the laboratory conforms to the standards set by state and/or federal regulations. The program functions at the local management level through company goals, from guidance at the executive management level, and at the analytical level through Standard Operating Procedures (SOPs) and quality control. Our program is designed to minimize systematic error, encourage constructive, documented problem solving, and provide a framework for continuous improvement within the organization to better serve our clients.

Specific terms and acronyms used in the laboratory are defined in the corresponding procedures, identified in the analysis reports, and/or addressed in the referenced regulatory/method documents. An overall listing is provided in the NBLSC Document *NDSC-QA-FRM68791* - Common Terms, Definitions, and Acronyms.

1.3) Scope / Fields of Testing

The laboratory analyzes a broad range of environmental and industrial samples. Sample matrices vary among air, drinking water, effluent water, groundwater, hazardous waste, sludge and soils. The Quality Management Program contains specific procedures and methods to test samples of differing matrices for chemical, physical and biological parameters. The Quality Management Program also contains guidelines on maintaining documentation of analytical processes, reviewing results, servicing clients and tracking samples through the laboratory. The technical and service requirements of all analytical requests are thoroughly evaluated before commitments are made to accept the work. Measurements are made using published reference methods or methods developed and validated by the laboratory.

The methods covered by this manual include the most frequently requested methodologies needed to provide analytical services in the United States and its territories. The specific list of test methods used by the laboratory can be found in the Laboratory Information Management System (LIMS). Our areas of expertise include:

Standard Services	Specialty Services
• Volatiles • Semivolatiles • Metals • Pesticides/PCBs • Petroleum Hydrocarbons • Waste Characterization • Non-Potable Water Testing • Drinking Water Testing • Soil and Surface Water Testing	• Agricultural Chemicals

Note: Current certificates and scopes of accreditation are available on the laboratory's website at https://www.eurofinsus.com/env.

The approach of this manual is to define the minimum level of quality assurance and quality control necessary to meet these requirements. All methods performed by the laboratory shall meet these criteria as appropriate. In some instances, quality assurance project plans (QAPPs), project-specific data quality objectives (DQOs) or local regulations may require criteria other than those contained in this manual. In these cases, the laboratory will abide by the requested criteria following review and acceptance of the requirements by the laboratory's Business Unit Manager (BUMA) and the Quality Assurance (QA) Manager. In some cases, QAPPs and DQOs may specify less stringent requirements.

The BUMA and the QA Manager must determine if it is in the laboratory's best interest to follow the less stringent requirements.

1.4) Quality Manual Review Process

The template on which this manual is based is reviewed annually by the NBLSC Quality Assurance leadership team. NBLSC-QA will assure that the template complies with Sec. 1.1.

This manual itself is reviewed at a minimum every two years by senior laboratory management to assure that it reflects current practices and meets the requirements of the laboratory's clients and regulators, but more frequent review is also acceptable (e.g., annually to coincide with the release of the new template). Occasionally, the manual may need changes in order to meet new or changing regulations and operations. The QA Manager (or designee) will review the changes in the normal course of business and incorporate changes into revised sections of the document. All updates will be reviewed by the designated senior laboratory management staff. The laboratory updates and approves such changes in accordance with our Document Control & Updating procedures (refer to laboratory SOP No. *CED-Q-DC-SOP42896*).

2) MANAGEMENT AND RESPONSIBILITIES

2.1) Overview

The Eurofins Cedar Falls laboratory is an independent business unit of Eurofins Environment Testing North Central, LLC ("EETNC"). EETNC is a wholly owned subsidiary of Eurofins Environment Testing America Holdings, Inc., which is in turn a wholly owned subsidiary of Eurofins Scientific, S.E., a publicly traded company. The laboratory's operational and support staff have the day-to-day independent operational authority under the direction of the BUMA. The laboratory's quality system is managed under the oversight of the QA Manager and is supported by the NBLSC-QA leadership team. The laboratory's management staff includes managers, supervisors, and group leaders.

The organizational chart of laboratory personnel is provided in the laboratory document *CED-G-OC-WI67245*.

2.2) Roles and Responsibilities

In order for the Quality Management Program to function properly, all members of the staff must clearly understand and meet their individual responsibilities as they relate to the quality program. The responsibility for quality resides with every employee of the laboratory. All employees have access to the QA Manual, are trained to this manual, and are responsible for upholding the standards therein. Each person carries out his/her daily tasks impartially and in a manner consistent with the goals and in accordance with the procedures in this manual and the laboratory's SOPs. The following descriptions briefly define key roles and their relationship to the Quality Management Program. Detailed job descriptions for all laboratory positions are maintained by Eurofins NSC HR.

2.2.1) Vice President of Quality and Environmental Health and Safety (VP-QA/EHS)

The Vice President (VP) of QA/EHS reports directly to Eurofins Environment Testing's Chief Operating Officer (COO). With the aid of the NBLSC Quality Team Members, Business Unit Managers and/or Laboratory Directors, the VP-QA/EHS has the responsibility for the establishment, general overview and maintenance of the Quality Assurance and EHS Programs within Eurofins Environment Testing.

Additional responsibilities include:

- Review of QA/QC and EHS aspects of NBLSC Official Documents, national projects, and expansions or changes in services.
- Work with various organizations outside of the Company to further the development of quality standards and represent the Company at various trade meetings.
- Prepare monthly reports for QA and EHS metrics across the environmental testing laboratories and a summary of any QA- and EHS-related initiatives and issues.
- With the assistance of Executive Management and the EHS Managers, maintenance and implementation of Eurofins Environment Testing's Environmental Health and Safety Program.

2.2.2) Quality Directors

There are four (4) Quality Directors within NBLSC that report directly to the VP-QA/EHS. These Quality Directors have oversight of the general overview and maintenance of the Quality Management Program within the Eurofins Environment Testing laboratories.

Supported tasks include:
- Monitor laboratory internal audit findings.
- Identify common laboratory weaknesses and monitor corrective action closures.
- Develop NBLSC quality guidance documents and management tools for ensuring and improving compliance.
- Monitor and communicate regulatory and certification requirements.
- Training and OnBoarding
- Laboratory assessments, mentoring, and interventions.
- Track/drive root cause investigations and corrective action plans.
- Build knowledge base for preventive actions.

2.2.3) Quality Information Manager

The Quality Information Manager works directly with the NBLSC Quality Directors and EHS Managers; and reports directly to the VP-QA/EHS.

The Quality Information Manager is responsible for the management of:
- NBLSC Official Documents.
- TALS/LIMS Certification Module Data.
- Company's Intranet Website.
- Company's Regulatory Limits Database.
- Subcontract laboratory and approved vendor information.
- Internal and External client support for various company groups (e.g., Client Services, EHS, Legal, IT, Sales) for both quality and operational functions.
- Communicate regulatory information and lists.

2.2.4) Environmental Health and Safety (EHS) Managers

There are three (3) EHS Managers within NBLSC that report directly to the VP-QA/EHS. These EHS Managers have oversight of the general overview and maintenance of the EHS Program within the Eurofins Environment Testing laboratories.

Supported tasks include:
- Consolidation and tracking all safety and health-related information and reports for the company, and managing compliance activities for Eurofins Environment Testing locations.
- Coordination/preparation of the Environmental Health and Safety Manual Template that is used by each laboratory to prepare its own laboratory-specific Safety Manual/Chemical Hygiene Plan.
- Preparation of information and training materials for laboratory EHS Coordinators.
- Assistance in the coordination of employee exposure and medical monitoring programs to ensure compliance with applicable safety and health regulations.
- Serving as Department of Transportation (D.O.T.) focal point and providing technical assistance to location management.

- Serving as Hazardous Waste Management main contact and providing technical assistance to location management.

2.2.5) Ethics and Compliance Officer (ECO)

Both the NBLSC VP-QA/EHS and Corporate Counsel are designated to fulfill the role of Ethics and Compliance Officer (ECO). Each ECO acts as a back-up to the other ECO and both are involved when data investigations occur. Each ECO has a direct line of communication to the entire executive management personnel and laboratory management staff.

The ECOs monitor and audit procedures to determine compliance with policies and to make recommendations for policy enhancements to the President, COO, BUMA or other appropriate individuals within the Company. The ECOs will assist the laboratory QA Manager in the coordination of internal auditing of ethical policy related activities and processes within the laboratory, in conjunction with the laboratory's regular internal auditing function.

The ECOs will also participate in investigations of alleged violations of policies and work with the appropriate internal departments to investigate misconduct, remedy the situation, and prevent recurrence of any such activity.

2.2.6) Business Unit Manager (BUMA)

The Business Unit Manager (BUMA) is responsible for the overall quality, safety, financial, technical, human resource and service performance of the whole laboratory and reports to his/her President. (At the Eurofins Cedar Falls laboratory, the term BUMA is synonymous with the term "Laboratory Director"; at other locations, the BUMA and Laboratory Director may be separate positions.) The BUMA is also responsible for any service centers connected with the laboratory. The BUMA provides the resources necessary to implement and maintain an effective and comprehensive Quality Assurance and Data Integrity Program.

Specific responsibilities include, but are not limited to:

- Designates one or more technical managers for the appropriate fields of testing. If the Technical Manager is absent for a period of time exceeding 15 consecutive calendar days, the BUMA must designate another full time staff member meeting the qualifications of the Technical Manager to temporarily perform this function. If the absence exceeds 35 consecutive calendar days, the primary accrediting authority must be notified in writing.
- Ensures that all analysts and supervisors have the appropriate education and training to properly carry out the duties assigned to them and ensure that this training has been documented. Work with Eurofins Environment Testing Human Resources for hiring of new personnel.
- Ensures that personnel are free from any commercial, financial and other undue pressures which might adversely affect the quality of their work.
- Ensures Company human resource policies are adhered to and maintained.
- Ensures that sufficient numbers of qualified personnel are employed to supervise and perform the work of the laboratory. Assesses laboratory capacity and workload.
- Ensures that appropriate corrective actions are taken to address analyses identified as requiring such actions by internal and external performance or procedural audits. Procedures that do not meet the standards set forth in the QA Manual or laboratory SOPs may be temporarily suspended by the BUMA.
- Reviews and approves all SOPs prior to their implementation and ensures all approved SOPs are implemented and adhered to.
- Pursues and maintains appropriate laboratory certification and contract approvals. Supports TNI Standard and ISO 17025 requirements.
- Ensures client specific reporting and quality control requirements are met.
- Contributes to the continuous improvement of the laboratory operations.
- Maintains an awareness of technical developments and regulatory requirements.
- Captains the laboratory's senior management team, consisting of the QA Manager, the Technical Manager(s), and the Client Service Manager as direct reports.

2.2.7) Quality Assurance Manager

The QA Manager has responsibility and authority to ensure the continuous implementation of the quality system at the laboratory where he/she works. The QA Manager is also responsible for any service centers connected with his/her laboratory that perform analytical tests, such as short holding time analyses for pH.

The QA Manager reports directly to the BUMA and his/her NBLSC Quality Director. This position is able to evaluate data objectively and perform assessments without outside (e.g., managerial) influence. The NBLSC-QA team may be used as a resource in dealing with regulatory requirements, certifications and other quality assurance related items.

The QA Manager directs the activities of the QA staff to accomplish specific responsibilities which include, but are not limited to:

- Serves as the focal point for QA/QC in the laboratory.
- Has functions independent from laboratory operations for which he/she has quality assurance oversight.
- Has documented training and/or experience in QA/QC procedures and the laboratory's Quality Management System.
- Has a general knowledge of the analytical test methods for which data audit/review is performed (and/or having the means of getting this information when needed).
- Arranges for or conducts internal audits on quality systems and the technical operation.
- Notifying laboratory management of deficiencies in the quality system and ensure corrective action is taken. Procedures that do not meet the standards set forth in the QA Manual or laboratory SOPs shall be investigated following procedures outlined in Section 12 and if deemed necessary may be temporarily suspended during the investigation.
- Maintains and updates the QA Manual.
- Monitors and evaluates laboratory certifications; schedules proficiency testing samples.
- Monitors and communicates regulatory changes that may affect the laboratory to management.
- Trains and advises the laboratory staff on quality assurance/quality control procedures that are pertinent to their daily activities.
- Maintains records of all ethics-related training, including the type and proof of attendance.
- Maintains, improves, and evaluates the corrective action database and the corrective and preventive action systems.
- Objectively monitors standards of performance in quality control and quality assurance without outside (e.g., managerial) influence.
- Coordinates document control of SOPs, MDLs, control limits, and miscellaneous forms and information.
- Performs technical data audits and method audits to ensure consistency and compliance with regulatory requirements.
- Reviews external audit reports and data validation requests.
- Follows up with audits to ensure client QAPP requirements are met.
- Establishes reporting schedule and preparation of various quality reports for the BUMA, clients, and/or the NBLSC-QA Team.
- Develops suggestions and recommendations to improve quality systems.
- Researches current state and federal requirements and guidelines.
- Participates in the vendor and supplier approval process, including subcontractors.
- Captains the QA team to enable communication and to distribute duties and responsibilities.
- Communicates to the relevant regulatory authorities when there are management or facility changes that impact the laboratory.
- Ensures communication & monitoring standards of performance to ensure that systems are in place to produce the level of quality as defined in this document.
- Evaluates the thoroughness and effectiveness of training.
- Supports TNI Standard and ISO 17025 requirements.

2.2.8) Technical Manager / Operations Manager

The Technical Manager, also known as the Operations Manger, reports directly to the BUMA. He/she is accountable for all analyses and analysts under their experienced supervision and for compliance with the TNI Standard and ISO 17025. The scope of responsibility ranges from the new-hire process and

existing technology through the ongoing training and development programs for existing analysts and new instrumentation.

Specific responsibilities include, but are not limited to:

- Exercises day-to-day supervision of laboratory operations for the appropriate field of accreditation and reporting of results. Coordinates, writes, and reviews preparation of all test methods, i.e., SOPs, with regard to quality, integrity, regulatory and optimum and efficient production techniques, and subsequent analyst training and interpretation of the SOPs for implementation and unusual project samples. Ensures that the SOPs are properly managed and adhered to at the bench. Develops standard costing of SOPs to include supplies, labor, overhead, and capacity (design vs. demonstrated versus first-run yield) utilization.
- Reviews and approves, with input from the QA Manager, proposals from marketing, in accordance with an established procedure for the review of requests and contracts. This procedure addresses the adequate definition of methods to be used for analysis and any limitations, the laboratory's capability and resources, the client's expectations. Differences are resolved before the contract is signed and work begins. A system documenting any significant changes is maintained, as well as pertinent discussions with the client regarding their requirements or the results of the analyses during the performance of the contract. All work subcontracted by the laboratory must be approved by the client. Any deviations from the contract must be disclosed to the client. Once the work has begun, any amendments to the contract must be discussed with the client and so documented.
- Monitors the validity of the analyses performed and data generated in the laboratory. This activity begins with reviewing and supporting all new business contracts, ensuring data quality, analyzing internal and external non-conformances to identify root cause issues and implementing the resulting corrective and preventive actions, facilitating the data review process (training, development, and accountability at the bench), and providing technical and troubleshooting expertise on routine and unusual or complex problems.
- Provides training and development programs to applicable laboratory staff as new hires and, subsequently, on a scheduled basis. Training includes instruction on calculations, instrumentation management to include troubleshooting and preventive maintenance.
- Enhances efficiency and improves quality through technical advances and improved LIMS utilization. Capital forecasting and instrument life cycle planning for second generation methods and instruments as well as asset inventory management.
- Coordinates sample management from "cradle to grave," ensuring that no time is lost in locating samples.
- Schedules all QA/QC-related requirements for compliance, e.g., MDLs, etc.
- Captains department personnel to communicate quality, technical, personnel, and instrumental issues for a consistent team approach.
- Coordinates audit responses with the QA Manager.
- Supports TNI Standard and ISO 17025 requirements.

2.2.9) Client Service Manager

The Client Service Manager reports to the BUMA and serves as the interface between the laboratory's technical departments and the laboratory's clients. The staff consists of the Client Services/Project Management Group.

The functions of this position include:

- Technical training and growth of the Project Management team.
- Technical liaison for the Project Management team.
- Human resource management of the Project Management team.
- Has signature authority for laboratory reports.
- Assesses and assures customer satisfaction.
- Provides feedback to management on changing customer needs.
- Works with the Department Managers and/or Analysts/Technicians to ensure the requirements of projects are met in a timely manner.
- Organizes bid activities for prospective new projects and clients.

2.2.10) Project Manager (PM) / Project Management Assistant (PMA)

Members of the laboratory's Client Services/Project Management Group are responsible for organizing and managing client projects. Clients are assigned a project manager who serves as their primary contact at the laboratory. It is the PM/PMA's responsibility to act as the client advocate by communicating client requirements to laboratory personnel and ensuring that clients provide complete information needed by the laboratory to meet those requirements – including all verbal communications. There is an entire staff of Project Managers and Project Management Assistants that make up the Client Services/Project Management Group.

With the overall goal of total client satisfaction, the functions of this position include:

- Scheduling sample submissions, sample container orders and sample pick-up via the laboratory courier service.
- Confirming certification status.
- Coordinating and communicating turnaround time (TAT) requirements for high priority samples/projects.
- Answering common technical questions, facilitating problem resolution and coordinating technical details with the laboratory staff.
- Ensuring that client specifications, when known, are met by communicating project and quality assurance requirements to the laboratory.
- Notifying the supervisors of incoming projects and sample delivery schedules.
- Accountable to clients for communicating sample status reports or results prior to receipt of the final report.
- Monitor the status of all data package projects in-house to ensure timely and accurate delivery of reports.
- Inform clients of data package-related problems and resolve service issues.
- Has signature authority for laboratory reports.

2.2.11) Department Supervisors / Managers

Department Supervisors and Managers report to the Technical Manager. Each one is responsible to:

- Ensure that analysts in their department adhere to applicable SOPs and the QA Manual. They perform frequent SOP and QA Manual review to determine if analysts are in compliance and if new, modified, and optimized measures are feasible and should be added to these documents.
- With regard to analysts, participates in the selection, training (as documented in Section 3.3), development of performance objectives and standards of performance, appraisal (measurement of objectives), scheduling, counseling, discipline, and motivation of analysts and documents these activities in accordance with systems developed by the QA and Personnel Departments. They evaluate staffing sufficiency and overtime needs. Training consists of familiarization with SOP, QC, Safety, and computer systems.
- Encourage the development of analysts to become cross-trained in various methods and/or operate multiple instruments efficiently while performing maintenance and documentation, self-supervise, and function as a department team.
- Provide guidance to analysts in resolving problems encountered daily during sample prep/analysis in conjunction with the Technical Manager and/or QA Manager. Each is responsible for 100% of the data review and documentation, non-conformance and corrective action issues, the timely and accurate completion of performance evaluation samples and MDLs, for his/her department.
- Ensure all logbooks are maintained, current, and properly labeled or archived.
- Report all non-conformance conditions to the QA Manager, Technical Manager, and/or BUMA.
- Ensure that preventive maintenance is performed on instrumentation as detailed in the QA Manual or SOPs. He/she is responsible for developing and implementing a system for preventive maintenance, troubleshooting, and repairing or arranging for repair of instruments.
- Maintain adequate and valid inventory of reagents, standards, spare parts, and other relevant resources required to perform daily analysis.
- Achieve optimum turnaround time on analyses and compliance with holding times.
- Conduct efficiency and cost control evaluations on an ongoing basis to determine optimization of labor, supplies, overtime, first-run yield, capacity (designed vs. demonstrated), second- and third-generation production techniques/instruments, and long-term needs for budgetary planning.
- Develop, implement, and enhance calibration programs.
- Provide written responses to external and internal audit issues.

2.2.12) EHS Specialist

The EHS Specialist serves in a combined role as the laboratory's Safety Officer—also known as the Environmental Health and Safety Coordinator (EHSC)—and the laboratory's Waste Coordinator. The EHS Specialist reports to the BUMA and his/her NBLSC EHS Manager and ensures that systems are maintained for the safe operation of the laboratory, as well as ensuring that waste disposal systems and processes are maintained to ensure compliance with all local, state, and federal hazardous waste regulations.

Specific responsibilities of the EHS Specialist include, but are not limited to:

- Conduct ongoing, necessary safety training and conduct new employee safety orientation.
- Assist in developing and maintaining the Chemical Hygiene Plan/Safety Manual.
- Administer dispersal of all material Safety Data Sheet (SDS) information.
- Perform regular chemical hygiene and housekeeping instruction.
- Give instruction on proper labeling and practice.
- Serve as chairperson of the laboratory safety committee.
- Provide and train personnel on protective equipment.
- Oversee the inspection and maintenance of general safety equipment – fire extinguishers, safety showers, eyewash fountains, etc. and ensure prompt repairs as needed.
- Supervise and schedule fire drills and emergency evacuation drills.
- Measure and record ventilation hood velocities according to the laboratory's schedule and procedures. Follow-up and/or schedule repair if ventilation hoods do not meet laboratory criteria.
- Determine what initial and subsequent exposure monitoring, if necessary to determine potential employee exposure to chemicals used in the laboratory.
- When determined necessary, conduct exposure monitoring assessments.
- Determine when a complaint of possible over-exposure is “reasonable” and should be referred for medical consultation.
- Assist in the internal and external coordination of the medical consultation/monitoring program conducted by Eurofins medical consultants.
- Stay current in knowledge of hazardous waste regulations.
- Maintain continued training on hazardous waste issues.
- Review and update annually the Hazardous Waste Contingency Plan in the Environmental Health and Safety Manual (EHSM).
- Audit staff with regard to compliance with the Hazardous Waste Contingency Plan.
- Contact hazardous waste subcontractors for review of procedures and opportunities for minimization of waste.
- Manage waste generated by the facility and organize waste streams for pickup by a licensed hazardous waste management contractor.

2.2.13) Laboratory Analysts

Laboratory analysts are responsible for conducting analysis and performing all tasks assigned to them by the Operations Manager, group leader or supervisor.

The responsibilities of the analysts are listed below:

- Perform analyses by adhering to analytical and quality control protocols prescribed by current SOPs, this QA Manual, and project-specific plans honestly, accurately, timely, safely, and in the most cost-effective manner.
- Document standard and sample preparation, instrument calibration and maintenance, data calculations, sample matrix effects, and any observed non-conformance on worklists, benchsheets, laboratory notebooks and/or the Non-Conformance Database.
- Report all non-conformance situations, instrument problems, matrix problems and QC failures, which might affect the reliability of the data, to their supervisor, the Technical Manager, and/or the QA Manager or member of QA staff.
- Perform 100% review of the data generated prior to entering and submitting for secondary level review.
- Suggest method improvements to their supervisor, the Technical Manager, and the QA Manager. These improvements, if approved, will be incorporated. Ideas for the optimum performance of

their assigned area, for example, through the proper cleaning and maintenance of the assigned instruments and equipment, are encouraged.
- Work cohesively as a team in their department to achieve the goals of accurate results, optimum turnaround time, cost effectiveness, cleanliness, complete documentation, and personal knowledge of environmental analysis.

2.2.14) Sample Receiving / Shipping Staff

Sample Receiving staff report to the Client Service Manager; Shipping staff report to the EHS Specialist.

The responsibilities include:
- Ensure implementation of proper sample receipt procedures, including maintenance of chain-of-custody.
- Report non-conformances associated with condition-upon-receipt of samples.
- Log incoming samples into the LIMS.
- Ensure that all samples are stored in the proper environment.
- Ensure the verification of data entry from login.
- Responsible for meeting quality requirements including documenting preservation.
- Responsible for ensuring the timely and correct shipment of sample containers, including proper preservatives and instructions, to clients.

2.3) Business Continuity and Contingency Plans

Various policies and practices are in place to address continuity of business and contingency plans to ensure continued operations or minimal disruption in operations should unplanned events (natural disasters, unexpected management changes, etc.) occur. Deputies are identified for all key management personnel. Deputies would temporarily fill a role if the primary is absent for more than 15 consecutive calendar days. The deputies must meet the same qualifications as the primary person should they be required to take on the responsibilities. The BUMA and/or QA Manager communicates to the relevant regulatory authorities when there are management or facility changes that impact the laboratory. Changes in the Technical Manager must be communicated within a period of time and in the manner dictated by each regulatory authority.

The following table defines who assumes the responsibilities of key personnel in their absence:

Key Personnel	Deputy
Business Unit Manager (BUMA)	Business Controller
QA Manager	BUMA
Technical Manager (Operations Manager)	BUMA
Department Supervisor/Manager	Technical Manager (Operations Manager)
EHS Specialist	BUMA
Client Service Manager	Designated Project Manager

3) PERSONNEL

3.1) Overview

The laboratory's management believes that its highly qualified and professional staff is the single most important aspect in assuring a high level of data quality and service. The staff consists of professionals

and support personnel. The laboratory employs sufficient personnel with the necessary education, training, technical knowledge and experience for their assigned responsibilities.

All personnel must demonstrate competence in the areas where they have responsibility. Any staff that is undergoing training shall have appropriate supervision until they have demonstrated their ability to independently perform their job functions. Staff shall be qualified for their tasks based on appropriate education, training, experience and/or demonstrated skills as required.

All personnel are responsible for complying with all QA/QC requirements that pertain to the laboratory and their area of responsibility. Each staff member must have a combination of experience and education to adequately demonstrate a specific knowledge of their particular area of responsibility. Technical staff must also have a general knowledge of lab operations, test methods, QA/QC procedures and records management.

Laboratory management is responsible for formulating goals for staff with respect to education, training and skills and ensuring that the laboratory has a policy and procedures for identifying training needs and providing training of personnel. The training shall be relevant to the present and anticipated responsibilities of the lab staff.

The laboratory only uses personnel that are employed by or under contract to, the laboratory. Contracted personnel, when used, must meet competency standards of the laboratory and work in accordance to the laboratory's quality system.

3.2) Education and Experience Requirements for Technical Personnel

The laboratory makes every effort to hire analytical staff members that possess a college degree (AA, BA, BS) in an applied science with some chemistry in the curriculum. Exceptions can be made based upon the individual's experience and ability to learn. Selection of qualified candidates for laboratory employment begins with documentation of the minimum levels of education, training, and experience needed to perform the prescribed task. Minimum education and training requirements for laboratory employees are outlined in job descriptions maintained by the Eurofins Environment Testing Human Resources group.

Experience and specialized training are occasionally accepted in lieu of a college degree (basic lab skills such as using a balance, colony counting, aseptic or quantitation techniques, etc., are also considered).

As a general rule for analytical staff:

Specialty	Education	Experience
Extractions, Digestions, some electrode methods (pH, DO, Redox, etc.), or Titrimetric and Gravimetric Analyses	H.S. Diploma	On the job training (OJT)
CVAA, Single component or short list Chromatography (e.g., Fuels, GC-BTEX, IC)	A college degree in an applied science or 2 years of college and at least 1 year of college chemistry	Or 2 years prior analytical experience is required
ICP, ICPMS, Long List or complex chromatography (e.g., Pesticides, PCBs, etc.), GCMS	A college degree in an applied science or 2 years of college chemistry	Or 5 years of prior analytical experience
Spectra Interpretation	A college degree is an applied science or 2 years of college chemistry	And 2 years relevant experience, Or 5 years of prior analytical experience
Technical Manager – General	Bachelor's degree in an applied science or engineering with 24	And 2 years experience in environmental analysis of

	semester hours in chemistry An advanced (MS, PhD.) degree may substitute for one year of experience	representative analytes for which they will oversee
Technical Manager – Wet Chemistry only (no advanced instrumentation)	Associates degree in an applied science or engineering or 2 years of college with 16 semester hours in chemistry	And 2 years relevant experience
Technical Manager - Microbiology	Bachelor's degree in an applied science with 16 semester hours in general microbiology and biology An advanced (MS, PhD.) degree may substitute for one year of experience	And 2 years relevant experience

When an analyst does not meet these requirements, they can perform a task under the direct supervision of a qualified analyst, peer reviewer or Technical Manager, and are considered an analyst-in-training. The person supervising an analyst-in-training is accountable for the quality of the analytical data and must review and approve data and associated corrective actions.

3.3) Training

The laboratory is committed to furthering the professional and technical development of employees at all levels. Orientation to the laboratory's policies and procedures, in-house method training, and employee attendance at outside training courses and conferences all contribute toward employee proficiency.

Eurofins trainings are achieved through a combination of in-person presentations, recorded/electronic presentations and courses managed through the Eurofins Learning Centre (ELC) platform, supervised on-the-job training, and SOP reading. All training is documented with employee acknowledgement of completion.

New hire orientation and training begins the first week of employment. These initial sessions include overviews of the business, quality system policies and procedures, ethics and data integrity, resources, health and safety, and introduction of their job specific tasks.

Comprehensive **Environmental Health and Safety** training and review of the EHS Manual must be completed prior to performance of work in the laboratory.

Formal **Ethics and Data Integrity** and, where applicable, **Manual Integration** trainings are completed within the first 30 days of employment and include reading the associated policies and completing the assigned courses and presentations.

Initial Demonstration of Capability (IDOC) must be completed and approved prior to the independent performance of analytical method testing. See Sec. 3.3.1.

The following occur annually:
- Ethics and Data Integrity Refresher training - all personnel.
- Manual Integration training - technical personnel as applicable.
- Continuing Demonstration of Capability (CDOC) - technical personnel. See Sec. 3.3.2.

The laboratory maintains records of relevant authorization/competence, education, professional qualifications, training, skills and experience of technical personnel (including contracted personnel) as

well as the date that approval/authorization was given. These records are kept on file at the laboratory.

The training of technical staff is kept up to date by:

- Each employee must have documentation in their training file that they have read, understood and agree to follow the most recent version of the laboratory QA Manual and SOPs in their area of responsibility. This documentation is updated as SOPs are updated.
- Documentation from any training courses or workshops on specific equipment, analytical techniques or other relevant topics.
- Documentation of proficiency.
- An Ethics Agreement signed by each staff member (renewed each year) and evidence of annual ethics training.
- A Confidentiality Agreement signed by each staff member signed at the time of employment.
- Human Resources maintains documentation and attestation forms on employment status and records; benefit programs; timekeeping/payroll; and employee conduct (e.g., ethics violations). This information is maintained in the employee's secured personnel file.

Evidence of successful training could include such items as:

- Adequate documentation of training within operational areas, including one-on-one technical training for individual technologies, and particularly for people cross-trained.
- Analyst's knowledge to refer to QA Manual for quality issues.
- Analyst following SOPs, i.e., practice matches SOPs.
- Analyst regularly communicate to supervisors and QA if SOPs need revision, rather than waiting for auditors to find problems.

Further details of the laboratory's training program are described in the Laboratory Training SOP (*CED-R-PE-SOP42903*).

3.3.1) Initial Demonstration of Capability (IDOC)

An individual must successfully perform an IDOC prior to independently analyzing and reporting client samples, and any time there is a change in instrument type, method, or any time that a method has not been performed by the analyst in a twelve (12) month period.

If the method or regulation does not specify and IDOC, it is the responsibility of the laboratory to document in their SOP what other other approaches to the IDOC can be used.

The laboratory SOP *CED-R-PE-SOP42903* details the following:

- The preparation and analysis of 4 laboratory control samples (LCS);
- The evaluation criteria; and
- Actions to be taken for IDOC failure.

3.3.2) Continuing Demonstration of Capability (CDOC)

The CDOC procedure is detailed in laboratory SOP *CED-R-PE-SOP42903*. This process must be completed annually for each analyst for the tests that they are performing. If the method has not been performed by the analyst in a twelve (12) month period, an IDOC shall be performed.

This on-going demonstration may be one of the following:

- Acceptable performance of a blind sample (single blind to the analyst) or successful analysis of a blind performance sample on a similar method using the same technology (e.g., GC/MS volatiles by purge and trap for Methods 524.2, 624.1, or 5030/8260);
- Another IDOC;
- At least four (4) consecutive laboratory control samples (LCS) with acceptable levels of precision and accuracy; or
- For methods that do no lend themselves to spiking—documented process of observing the analyst performing the process and/or comparison of results between two analysts with a documented evaluation of the precision.

3.4) Ethics and Data Integrity Training Program

The laboratory's Ethics and Data Integrity Program is discussed in Section 5.2. Employees are trained as to the legal and environmental repercussions that result from data misrepresentation.

Key topics covered in the presentation include:

- Organizational mission and its relationship to the critical need for honesty and full disclosure in all analytical reporting and business practices.
- Ethics and Data Integrity Policy and the Eurofins Ethics Statement.
- Consequences for infractions including potential for immediate termination, debarment, or criminal prosecution.
- How and when to report ethical/data integrity issues. Confidential reporting.
- Record keeping.
- Discussion regarding data integrity procedures.
- Specific examples of breaches of ethical behavior (e.g. peak shaving, altering data or computer clocks, improper macros, etc., accepting/offering kickbacks, illegal accounting practices, unfair competition/collusion).
- Internal monitoring, investigations, and data recalls.
- Importance of proper written narration / data qualification by the analyst and project manager with respect to those cases where the data may still be of use to the client but have some method or project deficiencies.

Additionally, an anonymous third party hotline is available to all employees as a means of reporting ethics and/or data integrity issues or concerns:

- Lighthouse Services hotline at www.lighthouse-services.com/eurofinsus;
- via e-mail at reports@lighthouse-services.com (include company name); or
- call 855-910-0005 (Spanish speaking 800-216-1288).

4) ACCOMMODATIONS AND ENVIRONMENTAL CONDITIONS

4.1) Overview

The laboratory is a 20,600 ft² secure laboratory facility with controlled access and designed to accommodate an efficient workflow and to provide a safe and comfortable work environment for employees. All visitors sign in and are escorted by laboratory personnel. Access is controlled by various measures.

The laboratory is equipped with structural safety features. Each employee is familiar with the location, use, and capabilities of general and specialized safety features associated with their workplace. The laboratory provides and requires the use of protective equipment including safety glasses, protective clothing, gloves, etc. OSHA and other regulatory agency guidelines regarding required amounts of bench and fume hood space, lighting, ventilation (temperature and humidity controlled), access, and safety equipment are met or exceeded.

Traffic flow through sample preparation and analysis areas is minimized to reduce the likelihood of contamination. Adequate floor space and bench top area is provided to allow unencumbered sample preparation and analysis space. Sufficient space is also provided for storage of reagents and media, glassware, and portable equipment. Ample space is also provided for refrigerated sample storage before analysis and archival storage of samples after analysis. Laboratory HVAC and deionized water systems are designed to minimize potential trace contaminants.

The laboratory is separated into specific areas for sample receiving, sample preparation, volatile organic sample analysis, non-volatile organic sample analysis, inorganic sample analysis, metals sample analysis, microbiological sample analysis, and administrative functions.

4.2) Environment

Laboratory accommodation, test areas, energy sources, and lighting are adequate to facilitate proper performance of tests. The facility is equipped with heating, ventilation, and air conditioning (HVAC) systems appropriate to the needs of environmental testing performed at this laboratory.

The environment in which these activities are undertaken does not invalidate the results or adversely affect the required accuracy of any measurements.

The laboratory provides for the effective monitoring, control and recording of environmental conditions that may affect the results of environmental tests as required by the relevant specifications, methods, and procedures. Such environmental conditions may include humidity, voltage, temperature, and vibration levels in the laboratory. When any of the method or regulatory required environmental conditions change to a point where they may adversely affect test results, analytical testing will be discontinued until the environmental conditions are returned to the required levels.

Environmental conditions of the facility housing the computer network and LIMS are regulated to protect against raw data loss.

Specific requirements for facility and environmental conditions, as well as periodic monitoring of conditions, are given in the NBLSC Environmental Health & Safety Manual (*NDSC-US-EHS-QP46060*) plus each laboratory's *Facility Addendum*.

4.3) Work Areas

There is effective separation between neighboring areas when the activities therein are incompatible with each other. Examples include:

- Microbiological culture handling and sample incubation areas.
- Volatile organic chemical handling areas, including sample preparation and waste disposal, and volatile organic chemical analysis areas.
- Closed areas for GC/MS analytical work.
- Designated areas for waste disposal, chemical storage, and sample storage.

Access to and use of all areas affecting the quality of analytical testing is defined and controlled by secure access to the laboratory building as described below in the Building Security section of this manual (Sec. 4.5).

Adequate measures are taken to ensure good housekeeping in the laboratory and to ensure that any contamination does not adversely affect data quality. These measures include regular cleaning to control dirt and dust within the laboratory. Work areas are available to ensure an unencumbered work area. Work areas include:

- Access and entryways to the laboratory.
- Sample receipt areas.
- Sample storage areas.
- Chemical and waste storage areas.
- Data handling and storage areas.
- Sample processing areas.
- Sample analysis areas.

Refer to the following documents and procedures for specific requirements for microbiological laboratory facility requirements:

- *Standard Methods for the Examination of Water and Wastewater*, 24th Edition, Chapter 9020B, Sec. 2.

4.4) Responding to Emergencies

Employees are trained in the procedures to respond to all emergencies that might occur in the workplace. Employees must be familiar with the location and proper operation of all emergency equipment, evacuation routes and designated assembly areas for all areas where they work.

Refer to the NBLSC EHS Manual (*NDSC-US-EHS-QP46060*, Section 7) and the laboratory's local *Facility Addendum* for complete details. These documents provide direction for situations where normal operations of the laboratory are not possible (e.g., electrical failures, heating/air conditioning failures, fire/building evacuation, computer failures, hazardous material spills, injury to employees, pandemic flu, disruption of phone service, etc.).

In the event that the building or information technology (IT) systems would be severely challenged, a designated disaster recovery team, which includes Facility Management, Maintenance, Safety, Laboratory/Executive Management, Public Relations, IT, QA and other applicable personnel depending on the scope of the disaster, would assemble at a designated area to assess the situation and formulate a plan.

4.5) Building Security

The laboratory is considered a secure facility. All employees are issued a key fob that allows access to the facility's secure employee entrance. All outside doors (except the main lobby entrance) are locked during normal business hours to prevent unauthorized entry. Building keys and alarm codes are distributed to employees as necessary.

All visitors to the laboratory must sign in and out in a visitor's logbook that is located in the lobby. A visitor is defined as any person who visits the laboratory who is not an employee of the laboratory. Both visitors and vendors must review and sign specific EHS forms and are escorted by laboratory personnel at all times, or the location of the visitor is noted in the visitor's logbook.

Signs are posted in the laboratory designating employee-only areas: "Notice - Authorized Personnel Only".

5) QUALITY SYSTEM

5.1) Quality Policy Statement

The Quality Policy Statement gives employees clear requirements for the production of analytical data. As an organization, all personnel are committed to high quality professional practice, testing and data, and service to our clients.

We strive to provide the highest quality data achievable by:

- Reading and understanding all of the quality documents applicable to each position and implementing the process in our work.
- Following all recordkeeping requirements; describing clearly and accurately all activities performed; recording "real time" as the task is carried out; understanding that it is never acceptable to "back date" entries and should additional information be required at a later date, the actual date and by whom the notation is made must be documented.
- Ensuring data integrity through the completeness, consistency, impartiality and accuracy of the data generated. Data is attributable, legible, contemporaneously recorded, original or a true copy, and accurate (ALCOA). This applies to manual paper documentation and electronic records.
- Providing accountability and traceability for each sample analyzed through proper sample handling, labeling, preparation, instrument calibration/qualification/validation, analysis, and reporting; establishing an audit trail (the who, what, when, and why) that identifies date, time, analyst, instrument used, instrument conditions, quality control samples (where appropriate and/or required by the method), and associated standard material.
- Emphasizing a total quality management process which provides impartiality, accuracy, and strict compliance with agency regulations and client requirements, giving the highest degree of confidence; understanding that meeting the requirements of the next employee in the work flow process is just as important as meeting the needs of the external client.
- Providing thorough documentation and explanation to qualify reported data that may not meet all requirements and specifications, but is still of use to the client; understanding this occurs only

after discussion with the client on the data limitations and acceptability of this approach.
- Responding immediately to indications of questionable data, out-of-specification occurrences, equipment malfunctions, and other types of laboratory problems, with investigation and applicable corrective action; documenting these activities completely, including the reasons for the decisions made.
- Providing a work environment that ensures accessibility to all levels of management and encourages questions and expression of concerns on quality issues to management. Eurofins recognizes that the implementation of a quality assurance program requires management's commitment and support as well as the involvement of the entire staff.
- Continually improve systems and manage risk to support quality improvement efforts in laboratory, administrative and managerial activities.
- Complying with the applicable versions of the TNI Standard & ISO/IEC Guide 17025.

5.2) Ethics and Data Integrity

The Eurofins Environment Testing group of companies is committed to ensuring the integrity of its data and meeting the quality needs of its clients. The laboratory operates its Ethics and Data Integrity program under the guidance of Eurofins Key Guidance Documents (KGD) and the NBLSC Ethics and Data Integrity Policy.

The elements of our program include:
- Ethics and Data Integrity Policy (NBLSC Document No. *NDSC-ETHC-QP5252*) and Employee Ethics Statements.
- Ethics and Compliance Officer/s (ECOs).
- A Training Program.
- Self-governance through disciplinary action for violations.
- A confidential mechanism for anonymously reporting alleged misconduct and a means for conducting internal investigations of all alleged misconduct (NBLSC Document No. *NDSC-ETHC-SOP38228*).
- Procedures and guidance for recalling data if necessary (NBLSC Document No. *NDSC-CAR-SOP38229*).
- Effective external and internal monitoring system that includes procedures for internal audits (Section 15).
- Produce results, which are accurate and include QA/QC information that meets client pre-defined Data Quality Objectives (DQOs).
- Present services in a confidential, honest and forthright manner.
- Provide employees with guidelines and an understanding of the Ethical and Quality Standards of our industry.
- Provide procedures and guidance to ensure the impartiality and confidentiality of all data and customer information.
- Operate our facilities in a manner that protects the environment and the health and safety of employees and the public.
- Obey all pertinent federal, state and local laws and regulations and encourage other members of our industry to do the same.
- Educate clients as to the extent and kinds of services available.
- Assert competency only for work for which adequate personnel and equipment are available and for which adequate preparation has been made.
- Promote the status of environmental laboratories, their employees, and the value of services rendered by them.

5.3) Quality System Documentation

The laboratory's quality system is defined and communicated through a variety of documents. There is a hierarchy of documents within Eurofins and for the local laboratory.

The top level documents are the NBLSC policies and procedures. These are written, approved, and released by the NBLSC-QA team with input from NBLSC IT and EHS staff, where applicable. These documents provide procedures that can be used as guidance or as a template for establishing local procedures, or may be used directly as the local laboratory SOP by assigning it to local staff to train on

the NBLSC document. This level of document is written to address US Environment regulatory processes and requirements (i.e., TNI and ISO 17025). Any individual state agency requirements must be addressed locally.

The local laboratory defines its quality system through its own policies and procedures which must at a minimum meet the guidance set forth in the NBLSC documents. The local laboratory documents are established using the following structure/hierarchy:

- Quality Manual
- Laboratory Operational SOPs and Policies
  - includes those that apply to the laboratory as a whole and those that apply to a specific laboratory area
- Laboratory Analytical SOPs
  - define method-specific processes to be followed in the laboratory tests
- Forms and Instructions Sheets
  - e.g., checklists, preformatted bench sheets, job aids, etc.

All of the documents described here are controlled with defined versioning, review, and approval processes. The laboratory's management and QA staff have the responsibility and authority to operate in compliance with regulatory requirements of the jurisdiction in which the work in performed.

5.4) Quality Control (QC) Objectives for the Measurement of Data

Quality Assurance (QA) is responsible for developing planned activities whose purpose is to provide assurance to all levels of management that a quality program is in place within the laboratory, and that it is functioning in an effective manner that is consistent with the requirements of TNI/NELAP, ISO 17025, and any other regulatory agencies (i.e., states) in which the laboratory maintains accreditation.

Quality Control (QC) is generally understood to be limited to the analyses of samples and to be synonymous with the term "*analytical quality control*". QC refers to the routine application of statistically based procedures to evaluate and control the accuracy of results from analytical measurements. The QC program includes procedures for estimating and controlling precision and bias and for determining reporting limits.

Request for Proposals (RFPs) and Quality Assurance Project Plans (QAPPs) provide a mechanism for the client and the laboratory to discuss the data quality objectives in order to ensure that analytical services closely correspond to client needs. In order to ensure the ability of the laboratory to meet the Data Quality Objectives (DQOs) specified in the QAPP, clients are advised to allow time for the laboratory to review the QAPP before being finalized. The client is responsible for developing the QAPP; however, the laboratory will provide support to the client for developing the sections of the QAPP that concern laboratory activities.

Historically, laboratories have described their QC objectives in terms of precision, accuracy, representativeness, comparability, completeness, selectivity and sensitivity (PARCCSS). See NBLSC document *NDSC-QA-FRM68791* - Common Terms, Definitions, and Acronyms for additional explanation. Each laboratory SOP defines the required QC parameters and criteria.

5.4.1) Precision

The objective is to meet the performance for precision demonstrated for the methods on similar samples and to meet DQOs of the EPA and/or other regulatory programs. Precision is defined as the degree of reproducibility of measurements under a given set of analytical conditions (exclusive of field sampling variability). Precision is documented on the basis of replicate analysis, usually sample duplicate (DU) or matrix spike duplicate (MSD) samples.

5.4.2) Accuracy

The objective is to meet the performance for accuracy demonstrated for the methods on similar samples and to meet DQOs of the EPA and/or other regulatory programs. Accuracy is defined as the

degree of bias in a measurement system. Accuracy may be documented through the use of the laboratory control sample (LCS) and/or matrix spike (MS). A statement of accuracy is expressed as an interval of acceptance recovery about the mean recovery.

5.4.3) Representativeness

The objective is to provide data which is representative of the sampled medium. Representativeness is defined as the degree to which data represent a characteristic of a population or set of samples and is a measurement of both analytical and field sampling precision. The representativeness of the analytical data is a function of the procedures used in procuring and processing the samples. The representativeness can be documented by the relative percent difference between separately procured, but otherwise identical samples or sample aliquots.

The representativeness of the data from the sampling site depends on both the sampling procedures and the analytical procedures. Refer to laboratory SOPs for subsampling and homogenization techniques appropriate to the analytical method.

5.4.4) Comparability

The objective is to provide analytical data for which the accuracy, precision, representativeness, and reporting limit statistics are similar to these quality indicators generated by other laboratories for similar samples, and data generated by the laboratory over time.

Comparability is documented by inter-laboratory studies carried out by regulatory agencies or carried out for specific projects or contracts, by comparison of periodically generated statements of accuracy, precision, and reporting limits with those of other laboratories.

5.4.5) Completeness

The completeness objective for data is 90% (or as specified by a particular project), expressed as the ratio of the valid data to the total data over the course of the project. Data will be considered valid if they are adequate for their intended use. Data usability will be defined in a QAPP, project scope, or regulatory requirement. Data validation is the process for reviewing data to determine its usability and completeness. If the completeness objective is not met, actions will be taken internally and with the data user to improve performance. This may take the form of an audit to evaluate the methodology and procedures as possible sources for the difficulty or may result in a recommendation to use a different method.

5.4.6) Selectivity

Selectivity is defined as the capability of a test method or instrument to respond to a target substance or constituent in the presence of non-target substances. Target analytes are separated from non-target constituents and subsequently identified/detected through one or more of the following, depending on the analytical method: extractions (separation), extract clean-ups (separation), digestions (separation), interelement corrections (separation), specific retention times (separation and identification), confirmations with different columns or detectors (separation and identification), specific wavelengths (identification), specific mass spectra (identification), and specific electrodes (separation and identification).

5.4.7) Sensitivity

Sensitivity refers to the amount of analyte necessary to produce an instrument response that can be reliably detected (above the Method Detection Limit) or quantified (above the Method Reporting Limit).

5.5) Criteria for Quality Indicators

The laboratory maintains tables, housed in LIMS, that summarize the precision and accuracy acceptability limits for performed analyses. This summary includes an effective date, is updated each time new limits are generated, and are managed by the laboratory's QA department. Unless otherwise noted, limits within these tables are laboratory generated. Some acceptability limits are derived from US EPA methods when they are required. Where US EPA method limits are not required, the laboratory has developed limits from evaluation of data from similar matrices. Criteria for development of control limits is contained in the laboratory's Control Limits SOP (Doc. No. *CED-Q-QC-SOP42899*).

5.6) Statistical Quality Control

Statistically-derived precision and accuracy limits are required by selected methods (such as SW-846) and programs. The laboratory routinely utilizes statistically-derived limits to evaluate method performance and determine when corrective action is appropriate. The analysts use the current limits entered into LIMS. The QA department maintains an archive of all limits used within the laboratory. If a method defines the QC limits, the method limits are used.

If a method requires the generation of historical limits, the lab develops such limits from recent data in the QC database of the LIMS following the guidelines described in Section 22. All calculations and limits are documented and dated when approved and effective. On occasion, a client requests contract-specified limits for a specific project.

Current QC limits are entered and maintained in the LIMS analyte database. As sample results and the related QC are entered into LIMS, the sample QC values are compared with the limits in LIMS to determine if they are within the acceptable range. The analyst then evaluates if the sample needs to be reanalyzed or re-extracted/reanalyzed or if a comment should be added to the report explaining the reason for the QC outlier.

5.6.1) QC Charts

QC charting is available in the LIMS for evaluation at any point by technical and/or QA staff. At a minimum, the charts are ran annually to evaluate the statistical QC performance and set new QC limits, if warranted (and where statistical limits are allowed by the method/program). This evaluation should also be used to look for trends in the data that require further investigation. Any trend investigation needs to be documented in the corrective action database/module.

5.7) Quality System Metrics

In addition to the QC parameters discussed above, the entire Quality System is evaluated on a monthly basis through the use of specific metrics (refer to Section 16). These metrics are used to evaluate and manage risk, and to drive continuous improvement in the laboratory's Quality System. The metrics are reviewed by the BUMA and the QA Manager and shared with other management staff.

5.8) Management of Change

The Management of Change process is designed to manage significant events and changes that occur within the laboratory. Through these procedures, the potential risks inherent with a new event or change are identified and evaluated. The risks are minimized or eliminated through pre-planning and the development of preventive measures.

The types of changes covered under this section include (but are not limited to): laboratory relocation, facility changes, major accreditation changes, implementation of method updates or program changes (e.g., MUR, client QAPPs, regulatory updates); addition or deletion of laboratory capabilities or instrumentation, key personnel changes, and laboratory information management system (LIMS) changes.

This process is discussed in further detail in NBLSC Doc. No. *NDSC-US-MCC-QP5339* - Change Control.

6) DOCUMENT CONTROL

6.1) Overview

The QA Department is responsible for the control of documents used in the laboratory to ensure that approved, up-to-date documents are in circulation and out-of-date (obsolete) documents are archived or destroyed. The laboratory's document control procedure is defined in SOP. No. *CED-Q-DC-SOP42896*.

The following documents, at a minimum, must be controlled:

- Laboratory Quality Assurance (QA) Manual
- Laboratory Standard Operating Procedures (SOPs)
- Laboratory Policies
- Work Instructions and Forms
- NBLSC Documents[1]

[1] Includes locally implemented documents that are document controlled within the laboratory's document control system.

All documents are considered "controlled" when they are accessed as the electronic file on the D4 Handbooks site. Printed copies are considered uncontrolled unless the laboratory physically distributes them as controlled documents.

The laboratory QA Department also maintains access to various references and document sources integral to the operation of the laboratory. This includes reference methods and regulations. Instrument manuals (hard or electronic copies) are also maintained by the laboratory.

The laboratory maintains control of records for raw analytical data and supporting records such as audit reports and responses, logbooks, standard logs, training files, MDL studies, Proficiency Testing (PT) studies, certifications and related correspondence, and corrective action reports. Raw analytical data consists of bound logbooks, instrument printouts, any other notes, magnetic media, electronic data, and final reports.

6.2) Document Approval and Issuance

The pertinent elements of the document control system includes a unique document title and number, pagination, the total number of pages of the item or an "end of document" page, the effective date, revision number, and the laboratory's name. The QA personnel are responsible for the maintenance of this system.

Controlled documents are authorized by the QA Department. In order to develop a new document, a responsible manager submits an electronic draft to the QA Department for suggestions and approval before use. Upon approval, QA personnel add the identifying version information to the document and retains that document as the official document on file. That document is then provided to all applicable operational units. Controlled documents are identified as such and records of their distribution are kept by the QA Department. Document control may be achieved by either electronic or hardcopy distribution. Procedures for writing and reviewing/approving laboratory documents are addressed in Document No. *CED-Q-DC-WI45965*.

The QA Department maintains a list of the official versions of controlled documents.

Quality System Policies and Procedures will be reviewed at a minimum of every two years (except Safe Drinking Water Act documents, which are reviewed annually) and revised as appropriate. Changes to documents occur when a procedural change warrants.

6.3) Procedures for Document Control

For creation of or changes to SOPs or the QA Manual, refer to laboratory SOP No. *CED-Q-DC-SOP42896*.

Uncontrolled copies must not be used within the laboratory. Controlled documents are marked as such, and posted to a controlled laboratory access drive by the QA department or on D4. Controlled distribution is achieved electronically. Controlled hardcopies must be obtained through the QA Department. Previous revisions and back-up data are stored on a restricted access drive or on D4 by the QA Department. Details of the numbering system, required format, and controlled distribution of documents are described in laboratory SOP No. *CED-Q-DC-SOP42896*. Editable copies are stored on a restricted access drive or accessed by designated personnel in D4.

Forms, worksheets, work instructions and information are organized by department in the QA office. Controlled electronic versions are distributed through D4 and can be printed out as needed. Editable copies are stored on a restricted access drive or accessed by designated personnel in D4.

6.4) Obsolete Documents

All documents reside within the D4 document management system. Only the current version of a document is accessible by the general user. Once a revision is made to a document, the prior version is automatically marked as 'Invalid' and redirects the user to the current version.

If a document is no longer needed at all, it is made obsolete by "deleting" it from the current documents but archived with the D4 system and marked as such.

All obsolete and prior versions of documents can be accessed by designated personnel under the advanced search function within D4.

7) SERVICE TO THE CLIENT

7.1) Overview

The laboratory has established procedures for the review of work requests and contracts, oral or written. The procedures include evaluation of the laboratory's capability and resources to meet the contract's requirements within the requested time period. All requirements, including the methods to be used, must be adequately defined, documented and understood. For many environmental sampling and analysis programs, testing design is site or program specific and does not necessarily fit into a standard laboratory service or product. It is the laboratory's intent to provide both standard and customized environmental laboratory services to our clients.

A thorough review of technical and QC requirements contained in contracts is performed to ensure project success. The appropriateness of requested methods, and the laboratory's capability to perform them must be established. Projects, proposals, and contracts are reviewed for adequately defined requirements and the laboratory's capability to meet those requirements. Alternate test methods that are capable of meeting the clients' requirements may be proposed by the laboratory. A review of the laboratory's capability to analyze non-routine analytes is also part of this review process.

All projects, proposals and contracts are reviewed for the client's requirements in terms of compound lists, test methodology requested, sensitivity (detection and reporting levels), accuracy, and precision requirements (%Recovery and RPD). The reviewer ensures that the laboratory's test methods are suitable to achieve these requirements and that the laboratory holds the appropriate certifications and approvals to perform the work. The laboratory and any potential subcontract laboratories must be certified, as required, for all proposed tests.

Electronic or hard copy deliverable requirements are evaluated against the laboratory's capacity for production of the documentation.

If the laboratory cannot provide all services but intends to subcontract such services, whether to another Eurofins facility on the same LIMS or to an outside firm, this will be documented and discussed with the client prior to contract approval. (Refer to Section 8 for Subcontracting Procedures.)

The laboratory informs the client of the results of the review if it indicates any potential conflict, deficiency, lack of accreditation, or inability of the laboratory to complete the work satisfactorily. Any discrepancy between the client's requirements and the laboratory's capability to meet those requirements is resolved in writing before acceptance of the contract. It is necessary that the contract be acceptable to both the laboratory and the client. Amendments initiated by the client and/or Eurofins Cedar Falls are documented in writing.

All contracts, QAPPs, Sampling and Analysis Plans (SAPs), contract amendments, and documented communications become part of the project record.

The same contract review process used for the initial review is repeated when there are amendments to the original contract by the client, and the participating personnel are informed of the changes.

7.2) Project Review

Appropriate personnel will review the work request at each stage of evaluation.

For routine projects and other simple tasks, a review by the Project Manager (PM) or Project Management Assistant (PMA) is considered adequate. The PM or PMA confirms that the laboratory has any required certifications, that it can meet the clients' data quality and reporting requirements and that the lab has the capacity to meet the clients' turn around needs. Laboratory SOP No. *CED-P-PROJ-SOP42905* provides additional details for project and contract review procedures for meeting regulatory, accreditation, and client requirements. It is recommended that, where there is a Sales person assigned to the account, an attempt should be made to contact that Sales person to inform them of the incoming samples.

For new, complex or large projects, the proposed contract is given to the Client Relationship Manager (CRM) or Proposal Team, who will decide which laboratory will receive the work based on the scope of work and other requirements, including certification, testing methodology, and available capacity to perform the work.

This review encompasses all facets of the operation. The scope of work is distributed to the appropriate personnel, as needed based on scope of contract, to evaluate all of the requirements shown above (not necessarily in the order below):

- Contract Administrator
- Laboratory Project Manager
- BUMA
- Technical Managers and/or Department Managers
- Account Executives
- Quality Manager
- Laboratory Environmental Health and Safety Managers/Directors

The QA Manager performs an overall review to identify any quality systems concerns. Technical/Department Managers review the sections of the documents applicable to their assigned areas of the laboratory to identify any project specific requirements to be communicated to their staff and/or any concerns with meeting the project requirements. Project specific requirements may be added as notes in the LIMS as part of the project setup. This is managed by the Project Management Group with input from the reviews.

The BUMA reviews the formal laboratory quote and makes final acceptance for his/her facility. The Sales Director, Contract Administrator, Account Executive or Proposal Coordinator then submits the final

proposal to the client.

In the event that one of the above personnel is not available to review the contract, his or her back-up will fulfill the review requirements.

7.2.1) Project-Specific Quality Planning

Communication of contract specific technical and QC criteria is an essential activity in ensuring the success of site specific testing programs. To achieve this goal, a PM and/or PMA is assigned to each client. It is the PM/PMA's responsibility to ensure that project-specific technical and QC requirements are effectively evaluated and communicated to the laboratory personnel before and during the project. QA department involvement may be needed to assist in the evaluation of custom QC requirements.

PM's are the primary client contact and they ensure resources are available to meet project requirements; they coordinate opportunities and work with laboratory management and supervisory staff to ensure available resources are sufficient to perform work for the client's project.

Prior to work on a new project, the dissemination of project information and/or project opening meetings may occur to discuss schedules and unique aspects of the project. Items to be discussed may include the project technical profile, turnaround times, holding times, methods, analyte lists, reporting limits, deliverables, sample hazards, or other special requirements. The PM introduces new project information to maximize production and client satisfaction, while maintaining quality.

Any change that may occur within an active project is agreed upon between the client/regulatory agency and the PM/laboratory. These changes (e.g., use of a non-standard method or modification of a method) and approvals must be documented prior to implementation. Documentation pertains to any document (e.g., letter, e-mail, variance, contract addendum), which has been acknowledged by both parties.

Such changes may be communicated to the laboratory during production meetings. The laboratory staff is then introduced to the modified requirements via the PM or the individual laboratory Technical Manager. After the modification is implemented into the laboratory process, documentation of the modification is made in the case narrative of the data report(s).

The laboratory strongly encourages client visits to the laboratory and for formal/informal information sharing session with employees in order to effectively communicate ongoing client needs as well as project specific details for customized testing programs.

7.3) Balancing Laboratory Capacity and Workload

Evaluating laboratory capacity to perform specific projects is the responsibility of the BUMA, Technical/Department Managers, and the Client Service Manager. Many analysts are cross-trained to perform a variety of tests, and there is redundant equipment available in case of malfunctions. This minimizes the need to evaluate small and medium size projects against capacity available to complete them. Large and complex projects are reviewed against capacity estimates before bids are submitted to ensure that the client's analysis schedule can be met. Regularly scheduled meetings are held between laboratory management, PMs, Client Services, and QA personnel to review progress with current projects, as well as special requirements of new work scheduled for the laboratory. Laboratory capacity and backlog is tracked on a continuous basis using information from the Laboratory Sample Information System (LIMS) including turnaround time, and work in-house.

7.4) Project Contracts/Records

The Contracts Department and the BUMA (or his/her Designee) maintain copies of all signed contracts.

Appropriate records are maintained for every contract or work request. All stages of the contract review process are documented and include records of any significant changes. This information is

available on the Company Intranet Website (EET-Net). Comments and notes are also maintained in LIMS for client and individual bids and contracts.

The contract will be distributed to and maintained by the appropriate Sales/Marketing personnel and the Account Executive. A copy of the contract and formal quote will be filed with the laboratory PM and the BUMA.

Records are maintained of pertinent discussions with a client relating to the client's requirements or the results of the work during the period of execution of the contract. Each PM and PMA keeps a phone log of conversations with the client. A quote log is maintained by the Proposal Group and distributed to Sales, Project Managers, and the BUMA on a regular basis. Communications between Sales and Marketing should be captured in Salesforce and pertinent information should be copied to all appropriate PM and technical staff. Information regarding specific projects or clients is entered into LIMS for reference by all laboratory staff. National client contract information is available on the EET-Net intranet website.

7.5) Special Services

The laboratory cooperates with clients and their representatives to monitor the laboratory's performance in relation to work performed for the client. It is the laboratory's goal to meet all client requirements in addition to statutory and regulatory requirements. The laboratory has procedures to ensure confidentiality to clients.

The laboratory's standard procedures for reporting data are described in Section 23. Special services are also available and provided upon request. These services include:

- Reasonable access for our clients or their representatives to the relevant areas of the laboratory for the witnessing of tests performed for the client.
- Assisting client-specified third party data validators as specified in the client's contract.
- Supplemental information pertaining to the analysis of their samples. Note: An additional charge may apply for additional data/information that was not requested prior to the time of sample analysis or previously agreed upon.

When the client requests a statement of conformity to a specification or standard based on the analysis performed by the laboratory (e.g., pass/fail, in-tolerance/out-of-tolerance), the decision rule shall be clearly defined. Unless inherent in the requested specification or standard, the decision rule selected shall be communicated to the client.

7.6) Client Communication

PMs and PMAs are the primary communication link with the clients. They shall inform their clients of any delays in project completion as well as any non-conformances in either sample receipt or sample analysis. Project management will maintain ongoing client communication throughout the entire client project.

Laboratory management are available to discuss any technical questions or concerns that the client may have.

7.7) Reporting

The laboratory works with our clients to produce any special communication reports required by the contract.

7.8) Client Feedback and Surveys

The laboratory assesses both positive and negative client feedback and tracks the business's Net Promoter Score (NPS) through the Relationwise system. The results are used to improve overall laboratory quality and client service. The NPS measures the customer experience from a specific

business unit (i.e., laboratory) on a scale of 0–10. The results of that range are put into three categories: detractors (0–6), passives (7, 8), and promoters (9, 10). To calculate the Net Promoter Score, the % of detractors is subtracted from the % of promoters to get the score which will be on a scale of -100 to +100.

Surveys are sent, using an electronic interface, every 2 weeks to only those that received a report in the 2 weeks prior. This allows us to gather more real-time data. Responses by laboratory management and/or the PM are required for all detractors. It is also required to be tracked within the Relationwise system.

When a complaint is received, we determine, to the best of our ability, the extent of the issue and what data is in question. The person receiving the complaint documents this information and promptly forwards it to the appropriate management personnel where the work in question was performed. If a data reporting error is discovered, the final report and/or data must be regenerated with the correct value(s).

The BUMA and Quality department is responsible for entering client concerns into ICAT (Incident and Corrective Action Tracker). While an individual issue may not warrant a formal investigation, QA monitors these issues for potential trends and will initiate an Investigation when a trend is evident. In other cases, based on the severity of the issue or upon client request, a formal Investigation is initiated for a single concern. Formal Investigation is used to document the situation and determine Root Cause(s) and Corrective Action(s).

7.9) Client Confidentiality

The laboratory will ensure the highest standards of quality and integrity of the data and services provided to our clients.

The laboratory is responsible for maintaining in confidence all client information obtained or created. In situations involving the transmission of environmental test results by telephone, facsimile or other electronic means, client confidentiality must be maintained.

The laboratory will not intentionally divulge to any person (other than the client or any other person designated by the client in writing) any information regarding the services provided by the laboratory or any information disclosed to the laboratory by the client. Furthermore, information known to be potentially endangering to national security or an entity's proprietary rights will not be released.

Information about the client obtained from sources other than the client (e.g., complainant, regulators) shall be confidential between client and the laboratory. The source of this information shall be confidential to the laboratory and shall not be shared with the client, unless agreed by the source.

> Note 1: This shall not apply to the extent that the information is required to be disclosed by the laboratory under the compulsion of legal process. The laboratory will, to the extent feasible, provide reasonable notice to the client before disclosing the information.
>
> Note 2: Authorized representatives of an accrediting authority are permitted to make copies of any analyses or records relevant to the accreditation process, and copies may be removed from the laboratory for purposes of assessment.

8) SUBCONTRACTING OF TESTS

8.1) Overview

For the purpose of this quality manual, the phrase subcontract laboratory refers to a laboratory external to the Eurofins Environment Testing laboratories. The phrase "work sharing" refers to internal transfers

of samples between the Eurofins Environment Testing laboratories. The term outsourcing refers to the act of subcontracting tests.

When contracting with our clients, the laboratory makes commitments regarding the services to be performed and the data quality for the results to be generated. When the need arises to outsource testing for our clients because project scope, changes in laboratory capabilities, capacity, or unforeseen circumstances, we must be assured that the subcontractors or work sharing laboratories understand the requirements and will meet the same commitments we have made to the client. Refer to the NBLSC document on Subcontracting Procedures (*NDSC-US-SUB-SOP44936*).

When outsourcing analytical services, the laboratory will assure, to the extent necessary, that the subcontract or work sharing laboratory maintains a program consistent with the requirements of this document, the requirements specified in TNI/ISO 17025 and/or the client's Quality Assurance Project Plan (QAPP). All QC guidelines specific to the client's analytical program are transmitted to the subcontractor and agreed upon before sending the samples to the subcontract facility. Additionally, work requiring accreditation will be placed with an appropriately accredited laboratory. The laboratory performing the subcontracted work will be identified in the final report, as will non-TNI accredited work where required.

PMs or other responsible Client Service members for the Export Lab (i.e., the Eurofins Environment Testing laboratory that transfers samples to another laboratory) are responsible for obtaining client approval prior to subcontracting any samples. The laboratory will advise the client of a subcontract arrangement in writing and when possible, approval from the client shall be obtained and retained in the project folder. Standard Terms & Conditions (T&C) include the flexibility to work share samples within the Eurofins Environment Testing laboratories. Therefore, additional advance notification to clients for intra-laboratory work sharing is not necessary unless specifically required by a client contract.

> Note: In addition to the client, some regulating agencies (e.g., USDA) or contracts (e.g., certain USACE projects) require notification prior to placing such work.

8.2) Qualifying and Monitoring of Subcontractors

Whenever a PM [or Account Executive (AE), Client Relationship Manager (CRM), etc.] becomes aware of a client requirement or laboratory need where samples must be outsourced to another laboratory, the other laboratory(s) shall be selected based on the following:

- Subcontractors specified by the client - In these circumstances, the client assumes responsibility for the quality of the data generated from the use of a subcontractor.
- Subcontractors reviewed by Eurofins Environment Testing – Firms which have been reviewed by the company and are known to meet standards for accreditations (e.g., State and TNI); technical specifications; legal and financial information.

A listing of current subcontractors is available on the Laboratory Subcontracting page of the company's intranet website, EET-Net.

All Eurofins Environment Testing laboratories are pre-qualified for work sharing provided they hold the appropriate accreditations and can adhere to the project/program requirements. Client approval is not necessary unless specifically required by the contract. In these cases, the client must provide acknowledgement that the samples can be sent to that facility (an e-mail is sufficient documentation or if acknowledgement is verbal, the date, time, and name of person providing acknowledgement must be documented). The Export Lab is responsible for communicating all technical, quality, and deliverable requirements as well as other contract needs.

8.2.1) New Subcontractors

When the potential subcontract laboratory has not been previously approved, Account Executives or PMs may nominate a laboratory as a subcontractor based on need. The decision to nominate a

laboratory must be approved by the Client Relations Manager (CRM) or BUMA. The CRM or BUMA requests that the QA Manager or PM begin the process of approving the subcontract laboratory. Refer to NBLSC Document No. *NDSC-US-SUB-SOP44936* for process details.

Once the appropriate accreditation and legal information is received by the laboratory, it is evaluated for acceptability and forwarded to the NBLSC Quality Information Manager (QIM) for review. After the NBLSC QIM reviews the documents for completeness, the subcontract agreement is forwarded to the BU's Scope President for formal signature and contracting with the laboratory. The approved laboratory will be added to the approved subcontractor list on the intranet site, and the finance group is concurrently notified. A copy of the signed subcontract agreement is forwarded to the subcontractor.

The client will assume responsibility for the quality of the data generated from the use of a subcontractor which they have requested the laboratory to use. The qualified subcontractors on the intranet site are known to meet minimal standards. Eurofins Environment Testing does not certify laboratories. The subcontractors on our approved list can only be recommended to the extent that we would use them.

8.3) Oversight and Reporting

The status and performance of qualified subcontractors will be monitored by local BUs and includes an annual evaluation survey conducted by the NBLSC QIM. Any problems identified will be brought to the attention of local BU management, the Legal department, and the Finance department.

- Complaints shall be investigated. Documentation of the complaint, investigation, and corrective action will be maintained in the subcontractor's file on the intranet site. Complaints are posted using the corrective action mechanism employed at each laboratory.

- Information shall be updated on the intranet site when new information is received from the subcontracted laboratories.

- Subcontractors in good standing will be retained on the approved subcontractor listing. Client Service personnel will notify all Eurofins Environment Testing laboratories, NBLSC-QA, Legal, and Finance departments if any laboratory requires removal from the approved subcontractor list. This notification will be posted on the intranet site and e-mailed to all Client Service personnel, BUMAs, QA Managers, and Sales personnel.

Prior to initially sending samples to the subcontracted laboratory, the PM confirms their certification status to determine if it's current and scope-inclusive. The information is documented within the project records.

The laboratory's certifications can be viewed on the company's website at https://www.eurofinsus.com/env.

8.4) Subcontracting Procedures

All subcontracted samples must be accompanied by a Eurofins Environment Testing (EET) Chain of Custody (COC). A copy of the original COC sent by the client must be available in LIMS for all samples work shared within EET. Client COCs are only forwarded to external subcontractors when samples are shipped directly from the project site to the subcontract laboratory. Under routine circumstances, to maintain client confidentiality, client COCs are not provided to external subcontractors.

Through communication with the subcontract laboratory, the PM monitors the status of the subcontracted analyses, facilitates successful execution of the work, and ensures the timeliness and completeness of the analytical report.

Non-TNI accredited work must be identified in the subcontractor's report as appropriate. If TNI accreditation is not required, the report does not need to include this information.

Reports submitted from external subcontract laboratories are not altered and are included in their original form in the final project report. This clearly identifies the data as being produced by a subcontractor facility. If subcontract laboratory data is incorporated into the laboratory's EDD (i.e., imported), the report must explicitly indicate which laboratory produced the data for which methods and samples.

> Note: The results submitted by a EET work sharing laboratory may be transferred electronically, and the results reported by the EET work sharing laboratory are identified on the final report. The report must explicitly indicate which laboratory produced the data for which methods and samples. The final report must include a copy of the completed COC for all work sharing reports.

8.5) Contingency Planning

The full qualification of a subcontractor may be waived to meet emergency needs. This decision and justification must be documented in the project files, and the "Purchase Order Terms And Conditions For Subcontracted Laboratory Services" must be sent with the samples and COC.

In the event this provision is utilized, the laboratory (e.g., PM) will be required to verify and document the applicable accreditations of the subcontractor. All other quality and accreditation requirements will still be applicable, but the subcontractor need not have signed a subcontract agreement with Eurofins Environment Testing at this time.

The use of any emergency subcontractor will require the PM to complete a New Supplier Information Request Form in order to process payment to the vendor and add them to LIMS. This form requires the user to define the subcontractor's category(ies) of testing and the reason for testing.

9) PURCHASING SERVICES AND SUPPLIES

9.1) Overview

Supplier Evaluation

Procedures are in place to evaluate vendors who supply us with: new equipment instrumentation, computerized systems and computer software; commercially purchased glassware, including sample bottleware, reagents, chemicals, solvents, gases, media, and standards; and contracted and subcontracted services.

The laboratory strives to ensure that our suppliers continually improve their quality systems and we reserve the right to purchase from suppliers of our choice in order to best fulfill the needs of our clients and our business. When directed by a client to purchase from a specific supplier, we will do so. In this instance it is the client's responsibility to "qualify" the specified supplier. We attempt to purchase from businesses that we have established purchase history or have previously acquired information regarding the supplier's quality programs.

An approved vendor list is maintained by the laboratory for critical consumables (reagents and standards), PT services, and metrological services.

The laboratory does not evaluate every supplier. Risk assessment is taken into consideration when making this decision. The risk assessment analysis includes system, material, services, and number of samples or operations the purchase may affect or support. Evaluations are not required for computer operating systems, utilities, toolsets, or systems software. They also are not required for any off-the-shelf configurable software package that has an extensive market performance history (e.g., Microsoft Word, Excel, Access, etc.).

Procurement

It is the responsibility of management personnel within each department to ensure that the appropriate supplies are available and/or ordered with sufficient lead-time to perform analytical testing or to provide support of the testing areas. The individual technical departments have trained personnel who enter the supply order into the company's purchasing system. The selection of these products is based on technical input at the analyst level and authorized by technical departmental management. The Purchasing Department maintains an ordering system in which purchase requisitions are managed. Common laboratory items (e.g., beakers, flasks, reagents) are ordered directly through the purchasing system. Purchase orders over a specified dollar amount require approval from the appropriate member(s) of the Executive Management Group before an order can be placed.

Upon receipt of an order, the recipient checks the order to ensure that all items were received as specified. Products that have specific storage requirements are taken to the technical area upon receipt. It is the technical area's responsibility to ensure that the product is stored in the appropriate manner. Any checks on the quality of the materials received for use in a specific test are the responsibility of the laboratory using them. This is based upon the experience of the laboratory with the usability of the product. Generally, each test has controls in place to ensure that test results are not adversely affected by the materials.

Any problems encountered when using a material in the laboratory must be brought to the attention of the BUMA and/or Quality department, as applicable, to ensure that follow-up and corrective action occur.

9.2) Glassware

Glassware used for volumetric measurements must be Class A or verified for accuracy according to laboratory procedure. Pyrex (or equivalent) glass should be used where possible. For safety purposes, thick-wall glassware should be used where available.

9.3) Reagents, Standards, and Supplies

Purchasing guidelines for equipment, consumables, and reagents must meet the requirements of the specific method and testing procedures for which they are being purchased. Solvents and acids are pre-tested in accordance with NBLSC Document No. *NDSC-US-PUR-SOP46704* - Acid and Solvent Testing and Approval Program. Approval information for the solvents and acids tested under that Program is distrubuted to the laboratory and kept on file on a shared network folder: \\tacorp\corp\QA\QA_SolventApproval.

9.3.1) Purchasing

Chemical reagents, solvents, glassware, and general supplies are ordered as needed to maintain sufficient quantities on hand. Materials used in the analytical process must be of a known quality. The wide variety of materials and reagents available makes it advisable to specify recommendations for the name, brand, and grade of materials to be used in any determination. This information is contained in the method SOP. The analyst may take the item from the general supplies area which contains items approved for laboratory use; or, if the item is not in the general supplies area, the analyst orders the item through the finance/procurement system which is set up for the laboratory with pre-approved items.

The analyst must provide the master item number (from the master item list that has been approved by the Technical Manager), item description, package size, catalogue page number, and the quantity needed. If an item being ordered is not the exact item requested, approval must be obtained from the Technical Manager or Department Manager prior to placing the order. The Purchasing Coordinator or Department Manager places the order.

9.3.2) Receiving

It is the responsibility of the Receiving department to receive the shipment. It is the responsibility of the person who ordered the materials to document the date materials were received. Once the ordered reagents or materials are received, the person compares the information on the label or packaging to the original order to ensure that the purchase meets the quality level specified. This is documented through the addition of the received date and the person's initials to the information present on the packing slip.

The person receiving the shipment verifies the lot numbers of received solvents and acids against the pre-approval lists. If a received material is listed as unapproved, or is not listed, it is sequestered and returned to the vendor. Alternatively, the laboratory may test the material for the intended use, and if it is acceptable, document the approval on the approval list. Records of any testing performed locally are maintained on the shared "public" folder on the computer network.

Materials may not be released for use in the laboratory until they have been inspected, verified as suitable for use, and the inspection/verification has been documented.

Safety Data Sheets (SDSs) are available online through the company's intranet website (EET-Net). Anyone may review these for relevant information on the safe handling and emergency precautions of on-site chemicals.

9.3.3) Specifications

Methods used in the laboratory specify the grade of reagent that must be used in the procedure. If the quality of the reagent is not specified, analytical reagent grade will be used. It is the responsibility of the analyst to check the procedure carefully for the suitability of grade of reagent.

Chemicals must not be used past the manufacturer's expiration date and must not be used past the expiration time noted in a method SOP. If expiration dates are not provided, the laboratory may contact the manufacturer to determine an expiration date or seek guidance from laboratory SOP No. *CED-P-STD-SOP42952* (Standards and Reagents - Documentation and Tracking).

The laboratory assumes a five year expiration date on inorganic dry chemicals and solvents unless noted otherwise by the manufacturer or by the reference source method. Chemicals/solvents should not be used past the manufacturer's or SOP expiration date unless verified as outlined below:

- An expiration date cannot be extended if the dry chemical/solvent is discolored or appears otherwise physically degraded. In this case, the dry chemical/solvent must be discarded.
- Expiration dates can be extended if the dry chemical/solvent is found to be satisfactory based on acceptable performance of quality control samples (Continuing Calibration Verification (CCV), Blanks, Laboratory Control Sample (LCS), etc.).
- If the dry chemical/solvent is used for the preparation of standards, the expiration dates can be extended 6 months if the dry chemical/solvent is compared to an unexpired independent source in performing the method and the performance of the dry chemical/solvent is found to be satisfactory. The comparison must show that the dry chemical/solvent meets CCV limits. The comparison studies are maintained on-file and available for review in the reagent module of the LIMS.

Wherever possible, standards must be traceable to national or international standards of measurement or to national or international reference materials. Records to that effect are available to the user.

Compressed gases in use are checked for pressure and secure positioning daily. To prevent a tank from going to dryness, or introducing potential impurities, the pressure should be closely watched as it decreases to approximately 15% of the original reading, at which point it should be replaced. For example, a standard sized laboratory gas cylinder containing 3,000 psig of gas should be replaced when it drops to approximately 450 psig. The quality of the gases must meet method or manufacturer specification or be of a grade that does not cause any analytical interference.

Water used in the preparation of samples, standards or reagents must have a conductivity of less than 1-µmho/cm (or resistivity of greater than 1.0 megohm-cm) at 25 °C. The conductivity is monitored daily. If the water's specific conductivity is greater than the specified limit, the Facility Manager and

appropriate Technical Managers must be notified immediately in order to notify all departments, decide on cessation (based on intended use) of activities, and make arrangements for correction.

The laboratory may purchase reagent grade (or other similar quality) water for use in the laboratory. This water must be certified clean by the supplier for all target analytes or otherwise verified by the laboratory prior to use. This verification is documented.

Standard lots are verified before first time use if the laboratory switches manufacturers or has historically had a problem with the type of standard.

Purchased bottleware used for sampling must be certified clean and the certificates must be maintained. If uncertified sampling bottleware is purchased, all lots must be verified clean prior to use. This verification must be maintained.

Records of manufacturer's certification and traceability statements are maintained as electronic copies in LIMS. These records include date of receipt, lot number (when applicable), and expiration date (when applicable). Incorporation of the item into the record indicates that the analyst has compared the new certificate with the previous one for the same purpose and that no difference is noted, unless approved and so documented by the Technical Manager or QA Manager.

9.3.4) Storage

Reagent and chemical storage is important from the aspects of both integrity and safety. Light-sensitive reagents may be stored in brown-glass containers. Storage conditions are per the NBLSC Environmental Health and Safety (EHS) Manual (Document No. *NDSC-US-EHS-QP46060*), the local laboratory's *Facility Addendum* to the EHS Manual, and method SOPs or manufacturer instructions.

9.4) Equipment, Instruments, and Software

When a new piece of equipment is needed, either for additional capacity or for replacing inoperable equipment, the analyst or supervisor makes a supply request to the Technical Manager and/or the BUMA. A decision is made as to which piece of equipment can best satisfy the requirements. The appropriate written requests are completed and Purchasing places the order.

Upon receipt of a new or used piece of equipment, an identification name is assigned to it and is added to the laboratory's equipment list. IT must also be notified so that they can synchronize the instrument for back-ups. Its capability is assessed to determine if it is adequate or not for the specific application. For instruments, a calibration curve is generated, followed by MDLs, Demonstration of Capabilities (DOCs), and other relevant criteria (refer to Section 18). For software, its operation must be deemed reliable and evidence of instrument verification must be retained by the IT Department or QA Department. Software certificates supplied by the vendors are filed with the LIMS Administrator. The manufacturer’s operation manual is retained by the department which operates the item.

9.5) Services

Service to analytical instruments (except analytical balances) is performed on an as needed basis. Routine preventative maintenance is discussed in Section 18. The need for service is determined by analysts and/or department managers. The service providers that perform the services are approved by the Technical Manager.

Analytical balances are serviced and calibrated annually by a vendor with current and valid ISO/IEC 17025 accreditation for calibration of analytical balances. The calibration and maintenance services are performed on-site, and the balances are returned to use immediately following successful calibration. Calibration certificates are filed for reference. If the calibration was unsuccessful, the balance is immediately removed from service and segregated pending either further maintenance or disposal.

Calibration services for support equipment such as reference thermometers and weight sets are obtained from vendors with current and valid ISO/IEC 17025 accreditation for calibration of the specific

piece of equipment. Prior to utilizing the vendor's services, the vendor's accreditation status is verified. Once the equipment has been calibrated, the calibration certificates are reviewed by the QA department and documentation of the review is filed with the calibration certificates. The equipment is then returned to service in the laboratory.

9.6) Suppliers

Eurofins adds vendors as options for use in the Purchasing program through a competitive proposal / bid process, strategic business alliances or negotiated vendor partnerships (contracts). The laboratory maintains a listing of all locally approved suppliers of critical consumables, supplies, and services (see laboratory Doc. No. *CED-S-PU-FRM58869*).

This process is defined in the NBLSC Doc. No. *NDSC-US-PUR-SOP62924*. The level of control used in the selection process is dependent on the anticipated spending amount and the potential impact on the laboratory's business. Vendors that provide test and measuring equipment, solvents, standards, certified containers, instrument related service contracts or subcontract laboratory services shall be subject to more rigorous controls than vendors that provide off-the-shelf items of defined quality that meet the end use requirements. The purchasing system includes all suppliers/vendors that have been approved for use.

Evaluation of suppliers is accomplished by ensuring the supplier ships the product or material ordered and that the material is of the appropriate quality. This is documented by signing off on packing slips or other supply receipt documents. The purchasing documents contain the data that adequately describe the services and supplies ordered.

Proficiency testing providers and suppliers of certified reference materials must have approved ISO accreditation.

10) COMPLAINTS

10.1) Overview

The laboratory considers an effective client complaint handling processes to be of significant business and strategic value. Listening to and documenting client concerns captures client knowledge that enables our operations to continually improve processes and client satisfaction. An effective client complaint handling process also provides assurance to the data user that the laboratory will stand behind its data, service obligations and products.

A client complaint is any expression of dissatisfaction with any aspect of our business services (e.g., communications, responsiveness, data, reports, invoicing and other functions) expressed by any party, whether received verbally or in written form. Client inquiries, complaints or noted discrepancies are documented, communicated to management, and addressed promptly and thoroughly. These must also be communicated to QA for trending and/or formal investigation.

The laboratory has procedures for addressing both external and internal complaints with the goal of providing satisfactory resolution to complaints in a timely and professional manner.

The nature of the complaint is identified, documented and investigated, and an appropriate action is determined and taken. In cases where a client complaint indicates that an established policy or procedure was not followed, the BUMA and/or QA Department must evaluate whether a special audit must be conducted to assist in resolving the issue. A written confirmation or letter to the client, outlining the issue and response taken, is recommended as part of the overall action taken. This may be handled by the PM following-up with the client on the resolution. If a client requires a letter detailing the investigation and actions, the letter may be written by department management and/or QA but must be approved by QA.

The process of complaint resolution and documentation utilizes the procedures outlined in Section 12 (Corrective Actions) and is documented following NBLSC Doc. No. *NDSC-CAR-QP5341* - Investigation and Corrective Action Process Policy.

10.2) External Complaints

An employee that receives a complaint initiates the complaint resolution process by first submitting the complaint to the Complaint Handling Team (consisting of the BUMA, Client Service Manager, and QA staff).

Complaints fall into two categories: correctable and non-correctable. An example of a correctable complaint would be one where a report re-issue would resolve the complaint. An example of a non-correctable complaint would be one where a client complains that their data was repeatedly late. Non-correctable complaints should be reviewed for preventive action measures to reduce the likelihood of future occurrence and mitigation of client impact.

The general steps in the complaint handling process are:

- Receiving and documenting complaints
- Acknowledging receipt of complaint, whenever possible
- Complaint investigation and service recovery
- Process improvement

Complaints need to be communicated to QA to allow for initiation of investigations and for trending purposes. Full root cause investigation with corrective actions are required when requested by the client, for issues that involve a change to a reported analytical result, and where an adverse trend in the type of issue has been seen. These investigations must be documented in the corrective action database.

The laboratory shall inform the initiator of the complaint of the results of the investigation and the corrective action taken, if any.

10.3) Internal Complaints

Internal complaints include, but are not limited to: errors and non-conformances, training issues, internal audit findings, and deviations from methods. Corrective actions may be initiated by any staff member who observes a nonconformance and shall follow the procedures outlined in Section 12. In addition, Executive Management, Sales/Marketing, and IT may initiate a complaint by contacting the laboratory or through the corrective action system described in Section 12.

10.4) Review of Complaints

The number and nature of client complaints is reported by the QA Manager to the BUMA and Quality Director in the QA Monthly report. Monitoring and addressing the overall level and nature of client complaints and the effectiveness of the solutions is part of the annual Management Systems Review (described in Section 16).

11) CONTROL OF NON-CONFORMING WORK

11.1) Overview

When data discrepancies are discovered or deviations and departures from laboratory SOPs, policies and/or client requests have occurred, corrective action is taken immediately. First, the laboratory evaluates the significance of the nonconforming work. Then, a corrective action plan is initiated based on the outcome of the evaluation. If it is determined that the nonconforming work is an isolated

incident, the plan could be as simple as adding a qualifier to the final results and/or making a notation in the case narrative. If it is determined that the nonconforming work is a systematic or improper practices issue, the corrective action plan could include a more in depth investigation and a possible suspension of an analytical method. In all cases, the actions taken are documented using the laboratory's corrective action system (refer to Section 12).

Due to the frequently unique nature of environmental samples, sometimes departures from documented policies and procedures are needed. These situations are documented in the corrective action system as Planned Deviations. When an analyst encounters such a situation, the problem is presented to the supervisor for resolution. The supervisor may elect to discuss it with the Technical Manager or have a representative contact the client to decide on a logical course of action. Once an approach is agreed upon, the analyst documents it using the laboratory's corrective action system described in Section 12. This information can then be supplied to the client in the form of a footnote or a case narrative with the report.

Project Management may encounter situations where a client requests that a special procedure be applied to a sample that is not standard laboratory practice. Based on a technical evaluation, the laboratory may accept or opt to reject the request based on technical or ethical merit. An example might be the need to report a compound that the laboratory does not normally report. The laboratory would not have validated the method for this compound following the procedures in Section 17. The client may request that the compound be reported based only on the calibration. Such a request would need to be approved by the Technical Manager and QA Manager, documented and included in the project folder. Deviations must also be noted on the final report with a statement that the compound is not reported in compliance with TNI (or the analytical method) requirements and the reason. Data being reported to a non-TNI state would need to note the change made to how the method is normally run.

11.2) Responsibilities and Authorities

Under certain circumstances, the BUMA, a Technical Manager, or a member of the QA team may authorize departures from documented procedures or policies. The departures may be a result of procedural changes due to the nature of the sample; a one-time procedure for a client; QC failures with insufficient sample to reanalyze, etc. In most cases, the client will be informed of the departure prior to the reporting of the data. Any departures must be well documented using the laboratory's corrective action procedures. This information may also be documented in logbooks and/or data review checklists as appropriate. Any impacted data must be referenced in a case narrative and/or flagged with an appropriate data qualifier.

Any misrepresentation or possible misrepresentation of analytical data discovered by any laboratory staff member must be reported to facility Senior Management within 24 hours. The Senior Management staff is comprised of the BUMA, the QA Manager, and the Technical Managers. The reporting of issues involving alleged violations of the company's Data Integrity or Manual Integration procedures must be conveyed to an ECO (e.g., the VP-QA/EHS) and the laboratory's Quality Director within 24 hours of discovery.

Whether an inaccurate result was reported due to calculation or quantitation errors, data entry errors, improper practices, or failure to follow SOPs, the data must be evaluated to determine the possible effect and include full root cause investigation and corrective action(s).

The BUMA, QA Manager, ECOs, VP-QA/EHS and the Quality Directors have the authority and responsibility to halt work, withhold final reports, or suspend an analysis for due cause as well as authorize the resumption of work once the investigation has been completed, root cause(s) determined and corrective action(s) implemented.

11.3) Evaluation of Significance and Actions Taken

For each nonconforming issue reported, an evaluation of its significance and the level of management involvement needed is made. This includes reviewing its impact on the final data, whether or not it is

an isolated or systematic issue, potential for recurrence and actions for prevention, and how it relates to any special client or program requirements.

The NBLSC Document No. *NDSC-CAR-SOP38229* - Nonconforming Work is the procedure to be followed when it is discovered that erroneous or biased data may have been reported to clients or regulatory agencies.

The NBLSC Document No. *NDSC-ETHC-SOP38228* - Internal Ethics and Data Integrity Investigations is the procedure to be followed for investigation and correction of situations involving alleged incidents of misconduct or violations of the Company's Ethics Policy.

Decisions are documented and approved using the laboratory's standard nonconformance/corrective action processes detailed in these procedures.

11.4) Prevention of Nonconforming Work

If it is determined that the nonconforming work could recur, further corrective actions must be made following the laboratory's corrective action system. Periodically, as defined by the laboratory's preventive action schedule, the QA Department evaluates non-conformances to determine if any nonconforming work has been repeated multiple times. If so, the laboratory's corrective action process may be followed.

11.5) Method Suspension or Restriction (Stop Work Procedures)

In some cases, it may be necessary to suspend/restrict the use of a method or target analyte which constitutes significant risk and/or liability to the laboratory. Suspension/restriction procedures can be initiated by designated persons as noted in Section 11.2.

Prior to suspension/restriction, confidentiality will be respected, and the problem with the required corrective and preventive action(s) will be stated in writing and presented to the BUMA.

The BUMA shall arrange for the appropriate personnel to meet with the QA Manager as needed. This meeting shall be held to confirm that there is a problem, that suspension/restriction of the method is required and will be concluded with a discussion of the steps necessary to bring the method/target or test fully back on line. In some cases, that may not be necessary if all appropriate personnel have already agreed there is a problem and there is agreement on the steps needed to bring the method, target or test fully back on line. The QA Manager will also initiate a corrective action report as described in Section 12 if one has not already been started. A copy of any meeting notes and agreed upon steps should be e-mailed by the laboratory to their Business Unit President and VP-QA/EHS. This e-mail serves as notification of the incident.

After suspension/restriction, the laboratory will hold all reports to clients pending review. No faxing, mailing or distributing through electronic means may occur. The report must not be posted for viewing on the internet. It is the responsibility of the BUMA to hold all reporting and to notify all relevant laboratory personnel regarding the suspension/restriction (e.g., Project Management, Log-in, etc.). Clients will NOT generally be notified at this time. Analysis may proceed in some instances depending on the non-conformance issue.

Within 72 hours, the QA Manager will determine if the issue has been addressed compliance is now met and reports can be released, or determine the plan of action with timeline to bring work into compliance, and release work. A team, with all principals involved (e.g., BUMA, Technical Manager, QA Manager) can devise a start-up plan to cover all steps from client notification through compliance and release of reports. Project Management and the Directors of Client Services and Sales and Marketing must be notified if clients must be notified or if the suspension/restriction affects the laboratory's ability to accept work.

12) CORRECTIVE ACTION

12.1) Overview

A major component of the laboratory's Quality Management Program is the problem investigation and feedback mechanism designed to keep the laboratory staff informed on quality related issues and to provide insight to problem resolution. When nonconforming work or departures from policies and procedures in the quality system or technical operations are identified, the corrective action procedure provides a systematic approach to assess the issues, restore the laboratory's system integrity, and prevent reoccurrence.

The laboratory employs two systems to manage non-conformances. Issues suspected of being systematic in nature and for which full investigation with root cause analysis and a formal Corrective Action Report (CAR) are needed are documented in the Incident and Corrective Action Tracking (ICAT) database. Routine batch non-conformances, events that are understood to be isolated in nature, are documented in the LIMS non-conformance memo (NCM) system.

12.2) General Processes

Problems within the quality system or within analytical operations may be discovered in a variety of ways, such as QC sample failures, internal or external audits, proficiency testing (PT) performance, client complaints, staff observation, etc.

The purpose of a corrective action system is to:

- Identify non-conformance events and assign responsibility for investigating.
- Resolve non-conformance events and assign responsibility for any required corrective action.
- Identify systematic problems before they become serious.
- Identify and track client complaints and provide resolution.

12.2.1) Non-Conformance Memo (NCM)

NCMs are used to document the following types of corrections/corrective actions:

- One-time deviations from an established procedure or SOP.
- QC outside of limits.
- Isolated reporting / calculation errors.
- Client complaints (minor, isolated issues).
- Discrepancies in materials/goods received vs. manufacturer packing slips (forms of documentation other than an NCM in LIMS is also acceptable).

12.2.2) Corrective Actions Documented in the CAR Database

The ICAT database is used to document background information, assigned tasks with the responsible staff, timelines, results of investigations/root cause analysis, details of the planned corrective actions(s), and follow-up for the following types of corrective actions:

- Internal and external audit findings.
- Failed or unacceptable PT results.
- Identified poor process or method performance trends.
- Systematic reporting / calculation errors.
- Analytical result changes.
- Data recall investigations.
- Questionable trends that are found in the review of NCMs.
- Client complaints (major issues; client requested full investigation).
- Excessive revised reports.

12.3) Corrective Action Process Steps

Any employee in the company can initiate a corrective action. There are four main components to a corrective action process once an issue has been identified: Cause Analysis, Selection and Implementation of Corrective Actions (both short and long term), Monitoring of Corrective Actions, and Follow-up.

12.3.1) Cause Analysis

Upon discovery of a non-conformance event, the event must be defined and documented. An entry into the ICAT system must be initiated, someone is assigned to investigate the issue and the event it investigated for cause.

The cause analysis step is the key to the process as a long term corrective action plan cannot be determined until the cause is determined.

If the cause is not readily obvious, the Technical Manager, BUMA, or QA Manager (or designee) is consulted.

Root Cause Analysis

Root Cause Analysis is a class of problem solving (investigative) methods aimed at identifying the basic or causal factor(s) that underlie variation in performance or the occurrence of a significant failure. The root cause may be buried under seemingly innocuous events, many steps preceding the perceived failure. At first glance, the immediate response is typically directed at a symptom and not the cause. Typically, root cause analysis would be best with three or more incidents to triangulate a weakness. NBLSC Document No. *NDSC-CAR-SOP43847* - Management of Root Cause Analysis, provides guidance on this procedure.

Systematically analyze and document the root causes of the more significant problems that are reported. Identify, track, and implement the corrective actions required to reduce the likelihood of recurrence of significant incidents. Trend the root cause data from these incidents to identify root causes that, when corrected, can lead to dramatic improvements in performance by eliminating entire classes of problems.

Identify the one event associated with problem and ask why this event occurred. Brainstorm the root causes of failures; for example, by asking why events occurred or conditions existed; and then why the cause occurred consecutive times until you get to the root cause. For each of these sub events or causes, ask why it occurred. Repeat the process for the other events associated with the incident.

Root cause analysis does not mean the investigation is over. Look at technique or other systems outside the normal indicators. Often creative thinking will find root causes that ordinarily would be missed and continue to plague the laboratory or operation.

12.3.2) Selection and Implementation of Corrective Actions

Where corrective action is needed, the laboratory shall identify potential corrective actions. The action(s) most likely to eliminate the problem and prevent recurrence are selected and implemented. Responsibility for implementation is assigned.

Corrective actions shall be to a degree appropriate to the magnitude of the problem identified through the cause analysis.

Whatever corrective action is determined to be appropriate, the laboratory shall document and implement the changes. The ICAT record is used for this documentation.

12.3.3) Monitoring of Corrective Actions

Departmental managers and the QA Manager are responsible to ensure that the corrective action(s) taken was effective.

Ineffective actions are documented and re-evaluated until acceptable resolution is achieved. Departmental managers are accountable to the BUMA to ensure final acceptable resolution is achieved and documented appropriately.

The QA Manager reviews monthly NCM and ICAT records for trends. Highlights are included in the QA Monthly Report (refer to Section 16). If a significant trend develops that adversely affects quality, an audit of the area is performed, and corrective action implemented.

Any out-of-control situations that are not addressed acceptably at the laboratory level may be reported to the NBLSC Quality Director by the QA Manager, indicating the nature of the out-of-control situation and problems encountered in solving the situation.

12.3.4) Follow-Up

Follow up audits may be initiated by the QA Manager or other management staff and shall be performed as soon as possible when the identification of a nonconformance casts doubt on the laboratory's compliance with its own policies and procedures, or on its compliance with state or federal requirements.

These audits often follow the implementation of the corrective actions to verify effectiveness. An additional audit would only be necessary when a critical issue or risk to business is discovered.

Also refer to Section 15.1 - Special Audits.

12.4) Technical Data Corrective Actions

In addition to providing acceptance criteria and specific protocols for technical corrective actions in the method SOPs, the laboratory has general procedures to be followed to determine when departures from the documented policies and procedures and quality control have occurred (refer to Section 11). The documentation of these procedures is through the use of an NCM or record in the ICAT system.

For specific criteria and corrective actions, refer to the analytical methods or specific method SOPs. The laboratory may also maintain controlled Work Instructions for Forms detailing these items. These procedures also detail the actions to be taken and by whom, for method and/or QC departures and non-conformances.

To the extent possible, samples shall be reported only if all quality control measures are acceptable. If the deficiency does not impair the usability of the results, data will be reported with an appropriate data qualifier and/or the deficiency will be noted in the case narrative. Where sample results may be impaired, the PM is notified by an NCM and appropriate corrective action (e.g., reanalysis) is taken and documented.

12.5) Corrections to Data / Records

When mistakes occur in records, each mistake shall be crossed-out with a single line (not obliterated, e.g. no white-out, erasure, scribble out, etc.), and the correct value entered alongside. All such corrections shall be initialed (or signed) and dated by the person making the correction.

This same process applies to adding additional information to a record. All additions made later to the original record must also be initialed (or signed) and dated by the person making the addition. When corrections are due to reasons other than obvious transcription errors, the reason for the corrections (or additions) shall also be documented. In the case of records stored electronically, the original uncorrected file must be maintained intact and a second corrected file is created.

13) PREVENTIVE ACTION / IMPROVEMENT

13.1) Overview

The laboratory's preventive action programs minimize or eliminate potential causes of nonconforming product and/or nonconformance to the quality system. This preventive action process is a proactive and continuous process of improvement activities that can be initiated through feedback from clients, employees, business providers, and affiliates. The QA Department has the overall responsibility to ensure that the preventive action process is in place, and that relevant information on actions is submitted for management review.

Dedicating resources to an effective preventive action system emphasizes the laboratory's commitment to its Quality Management Program. It is beneficial to identify and address negative trends before they develop into significant complaints, problems and corrective actions. Additionally, the laboratory continually strives to improve customer service and client satisfaction through continuous improvements to laboratory systems.

Opportunities for improvement may be discovered through any of the following:

- review of the monthly Quality Metrics Report
- trending NCMs
- review of control charts and QC results
- trending proficiency testing (PT) results
- performance of management system reviews
- trending client complaints
- review of processing operations
- staff observations.

The monthly Quality Metrics Report shows performance indicators in all areas of the laboratory and quality system. These areas include revised reports, corrective actions, audit findings, internal auditing and data authenticity audits, client complaints, PT samples, holding time violations, SOPs, ethics training, etc. The metrics report is reviewed monthly by the laboratory management, NBLSC QA Team and Local and Executive Management. These metrics are used in evaluating the management and quality system performance on an ongoing basis and provide a tool for measuring risk and identifying areas for improvement.

Items identified as continuous improvement opportunities to the management system may be issued as goals from the annual management systems review, recommendations from internal audits, or as management or NBLSC level initiatives.

The laboratory's corrective action process is integral to implementation of preventive actions. A critical piece of the corrective action process is the implementation of actions to prevent further occurrence of a non-compliance event. Historical review of corrective action and non-conformances provides a valuable mechanism for identifying preventive action opportunities.

13.1.1) The following elements are part of a preventive action/process improvement system:

- Identification of an opportunity for preventive action or process improvement.
- Process for the preventive action or improvement.
- Define the measurements of the effectiveness of the process once undertaken.
- Execution of the preventive action or improvement.
- Evaluation of the plan using the defined measurements.
- Verification of the effectiveness of the preventive action or improvement.
- Close-Out by documenting any permanent changes to the Quality System as a result of the Preventive Action or Process Improvement.

Documentation of Preventive Action/Process Improvement is incorporated into the monthly QA reports, corrective action process, and management review.

13.1.2) Any preventive actions/process improvement undertaken or attempted shall be taken into account during the annual Management Systems Review (Section 16). A highly detailed report is not

required; however, a summary of successes and failures within the preventive action program is sufficient to provide management with a measurement for evaluation.

14) CONTROL OF RECORDS

The laboratory maintains a records management system appropriate to its needs and that complies with applicable standards or regulations as required. The system produces unequivocal, accurate records that document all laboratory activities. The laboratory retains all original observations, calculations and derived data, calibration records and a copy of the analytical report for a minimum of five (5) years after it has been issued. Exceptions for programs with longer retention requirements are discussed in Section 14.2.

14.1) Overview

The laboratory has established procedures for identification, collection, indexing, access, filing, storage, maintenance and disposal of quality and technical records. Detailed information on retention of specific records is provided in NBLSC Document No/s. *NDSC-US-LEG-QP54927* (Records Retention Policy) and *NDSC-US-LEG-FRM58366* (Records Retention/Storage Schedule). Quality records and files are maintained by the QA department on the Corporate QA server, which is backed up as part of the regular laboratory backup. Records are of two types; either electronic or hard copy paper formats depending on whether the record is computer or hand generated (some records may be in both formats). Technical records such as logbooks and hard copy data are maintained by the appropriate laboratory technical staff until they are turned in and archived by QA.

14.1.1) Retention of Records

All records are stored and retained in such a way that they are secure and readily retrievable at the laboratory facility or an offsite location that provides a suitable environment to prevent damage or deterioration and to prevent loss at the laboratory or the offsite location. All records shall be protected against fire, theft, loss, environmental deterioration, and vermin. In the case of electronic records, electronic or magnetic sources, storage media are protected from deterioration caused by magnetic fields and/or electronic deterioration.

Access to the data is limited to laboratory and company employees and shall be documented with an access log. Records archived off-site are stored in a secure location where a record is maintained of any entry into the storage facility. Whether on-site or off-site storage is used, logs are maintained in each storage box to note removal and return of records. Retention of records are maintained on-site at the laboratory for at least one month after their generation and moved offsite for the remainder of the required storage time. Records are maintained for a minimum of five (5) years unless otherwise specified by a client or regulatory requirement.

For raw data and project records, record retention shall be calculated from the date the project report is issued. For other records, such as NBLSC Documents, QA, or Administrative Records, the retention time is calculated from the date the record is formally retired.

14.1.2) Record Keeping System

The laboratory has procedures to protect and back-up records stored electronically and to prevent unauthorized access to or amendment of these records. All analytical data is maintained as hard copy or in a secure readable electronic format.

The record keeping system allows for historical reconstruction of all laboratory activities that produced the analytical data, as well as rapid recovery of historical data. (Records stored off site should be accessible within 2 days of a request for such records.) The history of the sample from when the laboratory took possession of the samples must be readily understood through the documentation. This shall include inter-laboratory transfers of samples and/or extracts.

- The records include the identity of personnel involved in sampling, sample receipt, preparation, or testing. All analytical work contains the initials (at least) of the personnel involved. The laboratory's copy of the COC is stored electronically with the applicable job documents in LIMS. The chain of custody would indicate the name of the sampler. If any sampling notes are provided with a job, they are kept with this package.
- All information relating to the laboratory facility's equipment, analytical test methods, and related laboratory activities, such as sample receipt, sample preparation, or data verification are documented.
- The record keeping system facilitates the retrieval of all working files and archived records for inspection and verification purposes. Instrument data is stored sequentially by instrument. A given day's analyses are maintained in the order of the analysis. Run logs are maintained for each instrument or method; a copy of each day's run log or instrument sequence is stored with the data to aid in re-constructing an analytical sequence. Where an analysis is performed without an instrument, bound logbooks or bench sheets are used to record and file data. (Alternatively, this analysis data may be captured entirely in the electronic record in LIMS.) Standard and reagent information is recorded in logbooks or entered into LIMS for each method as required.
- Changes to hardcopy records shall follow the procedures outlined in Section 12 and 17. Changes to electronic records in LIMS or instrument data are recorded in audit trails.
- The reason for a signature or initials on a document is clearly indicated in the records such as "sampled by", "prepared by", "reviewed by", or "analyzed by".
- All generated data except those that are generated by automated data collection systems, are recorded directly, promptly and legibly in permanent dark ink.
- Hard copy data may be scanned into PDF format for record storage as long as the scanning process can be verified in order to ensure that no data is lost and the data files and storage media must be tested to verify the laboratory's ability to retrieve the information prior to the destruction of the hard copy that was scanned.
- Also refer to Section 17.12 - Control of Data.

14.2) Programs with Longer Retention Requirements

Some regulatory programs have longer record retention requirements than the standard record retention time. These are detailed in the table below with their retention requirements. In these cases, the longer retention requirement is enacted. If special instructions exist such that client data cannot be destroyed prior to notification of the client, the container or box containing that data is marked as to who to contact for authorization prior to destroying the data.

Program	Retention Requirement[1]
Drinking Water - All states	10 years (lab reports and raw data) 10 years - Radiochemistry (project records)
Drinking Water - Lead and Copper Rule	12 years (project records)
Commonwealth of MA - All environmental data 310 CMR 42.14	10 years
FIFRA - 40 CFR Part 160	Retain for life of research or marketing permit for pesticides regulated by EPA
Housing and Urban Development (HUD) - Environmental lead testing	10 years
Alaska	10 years
Louisiana - All	10 years
Michigan Department of Environmental Quality - all environmental data	10 years
Minnesota Department of Commerce - records for Petrofund program	7 years
Ohio VAP	10 years and state contacted prior to disposal
OSHA	30 years

[1]Extended retention requirements must be noted with the archive documents or addressed in facility-specific records retention procedures.

14.3) Technical and Analytical Records

The laboratory retains records of original observations, derived data and sufficient information to establish an audit trail, calibration records, staff records and a copy of each analytical report issued, for a minimum of five years unless otherwise specified by a client or regulatory requirement. The records for each analysis shall contain sufficient information to enable the analysis to be repeated under conditions as close as possible to the original. The records shall include the identity of laboratory personnel responsible for performance of each analysis and reviewing results.

Observations, data and calculations are recorded real-time and are identifiable to the specific task. Changes to electronic records in LIMS or instrument data are recorded in audit trails.

The essential information to be associated with analysis, such as instrument printouts, computer data files, analytical notebooks, and run logs, include:

- Laboratory sample ID code;
- Date of analysis; time of analysis is also required if the holding time is seventy-two (72) hours or less, or when time critical steps are included in the analysis (e.g., drying times, incubations, etc.); instrumental analyses have the date and time of analysis recorded as part of their general operations. Where a time critical step exists in an analysis, location for such a time is included as part of the documentation in a specific logbook or on a benchsheet;
- Instrumentation identification and instrument operating conditions/parameters. Operating conditions/parameters are typically recorded in instrument maintenance logs where available;
- Analysis type;
- All manual calculations and manual integrations;
- Analyst's or operator's initials/signature;
- Sample preparation including cleanup, separation protocols, incubation periods or subculture, ID codes, volumes, weights, instrument printouts, meter readings, calculations, reagents;
- Test results;
- Standard and reagent origin, receipt, preparation, and use;
- Calibration criteria, frequency and acceptance criteria;
- Data and statistical calculations, review, confirmation, interpretation, assessment and reporting conventions;
- Quality control protocols and assessment;
- Electronic data security, software documentation and verification, software and hardware audits, backups, and records of any changes to automated data entries; and
- Method performance criteria including expected quality control requirements. These are indicated both in LIMS and on specific analytical report formats.

All logbooks used during receipt, preparation, storage, analysis, and reporting of samples or monitoring of support equipment shall undergo a periodic, documented supervisory or peer review.

14.4) Laboratory Support Activities

In addition to documenting all the above-mentioned activities, the following are retained QA records and project records (previous discussions in this section relate where and how these data are stored):

- All original raw data, whether hard copy or electronic, for calibrations, samples and quality control measures, including analysts' work sheets and data output records (chromatograms, strip charts, and other instrument response readout records);
- A written description or reference to the specific test method used which includes a description of the specific computational steps used to translate parametric observations into a reportable analytical value;
- Copies of final reports;
- Archived SOPs;
- Correspondence relating to laboratory activities for a specific project;
- All corrective action reports, audits and audit responses;
- Proficiency test results and raw data; and

- Results of data review, verification, and crosschecking procedures

Records of all procedures to which a sample is subjected while in the possession of the laboratory are maintained. These include but are not limited to records pertaining to:

- Sample preservation including appropriateness of sample container and compliance with holding time requirements;
- Sample identification, receipt, acceptance or rejection and login;
- Sample storage and tracking including shipping receipts, sample transmittal/COC forms; and
- Procedures for the receipt and retention of samples, including all provisions necessary to protect the integrity of samples.

14.5) Administrative Records

The laboratory also maintains the administrative records in either electronic or hard copy form in accordance with the NBLSC Document No. *NDSC-US-LEG-FRM58366* - Records Retention/Storage Schedule.

14.6) Records Management, Storage, and Disposal

All records (including those pertaining to test equipment), certificates and reports are safely stored, held secure and in confidence to the client. Certification related records are available upon request.

All information necessary for the historical reconstruction of data is maintained by the laboratory. Records that are stored only on electronic media must be supported by the hardware and software necessary for their retrieval. Records that are stored or generated by computers or personal computers have hard copy, write-protected backup copies, or an electronic audit trail controlling access.

The laboratory has a record management system (a.k.a., document control) for control of laboratory notebooks, instrument logbooks, standards logbooks, and records for data reduction, validation, storage and reporting. Laboratory notebooks are issued on a per analysis basis, and are numbered sequentially. All data are recorded sequentially within a series of sequential notebooks. Bench sheets are filed sequentially. Standards are maintained in LIMS – no logbooks are used to record that data. Records are considered archived when noted as such in the record management system.

14.6.1) Transfer of Ownership

In the event that the laboratory transfers ownership or goes out of business, the laboratory shall ensure that the records are maintained or transferred according to clients' instructions. Upon ownership transfer, record retention requirements shall be addressed in the ownership transfer agreement and the responsibility for maintaining archives is clearly established. In addition, in cases of bankruptcy, appropriate regulatory and state legal requirements concerning laboratory records must be followed. In the event of the closure of the laboratory, all records will revert to the control of NBLSC. Should the entire company cease to exist, as much notice as possible will be given to clients and the accrediting bodies who have worked with the laboratory during the previous five (5) years of such action.

14.6.2) Records Disposal

Records are removed from the archive and destroyed after five (5) years unless otherwise specified by a client or regulatory requirement. On a project- or program-specific basis, clients may need to be notified prior to record destruction. Records are destroyed in a manner that ensures their confidentiality such as shredding, mutilation or incineration.

Electronic copies of records must be destroyed by erasure or physically damaging off-line storage media so no records can be read.

If a third party records management company is hired to dispose of records, a "Certificate of Destruction" (or however named) is required.

15) AUDITS

15.1) Internal Audits

Internal audits are performed to verify that laboratory operations comply with the requirements of the laboratory's quality system and with the external quality programs under which the laboratory operates. Audits are planned and organized by the QA staff. Personnel conducting the audits should be independent of the area being evaluated. Auditors will have sufficient authority, access to work areas, and organizational freedom necessary to observe all activities affecting quality and to report the assessments to laboratory management and, when requested, to NBLSC Management.

Audits are conducted and documented as described in NBLSC Document No. *NDSC-IA-SOP5260* - Internal Auditing. Special or ad hoc assessments may be conducted as needed under the direction of the QA staff.

15.1.1) Annual Quality Systems Audit

An annual quality systems audit is required to ensure compliance to analytical methods and SOPs, Eurofins Data Integrity and Ethics Policies (see Section 5.2), TNI quality systems, client and state requirements, and the effectiveness of the internal controls of the analytical process, including but not limited to data review, quality controls, preventive action and corrective action. The completeness of earlier corrective actions is assessed for effectiveness & sustainability. The audit is divided into sections for each operating or support area of the lab, and each section is comprehensive for a given area. The area audits may be performed on a rotating schedule throughout the year to ensure adequate coverage of all areas. This schedule may change as situations in the laboratory warrant.

15.1.2) QA Technical Audits

QA technical audits assess data authenticity and analyst integrity. These audits are based on client projects, associated sample delivery groups, and the methods performed. Reported results are compared to raw data to verify the authenticity of results. The validity of calibrations and QC results are compared to data qualifiers, footnotes, and case narratives. Documentation is assessed by examining run logs and records of manual integrations. Manual calculations are checked. Where possible, electronic audit miner programs (e.g., Chrom AuditMiner) are used to identify unusual manipulations of the data deserving closer scrutiny. QA technical audits will include all methods within a two-year period.

15.1.3) SOP Method Compliance

Compliance of all SOPs with the source methods and compliance of the operational groups with the SOPs will be assessed by the Technical Manager or qualified designee at least every two years. (Annually for methods and administrative SOPs related to Drinking Water compliance methods.) It is also recommended that the work of each newly hired analyst is assessed within 3 months of working independently, (e.g., completion of method IDOC). In addition, as an analyst adds methods to his/her capabilities (new IDOC), review of the analyst's work products should be performed within 3 months of completing the documented training.

15.1.4) Special Audits

Focused audits are conducted on an as needed basis, generally as a follow up to specific issues such as client complaints, corrective actions, PT results, data audits, system audits, validation comments,

regulatory audits or suspected ethical improprieties. Special audits are focused on a specific issue, and report format, distribution, and timeframes are designed to address the nature of the issue.

15.1.5) Performance Testing

The laboratory participates semi-annually (or in some cases, annually) in performance audits conducted through the analysis of PT samples provided by a third party. The laboratory participates in the following types of semi-annual PT studies:

- Drinking Water (WS)
- Non-Potable Water (WP)
- Soil/Hazardous Waste (HW)
- Underground Storage Tank Programs (UST)

The laboratory participates in the following types of annual PT studies:

- Drinking Water Microbiology (WSM)
- Non-Potable Water Microbiology (WPM)
- Air and Emissions (AE)

It is Eurofins' policy that PT samples be treated as typical samples in the production process. Furthermore, where PT samples present special or unique problems in the regular production process they may need to be treated differently, as would any special or unique request submitted by any client. The QA Manager must be consulted and in agreement with any decisions made to treat a PT sample differently due to some special circumstance. PT samples are processed in accordance with NBLSC Document No. *NDSC-APT-SOP56445* - Processing of Proficiency Test Samples.

Written investigations for unacceptable PT results are required. (Refer to laboratory SOP No. *CED-Q-APT-SOP42901*.) In some cases it may be necessary for blind QC samples to be submitted to the laboratory to show a return to control.

15.2) External Audits

External audits are performed when certifying agencies or clients conduct on-site inspections or submit performance testing samples for analysis. It is Eurofins' policy to cooperate fully with regulatory authorities and clients. The laboratory makes every effort to provide the auditors with access to personnel, documentation, and assistance. Laboratory supervisors are responsible for providing corrective actions to the QA Manager who coordinates the response. Audit responses are due in the time allotted by the client or agency performing the audit.

The laboratory cooperates with clients and their representatives to monitor the laboratory's performance in relation to work performed for the client. The client may only view data and systems related directly to the client's work. All efforts are made to keep other client information confidential.

During on-site audits, auditors may come into possession of information claimed as Confidential Business Information (CBI). A business confidentiality claim is defined as "a claim or allegation that business information is entitled to confidential treatment for reasons of business confidentiality or a request for a determination that such information is entitled to such treatment." When information is claimed as business confidential, the laboratory must place on (or attach to) the information at the time it is submitted to the auditor, a cover sheet, stamped or typed legend or other suitable form of notice, employing language such as "trade secret", "proprietary" or "company confidential". Confidential portions of documents otherwise non-confidential must be clearly identified. CBI may be purged of references to client identity by the responsible laboratory official at the time of removal from the laboratory. However, sample identifiers may not be obscured from the information. Additional information regarding CBI can be found in within the 2009 and 2016 TNI standards.

15.3) Audit Findings

Audit findings, deviations, or however named are documented using the corrective action process and database (see Section 12). The laboratory's corrective action documentation must include the

investigation, root cause(s), action(s) with timelines, and supporting documentation of proof of completion. The responses to the agency may include action plans that could not be completed prior to the response due date. In these instances, a completion date must be set and agreed to by Operations management and the QA Manager.

Developing and implementing corrective actions to findings is the responsibility of the Technical Manager where the finding originated. Findings that are not corrected by specified due dates are reported monthly to management in the monthly quality metrics report.

If any audit finding casts doubt on the effectiveness of the operations or on the correctness or validity of the laboratory's test results, the laboratory shall take timely corrective action, and shall notify clients in writing if the investigations show that the laboratory results have been affected. Once corrective action is implemented, a follow-up evaluation is scheduled to ensure that the problem has been corrected.

Clients must be notified promptly in writing of any event such as the identification of defective measuring or test equipment that casts doubt on the validity of results given in any test report or amendment to a test report. The investigation must begin within 24 hours of confirmation of the problem and all efforts are made to notify the client within two weeks after the completion of the investigation.

16) MANAGEMENT REVIEWS

16.1) Quality Metrics Report

The QA Department is responsible for preparing a comprehensive monthly metrics report to Management to keep them apprised of current quality system related issues. This report fosters communication, review, and refinement of the quality system to evaluate the suitability of policies and procedures to meet both regulatory and laboratory quality objectives.

The NBLSC QA team compiles information from all of the Eurofins Environment Testing laboratories' monthly metrics reports for the Executive Management team. This report includes notable information and concerns regarding the laboratories' quality system programs, overall concerns across the laboratories, and information regarding new regulations that may potentially affect the Eurofins businesses.

16.2) Annual Management Review

The BU Management team (BUMA, Technical Managers, QA Manager) conducts a review annually of its quality and management systems to ensure its continuing suitability and effectiveness in meeting client and regulatory requirements and to introduce any necessary changes or improvements. It will also provide a platform for defining goals, objectives and action items that feed into the laboratory planning system. NBLSC personnel are included in this meeting at the discretion of the BUMA.

Details on the review process and agenda topics to be addressed are covered in NBLSC Document No. *NDSC-IA-QP38702* - Management Systems Review. Checklists/templates that can be used to document the review are available under document *NDSC-IA-FRM43453* - Annual Management Systems Review Checklists. The review uses information generated during the preceding year to assess the "big picture" by ensuring that routine actions taken and reviewed on a monthly basis are not components of larger systematic concerns. The monthly review should keep the quality systems current and effective, therefore, the annual review is a formal senior management process to review specific existing documentation.

Significant issues from the following documentation are compiled or summarized by the BUMA and QA Manager prior to the review meeting:

- Matters arising from the previous annual review

- Prior Monthly QA Reports issues
- Laboratory QA Metrics
- Review of report reissue requests
- Review of client feedback and complaints
- Issues arising from any prior management or staff meetings
- Minutes from prior senior lab management meetings. Issues that may be raised from these meetings include:
  - Adequacy of staff, equipment and facility resources
  - Adequacy of policies and procedures
  - Future plans for resources and testing capability and capacity
- The annual internal double blind PT program sample performance (if performed),
- Compliance to the Ethics and Data Integrity Policy, including any evidence/incidents of inappropriate actions or vulnerabilities related to data integrity.
- For labs analyzing radioactive samples, also include the following:
  - Radiation health and safety
  - Radioactive hazardous waste management
  - Radioactive materials management
- Evaluation of overall risk, including risks to impartiality, confidentiality, reporting statements of conformity, and nonconforming work

A report is generated by the QA Manager and BUMA. The report is distributed to the Laboratory Management team, President of the Business Unit, and Quality Director. The report includes, but is not limited to:

- The date of the review and the names and titles of participants
- A reference to the existing data quality related documents and topics that were reviewed
- Quality system or operational changes or improvements that will be made as a result of the review [e.g., an implementation schedule including assigned responsibilities for the changes (Action Table)].

17) TEST METHODS AND METHOD VALIDATION

17.1) Overview

The laboratory uses methods that are appropriate to meet our clients' requirements and that are within the scope of the laboratory's capabilities. These include sampling, handling, transport, storage and preparation of samples, and, where appropriate, an estimation of the measurement of uncertainty as well as statistical techniques for analysis of environmental data.

Instructions are available in the laboratory for the operation of equipment as well as for the handling and preparation of samples. All instructions, Standard Operating Procedures (SOPs), reference methods and manuals relevant to the working of the laboratory are readily available to all staff. Deviations from published methods are documented (with justification) in the laboratory's approved SOPs. SOPs are submitted to clients and regulatory agencies for review at their request. Significant deviations from published methods require client approval and regulatory approval where applicable.

17.2) Standard Operating Procedures (SOPs)

The laboratory maintains SOPs that accurately reflect all phases of the laboratory such as customer service, sample receipt/login procedures, technical methods (preparatory and analytical procedures), sample disposal, and other support activities. The method SOPs are derived from the most recently promulgated/approved, published methods and are specifically adapted to the laboratory facility. Modifications or clarifications to published methods are clearly noted in the SOPs. All SOPs are controlled in the laboratory.

- All SOPs contain a revision number, effective date, and appropriate approval signatures. Controlled copies are available to all staff.

- Procedures for writing an SOP are addressed in *CED-Q-DC-WI45965* - Writing and Reviewing Laboratory Documents in D4Handbooks.
- SOPs are reviewed at a minimum of every 2 years (annually for Drinking Water method SOPs), and where necessary, revised to ensure continuing suitability and compliance with applicable requirements.

17.3) Laboratory Methods Manual

For each test method, the laboratory shall have available the published referenced method as well as the laboratory developed SOP.

> Note: If more stringent standards or requirements are included in a mandated test method or regulation than those specified in this QA manual, the laboratory shall demonstrate that such requirements are met. If it is not clear which requirements are more stringent, the standard from the method or regulation is to be followed. Any exceptions or deviations from the referenced methods or regulations are noted in the specific analytical SOP.

The laboratory maintains an SOP Index for both technical and non-technical SOPs. Technical SOPs are maintained to describe a specific test method. Non-technical SOPs are maintained to describe functions and processes not related to a specific test method.

17.4) Selection of Methods

Since numerous methods and analytical techniques are available, continued communication between the client and laboratory is imperative to assure the correct methods are utilized. Once client methodology requirements are established, this and other pertinent information is summarized by the PM. These mechanisms ensure that the proper analytical methods are applied when the samples arrive for log-in. For non-routine analytical services (e.g., special matrices, non-routine compound lists), the method of choice is selected based on client needs and available technology. The methods selected should be capable of measuring the specific parameter of interest, in the concentration range of interest, and with the required precision and accuracy.

Refer to Appendix 5 for a list of the currently accepted referenced methods in use by the laboratory.

17.4.1) Sources of Methods

Routine analytical services are performed using standard EPA-approved methodology. In some cases, modification of standard approved methods may be necessary to provide accurate analyses of particularly complex matrices. When the use of specific methods for sample analysis is mandated through project or regulatory requirements, only those methods shall be used.

When clients do not specify the method to be used or methods are not required, the methods used will be clearly validated and documented in an SOP and available to clients and/or the end user of the data.

The laboratory reviews updated versions to all the aforementioned references for adaptation based upon capabilities, instrumentation, etc., and implements them as appropriate. As such, the laboratory strives to perform only the latest versions of each approved method as regulations allow or require.

Other reference procedures for non-routine analyses may include methods established by specific states (e.g., Underground Storage Tank methods), ASTM or equipment manufacturers. Sample type, source, and the governing regulatory agency requiring the analysis will determine the method utilized.

The laboratory shall inform the client when a method proposed by the client may be inappropriate or out of date. After the client has been informed, and they wish to proceed contrary to the laboratory's recommendation, it will be documented.

17.4.1.1) Client Supplied, Laboratory Developed, and/or Non-Standard Methods

Most of the client-supplied method requirements presented to us involve achieving specific quality control criteria, limits of quantitation (LOQ), and/or method detection limits (MDL) using standard EPA methods. These requirements are communicated to the appropriate technical groups prior to the project start up. Each technical group evaluates the scope of work and the requirements to ensure the criteria can be met using the standard EPA method. The data is monitored to ensure the criteria are met throughout the project. The PM notifies the client if there is a more appropriate method available or if the client's criteria cannot be achieved on a certain sample matrix (i.e., due to matrix or dilutions).

The laboratory may be asked by a client to perform testing using a non-standard method or to develop a client/project specific method. Performance evaluation will be reviewed by the laboratory and the client. When consensus is reached on the method procedure, the laboratory determines the linearity, specificity, precision, accuracy, MDL, and LOQ by performing calibrations, analyzing method blanks, and carrying out method detection limit and IDOC studies, as applicable. The standard operating procedure is written and submitted to the client with the results of the validation. These steps are completed prior to analysis of actual samples.

17.4.1.2) Procedural Deviations

Analysts are required to follow a documented method for all tests performed; and any deviations from analytical methods must be documented, approved, and justified in an appropriate and consistent manner. We classify method deviations as either being a planned deviation or an unplanned deviation. In general, the following information is captured to document both types of situations:

- Description of the situation;
- Reason or justification for the deviation;
- Relevance the deviation has on the testing;
- Signature/date of analyst performing the test;
- Signature/date of QA and Laboratory management approving the deviation;
- Signature/date of client approval, if necessary.

Deviations to written procedures are documented in raw data records and/or the corrective action system (i.e., NCM or ICAT). Both types of documentation require management review and approval.

17.4.2) Demonstration of Capability

Before the laboratory may institute a new method and begin reporting results, the laboratory shall confirm that it can properly operate the method. In general, this demonstration does not test the performance of the method in real world samples, but in an applicable and available clean matrix sample. If the method is for the testing of analytes that are not conducive to spiking, demonstration of capability may be performed on quality control samples.

A demonstration of capability (DOC; see laboratory SOP No. *CED-R-PE-SOP42903*) is performed whenever there is a change in instrument type (e.g., new instrumentation), matrix, method or personnel (e.g., new analyst).

> Note: The laboratory shall have a DOC for all analytes included in the methods that the laboratory performs, and proficiency DOCs for each analyst shall include all analytes that the laboratory routinely performs. Addition of non-routine analytes does not require new DOCs for all analysts if those analysts are already qualified for routine analytes tested using identical chemistry and instrument conditions.

The initial demonstration of capability must be thoroughly documented and approved by the Technical Manager and QA Manager prior to independently analyzing client samples. All associated documentation must be retained in accordance with the laboratory's archiving procedures.

The laboratory must have an approved SOP, demonstrate satisfactory performance, and conduct an MDL study (when applicable). There may be other requirements as stated within the published method or regulations (e.g., retention time window study).

17.4.3) Initial Demonstration of Capability (IDOC) Procedures

The general procedure for completing an IDOC is summarized below. For a full description, refer to laboratory SOP No. *CED-R-PE-SOP42903* - Personnel Training and Demonstration of Capability Procedures.

a) The analyte(s) shall be diluted in a volume of clean matrix sufficient to prepare four (4) aliquots at the concentration specified by a method or in the laboratory SOP.

b) At least four (4) aliquots shall be prepared and analyzed according to the test method, either concurrently or over a period of days.

c) Using all of the results, calculate the mean recovery in the appropriate reporting units and the standard deviations of the sample (in the same units) for each analyte of interest. When it is not possible to determine mean and standard deviations, such as for presence/absence and logarithmic values, the laboratory shall assess performance against established and documented criteria (refer to the applicable method SOP).

d) Compare the information from (c) above to the corresponding acceptance criteria for precision and accuracy in the test method (if applicable) or in laboratory-generated acceptance criteria (if there are not established mandatory criteria). If all analytes meet the acceptance criteria, the analysis of actual samples may begin. If any one of the analytes does not meet the acceptance criteria, the performance is unacceptable for that analyte.

e) When one or more of the tested analytes fail at least one (1) of the acceptance criteria, the analyst must proceed according to i) or ii) below.

i. Locate and correct the source of the problem and repeat the test for all analytes of interest beginning with b) above.

ii. Beginning with b) above, repeat the test for all analytes that failed to meet criteria.

f) Repeated failure, however, confirms a general problem with the measurement system. If this occurs, locate and correct the source of the problem and repeat the test for all analytes of interest beginning with b).

g) When an analyte not currently found on the laboratory's list of accredited analytes is added to an existing accredited method, an initial demonstration shall be performed for that analyte.

Note: Results of successive LCS analyses can be used to fulfill the DOC requirement.

17.5) Method Detection Limit (MDL) / Limit of Detection (LOD)

Details of the laboratory's procedure for conducting MDL studies are given in NBLSC Document No. *NDSC-US-TS-SOP42091* - Detection and Quantitation Limits.

The MDL is the minimum measured quantity of a substance that can be reported with 99% confidence that the concentration is distinguishable from method blank results, consistent with 40CFR Part 136 Appendix B, (August 2017). The MDL is equivalent to the TNI LOD or DL. The working or final MDL is the higher of the MDL value determined from spikes (MDL_s) and the MDL value determined from blanks (MDL_b).

An initial MDL study shall be performed during the method validation process and when the method is altered in a way that can reasonably be expected to change its sensitivity. On-going data are collected during each quarter in which samples are being analyzed. If it is found during the re-evaluation of detection limit results that more than 5% of the on-going spiked samples do not return positive

numeric results that meet all method qualitative identification criteria, then the spiking level shall be increased and the initial MDL study will be repeated at the new spiking concentration.

At least once every 13 months the MDL_s and MDL_b are re-calculated and re-evaluated using data collected during the preceding period.

17.6) Instrument Detection Limit (IDL)

The IDL is sometimes used to assess the reasonableness of the MDL or in some cases required by the analytical method or program requirements. IDLs are most commonly used in metals analyses but may be useful in demonstration of instrument performance in other areas.

IDLs are calculated to determine an instrument's sensitivity independent of any preparation method. IDLs may be calculated either using >7 replicate spike analysis, like MDL but without sample preparation, or by the analysis of >10 instrument blanks and calculating the standard deviation multiplied by the appropriate *t*-statistic.

17.7) Reporting Limit (RL) / Limit of Quantitation (LOQ)

The LOQ (equivalent to the Reporting Limit, or RL) shall be at a concentration equivalent to the lowest calibration standard concentration, with the exception of methods using a single-point calibration, and shall be greater than the MDL. The LOQ is verified by preparing and analyzing spikes at concentrations 1-2 times the selected LOQ, employing the complete analytical process.

When the laboratory establishes a quantitation limit, it must be initially verified by the analysis of a low level standard or QC sample at 1-2 times the reporting limit or by a DL check samples at or below the LOQ. The LOQ is verified annually thereafter. The annual requirement is waived for methods that have an annually verified MDL. The laboratory will comply with any regulatory requirements.

17.8) Retention Time Windows

Most organic analyses and some inorganic analyses use chromatography techniques for qualitative and quantitative determinations. For every chromatography analysis or as specified in the reference method, each analyte will have a specific time of elution from the column to the detector. This is known as the analyte's retention time. The variance in the expected time of elution is defined as the retention time window. As the key to analyte identification in chromatography, retention time windows must be established on every column for every analyte used for that method. These records are kept on-file and available for review. Complete details are available in the laboratory's technical method SOPs.

17.9) Evaluation of Selectivity

The laboratory evaluates selectivity by following the checks within the applicable analytical methods, which may include mass spectral tuning, second column confirmation, ICP interelement interference checks, chromatography retention time windows, sample blanks, spectrochemical, atomic absorption or fluorescence profiles, co-precipitation evaluations and/or specific electrode response factors.

17.10) Estimation of Measurement Uncertainty

Uncertainty is "a parameter associated with the result of a measurement, that characterizes the dispersion of the values that could reasonably be attributed to the measurand" (as defined by the International Vocabulary of Basic and General Terms in Metrology, ISO Geneva, 1993, ISBN 92-67-10175-1). Knowledge of the uncertainty of a measurement provides additional confidence in a result's validity. Its value accounts for all the factors which could possibly affect the result, such as adequacy of analyte definition, sampling, matrix effects and interferences, climatic conditions, variances in weights, volumes, and standards, analytical procedure, and random variation. Some national accreditation

organizations require the use of an "expanded uncertainty," defined as the range within which the value of the measurand is believed to lie within at least a 95% confidence level with a coverage factor *k* equal to 2.

Uncertainty is not error. Error is a single value (i.e., the difference between the true result and the measured result). On environmental samples, the true result is never known. The measurement is the sum of the unknown true value and the unknown error. Unknown error is a combination of systematic error, or bias, and random error. Bias varies predictably, constantly, and independently from the number of measurements. Random error is unpredictable, assumed to be Gaussian in distribution, and reducible by increasing the number of measurements.

Further information on the laboratory's procedures for estimating measurement uncertainty can be found in laboratory SOP No. *CED-Q-MU-SOP42898* - Estimating Measurement Uncertainty.

17.11) Sample Reanalysis Guidelines

Because there is a certain level of uncertainty with any analytical measurement, a sample re-preparation (where appropriate) and subsequent analysis (hereafter referred to as "reanalysis") may result in either a higher or lower value from the initial sample analysis. There are also variables that may be present (e.g., sample homogeneity, analyte precipitation over time, etc.) that may affect the results of a reanalysis. Based on the above comments, the laboratory will reanalyze samples at a client's request with the following caveats listed below. Client-specific contractual terms & conditions for reanalysis protocols may supersede the following items.

Homogenous samples: If a reanalysis agrees with the original result to within the RPD limits for MS/MSD or Duplicate analyses, or within ± 1 reporting limit for samples ≤ 5× the reporting limit, the original analysis will be reported. At the client's request, both results may be reported on the same report but not on two separate reports.

- If the reanalysis does not agree (as defined above) with the original result, then the laboratory will investigate the discrepancy and reanalyze the sample a third time for confirmation if sufficient sample is available. (Some clients may request reanalysis be done in duplicate to expedite the confirmation process.)
- Any potential charges related to reanalysis are discussed in the contract terms and conditions or discussed at the time of the request. The client will typically be charged for reanalysis unless it is determined that the laboratory was in error.
- Due to the potential for increased variability, reanalysis may not be applicable to non-homogenous, Encore, and sodium bisulfate preserved samples. See the Area Supervisor or BUMA if unsure.

17.12) Control of Data

The laboratory has policies and procedures in place to ensure the authenticity, integrity, and accuracy of the analytical data generated by the laboratory.

17.12.1) Computer and Electronic Data Related Requirements

The three basic objectives of our computer security procedures and policies are shown below. The laboratory is currently using the Eurofins Laboratory Information System (also known as "TALS"), which has been highly customized to meet the needs of the laboratory.

1.) Maintain the Database Integrity – Assurance that data is reliable and accurate from acquisition through data verification (review) procedures, password-protecting access, anti-virus protection, data change requirements, as well as an internal LIMS permissions procedure.

- LIMS Database Integrity is achieved through data input validation, internal user controls, documentation of system failures and corrective actions taken, and data change requirements.
- Spreadsheets and other software developed in-house must be verified with documentation through hand calculations prior to use. Cells containing calculations must be lock-protected and controlled.

- Instrument hardware and software adjustments are safeguarded through maintenance logs, audit trails and controlled access.

2.) Ensure Information Availability – Protection against loss of information or service is ensured through scheduled back-ups, stable file server network architecture, secure storage of media, line filter, Uninterruptible Power Supply (UPS), and maintaining older versions of software as revisions are implemented.

3.) Maintain Confidentiality – Ensure data confidentiality through physical access controls such as password protection or website access approval when electronically transmitting data.

17.12.2) Data Reduction

The complexity of the data reduction depends on the analytical method and the number of discrete operations involved (e.g., extractions, dilutions, instrument readings and concentrations). The analyst calculates the final results from the raw data or uses appropriate computer programs to assist in the calculation of final reportable values.

For manual data entry (e.g., Wet Chemistry), the data is reduced by the analyst and then verified by the Department Manager or alternate analyst prior to updating the data in LIMS. The spreadsheets, or any other type of applicable documents, are signed by both the analyst and alternate reviewer to confirm the accuracy of the manual entry(s).

Manual integration of peaks will be documented and reviewed and the raw data will be flagged using NBLSC Document No. *NDSC-ETHC-SOP43862* - Manual Integrations.

Analytical results are reduced to appropriate concentration units specified by the analytical method, taking into account factors such as dilution, sample weight or volume, etc. Blank correction will be applied only when required by the method or per manufacturer's indication; otherwise, it should not be performed. Calculations are independently verified by appropriate laboratory staff. Calculations and data reduction steps for various methods are summarized in the respective analytical SOPs or program requirements.

- In general, concentration results are reported in milligrams per liter (mg/L) or micrograms per liter (µg/L) for liquids, and milligrams per kilogram (mg/kg) or micrograms per kilogram (µg/kg) for solids. For values greater than 10,000 mg/L, results can be reported in percent (e.g., 10,000 mg/L = 1%). Units are defined in each laboratory SOP.
- For those methods that do not have an instrument printout or an instrumental output compatible with the LIMS, the raw results and dilution factors are entered directly into LIMS by the analyst, and the software calculates the final result for the analytical report. LIMS has a formatter for significant figure criterion for each analyte.
- All raw data must be retained in the worklist folder, computer file (if appropriate), and/or runlog. All criteria pertinent to the method must be recorded. The documentation is recorded at the time observations or calculations are made and must be signed or initialed/dated (month/day/year). It must be easily identifiable who performed which tasks if multiple people were involved.
- In reporting, the analyst or the instrument output records the raw data result using values of known certainty plus one uncertain digit. If final calculations are performed external to LIMS, the results should be entered in LIMS with at least three significant figures. In general, results are presented on the final report with two or three significant figures, depending on client specifications and the formatter used.
- The laboratory strives to import data directly from instruments or calculation spreadsheets to ensure that the reported data are free from transcription and calculation errors. For those analyses with an instrumental output compatible with the LIMS, the raw results and dilution factors are transferred into LIMS, electronically after reviewing the quantitation report, and removing unrequested or poor spectrally-matched compounds. The analyst may print a copy of what has been entered to check for errors. This printout and the instrument's printout of calibrations, concentrations, retention times, chromatograms, and mass spectra, if applicable, are retained with the data file. The data file is stored in a monthly folder on the instrument computer; periodically, this file is transferred to the server and, eventually, to a tape file.

17.12.3) Logbook / Worksheet Use Guidelines

Logbooks and worksheets are filled out 'real time' and have enough information on them to trace the events of the applicable analysis/task. (e.g. Calibrations, standards, analyst, sample ID, date, time on short holding time tests, temperatures when applicable, calculations are traceable, etc.)

- Corrections are made following the procedures outlined in Section 12.
- Logbooks are controlled by the QA department. A record is maintained of all logbooks in the laboratory.
- Unused portions of pages must be "Z'd" out, signed and dated.
- Worksheets are created with the approval of the Technical Manager/QA Manager at the facility. The QA Manager controls all worksheets following the laboratory's document control procedures.

17.12.4) Review / Verification Procedures

Review procedures are outlined in several laboratory SOPs (i.e., *CED-P-PROJ-SOP42905* for Project Management, *CED-P-SAM-SOP42940* for Sample Control, and *CED-P-REV-SOP42955* for Analytical Data Review) to ensure that reported data are free from calculation and transcription errors; and that QC parameters have been reviewed and evaluated before data is reported. The laboratory also abides by NBLSC Document No. *NDSC-ETHC-SOP43862* discussing acceptable manual integration practices to ensure the authenticity of the data.

The general review concepts are discussed below, more specific information can be found in the laboratory SOPs.

17.12.4.1) Log-In Review - The data review process starts at the sample receipt stage. Sample control personnel review chain-of-custody forms and project instructions from the project management group. This is the basis of the sample information and analytical instructions entered into the LIMS. The log-in instructions are reviewed by the personnel entering the information, and a second level review is conducted by the project management staff.

17.12.4.2) First Level Data Review - The next level of data review occurs with the analysts. As data are generated, analysts review their work to ensure that the results meet project and SOP requirements. First level reviews include inspection of all raw data (e.g., instrument output for continuous analyzers, chromatograms, spectra, and manual integrations), evaluation of calibration/calibration verification data in the day's analytical run, evaluation of QC data, and reliability of sample results. The analyst transfers data into LIMS, data qualifiers are added as needed. A Data Review Checker (DRC) is utilized as a tool to automate review of select method requirements. All first level reviews are documented.

17.12.4.3) Second Level Data Review - All analytical data are subject to review by a second qualified analyst or supervisor. Second level reviews include inspection of all raw data (e.g., instrument output, chromatograms, and spectra) including 100% of data associated with any changes made by the primary analyst, such as manual integrations or reassignment of peaks to different analytes, or elimination of false negative analytes. The second review also includes evaluation of initial calibration/calibration verification data in the day's analytical run, evaluation of QC data, reliability of sample results, qualifiers and NCM narratives. Manual calculations are checked in second level review. A Data Review Checker (DRC) is utilized as a tool to automate review of select method requirements. All second level reviews are documented.

Issues that deem further review include the following:

- QC data are outside the specified control limits for accuracy and precision
- Reviewed sample data does not match with reported results
- Unusual detection limit changes
- Samples having unusually high results
- Samples exceeding a known regulatory limit
- Raw data indicating some type of contamination or poor technique
- Inconsistent peak integration

- Transcription errors
- Results outside of calibration range

17.12.4.4) Unacceptable analytical results may require reanalysis of the samples. Any problems are brought to the attention of the Technical Manager or Supervisor for further investigation. Corrective action is initiated whenever necessary.

17.12.4.5) The results are then entered or directly transferred into the computer database and a PDF is generated for the client.

17.12.4.6) As a final review prior to the release of the report, the Project Manager reviews the results for appropriateness and completeness. This review and approval ensures that client requirements have been met and that the final report has been properly completed. The process includes, but is not limited to, verifying that the COC is followed, cover letters / narratives are present, flags are appropriate, and project specific requirements are met. The Project Manager may also evaluate the validity of results for different test methods given expected chemical relationships.

17.12.4.7) Any project that requires a data package is subject to a tertiary data review for transcription errors and acceptable quality control requirements. The Project Manager then signs the final report. The accounting personnel also check the report for any clerical or invoicing errors. When complete, the report is sent out to the client.

17.12.4.8) A brief overview of sample flow and information through the laboratory, as well as data review and validation, is presented below.

Action	Personnel Involved
Bottle orders generated upon request • Bottles packed and shipped to the client under COC	Client Service Personnel/PM/PMA; Bottle Preparation Personnel
Samples received at the laboratory • Unpacked and reconciled against client paperwork or COC • Sample acceptance documented against completed COC[1]	Sample Login Personnel
Sample storage • Short TATs and hold-time samples are delivered directly to laboratory for analysis • Samples stored in assigned locations (refrigerated walk-in coolers, freezers, VOA refrigerator, etc.)	Sample Login Personnel
Sample receipt acknowledgement sent to client	PM/PMA
Sample acquisition and testing • Analysts retrieve samples from assigned storage • Legal COC samples are signed in-and-out of storage • Remaining sample returned to storage	Sample Login Personnel; Analysts
Preparation and analysis is performed according to selected analytical method and applicable Project notes • Raw data recorded/reviewed[2] • Data imported into LIMS	Analysts
LIMS performs calculations • Data reviewed by primary/secondary analysts • Data approved as final	Data Process (LIMS / Analyst)
Generation, review, and release of reports (automated through LIMS)	PM

• Electronic copy saved in LIMS	
Electronic data deliverables (EDDs) generated as applicable	EDD Group
Hard copy and electronic batch raw data is archived according to data archiving procedures	Analysts; IT

[1]Refer to Section 21.3
[2]Analyses requiring the analyst's interpretation may involve manual data reduction before entry into LIMS.

17.12.5) Manual Integrations

Computerized data systems provide the analyst with the ability to re-integrate raw instrument data in order to optimize the interpretation of the data. Though manual integration of data is an invaluable tool for resolving variations in instrument performance and some sample matrix problems, when used improperly, this technique would make unacceptable data appear to meet quality control acceptance limits. Improper re-integrations lead to legally indefensible data, a poor reputation, or possible laboratory decertification. Because guidelines for re-integration of data are not provided in the methods and most methods were written prior to widespread implementation of computerized data systems, the laboratory trains all analytical staff on proper manual integration techniques in accordance with NBLSC Document No. *NDSC-ETHC-SOP43862* - Manual Integrations.

18) INSTRUMENTS, EQUIPMENT AND CALIBRATION

18.1) Overview

Instrumentation is purchased on the basis of accuracy, dependability, efficiency and sensitivity. Each laboratory is furnished with all items of sampling, preparation, analytical testing and measurement equipment necessary to correctly perform the tests for which the laboratory has capabilities. Each piece of equipment is capable of achieving the required accuracy and complies with specifications relevant to the method being performed. Before being placed into use, the equipment (including sampling equipment) is calibrated and checked to establish that it meets its intended specification. The calibration routines for analytical instruments establish the range of quantitation. Calibration procedures are specified in laboratory SOPs. Equipment is only operated by authorized and trained personnel. Manufacturer's instructions for equipment use are readily accessible to all appropriate laboratory personnel.

A list of available laboratory instrumentation is presented below.

Instrument	Number
Autoclave	1
Air incubator	2
Balances (including analytical and top loading)	10
Flashpoint tester	2
Conductivity meter	1
pH meter	2
Discrete analyzer	2
Autotitrator	1
Turbidity meter	1
TOC analyzer	1
Spectrophotometer (VIS)	1

Colorimeter	2
COD Reactor	3
Midi distillation unit	3
TKN block digestor	1
Oven/furnace (for solids determination)	3
BOD autoanalyzer	2
Ion chromatograph	2
Microwave extraction apparatus	1
Ultrasonic extraction apparatus	2
Gas chromatograph/Mass spectrometer (MS)	9
Gas chromatograph/Tandem mass spectrometer (MS/MS)	1
Gas chromatograph/Electron capture detector (ECD)	2
Gas chromatograph/Flame ionization detector (FID)	4
Gas chromatograph/Dual photoionization detector-flame ionization detector (PID-FID)	3
Inductively Coupled Plasma-Atomic Emission Spectrometer (ICP-AES)	1
Inductively Coupled Plasma-Mass Spectrometer (ICP-MS)	3
Cold Vapor Atomic Absorption Spectrophotometer (CVAAS)	1

18.2) Instrument / Equipment Maintenance

The laboratory follows a well-defined maintenance program to ensure proper equipment operation and to prevent the failure of laboratory equipment or instrumentation during use. This program of preventive maintenance helps to avoid delays due to instrument failure.

Routine preventive maintenance procedures and frequency, such as cleaning and replacements, should be performed according to the procedures outlined in the manufacturer's manual. Qualified personnel must also perform maintenance when there is evidence of degradation of peak resolution, a shift in the calibration curve, loss of sensitivity, or failure to continually meet one of the quality control criteria.

Scheduled routine maintenance is defined in each method SOP. It is the responsibility of each Technical Manager to ensure that instrument maintenance logs are kept for all equipment in his/her department. Preventative maintenance procedures are also outlined in analytical SOPs or instrument manuals. (Note: for some equipment, the log used to monitor performance is also the maintenance log. Multiple pieces of equipment may share the same log as long as it is clear as to which instrument is associated with an entry.)

Instrument maintenance logs are controlled and are used to document instrument problems, instrument repair and maintenance activities. Maintenance logs shall be kept for all major pieces of equipment. Instrument maintenance logs may also be used to specify instrument parameters.

- Documentation must include all major maintenance activities such as contracted preventive maintenance and service and in-house activities such as the replacement of electrical components, lamps, tubing, valves, columns, detectors, cleaning and adjustments.

- Each entry in the instrument log includes the analyst's initials, the date, a detailed description of the problem (or maintenance needed/scheduled), a detailed explanation of the solution or maintenance performed, and a verification that the equipment is functioning properly (state what was used to determine a return to control, e.g. CCV run on *'date'* was acceptable, or instrument recalibrated on *'date'* with acceptable verification, etc.) must also be documented in the instrument records.

- When maintenance or repair is performed by an outside agency, service receipts detailing the service performed can be affixed into the logbooks adjacent to pages describing the maintenance performed. This stapled in page must be signed across the page entered and the logbook so that it is clear that a page is missing if only half a signature is found in the logbook.

If an instrument requires repair (subjected to overloading or mishandling), gives suspect results, or otherwise has shown to be defective or outside of specified limits it shall be taken out of operation and tagged as out-of-service or otherwise isolated until such a time as the repairs have been made and the instrument can be demonstrated as operational by calibration and/or verification or other test to demonstrate acceptable performance. The laboratory shall examine the effect of this defect on previous analyses.

In the event of equipment malfunction that cannot be resolved, service shall be obtained from the instrument vendor manufacturer, or qualified service technician, if such a service can be tendered. If on-site service is unavailable, arrangements shall be made to have the instrument shipped back to the manufacturer for repair. Back up instruments, which have been approved, for the analysis shall perform the analysis normally carried out by the malfunctioning instrument. If the back-up is not available and the analysis cannot be carried out within the needed timeframe, the samples shall be subcontracted.

At a minimum, if an instrument is sent out for service or transferred to another facility, it must be recalibrated and the laboratory MDL verified (using an MDLV) prior to return to lab operations.

18.3) Support Equipment

This section applies to all devices that may not be the actual test instrument, but are necessary to support laboratory operations. These include but are not limited to: balances, ovens, refrigerators, freezers, incubators, water baths, temperature measuring devices, thermal/pressure sample preparation devices and volumetric dispensing devices if quantitative results are dependent on their accuracy, as in standard preparation and dispensing or dilution into a specified volume. All raw data records associated with the support equipment are retained to document instrument performance.

18.3.1) Weights and Balances

The accuracy of the balances used in the laboratory is checked every working day, before use, with at least four (4) certified ASTM Class 1 weights spanning the balance's range of use. All balances are placed on level, stable counter tops.

Each balance is calibrated prior to initial serviceable use by an approved external calibration service. An approved external calibration service is a calibration laboratory that is accredited to ISO/IEC 17025 by a recognized accreditation body. Thereafter, all balances are serviced and calibrated annually by a qualified service representative, who supplies the laboratory with a certificate that identifies traceability of the calibration to NIST standards.

All weights (including ASTM Class 1) used for daily balance checks or other purposes are recalibrated/recertified annually to NIST standards by an approved external calibration service.

All of the daily balance verification information is recorded in logbooks, and all of the recalibration certificates issued by the external calibration service are kept on file in the QA Department. Additional information on the verification and operation of laboratory balances is found in laboratory SOP No. *CED-R-EQ-SOP42930* (Analytical Balance Operation).

18.3.2) pH, Conductivity and Turbidity Meters

The pH meters used in the laboratory are accurate to ± 0.1 pH units, and have a scale readability of at least 0.05 pH units. The meters automatically compensate for the temperature, and are calibrated with at least two working range buffer solutions each working day prior to use.

Conductivity meters used in the laboratory are capable of measuring conductivity with an error not exceeding 1% or one µmho/cm, whichever is greater. The meters are also calibrated each working day prior to use with a known standard.

Turbidity meters are calibrated according to the manufacturer's specifications. All of this information is documented in logbooks, either hard copy or electronic.

Consult pH, Conductivity, and Turbidity method SOPs for further information.

18.3.3) Temperature Measuring Devices

All working thermometers are calibrated or otherwise verified at least on an annual basis with a NIST-traceable reference thermometer. Dial-type thermometers are calibrated quarterly.

- If the temperature measuring device is used over a range of 10 °C or less, then a single point verification within the range of use is acceptable.
- If the temperature measuring device is used over a range of greater than 10 °C, then the verification must bracket the range of use.

Infrared (IR) thermometers used to measure the temperature of samples during sample receipt are calibrated on a semi-annual basis over the full temperature range that the device will be used. This includes ambient (20 to 30 °C), iced (4 °C), and frozen (0 to -5 °C), per the Drinking Water Certification Manual. Each day of use, a single verification of the IR thermometer is made by checking the temperature of a bottle of water at the temperature of interest that contains a calibrated thermometer.

Liquid-in-glass reference thermometers are recalibrated every five years (unless the thermometer has been exposed to temperature extremes or apparent separation of internal liquid) by an approved external calibration service, and the provided calibration certificate showing traceability to NIST is kept on file. Electronic (i.e., platinum-RTD) reference thermometers are recalibrated annually. The NIST-traceable reference thermometers have increments of ≤ 1 degree (≤ 0.5 degrees are required for the drinking water microbiological section), and have ranges applicable to method and accreditation requirements. The NIST-traceable reference thermometers are used for no other purpose than to calibrate/verify other temperature measuring devices.

All of this information is documented in logbooks. Monitoring of method-specific temperatures, including incubators, heating blocks, water baths, and ovens, is documented in method-specific logbooks.

More information on this subject is found in laboratory SOP No/s. *CED-R-EQ-SOP42915* (In-House Calibration and Verification of Laboratory Support Equipment).

18.3.4) Refrigerator/Freezer Units, Water Baths, Ovens and Incubators

The temperatures of all refrigerator and freezers units used for sample and standard storage are monitored each working day. Sample storage refrigerator temperatures are kept between >0 °C and ≤6 °C. Freezer temperatures are kept ≤ -10 °C.

Ovens, water baths and incubators are monitored on days of use. Specific temperature settings/ranges can be found in method specific SOPs.

All of this equipment has a unique identification number, and is assigned a calibrated thermometer for monitoring.

All of this information is documented in Daily Temperature Logbooks or method-specific logbooks, and discussed in laboratory SOP No. *CED-R-EQ-SOP42968* (Thermometer Operation).

18.3.5) Autopipettors, Dilutors, and Syringes

If quantitative results are dependent on their accuracy, such as in standard preparation or dispensing or dilution into a specified volume, volumetric measuring devices shall be checked for accuracy prior to initial use. Each piece of volumetric equipment is given a unique identification number and the delivery volumes are verified gravimetrically according to the following guidelines:

- Glass microliter syringes (such as those purchased from Hamilton Company) and Class A glassware are exempt from any verification requirements. Glass microliter syringes and Class A glassware should be routinely inspected for chips, acid etching, or deformity. If the equipment is suspect, the accuracy will be assessed prior to use.
- Disposable or single-use volumetric equipment is verified once per lot, prior to or in conjunction with is first use.
- Mechanical devices are verified prior to first use and on a quarterly basis.
- All other volumetric support equipment is checked for accuracy prior to or in conjunction with its first use.

For those dispensers that are not used for analytical measurements, a label shall be applied to the device stating that it is not calibrated. Any device not regularly verified cannot be used for any quantitative measurements.

Glass microliter syringes are purchased from Hamilton Company or an equivalent manufacturer. Each syringe is traceable to NIST. The laboratory keeps on file an "Accuracy and Precision Statement of Conformance," or however named, from the manufacturer attesting to established precision and accuracy.

Details of the procedures used to verify volumetric equipment are found in laboratory SOP No. *CED-R-EQ-SOP43012* (Pipette Verification Procedures).

18.3.6) Autoclaves

Each batch processed in the autoclave is marked with autoclave tape. The autoclave tape must turn dark to verify sterilization temperatures were achieved. An autoclave maximum-registering thermometer is also used to verify autoclave temperatures with every batch. The duration and temperatures reached during each autoclave batch are recorded in the autoclave logbook.

Sterilization is also verified monthly with "temptubes". A temptube is a small culture tube that contains a solid pellet. The temptube is processed through a normal sterilization cycle. The pellet in the tube must be completely melted as verification that temperatures sufficient for sterilization were maintained for the proper duration.

The autoclave's internal timing device is checked quarterly against a stopwatch to verify the actual time elapsed. The results of this check are documented in the Bacteria QA Logbook.

A spore check is performed on the autoclave on a monthly basis according to the following procedure:

- A sealed ampule containing *Geobacillus stearothermophilus* and Bromocresol Purple (pH indicator) is put through a normal autoclave sterilization cycle. After autoclaving, the autoclaved test ampoule is incubated for 48 hours at 55-60 °C along with a control ampule which has not been autoclaved. The control ampule should show a positive test by exhibiting a color change to or toward yellow and/or turbidity. If the control ampule does not show a positive result the test should be considered invalid.
- A successful sterilization cycle would result in the autoclaved test ampule having no color change (remains purple) and no turbidity after incubation. A failed sterilization is indicated by a color

change to or toward yellow and/or turbidity in the autoclaved test ampule.
- The spore check test results are documented in the Bacteria QA Logbook.

18.3.7) Soil Gas Sampling Pumps

The laboratory provides sampling pumps for soil gas collection by clients. Each sampling pump is assigned a unique identification number in order to keep track of the calibration. This number should be recorded by the client on the sampling documentation. Procedures for calibration of sampling pumps are found in laboratory SOP No. *CED-R-EQ-SOP43014* (Calibration of Sampling Pumps).

18.4) Instrument Calibration

Calibration of analytical instrumentation is essential to the production of quality data. Strict calibration procedures are followed for each method. These procedures are designed to determine and document the method reporting limits, the working range of the analytical instrumentation, and any fluctuations that may occur from day to day. Generation and review of calibration curves follow laboratory method SOPs and NBLSC Document No. *NDSC-US-TS-QP44940* (Calibration Curves and the Selection of Calibration Points).

Sufficient raw data records are retained to allow an outside party to reconstruct all facets of the initial calibration. Records contain, but are not limited to, the following: calibration date, method, instrument, analyst(s) initials or signatures, analysis date, analytes, concentration, response, and type of calibration (average response factor, linear/non-linear regression, or other calculations that may be used to reduce instrument responses to concentration).

Sample results must be quantitated from the initial calibration and may not be quantitated from any continuing instrument calibration verification unless otherwise required by regulation, method or program.

If the initial calibration results are outside of the acceptance criteria, corrective action is performed and any affected samples are reanalyzed if possible. If the reanalysis is not possible, any data associated with an unacceptable initial calibration will be reported with appropriate data qualifiers (refer to Section 12).

> Note: Instruments are calibrated initially and as needed after that and at least annually (the annual requirement does not apply to isotope dilution).

18.4.1) Calibration Standards

Calibration standards are prepared using the procedures indicated in the Reagents and Standards section of the determinative method SOP. The minimum number of non-zero calibration standards shall be as follows:

Type of Calibration Curve	Minimum Number of Calibration Standards[b]
Threshold Testing[a]	1
Average Response	4
Linear Fit	5
Quadratic Fit	6

[a]The initial one-point calibration shall be at the project-specified threshold level.

[b]Fewer calibration standards may be used only if equipment firmware or software cannot accommodate the specified number of standards. Documentation detailing that limitation shall be maintained by the laboratory.

Standards for instrument calibration are obtained from a variety of sources. All standards are traceable to national or international standards of measurement, or to national or international standard

reference materials.

The lowest concentration calibration standard that is analyzed during an initial calibration must be at or below the stated reporting limit for the method based on the final volume of extract (or sample).

The other concentrations define the working range of the instrument/method or correspond to the expected range of concentrations found in actual samples that are also within the working range of the instrument/method. Results of samples not bracketed by initial instrument calibration standards (within calibration range to at least the same number of significant figures used to report the data) must be reported as having less certainty, e.g., defined qualifiers or flags (additional information may be included in the case narrative). The exceptions to these rules are ICP methods which define the working range with periodic linear dynamic range studies, rather than through the range of concentrations of routine calibration standards.

All initial calibrations are verified with a standard obtained from a second source and traceable to a national standard, when available (or vendor-certified different lot if a second source is not available). For unique situations, such as air analysis where no other source or lot is available, a standard made by a different analyst at a different time or a different preparation would be considered a second source. This verification occurs immediately after the calibration curve has been analyzed, and before the analysis of any samples.

18.4.2) Calibration Verification

The calibration relationship established during the initial calibration must be verified initially and at least daily as specified in the laboratory method SOPs in accordance with the referenced analytical methods and in the 2009 and 2016 TNI Standard. The process of calibration verification applies to both external standard and internal standard calibration techniques, as well as to linear and non-linear calibration models. Initial calibration verification (ICV) is with a standard source secondary (second source standard) to the calibration standards, but continuing calibration verifications (CCV) may use the same source standards as the calibration curve.

> Note: The process of calibration verification referred to here is fundamentally different from the approach called "calibration" in some methods. As described in those methods, the calibration factors or response factors calculated during continuing calibration verification are used to update the calibration factors or response factors used for sample quantitation. This approach, while employed in other EPA programs, amounts to a daily single-point calibration.

All target analytes and surrogates, including those reported as non-detects, must be included in periodic calibration verifications for purposes of retention time confirmation and to demonstrate that calibration verification criteria are being met.

All samples must be bracketed by periodic analyses of standards that meet the QC acceptance criteria (e.g., calibration and retention time). The frequency is found in the determinative methods or SOPs.

> Note: If an internal standard calibration is being used then bracketing calibration verification standards are generally not required, only opening calibration verifications are needed in each analytical batch, except as specified by program or method requirements. The results from these verification standards must meet the calibration verification criteria and the retention time criteria (if applicable).

Generally, the calibrations must be verified by an ICV analyzed immediately following initial calibration and before sample analysis. The ICV may be used as the first bracketing CCV, if criteria for both are met.

A continuing instrument calibration verification (CCV) is generally analyzed at the beginning of each 12-hour analytical shift during which samples are analyzed (some methods specify a 24-hour analytical shift - refer to laboratory method SOPs). The 12-hour analytical shift begins with the injection of the calibration verification standard (or the MS tuning standard in MS methods). The shift ends after the completion of the analysis of the last sample, QC, or standard that can be injected within 12-hours of

the beginning of the shift. For methods that have quantitation by external calibration models, a CCV is analyzed at the end of each analytical sequence. Some methods have more frequent CCV requirements. See specific SOPs. Most inorganic methods require the CCV to be analyzed after every 10 samples or injections, including matrix or batch QC samples.

If the results of a CCV are outside the established acceptance criteria and analysis of a second consecutive (and immediate) CCV fails to produce results within acceptance criteria, corrective action shall be performed. Once corrective actions have been completed and documented, the laboratory shall demonstrate acceptable instrument / method performance with successful calibration verification or a new initial calibration shall be performed. Samples analyzed prior to or after the calibration verification failure are to be reanalyzed or the results qualified if calibration verification bracketing is required.

Calibration verification for calibrations involves the calculation of the percent drift or the percent difference of the instrument response between the initial calibration and each subsequent analysis of the verification standard (these calculations are available in the laboratory method SOPs). Verification standards are evaluated based on the percent difference from the average calibration factor (CF) or response factor (RF) of the initial calibration, or based on the percent drift (or percent recovery) if a linear or quadratic curve is used.

Regardless of whether a linear or non-linear calibration model is used, if initial verification criteria is not met, then no sample analysis may take place until the initial calibration has been successfully verified or a new initial calibration is performed that meets the specifications listed in the method SOPs. If the calibration cannot be verified after the analysis of a single verification standard, then adjust the instrument operating conditions and/or perform instrument maintenance, and analyze another aliquot of the verification standard. If the calibration cannot be verified with the second standard, then a new initial calibration is performed.

Sample analyses and reporting of data may not occur or continue until the analytical system is calibrated or calibration verified. However, data associated with an unacceptable calibration verification may still be useable under the following special conditions:

1. When the acceptance criteria for the CCV are exceeded high (i.e., high bias) and the associated samples within the batch are non-detects, then those non-detects may be reported with a case narrative comment explaining the high bias. Otherwise the samples affected by the unacceptable CCV shall be re-analyzed after a new calibration curve has been established, evaluated and accepted; or
2. When the acceptance criteria for the CCV are exceeded low (i.e., low bias), those sample results may be reported if they exceed a maximum regulatory limit/decision level. Otherwise the samples affected by the unacceptable CCV shall be re-analyzed after a new calibration curve has been established, evaluated and accepted. Alternatively, a reporting limit verification standard may be analyzed to demonstrate that there was adequate sensitivity to detect the compound at the reporting limit (if allowed by the method).

Samples reported by the two conditions identified above will be appropriately flagged.

18.5) Tentatively Identified Compounds (TICs) - GC/MS Analysis

For samples containing components not associated with the calibration standards, a library search may be made for the purpose of tentative identification. The necessity to perform this type of identification will be determined by the purpose of the analyses being conducted. For example, the RCRA permit or waste delisting requirements may require the reporting of non-target analytes. Only after visual comparison of sample spectra with the nearest library searches may the analyst assign a tentative identification. Data system library search routines should not use normalization routines that would misrepresent the library or unknown spectra when compared to each other. Additional details are provided in the applicable method SOPs and in NBLSC Document No. *NDSC-US-TS-QP71638* (Policy on Tentatively Identified Compounds).

> Note: If the TIC compound is not part of the client target analyte list but is calibrated by the laboratory and is both qualitatively and/or quantitatively identifiable, it should not be reported as a TIC. If the compound is reported on the same form as true TICs, it should be

qualified and/or narrated that the reported compound is qualitatively and quantitatively (if verification in control) reported compared to a known standard that is in control (where applicable).

18.6) GC/MS Tuning

Prior to any full-scan GC/MS analytical sequence, including calibration, the instrument parameters for the tune and subsequent sample analyses within that sequence must be set. Alternatively, some methods allow for the tune to only be performed prior to each calibration and not prior to each daily analytical sequence; refer to the applicable method SOPs and NBLSC Document No. *NDSC-US-TS-QP44987* (Policy on GC/MS Tuning for Full Scan Volatile and Semi-Volatile Methods).

Prior to tuning/auto-tuning the mass spectrometer, the parameters may be adjusted within the specifications set by the manufacturer or the analytical method. These generally do not need any adjustment but it may be required based on the current instrument performance. If the tune verification does not pass it may be necessary to clean the source or perform additional maintenance. Any maintenance is documented in the maintenance log.

19) MEASUREMENT TRACEABILITY

19.1) Overview

Traceability of measurements shall be assured using a system of documentation, calibration, and analysis of reference standards. Laboratory equipment that are peripheral to analysis and whose calibration is not necessarily documented in a test method analysis or by analysis of a reference standard shall be subject to ongoing certifications of accuracy. At a minimum, these must include procedures for checking specifications of ancillary equipment. Wherever possible, subsidiary or peripheral equipment is checked against standard equipment or standards that are traceable to national or international standards.

19.2) Reference Weights and Thermometers

Reference standards of measurement shall be used for calibration only and for no other purpose, unless it can be shown that their performance as reference standards would not be invalidated.

For reference weights and thermometers, the laboratory requires that all calibrations be conducted by a calibration laboratory accredited under ISO/IEC 17025. A calibration certificate for these reference weight and thermometers is kept on file at the laboratory.

19.3) Reference Standards, Materials and Reagents

Reference standards/materials/reagents, where commercially available, are traceable to certified reference materials. Commercially prepared reference standards, to the extent available, are purchased from vendors that are accredited under ISO 17034 (formerly known as ISO Guide 34). All reference standards from commercial vendors shall be accompanied with a Certificate of Analysis (COA) that includes at least the following information:

- Manufacturer
- Analytes or parameters calibrated
- Identification or lot number
- Calibration method
- Concentration with associated uncertainties
- Purity

If a standard cannot be purchased from a vendor that supplies a COA, the purity of the standard is documented by analysis. The receipt of all reference standards must be documented. Reference standards are labeled with a unique identification number and expiration date. All documentation received with the reference standard is retained as a QC record and references the identification number.

All reference, primary and working standards/materials, whether commercially purchased or laboratory prepared, must be checked regularly to ensure that the variability of the standard or material from the true value does not exceed method requirements. The accuracy of calibration standards is checked by comparison with a standard from a second source. In cases where a second standard manufacturer is not available, a vendor certified different lot is acceptable for use as a second source. For unique situations, such as air analysis where no other second source or lot is available, a standard made by a different analyst would be considered a second source. The appropriate Quality Control (QC) criteria for specific standards are defined in laboratory SOPs.

All standards and materials must be stored and handled according to method or manufacturer's requirements in order to prevent contamination or deterioration. For safety requirements, refer to the NBLSC Environmental Health and Safety Manual/Chemical Hygiene Plan (*NDSC-US-EHS-QP46060*) and/or laboratory method SOPs.

Standards and reference materials shall not be used after their expiration dates unless their reliability is verified by the laboratory and their use is approved by the Quality Assurance Manager. The laboratory must have documented contingency procedures for re-verifying expired standards.

19.4) Documentation and Labeling of Reference Standards, Materials, and Reagents

Records are maintained electronically for standard and reference material preparation. These records show the traceability to purchased stock or neat compounds. These records also include method of preparation, date of preparation, expiration date and preparer's name or initials. Detailed preparation procedures are provided in the laboratory method SOPs. For information on documentation and labeling, refer to laboratory SOP No. *CED-P-STD-SOP42952* (Standards and Reagents - Documentation and Tracking).

All standards, reagents, and reference materials must be clearly labeled with a minimum of the following information:

- Expiration date (include prep date for reagents)
- Unique identification number
- Date opened

Label with the following when container size allows, if not ensure the information is in the associated LIMS/logbook record:

- Description (if different from manufacturer's label or it it was prepared in the laboratory)
- Storage conditions
- Concentration (if applicable)
- Preparer name/ID

Special health/safety warnings must also be available to the analyst. This information is located in the NBLSC Environmental Health and Safety Manual (*NDSC-US-EHS-QP46060*), manufacturer's safety data sheets (SDS), and/or laboratory method SOPs.

20) SAMPLING

20.1) Overview

The laboratory does not provide sampling services. The laboratory's responsibility in the sample collection process lies in supplying the sampler with the necessary coolers, reagent water, sample

containers, preservatives, sample labels, custody seals, COC forms, ice and packing materials required to properly preserve, pack, and ship samples to the laboratory.

20.2) Sampling Containers

The laboratory offers clean sampling containers for use by clients. These containers are obtained from reputable container manufacturers and meet EPA specifications as required. Certificates of cleanliness for bottles and preservatives are provided by the supplier and are maintained at the laboratory. Alternatively, the certificates may be maintained by the supplier and available to the laboratory on-line.

21) HANDLING OF SAMPLES

21.1) Overview

It is the responsibility of the client to send us representative and/or homogeneous and properly preserved samples of the system from which they are drawn. The laboratory assumes that all multiple sample containers with the same designator/description and bottle type contain a homogeneous, representative sample.

The laboratory provides the appropriate sample containers, required preservative, chain-of-custody (COC) forms, shipping containers, labels, and custody seals. The laboratory also provides trip blanks and analyte-free water for field blanks. Preparation of methanol containers for field preservation of volatile soil samples is available.

Sample management procedures at the laboratory ensure that sample integrity and custody are maintained and documented from sampling/receipt through disposal.

21.2) Chain of Custody (COC)

The COC form is the documented history of any sample and is initiated when bottles are sent to the field, or at the time of sampling. This form is completed by the sampling personnel and accompanies the samples to the laboratory where it is received and stored under the laboratory's custody. The purpose of the COC form is to provide a legal record of the handling of samples from the time of collection until they are received at the laboratory. It also serves as the primary documented request for analyses from the client to the laboratory. The COC form may serve as the purchase order specifying the requested analytical services when no other contractual agreement is in effect.

21.2.1) Field Documentation

The information the sample collector needs to provide at the time of sampling on the container label includes:

- Sample identification
- Date and time of collection
- Preservative

During the sampling process, the COC form is completed and must be legible. This form includes information such as:

- Client name, address, phone number and fax number (if available)
- Project name and/or number
- The sample identification
- Date, time and location of sampling
- Sample collector's name
- The matrix description
- The container description
- The total number of each type of container

- Preservatives used
- Analysis requested
- Requested turnaround time (TAT)
- Any special instructions
- Purchase Order number or billing information (e.g. quote number) if available
- The date and time that each person received or relinquished the sample(s), including their signed name.

The client relinquishes the sample(s) in writing on the COC form, or through the Eurofins eCOC electronic transfer program, to the sample control personnel at the laboratory or to a laboratory courier. The laboratory personnel document the receipt date and time on the COC.

When clients send the samples through a common carrier (Fed-Ex, UPS), the COC relinquished date/time is completed by the client. During normal business hours, samples are documented as being transferred into the laboratory's possession with the date/time of receipt of the shipment from the common carrier. For sample shipments received after-hours, refer to laboratory SOP *CED-P-SAM-SOP42940*.

Note: Independent couriers are not required to sign the COC form.

21.2.2) Legal / Evidentiary Chain-of-Custody

Samples being tested for litigation may require locked storage and documentation of the time and personnel responsible when the sample is not in storage. This level of documentation is available upon client request and procedures to define these activities are in place and include the following:

- An internal chain-of-custody document is initiated for each bottle type submitted by the client.
- The internal chain of custody is signed each time the sample is stored, removed from storage, or changes hands.
- Client requesting legal internal chain-of-custody documentation receive the completed forms after the analysis is complete.

21.3) Sampling Containers, Preservation Requirements, and Holding Times

The sampling container type, preservation, and holding time criteria specified in the laboratory SOPs are derived from the source documents for the methods and/or from the promulgated regulations specifying the analysis. If the required holding times or preservation requirements are not met, the reports will be qualified using a flag, footnote, and/or case narrative comment.

The date and time of sampling documented on the COC form establishes the day and time zero. As a general rule, when the maximum allowable holding time is expressed in days (e.g., 7 days, 14 days, etc.), the holding time is based on calendar day measured. Maximum allowable holding times expressed in hours (e.g., 8 hours, 24 hours, etc.) are measured from date and time zero. Holding times for analysis include any necessary re-analysis. However, there are some programs that determine holding time compliance based on the date and specific time of analysis compared to the time of sampling regardless of how the holding time is expressed.

Tests designated in the method or regulation as to be performed "as soon as possible" or "ASAP" is indicative of a parameter that should be analyzed within 15 minutes of collection. Therefore, these are typically tests that are to be performed in the field. When the analysis is performed in the laboratory, the data will be qualified as outside the holding time.

21.4) Sample Receipt

Samples are received at the laboratory by designated sample receiving personnel and a unique laboratory project identification number is assigned. Each sample container shall be assigned a unique sample identification number that is cross-referenced to the client identification number such that traceability of test samples is unambiguous and documented. Each sample container is affixed with a

durable sample identification label. Sample acceptance, receipt, tracking and storage procedures are detailed in laboratory SOP No. *CED-P-SAM-SOP42940* (Customer Service and Login Procedures).

When samples arrive at the laboratory, sample receiving personnel inspect the coolers and samples. The integrity of each sample must be determined by comparing sample labels or tags with the COC and by visual checks of the container for possible damage. Any non-conformance, irregularity, or compromised sample receipt must be documented in LIMS and brought to the immediate attention of the PM/PMA, who will contact the client. The COC, shipping documents, documentation of any non-conformance, irregularity, or compromised sample receipt, record of client contact, and resulting instructions become part of the project record.

Sample receiving personnel check and document the chemical preservation of non-volatile liquid samples after the samples have been entered into the LIMS and before they are released to the laboratory for testing or placed into storage. Any checks of samples to be analyzed for oil and grease or volatile constituents are performed and documented at the time of analysis.

21.5) Sample Acceptance Policy

The laboratory has a written sample acceptance policy (*CED-P-SAM-WI43567*) that clearly outlines the circumstances under which samples shall be accepted or rejected. These include:

1. The COC is filled out correctly.
2. Samples must be properly labeled.
3. Proper sample containers with adequate volume for the analysis and necessary QC.
4. Sample must be preserved according to the requirements of the requested analytical method.
5. Client must notify the lab of any potentially hazardous samples.
6. Sample holding times must be adhered to.
7. The project manager will be notified if any sample is received in damaged condition.

Data from samples which do not meet these criteria are flagged and the nature of the variation from policy is defined.

21.5.1) After inspecting the samples, the sample receiving personnel sign and date the COC form, make any necessary notes of the samples' conditions and store them in appropriate refrigerators or storage locations.

21.5.2) Any deviations from these checks that question the suitability of the sample for analysis, or incomplete documentation as to the tests required will be resolved by consultation with the client. If the sample acceptance policy criteria are not met, the laboratory shall either:

- Retain all correspondence and/or records of communications with the client regarding the disposition of rejected samples, or
- Fully document any decision to proceed with sample analysis that does not meet sample acceptance criteria.

21.5.3) Once sample acceptance is verified, the samples are logged into LIMS according to laboratory SOP No. *CED-P-SAM-SOP42940* (Customer Service and Login Procedures).

21.6) Sample Storage

In order to avoid deterioration, contamination or damage to a sample during storage and handling, from the time of receipt until all analyses are complete, samples are stored in refrigerators, freezers or protected locations suitable for the sample matrix. In addition, samples to be analyzed for volatile organic compounds are stored in separate refrigerators designated for volatile parameters only. Samples are never to be stored with reagents, standards or materials that may create contamination.

Analysts and technicians retrieve the sample container allocated to their analysis from the designated storage location and place it on a cart, analyze the sample, and return the remaining sample or empty container to the storage location from which it originally came. All samples are kept in the designated storage location for two to four weeks after analysis, which meets or exceeds most sample holding times. After this time period, the samples are moved to the sample archive area where they are stored

until disposal. This holding period allows samples to be checked if a discrepancy or question arises. Special arrangements may be made to store samples for longer periods of time.

Access to the laboratory is controlled such that sample storage need not be locked at all times unless a project specifically requires it. Samples are accessible to laboratory personnel only. Visitors to the laboratory are prohibited from entering the sample storage locations and laboratory areas unless accompanied by an employee of Eurofins Cedar Falls.

21.7) Hazardous Samples and Foreign Soils

To minimize exposure to personnel and to avoid potential accidents, hazardous samples are stored in an isolated area designated for hazardous waste only. All hazardous samples are either returned to the client or disposed of appropriately through a hazardous waste disposal firm that lab-packs all hazardous samples and removes them from the laboratory.

The Eurofins Cedar Falls laboratory does not knowingly accept foreign soil samples. (A foreign soil is defined as a soil sample from foreign countries, U.S. territories, or areas within the U.S. that are under Federal Domestic Soil Quarantine.)

21.8) Sample Shipping

In the event that the laboratory needs to ship samples, the samples are placed in a cooler with enough ice to ensure the samples remain just above freezing and at or below 6 °C during transit. The samples are carefully surrounded by packing material to avoid breakage (yet maintain appropriate temperature). A trip blank is enclosed for those samples requiring water/solid volatile organic analyses (see Note below). The chain-of-custody form is signed by the sample control technician and attached to the shipping paperwork.

Samples are generally shipped overnight express or hand-delivered by a Eurofins Cedar Falls courier to maintain sample integrity. All personnel involved with shipping and receiving samples must be trained to maintain the proper chain-of-custody documentation and to keep the samples intact and on ice. The NBLSC Environmental Health and Safety Manual (*NDSC-US-EHS-QP46060*) contains additional shipping requirements as well as laboratory SOP No. *CED-P-SAM-SOP42892* - Shipping.

> Note: If a client does not request trip blank analysis on the COC or other paperwork, the laboratory will not analyze the trip blanks that were supplied. However, in the interest of good client service, the laboratory will advise the client at the time of sample receipt that it was noted that they did not request analysis of the trip blank; and that the laboratory is providing the notification to verify that they are not inadvertently omitting a key part of regulatory compliance testing.

21.9) Sample Aliquots / Subsampling

Taking a representative sub-sample from a container is necessary to ensure that the analytical results are representative of the sample collected in the field. The size of the sample container, the quantity of sample fitted within the container, and the homogeneity of the sample need consideration when sub-sampling for sample preparation. It is the laboratory's responsibility to take a representative sub-sample or aliquot of the sample provided for analysis.

Analysts should handle each sample as if it is potentially dangerous. At a minimum, safety glasses, gloves, and lab coats must be worn when preparing aliquots for analysis.

Instructions for taking sample aliquots and sub-sampling are provided in laboratory SOP No. *CED-P-FPS-SOP42947* and/or method SOPs.

21.10) Sample Disposal

Samples should be retained for a minimum of 30 days after the project report is sent, however, provisions may be made for earlier disposal of samples once the holding time is exceeded. Some samples are required to be held for longer periods based on regulatory or client requirements (e.g., 60 days after project report is sent). The laboratory must follow the longer sample retention requirements where required by regulation or client agreement.

Several possibilities for sample disposal exist: the sample may be consumed completely during analysis, the sample may be returned to the customer or location of sampling for disposal, or the sample may be disposed of in accordance with the laboratory's waste disposal procedures (laboratory SOP No. *CED-S-WD-SOP42937*). All safety protocols in the NBLSC Environmental Health and Safety Manual/Chemical Hygiene Plan (*NDSC-US-EHS-QP46060*) are followed during disposal. Unused portions of samples found or suspected to be hazardous according to state or federal guidelines may be returned to the client upon completion of the analytical work or disposed of in the relevant hazardous waste stream.

If a sample is part of a known litigation, the affected legal authority, sample data user, and/or submitter of the sample must participate in the decision about the sample's disposal.

All documentation and correspondence concerning the disposal decision process must be kept on file. Pertinent information includes the date of disposal, nature of disposal (such as sample depletion, hazardous waste facility disposal, return to client), names of individuals who conducted the arrangements and physically completed the task. The laboratory will remove or deface sample labels prior to disposal unless this is accomplished through the disposal method (e.g., samples are incinerated). A Waste Disposal Record should be completed.

22) ASSURING THE QUALITY OF TEST RESULTS

22.1) Overview

In order to assure our clients of the validity of their data, the laboratory continually evaluates the quality of the analytical process. The analytical process is controlled not only by instrument calibration as discussed in Section 18, but also by routine process quality control measurements [e.g., Method Blanks [MB], Laboratory Control Samples (LCS), Matrix Spikes (MS), Duplicates (DU), Surrogates (SU), and/or Internal Standards (IS)]. These quality control checks are performed as required by the method or regulations to assess precision and accuracy. Quality control samples are to be treated in the exact same manner as the associated field samples being tested. In addition to the routine process quality control samples, Proficiency Testing (PT) Samples (concentrations unknown to laboratory) are analyzed to help ensure laboratory performance.

22.2) Batch Controls

Sample preparation or pre-treatment is commonly required before analysis. Typical preparation steps may include sample homogenization/subsampling, solvent extraction, acid digestion, distillation, reflux, filtration, evaporation, drying, and/or cleanup. During these pre-treatment steps, samples are arranged into discreet manageable groups referred to batches. Typically a batch consists of a maximum 20 field samples and the associated preparation and/or analytical quality control (QC) samples. QC samples are added to each batch to monitor method performance and are processed through the entire procedure with field samples.

22.3) Negative Controls

22.3.1) Negative Controls for Chemistry

Control Type	Details
Method Blank (MB)	Used to assess preparation and analysis for possible contamination during the preparation and processing steps. The specific frequency of use for the method blank during the analytical sequence is defined in the specific SOP for each analysis. Generally it is 1 for each batch of samples, not to exceed 20 environmental samples. The method blank is prepared from a clean matrix similar to that of the associated samples which is free from target analytes (e.g., reagent water, Ottawa sand, glass beads, etc.) and is processed along with and under the same conditions as the associated samples. The method blank goes through all of the steps of the process (including as necessary: filtration, clean-ups, etc.). Reanalyze or qualify associated sample results when the concentration of a target analyte in the method blank is at or above the reporting limit as established by the method or by regulation, and is greater than 1/10 of the amount measured in the sample.
Calibration Blank	Prepared and analyzed along with calibration standards where applicable. They are prepared using the same reagents that are used to prepare the standards. In some analyses the calibration blank may be included in the calibration curve.
Instrument Blank	Blank reagents or reagent water that may be processed during an analytical sequence in order to assess contamination in the analytical system. In general, instrument blanks are used to differentiate between contamination caused by the analytical system and that caused by the sample handling or sample prep process. Instrument blanks may also be inserted throughout the analytical sequence to minimize the effect of carryover from samples with high analyte content.
Trip Blank[1]	Required to be submitted by the client with each shipment of samples requiring aqueous and solid volatiles analyses (or as specified in the client's project plan). Additionally, trip blanks may be prepared and analyzed for volatile analysis of air samples, when required by the client. A trip blank may be purchased (certified clean) or is prepared by the laboratory by filling a clean container with pure deionized water that has been purged to remove any volatile compounds. Appropriate preservatives are also added to the container. The trip blank is sent with the bottle order and is intended to reflect the environment that the containers are subjected to throughout shipping and handling and help identify possible sources if contamination is found. The field sampler returns the trip blank in the cooler with the field samples.
Field Blank[1]	Are sometimes used for specific projects by the field samplers. A field blank prepared in the field by filling a clean container with pure reagent water and appropriate preservative, if any, for the specific sampling activity being undertaken. (EPA OSWER)
Equipment Blank[1]	Are also sometimes created in the field for specific projects. An equipment blank is a sample of analyte-free media which has been used to rinse common sampling equipment to check effectiveness of decontamination procedures in the field. (TNI)
Storage Blank	Also referred to as refrigerator or freezer blanks, are used to monitor the sample storage units for volatile organic compounds during the storage of VOA samples in the laboratory.

[1]When known, these field QC samples should not be selected for matrix QC as it does not provide information on the behavior of the target compounds in the field samples. Usually, the client sample ID will provide information to identify the field blanks with labels such as "TB", "FB", or "EB."

Evaluation criteria and corrective action for these controls are defined in the specific method SOP for each analysis.

22.3.1a) Negative Controls for Microbiology

Microbiological methods utilize a variety of negative controls throughout the process to ensure that false positive results are not obtained. These controls are critical to the validity of the microbiological analyses. Some of these negative controls are:

Control Type	Details
Sterility Checks (Media)	Are analyzed for each lot of pre-prepared media, ready-to-use media and for each batch of medium prepared by the laboratory.
Sterility Checks (Sample Containers)	Are performed on at least one container per lot of purchased, pre-sterilized containers. If containers are prepared and sterilized by the laboratory, one container pre sterilization batch is checked. Container sterility checks are performed using non-selective growth media.
Sterility Checks (Dilution Water)	Are performed on each batch of dilution water prepared by the laboratory and on each batch of pre-prepared dilution water. All checks are performed using non-selective growth media.
Sterility Checks (Filters)	Are performed on at least one filter from each new lot of membrane filters using non-selective growth media.
Filtration Blanks	Blanks are run at the beginning and end for each sterilized filtration unit used in a filtration series. For pre-sterilized single use funnels, a sterility check is performed on at least one funnel per lot.

Negative culture controls demonstrate that a media does not support growth of non-target organisms and ensures that there is not an atypical positive reaction from the target organisms. Prior to the first use of the media, each lot of pre-prepared selective media or batch of laboratory-prepared selective media is analyzed with at least one known negative culture control as appropriate to the method.

22.4) Positive Controls

Control samples (e.g., QC indicators) are analyzed with each batch of samples to evaluate data based upon (1) method performance [Laboratory Control Sample (LCS)], which entails both the preparation and measurement steps; and (2) matrix effects [Matrix Spike (MS) and Matrix Spike Duplicate (MSD)] or Sample Duplicate (DU), which evaluates field sampling accuracy, precision, representativeness, interferences, and the effect of the matrix on the method performed. Each regulatory program and each method within those programs specify the control samples that are prepared and/or analyzed with a specific batch.

Note that frequency of control samples vary with specific regulatory, methodology and project specific criteria. Complete details on method control samples are as listed in each analytical SOP.

22.4.1) Method Performance Control - Laboratory Control Sample (LCS)

The LCS measures the accuracy of the method in a blank matrix and assesses method performance independent of potential field sample matrix affects in a laboratory batch.

The LCS is prepared from a clean matrix similar to that of the associated samples that is free from target analytes (for example: reagent water, Ottawa sand, glass beads, etc.) and is processed along with and under the same conditions as the associated samples. The LCS is spiked with verified known amounts of analytes or is made of a material containing known and verified amounts of analytes, taken through all preparation and analysis steps along with the field samples. Where there is no preparation taken for an analysis (such as in aqueous volatiles), or when all samples and standards undergo the same preparation and analysis process, a calibration verification standard may be reported as the LCS. In some instances where there is no practical clean solid matrix available, aqueous LCS's may be processed for solid matrices; final results may be calculated as mg/kg or ug/kg, assuming 100% solids

and a weight equivalent to the aliquot used for the corresponding field samples, to facilitate comparison with the field samples.

Certified pre-made reference material purchased from a NIST/A2LA accredited vendor may also be used for the LCS when the material represents the sample matrix or the analyte is not easily spiked (e.g. solid matrix LCS for metals, etc.).

The specific frequency of use for LCS during the analytical sequence is defined in the specific standard operating procedure for each analysis. It is generally 1 for each batch of samples; not to exceed 20 environmental samples.

If the mandated or requested test method, or project requirements, do not specify the spiking components, the laboratory shall spike all reportable components to be reported in the Laboratory Control Sample (and Matrix Spike) where applicable (e.g. no spike of pH). However, in cases where the components interfere with accurate assessment (such as simultaneously spiking chlordane, Toxaphene and PCBs in method 608.3), the test method has an extremely long list of components or components are incompatible, at a minimum, a representative number of the listed components (see below) shall be used to control the test method. The selected components of each spiking mix shall represent all chemistries, elution patterns and masses, permit specified analytes and other client requested components. However, the laboratory shall ensure that all reported components are used in the spike mixture within a two-year time period.

- For methods that have 1-10 target analytes, spike all components.
- For methods that include 11-20 target analytes, spike at least 10 or 80%, whichever is greater.
- For methods with more than 20 target analytes, spike at least 16 components.
- Exception: Due to analyte incompatibility in pesticides, Toxaphene and Chlordane are only spiked at client request based on specific project needs.
- Exception: Due to analyte incompatibility between the various PCB Aroclors, Aroclors 1016 and 1260 are used for spiking as they cover the range of all of the Aroclors. Specific Aroclors may be used by request on a project specific basis.

22.4.1a) Positive Controls for Microbiology

Each lot of pre-prepared media (including chromofluorogenic reagent) and each batch of laboratory prepared media is tested with a pure culture of known positive reaction.

22.4.2) Sample Matrix Controls

Control Type	Details
Matrix Spike (MS)	Use: used to assess the effect sample matrix of the spiked sample has on the precision and accuracy of the results generated by the method used. Typical Frequency[1]: at a minimum, with each matrix-specific batch of samples processed, one MS is carried through the complete analytical procedure. Unless specified by the client, samples used for spiking are randomly selected and rotated between different client projects. If the mandated or requested test method does not specify the spiking components, the laboratory shall spike all reportable components to be reported in the LCS. Refer to the method SOP for complete details. Description: essentially a sample fortified with a known amount of the targeted analyte(s).
Surrogate (SU)	Use: measures method performance to sample matrix (Organics only). Typical Frequency[1]: Are added to all samples, standards, and blanks for all organic chromatography methods except when the matrix precludes it use or when a surrogate compound is not available. The recovery of the surrogate compound(s) is compared to the acceptance limits for the

	specific method. Poor surrogate recovery may indicate a problem with sample composition and shall be reported, with data qualifiers, to the client whose sample produced poor recovery. Description: Are similar to matrix spikes except the analytes are compounds with properties that mimic the analytes of interest and are unlikely to be found in environmental samples.
Duplicates (DU)[2]	Use: For a measure of analytical precision, with each matrix-specific batch of samples processed, a matrix duplicate sample (DU), matrix spike duplicate (MSD), or LCS duplicate (LCSD) is carried through the complete analytical procedure. Typical Frequency[1]: Matrix duplicate samples (DU) are usually analyzed with methods that do not require matrix spike analysis. The MSD or LCSD is analyzed at the same frequency as their paired QC type. Description: Performed by analyzing two aliquots of the same field sample independently, or an additional LCS.
Internal Standards (IS)	Use: Are spiked into all environmental and quality control samples (including the initial calibration standards) to monitor the qualitative aspect of organic and some inorganic analytical measurements. Typical Frequency[1]: All organic and ICP/ICPMS methods as required by the analytical method. Description: Use to correct for matrix effects and to help troubleshoot variability in analytical response and are assessed after data acquisition. Possible sources of poor internal standard response are sample matrix, poor analytical technique, or poor instrument performance.

[1]See the specific analytical SOP for actual type and frequency of sample matrix control samples.
[2]LCSDs are normally not performed except when regulatory agencies or client specifications require them. The recoveries for the spiked duplicate samples must meet the same laboratory established recovery limits as the accuracy QC samples. If an LCSD is analyzed both the LCS and LCSD must meet the same recovery criteria and be included in the final report. The precision measurement is reported as "Relative Percent Difference" (RPD). Poor precision between duplicates (except LCS/LCSD) may indicate non-homogeneous matrix or non-representative subsampling techniques.

22.4.2a) Sample Matrix Controls for Microbiology

For a measure of analyst and method precision, with each matrix-specific batch of microbiological samples processed, a duplicate range-of-logarithms sample (DUR) is carried through the complete analytical procedure, if sufficient sample volume allows.

22.5) Acceptance Criteria (Quality Control Limits)

As mandated by the test method and/or regulation, each individual analyte in the QC is evaluated against the control limits published in the test method. Where there are no established acceptance criteria, the laboratory calculates in-house control limits with the use of control charts or, in some cases, utilizes client project-specific control limits. When this occurs, the regulatory or project limits will supersede the laboratory's in-house limits.

> Note: For methods, analytes and matrices with very limited data (e.g., unusual matrices not analyzed often), interim limits are established using available data or by analogy to similar methods or matrices.

Once control limits have been established, they are verified, reviewed, and updated if necessary on an annual basis unless the method requires more frequent updating. Control limits are established per method (as opposed to per instrument) regardless of the number of instruments utilized. Laboratory SOP No. *CED-Q-QC-SOP42899* (Quality Control Limits) describes the process of establishing in-house control limits.

Laboratory-generated percent recovery acceptance (control) limits are generally established by taking ± 3 standard deviations about the average recovery of a minimum of 20-30 data points (more points are preferred).

- Regardless of the calculated limit, the limit should be no tighter than the calibration verification (ICV/CCV), unless the analytical method specifies a tighter limit.
- In-house limits cannot be any wider than those mandated in a regulated analytical method. Client or contract required control limits are evaluated against the laboratory's statistically derived control limits to determine if the data quality objectives (DQOs) can be achieved. If laboratory control limits are not consistent with DQOs, then alternatives must be considered, such as method improvements or use of an alternate analytical method.
- The lowest acceptable recovery limit will be 10% (the analyte must be detectable and identifiable). Exception: The lowest acceptable recovery limit for poor-performing analytes such as benzidine will be 5% and the analyte must be detectable and identifiable.
- The maximum acceptable recovery limit will be 150%.
- The maximum acceptable RPD limit will be 35% for waters and 40% for soils. The minimum RPD limit is 10%.
- If either the high or low end of the control limit changes by < 5% from previous, the control chart is visually inspected and, using professional judgment, they may be left unchanged if there is no effect on laboratory ability to meet the existing limits.

The laboratory must be able to generate a current listing of their control limits and track when the updates are performed. In addition, the laboratory must be able to recreate historical control limits.

General QC acceptance and actions for outliers are described below. A more detailed discussion of acceptance criteria and corrective actions can be found in the laboratory method SOPs.

A **LCS** that is within the acceptance criteria establishes that the analytical system is in control and is used to validate the process. Samples that are analyzed with an LCS with recoveries outside of the acceptance limits may be determined as out of control and should be reanalyzed if possible. If reanalysis is not possible, then the results for all affected analytes for samples within the same batch must be qualified when reported. The internal corrective action process (see Section 12) is also initiated if an LCS exceeds the acceptance limits. Sample results may be qualified and reported without reanalysis if:

- The analyte results are below the reporting limit and the LCS is above the upper control limit.
- If the analytical results are above the relevant regulatory limit and the LCS is below the lower control limit.

If the **MS/MSDs** do not meet acceptance limits, the MS/MSD and the associated spiked sample is reported with a qualifier for those analytes that do not meet limits. If obvious preparation errors are suspected, or if requested by the client, unacceptable MS/MSDs are reprocessed and reanalyzed to prove matrix interference.

If a **Surrogate** standard falls outside the acceptance limits, and if there is not obvious chromatographic matrix interference, reanalyze the sample to confirm a possible matrix effect. If the recoveries confirm or there was obvious chromatographic interference, results are reported from the original analysis and a qualifier is added. If the reanalysis meets surrogate recovery criteria, the second run is reported (or both are reported if requested by the client). Under certain circumstances, where all of the samples are from the same location and share similar chromatography, the reanalysis may be performed on a single sample rather than all of the samples and if the surrogate meets the recovery criteria in the reanalysis, all of the affected samples would require reanalysis.

22.6) Marginal Exceedances

Marginal exceedances (ME) are recovery exceedances between 3 SD and 4 SD from the mean recovery limit.

Marginal exceedances must be random. If the same analyte exceeds the LCS control limit repeatedly, it is an indication of a systematic problem. The source of the error must be located and corrective action taken.

Though marginal exceedances may be allowed, the data must still be qualified to indicate it is outside of the normal limits. More detail on marginal exceedance procedures is located in laboratory SOP No. *CED-Q-QC-SOP42900* - Random Marginal Exceedances.

For TNI work, there are an allowable number of marginal exceedances. Note: some methods/regulations may not allow the use of ME.

< 11 analytes	0 marginal exceedances are allowed
11 – 30 analytes	1 marginal exceedance is allowed
31 – 50 analytes	2 marginal exceedances are allowed
51 – 70 analytes	3 marginal exceedances are allowed
71 – 90 analytes	4 marginal exceedances are allowed
> 90 analytes	5 marginal exceedances are allowed

23) REPORTING RESULTS

23.1) Overview

The results of each test are reported accurately, clearly, unambiguously, and objectively in accordance with State and Federal regulations as well as client requirements. Analytical results are issued in a format that is intended to satisfy customer and laboratory accreditation requirements as well as provide the end user with the information needed to properly evaluate the results. Where there is conflict between client requests and laboratory ethics or regulatory requirements, the laboratory's ethical and legal requirements are paramount, and the laboratory will work with the client during project setup to develop an acceptable solution.

A variety of report formats are available to meet specific needs.

23.2) Test Reports

At a minimum, the standard laboratory test report shall contain the following information:

1. A report title (e.g., Analytical Report).
2. The cover page shall include the laboratory name, address and telephone number.
3. A unique identification of the report (e.g., Eurofins Cedar Falls Job #) and on each page an identification in order to ensure the page is recognized as part of the report and a clear identification of the end. Note: page numbers of the report are represented as # of ##, where the first number is the page number and the second is the total number of pages.
4. A copy of the chain of custody (COC), including subcontract and/or work share COCs.
5. The name and address of client and a project name/number, if applicable.
6. Client project manager or other contact.
7. Description and unambiguous identification of the tested sample(s) including the client identification code.
8. Date of receipt of sample, date and time of collection, and date(s) of test preparation and performance, and time of preparation or analysis if the required holding time for either activity is less than or equal to 72 hours.
9. Date reported or date of revision, if applicable.
10. Method of analysis including method code (EPA, Standard Methods, etc.).
11. Reporting limits.
12. Method detection limits, if requested.
13. Definition of data qualifiers and reporting acronyms.
14. Sample results, including units.
15. QC data consisting of method blank, surrogate, LCS, and MS/MSD recoveries and control limits.

16. Condition of samples at receipt including temperature. This may be accomplished in a narrative or by attaching sample login sheets.
17. A statement expressing the validity of the results, that the source methodology was followed, and all results were reviewed for error.
18. A statement to the effect that the results relate only to the items tested and the sample as received by the laboratory, except when information is provided by the client. When data is provided by the client there shall be a clear identification of it, and a disclaimer shall be put in the report when the client supplied data can affect the validity of the test.
19. A statement that the report shall not be reproduced except in full, without prior express written approval by the laboratory.
20. A signature and title of the person(s) accepting responsibility for the content of the report and date of release. Authorized signatories are qualified Project Managers appointed by the Client Service Manager.
21. A narrative to the report that explains any noncompliant data and (where applicable) corrective action(s) taken.
22. When soil samples are analyzed, a specific identification as to whether results are reported on a "wet weight" or "dry weight" basis.
23. Laboratory certification number for the state of origin of the sample, if applicable.
24. If only part of the report is provided to the client (client requests some results before all of it is complete), it must be clearly indicated on the report (e.g., partial report or preliminary report). A complete report must be sent once all of the work has been completed.
25. Any subcontracted analysis results are provided as an attachment of the subcontract laboratory's report. All subcontract or work share testing is clearly identified on the report as to which laboratory performed a specific analysis.
26. A Certification Summary Report, where required, will document that, unless otherwise noted, all analytes tested and reported by the laboratory were covered by the noted certifications.

23.3) Reporting Level or Report Type

The type and format of the test report is designed to accommodate each type of environmental test carried out and to minimize the possibility of misunderstanding or misuse of the data. The laboratory offers four levels of quality control reporting. Each level, in addition to its own specific requirements, contains all the information provided in the preceding level.

The packages provide the following information:

- Level 1 is a basic sample results report noting any data qualification but excluding QC results.
- Level 2 is a Level 1 report plus QC summary information, including results for the method blank, percent recovery for laboratory control samples and matrix spike samples, and the RPD values for all MSD and sample duplicate analyses.
- Level 3 contains all the information supplied in Level 2, but presented on the CLP-like summary forms, and relevant calibration information. No raw data is provided.
- Level 4 is the same as Level 3 with the addition of all raw supporting data.

Various formatter options are available with the report types. These are designed to meet program and/or client specific requirements. These formatters define such parameters as reporting to the MDL vs. RL, flags, and qualifier types. The laboratory also offers reports in electronic data deliverable (EDD) formats.

23.4) Electronic Data Deliverable (EDD)

A variety of EDDs are available. EDD formats include, but are not limited to, Environmental Quality Information System (EQuIS), Illinois EPA, MPCA, Missouri TerraBase, Excel and custom files in client-specified formats.

23.5) Supplemental Information

When, as requested by the client and agreed to by Eurofins Cedar Falls, the test report includes a statement of conformity to a specification or standard (see Special Services, Section 7.5), the report

shall clearly identify:

- to which results the statement applies,
- which specifications, standard or parts thereof are met or not met, and
- the decision rule that was applied, unless the decision rule is inherent in the requested specification or standard, taking into account the level of risk (such as false accept and false reject and statistical assumptions) associated with the decision rule.

Where applicable and required by the client, a statement on the estimated measurement uncertainty is provided with the test report.

Opinions and Interpretations — The test report contains objective information, and generally does not contain subjective information such as opinions and interpretations. If such information is required by the client, the BUMA will determine if a response can be prepared. If so, the BUMA will designate the appropriate member of the management team to prepare a response. The response will be fully documented, and reviewed by the BUMA, before release to the client. There may be additional fees charged to the client at this time, as this is a non-routine function of the laboratory.

When opinions or interpretations are included in the test report, the laboratory provides an explanation as to the basis upon which the opinions and interpretations have been made. Opinions and interpretations are clearly noted as such and where applicable, a comment should be added recommending that the client discuss acceptability of the data with their regulator.

23.6) Amendments to Test Reports

Corrections, additions, or deletions to final issued reports are only made when justification arises through supplemental documentation. Investigation into any laboratory-caused data change is documented using the laboratory's corrective action system.

Copies of all final versions of a report, as well as the original, are maintained in the LIMS. Any revisions are identified with a revision number in the file name and on the report cover page. The date that the revision was generated is also identified on the cover page.

Further detail on the revision is provided in the report narrative. This detail includes the date of the original report and the reason for the revision. Example explanatory text could be: "*The report being provided is a revision of the original report sent on 5/4/2022. This report (revision 1) is being revised due to correction to QC data for method ####.*"

23.6.1) Policy on Data Omissions or Reporting Limit Increases

Eurofins' policy is simply to not omit previously reported results (including data qualifiers) or to not raise reporting limits and report sample results as ND.

This policy has few exceptions, but may include:

- Laboratory error;
- Sample identification is unclear (discrepancy between COC and sample labels);
- An incorrect analysis (not analyte) was requested (e.g., COC lists 8315 but client wanted 8310). A documented request for the change is required;
- Incorrect limits reported based on regulatory requirements;
- The requested change has absolutely *no possible* impact on the interpretation of the analytical results and there is *no possibility* of the change being interpreted as misrepresentation by anyone inside or outside of our company.

23.6.2) Multiple Reports

The laboratory does not issue multiple reports for the same work order where there is different information on each report (this does not refer to copies of the same report) unless required to meet regulatory needs and approved by the BUMA Director and QA.

A.1) APPENDIX 1 - List of Governing Documents Applicable to the QA Manual

NBLSC SOPs and Policies

NBLSC Doc. No.	Title
NDSC-APT-SOP56445	Processing of Proficiency Testing Samples
NDSC-CAR-QP5341	Investigation and Corrective Action Process Policy
NDSC-CAR-SOP38229	Nonconforming Work
NDSC-CAR-SOP43847	Management of Root Cause Analysis
NDSC-ETHC-QP5252	Ethics and Data Integrity Policy
NDSC-ETHC-SOP38228	Internal Ethics and Data Integrity Investigations
NDSC-ETHC-SOP43862	Manual Integrations
NDSC-IA-FRM43453	Annual Management Systems Review Checklists
NDSC-IA-QP38702	Management Systems Review
NDSC-IA-SOP5260	Internal Auditing
NDSC-QA-FRM68791	Common Terms, Definitions, and Acronyms
NDSC-US-EHS-QP46060	Environmental Health and Safety Manual
NDSC-US-LEG-FRM58366	Records Retention / Storage Schedule
NDSC-US-LEG-QP54927	Records Retention Policy
NDSC-US-MCC-QP5339	Change Control
NDSC-US-PUR-SOP46704	Acid and Solvent-Lot Testing and Approval Program
NDSC-US-PUR-SOP62924	Guidance for Procurement of Environmental Laboratory Supplies
NDSC-US-SUB-SOP44936	Subcontracting
NDSC-US-TS-QP44940	Calibration Curves and the Selection of Calibration Points
NDSC-US-TS-QP44987	Policy on GC/MS Tuning for Full Scan Volatile and Semi-Volatile Methods
NDSC-US-TS-QP71638	Policy on Tentatively Identified Compounds (TICs) - GC/MS Analysis
NDSC-US-TS-SOP42091	Detection and Quantitation Limits

Laboratory SOPs and Policies

Local Doc. No.	Title
CED-G-OC-WI67245	Organizational Chart - Eurofins Cedar Falls Laboratory
CED-P-FPS-SOP42947	General Procedures for Subsampling, Sample Homogenization, and Sample Compositing
CED-P-PROJ-SOP42905	Project and Contract Review Procedures for Meeting Regulatory, Accreditation, and Client Requirements
CED-P-REV-SOP42955	Data Review Procedures
CED-P-SAM-SOP42892	Shipping
CED-P-SAM-SOP42940	Customer Service and Login Procedures
CED-P-SAM-WI43567	Sample Acceptance Policy
CED-P-STD-SOP42952	Standards and Reagents - Documentation and Tracking
CED-Q-APT-SOP42901	Investigating a Proficiency Testing Failure
CED-Q-DC-SOP42896	Laboratory Document Control Procedures
CED-Q-DC-WI45965	Writing and Reviewing Laboratory Documents in D4 Handbooks
CED-Q-MU-SOP42898	Estimating Measurement Uncertainty
CED-Q-QC-SOP42899	Quality Control Limits
CED-Q-QC-SOP42900	Random Marginal Exceedances
CED-R-EQ-SOP42915	In-House Calibration and Verification of Laboratory Support Equipment
CED-R-EQ-SOP42930	Analytical Balance Operation
CED-R-EQ-SOP42968	Thermometer Operation
CED-R-EQ-SOP43012	Volumetric Equipment Verification Procedures
CED-R-EQ-SOP43014	Calibration of Sampling Pumps
CED-R-PE-SOP42903	Personnel Training and Demonstration of Capability Procedures
CED-S-EHS-WI49679	HSE Manual Addendum - Eurofins Cedar Falls
CED-S-PU-FRM58869	Environmental Suppliers - Approved List
CED-S-WD-SOP42937	Waste Disposal

A.2) APPENDIX 2 - List of Laboratory Accreditations, Certifications, and Approvals

The Eurofins Cedar Falls laboratory maintains accreditations, certifications, and approvals with numerous state and national entities. Programs vary but may include on-site audits, reciprocal agreements with another entity, performance testing evaluations, review of the QA Manual, standard operating procedures, method detection limits, training records, etc. At the time of this QA Manual revision, the laboratory has accreditation/certification/approval with the following organizations:

Program	Authority	ID	Type
NELAP	Illinois EPA	200024	Laboratory accreditation (secondary)
NELAP	Kansas Dept. of Health and Environment	E-10341	Laboratory accreditation (secondary)
NELAP	Minnesota Dept. of Health	019-099-319	Laboratory accreditation (secondary)
NELAP	Oregon Health Authority	IA100001	Laboratory accreditation (primary)
State	Colorado Dept. of Labor and Employment/Division of Oil and Public Safety	IA100001 (OR)	Petroleum Storage Tank Program - Laboratory approval
State	Georgia Dept. of Natural Resources	IA100001 (OR)	Laboratory stipulation of certification
State	Iowa Dept. of Natural Resources	007	Laboratory certification
State	North Dakota Dept. of Environmental Quality	R-186	Laboratory certification

The certificates and accredited parameter lists are available for each program/authority at https://www.eurofinsus.com/env under Resources → Certifications.

The laboratory also maintains other approvals and registrations with a variety of organizations and entities. These include:

Program	Authority	ID	Type
Federal	U.S. EPA / Environmental Response Laboratory Network (ERLN)	68HERH22G0014	Basic Ordering Agreement (BOA) - ERLN
Federal	U.S. EPA / Discharge Monitoring Report QA Program (DMR-QA)	IA00018	EPA lab code
Other	TNI LAMS / National Environmental Laboratory Accreditation Management System	TNI00232	TNI lab code
State	Iowa Dept. of Public Health	3063-1-07-ECD	Radioactive materials registration
State	Minnesota Dept. of Commerce	3349	Petrofund contractor registration

A.3) APPENDIX 3 - References Used to Prepare the QA Manual

The QAM has been prepared to be consistent with the requirements of the following documents:

- ANSI/ASQC, E4-1994, "Specifications and Guidelines for Quality Management Systems for Environmental Data Collection and Environmental Technology Programs" (American National Standard, January 5, 1995, or most recent version).
- EPA 240/B-01-002, *EPA Requirements for Quality Management Programs (QA/R-2)*, May 31, 2006.
- EPA 600/4-79-019, *Handbook for Analytical Quality Control in Water and Wastewater Laboratories*, EPA, March 1979.
- *Test Methods for Evaluating Solid Waste Physical/Chemical Methods (SW846)*, Third Edition, September 1986; Final Update I, July 1992; Final Update IIA, August 1993; Final Update II, September 1994; Final Update IIB, January 1995; Final Update III, December 1996; Final Update IIIA, April 1998; Final Update IIIB, November 2004; Final Update IV, February 2007; Final Update V, July 2014; Final Update VI (various dates); Final Update VII (various dates).
- Federal Register, 40 CFR Parts 136, 141, 172, 173, 178, 179 and 261.
- *Manual for the Certification of Laboratories Analyzing Drinking Water*, Fifth Edition (EPA 815-R-05-004, January 2005) and its supplements.
- APHA, *Standard Methods for the Examination of Water and Wastewater*, 20th, 21st, 22nd, 23rd, 24th and on-line Editions.

A.4) APPENDIX 4 - QA Manual Crosswalk with TNI and ISO/IEC 17025 Standards

Sec. No.	Title	2009 and 2016 TNI Standard Reference	ISO/IEC 17025:2005(E) Reference	ISO/IEC 17025:2017(E) Reference
-	COVER PAGE	V1M2 Sec. 4.2.8.3		
-	TABLE OF CONTENTS	V1M2 Sec. 4.2.8.3		8.1.2; 8.2.1
1	INTRODUCTION, SCOPE AND APPLICABILITY	V1M2 Sec. 4.2.8.4		
1.1	Introduction and Compliance References	V1M2 Secs. 1.1; 1.2; 2.0; 3.2; 4.1.2; 4.2.4	4.1.2; 4.2.4	5.3; 5.4; 8.2.4; 8.3.1
1.2	Terms and Definitions	V1M2 Secs. 3.0; 4.2.4	4.2.4	
1.3	Scope / Fields of Testing	V1M2 Secs. 1.2; 4.2.4	4.1.2; 4.2.4	5.3; 5.4; 8.2.1; 8.2.4
1.4	Quality Manual Review Process	V1M2 Secs. 4.2.1; 4.2.7; 4.3.3.2; 4.3.3.3	4.2.1; 4.2.7; 4.3.3.2; 4.3.3.3	5.3
2	MANAGEMENT AND RESPONSIBILITIES	V1M2 Sec. 4		8.2.4; 8.2.5
2.1	Overview	V1M2 Secs. 4.1.1; 4.1.3; 4.1.5	4.1.1; 4.1.3; 4.1.5; 4.2.6	5.1; 5.2; 5.5; 5.6; 6.2.1; 6.2.4
2.2	Roles and Responsibilities	V1M2 Secs. 4.1.4; 4.1.5; 4.1.6; 4.2.1; 4.2.6; 5.2.4	4.1.3; 4.1.5; 4.1.6; 4.2.1; 4.2.6; 5.2.4	4.1.1-4.1.3; 4.1.5; 5.5; 5.6; 6.2.1; 6.2.4; 6.2.6; 8.2.2
2.3	Business Continuity and Contingency Plans	V1M2 Secs. 4.1.5; 4.1.7.2; 4.2.7	4.1.5; 4.2.7	
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23.6	Amendments to Test Reports	V1M2 Sec. 5.10.9	5.10.1; 5.10.9	7.8.8.1-7.8.8.3
A.1	APPENDIX 1 - List of Governing Documents Applicable to the QA Manual			
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A.5) APPENDIX 5 - Analytical Method References

Source references for methods include:

- *Guidelines Establishing Test Procedures for the Analysis of Pollutants Under the Clean Water Act: Analysis and Sampling Procedures*; 40CFR Part 136 as amended by Method Update Rules; August 28, 2017; May 3, 2021; and April 16, 2024.
- *Methods for Chemical Analysis of Water and Wastes*, EPA 600 (4-79-020), revised March 1983 where applicable.
- *Methods for the Determination of Inorganic Substances in Environmental Samples*, EPA-600/R-93/100, August 1993.
- *Methods for the Determination of Metals in Environmental Samples*, EPA/600/4-91/010, June 1991; Supplement I: EPA-600/R-94/111, May 1994.
- *Technical Notes on Drinking Water Methods*, EPA-600/R-94/173, October 1994.
- *NIOSH Manual of Analytical Methods*, 4th Ed., August 1994.
- *Standard Methods for the Examination of Water and Wastewater*, 20th, 21st, 22nd, 23rd, 24th and on-line Editions; American Water Works Association, Water Pollution Control Federation, American Public Health Association: Washington, D.C.
- *Test Methods for Evaluating Solid Waste Physical/Chemical Methods (SW846)*, Third Edition, September 1986 and as amended by updates promulgated by U.S. EPA.
- *Annual Book of ASTM Standards*, ASTM International, West Conshohocken, PA.
- Code of Federal Regulation (CFR), Title 40, Parts 136, 141, 172, 173, 178, 179 and 261.
- "Methods for Determination of Inorganic Substances in Water and Fluvial Sediments," (Book 5, Chapter A1), *Techniques of Water-Resources Investigations of the United States Geological Survey*, U.S. Department of the Interior, Denver, CO; Revised 1989 unless otherwise stated.
- State-specific method references include:
  - *Method for Determination of Volatile Petroleum Hydrocarbons (Gasoline)*, Method OA-1, Iowa DNR, Revision 7/27/1993.
  - *Extractable Petroleum Products (And Related Low Volatility Organic Compounds)*, Method OA-2, Iowa DNR, Revision 7/27/1993 and Revision 1/1/2015.
  - *Modified GRO: Method for Determining Gasoline Range Organics*, PUBL-SW-140, Wisconsin DNR, September 1995.
  - *Modified DRO: Method for Determining Diesel Range Organics*, PUBL-SW-141, Wisconsin DNR, September 1995.
  - *Soil Sample Collection and Analysis Procedures, Petroleum Remediation Program*, c-prp4-04, Minnesota Pollution Control Agency, August 2022.
  - *Groundwater Sample Collection and Analysis Procedures, Petroleum Remediation Program*, c-prp4-05, Minnesota Pollution Control Agency, August 2022.
  - *Kansas Method for the Determination of Low-Range Hydrocarbons (LRH)*, Kansas Department of Health and Environment, Revision 1.0, November 2015.
  - *Kansas Method for the Determination of Mid-Range Hydrocarbons (MRH) and High-Range Hydrocarbons (HRH)*, Kansas Department of Health and Environment, Revision 1.0, November 2015.

A.6) APPENDIX 6 - Summary of Revisions to this QA Manual

Only details of the last two major revisions (and any interim modifications) are incorporated into this appendix. Prior revisions are documented in the QA files.

• Version 9 (effective 19-Nov-2021)

1. Formatted for D4.
2. Throughout this document, updated the ID numbers for laboratory documents which are cross-referenced via D4.
3. Section 2.2 - Added descriptions for Client Service Manager and Sample Receiving Staff.
4. Section 2.2.6 - Added Business Unit Manager to Laboratory Director's title.
5. Section 2.3 - Added Department Supervisor/Manager to list of Key Personnel; updated deputy for Client Service Manager.
6. Section 2.4 - Created new section for Organizational Charts (formerly named Figure 4-1); added statement about NDSC organizational charts; updated the laboratory's organizational chart.
7. Section 3.3 - Updated timeframe of QA training to 90 days of hire.
8. Section 5.4.6 - Added extract clean-up as an additional technique for Selectivity.
9. Section 5.7 - Added statement that Quality System Metrics are used to evaluate and manage risk.
10. Section 6.3 - Updated procedures as they relate to new document database (D4).
11. Section 7.4 - Added that the Laboratory Director or his/her designee maintain copies of signed contracts.
12. Section 9.3.1 - Removed reference to laboratory consignment system because it has been discontinued.
13. Section 10.2 - Changed the complaint submittal contact person from just the QA Manager to the Complaint Handling Team.
14. Section 11.3 - Updated document title for NDSC Doc. No. CW-Q-S-005 (formerly entitled *Data Recalls*).
15. Section 12.6 - Created new section for example corrective actions (formerly named Table 14-1); updated database where health/safety violations are documented.
16. Section 15.1.5 - Added additional details to describe the various proficiency testing studies in which the laboratory participates.
17. Section 17.6 - Created new section for Example Work Flow (formerly named Figure 19-1).
18. Section 18.3.3 - Clarified that *working* thermometers are calibrated at least annually.
19. Section 18.3.4 - Added temperature specification for freezers.
20. Section 18.3.5 - Added additional detail to distinguish among various types of volumetric equipment, which may have differing verification requirements.
21. Section 18.6 - Updated GC/MS tuning frequency to accommodate methods which allow less-frequent tune analysis.
22. Section 18.7 - Created new section for Example Instrumentation List (formerly named Table 20-1).
23. Section 21.4 - Created new document reference for Sample Acceptance Policy to make it a stand-alone document (formerly existed as Figure 23-1 within this manual); added criteria for client to notify the laboratory if sample is potentially hazardous.
24. Section 21.7 - Added cross-reference to laboratory's Shipping SOP.
25. Appendix 2 - Separated listing of certifications/accreditations and other approvals into two separate tables; added additional listing for ERLN, DMR-QA, and TNI LAMS programs.
26. Appendix 3 - Added version details to several document references.
27. Appendix 5 - Added additional detail to definitions of Least Squares Regression and Quadratic Curves; added acronyms for RE and RSE.
28. Appendix 6 - Added source references for several state-specific methods.
29. Appendix 7 - Created new appendix to track recent changes and revisions to this manual.

• Version 9.1 (effective 25-Feb-2022)

1. Throughout document, updated legal entity/ownership information from "Eurofins TestAmerica" to Eurofins Environment Testing North Central, LLC ("EETNC").
2. Throughout document, updated the laboratory's short business name from "Eurofins TestAmerica Cedar Falls" to "Eurofins Cedar Falls".
3. Throughout document, updated the company website address.
4. Cover page - Updated company logo, lab name, and confidentiality statement.

5. Sec. 2.1 - Updated the description of the company's organizational structure.
6. Sec. 2.4 - Updated logo on the laboratory's organizational chart.
7. Sec. 21.6 - Removed reference to laboratory SOP *Quarantine Soils Procedure* (discontinued).
8. Appendix 1 - Removed *Quarantine Soils Procedure* from "Laboratory SOPs and Policies" table.
9. Appendix 2 - Removed reference to the laboratory's USDA-APHIS Foreign Soil Permit (expired and not renewed); updated ERLN BOA number.

• Version 10 (this document)

1. Editorial revisions made throughout document; some sections reorganized to harmonize with latest NBLSC Quality Manual Template.
2. Throughout document, updated references for generic company name to "Eurofins Environment Testing" ("EET").
3. Throughout document, updated references to "NDSC" with "NBLSC" (National Business Line Support Center).
4. Throughout document, updated references to NBLSC documents contained within D4.
5. Throughout document, updated references to the company intranet website from TANet Oasis to EET-Net.
6. Throughout document updated references to "Laboratory Director" ("LD") with "Business Unit Manager" ("BUMA").
7. Throughout document, added method reference to Standard Methods 24th Edition, where applicable.
8. Sec. 1.2 - updated Terms and Definitions to reference NBLSC document.
9. Sec. 2.1 - removed image of Organizational chart and replaced by reference to D4 document.
10. Sec. 2.2.12 - combined separate descriptions of EHSC and Waste Coordinator into one position (EHS Specialist).
11. Sec. 2.2.14 - updated reporting structure for sample receiving and shipping staff.
12. Sec. 3.3 - provided updated description of training processes; added subsections 3.3.1 and 3.3.2 to provide additional description of IDOC and CDOC.
13. Sec. 3.4 - updated reporting hotline for ethics/data integrity concerns.
14. Sec. 5.3 - rewrote description of quality system documentation.
15. Sec. 5.4 - added reference to NBLSC Terms and Definitions document.
16. Sec. 5.6.1 - rewrote description of QC charting.
17. Sec. 5.8 - added new section on Management of Change and reference to NBLSC Change Control document.
18. Sec. 6.3 - rewrote description of document control procedures in D4.
19. Sec. 6.4 - rewrote description of obsolete documents in D4.
20. Sec. 7.2 - added detail on project review.
21. Sec. 7.8 - added procedures for Net Promoter Score; clarified investigation process for informal/formal investigation of client feedback.
22. Sec. 8.2.1 - added clarifying details on new subcontractor process.
23. Sec. 8.3 - added clarifying details on subcontractor oversight and reporting process.
24. Sec. 9 - rewrote overview of supplier evaluation and procurement processes.
25. Sec. 9.3 - updated location for storing solvent and acid approval documentation.
26. Sec. 9.6 - added description of review/approval of critical consumables, supplies, and services.
27. Sec. 10.1 - clarified cases where PM can resolve complaints; added reference to NBLSC Investigation and Corrective Action Process Policy.
28. Secs. 11.2 and 11.3 - clarified steps of the corrective action process for certain nonconforming work.
29. Sec. 12.2.2 - clarified details stored in the CAR database.
30. Sec. 15.1.5 - added reference to NBLSC SOP for Processing of Proficiency Testing Samples.
31. Sec. 15.3 - clarified steps of the corrective action process for audit findings.
32. Sec. 17.4.1.1 - consolidated details of method validation process from other sections.
33. Sec. 17.10 - removed description of using LCS limits to "estimate" uncertainty since it is a non-standard approach.
34. Sec. 17.12.4 - included description of Data Review Checker (DRC) for data review.
35. Sec. 18.1 - updated table to reflect current laboratory instrumentation.
36. Sec. 18.3.5 - added exception for verifying exempted volumetric measuring devices.
37. Sec. 18.5 - added reference and link to NBLSC TIC policy.
38. Sec. 19.3 - updated name of ISO Guide 34 to ISO 17034.
39. Sec. 19.4 - simplified description of documentation and labeling practices of reference standards, materials, and reagents.

40. Sec. 20 - removed all descriptions of field sampling activities, since the laboratory no longer performs them.
41. Sec. 21.2.1 - added reference to the Eurofins eCOC electronic sample transfer program.
42. Sec. 22.2 - added general statement on the maximum batch size.
43. Sec. 22.4 - added description of sample matrix controls for microbiology.
44. Sec. 22.5 - removed detailed descriptions of QC acceptance and actions; replaced with reference to laboratory method SOPs.
45. Sec. 23.2 - updated list of test report information to reflect current practices.
46. Sec. 23.3 - added short description of report formatters.
47. Appendix 1 - updated list of NBLSC and laboratory documents.
48. Appendix 4 - table updated to incorporate sections changes throughout document; added list of appendixes to table.
49. Removed previous Appendix 5 (Terms/Glossary and Acronyms).
50. Appendix 6 (Analytical Method References) changed to new Appendix 5; added updated references where applicable.
51. Appendix 7 (Summary of Revisions to this QA Manual) changed to new Appendix 6.

CED-G-OC-WI67245 Organizational Chart - Eurofins Cedar Falls Laboratory
CED-P-FPS-SOP42947 General Procedures for Subsampling, Sample Homogenization, and Sample Compositing
CED-P-PROJ-SOP42905 Project and Contract Review Procedures for Meeting Regulatory, Accreditation, and Client Requirements
CED-P-REV-SOP42955 Data Review Procedures
CED-P-SAM-SOP42892 Shipping
CED-P-SAM-SOP42940 Customer Service and Login Procedures
CED-P-SAM-WI43567 Sample Acceptance Policy
CED-P-STD-SOP42952 Standards and Reagents - Documentation and Tracking
CED-Q-APT-SOP42901 Investigating a Proficiency Testing Failure
CED-Q-DC-SOP42896 Laboratory Document Control Procedures
CED-Q-DC-WI45965 Writing and Reviewing Laboratory Documents in D4Handbooks
CED-Q-MU-SOP42898 Estimating Measurement Uncertainty
CED-Q-QC-SOP42899 Quality Control Limits
CED-Q-QC-SOP42900 Random Marginal Exceedances
CED-R-EQ-SOP42915 In-House Calibration and Verification of Laboratory Support Equipment
CED-R-EQ-SOP42930 Analytical Balance Operation
CED-R-EQ-SOP42968 Thermometer Operation
CED-R-EQ-SOP43012 Volumetric Equipment Verification Procedures
CED-R-EQ-SOP43014 Calibration of Sampling Pumps
CED-R-PE-SOP42903 Personnel Training and Demonstration of Capability Procedures
CED-S-EHS-WI49679 HSE Manual Addendum - Eurofins Cedar Falls
CED-S-PU-FRM58869 Environmental Suppliers - Approved List
CED-S-WD-SOP42937 Waste Disposal
IA-QP38702 Management Systems Review
US-PUR-SOP62924 Guidance for Procurement of Environmental Laboratory Supplies
NDSC-APT-SOP56445 Processing of Proficiency Test Samples
NDSC-CAR-QP5341 Investigation and Corrective Action Process Policy
NDSC-CAR-SOP38229 Nonconforming Work
NDSC-CAR-SOP43847 Management of Root Cause Analysis
NDSC-ETHC-QP5252 Ethics and Data Integrity Policy
NDSC-ETHC-SOP38228 Internal Ethics and Data Integrity Investigations
NDSC-ETHC-SOP43862 Manual Integrations
NDSC-IA-FRM43453 Annual Management Systems Review Checklists
NDSC-IA-SOP5260 Internal Auditing
NDSC-QA-FRM68791 Common Terms, Definitions, and Acronyms
NDSC-US-EHS-QP46060 Environmental Health and Safety (HSE) Manual
NDSC-US-LEG-FRM58366 Records Retention / Storage Schedule
NDSC-US-LEG-QP54927 Records Retention Policy
NDSC-US-MCC-QP5339 Change Control
NDSC-US-PUR-SOP46704 Acid and Solvent Testing and Approval Program

NDSC-US-SUB-SOP44936 Subcontracting
NDSC-US-TS-QP44940 Calibration Curves and the Selection of Calibration Points
NDSC-US-TS-QP44987 Policy on GC/MS Tuning for Full Scan Volatile and Semi-Volatile Methods
NDSC-US-TS-QP71638 Policy on Tentatively Identified Compounds (TICs) – GC/MS Analysis
NDSC-US-TS-SOP42091 Detection and Quantitation Limits

End of document

Version history

Version	Approval	Revision information	
9	09.NOV.2021	Rewritten in D4; new manual revision	
9.1	25.FEB.2022	Editorial revisions	
10	13.AUG.2024	Reviewed; new manual revision.	

APPENDIX C

OMITTED

APPENDIX D

Standard Field Procedures

APPENDIX D
BT^2 STANDARD FIELD PROCEDURES

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1.0 LABELING OF MONITORING WELLS, BORINGS, AND OTHER SAMPLING AND REFERENCE POINTS

1.1 Scope

This SOP describes standard procedures for labeling monitoring wells, soil borings, and other common sampling and reference points.

1.2 Background

The objectives of standardizing the designation of sampling and reference points are:

- To provide consistency in documentation of field sampling and reference points.
- To communicate information about the type of sampling point by using standard designations that represent the general types of sampling points.
- To avoid confusion resulting from non-unique, vague, or misleading labeling of sampling points.

The purpose of the standard procedure is to provide a labeling scheme for common sampling and reference points and serve as the basis for devising labeling schemes needed for complex or unusual sites, or for sites on which sampling and reference points have previously been designated by site owners or other consultants.

1.3 Procedures and Documentation

1.3.1 General Guidelines

When developing a labeling scheme the following general guidelines apply:

1.3.1.1 Numbering

A number is to be used to identify a location at a site. Generally, a location has a radius of about 10 feet. The following is an example.

> A monitoring well, installed within 10 feet of a previously installed boring, B**2**, is designated MW**2**. A piezometer, installed within 10 feet of the monitoring well, is designated MW**2P**. A test pit excavated at the location is designated TP**2**.

Numbering at a site should begin at **1** unless sampling and reference points have already been established at the site. To avoid nonspecific numbering at a site when you are unsure of what numbers have been already used, or if sampling or reference points designated for purposes other than yours exist at the site, start with number 100 or 200. The following are examples.

At an existing landfill, monitoring wells were designated MW1 through MW135, with some ambiguity if wells with numbers greater than 135 had previously existed at the site. The new series of wells installed for the landfill expansion were designated MW201 through MW212.

At an industrial site, an ongoing geotechnical investigation is using a labeling scheme of B1 through B55. The environmental investigation used a designation system starting with B201 to avoid possible overlap with the geotechnical borings that might eventually exceed 100 in number.

At a petroleum release site, a monitoring well, MW7, was located in the road right-of-way and was part of the monitoring network for an adjacent petroleum release investigation. Access to MW7 could not be obtained, so a well was installed within 10 feet of MW7 and was designated MW7BT (BT for BT^2).

1.3.1.2 Replacements

If a sampling or reference point is removed and then replaced within 10 feet of the original point, it is designated with an **R**. The following is an example.

MW2**R** is a replacement well installed within 10 feet of the original MW2, which was removed.

1.3.1.3 Unsuccessful Installations

If the installation at a sampling point is unsuccessful, the unsuccessful attempts at the location should be designated with an **X**. The following is an example.

A boring could not be advanced to its target depth because of refusal on boulders. Two attempts were made within 10 feet of the original location before the boring was advanced to its target depth. The unsuccessful borings were designated B14**X**, and B14**XX**. The successful boring was designated B14.

1.3.2 General Designations

The following designations should be used unless site activities require a unique labeling scheme.

1.3.2.1 Borings

B A boring not converted to a permanent sampling point. Example **B2**.

GB A boring installed using direct-push technology and not converted to a permanent sampling point. Example **GB2**.

HA A hand-auger boring not converted to a permanent sampling point. Example **HA2**.

1.3.2.2 Wells

MW A monitoring well used to measure water levels and collect groundwater samples for field or laboratory analysis. Constructed such that the water table intersects the screen. Example **MW2**.

MW P A monitoring well used to measure water levels and collect groundwater samples for field or laboratory analysis. Constructed such that the screen is below the water table. Example **MW2P**.

MW PP A monitoring well used to measure water levels and collect groundwater samples for field or laboratory analysis. Constructed such that the screen is below the water table and is deeper than the next deepest well. Example **MW2PP**.

MW Q A monitoring well used to measure water levels and collect groundwater samples for field or laboratory analysis. Constructed in a perched aquifer. Example **MW2Q**.

MW T A temporary well. Examples **MW2T**, **MW2PT**.

PZ Small diameter well used only for measuring water levels. Example **PZ4**.

EXT Groundwater extraction well. Example **EXT2**.

SV Soil vapor extraction well. Example **SV7**.

TW Groundwater pump test well. Example **TW2**.

PW Private drinking water supply well. Example **PW13**.

1.3.2.3 Other Monitoring Well Designations

Sites with extensive monitoring systems may require monitoring well designations that reflect the site stratigraphy. (Avoid the use of A, B, C designations as these convey little or no information.) Select letters designations that provide stratigraphic information. The following is an example for nested wells at a site with four stratigraphic units.

MW2SG Monitoring well installed in the sand and gravel aquifer. The screen intersects the water table.

MW2D Monitoring well installed in the dolomite underlying the sand and gravel. The screen is below the water table.

MW2SS Monitoring well installed in the sandstone underlying the dolomite.

MW2PC Monitoring well installed in the PreCambrian rock underlying the sandstone.

1.3.2.4 Other Sampling Points

TP Test pit excavated with a backhoe or by hand. Example **TP5**.

SW Surface water sampling point. Example **SW5**.

1.3.2.5 Reference Points

SG Staff gauge, surface water level measuring point. Example **SG5**.

M Survey control monument. Example **M5**.

MH Manhole. Example **MH7**.

UTR Underground storage tank riser. Example **UTR5**.

1.3.3 Creation of Numbering System

Each numbering system shall be prepared by the project technical coordinator planning the sampling or reference point setup.

1.3.4 Numbering System Review and Approval

Before beginning field or office work (workplan preparation, bid specification preparation, etc.) on the project, the numbering system should be approved by the Project Manager.

1.3.5 Revision of Numbering System or Individual Sampling or Reference Point Designation

A revision to the numbering system or to an individual sampling or reference point designation must be approved by the Technical Coordinator and the Project Manager. After approval is obtained, the change to the numbering system should be documented by a memo to the project team and file. Changes made to an individual sampling or reference point designation must be documented on all existing original forms including field notes, field forms such as boring logs, monitoring well diagrams, etc., and finalized report-ready versions of these and similar forms. The changes are to be indicated by drawing a single line through the original designation, then writing the revised designation beneath it, initialing and dating the revision.

1.4 Limitations on Standard Procedure Application

A project may require a labeling scheme for sampling and reference points that serves special needs and is not compatible with the general scheme for common sampling and reference points described in the standard procedure.

2.0 SOIL BORING – DRILLED

Soil borings are drilled to create boreholes in which wells or other subsurface monitoring and sampling points can be installed. Soil borings can also be used to collect discrete soil samples for logging, field screening, and analytical sample collection. The drilling equipment is operated by a subcontractor. The BT^2 geologist is responsible for selecting sampling intervals, logging and screening samples after they are collected, placing samples in appropriate containers for laboratory analysis, and documenting sampling procedures.

- Collect split-spoon samples at 2.5-foot intervals using standard split-spoon sampling techniques. Split-spoons will be driven 18 inches to 24 inches, with the longer interval to be used if sample recovery is poor.

- Sample borings continuously if, in the judgment of the field geologist, soil particle size, stratigraphy (layering), or degree of sorting are so variable that the entire soil column needs to be sampled.

- Examine each split-spoon sample for soil type (Unified Soil Classification System (USCS)), moisture, grain size distribution, consolidation (blow counts), color, stratigraphic features, and discoloration or odors.

- Record field observations and measurements on field record forms, soil boring logs, and in the field logbook. Record other information concerning field activities and conditions in the field logbook.

The procedures for collecting headspace readings from soil samples are provided in **Section 4.0**. The procedures for collecting analytical soil samples are provided in **Section 5.0**. The procedures for managing soil cuttings generated by drilling are provided in **Section 12.0**. The procedures for monitoring air conditions in the breathing zone during drilling are provided in **Section 13.0**.

Soil borings can be drilled using a variety of drilling techniques including, but not limited to, hollow stem auger drilling, air rotary drilling, and mud rotary drilling. The type of drilling selected will be project-specific and will depend on site geology, project sampling needs, and the intended end-use of the soil boring. The required drilling technique will be specified in the project workplan.

3.0 SOIL BORING – DIRECT PUSH TECHNOLOGY

The direct push technology Geoprobe™ (geoprobe) system can be used to collect discrete soil, groundwater, and soil vapor samples from the subsurface. Soft, shallow soil can be drilled and sampled quickly. During drilling, the sampler remains sealed as it is pushed or driven to the desired sampling depth. A piston stop-pin is removed after the sampler has reached the sampling depth. This allows the piston to retract so that soil enters the sampling tube as it is driven through the soil sampling interval. The soil sample interval is 4 to 5 feet long, and the soil sample cores are approximately 1 inch to 1.5 inches in diameter.

The geoprobe can be used to collect discrete soil samples for logging, field screening, and analytical sample collection. The soil sampling procedures to be used by BT^2 personnel are similar to those used in soil sampling using split-spoons in augered borings. The geoprobe sampler is operated by a subcontractor. The BT^2 geologist is responsible for selecting sampling intervals, logging and screening

samples after they are collected, placing samples in appropriate containers for laboratory analysis, and documenting sampling procedures.

- Collect geoprobe soil samples continuously unless a sampling interval is specified in the project workplan.

- Examine each soil sample for soil type (USCS), moisture, grain size distribution, color, stratigraphic features, and discoloration or odors.

The procedures for collecting headspace readings from soil samples are provided in **Section 4.0**. The procedures for collecting analytical soil samples are provided in **Section 5.0**. The procedures for managing soil cuttings generated by drilling are provided in **Section 12.0**. The procedures for monitoring air conditions in the breathing zone during drilling are provided in **Section 13.0**.

4.0 HEADSPACE ANALYSIS

4.1 Scope

This Standard Operating Procedure (SOP) outlines the procedure through which soil headspace is measured in the field using a photo-ionization detector (PID) or a flame-ionization detector (FID).

4.2 Background

Field headspace measurements are used in a number of ways. Although the use of the screening varies, the manner in which soil is screened does not. This SOP is intended as a guide to field headspace screening.

4.3 Procedures

The following procedures are specific to the Thermo Environmental Model 580B PID and the Sensidyne FID. If using other equipment, follow the manufacturer's instructions for calibration and use.

- Unplug PID or FID in office, pack up in case, and proceed to field site
  - Calibrate PID
    - Insert RUN key
    - Turn PID on

- Press “mode/store”
- Press “-/CSR”
- Press “-/CSR”
- Press “-/CSR”
- Press “-/CSR” display will say “reset to calibrate”
- Press “reset”
- Press “-\CSR” display will read “zero gas reset when ready”
- Press “reset” display will read “580 zeroing” then “span=0100"
- Press “+” display will read “span gas when ready”
- Attach 100 ppm gas to PID
- Press “reset” display will read “calibrating” then “reset to calibrate”
- DO NOT PRESS RESET
- Unplug the RUN key
- Plug the RUN key back in
- Turn PID on
- Record calibrated reading and background range

o Turn on FID

- Turn the on/off knob to R1
- Open valve on gas tank
- Adjust flow - ball should be at or below center line
- Press ”ignite” button
- Unit is lit when beeping stops
- Turn unit off if there is a long wait between samples - battery will die

- Collect and Run Sample
  - o Fill sealable plastic bag approximately ¼ full of soil
  - o Break up the soil to the extent possible
  - o Allow soil to warm out of direct sunlight
  - o Open corner of baggie and insert tip of PID or FID
  - o Hold tip of PID or FID approximately ¾ inch from soil in baggie
  - o Wait 10 to 15 seconds for PID or FID to make reading
  - o Record highest reading on meter
- Repeat for each sample to run
- Return PID or FID to box until back in the office
- Plug the PID or FID into the appropriate charger

5.0 SOIL SAMPLE COLLECTION

5.1 General

Follow these general methods for all soil sampling (semi-volatiles, metals, pesticides/herbicides, polychlorinated biphenyls, etc.) except sampling for volatiles organic compounds (volatiles) with methanol preservation. Procedures for sampling volatiles with methanol preservation are detailed in **Section 5.2**.

- Place soil samples into sample containers appropriate for the analytical method.
- Place all laboratory sample jars immediately on ice in a cooler and deliver by courier to a laboratory to analyze the target analyte(s).
- Complete sample documentation, labeling, and shipping as described in **Sections 9.0** and **10.0**.

5.2 Volatiles

5.2.1 Scope

Soils are analyzed by methanol extraction in the vial, followed by purge and trap analysis. Soil concentrations must be reported on a dry weight basis. This method is based on extracting the soil contaminants with methanol. Soil or waste samples are dispersed in methanol to dissolve the volatile organic constituents. A portion of the methanol solution is then analyzed by purge and trap Gas Chromatography (GC) or Gas Chromatography/Mass Spectrometer (GC/MS).

Soil samples are collected in wide-mouth volatile organic compound (VOC) vials and preserved with methanol. Minimum handling is required to reduce loss of contaminants. This method is based in part on: (1) ASTM D4547-91; (2) USEPA SW-846: Methods 5030, 5035, 8000, 8015, and 8260; (3) a single laboratory method evaluation study conducted by the American Petroleum Institute; and (4) work by the EPA Total Petroleum Hydrocarbons Committee.

5.2.2 Equipment

The following equipment will be utilized by field personnel for methanol soil sample collection:

- Laboratory-prepared methanol preservation vials
- Field balance

- Stainless steel spatulas
- Nitrile gloves
- Plastic bags
- Field notebook or field data sheets

5.2.3 Procedure

NOTE: Methanol preservation is mandatory for the soil analysis method and must be noted on the chain-of-custody (COC). Sample collection time must be verifiable from the COC. Soil samples that arrive at the laboratory without methanol, which have not been stored properly, must be rejected. Results from soil samples not properly preserved in methanol will be rejected. Bulk sampling will not be permitted.

1. Prior to sampling activities, the field balance will be properly calibrated (procedures for field balance use is discussed in **Section 5.2.4**). Calibration will be recorded in the field notebook.

2. Put on nitrile gloves.

3. Place empty VOC sample container on field balance.

4. Tare the VOC sample container so the field balance reads zero.

5. Use a stainless steel spatula to collect the appropriate amount of soil required for the VOC sample. The weight of the soil should be between 25 and 35 grams. A separate portion of the soil will be collected for field screening (procedures for field screening are discussed in **Section 4.0**).

6. Immediately add 25 milliliters (mL) of methanol (provided by laboratory in pre-measured vials) to the soil in the VOC sample container.

7. Close the VOC sample container tightly, label sample, and place in a plastic bag. An additional 4 ounces of soil will be collected in a 4-ounce jar for shipment to the laboratory for measurement of percent solids. The 4-ounce jar will be placed in a separate plastic bag from the VOC sample container. In the event insufficient soil is available for percent solids, it will be noted in the field notebook and on the COC.

8. The sample weight will be recorded on a log form (an example form is included in **Section 5.2.5**). In addition, the vial/methanol weight will be recorded on the same form.

5.2.4 Field Balance

The following SOP outlines procedures for weighing methanol preserved, VOC samples in the field. The SOP includes equipment, calibration procedures, and equipment use procedures.

5.2.4.1 Equipment

The following equipment will be utilized by field personnel when using the field balance:

- Field balance
- 10-gram weight
- Two U.S. nickels

5.2.4.2 Calibration

The field balance will be calibrated prior to use in the field using the following procedures:

- The field balance will be turned to the on position (the field balance should read zero).
- The 10-gram weight will then be placed on the field balance. Note, if a 10-gram weight is not available, two U.S. nickels will be used in placed of the 10-gram weight. Each nickel weighs 5 grams for a total of 10 grams.
- If the field balance fails to read zero when turned to the on position or the balance reads +/- 10 grams when the 10-gram weight is placed on the balance, it will be replaced.

5.2.5 Methanol Preservation Field Log

The following table is an example of the methanol preservation field log to be completed during all sampling events where methanol preservation of soil samples is required. The following information will be included on the form, and will be sent to the laboratory with the COC.

Methanol Preservation Record

Project Number: _____

Project Name: _____

Project Location: _____

Date: _____

Field Sample I.D.	Sample Depth (feet)	Jar Weight (grams)	Jar w/MeOH Weight (grams)	Jar w/Soil & MeOH Weight (grams)	Soil Weight (grams)

6.0 GROUNDWATER SAMPLE COLLECTION

6.1 Well Construction and Development

- Construct and develop all groundwater monitoring wells in accordance with the project workplan and applicable state requirements such as:
  - Iowa Administrative Code Chapter 110.11
  - Wisconsin Administrative Code Chapter NR 141

- Develop wells by alternately surging and purging with a PVC bailer, and then purging the well with a PVC bailer or submersible pump. Surge and purge each well for 30 minutes, and then purge the well continuously until ten well volumes of water are removed or until the water is clear.

- If the well does not produce enough water for continuous purging, then bail down at least three times, allowing the well to recover in between.

6.2 Well Purging

- Proceed with groundwater sampling from the least contaminated well (based upon observations and field instrument readings during drilling or existing water quality data) to the most contaminated well.

- Note the condition of the monitoring well and verify the correct well to be sampled. Additional information may be required for documentation before, during, and after groundwater sampling.

- Measure the total depth of the groundwater monitoring well and the depth to the groundwater using the methods detailed in **Section 7.0** Water Level and Well Depth Measurements.

- Subtracting the depth to the groundwater from the total depth of the monitoring well will give you the height of the water column within the well.

- The well volume can be determined using the following conversion factors:
  - Each foot of water in a 2-inch diameter well equals 0.16 gallons,
  - Each foot of water in a 4-inch diameter well equals 0.66 gallons, and

- Each foot of water in a 6-inch diameter well equals 1.5 gallons.
- Multiply the well volume based on the height of the water column by three.

- Purge each well immediately prior to sampling using a PVC, Teflon, or stainless steel bailer attached to a dedicated sampling rope, a dedicated inertial lift pump, or a Grundfos submersible pump.

- Measure the volume of water removed from the well. Pump or bail water from the well until three to five well volumes have been removed.

6.3 Sample Collection, Preparation, Handling, and Preservation

6.3.1 General

- Calibrate field parameter measuring equipment, if required, as described in **Section 8.0**.

- After well purging has been completed, collect samples using a low flow sampling pump or a PVC bailer.

- Place groundwater samples in a sample container appropriate for the analytical method.

- Place all samples on ice for storage and shipping at approximate four degrees Fahrenheit.

6.3.2 Volatiles

- Samples for VOC analysis will be collected first.

- Gently fill a tilted 40-milliliter sample VOC preservation vial (preserved with HCl) with as little turbulence as possible.

- Place the Teflon-coated silicone septum carefully into place and screw cap on firmly.

- Invert the vial to check for air bubbles. If any are present, discard and retake the sample.

6.3.3 Semi-Volatiles

- Gently fill two 1,000-milliliter amber glass bottles.

6.3.4 Metals

- Gently fill one 1-liter HNO_3 preserved plastic bottle.

7.0 WATER LEVEL AND WELL DEPTH MEASUREMENTS

- Open all wells and allow water levels to equilibrate before measuring depths to water. Measure water levels several times at 10- to 15-minute intervals to ensure that the water levels have stabilized.

- Measure and record the depth to water and depth to the bottom of the well using an electric water level indicator tape.

8.0 GROUNDWATER pH, CONDUCTIVITY, TEMPERATURE, AND TURBIDITY MEASUREMENTS

8.1 Scope

The following procedure outlines the techniques used for the accurate field measurement of pH, specific conductance (conductivity), temperature, and turbidity using appropriate meters and electrodes.

8.2 Equipment

The following equipment will be utilized by field personnel during measurement activities:

- pH meter
- pH buffer solution
- Probe preservation solution
- Deionized water
- Conductance meter
- Conductance standards
- Temperature probe
- Temperature simulator
- Field notebook or field data sheets
- Turbidimeter

8.3 Procedures

8.3.1 Field Measurement of pH by Electrode

8.3.1.1 Electrode Preparation

All field analytical meters require a pre-field inspection to insure that the equipment components are complete and in proper working order.

1. Remove any salt deposits from the exterior of the probe by rinsing with deionized water.

2. Shake the electrode (like a clinical thermometer) to remove air bubbles.

3. Connect electrode to the meter.

8.3.1.2 Inspection and Calibration

Inspect and calibrate the meter in accordance with the manufacturer's instructions.

8.3.1.3 Sample Analysis

1. Collect sample in a disposable container.

2. Immerse pH probe in the sample.

3. Measure the pH in accordance with the meter manufacturer's instructions.

4. Record the pH and rinse the probe with deionized water.

5. Check the instrument for drift after every 2 to 4 hours (or according to site-specific workplan) by measuring the standard closest in the pH to the samples being measured. Record the reading in the field notebook or field data sheets. Recalibrate the instrument whenever the reading deviates more than the 0.10-pH units from the standard's manufactured value.

6. If the instrument does not calibrate within 0.1 pH units, consult the instruction manual. Recalibrate the instrument with a back up probe if necessary.

8.3.1.4 Electrode Storage

When storing up to one week, use electrode storage solution. A temporary solution can be made with 1 gram of KCI added to 200 ml of pH 7 buffer. (Storage of the electrode in distilled water will shorten the life of the probe!) If the probe will not be used for periods greater than one week, clean the electrode as directed in the manual, secure the protective cap, and store dry.

8.3.1.5 Electrode Maintenance

Refer to the pH instruction manual for cleaning and maintenance instructions.

8.3.2 Field Measurement of Specific Conductance by Electrode

8.3.2.1 Inspection and calibration

Inspect and calibrate the meter in accordance with the manufacturer's instructions.

8.3.2.2 Sample Analysis

1. Rinse the probe in deionized water, and then rinse the probe in the sample to be measured.

2. Immerse the probe into the sample.

3. Measure the conductance in accordance with the meter manufacturer's instructions.

8.3.2.3 Calibration Check

Check the instrument calibration every 4 hours by re-measuring a standard closest to the conductivity of the samples being measured.

8.3.3 Field Measurement of Temperature by Electrode

1. Prepare the temperature probe in accordance with the manufacturer's instructions.

2. Immerse the probe into the sample and allow a short time (10 to 20 seconds) for the temperature to stabilize.

3. Record the temperature reading displayed in the field notebook or field data sheet.

9.0 SAMPLE COLLECTION DOCUMENTATION

- Record field observations and measurements on field record forms. Record information concerning field activities and conditions directly and legibly in the field logbooks in ink. If an entry must be changed, do not obscure the original entry. Document the date, weather conditions, site activities, and personnel on site including visitors in the logbook.

- Record sample time, sample location, sample interval depth, sample number, and sample preservation method in field notebook. Identify soil samples by the sampling location and sample depth. For example, a soil sample from soil boring number B3 collected from a depth interval of 7 to 9 feet will be designated as B3 7-9 feet. Identify field samples with sample labels that list the date, sample identification, and BT^2, Inc. project number.

- Prepare COC forms that include sample number, sampling procedures, analysis required, the signature of the sampler, type of sample (grab or composite), number of containers, and signature blocks for all who handle the sample (with the exception of shipping personnel).

10.0 SAMPLE LABELING AND SHIPMENT

Attach a sample label to each individual sample bottle. The label shall include the field sample number, date/time of collection, type of analysis, sampler initials, and project name. Labels shall be annotated with waterproof, permanent ink. Fill out the COC form including the site name, sampler names/signatures, time/date of sampling (in military time), type of sample, and analyses requested. The completed COC form should be enclosed in a sealable plastic bag taped to the inside lid of the cooler that contains the samples listed on the form, after retaining the sampler's copy.

11.0 EQUIPMENT DECONTAMINATION

- Wash all non-disposable sampling tools in an Alconox solution followed by a clean water rinse. Use tap water from a public water supply or a clean supply well or distilled water for the final rinse. Sampling equipment will be air or towel dried between sampling locations.

- Collect all decontamination water for treatment and or disposal. Collect a representative sample for analyses of target compounds. Obtain analyses and consult the operator of the

local publicly owned treatment works (POTW) to determine if the water may be discharged to the sanitary sewer system or into the POTW headwaters.

12.0 INVESTIGATIVE WASTE MANAGEMENT

12.1 Contaminant Impacted Soil

- All probing and drilling cuttings will be contained and sampled for appropriate handling, treatment, or disposal.

- Samples from the contained cuttings will be submitted for analyses of the contaminants of concern and the results will be compared to applicable standards.

- If the soil cuttings do not contain concentrations that exceed the applicable standards, the cuttings will be spread on the site or blended into landscaped areas. If soil cuttings contain contaminant concentrations that exceed applicable standards, the cuttings will be disposed or treated at a permitted facility.

12.2 Contaminant Impacted Groundwater or Decontamination Water

- Potentially contaminated groundwater will be generated during the development, purging, and sampling of the monitoring wells.

- Contaminant impacted decontamination water will be generated during the decontamination of drilling and sampling equipment.

- Development, decontamination, and purge water with FID/PID readings greater than 10 ppm or with concentrations of any compounds above the applicable maximum contaminant levels (MCLs) will be discharged to the local publicly owned wastewater treatment works (POTW) after obtaining written authorization from the POTW superintendent. Based on the approval granted by the POTW operator or superintendent, the water may be discharged directly to the nearest sanitary sewer connection or collected in 55-gallon drums to be disposed of at the headwaters of the treatment works. If permission to discharge the impacted water to the POTW is not granted, the water will be contained and sampled for approved treatment at an alternate permitted treatment, storage, or disposal facility.

12.3 Free Product

Any free product collected from groundwater wells will be collected in 55-gallon or smaller drums that are approved for storage of flammable liquids. The free product will be properly treated or disposed of as a special waste or a hazardous waste as is appropriate.

13.0 AIR MONITORING FOR VOLATILE ORGANIC CHEMICALS

13.1 Photo-Ionization Detector and Flame-Ionization Detector

A PID or FID may be used to monitor the concentration of volatile organic chemicals in the ambient air on a work site. Perform air monitoring as required in the project Health and Safety Plan (HSP).

- Calibrate the PID or FID as described in **Section 4.0**.
- Hold PID or FID inlet in the worksite breathing zone until a stable reading is obtained.
- Collect samples at regular intervals, at a frequency appropriate for the likely concentration of contaminants of concern, ventilation at the site, temperature, and work activities.
- Record readings in field note book and alert workers to any elevated readings. If appropriate, take actions in accordance with the project HSP.

14.0 SLUG TESTING AND ANALYSIS

14.1 Purpose

The purpose of a slug test is to measure an aquifer's hydraulic conductivity in the vicinity of a monitoring well. In a slug test, water level measurements are collected at timed intervals after a volume is removed from or added to the well. The rate at which the water level returns to its original position is a function of the aquifer hydraulic conductivity. The larger the hydraulic conductivity, the faster the water level would return to its original position.

Due to the relatively small volume removed from a well (1 to 2 gallons), a slug test is only able to measure the hydraulic conductivity in the immediate area of the well screen. To estimate regional

hydraulic conductivity, it is necessary to perform a pump test where water is actively pumped from the well for a set period.

14.2 Equipment

- slug (1-inch diameter solid PVC with a galvanized iron eyehook in the top end) or bailer
- nylon rope (a separate piece for each well)
- Instrumentation Northwest DL2 datalogger
- Instrumentation Northwest pressure transducer and cable
- collar to hold cable in place during test
- electric water level indicator
- decontamination equipment (e.g., Alconox, brushes, buckets, distilled water, and a source of clean tap water)

14.3 Procedure

Open the well and allow it to equilibrate with atmospheric pressure, if necessary. Before beginning the test, measure the depth to water and the total depth of water in the well (the height of the water column in the well). Decontaminate the slug, the pressure transducer, and the cable by washing in a clean tap water/Alconox solution, followed by a triple rinse with distilled water.

Prepare and use the transducer and datalogger in accordance with the manufacturer's instructions. Place the transducer in the well so that it is near, but not touching, the bottom, and secure the cable with the collar. Avoid clogging the end of the transducer with sediment (if there is any sediment in the well). Connect the transducer cable to the datalogger. Place the slug in the well, using a new length of rope. Avoid placing the slug below the transducer, as it may jostle the transducer as it is pulled.

Allow sufficient time for the water level in the well to re-equilibrate. Monitor the change in water level with the datalogger; when the water level is changing less than 0.01 feet every minute, equilibration is sufficient. Before pulling the slug, note the water level indicated by the logger, then note the exact time the slug is pulled. After pulling the slug, allow the well to recover until the water level is changing less than 0.01 feet per recording interval. The transducer and cable may now be disconnected from the logger and removed from the well. Before moving on to the next well, decontaminate all equipment (e.g., slugs, transducer/cable) using the procedure noted above.

14.4 Data Analysis

Several methods are available to determine hydraulic conductivity based on the data collected during the slug test. Commonly used methods include Hvorslev (1951), Bouwer and Rice (1976), and Cooper, et al. (1967). The Bouwer and Rice method is most frequently used because it is able to correct for partial penetration of the well (the well is not fully screened over the entire thickness of the aquifer).

The Bouwer and Rice method utilizes a modification of the Thiem equation for radial flow to a pumped well. The equation used in this method is shown below:

$$K = \{[rc2 \ln(re / rw)]/2L\} \ 1/t \ln(yo/yt)$$

Where:

K = hydraulic conductivity

yo = initial change in water level due to instantaneous removal of water from the well

yt = change in water level at time t

L = length of well screen

t = time

rc = radius of well casing

re = equivalent radius over which head loss occurs

rw= radius of well (including filter pack)

After field data for the slug tests on each well are reduced and graphed, manual curve matching will be utilized to insure that sand pack dewatering effects, late time data, and other outliers do not affect the computed solution of the above equation.

15.0 SITE MAPPING WITH GPS

15.1 Scope

This Standard Operating Procedure (SOP) outlines the procedure through which site maps are created using mapping-grade Global Positioning System (GPS) equipment.

15.2 Personnel Training and Qualifications

Personnel generating site maps with GPS equipment should be familiar with technical aspects and goals of the site prior to site mapping. Field personnel should be familiar with operation of the equipment.

15.3 Equipment Needed

1. Trimble ™ GPS Pathfinder Pro XR Receiver with Geo XT handheld and batteries
2. Tape measure

15.4 Procedures and Documentation

A. GPS Equipment Setup

1) Connect antenna, batteries, and Geo XT handheld to the Pro XR Receiver (backpack)

2) Turn on Geo XT handheld and start the TerraSync application

3) Select “setup” from the top left drop-down menu in TerraSync
   a) Click the “connect” button (if button says “disconnect”, unit is already connected, proceed to step
   b) Select “GPS settings”
   c) Select “COM1” from the “GPS receiver port” pull-down menu
   d) Select “real-time settings”
   e) At choice 1 select “Integrated Beacon”
   f) At choice 2 select “Integrated WAAS”
   g) At choice 3 select “Use Uncorrected GPS”

4) Select “data” from the top left drop-down menu in TerraSync
   a) Select “new file” from the secondary drop-down menu
   b) Enter name of the new file, use the following format: “project number_yearmonthday”. Write the filename in the fieldbook.
   c) Select “BT2 Standard” dictionary

B. Point Feature (boring, well, benchmark, etc.) Data Collection

1) Select "data" from the top left pull-down menu (if it is not currently showing)

2) Select the "feature name" for the feature you want to map
   a) Stand with the GPS antenna directly above the feature and stand still
   b) Select "create". Logging should begin. If logging is paused, select "options", and choose "log now" from the drop down menu. If logging is slower than one point per second, choose "logging interval" from the drop down menu and change to 1 second
   c) While GPS is logging, fill out attribute information (feature name, etc.)
   d) After logging at least 60 data points select "OK"
   e) Screen will display "feature saved" message. Move to next feature to map.

C. Point Feature Data Collection by Offset (For mapping building corners or features within 10 feet of a building or tall structure)

1) In the Data screen Select "Options" and choose "log later" from the drop down menu

2) Select the "feature name" for the feature you want to map
   a) Select "create". Logging will be paused.
   b) Select "options" and choose "offset" from the drop down menu
   c) Select "distance-distance" and click "next"
   d) Move to a location approximately 10 feet away from the feature, stand still, and click "log"
   e) After logging at least 60 data points, click "pause" then "next"
   f) Enter the horizontal distance between the feature and the point just logged (measure with tape measure), click "next"
   g) Move to a second location approximately 10 feet away from the feature, stand still, and click "log"
   h) After logging at least 60 data points click "pause" then "next"
   i) Enter the horizontal distance between the feature and point just logged (measure with tape measure), click "next"
   j) Determine whether the feature is to the right or the left as you walk from the first logged point to the second log point, choose "right" or "left", click "next"
   k) Fill out attribute information and click "ok"
   l) Screen will display "feature stored" message. Move to next feature to map.

D. Line Feature (utility, road, etc.) Data Collection

1) In the Data screen Select "Options" and choose "log later" from the drop down menu

2) Select the "feature name" for the feature you want to map

a) Select "create". Logging will be paused.

b) Stand at the beginning of the line feature to be mapped.

c) Select "options" and choose "new vertex" from the drop down menu. Logging will begin

d) After 20 data points have been logged, click "OK"

e) If the feature is a straight line, move to a second point on the line and repeat steps "c" and "d" to log a second vertex. Log as many vertexes as desired to describe the line feature. Specifically log corners or distinct changes in direction. The GPS will draw straight lines between vertexes.

f) If the feature contains curves that cannot be reasonable captured with vertexes, after logging the first vertex, click "log" and walk along the line. The GPS will log points as you walk.

g) Click "pause" to stop logging for any reason. Click "log" to resume logging or select "options" and choose "new vertex" to collect another vertex position.

h) Click "OK" to end collection of the line feature

15.5 Health and Safety Issues

Do not collect GPS data if lightning is present or could be present in the area. There are no other specific health and safety issues associated with this SOP. Refer to the site-specific health and safety plan for site-specific health and safety concerns and procedures.

15.6 Background

Site mapping is the foundation for all site work. Accurate site maps are necessary for all site investigation, remediation, and design activities. The objectives of the site mapping procedures are:

- To accurately and precisely present site information and features on a map; and
- To record site information for future use.

15.7 Limitations ON SOP Application

This SOP applies to sites where an adequate GPS signal is received. The GPS equipment will not accurately map indoors or in areas with significant overhead cover (trees, buildings, conveyors, etc.).

This SOP provides a description of the preferred way to complete GPS mapping in most situations. In some cases, the person performing site mapping may feel that an alternate approach would be more appropriate. In general, the SOP should be followed wherever feasible. However, the SOP is not intended to completely override the judgment of the technical person doing the work.

If the SOP for the task will not be followed, the person performing the work should:

- Obtain approval for the deviation from the SOP from the project manager if time permits. If the project manager is not available, request approval from a senior staff person familiar with the technical area of the SOP.

- Document deviations from the SOP. Documentation should include the reasons for the change in procedure and a detailed description of the changes.

16.0 PROCESSING GPS MAPPING DATA

16.1 Scope

This Standard Operating Procedure (SOP) outlines the procedure through which Global Positioning System (GPS) mapping data are processed and checked for quality assurance and quality control (QA/QC) purposes.

16.2 Personnel Training and Qualifications

Personnel processing GPS data should be familiar with technical aspects of the global positioning system, GPS equipment, and GPS data collection and processing. Personnel should receive training prior to processing GPS data.

16.3 Equipment Needed

1. Geo XT handheld unit
2. Computer with GPS Pathfinder Office software, Windows Explorer, Microsoft Excel

16.4 Procedures and Documentation

A. Transfer Data from Geo XT to the Desktop Computer

1) Open GPS Pathfinder Office software (Pathfinder)

2) The Pathfinder Project Window will open automatically.

a) If the data to be transferred were collected for a project with an exiting GPS folder, select the existing project

b) If the data to be transferred were collected for a new GPS project, create a new project in the project window. All projects with GPS data should have a GPS folder created in the "I:" drive (e.g. I:\Project#\GPS\)

3) Take the Geo XT out of the cradle, turn it on, and place back in the cradle. The Geo XT will communicate with the computer via USB. Select "no" when prompted to set up a partnership.

4) Select the "data" pull-down menu in Pathfinder and choose "transfer"

a) Select the "receive" tab (to receive data from the Geo XT)

b) Select "add"

c) Select "data file" from the drop-down menu

d) Select the file you want to transfer from the Geo XT to the computer (file type is .ssf)

e) Select "transfer all"

f) After the transfer is complete close the transfer windows

g) Use Windows Explorer to rename the file if the BT2 convention was not used (Project#_yearmonthday.ssf)

h) Use Windows Explorer to make the transferred file "read only"

i) Once the file transfer is confirmed, delete the file from the Geo XT.

5) Optional step – view transferred data

a) In Pathfinder, select the "file" drop-down menu and choose "open"

b) Navigate to the transferred file and open it. Review data as desired, then close the file.

B. Differential Correction of Data

1) In Pathfinder, select the "data" pull-down menu and choose "differential correction". The file to be differentially corrected does not need to be open in Pathfinder. The differential correction window will open.

a) Under "rover files" browse for the desired .ssf file if it is not already selected.

b) Under “base files” select “internet search”

c) If you know which base station is closest to the site at which the data was collected, select it from the drop down menu under “base data provider” and proceed to step “j”. If you do not know the closest base station, proceed to step “d”.

d) Select “new”

e) In the “new provider” window, select “copy the most up-to-date . .”

f) Select “yes” in the “confirm internet setup” window. A list of base stations with distances to the subject site will be downloaded.

g) Select the closest base station and click “OK”

h) If prompted to “overwrite existing base provider” choose “yes”

i) Click “OK” to close the “provider properties” window

j) Click “OK” in the “internet search” window

k) Select “yes” in the “confirm internet setup” window. Internet base files will download.

l) When the file download is complete, the “confirm selected base files” window will open. The window should indicate 100% coverage. If coverage is not 100% and it has been at least a day since the data were collected, go back to step “c” and choose the next closest base station.

m) Click “OK” in the “reference position” window

n) Click “OK” in the “differential correction” window. Differential correction will proceed. Differential correction will take several minutes depending on the amount of data collected.

o) The “differential correction completed” window will show a summary. Coverage should again be 100%. Click “close” to close this window.

p) The differential correction process creates a new file with the same name as the .ssf file, but with the extension .cor. Use Windows Explorer to navigate to the new .cor file and make it read only.

C. Review Data for QA/QC Purposes

1) In Pathfinder, select the “file” pull-down menu and choose “open”. Browse to the desired file (.cor) and open it.

2) Select the “file” pull-down menu and choose “save as”. Save the file using the following naming convention: Project#_QC_yearmonthday.cor. The date reference should be the date of data collection, consistent with the other filenames for the data.

3) Use the "feature property" window to view properties for each feature. Specifically review the standard deviation and horizontal precision for each feature. If the standard deviation and horizontal precision for a feature are both less than 1, not further review is needed for that feature. If the standard deviation or horizontal precision are greater than 1, proceed to step 4.

4) Review position data
   a) Select the "view" pull-down menu choose "layers" then "features"
   b) Select "not in feature"
   c) Select "line style". Select the color red and increase the line weight to be greater than the default.
   d) Click "ok" to close window.
   e) Select the desired feature in the "feature properties" box
   f) Click "delete", the feature will be temporarily deleted and replaced by the individual position data (red dots) collected by the GPS
   g) In the "map" window, zoom in on the data points that make up the feature
   h) Use the "position properties" window to review position data for each point. Review standard deviation, horizontal precision, visual position, number of satellites, and DOPs to determine if some points are better than others.
   i) If position data points are identified as poor quality (high standard deviation, high horizontal precision, lower number of satellites, high DOPs, or poor visual position as compared to the other position data points), use the eraser tool to delete the poor quality position data points. It is possible that none of the data points will stand out as poor quality. In that case, no action is required.
   j) When editing of position data is finished, click "undelete" in the "feature property" window. The feature will be restored. If data points were deleted, new values for standard deviation and horizontal precision will be calculated in the "feature property" window.
   k) Repeat steps e through j for all features. Save the file periodically and when finished.

D. Export Data to Excel File

1) In Pathfinder select the "utilities" drop-down menu and choose "export"
2) In the export window select "sample dbase setup" from the drop down menu
3) Click "properties". Verify that the desired coordinate system is selected. BT2 standard practice is to use Universal Transverse Mercator (UTM), NAD 1983 conus datum, units in feet, and mean sea level for altitude reference. Deviations from standard practice will

be necessary if the GPS data will be used with a base map in a different coordinate system. The export coordinate system should always match the coordinate system of the intended use of the data.

4) When export properties are confirmed click "OK" to exit the properties window
5) In the export window add file path information for export file destination. Add "database" to the existing export directory (e.g., I:\Project#\GPS\Export\Database).
6) Click "OK" to export. When prompted to create the new database folder select "yes". Pathfinder will create a separate database file (.dbf) for each feature type collected and place it in the database folder just created.
7) Close the "export completed" window.
8) Open the MS Excel database template file located at Q:\GPS\metadata_gps_data-template.xls.
9) Save the template file in the database folder with filename Metadata_gps_yearmonthday.xls (the date included in the filename should be the date of data collection).
10) Open all of the exported database files in MS Excel. The files are located at I:\Project#\GPS\Export\Database.
11) Copy each of the database files into the Metadata file.
12) Fill in the project information in the "read me" worksheet of the Metadata file. Save the Excel file.
13) After all database files are saved in the Metadata Excel file, use Windows Explorer to delete the database files (.dbf files) from the Database folder.

E. Export to AutoCad

1) In Pathfinder select the "utilities" drop down menu then choose "export"
2) In the export window select "sample AutoCad DXF Setup without blocks" from the drop-down menu
3) Click "properties". Verify that the desired coordinate system is selected. BT2 standard practice is to use Universal Transverse Mercator (UTM), NAD 1983 conus datum, units in feet, and mean sea level for altitude reference. Deviations from standard practice will be necessary if the GPS data will be used with a base map in a different coordinate system. The export coordinate system should always match the coordinate system of the intended use of the data.
4) When export properties are confirmed click "OK" to exit the properties window

5) In the export window add file path information for export file destination. Add "AutoCad" to the existing export directory (e.g., I:\Project#\GPS\Export\AutoCad).
6) Click "OK" to export. When prompted to create the new AutoCad folder select "yes". Pathfinder will create a .dxf file and place it in the AutoCad folder just created.
7) Close the "export completed" window

16.5 Health and Safety Issues

There are no health and safety issues associated with this SOP.

16.6 Background

GPS mapping data need to be accurate to make and edit accurate site maps. The objectives of this GPS mapping data processing procedure are:

- To review the quality of GPS mapping data; and
- To prepare GPS mapping data for use in site maps.

16.7 Limitations on SOP Application

This SOP applies to GPS data collected with the Trimble GPS Pathfinder Pro XR system with Geo XT handheld. Data collected with a different system will require a different procedure. Only personnel who have received training for this SOP should implement this SOP.

This SOP provides a description of the preferred way to complete GPS data processing in most situations. In some cases, the person performing data processing may feel that an alternate approach would be more appropriate. In general, the SOP should be followed wherever feasible. However, the SOP is not intended to completely override the judgment of the technical person doing the work.

If the SOP for the task will not be followed, the person performing the work should:

- Obtain approval for the deviation from the SOP from the project manager if time permits. If the project manager is not available, request approval from a senior staff person familiar with the technical area of the SOP.

- Document deviations from the SOP. Documentation should include the reasons for the change in procedure and a detailed description of the changes.

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APPENDIX E

Appendix IX Inorganics List

Appendix E

List of Inorganic Compounds from 40 CFR Part 264 Appendix IX

Antimony
Arsenic
Barium
Beryllium
Cadmium
Chromium
Cobalt
Copper
Lead
Mercury
Nickel
Selenium
Silver
Sulfide
Thallium
Tin
Vanadium
Zinc

APPENDIX F

Example Field Forms

BT², Inc.
Environmental Engineering and Science

SOIL BORING LOG INFORMATION

10-92

Facility/Project Name BT²#		License/Permit/Monitoring Number	Boring Number
Boring Drilled By (Firm name and name of crew chief)		Drilling Started	Drilling Completed / Drilling Method
Facility Well No.	Unique Well No. / Common Well Name	Static Water Level Feet	Surface Elevation Feet / Borehole Diam. Inches
Boring Location State Plane N, E NE 1/4 of NE 1/4 of Section , T. N., R. E.		Lat. Long.	Local Grid Location (If applicable)
County	Location Code	Civil Town/City/or Village	

Sample Number	Sample Length Recovered	Sample Blow Counts	Depth in Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	Soil Properties: Max. PID/FID	Soil Properties: Standard Penetration	Soil Properties: Moisture Content	Soil Properties: P200	Soil Properties: RQD/ Comments
			5									
			10									
			15									
			20									
			25									

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature | Firm BT², Inc.

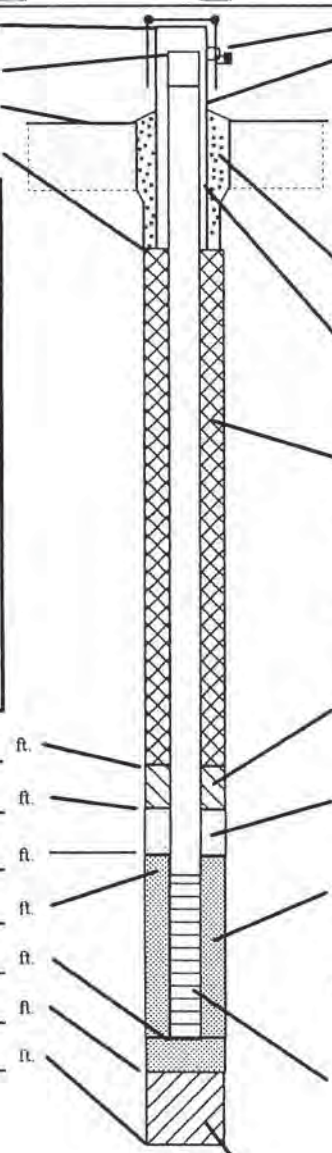
Sample Number	Sample Length Recovered	Sample Blow Counts	Depth in Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	Max. PID/FID	Soil Properties: Standard Penetration	Soil Properties: Moisture Content	Soil Properties: P200	RQD/ Comments
			30									
			35									
			40									
			45									
			50									
			55									
			60									
			65									

BT², Inc.
Environmental Engineering and Science

Watershedwater ☐ Waste Management ☐
Remediation ☐ Other ☐ _____

MONITORING WELL CONSTRUCTION
Form GEN-CONS -A Rev. 4-2002

Facility/Project Name	Local Grid Location of Well: ____ ft. ☐N ☐S ____ ft. ☐E ☐W	Well Name
Facility License,Permit or Monitoring Number	Local Grid Origin ☐ (estimated ☐) or Well Location ☐	Unique Well Number / Well ID No.
Facility ID	Lat. ° ' " Long. ° ' " or	Date Well Installed (mm dd yyyy)
Type of Well: Well Code ____ / ____	St.Plane ____ ft. N. ____ ft. S. / Section Location of Waste/Source ☐E ☐W: ___1/4 of ___1/4 of Sec. ___,T ___ N,R.	Well Installed By: Name (first, last) and Firm
Distance From Waste/Source ____ ft. / Enf. Stds. Apply ☐	Location of Well Relative to Waste/Source: u ☐Upgradient s ☐Sidegradient d ☐Downgradient n ☐Not Known	Gov. Lot Number ____



A. Protective pipe, top elevation ____.__ ft. MSL
B. Well casing, top elevation ____.__ ft. MSL
C. Land surface elevation ____.__ ft. MSL
D. Surface seal, bottom ____.__ ft. MSL or __.__ ft.

12. USCS classification of soil near screen:
GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☐
SM ☐ SC ☐ ML ☐ MH ☐ CL ☐ CH ☐
Bedrock ☐

13. Sieve analysis attached? ☐Yes ☐No

14. Drilling method used: Rotary ☐ 50 / Hollow Stem Auger ☐ 41 / Other ☐ __

15. Drilling fluid used: Water ☐ 02 / Air ☐ 01 / Drilling Mud ☐ 03 / None ☐ 99

16. Drilling additives used? ☐Yes ☐No
Describe ____

17. Source of water (attach analysis, if required): ____

E. Bentonite seal, top ____.__ ft. MSL or ___.__ ft.
F. Fine sand, top ____.__ ft. MSL or ___.__ ft.
G. Filter pack, top ____.__ ft. MSL or ___.__ ft.
H. Screen joint, top ____.__ ft. MSL or ___.__ ft.
I. Well bottom ____.__ ft. MSL or ___.__ ft.
J. Filter pack, bottom ____.__ ft. MSL or ___.__ ft.
K. Borehole, bottom ____.__ ft. MSL or ___.__ ft.
L. Borehole, diameter __.__ in.
M. O.D. well casing ____ in.
N. I.D. well casing __.__ in.

1. Cap and lock? ☐Yes ☐No
2. Protective cover pipe:
a. Inside diameter: __.__ in.
b. Length: __.__ ft.
c. Material: Steel 04 / Other ☐ __ ____
d. Additional protection? ☐Yes ☐No
If yes, describe: ____
3. Surface Seal: Bentonite 30 / Concrete 01 / Other ☐ __ ____
4. Material between well casing and protective pipe: Bentonite ☐ 30 / Other ☐ __ ____
5. Annular space seal: a. Granular/Chipped Bentonite ☐ 33
b. ____Lbs/gal mud weight...Bentonite-sand slurry ☐ 35
c. ____Lbs/gal mud weight.....Bentonite slurry ☐ 31
d. ____% Bentonite.....Bentonite-cement grout ☐ 50
e. ____ Ft^3 volume added for any of the above
f. How installed: Tremie ☐ 01 / Tremie pumped ☐ 02 / Gravity ☐ 08
6. Bentonite seal: a. Bentonite granules ☐ 33
b. ☐1/4 in. ☐3/8 in. ☐1/2 in. Bentonite chips ☐ 32
c. ☐ __ ____
7. Fine sand material: Manufacturer, product name & mesh size
a. ____ __ ____
b. Volume added ____ ft^3
8. Filter pack material:Manufacturer, product name & mesh size
a. ____ __ ____
b. Volume added ____ ft^3
9. Well casing: Flush threaded PVC schedule 40 ☐ 23 / Flush threaded PVC schedule 80 ☐ 24 / ☐ __ ____
10. Screen material ____ __ ____
a. Screen type: Factory cut ☐ 01 / Continuous slot ☐ 02 / Other ☐ __ ____
b. Manufacturer ____
c. Slot size: 0 ___ in.
d. Slotted length: __.__ ft.
11. Backfill material (below filter pack): None ☐ 14 / Other ☐ __ ____

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature	Firm
	BT², Inc., 2830 Dairy Drive, Madison, WI 53704-6751

Please complete both Well Construction and Well Development Forms and return them to the appropriate parties

BT², Inc.
Environmental Engineering and Science

MONITORING WELL DEVELOPMENT
Form GEN-CONS-B **Rev. 4-2002**

Watershed ☐ Waste Management ☐
Remediation ☐ Other ☐ _____

Facility/Project Name	County Name	Well Name

Facility License, Permit or Monitoring Number	County Code	Unique Well Number	Well Number
	__	_____	____

1. Can this well be purged dry? ☐ Yes ☐ No

2. Well development method

surged with bailer and bailed	☐ 41
surged with bailer and pumped	☐ 61
surged with block and bailed	☐ 42
surged with block and pumped	☐ 62
surged with block, bailed and pumped	☐ 70
compressed air	☐ 20
bailed only	☐ 10
pumped only	☐ 51
pumped slowly	☐ 50
Other_____	☐ ☐☐

3. Time spent developing well ____ min.

4. Depth of well (from top of casing) ____.__ ft.

5. Inside diameter of well ____.__ in.

6. Volume of water in filter pack and well casing ____.__ gal.

7. Volume of water removed from well ____.__ gal.

8. Volume of water added (if any) ____.__ gal.

9. Source of water added _____

10. Analysis performed on water added? (if yes, attach results) ☐ Yes ☐ No

	Before Development	After Development
11. Depth to Water (from top of well casing)	a. ____.__ ft.	____.__ ft.
Date	b. __/__/____ mm dd yyyy	__/__/____ mm dd yyyy
Time	c. __:__ ☐a.m ☐p.m	__:__ ☐a.m ☐p.m
12. Sediment in well bottom	__.__ inches	__.__ inches
13. Water clarity	Clear ☐ 10 Turbid ☐ 15 (Describe) _____	Clear ☐ 20 Turbid ☐ 25 (Describe) _____

Fill in if drilling fluids were used and well is at solid waste facility:

14. Total suspended solids	____.__ mg/l	____.__ mg/l
15. COD	____.__ mg/l	____.__ mg/l

16. Well Developed by: Name (first, last) and Firm
First Name: Last Name:
Firm:

17. Additional comments on development:

Name and Address of Facility Contact/Owner/Responsible Party
First Name: _____ Last Name: _____
Firm: _____
Street: _____
City/State/Zip: _____

I hereby certify that the above information is true and correct to the best of my knowledge.
Signature: _____
Print Name _____
Firm: BT², Inc., 2830 Dairy Drive, Madison, WI 53704-6751

See instructions for more information including a list of county codes and well types.

BT², Inc.
Environmental Engineering and Science

WELL/DRILLHOLE/BOREHOLE ABANDONMENT

(1) GENERAL INFORMATION

Well/Drillhole/Borehole Location | County

___ 1/4 of ___ 1/4 of Sec. ___ ; T. ___ N;R ___ ☐ E. ☐ W.

(If applicable)
___ Gov't Lot ___ Grid Number

Grid Location
___ ft. ☐ N. ☐ S. ___ ft. ☐ E. ☐ W.

Civil Town Name

Street Address of Well

City, Village

(2) FACILITY NAME

Original Well Owner (If Known)

Present Well Owner

Street or Route

City, State, Zip Code

Facility Well No. and/or Name (If Applicable) | WI Unique Well No. ___ ___ ___ ___ ___

Reason For Abandonment

Date of Abandonment

WELL/DRILLHOLE/BOREHOLE INFORMATION

(3) Original Well/Drill/Borehole Construction Completed On
(Date) _____

☐ Monitoring Well
☐ Water Well
☐ Drillhole
☐ Borehole

Construction Report Available?
☐ Yes ☐ No

Construction Type:
☐ Drilled ☐ Driven (Sandpoint) ☐ Dug
☐ Other (Specify) _____

Formation Type:
☐ Unconsolidated Formation ☐ Bedrock

Total Well Depth (ft.) (From groundsurface) _____
Casing Diameter (ins.) _____
Casing Depth (ft.) _____

Lower Drillhole Diameter (in.) _____

Was Well Annular Space Grouted? ☐ Yes ☐ No ☐ Unknown

If Yes, To What Depth? _____ Feet

(4) Depth to Water (Feet) _____

Pump & Piping Removed?	☐ Yes	☐ No	☐ Not Applicable
Liner(s) Removed?	☐ Yes	☐ No	☐ Not Applicable
Screen Removed?	☐ Yes	☐ No	☐ Not Applicable
Casing Left in Place?	☐ Yes	☐ No	☐ Not Applicable

If No, Explain _____

Was Casing Cut Off Below Surface?	☐ Yes	☐ No
Did Sealing Material Rise to Surface?	☐ Yes	☐ No
Did Material Settle After 24 Hours?	☐ Yes	☐ No
If Yes, Was Hole Retopped?	☐ Yes	☐ No

(5) Required Method of Placing Sealing Material
☐ Conductor Pipe-Gravity ☐ Conductor Pipe-Pumped
☐ Dump Bailer ☐ Other(Explain)

(6) Sealing Materials

☐ Neat Cement Grout
☐ Sand-Cement (Concrete) Grout
☐ Concrete
☐ Clay-Sand Slurry
☐ Bentonite-Sand Slurry
☐ Chipped Bentonite

For monitoring wells and monitoring well boreholes only

☐ Bentonite Pellets
☐ Granular Bentonite
☐ Bentonite -Cement Grout

(7) Sealing Material Used	From (Ft.)	To (Ft.)	No. Yards, Sacks Sealant or Volume	Mix Ratio or Mud Weight
	Surface			

(8) Comments: _____

(9) Name of Person or Firm Doing Sealing

Signature of Person Doing Work | Date Signed

Street or Route | Telephone Number ( )

City, State, Zip Code

GROUNDWATER SAMPLING AND/OR GROUNDWATER ELEVATION MEASUREMENT FORM

Site Name	Permit No.
Monitoring Well/Piezometer No.	
Upgradient	Downgradient
Name of person sampling	

A. MONITORING WELL/PIEZOMETER CONDITIONS		
Well/Piezometer Properly Capped? (please circle)	YES	NO
If no, explain		
Standing Water or Litter? (please circle)	YES	NO
If yes, explain		

B. GROUNDWATER ELEVATION MEASUREMENT (± 0.01 foot, MSL) Elevation:	
Top of inner well casing	Ground Elevation
Depth of Well	Inside Casing Diameter (in inches)
Equipment Used	

Groundwater Level (± 0.01 foot below top of inner casing, MSL):			
	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging			
*After Purging			
*Before Purging			

*C. WELL PURGING	
Quantity of Water Removed from Well (gallons)	
No. of Well Volumes (based on current water level)	
Was well pumped/bailed dry?	
Equipment used:	
Bailer type	Dedicated Bailer?
Pump type	Dedicated Pump?
If not dedicated, method of cleaning	

*D. FIELD MEASUREMENT	
Weather Conditions	
Field Measurements (after stabilization):	
Temperature	Units
Equipment Used	
pH	
Equipment Used	
Specific Conditions	Units
Equipment Used	

Comments

CERTIFICATION

I certify under penalty of law I believe the information reported above is true, accurate and complete.

Signature		**Date**
Telephone	**Fax**	**Email**

NOTE: Attach Laboratory Report and 8-1/2" x II" site plan showing locations of all surface and groundwater monitoring points. One map per sampling round.

*Omit if only measuring groundwater elevations.

Ground Water Sampling Log

Site Name: **Well #:** **Date:**
Well Depth(Ft-BTOC[1]): **Screen Interval**(Ft):

Well Dia.: **Casing Material:** **Sampling Device:**

Pump placement(Ft from TOC[2]):

Measuring Point: **Water level (static)**(Ft):

Water level (pumping)(Ft): **Pump rate**(Liter/min):

Sampling Personnel:

Other info: (such as sample numbers, weather conditions and field notes)

Water Quality Indicator Parameters

Time	Pumping rates (L/Min)	Water level (ft)	DO (mg/L)	ORP (mv)	SEC[3]	Turb. (NTU)	pH	Temp. (C^0)	Volume pumped (L)

Type of Samples collected:

1 casing volume was:
Total volume purged prior to sample collection:
[1]BTOC-Below Top of Casing
[2]TOC-Top of Casing
[3]Specific Electrical Conductance

Stabilization Criteria

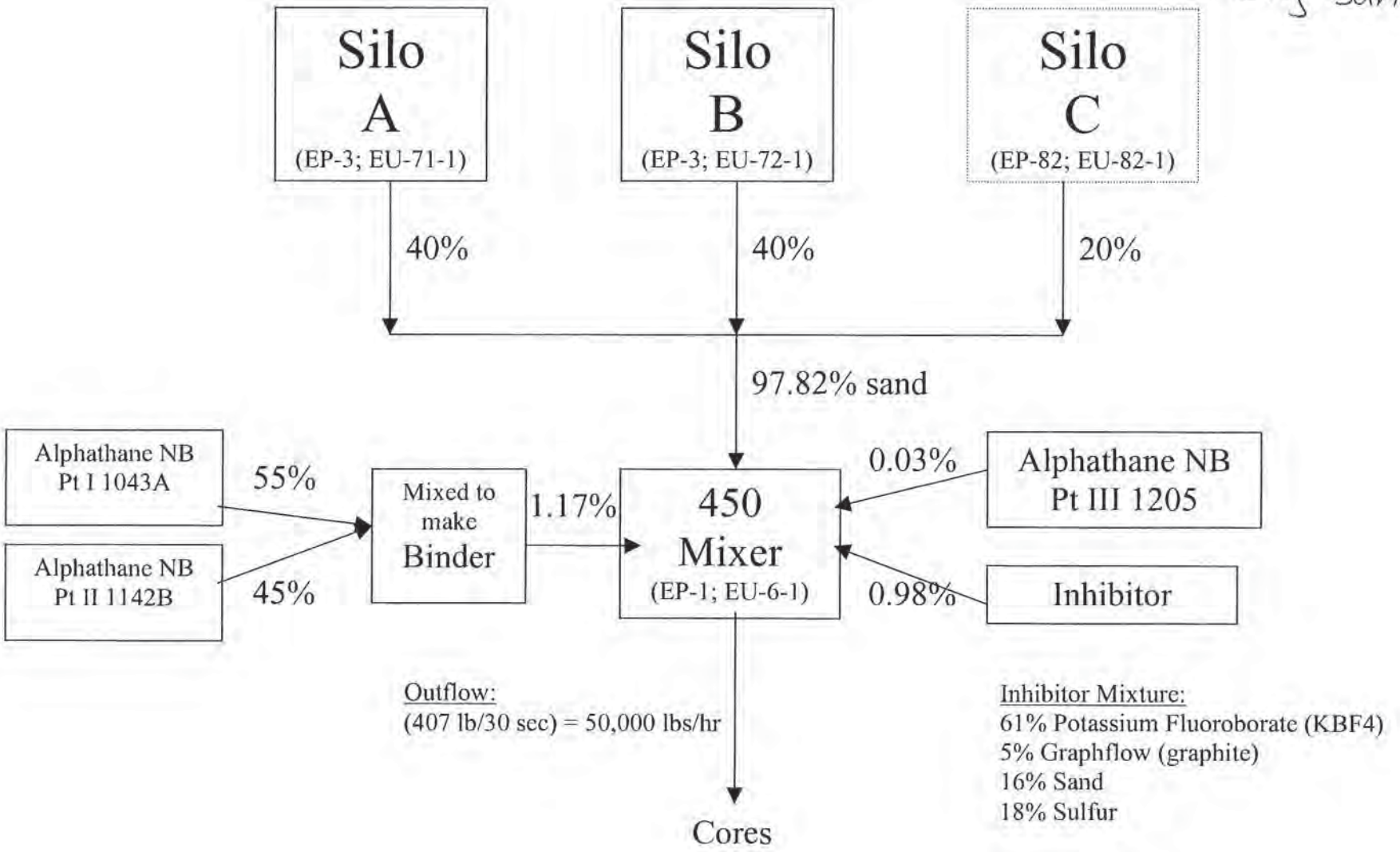
D.O.	+/- 0.3 mg/l
Turb.	+/- 10%
S.C.	+/- 3%
ORP	+/- 10 mV
pH	+/- 0.1 unit

APPENDIX G

Foundry Sand Information

Dry Sand Information

Sample flow chart for dry sand



H-1 F-2 R-1

MATERIAL SAFETY DATA SHEET

SECTION 1 CHEMICAL PRODUCT and COMPANY IDENTIFICATION

Product Name: Alphathane NB 1043A Pt I

Manufacturer and Supplier Information
Alpha Resins, Inc.
17350 Ryan Road
Detroit, MI 48212
313-366-9300

For Chemical Emergency, Spill, Leak, Fire, Exposure, or Accident, call **CHEMTREC** – Day or Night
800-424-9300

SECTION 2 COMPOSITION / INFORMATION on INGREDIENTS

Component	CAS Number	Range % by Weight
Phenolic Resin	9003-35-4	50 - 55
Phenol	108-95-2	<6.5
Aromatic Petroleum Distillate	64742-94-5	10 - 20
Aromatic Petroleum Distillate	64742-95-6	10 - 20
Naphthalene	91-20-3	1 - 3
1,2,4-Trimethylbenzene	95-63-6	1 - 5
Ester solvents	1119-40-0 & 627-93-0 & 106-65-0	10 - 15

SECTION 3 HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: Harmful by inhalation, in contact with skin and if swallowed. Irritating to eyes and skin.

POTENTIAL HEALTH EFFECTS

EYE CONTACT: May cause eye irritation, redness, pain, inflammation, blurred vision or corneal opacity. Concentrations of 10 ppm in humans can be tolerated without significant eye irritation.

SKIN CONTACT: Frequent or prolonged contact may cause moderate irritation, stinging, defatting of skin and dermatitis.

INHALATION: May cause respiratory tract irritation, headache, nausea and dizziness.

INGESTION: May cause irritation of the mouth and stomach and central nervous system, vomiting and diarrhea. Aspiration of the material into lungs can cause chemical pneumonitis which can be fatal.

SECTION 3 HAZARDS IDENTIFICATION cont'd

HMIS RATING			NFPA CODE		
HEALTH	=	1	HEALTH	=	1
FLAMMABILITY	=	2	FLAMMABILITY	=	2
REACTIVITY	=	1	REACTIVITY	=	1

SECTION 4 FIRST AID MEASURES

EYE CONTACT: Flush eyes immediately for 15 minutes with copious amounts of water. Hold eyelids open and roll eyes to ensure complete washing. Get prompt medical attention.

SKIN CONTACT: Wash immediately with large amounts of water and soap, if available. Remove contaminated clothing, including shoes, and launder before reuse.

INHALATION: Using proper respiratory protection, immediately move the exposed person to fresh air. Administer artificial respiration if breathing is stopped. Call for immediate medical attention.

INGESTION: If swallowed DO NOT INDUCE VOMITING. Call for immediate medical attention. Aspiration of the material into the lungs can cause chemical pneumonitis which can be fatal.

NOTE TO PHYSICIAN: No specific antidote. Treat symptomatically and supportively.

SECTION 5 FIRE-FIGHTING MEASURES

FLASH POINT (PMCC):	110°F
LOWER EXPLOSION LIMIT:	0.6% for aromatic hydrocarbon
UPPER EXPLOSION LIMIT:	7.0% for aromatic hydrocarbon
AUTOIGNITION TEMPERATURE:	Not determined
FLAMMABILITY CLASSIFICATION:	II
FIRE-FIGHTING EQUIPMENT:	Wear positive pressure self-contained breathing apparatus and full turnout gear.
EXTINGUISHING MEDIA:	Dry chemical, water spray, or regular foam.
PRECAUTIONS:	Take precautionary measures against static discharge.

SECTION 5 FIRE-FIGHTING MEASURES cont'd

HAZARDOUS COMBUSTION PRODUCTS:	Carbon monoxide, and/or carbon dioxide, and unknown organic compounds in black smoke.
UNUSUAL FIRE AND EXPLOSION HAZARDS:	Moderate fire hazard when exposed to heat or flame. Vapors are heavier than air and can travel a considerable distance to a source of ignition and flash back.

SECTION 6 ACCIDENTAL RELEASE MEASURES

Evacuate and ventilate spill area. Wear appropriate Personal Protective Equipment (PPE) including respiratory equipment during clean-up.

For small spills: contain/absorb spilled liquid with inert material (e.g. sand or vermiculite). Do not use combustible materials such as sawdust. Place recovered material in appropriate container (open top).
Major spill: Call Alpha Resins (313) 366-9300. If temporary control of vapor is required, a blanket of protein foam may be placed over the spill. Large quantities may be placed into closed, but not sealed drums for disposal. Spill should be contained by diking, to prevent run-off and contamination of ground water, soil, storm drains, or sewers. Consult an expert on disposal of recovered material and ensure conformity to local disposal regulations.

SECTION 7 STORAGE and HANDLING

STORAGE: Store indoors at 75-105° F in original, unopened containers. Protect from atmospheric moisture. Keep separate from combustibles and other reactive materials.

HANDLING: Handle with care, in accordance with good industrial hygiene and safety practices. Wear proper protective clothing and rubber gloves if possibility of contact exists. Do NOT handle near an open flame, heat, or other sources of ignition. Do NOT pressurize, cut, or weld containers. Empty product containers may contain product residue. Do NOT reuse empty containers without commercial cleaning or reconditioning. Fixed equipment, as well as transfer containers and equipment should be grounded to prevent accumulation of static charge.

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS: Use of local exhaust ventilation is recommended to control emissions near the source. Atmospheric levels should be maintained below the exposure guideline. When respiratory protection is required for certain operations, use an approved positive-pressure supplied air respirator. Laboratory samples should be handled in a lab hood. Provide mechanical ventilation of confined spaces.

PERSONAL PROTECTION: For open systems where contact is possible, wear safety glasses with side shields/chemical goggles, long sleeves, and chemically resistant gloves. Where adequate ventilation is not possible, a NIOSH/MSHA approved air-purifying respirator or an air line-supplied respirator should be used.

EXPOSURE GUIDELINES:

		Exposure Limits	
Component	CAS Number	OSHA-PEL	ACGIH-TLV
Phenolic Resin	9003-35-4	None established	None established
Phenol	108-95-2	5 ppm (skin)	5 ppm (skin)
Aromatic Petroleum Distillate	64742-94-5	None established	None established
Aromatic Petroleum Distillate	64742-95-6	None established	None established
Naphthalene	91-20-3	20 ppm	10 ppm
1,2,4-Trimethylbenzene	95-63-6	25 ppm	25 ppm
Ester solvents	1119-40-0 & 627-93-0 & 106-65-0	None established	None established

SECTION 9 PHYSICAL and CHEMICAL PROPERTIES

APPEARANCE	Viscous liquid
ODOR	Characteristic phenolic
pH	Not applicable
VAPOR PRESSURE	0.15 mm Hg @ 100°F
BOILING POINT	305-340°F
MELTING POINT	Not applicable
SOLUBILITY IN WATER	Nil
SPECIFIC GRAVITY	1.05 - 1.15

SECTION 10 STABILITY and REACTIVITY

STABILITY	Stable under normal temperature and pressure.
CONDITIONS TO AVOID INSTABILITY	None under normal conditions.
MATERIALS TO AVOID INSTABILITY	Strong mineral and organic acids.
HAZARDOUS DECOMPOSITION PRODUCTS	May yield toxic oxides of carbon.
HAZARDOUS POLYMERIZATION	Will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

ACUTE TOXICITY DATA

EYE IRRITATION	Moderate irritant
SKIN IRRITATION	Moderate irritant
DERMAL LD50	669 mg/kg Phenol - Rat
ORAL LD50	317 mg/kg Phenol - Rat
INHALATION LC50	316 mg/4 hours Phenol - Rat

OTHER TOXICITY DATA None known at this time

SECTION 12 ECOLOGICAL INFORMATION

No additional information known.

SECTION 13 DISPOSAL CONSIDERATIONS

Dispose in accordance with all applicable Federal, State, and local regulations.

SECTION 14 TRANSPORT INFORMATION

U.S. DEPARTMENT OF TRANSPORTATION

DOT Not Regulated in containers less than 110 gallons.

For containers greater than 110 gallons:

Combustible Liquids, N.O.S., 3, NA 1993, PG III (aromatic hydrocarbon)

INTERNATIONAL INFORMATION

Not regulated

SECTION 15 REGULATORY INFORMATION

U.S. FEDERAL REGULATIONS

CERCLA
SECTIONS 102A/103 - HAZARDOUS SUBSTANCES (40 CFR PART 302.4)
This product contains Phenol (108-95-2) and Naphthalene (91-20-3). The RQ for this product is 6600#.

SARA TITLE III
SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR PART 355)
Phenol

SECTION 311/212 - HAZARDOUS CATEGORIZATION (40 CFR PART 370)
Acute health

SECTION 313 - 40 CFR PART 372

Phenol	108-95-2	< 6.5%
Naphthalene	91-20-3	< 1.5%
1,2,4-Trimethylbenzene	95-63-6	< 5.0%

TSCA
All components on inventory

OSHA HAZARD COMMUNICATION STANDARD
Irritant

SECTION 15 REGULATORY INFORMATION cont'd

CANADIAN REGULATIONS

WHMIS CONTROLLED PRODUCT CLASSIFICATION
B3, D2B

EINECS/ELINCS
Not known

DOMESTIC SUBSTANCES LIST
All components on list

SECTION 16 OTHER INFORMATION

None known at this time.

MANUFACTURER DISCLAIMER

This material data sheet conforms to the requirements of ANSI Z400.1. The foregoing data has been compiled from sources, which the company, in good faith, believes to be dependable and is accurate and reliable to the best of our knowledge and belief. However, the company cannot make any warranty or representation respecting accuracy or completeness of the data and assumes no responsibility for any liability or damages relating thereto or for advising you regarding the protection of your employees, customers, or others. Users should consult OSHA and other applicable safety laws and regulations before use.

MATERIAL SAFETY DATA SHEET

SECTION 1 CHEMICAL PRODUCT and COMPANY IDENTIFICATION

Product Name: Alphathane NB 1142B Pt 2

Manufacturer and Supplier Information
Alpha Resins, Inc.
17350 Ryan Road
Detroit, MI 48212
313-366-9300

For Chemical Emergency, Spill, Leak, Fire, Exposure, or Accident, call **CHEMTREC** – Day or Night
800-424-9300

SECTION 2 COMPOSITION / INFORMATION on INGREDIENTS

Component	CAS Number	Range % by Weight
Polymeric diphenylmethane diisocyanate	9016-87-9	30 - 50
Methylene bis(phenylisocyanate) (MDI)	101-68-8	10 - 30
Isocyanic Acid, Methylenediphenylene Ester	26447-40-5	1 - 10
Aromatic Petroleum Distillate	64742-95-6	20 - 40
1, 2, 4, Trimethylbenzene	95-63-6	3 - 17
Kerosene	8008-20-6	2 - 10

SECTION 3 HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: Harmful by inhalation, in contact with skin and if swallowed. Irritating to eyes and skin. Prompt medical attention is required in case of eye contact.

POTENTIAL HEALTH EFFECTS

EYE CONTACT: May cause eye irritation, redness, pain, blurred vision, inflammation or corneal opacity.

SKIN CONTACT: Frequent or prolonged contact may cause redness, itching, or burning, stinging, defatting of skin and dermatitis. Skin contact may result in allergic skin reactions or respiratory sensitization, but is not expected to result in absorption of amounts sufficient to cause other adverse effects.

INHALATION: May cause respiratory tract irritation, headache, nausea and dizziness. May cause respiratory sensitization in susceptible individuals.

INGESTION: May cause irritation of the mouth and stomach and central nervous system, vomiting and diarrhea. Aspiration of the material into lungs can cause chemical pneumonitis, which can be fatal.

H-1 F-2 R-1

MATERIAL SAFETY DATA SHEET

SECTION 1 CHEMICAL PRODUCT and COMPANY IDENTIFICATION

Product Name: Alphathane NB 1043A Pt I

Manufacturer and Supplier Information
Alpha Resins, Inc.
17350 Ryan Road
Detroit, MI 48212
313-366-9300

For Chemical Emergency, Spill, Leak, Fire, Exposure, or Accident, call **CHEMTREC** – Day or Night
800-424-9300

SECTION 2 COMPOSITION / INFORMATION on INGREDIENTS

Component	CAS Number	Range % by Weight
Phenolic Resin	9003-35-4	50 - 55
Phenol	108-95-2	<6.5
Aromatic Petroleum Distillate	64742-94-5	10 - 20
Aromatic Petroleum Distillate	64742-95-6	10 - 20
Naphthalene	91-20-3	1 - 3
1,2,4-Trimethylbenzene	95-63-6	1 - 5
Ester solvents	1119-40-0 & 627-93-0 & 106-65-0	10 - 15

SECTION 3 HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: Harmful by inhalation, in contact with skin and if swallowed. Irritating to eyes and skin.

POTENTIAL HEALTH EFFECTS

EYE CONTACT: May cause eye irritation, redness, pain, inflammation, blurred vision or corneal opacity. Concentrations of 10 ppm in humans can be tolerated without significant eye irritation.

SKIN CONTACT: Frequent or prolonged contact may cause moderate irritation, stinging, defatting of skin and dermatitis.

INHALATION: May cause respiratory tract irritation, headache, nausea and dizziness.

INGESTION: May cause irritation of the mouth and stomach and central nervous system, vomiting and diarrhea. Aspiration of the material into lungs can cause chemical pneumonitis which can be fatal.

MATERIAL SAFETY DATA SHEET

SECTION 1 CHEMICAL PRODUCT and COMPANY IDENTIFICATION

Product Name: Alphathane NB 1205 Pt 3

Manufacturer and Supplier Information
Alpha Resins, Inc.
17350 Ryan Road
Detroit, MI 48212
313-366-9300

For Chemical Emergency, Spill, Leak, Fire, Exposure, or Accident, call **CHEMTREC** – Day or Night
800-424-9300

SECTION 2 COMPOSITION / INFORMATION on INGREDIENTS

Component	CAS Number	Range % by Weight
Aromatic Petroleum Distillate	64742-94-5	65 - 85
contains Naphthalene	91-20-3	2 - 9
4-Phenyl Propyl Pyridine	2057-49-0	15 - 25

SECTION 3 HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: Harmful by inhalation, in contact with skin and if swallowed. Slightly irritating to eyes and skin.

POTENTIAL HEALTH EFFECTS

EYE CONTACT: May cause eye irritation, redness, pain, inflammation, blurred vision or corneal opacity.

SKIN CONTACT: Frequent or prolonged contact may cause moderate irritation, stinging, defatting of skin and dermatitis.

INHALATION: May cause respiratory tract irritation, headache, nausea and dizziness.

INGESTION: May cause irritation of the mouth and stomach and central nervous system, vomiting and diarrhea. Aspiration of the material into lungs can cause chemical pneumonitis which can be fatal.

HMIS RATING

HEALTH	=	2
FLAMMABILITY	=	2
REACTIVITY	=	0

NFPA CODE

HEALTH	=	2
FLAMMABILITY	=	2
REACTIVITY	=	0

H-1 F-0 R-0

MATERIAL SAFETY DATA SHEET

ATOTECH USA INC.
1750 OVERVIEW DRIVE
ROCK HILL, S.C. 29730

EMERGENCY TELEPHONE NUMBER
8:00 am - 5:00 pm
(803) 817-3500

CHEMTREC - 24 HOURS
1-800-424-9300

NAME USED ON LABEL: POTASSIUM FLUOBORATE SPEC 104
CHEMICAL NAME (if single substance): Potassium Fluoroborate
CHEMICAL FAMILY: Inorganic Fluoroborate
FORMULA: KBF4

HAZARDOUS INGREDIENTS

IDENTITY	CAS No.	%	EXPOSURE LIMITS
Potassium Fluoroborate	14075-53-7	100	ACGIH-TWA(1): 2.5 mg/m3 OSHA-PEL(1): 2.5 mg/m3

(1) Fluorides, as F.

PHYSICAL DATA

BOILING POINT: N/APP
SPECIFIC GRAVITY: ~2.5 g/cm3
VAPOR DENSITY (Air=1): N/A
% VOLATILE: N/A
pH: 6-8 (aq. soln)
MELTING POINT: ~986 deg F
VAPOR PRESSURE @ 20 C: N/APP
SOLUBILITY IN WATER: Complete
EVAPORATION RATE (Butyl Acetate=1): N/APP

APPEARANCE: White, free-flowing solid. Odorless.

FIRE AND EXPLOSION DATA

FLASH POINT (Test Method)	AUTOIGNITION TEMPERATURE	FLAMMABLE LTS.
N/APP	N/A	LEL-N/A UEL-N/A

EXTINGUISHING MEDIA: Noncombustible- Use extinguishing media appropriate to surrounding fire conditions.

SPECIAL FIRE FIGHTING PROCEDURES: Do not get material on skin or clothing. Avoid inhalation of fumes or mists. Stay upwind, out of low areas, and ventilate closed spaces before entering. Cool containers from the side with water until fire is out. Use water spray to reduce vapor; do not put water directly on leak or spill area. Keep combustibles away from spilled material. Self-contained breathing apparatus (SCBA) and chemical-protective clothing can be worn but may not provide adequate thermal protection for chemical

*N/A = NOT AVAILABLE
**N/APP = NOT APPLICABLE
***N/E = NOT ESTABLISHED

H2 F-1 R-0

MATERIAL SAFETY DATA SHEET

RHONE-POULENC BASIC CHEMICALS CO.
1 Corporate Drive Box 881 Shelton, Conn 06484
24-HOUR EMERGENCY TELEPHONE CHEMTREC 1-800-424-9300

Effective Date: MAR 8, 1991 Date Printed: MAR 8, 1991
Supercedes: JAN 15, 1991

PRODUCT NAME: SULFUR

I. IDENTIFICATION A

CHEMICAL NAME OF PRIMARY COMPONENT(S): Sulfur

FORMULA: Sx ATOMIC WEIGHT: 32.06

SYNONYMS: brimstone, flowers of sulphur, ground sulfur, industrial sulfur

TRADENAMES: ANCHOR(R), YELLOTONE(R), DIAMOND-S(R), TRIANGLE(R), Crude Lump, ARROW(R) Roll, TIRE(R), Rubbermakers, Screened Crude, Spider, LACCO(R)

CAS # & NAME: 7704-34-9 Sulfur

II. INGREDIENTS/SUMMARY OF HAZARDS

REDIENT(S)	CAS Number	OSHA Hazardous (H)/ Non-Hazardous (NH)	Percent
(1) sulfur	7704-34-9	H	97-100

WARNING STATEMENTS:

WARNING! BURNING SULFUR EMITS HIGHLY TOXIC FUMES.
SULFUR DUST SUSPENDED IN AIR IGNITES EASILY.
SULFUR DUST CAUSES EYE IRRITATION.

Avoid contact with eyes. Keep away from heat, sparks and flames. Avoid creating dust in handling. Wash thoroughly after handling. Keep container closed. Use with adequate ventilation. Keep from contact with oxidizing materials.

See Section VI for complete Health Hazard Data.

NATIONAL FIRE PROTECTION ASSOCIATION RATING

ZARDOUS MATERIALS IDENTIFICATION SYSTEM

KEY = NFPA/HMIS	NFPA	HMIS
4=Extreme/ Severe	Health 2	1
3=High/ Serious	Fire 1	1
2=Moderate		
1=Slight	Reactivity 0	0
0=Minimum		

(continued on Page 2)

WEDRON

SILICA

Material Safety Data Sheet

Date: February 15, 2006 **Supersedes:** June 29, 2005

SECTION 1: PRODUCT IDENTIFICATION

Trade Name as Labeled: Silica, Lake or Bank Sand; All Grades
Chemical Name and Formula: Silica, mainly in the form of quartz (crystalline silica); SiO_2

Manufacturer:
Wedron Silica Company
P.O. Box 177
Wedron, IL 60557
Phone: (815) 433-2449

Emergency Telephone Number: (800) 281-9876

"This Wedron Silica Company product is not intended for and is strictly prohibited for sandblasting."

SECTION 2: COMPOSITION/INFORMATION ON INGREDIENTS

Chemical	CAS Number	% by Weight
Crystalline Silica (Quartz)	14808-60-7	87-99.9

Crystalline silica exists in several forms, the most common of which is quartz. If crystalline silica (quartz) is heated to more than 870°C, it can change to a form of crystalline silica known as trydimite, and if crystalline silica (quartz) is heated to more than 1470°C, it can change to a form of crystalline silica known as cristobalite. The OSHA PEL for crystalline silica as trydimite and cristobalite is one-half of the OSHA PEL for crystalline silica (quartz).

SECTION 3: HAZARD IDENTIFICATION

Emergency Overview: The material is white or tan colored free-flowing sand. High airborne levels of dust may cause irritation to eyes and upper respiratory tract. Crystalline silica is an IARC Group 1 carcinogen. Contact with powerful oxidizing agents such as fluorine, chlorine trifluoride, manganese trioxide, oxygen difluoride, may cause fire. It dissolves in hydrofluoric acid and may produce a corrosive gas (silicon tetrafluoride).

Acute Health Effects:

Inhalation: Excessive exposure to high concentrations of dust may cause irritation to the eyes, skin, and mucous membranes of the upper respiratory tract.

Eye: Dusts may cause irritation to the eye. Scratching of cornea can occur if eye is rubbed.

Ingestion: Ingestion of harmful amounts of this product as distributed is unlikely due to its solid insoluble form. Ingestion of excessive amounts of dust may cause nausea or vomiting.

Chronic Health Effects:

Chronic inhalation of respirable crystalline silica may cause silicosis; a fibrosis (scarring) of the lungs. Silicosis may be progressive; it may lead to disability and death. Crystalline silica inhaled from occupational sources is classified as carcinogenic to humans. There is some evidence that inhalation of respirable crystalline silica or silicosis is associated with an increased incidence of scleroderma (an immune system disorder manifested by fibrosis of the lungs, skin, and other internal organs), and kidney disease. Silicosis is also reported to increase the

Green Sand Information

Green Sand Mix Quantities per 1500-Pound Batch

Component	Quantity
Bondtone (organophilic clay)	5 lb
Potassium fluoroborate (KBF4)	4 lb
Sunpar Oil	3 quarts
Sulfur	1.5 lb
Sand	3 shots (about 1500 lb)

H-0 F-1 R-0

MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY INFORMATION

Product Name: SUNPAR 150

Manufacturer Information:

Sunoco, Inc. (R&M)
Ten Penn Center
1801 Market Street
Philadelphia, Pennsylvania, 19103-1699

Product Use:

Process Oil

Emergency Phone Numbers:

Chemtrec	(800) 424-9300
Sunoco Inc.	(800) 964-8861

Information:

Product Safety Information	(610) 859-1120

2. COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS No.	Amount (Vol%)
SEVERELY SOLVENT REFINED HEAVY PARAFFINIC PETROLEUM OIL	64741-88-4	100 - 100

EXPOSURE GUIDELINES (SEE SECTION 15 FOR ADDITIONAL EXPOSURE LIMITS)

CAS No.	Governing Body	Exposure Limits

3. HAZARDS IDENTIFICATION

- **EMERGENCY OVERVIEW**
  Poses little or no immediate hazard.

  Hazards Ratings:
  Key: 0 = least, 1 = slight, 2 = moderate, 3 = high, 4 = extreme

	Health	Fire	Reactivity	PPI
NFPA	0	1	0	
HMIS	0	1	0	X

- **POTENTIAL HEALTH EFFECTS**
  - **PRE-EXISTING MEDICAL CONDITIONS**
    The following diseases or disorders may be aggravated by exposure to this product: Skin;

Sand Analytical Data

Dry Sand

TestAmerica
ANALYTICAL TESTING CORPORATION 704 ENTERPRISE DRIVE · CEDAR FALLS, IA 50613 · 319-277-2401 · 800-750-2401 · FAX 319-277-2425

ANALYTICAL REPORT

Joe Haller
FANSTEEL/WELLMAN CORP.
1746 Commerce Road
Creston, IA 50801

04/19/2005

TestAmerica Job: 05.04368

Project Number:
Project: Sand-TCLP

Enclosed is the Analytical Reports for the following samples submitted to the Cedar Falls Division of TestAmerica Analytical Testing Corporation for analysis.

Sample Number	Sample Description	Date Taken	Date Received
859879	3-29-05 Sand	03/29/2005	03/30/2005

TestAmerica Analytical Testing Corporation certifies that the analytical results contained herein apply only to the specific samples analyzed.

Linda Cmelik

Linda Cmelik
Project Coordinator

TestAmerica
ANALYTICAL TESTING CORPORATION 704 ENTERPRISE DRIVE · CEDAR FALLS, IA 50613 · 319-277-2401 · 800-750-2401 · FAX 319-277-2425

ANALYTICAL REPORT

Joe Haller
FANSTEEL/WELLMAN CORP.
1746 Commerce Road
Creston, IA 50801

04/19/2005

Date Received: 03/30/2005
Job Number: 05.04368

	Result	Units	Flags	Date Taken	Date Analyzed	Regulatory Limit	Analyst	Analysis Method
859879 3-29-05 Sand								
Solid pH Measured in Water	6.6	units		03/29/2005	04/12/2005	<2.0 & >12.5	sas	SW 9045
TCLP Metals Digest	Complete			03/29/2005	04/14/2005		heh	
TCLP - Mercury	<0.0020	mg/L		03/29/2005	04/19/2005	0.2	heh	SW 7470
ICP TCLP METALS				03/29/2005				
TCLP Arsenic (ICP)	<0.300	mg/L		03/29/2005	04/14/2005	5.0	heh	SW 6010B
TCLP Barium (ICP)	<0.100	mg/L		03/29/2005	04/14/2005	100	heh	SW 6010B
TCLP Cadmium (ICP)	<0.020	mg/L		03/29/2005	04/14/2005	1.0	heh	SW 6010B
TCLP Chromium (ICP)	<0.020	mg/L		03/29/2005	04/14/2005	5.0	heh	SW 6010B
TCLP Lead (ICP)	<0.10	mg/L		03/29/2005	04/14/2005	5.0	heh	SW 6010B
TCLP Selenium (ICP)	<0.15	mg/L		03/29/2005	04/14/2005	1.0	heh	SW 6010B
TCLP Silver (ICP)	<0.020	mg/L		03/29/2005	04/14/2005	5.0	heh	SW 6010B
TCLP EXTRACTION	complete			03/29/2005	04/12/2005		kak	SW 1311

Key to Flags:

TestAmerica
ANALYTICAL TESTING CORPORATION 704 ENTERPRISE DRIVE · CEDAR FALLS, IA 50613 · 319-277-2401 · 800-750-2401 · FAX 319-277-2425

TestAmerica Job Number: 05.04368

ATTACHMENTS

Following are the sample receipt log and the chain of custody applicable to this analytical report.

Any abnormalities or departures from sample acceptance policy shall be documented on the "Sample Receipt and Temperature Log Form" and Sample Non-Conformance Form" (if applicable) included with this report.

For information concerning certifications of this facility or another TestAmerica facility please visit our website at **www.TestAmericaInc.com.**

This data has been produced in compliance with 2002 NELAC Standards (July 2004), except where noted.

Samples collected by TestAmerica Field Services personnel are noted on the Chain of Custody (COC) and are sampled in accordance with TA-CF SOP CF09-01.

This report shall not be reproduced, except in full, without written approval of the laboratory.

For questions regarding this report, please contact the individual who signed the analytical report.

Fansteel
Wellman Dynamics
1746 Commerce Road, Creston, Iowa 50801
(641) 782-8521 FAX: (641) 782-7672

To:	Kristin Clay (Test America)	From:	Joe Haller
Fax:	319-277-2425	Pages:	1 (Including cover sheet)
Phone:	319-277-2401	Date:	4/11/2005
Re:	Additional laboratory analysis	CC:	None

Kristin,

As discussed on the phone today I would like additional analysis to be completed on the reclaim foundry sand that was submitted for Test America Job: 05.03748

The analysis that I would like to have done on this sand is a TCLP of the 8 RCRA metals of arsenic, mercury, barium, cadmium, chromium, lead, selenium, and silver. If you have any questions with regard to this fax please feel free to contact me at 641-782-8521 ext 206.

Sincerely,

Joe Haller

Joe Haller
Wellman Dynamics Corporation
641-782-8521 ext. 206

TestAmerica
INCORPORATED

Cedar Falls Division
704 Enterprise Dr, Cedar Falls, IA 50613-0625
Phone: (319) 277-2401 Fax: (319) 277-2425

TO: Joe Haller

COMPANY: FANSTEEL/WELLMAN CORP.

Fax: jhaller@weldyn.net

FROM: Kristin Clay

PHONE: (319)277-2401

SENT ON: 04/07/05 04:43 PM CDT

PAGES INCLUDING COVER: 4

COMMENTS:

PLEASE CALL NUMBER ABOVE IF FAX TRANSMISSION IS INCOMPLETE

Dry Sand

ANALYTICAL REPORT

Joe Haller
FANSTEEL/WELLMAN CORP.
1746 Commerce Road
Creston, IA 50801

04/07/2005

TestAmerica Job: 05.03748

Project Number:
Project: Metals-Alternate Soil Usage Chpt 13

Enclosed is the Analytical Reports for the following samples submitted to the Cedar Falls Division of TestAmerica Analytical Testing Corporation for analysis.

Sample Number	Sample Description	Date Taken	Date Received
857790	3-29-05 Sand	03/29/2005	03/30/2005

TestAmerica Analytical Testing Corporation certifies that the analytical results contained herein apply only to the specific samples analyzed.

H-1 F-1R-0

CUMMINGS-MOORE GRAPHITE CO.
MATERIAL SAFETY DATA SHEET

Hazard Communication Standard
29 CFR 1910, 1200.

TYPE: Natural Graphite, Less than 85 Carbon (General)

IDENTITY: Natural Graphite Graphite

Note: Blank spaces are not permitted. If any item is not applicable, or no information is available, the space must be marked to indicate such.

SECTION I

Manufacturer's Name: Cummings-Moore Graphite Co.
1646 N. Green Ave
Detroit, MI 48209

Emergency Telephone Number 908-537-2153

Telephone Number for Information 908-537-2155

Date: January 2003 Review Date: 1/2004

Prepared by: (optional) AVT

SECTION II - HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

Component(s) (Specific Chemical Identity, Common Name(s))		OSHA PEL	Other Limits ACGIH TLV	Recommended	% (optional)
Graphite	CAS NO. 7782-42-5	2.0 mg/m3		Respirable dust.	100
Silica 0.0-4.0	CAS NO. 14808-60-7	0.05 mg/m3		Respirable dust	

TSCA Status: Graphite is listed on the US EPA TSCA Inventory

SECTION III - PHYSICAL CHEMICAL CHARACTERISTICS

Boiling Point: N/A

Vapor Pressure (mm Hg.): N/A

Vapor Density (AIR = 1): N/A

Solubility in Water: Insoluble

Specific Gravity (H2O = 1): 2.20 - 2.35

Melting Point: N/A

Evaporation Rate: (Butyl Acetate = 1) N/A

Appearance and Odor: Grey to Black - No Odor

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flash Point (Method Used): N/A Flammable Limits: N/A LEL: N/A UEL: N/A

Extinguishing Media: Water

Special Fire Fighting Procedures: Spray with water.

Unusual Fire and Explosion Hazards: None.

HMIS RATING 1 1 0 R NFP RATING: 0 1 0

ANALYTICAL REPORT

Joe Haller
FANSTEEL/WELLMAN CORP.
1746 Commerce Road
Creston, IA 50801

04/07/2005

METALS-ALTERNATE SOIL USAGE CHPT 13

Date Received: 03/30/2005
Job Number: 05.03748

	Result	Units	Flags	Date Taken	Date Analyzed	Time Analyzed	Analyst	Analysis Method
857790 3-29-05 Sand								
Solids, Total	99.89	%		03/29/2005	03/30/2005		sas	SM 2540 G
Arsenic, (GFAA)	<1.0	mg/kg dw		03/29/2005	04/04/2005		krb	SW 7060A
Beryllium, (GFAA)	<0.50	mg/kg dw		03/29/2005	04/05/2005		heh	SW 7091
Mercury, Cold Vapor	<0.020	mg/kg dw		03/29/2005	04/05/2005		heh	SW 7471A
Thallium, (GFAA)	<1.0	mg/kg dw		03/29/2005	04/06/2005		krb	SW 7841
GFAA Metals Digestion	1.029	g		03/29/2005	04/04/2005		heh	SW 3050 B
ICP Metals Prep (Solid)	1.042	g		03/29/2005	03/31/2005		llw	SW 3050 B
ICP Metals-Solid				03/29/2005				
Antimony, (ICP)	<5.0	mg/kg dw		03/29/2005	04/01/2005		llw	SW 6010B
Barium, (ICP)	3.7	mg/kg dw		03/29/2005	04/01/2005		llw	SW 6010B
Boron, (ICP)	110	mg/kg dw		03/29/2005	04/01/2005		llw	SW 6010B
Cadmium, (ICP)	<1.0	mg/kg dw		03/29/2005	04/01/2005		llw	SW 6010B
Chromium, (ICP)	10	mg/kg dw		03/29/2005	04/01/2005		llw	SW 6010B
Copper, (ICP)	15	mg/kg dw		03/29/2005	04/01/2005		llw	SW 6010B
Lead, (ICP)	<5.0	mg/kg dw		03/29/2005	04/01/2005		llw	SW 6010B
Manganese, (ICP)	92	mg/kg dw		03/29/2005	04/01/2005		llw	SW 6010B
Molybdenum, (ICP)	3.1	mg/kg dw		03/29/2005	04/01/2005		llw	SW 6010B
Nickel, (ICP)	5.9	mg/kg dw		03/29/2005	04/01/2005		llw	SW 6010B
Selenium, (ICP)	<7.5	mg/kg dw		03/29/2005	04/01/2005		llw	SW 6010B
Silver, (ICP)	<1.0	mg/kg dw		03/29/2005	04/01/2005		llw	SW 6010B
Vanadium, (ICP)	<2.5	mg/kg dw		03/29/2005	04/01/2005		llw	SW 6010B
Zinc, (ICP)	14	mg/kg dw		03/29/2005	04/01/2005		llw	SW 6010B

Key to Flags:

TestAmerica Job Number: 05.03748

ATTACHMENTS

Following are the sample receipt log and the chain of custody applicable to this analytical report.

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Samples collected by TestAmerica Field Services personnel are noted on the Chain of Custody (COC) and are sampled in accordance with TA-CF SOP CF09-01.

This report shall not be reproduced, except in full, without written approval of the laboratory.

For questions regarding this report, please contact the individual who signed the analytical report.

Leachate Analytical Data

Hygienic Laboratory

The University of Iowa

Oakdale Hall
Iowa City, IA 52242
Telephone: (319) 335-4500
FAX: (319) 335-4555

H.A. Wallace Building
900 East Grand, Des Moines, IA 50319
Telephone: (515) 281-5371
FAX: (515) 243-1349

Report Results To:	Sample Identification: 9260819
H R GREEN CO 250 GLASS RD N.E. BOX 9009 CEDAR RAPIDS, IA 52409	Submitter Reference: S-3 Location: CRESTON Sample Type: WATER Date Collected: 07/16/92 10:40:00
Date Received: 07/17/92 Date Reported: 08/20/92	Collected by: GAVIN RANDALL

Comments
BILL TO:WELLMAN DYNAMICS-CRESTON
THIS SAMPLE GOES WITH UHL#9207337

— Results of Analyses —

Description: INORGANIC CHEMISTRY

Analyte	Concentration	Method	Analyst / Verifier	Date Analyzed
TOTAL SOLIDS	7200 MG/L @103 C	EPA 160.3	MS /LF	07/27/92
DISSOLVED SOLIDS	4000 MG/L @180 C	EPA 160.1	MS /LF	07/27/92
SUSPENDED SOLIDS	2400 MG/L @103 C	EPA 160.2	MS /LF	07/24/92
CHLORIDE	340 MG/L	EPA 325.3	SMM/LF	07/17/92
FLUORIDE	120 MG/L	TIM 380-75W	BR /LF	08/06/92
SULFATE	1100 MG/L	EPA 375.4	LDA/LF	07/21/92
BROMIDE	1.8 MG/L	EPA 300.0	RVD/LF	08/03/92
Comments	*Due to chloride interference, bromide was analyzed on a diluted portion of the original sample.*			
SULFITE	<1 MG/L	EPA 377.1	RS /LF	07/17/92
SULFIDE	0.2 MG/L	SM 427	LDA/LF	07/27/92
AMMONIA (AS N)	25 MG/L	TIM #780-86	RW /LF	07/29/92
NO2+NO3 AS NO3-N	<0.1 MG/L	EPA 353.2	BR /LF	06/22/92
TOTAL PHOSPHORUS (P)	35 MG/L	TIM #787-86	RW /LF	08/04/92
5 DAY BOD	80 MG/L	SM 16-507	RO /LF	07/28/92
Comments	*BOD MISSED AND RESET.VALUE MAY BE LOW.*			
CHEMICAL OXYGEN DMND	270 MG/L	EPA 410.1	BR /LF	08/05/92
TOTAL CYANIDE	<0.01 MG/L	EPA 335.2	LDA/LF	07/27/92
PHENOLS (4AAP REAC.)	140 uG/L	EPA 420.2	BR /LF	07/29/92
TOTAL ALUMINUM	43 MG/L	EPA 200.7	RVD/LF	07/27/92
TOTAL ANTIMONY	<0.01 MG/L	EPA 204.2	DC /LF	07/29/92
TOTAL ARSENIC	<0.01 MG/L	EPA 206.2	ML /LF	07/27/92
TOTAL BARIUM	0.95 MG/L	EPA 200.7	RVD/LF	08/05/92

Hygienic Laboratory

The University of Iowa

UHL Sample No: 9260819

Description: INORGANIC CHEMISTRY

Analyte	Concentration	Method	Analyst/ Verifier	Date Analyzed
TOTAL BERYLLIUM	<0.02 MG/L	EPA 200.7	RVD/LF	08/05/92
TOTAL BORON	260 MG/L	EPA 200.7	RVD/LF	07/29/92
TOTAL CADMIUM	<0.02 MG/L	EPA 200.7	RVD/LF	07/27/92
TOTAL CHROMIUM	0.11 MG/L	EPA 218.1	SMM/LF	07/24/92
CHROMIUM, HEXAVALENT	<0.05 MG/L	SM 14ED 307	RS /LF	06/17/92
TOTAL COBALT	<0.05 MG/L	EPA 200.7	RVD/LF	07/28/92
TOTAL COPPER	<0.05 MG/L	EPA 220.1	SMM/LF	07/27/92
TOTAL IRON	120 MG/L	EPA 200.7	RVD/LF	07/23/92
TOTAL LEAD	<0.1 MG/L	EPA 200.7	RVD/LF	07/24/92
TOTAL MAGNESIUM	300 MG/L	EPA 200.7	RVD/LF	07/23/92
TOTAL MANGANESE	6.0 MG/L	EPA 200.7	RVD/LF	07/23/92
TOTAL MERCURY	<0.001 MG/L	EPA 245.1	DC /LF	07/23/92
TOTAL NICKEL	0.14 MG/L	EPA 200.7	RVD/LF	07/27/92
TOTAL SELENIUM	<0.01 MG/L	EPA 270.2	ML /LF	07/27/92
TOTAL SILVER	0.01 MG/L	EPA 272.1	ML /LF	07/28/92
TOTAL THALLIUM	<0.001 MG/L	EPA 279.2	DC /LF	07/29/92
TOTAL TIN	<0.5 MG/L	EPA 200.7	RVD/LF	07/29/92
TOTAL ZINC	0.97 MG/L	EPA 289.1	SMM/LF	07/26/92

Description: GC/MS EXTRACTABLES

Analyte	Concentration ug/L	Quantitation Limit
PHENOL	<4	4
BIS(2-CHLOROETHYL) ETHER	<4	4
2-CHLOROPHENOL	<4	4
1,3-DICHLOROBENZENE	<4	4
1,4-DICHLOROBENZENE	<4	4
BENZYL ALCOHOL	<10	10
1,2-DICHLOROBENZENE	<4	4
2-METHYLPHENOL	<10	10
BIS(2-CHLOROISOPROPYL) ETHER	<4	4
4-METHYLPHENOL	<10	10
N-NITROSO-DI-N-PROPYLAMINE	<6	6
HEXACHLOROETHANE	<6	6
NITROBENZENE	<6	6
ISOPHORONE	<4	4
2-NITROPHENOL	<8	8
2,4-DIMETHYLPHENOL	<6	6

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UHL Sample No. 9260819

Analyte	Concentration ug/L	Quantitation Limit ug/L
BIS(2-CHLOROETHOXY) METHANE	<4	4
2,4-DICHLOROPHENOL	<6	6
1,2,4-TRICHLOROBENZENE	<4	4
NAPHTHALENE	<4	4
4-CHLOROANILINE	<8	8
HEXACHLOROBUTADIENE	<6	6
4-CHLORO-3-METHYLPHENOL	<6	6
2-METHYLNAPHTHALENE	<4	4
HEXACHLOROCYCLOPENTADIENE	<10	10
2,4,6-TRICHLOROPHENOL	<6	6
2,4,5-TRICHLOROPHENOL	<8	8
2-CHLORONAPHTHALENE	<4	4
2-NITROANILINE	<8	8
DIMETHYL PHTHALATE	<4	4
ACENAPHTHYLENE	<4	4
3-NITROANILINE	<20	20
ACENAPHTHENE	<4	4
2,4-DINITROPHENOL	<30	30
4-NITROPHENOL	<30	30
DIBENZOFURAN	<4	4
2,6-DINITROTOLUENE	<8	8
2,4-DINITROTOLUENE	<6	6
DIETHYL PHTHALATE	<6	6
4-CHLOROPHENYL PHENYL ETHER	<6	6
FLUORENE	<4	4
4-NITROANILINE	<30	30
4,6-DINITRO-2-METHYLPHENOL	<20	20
N-NITROSODIPHENYLAMINE	<6	6
4-BROMOPHENYL PHENYL ETHER	<6	6
HEXACHLOROBENZENE	<6	6
PENTACHLOROPHENOL	<20	20
PHENANTHRENE	<4	4
ANTHRACENE	<4	4
DI-N-BUTYL PHTHALATE	<6	6
FLUORANTHENE	<8	8
PYRENE	<8	8
BUTYL BENZYL PHTHALATE	<6	6
3,3-DICHLOROBENZIDINE	<10	10
BENZO(A)ANTHRACENE	<4	4

Hygienic Laboratory

The University of Iowa

Analyte	Concentration ug/L	Quantitation Limit
BIS(2-ETHYLHEXYL) PHTHALATE	<10	10
CHRYSENE	<4	4
DI-N-OCTYL PHTHALATE	<10	10
BENZO(B)FLUORANTHENE	<8	8
BENZO(K)FLUORANTHENE	<8	8
BENZO(A)PYRENE	<4	4
INDENO(1,2,3-CD)PYRENE	<6	6
DIBENZ(A,H)ANTHRACENE	<6	6
BENZO(G,H,I)PERYLENE	<6	6
N-NITROSODIMETHYLAMINE	<10	10
BENZIDINE	<10	10

Date Analyzed: 07/30/92 Analyst: KH
Method: EPA 625 Verified: TC

Description: RADIOCHEMISTRY

Analyte	Conc	Units	Prec	Quant Limit	Method	Analyst / Verifier	Date Analyzed
GROSS ALPHA	2.0	pCi/L	1.0	0.8	EPA 900.0	DR /MM	07/22/92
GROSS BETA	874.9	pCi/L	33.0	3.3	EPA 900.0	DR /MM	07/22/92
RADIUM-226	1.0	pCi/L	0.1	0.1	EPA 904.0	DCK/MM	08/13/92
RADIUM-228	<0.8	pCi/L		0.8	EPA 904.0	DCK/MM	08/13/92
TOTAL RADIUMS	<1.8	pCi/L			EPA 904.0	DCK/MM	08/13/92

Description: ANALYSIS FOR ACID HERBICIDES IN WATER

Analyte	Concentration ug/L	Quantitation Limit
2,4-D	<0.2	0.2
SILVEX	<0.2	0.2

Date Analyzed: 07/24/92 Analyst: WP
Method: EPANPS3 Verified: DL

Description: ANALYSIS FOR MISCELLANEOUS WATER SAMPLES

Analyte	Concentration ug/L	Quantitation Limit
ALDRIN	<0.5	0.5
Alpha-BHC	<0.5	0.5
Beta-BHC	<0.5	0.5
Delta-BHC	<0.5	0.5
Gamma-BHC (LINDANE)	<0.5	0.5

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The University of Iowa

UHL Sample No: 9260819

	Concentration ug/L	Quantitation Limit
LORDANE	<2	2
-DDD	<0.5	0.5
-DDE	<0.5	0.5
-DDT	<0.5	0.5
ELDRIN (HEOD)	<0.5	0.5
DOSULFAN I	<0.5	0.5
DOSULFAN II	<0.5	0.5
DOSULFAN SULFATE	<0.5	0.5
DRIN (ENDREX)	<0.5	0.5
DRIN ALDEHYDE	<0.5	0.5
PTACHLOR	<0.5	0.5
PTACHLOR EPOXIDE	<0.5	0.5
THOXYCHLOR	<0.5	0.5
XAPHENE	<10	10
B-1016	<5	5
B-1221	<5	5
B-1232	<5	5
B-1242	<5	5
B-1248	<5	5
B-1254	<5	5
B-1260	<5	5

e Analyzed: 07/24/92
hod: 508\8080

Analyst: VR
Verified: DL

rdinator of analytical services - Lynn Hudachek @ (319) 335-4500

Hygienic Laboratory

The University of Iowa

Oakdale Hall
Iowa City, IA 52242
Telephone: (319) 335-4500
FAX: (319) 335-4555

H.A. Wallace Building
900 East Grand, Des Moines, IA 50319
Telephone: (515) 281-5371
FAX: (515) 242-1349

Report Results To:
H R GREEN CO
4250 GLASS RD N.E. BOX 9009
CEDAR RAPIDS, IA 52409

Date Received: 07/17/92
Date Reported: 08/04/92

Sample Identification: 9207337
Submitter Reference: S-3
Location: WELLMAN DYNAMICS
Sample Type: WATER
Date Collected: 07/16/92 10:40:00
Collected by: GAVIN RANDALL T

Comments:
THIS SAMPLE GOES WITH DML SAMPLE #9260819

— Results of Analyses —

Description: GC/MS VOLATILES

Analyte	Concentration ug/l	Quantitation Limit
CHLOROMETHANE	<5	5
BROMOMETHANE	<5	5
VINYL CHLORIDE	<5	5
CHLOROETHANE	<5	5
METHYLENE CHLORIDE	<10	10
1,1-DICHLOROETHENE	<5	5
1,1-DICHLOROETHANE	60	5
CIS 1,2-DICHLOROETHENE	14	5
TRANS 1,2-DICHLOROETHENE	<5	5
CHLOROFORM	<5	5
1,2-DICHLOROETHANE	<5	5
1,1,1-TRICHLOROETHANE	54	5
CARBON TETRACHLORIDE	<5	5
BROMODICHLOROMETHANE	<5	5
2-CHLOROETHYLVINYL ETHER	<10	10
1,2-DICHLOROPROPANE	<5	5
TRICHLOROETHENE	<5	5
DIBROMOCHLOROMETHANE	<5	5
1,1,2-TRICHLOROETHANE	<5	5
BENZENE	<5	5
BROMOFORM	<5	5
TETRACHLOROETHENE	<5	5
1,1,2,2-TETRACHLOROETHANE	<5	5

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Analyte	Concentration ug/L	Quantitation Limit
TOLUENE	<5	5
CHLOROBENZENE	<5	5
ETHYLBENZENE	<5	5
ACROLEIN	<20	20
ACRYLONITRILE	<10	10
CIS-1,3-DICHLOROPROPENE	<5	5
TRANS-1,3-DICHLOROPROPENE	<5	5
ACETONE	40	10
2-HEXANONE	<10	10
2-BUTANONE	21	10
4-METHYL-2-PENTANONE	<10	10
XYLENES,TOTAL	19	5

Date Analyzed: 07/30/92
Method: EPA 624
Analyst: JN
Verified: TC

Description: GC/MS VOLATILES

Analyte	Concentration ug/L	Quantitation Limit
CHLOROMETHANE	<5	5
BROMOMETHANE	<5	5
VINYL CHLORIDE	<5	5
CHLOROETHANE	<5	5
METHYLENE CHLORIDE	<10	10
1,1-DICHLOROETHENE	<5	5
1,1-DICHLOROETHANE	58	5
CIS 1,2-DICHLOROETHENE	14	5
TRANS 1,2-DICHLOROETHENE	<5	5
CHLOROFORM	<5	5
1,2-DICHLOROETHANE	<5	5
1,1,1-TRICHLOROETHANE	54	5
CARBON TETRACHLORIDE	<5	5
BROMODICHLOROMETHANE	<5	5
2-CHLOROETHYLVINYL ETHER	<10	10
1,2-DICHLOROPROPANE	<5	5
TRICHLOROETHENE	<5	5
DIBROMOCHLOROMETHANE	<5	5
1,1,2-TRICHLOROETHANE	<5	5
BENZENE	<5	5
BROMOFORM	<5	5

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UHL Sample No: 9207137

Analyte	Concentration ug/L	Quantitation Limit
TETRACHLOROETHENE	<5	5
1,2,2-TETRACHLOROETHANE	<5	5
TOLUENE	<5	5
CHLOROBENZENE	<5	5
ETHYLBENZENE	<5	5
ACROLEIN	<20	20
ACRYLONITRILE	<10	10
CIS-1,3-DICHLOROPROPENE	<5	5
TRANS-1,3-DICHLOROPROPENE	<5	5
ACETONE	44	10
2-HEXANONE	<10	10
2-BUTANONE	20	10
4-METHYL-2-PENTANONE	<10	10
XYLENES,TOTAL	23	5

Date Analyzed: 07/30/92
Method: EPA 624

Analyst: JN
Verified: TC

Description: GC/MS VOLATILES

Analyte	Concentration ug/L	Quantitation Limit
CHLOROMETHANE	<5	5
BROMOMETHANE	<5	5
VINYL CHLORIDE	<5	5
CHLOROETHANE	<5	5
METHYLENE CHLORIDE	<10	10
1,1-DICHLOROETHENE	<5	5
1,1-DICHLOROETHANE	61	5
CIS 1,2-DICHLOROETHENE	15	5
TRANS 1,2-DICHLOROETHENE	<5	5
CHLOROFORM	<5	5
1,2-DICHLOROETHANE	<5	5
1,1,1-TRICHLOROETHANE	61	5
CARBON TETRACHLORIDE	<5	5
BROMODICHLOROMETHANE	<5	5
2-CHLOROETHYLVINYL ETHER	<10	10
1,2-DICHLOROPROPANE	<5	5
TRICHLOROETHENE	<5	5
DIBROMOCHLOROMETHANE	<5	5
1,1,2-TRICHLOROETHANE	<5	5

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Page No.

SVHL Sample No. 2417

Analyte	Concentration ug/L	Quantitation Limit
BENZENE	<5	5
BROMOFORM	<5	5
TETRACHLOROETHENE	<5	5
1,1,2,2-TETRACHLOROETHANE	<5	5
TOLUENE	<5	5
CHLOROBENZENE	<5	5
ETHYLBENZENE	<5	5
ACROLEIN	<20	20
ACRYLONITRILE	<10	10
CIS-1,3-DICHLOROPROPENE	<5	5
TRANS-1,3-DICHLOROPROPENE	<5	5
ACETONE	39	10
2-HEXANONE	<10	10
2-BUTANONE	18	10
4-METHYL-2-PENTANONE	<10	10
XYLENES,TOTAL	20	5

Date Analyzed: 07/30/92
Method: EPA 624

Analyst: JN
Verified: TC

Description: GC/MS VOLATILES

Analyte	Concentration ug/L	Quantitation Limit
CHLOROMETHANE	<5	5
BROMOMETHANE	<5	5
VINYL CHLORIDE	<5	5
CHLOROETHANE	<5	5
METHYLENE CHLORIDE	<10	10
1,1-DICHLOROETHENE	<5	5
1,1-DICHLOROETHANE	58	5
CIS 1,2-DICHLOROETHENE	15	5
TRANS 1,2-DICHLOROETHENE	<5	5
CHLOROFORM	<5	5
1,2-DICHLOROETHANE	<5	5
1,1,1-TRICHLOROETHANE	55	5
CARBON TETRACHLORIDE	<5	5
BROMODICHLOROMETHANE	<5	5
2-CHLOROETHYLVINYL ETHER	<10	10
1,2-DICHLOROPROPANE	<5	5
TRICHLOROETHENE	<5	5

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Analyte	Concentration ug/L	Quantitation Limit
BROMOCHLOROMETHANE	<5	5
1,2-TRICHLOROETHANE	<5	5
BENZENE	<5	5
BROMOFORM	<5	5
TETRACHLOROETHENE	<5	5
1,2,2-TETRACHLOROETHANE	<5	5
TOLUENE	6	5
CHLOROBENZENE	<5	5
ETHYLBENZENE	<5	5
ACROLEIN	<20	20
ACRYLONITRILE	<10	10
CIS-1,3-DICHLOROPROPENE	<5	5
TRANS-1,3-DICHLOROPROPENE	<5	5
ACETONE	45	10
2-HEXANONE	<10	10
2-BUTANONE	11	10
4-METHYL-2-PENTANONE	<10	10
XYLENES,TOTAL	25	5

Date Analyzed: 07/30/92
Method: EPA 624

Analyst: JN
Verified: TC

Description: GC/MS VOLATILES

Analyte	Concentration ug/L	Quantitation Limit
CHLOROMETHANE	<5	5
BROMOMETHANE	<5	5
VINYL CHLORIDE	<5	5
CHLOROETHANE	<5	5
METHYLENE CHLORIDE	<10	10
1,1-DICHLOROETHENE	<5	5
1,1-DICHLOROETHANE	69	5
CIS 1,2-DICHLOROETHENE	16	5
TRANS 1,2-DICHLOROETHENE	<5	5
CHLOROFORM	<5	5
1,2-DICHLOROETHANE	<5	5
1,1,1-TRICHLOROETHANE	37	5
CARBON TETRACHLORIDE	<5	5
BROMODICHLOROMETHANE	<5	5
2-CHLOROETHYLVINYL ETHER	<10	10

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Analyte	Concentration ug/L	Quantitation Limit
1,2-DICHLOROPROPANE	<5	5
TRICHLOROETHENE	<5	5
DIBROMOCHLOROMETHANE	<5	5
1,1,2-TRICHLOROETHANE	<5	5
BENZENE	<5	5
BROMOFORM	<5	5
TETRACHLOROETHENE	<5	5
1,1,2,2-TETRACHLOROETHANE	<5	5
TOLUENE	<5	5
CHLOROBENZENE	<5	5
ETHYLBENZENE	<5	5
ACROLEIN	<20	20
ACRYLONITRILE	<10	10
CIS-1,3-DICHLOROPROPENE	<5	5
TRANS-1,3-DICHLOROPROPENE	<5	5
ACETONE	49	10
2-HEXANONE	<10	10
2-BUTANONE	23	10
4-METHYL-2-PENTANONE	<10	10
XYLENES,TOTAL	23	5

Date Analyzed: 07/30/92
Method: EPA 624

Analyst: JN
Verified: TC

Coordinator of analytical services - Lynn Hudachek @ (319) 335-4500

NATIONAL ENVIRONMENTAL TESTING, INC.

Cedar Falls Division
704 Enterprise Drive
Cedar Falls, IA 50613
Tel: (319) 277-2401
Fax: (319) 277-2425

ANALYTICAL REPORT

Gordon Crawford
FANSTEEL/WELLMAN CORP.
U.S. Route 34
P.O. Box 147
Creston, IA 50801

04/09/1996

Sample No.: 339000

NET Job No: 96.03127

Sample ID: Comp2 #715310-JO2,685

CC: HELGA MAYHEW, HOWARD R. GREEN

Date Taken: 03/22/1996 Date Received: 03/23/1996

	Result	Units	Date Analyzed	Analyst	Analysis Method
Chloride	640	mg/L	03/25/1996	llw	SM 4500-Cl C
COD, Lov Level	160	mg/L	03/28/1996	jcf	SM 5220 B
Fluoride, distilled	320	mg/L	04/01/1996	kmv	SM 4500-F B,C
Fluoride, dissolved	91	mg/L	04/01/1996	kmv	SM 4500-F C
Ammonia Nitrogen (probe)	29	mg/L	03/26/1996	jcf	SM 4500-NH3 F
Sulfate	860	mg/L	03/28/1996	cjh	SM 4500-SO4 E
Magnesium, Dissolved (ICP)	300	mg/L	04/03/1996	lmc	S-6010A
Sodium, Dissolved (ICP)	83	mg/L	04/03/1996	lmc	S-6010A
ICP Metals - SW-6010	Complete		03/27/1996	lmc	S-6010
Iron, ICP	320	mg/L	03/27/1996	lmc	S-6010A
Magnesium, ICP	370	mg/L	03/27/1996	lmc	S-6010A
Sodium, ICP	110	mg/L	03/27/1996	lmc	S-6010A

Units: mg/L = ppm ug/g = mg/kg = ppm

Cheryl L. Wilson
Operations Manager

NATIONAL ENVIRONMENTAL TESTING, INC.

Cedar Falls Division
704 Enterprise Drive
Cedar Falls, IA 50613
Tel: (319) 277-2401
Fax: (319) 277-2425

ANALYTICAL REPORT

Helga Mayhew
HOWARD R. GREEN CO.
4250 Glass Road NE
P.O. Box 9009
Cedar Rapids, IA 52409-9009

07/11/1996

Sample No.: 354211

NET Job No: 96.07864

Sample ID: COMP-2 #715310-J02, 0685

PROJECT: FANSTEEL-WELLMAN/CRESTON, IOWA

Date Taken: 06/19/1996 Date Received: 06/20/1996

	Result	Units	Date Analyzed	Analyst	Analysis Method
Chloride	730	mg/L	07/03/1996	llw	SM 4500-Cl C
COD, Low Level	49	mg/L	06/28/1996	kmv	SM 5220 B
Fluoride, distilled	410	mg/L	07/09/1996	cjh	SM 4500-F B,C
Fluoride, dissolved	99	mg/L	06/27/1996	cjh	SM 4500-F C
Ammonia Nitrogen (probe)	26	mg/L	07/03/1996	llw	SM 4500-NH3 F
Sulfate	1,400	mg/L	06/24/1996	cjh	SM 4500-SO4 E
Magnesium, Dissolved (ICP)	470	mg/L	07/05/1996	lmc	S-6010A
Sodium, Dissolved (ICP)	110	mg/L	07/05/1996	lmc	S-6010A
ICP Metals - SW-6010	Complete	mg/L	07/02/1996	lmc	S-6010
Iron, ICP	110	mg/L	07/02/1996	lmc	S-6010A
Magnesium, ICP	410	mg/L	07/02/1996	lmc	S-6010A
Sodium, ICP	93	mg/L	07/02/1996	lmc	S-6010A

Units: mg/L = ppm ug/g = mg/kg = ppm

Cheryl L. Wilson
Operations Manager

NATIONAL ENVIRONMENTAL TESTING, INC.

Cedar Falls Division
704 Enterprise Drive
Cedar Falls, IA 50613
Tel: (319) 277-2401
Fax: (319) 277-2425

ANALYTICAL REPORT

Helga Mayhew
HOWARD R. GREEN CO.
4250 Glass Road N.E.
Cedar Rapids, IA 52409

10/14/1996

Sample No.: 367731

NET Job No: 96.12537

Sample ID: COMP-2 Fansteel/Wellman

H.R. GREEN PROJECT #715310-J02-0685

Date Taken: 10/03/1996 Date Received: 10/04/1996

	Result	Units	Date Analyzed	Analyst	Analysis Method
Chloride	1,400	mg/L	10/05/1996	llw	SM 4500-Cl C
COD, Low Level	120	mg/L	10/12/1996	jas	SM 5220 B
Fluoride, distilled	310	mg/L	10/11/1996	cjh	SM 4500-F B,C
Fluoride, dissolved	88	mg/L	10/11/1996	cjh	SM 4500-F C
Ammonia Nitrogen (probe)	20	mg/L	10/09/1996	llw	SM 4500-NH3 F
Sulfate	1,100	mg/L	10/12/1996	cjh	SM 4500-SO4 E
ICP Metals - E 200.7	Complete	mg/L	10/10/1996	lmc	
Iron, Dissolved (ICP)	70	mg/L	10/09/1996	lmc	S-6010A
Magnesium, ICP	460	mg/L	10/10/1996	lmc	E-200.7
Magnesium, Dissolved (ICP)	520	mg/L	10/09/1996	lmc	S-6010A
Sodium, ICP	230	mg/L	10/10/1996	lmc	E-200.7
Sodium, Dissolved (ICP)	250	mg/L	10/09/1996	lmc	S-6010A

Cheryl L. Wilson
Operations Manager

Outreach Laboratory

311 North Aspen
Broken Arrow, Ok 74012
(918) 251-2515
FAX (918) 251-0008

Lab Project Number:	980922
Client:	Earth Sciences
Client Project Number:	4764A-02
Client Project Name:	Fansteel Wellman Dynamics
Date Submitted:	24-Sep-98
Date Reported:	10-Nov-98
Page:	1 of 8

		Parameter	Method	Result	Detection Limit	Units
Client Sample ID:	Leachate	**TOTAL VOLATILE ORGANICS**				
Lab Sample ID:	980922	Bromomethane	8260	BDL	10.0	ug/l
Sample Matrix:	unfilt groundwater	Chloroethane	8260	BDL	10.0	ug/l
Date Sampled:	9/23/98	Chloromethane	8260	BDL	10.0	ug/l
		Dichlorodifluoromethane	8260	BDL	10.0	ug/l
		Vinyl chloride	8260	BDL	10.0	ug/l
		1,1-Dichloroethene	8260	BDL	10.0	ug/l
		Acetone	8260	BDL	50.0	ug/l
		Methylene chloride	8260	BDL	10.0	ug/l
		trans-1,2-dichloroethene	8260	BDL	10.0	ug/l
		1,1-Dichloroethane	8260	54.1	10.0	ug/l
		cis-1,2-Dichloroethene	8260	BDL	10.0	ug/l
		2-Butanone	8260	BDL	10.0	ug/l
		Chloroform	8260	BDL	10.0	ug/l
		Bromochloromethane	8260	BDL	10.0	ug/l
		1,1,1-Trichloroethane	8260	BDL	10.0	ug/l
		Carbon tetrachloride	8260	BDL	10.0	ug/l
		1,2-Dichloroethane	8260	BDL	10.0	ug/l
		1,2-Dichloropropane	8260	BDL	10.0	ug/l
		Benzene	8260	BDL	10.0	ug/l
		Trichloroethene	8260	BDL	10.0	ug/l
		Bromodichloromethane	8260	BDL	10.0	ug/l
		4-Methyl-2-pentanone	8260	BDL	10.0	ug/l
		cis-1,3-Dichloropropene	8260	BDL	10.0	ug/l
		Toluene	8260	210	10.0	ug/l
		trans-1,3-Dichloropropene	8260	BDL	10.0	ug/l
		1,1,2-Trichloroethane	8260	BDL	10.0	ug/l
		2-Hexanone	8260	BDL	10.0	ug/l
		1,3-Dichloropropane	8260	BDL	10.0	ug/l
		Tetrachloroethene	8260	BDL	10.0	ug/l
		Dibromochloromethane	8260	BDL	10.0	ug/l
		Dibromomethane	8260	BDL	10.0	ug/l
		Chlorobenzene	8260	BDL	10.0	ug/l
		1,1,1,2-Tetrachloroethane	8260	BDL	10.0	ug/l
		Ethylbenzene	8260	BDL	10.0	ug/l
		Xylenes, Total	8260	11.2	10.0	ug/l
		Styrene	8260	BDL	10.0	ug/l
		Bromoform	8260	BDL	10.0	ug/l
		1,2,3-Trichloropropane	8260	BDL	10.0	ug/l
		1,1,2,2-Tetrachloroethane	8260	BDL	10.0	ug/l
		1,3-Dichlorobenzene	8260	BDL	10.0	ug/l
		1,4-Dichlorobenzene	8260	BDL	10.0	ug/l
		1,2-Dichlorobenzene	8260	BDL	10.0	ug/l

Outreach Laboratory

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Lab Project Number:	980922
Client:	Earth Sciences
Client Project Number:	4764A-02
Client Project Name:	Fansteel Wellman Dynamics
Date Submitted:	24-Sep-98
Date Reported:	10-Nov-98
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		Parameter	Method	Result	Detection Limit	Units
Client Sample ID:	Leachate	**TOTAL SEMI-VOLATILES**				
Lab Sample ID:	980922	Phenol	8270	28.0	10	ug/l
Sample Matrix:	unfilt groundwater	bis(2-Chloroethyl)ether	8270	BDL	10	ug/l
Date Sampled:	9/23/98	2-Chlorophenol	8270	BDL	10	ug/l
		1,3-Dichlorobenzene	8270	BDL	10	ug/l
		1,4-Dichlorobenzene	8270	BDL	10	ug/l
		1,2-Dichlorobenzene	8270	BDL	10	ug/l
		2-Methylphenol	8270	23.1	10	ug/l
		2,2'-oxybis-(1-Chloropropane)	8270	BDL	10	ug/l
		4-Methylphenol	8270	BDL	10	ug/l
		n-Nitroso-di-n-propylamine	8270	BDL	10	ug/l
		Hexachloroethane	8270	BDL	10	ug/l
		Nitrobenzene	8270	BDL	10	ug/l
		Isophorone	8270	BDL	10	ug/l
		2-Nitrophenol	8270	BDL	10	ug/l
		2,4-Dimethylphenol	8270	BDL	20	ug/l
		bis(2-Chloroethoxy)methane	8270	BDL	20	ug/l
		2,4-Dichlorophenol	8270	BDL	10	ug/l
		1,2,4-Trichlorobenzene	8270	BDL	10	ug/l
		Naphthalene	8270	217	10	ug/l
		4-Chloroaniline	8270	BDL	10	ug/l
		Hexachlorobutadiene	8270	BDL	10	ug/l
		4-Chloro-3-methylphenol	8270	BDL	10	ug/l
		2-Methylnaphthalene	8270	BDL	10	ug/l
		Hexachlorocyclopentadiene	8270	BDL	10	ug/l
		2,4,6-Trichlorophenol	8270	BDL	10	ug/l
		2,4,5-Trichlorophenol	8270	BDL	10	ug/l
		2-Chloronaphthalene	8270	BDL	10	ug/l
		2-Nitroaniline	8270	BDL	10	ug/l
		Dimethylphthalate	8270	BDL	10	ug/l
		Acenaphthylene	8270	BDL	10	ug/l
		3-Nitroaniline	8270	BDL	10	ug/l
		Acenaphthene	8270	BDL	10	ug/l
		2,4-Dinitrophenol	8270	BDL	10	ug/l
		4-Nitrophenol	8270	BDL	10	ug/l
		Dibenzofuran	8270	BDL	10	ug/l
		2,4-Dinitrotoluene	8270	BDL	20	ug/l
		2,6-Dinitrotoluene	8270	BDL	10	ug/l
		Diethylphthalate	8270	BDL	10	ug/l
		4-Chlorophenyl phenyl ether	8270	BDL	20	ug/l
		Fluorene	8270	BDL	20	ug/l
		4-Nitroaniline	8270	BDL	10	ug/l
		4,6-Dinitro-2-methylphenol	8270	BDL	20	ug/l

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Lab Project Number:	980922
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Client Project Name:	Fansteel Wellman Dynamics
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		Parameter	Method	Result	Detection Limit	Units
Client Sample ID:	Leachate	**TOTAL SEMI-VOLATILES(cont).**				
Lab Sample ID:	980922	n-Nitrosodiphenylamine	8270	BDL	10	ug/l
Sample Matrix:	unfilt groundwater	4-Bromophenyl phenyl ether	8270	BDL	10	ug/l
Date Sampled:	9/23/98	Hexachlorobenzene	8270	BDL	10	ug/l
		Pentachlorophenol	8270	BDL	20	ug/l
		Phenanthrene	8270	BDL	10	ug/l
		Anthracene	8270	BDL	10	ug/l
		Carbazole	8270	BDL	10	ug/l
		di-n-butylphthalate	8270	BDL	10	ug/l
		Fluoranthene	8270	BDL	10	ug/l
		Pyrene	8270	BDL	10	ug/l
		Butylbenzylphthalate	8270	BDL	20	ug/l
		3,3'-Dichlorobenzidine	8270	BDL	10	ug/l
		Benzo(a)anthracene	8270	BDL	10	ug/l
		bis(2-Ethylhexyl)phthalate	8270	23.2	10	ug/l
		Chrysene	8270	BDL	10	ug/l
		di-n-Octylphthalate	8270	BDL	10	ug/l
		Benzo(b)fluoranthene	8270	BDL	10	ug/l
		Benzo(k)fluoranthene	8270	BDL	10	ug/l
		Benzo(a)pyrene	8270	BDL	10	ug/l
		Indeno(1,2,3-cd)pyrene	8270	BDL	10	ug/l
		Dibenz(a,h)anthracene	8270	BDL	10	ug/l
		Benzo(g,h,i)perylene	8270	BDL	10	ug/l

Outreach Laboratory

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Lab Project Number:	980922
Client:	Earth Sciences
Client Project Number:	4764A-02
Client Project Name:	Fansteel Wellman Dynamics
Date Submitted:	24-Sep-98
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1st set

		Parameter	Method	Result	Detection Limit	Units	Date Analyzed
Client Sample ID:	Leachate	**Metals**					
Lab Sample ID:	980922	Aluminum	EPA6010B	1.46	0.05	mg/l	10/10/98
Sample Matrix:	unfilt groundwater	Arsenic	EPA7060A	BDL	0.005	mg/l	10/26/98
Date Sampled:	9/23/98	Barium	EPA6010B	BDL	0.02	mg/l	10/10/98
		Cadmium	EPA6010B	BDL	0.01	mg/l	10/10/98
		Chromium	EPA6010B	BDL	0.01	mg/l	10/10/98
		Copper	EPA6010B	BDL	0.02	mg/l	10/10/98
		Iron	EPA6010B	25.6	0.02	mg/l	10/10/98
		Lead	EPA7421	BDL	0.005	mg/l	10/1/98
		Magnesium	EPA6010B	598	0.10	mg/l	10/10/98
		Manganese	EPA6010B	8.3	0.01	mg/l	10/10/98
		Mercury	EPA7470A	BDL	0.0002	mg/l	9/30/98
		Nickel	EPA6010B	BDL	0.02	mg/l	10/10/98
		Potassium	EPA6010B	600	0.43	mg/l	9/25/98
		Selenium	EPA7740	BDL	0.005	mg/l	10/23/98
		Silver	EPA6010B	BDL	0.01	mg/l	10/10/98
		Zinc	EPA6010B	0.239	0.02	mg/l	10/10/98
		General Chemistry					
		Biochemical Oxygen Demand	SM5210	14.0	2.0	mg/l	9/25/98
		Chemical Oxygen Demand	EPA410.2	75.9	17.0	mg/l	10/1/98
		Total Solids	EPA160.3	7300	20.0	mg/l	9/30/98
		Total Suspended Solids	EPA160.2	70.0	1.0	mg/l	9/24/98
		TKN as N	EPA351.3	14.6	1.0	mg/l	9/30/98
		Ammonia as N	EPA350.3	18.1	0.2	mg/l	9/28/98
		pH	EPA150.1	6.87			9/24/98
		Bicarbonate Alkalinity as $CaCO_3$	EPA310.1	700	2.0	mg/l	9/24/98
		Sulfate	EPA375.4	1270	100	mg/l	10/8/98
		Fluoride	EPA340.2	83.2	3.0	mg/l	9/28/98
		Total Organic Carbon	EPA415.2	262	2.0	mg/l	10/1/98
		Oil & Grease	EPA413.1	BDL	5.0	mg/l	10/12/98
		Chloride	SM4500-Cl	1510	5.0	mg/l	9/30/98
		Nitrate as NO_3 by Brucine	EPA352.1	3.8	1.8	mg/l	9/29/98
		Total Phosphate as P	SM4500 P	BDL	0.1	mg/l	10/16/98
		Total Dissolved Solids	EPA160.1	6160	5.0	mg/l	9/30/98
		Total Volatile Solids	EPA160.4	2190	50.0	mg/l	9/30/98
		Herbicides					
		2,4-D	EPA8151	BDL	0.05	ug/l	10/9/98
		2,4,5-TP	EPA8151	BDL	0.05	ug/l	10/9/98

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Lab Project Number:	980922
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Client Sample ID:	Lab Sample ID:	Parameter	Method	Result	Detection Limit	Units	Date Analyzed
Client Sample ID:	Leachate	**Pesticides**					
Lab Sample ID:	980922	Aldrin	8081	BDL	0.02	ug/l	11/4/98
Sample Matrix:	unfilt groundwater	Alpha-BHC	8081	BDL	0.02	ug/l	11/4/98
Date Sampled:	9/23/98	Beta-BHC	8081	BDL	0.02	ug/l	11/4/98
		Delta-BHC	8081	BDL	0.02	ug/l	11/4/98
		Gamma-BHC	8081	BDL	0.02	ug/l	11/4/98
		DDE	8081	BDL	0.02	ug/l	11/4/98
		DDD	8081	BDL	0.02	ug/l	11/4/98
		DDT	8081	BDL	0.02	ug/l	11/4/98
		Dieldrin	8081	BDL	0.02	ug/l	11/4/98
		Endosulfan I	8081	BDL	0.02	ug/l	11/4/98
		Endosulfan II	8081	BDL	0.02	ug/l	11/4/98
		Endosulfan Sulfate	8081	BDL	0.02	ug/l	11/4/98
		Endrin	8081	BDL	0.02	ug/l	11/4/98
		Endrin Aldehyde	8081	BDL	0.02	ug/l	11/4/98
		Heptachlor	8081	BDL	0.02	ug/l	11/4/98
		Heptachlor Epoxide	8081	BDL	0.02	ug/l	11/4/98
		Methoxychlor	8081	BDL	0.02	ug/l	11/4/98

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Lab Project Number:	980922
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Client Project Number:	4764A-02
Client Project Name:	Fansteel Wellman Dynamics
Date Submitted:	24-Sep-98
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Client Sample ID: Leachate
Lab Sample ID: 980922
Sample Matrix: unfilt groundwater
Date Sampled: 9/23/98

Radiological	Method	Result			MDA	Units	Date Analyzed
Thorium 232	LANLER200	0.2	+/-	0.1	0.1	pCi/L	10/30/98
Thorium 230	LANLER200	0.1	+/-	0.2	0.2	pCi/L	10/30/98
Thorium 228	LANLER200	0.2	+/-	0.2	0.2	pCi/L	10/30/98
Uranium 238	ASTM5174M		BDL		0.3	pCi/L	11/6/98
Radium 226	SM705M	0.5	+/-	0.5	0.2	pCi/L	10/16/98
Gross Alpha	EPA900	0	+/-	38.1	44.6	pCi/L	10/30/98
Gross Beta	EPA900	663	+/-	95.2	74.1	pCi/L	10/30/98
K-40	EPA6010B		521		0.43	pCi/L	9/25/98

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Lab Project Number:	980922
Client:	Earth Sciences
Client Project Number:	4764A-02
Client Project Name:	Fansteel Wellman Dynam
Date Submitted:	24-Sep-98
Date Reported:	10-Nov-98
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QC REPORT

	Date Extracted	Date Analyzed	Analyst	Blank	LCS %REC	MS %REC	MSD %REC	% RPD
Volatiles								
1,1-Dichloroethene		9/28/98	BD	<10	103	104	106	2.1
Benzene		9/28/98	BD	<10	104	105	113	6.9
Trichloroethene		9/28/98	BD	<10	98	97	104	6.1
Toluene		9/28/98	BD	<10	103	73	77	5.1
Chlorobenzene		9/28/98	BD	<10	99	96	105	9.3
Semi-Volatiles								
Phenol	9/28/98	9/29/98	BD	<10	74	92	56	48
2-Chlorophenol	9/28/98	9/29/98	BD	<10	104	94	89	5
1, 4-Dichlorobenzene	9/28/98	9/29/98	BD	<10	80	66	63	5
n-Nitroso-di-n-propylamine	9/28/98	9/29/98	BD	<10	116	106	95	11
1,2,4-Trichlorobenzene	9/28/98	9/29/98	BD	<10	87	65	61	6
4-Chloro-3-methylphenol	9/28/98	9/29/98	BD	<10	97	99	78	23
Acenaphthene	9/28/98	9/29/98	BD	<10	106	104	86	20
4-Nitrophenol	9/28/98	9/29/98	BD	<10	50	76	69	10
2,4-Dinitrotoluene	9/28/98	9/29/98	BD	<10	108	148	127	15
Pentachlorophenol	9/28/98	9/29/98	BD	<10	99	159	149	6
Pyrene	9/28/98	9/29/98	BD	<10	159	145	133	8
2,4-D		10/9/98	BD	<.05	76	57	62	48
2,4,5-TP		10/9/98	BD	<.05	74	93	88	35
Total Phosphate as P		10/16/98	RT	<0.1	99.6	83.9		NC
Oil & Grease		10/12/98	RT	<5.0	84.1			
TDS		9/30/98	RT	<5.0	99.2			0.62
TS		9/30/98	RT	50				1.4
TVS		9/30/98	RT	<50				1.9
Sulfate		10/8/98	RT	<100	98.1	101		1.1
BOD		9/25-30/98	RT	<2.0	113			2.9
Chloride		9/30/98	RT	<5.0	100	97		0.3
COD		10/1/98	RT	<17	92.7	98.5		1.5
TKN as N		9/30/98	RT	<1.0	94.5	115		4.1
Nitrate as NO_3 by Brucine		9/29/98	RT	<1.8	106	111		2.1
Total Organic Carbon		10/1/98	BD	<2.0	99	109		1.7
Ammonia as N		9/28/98	RT	<0.2	94.4	113		0.8
Fluoride		9/28/98	RT	<3.0	102	103		2.0
TSS		9/24/98	RT	<1.0				0
pH		9/24/98	RT					0.15
Bicarbonate Alkalinity as $CaCO_3$		9/24/98	RT	<2.0	99.8	99.9		0.43

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Client:	Earth Sciences
Client Project Number:	4764A-02
Client Project Name:	Fansteel Wellman Dynam
Date Submitted:	24-Sep-98
Date Reported:	10-Nov-98
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QC REPORT

	Date Extracted	Date Analyzed	Analyst	Blank	LCS %REC	MS %REC	MSD %REC	% RPD
Metals								
K-40		9/25/98	BD	<0.43	85.2	84.7	76.3	10.4
Aluminum		10/10/98	BD	<.05	93.1	95	111	15.1
Arsenic		10/26/98	BD	<.005	102	108	106	1.9
Barium		10/10/98	BD	<.02	99.1	93.2	102	9.1
Cadmium		10/10/98	BD	<.01	103	91.3	100	9.4
Chromium		10/10/98	BD	<.01	99.3	87.8	96.9	9.9
Copper		10/10/98	BD	<.02	94.1	79.4	86.5	8.5
Iron		10/10/98	BD	<.05	93.5	D	D	14.7
Lead		10/1/98	BD	<.005	102	94	92	2.1
Magnesium		10/10/98	BD	<.10	94.6	D	D	6.1
Manganese		10/10/98	BD	<.01	98.4	D	D	12.9
Mercury		10/10/98	BD	<.0002	104	109	117	7.1
Nickel		10/10/98	BD	<.02	101	88.3	96.2	8.6
Selenium		10/10/98	BD	<.005	90	104	102	1.9
Silver		10/10/98	BD	<.01	101	92.7	100	7.7
Zinc		10/10/98	BD	<.02	98.0	86.8	97.2	11.3
Pesticides								
delta-BHC	10/16/98	11/4/98	BD	<.02	106	123	86	35
Heptachlor	10/16/98	11/4/98	BD	<.02	90	93	66	35
Heptachlor epoxide	10/16/98	11/4/98	BD	<.02	91	100	73	31
Endrin	10/16/98	11/4/98	BD	<.02	83	95	91	5
Methoxychlor	10/16/98	11/4/98	BD	<.02	85	102	75	30
Radiological								
Ra-226		10/16/98	RE	0.0+/-0.2	104	95.0		NC
Gross Alpha		10/30/98	RE	0 +/- 0.1	66.5	78.0	110	NC
Gross Beta		10/30/98	RE	0 +/- 0.6	86.4	94.2	91.4	NC
Th-232		10/30/98	RE	0.1 +/-0.1	102	105		NC
Th-230		10/30/98	RE	0.0 +/-0.1				NC
Th-228		10/30/98	RE	0.1+/-0.2	100	91.2		NC
U-238		11/6/98	RE	<1	99.8	91.0	87.4	4.0

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Laboratory Approvals:

QA/QC Officer

Laboratory Director

Outreach Laboratory

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Lab Project Number:	981336
Client:	Earth Sciences
Client Project Number:	4764A-02
Client Project Name:	Fansteel Wellman Dynamics
Date Submitted:	29-Dec-98
Date Reported:	20-Jan-99
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		Parameter	Method	Result	Detection Limit	Units	
Client Sample ID:	Leachate Filtered	**Metals**					
Lab Sample ID:	981336-01	Aluminum	EPA6010B	1.45	0.10	mg/l	1/6/99
Sample Matrix:	filt groundwater	Arsenic	EPA7060A	BDL	0.005	mg/l	1/5/99
Date Sampled:	Unknown	Barium	EPA6010B	BDL	0.02	mg/l	1/6/99
		Cadmium	EPA6010B	BDL	0.01	mg/l	1/6/99
		Chromium	EPA6010B	BDL	0.01	mg/l	1/6/99
		Copper	EPA6010B	BDL	0.02	mg/l	1/6/99
		Iron	EPA6010B	16.9	0.05	mg/l	1/6/99
		Lead	EPA7421	BDL	0.005	mg/l	1/7/99
		Magnesium	EPA6010B	708	0.05	mg/l	1/6/99
		Manganese	EPA6010B	8.07	0.01	mg/l	1/6/99
		Mercury	EPA7470A	BDL	0.0002	mg/l	1/8/99
		Nickel	EPA6010B	BDL	0.02	mg/l	1/6/99
		Potassium	EPA6010B	1140	1.00	mg/l	1/19/99
		Selenium	EPA7740	BDL	0.01	mg/l	1/13/99
		Silver	EPA6010B	BDL	0.01	mg/l	1/6/99
		Zinc	EPA6010B	BDL	0.02	mg/l	1/6/99
		General Chemistry					
		Biochemical Oxygen Demand	SM5210	1.3	1.0	mg/l	12/30/98
		Chemical Oxygen Demand	EPA410.2	140	50.0	mg/l	12/30/98
		Total Solids	EPA160.3	2500	50	mg/l	12/2998
		Total Suspended Solids	EPA160.2	30.2	0.2	mg/l	12/2998
		TKN as N	EPA351.3	19.7	0.5	mg/l	1/4/99
		Ammonia as N	EPA350.3	17.5	0.2	mg/l	1/4/99
		pH	EPA150.1	7.03			12/29/98
		Bicarbonate Alkalinity as $CaCO_3$	EPA310.1	597	2.0	mg/l	12/29/98
		Sulfate	EPA375.4	1530	100	mg/l	1/5/99
		Fluoride	EPA340.2	66.5	2.0	mg/l	1/5/99
		Total Organic Carbon	EPA415.2	175	2.0	mg/l	1/5/99
		Oil & Grease	EPA413.2	6.5	1.0	mg/l	1/7/99
		Chloride	EPA325.3	1640	10	mg/l	1/6/99
		Nitrate as NO_3 by Brucine	EPA352.1	BDL	0.4	mg/l	1/4/99
		Total Phosphate as P	SM4500 -9	BDL	0.1	mg/l	12/30/98
		Total Dissolved Solids	EPA160.1	2520	10	mg/l	12/29/98
		Total Volatile Solids	EPA160.4	622	50	mg/l	12/29/98

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Lab Project Number:	981336
Client:	Earth Sciences
Client Project Number:	4764A-02
Client Project Name:	Fansteel Wellman Dynamics
Date Submitted:	29-Dec-98
Date Reported:	20-Jan-99
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Client Sample ID: Leachate Unfilterec
Lab Sample ID: 981336-02
Sample Matrix: unfilt groundwater
Date Sampled: Unknown

Parameter	Method	Result	Detection Limit	Units	
Metals					
Aluminum	EPA6010B	4.97	0.10	mg/l	1/6/99
Arsenic	EPA7060A	BDL	0.005	mg/l	1/5/99
Barium	EPA6010B	BDL	0.02	mg/l	1/6/99
Cadmium	EPA6010B	BDL	0.01	mg/l	1/6/99
Chromium	EPA6010B	0.033	0.01	mg/l	1/6/99
Copper	EPA6010B	BDL	0.02	mg/l	1/6/99
Iron	EPA6010B	71.9	0.05	mg/l	1/6/99
Lead	EPA7421	BDL	0.005	mg/l	1/7/99
Magnesium	EPA6010B	399	0.05	mg/l	1/6/99
Manganese	EPA6010B	5.65	0.01	mg/l	1/6/99
Mercury	EPA7470A	BDL	0.0002	mg/l	1/8/99
Nickel	EPA6010B	0.030	0.02	mg/l	1/6/99
Potassium	EPA6010B	661	1.00	mg/l	1/19/99
Selenium	EPA7740	BDL	0.01	mg/l	1/13/99
Silver	EPA6010B	BDL	0.01	mg/l	1/6/99
Zinc	EPA6010B	1.42	0.02	mg/l	1/6/99
General Chemistry					
Biochemical Oxygen Demand	SM5210	17.5	2.0	mg/l	12/30/98
Chemical Oxygen Demand	EPA410.2	189	50.0	mg/l	12/30/98
Total Solids	EPA160.3	7380	50	mg/l	12/2998
Total Suspended Solids	EPA160.2	270	2.0	mg/l	12/2998
TKN as N	EPA351.3	20	0.5	mg/l	1/4/99
Ammonia as N	EPA350.3	17.9	0.2	mg/l	1/4/99
pH	EPA150.1	7.00			12/29/98
Bicarbonate Alkalinity as $CaCO_3$	EPA310.1	634	2.0	mg/l	12/29/98
Sulfate	EPA375.4	1510	100	mg/l	1/5/99
Fluoride	EPA340.2	66.5	2.0	mg/l	1/5/99
Total Organic Carbon	EPA415.2	180	2.0	mg/l	1/5/99
Oil & Grease	EPA413.2	8.8	1.0	mg/l	1/7/99
Chloride	EPA325.3	1630	10	mg/l	1/6/99
Nitrate as NO_3 by Brucine	EPA352.1	BDL	0.4	mg/l	1/4/99
Total Phosphate as P	SM4500 -9	0.11	0.1	mg/l	12/30/98
Total Dissolved Solids	EPA160.1	6270	10	mg/l	12/29/98
Total Volatile Solids	EPA160.4	1950	50	mg/l	12/29/98

Outreach Laboratory

311 North Aspen
Broken Arrow, Ok 74012
(918) 251-2515
FAX (918) 251-0008

Lab Project Number:	981336
Client:	Earth Sciences
Client Project Number:	4764A-02
Client Project Name:	Fansteel Wellman Dynamics
Date Submitted:	29-Dec-98
Date Reported:	20-Jan-99
Page:	3 of 3

QC REPORT

	Date Extracted	Date Analyzed	Analyst	Blank	LCS %REC	MS %REC	MSD %REC	% RPD
Metals								
Aluminum		1/6/99	BD	<.05	97	83	91	8.9
Arsenic		1/5/99	BD	<.005	106	98	106	8.6
Barium		1/6/99	BD	<.02	103	85	92	8.2
Cadmium		1/6/99	BD	<.01	101	80	85	5.9
Chromium		1/6/99	BD	<.01	98	75	84	10.2
Copper		1/6/99	BD	<.02	110	87	92	6.3
Iron		1/6/99	BD	<.05	96	D	D	11.6
Lead		1/7/99	BD	<.005	96	104	101	2.9
Magnesium		1/6/99	BD	<.10	105	D	D	7.9
Manganese		1/6/99	BD	<.01	104	109	100	8.3
Mercury		1/8/99	BD	<.02	108	104	96	8.8
Nickel		1/6/99	BD	<.02	101	79	85	8.0
Potassium		1/19/99	BD	<1	95.3	D	D	
Selenium		1/13/99	BD	<.01	108	81	87	7.4
Silver		1/6/99	BD	<.01	98	86	88	2.1
Zinc		1/6/99	BD	<.02	96	84	89	6.6
General Chemistry								
Total Phosphate as P		12/30/98	RT	<0.1	89.6	108		NC
Oil & Grease		1/7/99	RT	<1.0	89.9			
TDS		12/29/98	RT	<10	106			0.3
TS		12/29/98	RT	<50				1.6
TVS		12/29/98	RT	<50				0.3
Sulfate		1/5/99	RT	<100	111	112		0.9
BOD		12/30-1/4/99	RT	<2.0	83.8			2.1
Chloride		1/6/99	RT	<10	99.3	105		0.6
COD		12/30/98	RT	<50	94.5	90.6		8.7
TKN as N		1/4/99	RT	<0.5	102	99.4		1.6
Nitrate as NO_3 by Brucine		1/4/99	RT	<0.4	98	88.9		3.4
Total Organic Carbon		1/5/99	BD	<2.0	101	107		0.6
Ammonia as N		1/4/99	RT	<0.2	93.4	103		1.7
Fluoride		1/5/99	RT	<2.0	99.6	99.4		0.4
TSS		12/29/98	RT	<2.0				0
pH		12/29/98	RT		99.9			0.3
Bicarbonate Alkalinity as $CaCO_3$		12/29/98	RT	<2.0	98.4	94.8		0.5

D-Diluted Out

Laboratory Approvals:

QA/QC Officer

Laboratory Director

OUTREACH TECHNOLOGIES, INC.

311 North Aspen
Broken Arrow, OK 74012
Phone: (918) 251-2515
Fax: (918) 251-0008

CLIENT Earth Sciences | BILL TO:

CONTACT Ellen Jakub | CONTACT

ADDRESS | ADDRESS

CITY STATE ZIP | CITY STATE ZIP

PHONE | PHONE

FAX | FAX

CHAIN OF CUSTODY RECORD

PROJECT NO. 4764A-02

PROJECT NAME Fanstel Wellonal Dynamics

TURNAROUND TIME

SAMPLER

(SIGNATURE)

LAB SAMPLE #	CLIENT SAMPLE ID	DATE SAMPLED	TIME SAMPLED	MATRIX	# CONTAINERS	Al, As, Be, Cd, Cr, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Zn	BOD	COD	Total Solids	TSS	TDS	TVS	TKN as N	Ammonia as N	$NO_3(N)$ by Brucine	O.I & Grease	COMMENTS
	Leachate Filtered G.W.			Ground Wtr	6	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	Leachate Unfiltered G.W.			Ground Wtr	6	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	

RELINQUISHED BY	DATE	TIME	RECEIVED BY	RELINQUISHED BY	DATE	TIME	RECEIVED BY
[signature]	12-28-98	3:00	[signature]				
			12/29/98 0900				

RELINQUISHED BY	DATE	TIME	RECEIVED BY	RELINQUISHED BY	DATE	TIME	RECEIVED BY

REMARKS

1 of 1

981336

OUTREACH TECHNOLOGIES, INC.

311 North Aspen
Broken Arrow, OK 74012
Phone: (918) 251-2515
Fax: (918) 251-0008

CLIENT Earth Services | BILL TO:

CONTACT Ellen Jakubs | CONTACT

ADDRESS | ADDRESS

CITY STATE ZIP | CITY STATE ZIP

PHONE | PHONE

FAX | FAX

CHAIN OF CUSTODY RECORD

PROJECT NO. 4764A-02

PROJECT NAME Forsted Weldon Dynamics

TURNAROUND TIME

SAMPLER

(SIGNATURE)

LAB SAMPLE #	CLIENT SAMPLE ID	DATE SAMPLED	TIME SAMPLED	MATRIX	# CONTAINERS	pH	Bicarbonate Alkalinity as CaCO3	Sulfate	F	Cl	TOC	Total Phosphate as P				COMMENTS
	Leachate Filtered			Groundwa	6	✓	✓	✓	✓	✓	✓	✓				
	Leachate Unfiltered			Groundwa	6	✓	✓	✓	✓	✓	✓	✓				

RELINQUISHED BY	DATE	TIME	RECEIVED BY	RELINQUISHED BY	DATE	TIME	RECEIVED BY
			12/29/98 0900				
RELINQUISHED BY:	DATE	TIME	RECEIVED BY	RELINQUISHED BY	DATE	TIME	RECEIVED BY:

REMARKS

2 of 2

981336

Outreach Laboratory

311 North Aspen
Broken Arrow, Ok 74012
(918) 251-2515
FAX (918) 251-0008

Lab Project Number:	981338
Client:	Earth Sciences
Client Project Number:	4764A-02
Client Project Name:	Fansteel Wellman Dyn
Date Submitted:	29-Dec-98
Date Reported:	20-Jan-99
Page:	1 of 4

Client Sample ID: Leachate Unfiltered
Lab Sample ID: 981338
Sample Matrix: groundwater
Date Sampled: Unknown

TOTAL VOLATILE ORGANICS

Parameter	Method	Result	Detection Limit	Units
Bromomethane	8260	BDL	5.0	ug/l
Chloroethane	8260	BDL	5.0	ug/l
Chloromethane	8260	BDL	10.0	ug/l
Dichlorodifluoromethane	8260	BDL	10.0	ug/l
Vinyl chloride	8260	BDL	5.0	ug/l
1,1-Dichloroethene	8260	BDL	5.0	ug/l
Acetone	8260	BDL	15.0	ug/l
Methylene chloride	8260	BDL	5.0	ug/l
trans-1,2-dichloroethene	8260	BDL	5.0	ug/l
1,1-Dichloroethane	8260	36.4	5.0	ug/l
cis-1,2-Dichloroethene	8260	BDL	5.0	ug/l
2-Butanone	8260	BDL	5.0	ug/l
Chloroform	8260	BDL	5.0	ug/l
Bromochloromethane	8260	BDL	5.0	ug/l
1,1,1-Trichloroethane	8260	BDL	5.0	ug/l
Carbon tetrachloride	8260	BDL	5.0	ug/l
1,2-Dichloroethane	8260	BDL	5.0	ug/l
1,2-Dichloropropane	8260	BDL	5.0	ug/l
Benzene	8260	BDL	5.0	ug/l
Trichloroethene	8260	BDL	5.0	ug/l
Bromodichloromethane	8260	BDL	5.0	ug/l
4-Methyl-2-pentanone	8260	BDL	5.0	ug/l
cis-1,3-Dichloropropene	8260	BDL	5.0	ug/l
Toluene	8260	35.8	5.0	ug/l
trans-1,3-Dichloropropene	8260	BDL	5.0	ug/l
1,1,2-Trichloroethane	8260	BDL	5.0	ug/l
2-Hexanone	8260	BDL	5.0	ug/l
1,3-Dichloropropane	8260	BDL	5.0	ug/l
Tetrachloroethene	8260	BDL	5.0	ug/l
Dibromochloromethane	8260	BDL	5.0	ug/l
Dibromomethane	8260	BDL	5.0	ug/l
Chlorobenzene	8260	BDL	5.0	ug/l
1,1,1,2-Tetrachloroethane	8260	BDL	5.0	ug/l
Ethylbenzene	8260	BDL	5.0	ug/l
Xylenes, Total	8260	BDL	5.0	ug/l
Styrene	8260	BDL	5.0	ug/l
Bromoform	8260	BDL	5.0	ug/l
1,2,3-Trichloropropane	8260	BDL	5.0	ug/l
1,1,2,2-Tetrachloroethane	8260	BDL	5.0	ug/l
1,3-Dichlorobenzene	8260	BDL	10.0	ug/l
1,4-Dichlorobenzene	8260	BDL	5.0	ug/l
1,2-Dichlorobenzene	8260	BDL	5.0	ug/l

Outreach Laboratory

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Lab Project Number:	981338
Client:	Earth Sciences
Client Project Number:	4764A-02
Client Project Name:	Fansteel Wellman Dyn
Date Submitted:	29-Dec-98
Date Reported:	20-Jan-99
Page:	2 of 4

Client Sample ID: Leachate Unfiltered
Lab Sample ID: 981338
Sample Matrix: groundwater
Date Sampled: Unknown

Parameter	Method	Result	Detection Limit	Units
TOTAL SEMI-VOLATILES				
Phenol	8270A	75.0	10	ug/l
bis(2-Chloroethyl)ether	8270A	BDL	10	ug/l
2-Chlorophenol	8270A	BDL	10	ug/l
1,3-Dichlorobenzene	8270A	BDL	10	ug/l
1,4-Dichlorobenzene	8270A	BDL	10	ug/l
1,2-Dichlorobenzene	8270A	BDL	10	ug/l
2-Methylphenol	8270A	54.8	10	ug/l
2,2'-oxybis-(1-Chloropropane)	8270A	BDL	10	ug/l
4-Methylphenol	8270A	BDL	10	ug/l
n-Nitroso-di-n-propylamine	8270A	BDL	10	ug/l
Hexachloroethane	8270A	BDL	10	ug/l
Nitrobenzene	8270A	BDL	10	ug/l
Isophorone	8270A	BDL	10	ug/l
2-Nitrophenol	8270A	BDL	10	ug/l
2,4-Dimethylphenol	8270A	BDL	20	ug/l
bis(2-Chloroethoxy)methane	8270A	BDL	20	ug/l
2,4-Dichlorophenol	8270A	BDL	10	ug/l
1,2,4-Trichlorobenzene	8270A	BDL	10	ug/l
Naphthalene	8270A	527	10	ug/l
4-Chloroaniline	8270A	BDL	10	ug/l
Hexachlorobutadiene	8270A	BDL	10	ug/l
4-Chloro-3-methylphenol	8270A	BDL	10	ug/l
2-Methylnaphthalene	8270A	17.9	10	ug/l
Hexachlorocyclopentadiene	8270A	BDL	10	ug/l
2,4,6-Trichlorophenol	8270A	BDL	10	ug/l
2,4,5-Trichlorophenol	8270A	BDL	10	ug/l
2-Chloronaphthalene	8270A	BDL	10	ug/l
2-Nitroaniline	8270A	BDL	10	ug/l
Dimethylphthalate	8270A	BDL	10	ug/l
Acenaphthylene	8270A	BDL	10	ug/l
3-Nitroaniline	8270A	BDL	10	ug/l
Acenaphthene	8270A	BDL	10	ug/l
2,4-Dinitrophenol	8270A	BDL	10	ug/l
4-Nitrophenol	8270A	BDL	10	ug/l
Dibenzofuran	8270A	BDL	10	ug/l
2,4-Dinitrotoluene	8270A	BDL	20	ug/l
2,6-Dinitrotoluene	8270A	BDL	10	ug/l
Diethylphthalate	8270A	BDL	10	ug/l
4-Chlorophenyl phenyl ether	8270A	BDL	20	ug/l
Fluorene	8270A	BDL	20	ug/l
4-Nitroaniline	8270A	BDL	10	ug/l
4,6-Dinitro-2-methylphenol	8270A	BDL	20	ug/l

Outreach Laboratory

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Lab Project Number:	981338
Client:	Earth Sciences
Client Project Number:	4764A-02
Client Project Nane:	Fansteel Wellman Dyn
Date Submitted:	29-Dec-98
Date Reported:	20-Jan-99
Page:	3 of 4

Parameter	Method	Result	Detection Limit	Units
TOTAL SEMI-VOLATILES(cont).				
n-Nitrosodiphenylamine	8270A	BDL	10	ug/l
4-Bromophenyl phenyl ether	8270A	BDL	10	ug/l
Hexachlorobenzene	8270A	BDL	10	ug/l
Pentachlorophenol	8270A	BDL	20	ug/l
Phenanthrene	8270A	BDL	10	ug/l
Anthracene	8270A	BDL	10	ug/l
Carbazole	8270A	BDL	10	ug/l
di-n-butylphthalate	8270A	BDL	10	ug/l
Fluoranthene	8270A	BDL	10	ug/l
Pyrene	8270A	BDL	10	ug/l
Butylbenzylphthalate	8270A	BDL	20	ug/l
3,3'-Dichlorobenzidine	8270A	BDL	10	ug/l
Benzo(a)anthracene	8270A	BDL	10	ug/l
bis(2-Ethylhexyl)phthalate	8270A	BDL	10	ug/l
Chrysene	8270A	BDL	10	ug/l
di-n-Octylphthalate	8270A	BDL	10	ug/l
Benzo(b)fluoranthene	8270A	BDL	10	ug/l
Benzo(k)fluoranthene	8270A	BDL	10	ug/l
Benzo(a)pyrene	8270A	BDL	10	ug/l
Indeno(1,2,3-cd)pyrene	8270A	BDL	10	ug/l
Dibenz(a,h)anthracene	8270A	BDL	10	ug/l
Benzo(g,h,i)perylene	8270A	BDL	10	ug/l

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Lab Project Number:	981338
Client:	Earth Sciences
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Client Project Name:	Fansteel Wellman Dyn
Date Submitted:	29-Dec-98
Date Reported:	20-Jan-99
Page:	4 of 4

QC REPORT

Volatiles	Date Analyzed	Analyst	Blank	LCS %REC	MS %REC	MSD %REC	% RPD
1,1-Dichloroethene	1/4/98	BD	<10	101	103	106	3.0
Benzene	1/4/98	BD	<10	104	106	108	2.8
Trichloroethene	1/4/98	BD	<10	99	100	104	4.4
Toluene	1/4/98	BD	<10	101	104	105	1.4
Chlorobenzene	1/4/98	BD	<10	102	106	111	4.8

Semi-Volatiles	Date Extracted	Date Analyzed	Analyst	Blank	LCS %REC	MS %REC	MSD %REC	% RPD
Phenol	12/30/98	1/19/98	BD	<10	59	58	62	7.0
2-Chlorophenol	12/30/98	1/19/98	BD	<10	62	75	88	15.7
1, 4-Dichlorobenzene	12/30/98	1/19/98	BD	<10	51	55	70	23.5
n-Nitroso-di-n-propylamine	12/30/98	1/19/98	BD	<10	62	64	74	14.2
1,2,4-Trichlorobenzene	12/30/98	1/19/98	BD	<10	55	52	70	30.2
4-Chloro-3-methylphenol	12/30/98	1/19/98	BD	<10	63	68	86	22.9
Acenaphthene	12/30/98	1/19/98	BD	<10	62	66	78	17.6
4-Nitrophenol	12/30/98	1/19/98	BD	<10	50	38	42	9.9
2,4-Dinitrotoluene	12/30/98	1/19/98	BD	<10	68	79	88	9.9
Pentachlorophenol	12/30/98	1/19/98	BD	<10	85	110	127	14.3
Pyrene	12/30/98	1/19/98	BD	<10	79	70	83	17.8

LABORATORY APPROVALS:

QA/QC Officer: _____

Laboratory Director: _____

OUTREACH TECHNOLOGIES, INC.

311 North Aspen
Broken Arrow, OK 74012
Phone: (918) 251-2515
Fax: (918) 251-0008

CLIENT Earth Sciences
CONTACT Ellen Jakub
ADDRESS
CITY STATE ZIP
PHONE
FAX

BILL TO:
CONTACT
ADDRESS
CITY STATE ZIP
PHONE
FAX

CHAIN OF CUSTODY RECORD

PROJECT NO. 4764A-02
PROJECT NAME Fansteel Wellman Dynamics
TURNAROUND TIME
SAMPLER
(SIGNATURE)

LAB SAMPLE #	CLIENT SAMPLE ID	DATE SAMPLED	TIME SAMPLED	MATRIX	# CONTAINERS	Total Vol. Organics	Total Semi Vol Org									COMMENTS
	Leachate Unfiltered			groundwater	3 voa	✓	✓									
					2 1 gallon											

RELINQUISHED BY:	DATE	TIME	RECEIVED BY:	RELINQUISHED BY	DATE	TIME	RECEIVED BY:
Don Schultz	12-28-98	3:00 P	Kyle Johnson OOO				
RELINQUISHED BY:	DATE	TIME	RECEIVED BY	RELINQUISHED BY	DATE	TIME	RECEIVED BY:

REMARKS:

981338

TestAmerica
ANALYTICAL TESTING CORPORATION
704 Enterprise Drive Cedar Falls, IA 50613 * 800-750-2401 * Fax 319-277-2425

January 31, 2006

Client:
FANSTEEL/WELLMAN CORP.
1746 Commerce Road
Creston, IA 50801

Attn: Joe Haller

Work Order: COL1216
Project Name: Landfill Leachate Permit Renewal
Project Number: Landfill Leachate Permit Renewal

Date Received: 12/28/05

An executed copy of the chain of custody is also included as an addendum to this report.

If you have any questions relating to this analytical report, please contact your Laboratory Project Manager at 1-(800)750-2401

SAMPLE IDENTIFICATION	LAB NUMBER	COLLECTION DATE AND TIME
Landfill Leachate	COL1216-01	12/27/05 09:20

Samples were received into laboratory at a temperature of 3 °C.

The reported results were obtained in compliance with the 2003 NELAC standards unless otherwise noted.

TestAmerica Analytical Testing Corporation certifies that the analytical results contained herein apply only to the specific sample analyzed.

Approved By:

TestAmerica Analytical - Cedar Falls
Derrick Klinkenberg
Organics Manager

TestAmerica
ANALYTICAL TESTING CORPORATION
704 Enterprise Drive Cedar Falls, IA 50613 * 800-750-2401 * Fax 319-277-2425

FANSTEEL/WELLMAN CORP.
1746 Commerce Road
Creston, IA 50801
Joe Haller

Work Order: COL1216
Project: Landfill Leachate Permit Renewal
Project Number: Landfill Leachate Permit Renewal

Received: 12/28/05
Reported: 01/31/06 13:48

ANALYTICAL REPORT

Analyte	Sample Result	Data Qualifiers	Units	Quan. Limit	Dilution Factor	Date Analyzed	Analyst	Seq/ Batch	Method
Sample ID: COL1216-01 (Landfill Leachate - Ground Water)					**Sampled: 12/27/05 09:20**			**Recvd: 12/28/05 08:40**	
General Chemistry Parameters									
Alkalinity, bicarb (CaCO3)	**644**		mg/L	5.00	1	12/29/05 13:28	jcf	5120965	SM2320B
Alkalinity, Phenol. (CaCO3)	<5.00		mg/L	5.00	1	12/29/05 13:28	jcf	5120965	SM 2320B
Alkalinity, Total (CaCO3)	**644**		mg/L	5.00	1	12/29/05 13:24	jcf	5120954	SM 2320B
Ammonia as N	**10.5**		mg/L	1.50	3	12/29/05 17:27	jmh	5120985	SM 4500NH3 B,E
BOD - 5 Day	<12.0		mg/L	12.0	4	12/28/05 12:00	lbb	5120888	SM 5210B
Chemical Oxygen Demand	**219**		mg/L	25.0	1	12/29/05 14:37	jcf	5120970	SM 5220D
Chloride	**3000**		mg/L	250	50	01/03/06 11:21	mdk	6010017	SM 4500Cl E
Oil & Grease	<4.85		mg/L	4.85	1	12/29/05 21:04	cah	5120982	EPA 1664
pH	**7.6**	H3	pH Units	0.1	1	12/28/05 11:30	sas	5120896	EPA 150.1
Phosphorus, Total (as P)	**0.109**		mg/L	0.100	1	01/03/06 12:19	lbb	6010010	EPA 365.1
Sulfate	**1070**	M1	mg/L	333	33.3	01/09/06 14:59	mdk	6010255	ASTM D516-90
Total Dissolved Solids	**7720**		mg/L	20.0	1	12/29/05 08:00	sas	6010003	SM2540C
Total Kjeldahl Nitrogen	**15.8**		mg/L	1.00	1	12/30/05 13:29	jcf	5120937	EPA 351.2
Total Organic Carbon	**8.31**	ET	mg/L	2.00	2	01/04/06 20:14	jcf	6010057	SM 5310C
Total Solids	**9140**		mg/L	20.0	1	12/29/05 08:00	sas	6010062	SM 2540B
Total Suspended Solids	**7.00**		mg/L	3.00	1	12/28/05 15:00	lbb	5120951	USGS I-3765-85
Total Volatile Solids	**2960**		mg/L	20.0	1	12/29/05 08:00	sas	6010060	EPA 160.4
Fluoride	**110**		mg/L	15.0	15	01/10/06 07:49	lbb	6010305	SM 4500F BC
Nitrate as N	<1.00		mg/L	1.00	1	12/28/05 14:00	jcf	5120914	EPA 353.3
Total Metals by EPA 200 Series Methods									
Aluminum	**0.293**		mg/L	0.100	1	01/03/06 12:47	heh	5120994	EPA 200.7
Arsenic	**0.149**		mg/L	0.0800	1	01/03/06 12:47	heh	5120994	EPA 200.7
Barium	**0.121**		mg/L	0.0100	1	01/03/06 12:47	heh	5120994	EPA 200.7
Cadmium	<0.0200		mg/L	0.0200	1	01/03/06 12:47	heh	5120994	EPA 200.7
Chromium	<0.0200		mg/L	0.0200	1	01/03/06 12:47	heh	5120994	EPA 200.7
Copper	**0.502**		mg/L	0.0200	1	01/03/06 12:47	heh	5120994	EPA 200.7
Iron	**1.99**		mg/L	0.100	1	01/03/06 12:47	heh	5120994	EPA 200.7
Lead	**0.136**		mg/L	0.100	1	01/03/06 12:47	heh	5120994	EPA 200.7
Manganese	**7.89**		mg/L	0.0100	1	01/03/06 12:47	heh	5120994	EPA 200.7
Mercury	<0.000200		mg/L	0.000200	1	01/04/06 10:50	llw	6010059	EPA 245.2
Nickel	**0.0529**		mg/L	0.0500	1	01/03/06 12:47	heh	5120994	EPA 200.7
Potassium	**821**		mg/L	1.00	1	01/03/06 12:47	heh	5120994	EPA 200.7
Selenium	**0.508**		mg/L	0.150	1	01/03/06 12:47	heh	5120994	EPA 200.7
Silver	<0.0200		mg/L	0.0200	1	01/03/06 12:47	heh	5120994	EPA 200.7
Zinc	**0.490**		mg/L	0.100	5	01/03/06 12:47	heh	5120994	EPA 200.7
Magnesium	**798**		mg/L	1.00	1	01/03/06 12:47	heh	5120994	EPA 200.7
Volatile Organic Compounds									
Acetone	<10.0		ug/L	10.0	1	12/30/05 16:53	DMD	6010055	EPA 624
Benzene	**0.610**		ug/L	0.500	1	12/30/05 16:53	DMD	6010055	EPA 624
Bromodichloromethane	<1.00		ug/L	1.00	1	12/30/05 16:53	DMD	6010055	EPA 624
Bromoform	<5.00		ug/L	5.00	1	12/30/05 16:53	DMD	6010055	EPA 624
Bromomethane	<4.00		ug/L	4.00	1	12/30/05 16:53	DMD	6010055	EPA 624

TestAmerica Analytical - Cedar Falls
Derrick Klinkenberg
Organics Manager

FANSTEEL/WELLMAN CORP.
1746 Commerce Road
Creston, IA 50801
Joe Haller

Work Order: COL1216
Project: Landfill Leachate Permit Renewal
Project Number: Landfill Leachate Permit Renewal

Received: 12/28/05
Reported: 01/31/06 13:48

ANALYTICAL REPORT

Analyte	Sample Result	Data Qualifiers	Units	Quan. Limit	Dilution Factor	Date Analyzed	Analyst	Seq/ Batch	Method
Sample ID: COL1216-01 (Landfill Leachate - Ground Water) - cont.					**Sampled:**	**12/27/05 09:20**		**Recvd: 12/28/05 08:40**	
Volatile Organic Compounds - cont									
Carbon Tetrachloride	<2.00		ug/L	2.00	1	12/30/05 16:53	DMD	6010055	EPA 624
Chlorobenzene	<1.00		ug/L	1.00	1	12/30/05 16:53	DMD	6010055	EPA 624
Chloroethane	<4.00		ug/L	4.00	1	12/30/05 16:53	DMD	6010055	EPA 624
Chloroform	<1.00		ug/L	1.00	1	12/30/05 16:53	DMD	6010055	EPA 624
Chloromethane	<3.00	CIN	ug/L	3.00	1	12/30/05 16:53	DMD	6010055	EPA 624
Bromochloromethane	<5.00		ug/L	5.00	1	12/30/05 16:53	DMD	6010055	EPA 624
1,2,3-Trichloropropane	<1.00		ug/L	1.00	1	12/30/05 16:53	DMD	6010055	EPA 624
Chlorodibromomethane	<5.00		ug/L	5.00	1	12/30/05 16:53	DMD	6010055	EPA 624
1,2-Dibromoethane (EDB)	<10.0		ug/L	10.0	1	12/30/05 16:53	DMD	6010055	EPA 624
m,p-Xylene	<2.00		ug/L	2.00	1	12/30/05 16:53	DMD	6010055	EPA 624
o-Xylene	**1.58**		ug/L	1.00	1	12/30/05 16:53	DMD	6010055	EPA 624
1,2-Dichlorobenzene	<1.00		ug/L	1.00	1	12/30/05 16:53	DMD	6010055	EPA 624
1,3-Dichlorobenzene	<1.00		ug/L	1.00	1	12/30/05 16:53	DMD	6010055	EPA 624
1,4-Dichlorobenzene	<1.00		ug/L	1.00	1	12/30/05 16:53	DMD	6010055	EPA 624
Dichlorodifluoromethane	<3.00		ug/L	3.00	1	12/30/05 16:53	DMD	6010055	EPA 624
1,1-Dichloroethane	**14.7**		ug/L	1.00	1	12/30/05 16:53	DMD	6010055	EPA 624
1,2-Dichloroethane	<1.00		ug/L	1.00	1	12/30/05 16:53	DMD	6010055	EPA 624
1,1-Dichloroethene	<2.00		ug/L	2.00	1	12/30/05 16:53	DMD	6010055	EPA 624
cis-1,2-Dichloroethene	**7.34**		ug/L	1.00	1	12/30/05 16:53	DMD	6010055	EPA 624
trans-1,2-Dichloroethene	<1.00		ug/L	1.00	1	12/30/05 16:53	DMD	6010055	EPA 624
1,2-Dichloropropane	<1.00		ug/L	1.00	1	12/30/05 16:53	DMD	6010055	EPA 624
cis-1,3-Dichloropropene	<5.00		ug/L	5.00	1	12/30/05 16:53	DMD	6010055	EPA 624
trans-1,3-Dichloropropene	<5.00		ug/L	5.00	1	12/30/05 16:53	DMD	6010055	EPA 624
1,3-Dichloropropene (total)	<5.00		ug/L	5.00	1	12/30/05 16:53	DMD	6010055	EPA 624
Ethylbenzene	<1.00		ug/L	1.00	1	12/30/05 16:53	DMD	6010055	EPA 624
2-Hexanone	<10.0		ug/L	10.0	1	12/30/05 16:53	DMD	6010055	EPA 624
2-Butanone (MEK)	<10.0		ug/L	10.0	1	12/30/05 16:53	DMD	6010055	EPA 624
4-Methyl-2-pentanone (MIBK)	<10.0		ug/L	10.0	1	12/30/05 16:53	DMD	6010055	EPA 624
Methylene Chloride	<5.00		ug/L	5.00	1	12/30/05 16:53	DMD	6010055	EPA 624
Styrene	<1.00		ug/L	1.00	1	12/30/05 16:53	DMD	6010055	EPA 624
1,1,1,2-Tetrachloroethane	<1.00		ug/L	1.00	1	12/30/05 16:53	DMD	6010055	EPA 624
1,1,2,2-Tetrachloroethane	<1.00		ug/L	1.00	1	12/30/05 16:53	DMD	6010055	EPA 624
Tetrachloroethene	<1.00		ug/L	1.00	1	12/30/05 16:53	DMD	6010055	EPA 624
Trichloroethene	<1.00		ug/L	1.00	1	12/30/05 16:53	DMD	6010055	EPA 624
1,1,2-Trichloroethane	<1.00		ug/L	1.00	1	12/30/05 16:53	DMD	6010055	EPA 624
1,1,1-Trichloroethane	<1.00		ug/L	1.00	1	12/30/05 16:53	DMD	6010055	EPA 624
Vinyl chloride	**5.06**		ug/L	1.00	1	12/30/05 16:53	DMD	6010055	EPA 624
Xylenes, total	**2.53**		ug/L	2.00	1	12/30/05 16:53	DMD	6010055	EPA 624
Surr: Dibromofluoromethane (70-130%)	*106 %*								
Surr: Toluene-d8 (70-130%)	*99 %*								
Surr: 4-Bromofluorobenzene (70-130%)	*91 %*								
Semivolatile Organics by GC/MS									
Acenaphthene	<10.0		ug/L	10.0	1.06	01/10/06 18:27	ake	5120968	EPA 625
Acenaphthylene	<10.0		ug/L	10.0	1.06	01/10/06 18:27	ake	5120968	EPA 625

TestAmerica
ANALYTICAL TESTING CORPORATION
704 Enterprise Drive Cedar Falls, IA 50613 * 800-750-2401 * Fax 319-277-2425

FANSTEEL/WELLMAN CORP.
1746 Commerce Road
Creston, IA 50801
Joe Haller

Work Order: COL1216
Project: Landfill Leachate Permit Renewal
Project Number: Landfill Leachate Permit Renewal

Received: 12/28/05
Reported: 01/31/06 13:48

ANALYTICAL REPORT

Analyte	Sample Result	Data Qualifiers	Units	Quan. Limit	Dilution Factor	Date Analyzed	Analyst	Seq/ Batch	Method
Sample ID: COL1216-01 (Landfill Leachate - Ground Water) - cont.					**Sampled:**	**12/27/05 09:20**		**Recvd: 12/28/05 08:40**	
Semivolatile Organics by GC/MS - cont.									
Anthracene	<10.0		ug/L	10.0	1.06	01/10/06 18:27	ake	5120968	EPA 625
Benzo (a) anthracene	<10.0		ug/L	10.0	1.06	01/10/06 18:27	ake	5120968	EPA 625
Benzo (b) fluoranthiene	<10.0		ug/L	10.0	1.06	01/10/06 18:27	ake	5120968	EPA 625
Benzo (k) fluoranthene	<10.0		ug/L	10.0	1.06	01/10/06 18:27	ake	5120968	EPA 625
Benzo (a) pyrene	<10.0		ug/L	10.0	1.06	01/10/06 18:27	ake	5120968	EPA 625
Benzo (g,h,i) perylene	<10.0		ug/L	10.0	1.06	01/10/06 18:27	ake	5120968	EPA 625
Butyl benzyl phthalate	<10.0		ug/L	10.0	1.06	01/10/06 18:27	ake	5120968	EPA 625
Bis(2-chloroethyl)ether	<10.0		ug/L	10.0	1.06	01/10/06 18:27	ake	5120968	EPA 625
Bis(2-chloroethoxy)methane	<10.0		ug/L	10.0	1.06	01/10/06 18:27	ake	5120968	EPA 625
Bis(2-ethylhexyl)phthalate	<10.0		ug/L	10.0	1.06	01/10/06 18:27	ake	5120968	EPA 625
Bis(2-chloroisopropyl) ether	<10.0		ug/L	10.0	1.06	01/10/06 18:27	ake	5120968	EPA 625
4-Bromophenyl phenyl ether	<10.0		ug/L	10.0	1.06	01/10/06 18:27	ake	5120968	EPA 625
Carbazole	<10.0		ug/L	10.0	1.06	01/10/06 18:27	ake	5120968	EPA 625
4-Chloroaniline	<10.0		ug/L	10.0	1.06	01/10/06 18:27	ake	5120968	EPA 625
2-Chloronaphthalene	<10.0		ug/L	10.0	1.06	01/10/06 18:27	ake	5120968	EPA 625
4-Chlorophenyl phenyl ether	<10.0		ug/L	10.0	1.06	01/10/06 18:27	ake	5120968	EPA 625
Chrysene	<10.0		ug/L	10.0	1.06	01/10/06 18:27	ake	5120968	EPA 625
Dibenzo (a,h) anthracene	<10.0		ug/L	10.0	1.06	01/10/06 18:27	ake	5120968	EPA 625
Dibenzofuran	<10.0		ug/L	10.0	1.06	01/10/06 18:27	ake	5120968	EPA 625
Di-n-butyl phthalate	<10.0		ug/L	10.0	1.06	01/10/06 18:27	ake	5120968	EPA 625
1,2-Dichlorobenzene	<10.0		ug/L	10.0	1.06	01/10/06 18:27	ake	5120968	EPA 625
1,3-Dichlorobenzene	<10.0		ug/L	10.0	1.06	01/10/06 18:27	ake	5120968	EPA 625
1,4-Dichlorobenzene	<10.0		ug/L	10.0	1.06	01/10/06 18:27	ake	5120968	EPA 625
3,3'-Dichlorobenzidine	<10.0		ug/L	10.0	1.06	01/10/06 18:27	ake	5120968	EPA 625
Diethyl phthalate	<10.0		ug/L	10.0	1.06	01/10/06 18:27	ake	5120968	EPA 625
Dimethyl phthalate	<10.0		ug/L	10.0	1.06	01/10/06 18:27	ake	5120968	EPA 625
2,4-Dinitrotoluene	<10.0		ug/L	10.0	1.06	01/10/06 18:27	ake	5120968	EPA 625
2,6-Dinitrotoluene	<10.0		ug/L	10.0	1.06	01/10/06 18:27	ake	5120968	EPA 625
Di-n-octyl phthalate	<10.0		ug/L	10.0	1.06	01/10/06 18:27	ake	5120968	EPA 625
Fluoranthene	<10.0		ug/L	10.0	1.06	01/10/06 18:27	ake	5120968	EPA 625
Fluorene	<10.0		ug/L	10.0	1.06	01/10/06 18:27	ake	5120968	EPA 625
Hexachlorobenzene	<10.0		ug/L	10.0	1.06	01/10/06 18:27	ake	5120968	EPA 625
Hexachlorobutadiene	<10.0		ug/L	10.0	1.06	01/10/06 18:27	ake	5120968	EPA 625
Hexachlorocyclopentadiene	<10.0		ug/L	10.0	1.06	01/10/06 18:27	ake	5120968	EPA 625
Hexachloroethane	<10.0		ug/L	10.0	1.06	01/10/06 18:27	ake	5120968	EPA 625
Indeno (1,2,3-cd) pyrene	<10.0		ug/L	10.0	1.06	01/10/06 18:27	ake	5120968	EPA 625
Isophorone	<10.0		ug/L	10.0	1.06	01/10/06 18:27	ake	5120968	EPA 625
2-Methylnaphthalene	<10.0		ug/L	10.0	1.06	01/10/06 18:27	ake	5120968	EPA 625
Naphthalene	<10.0		ug/L	10.0	1.06	01/10/06 18:27	ake	5120968	EPA 625
2-Nitroaniline	<10.0		ug/L	10.0	1.06	01/10/06 18:27	ake	5120968	EPA 625
3-Nitroaniline	<10.0		ug/L	10.0	1.06	01/10/06 18:27	ake	5120968	EPA 625
4-Nitroaniline	<10.0		ug/L	10.0	1.06	01/10/06 18:27	ake	5120968	EPA 625
Nitrobenzene	<10.0		ug/L	10.0	1.06	01/10/06 18:27	ake	5120968	EPA 625

FANSTEEL/WELLMAN CORP.
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ANALYTICAL REPORT

Analyte	Sample Result	Data Qualifiers	Units	Quan. Limit	Dilution Factor	Date Analyzed	Analyst	Seq/ Batch	Method
Sample ID: COL1216-01 (Landfill Leachate - Ground Water) - cont.					**Sampled:**	**12/27/05 09:20**		**Recvd: 12/28/05 08:40**	
Semivolatile Organics by GC/MS - cont.									
N-Nitrosodiphenylamine	<10.0		ug/L	10.0	1.06	01/10/06 18:27	ake	5120968	EPA 625
N-Nitrosodi-n-propylamine	<10.0		ug/L	10.0	1.06	01/10/06 18:27	ake	5120968	EPA 625
Phenanthrene	<10.0		ug/L	10.0	1.06	01/10/06 18:27	ake	5120968	EPA 625
Pyrene	<10.0		ug/L	10.0	1.06	01/10/06 18:27	ake	5120968	EPA 625
1,2,4-Trichlorobenzene	<10.0		ug/L	10.0	1.06	01/10/06 18:27	ake	5120968	EPA 625
4-Chloro-3-methylphenol	<10.0		ug/L	10.0	1.06	01/10/06 18:27	ake	5120968	EPA 625
2-Chlorophenol	<10.0		ug/L	10.0	1.06	01/10/06 18:27	ake	5120968	EPA 625
2,4-Dichlorophenol	<10.0		ug/L	10.0	1.06	01/10/06 18:27	ake	5120968	EPA 625
2,4-Dimethylphenol	<10.0		ug/L	10.0	1.06	01/10/06 18:27	ake	5120968	EPA 625
2,4-Dinitrophenol	<10.0		ug/L	10.0	1.06	01/10/06 18:27	ake	5120968	EPA 625
4,6-Dinitro-2-methylphenol	<10.0		ug/L	10.0	1.06	01/10/06 18:27	ake	5120968	EPA 625
2-Nitrophenol	<10.0		ug/L	10.0	1.06	01/10/06 18:27	ake	5120968	EPA 625
4-Nitrophenol	<10.0		ug/L	10.0	1.06	01/10/06 18:27	ake	5120968	EPA 625
Pentachlorophenol	<10.0		ug/L	10.0	1.06	01/10/06 18:27	ake	5120968	EPA 625
Phenol	<10.0		ug/L	10.0	1.06	01/10/06 18:27	ake	5120968	EPA 625
2-Methylphenol (o-Cresol)	<10.0		ug/L	10.0	1.06	01/10/06 18:27	ake	5120968	EPA 625
4-Methylphenol (p-Cresol)	<10.0		ug/L	10.0	1.06	01/10/06 18:27	ake	5120968	EPA 625
2,4,5-Trichlorophenol	<10.0		ug/L	10.0	1.06	01/10/06 18:27	ake	5120968	EPA 625
2,4,6-Trichlorophenol	<10.0		ug/L	10.0	1.06	01/10/06 18:27	ake	5120968	EPA 625
Surr: Nitrobenzene-d5 (35-110%)	*76 %*								
Surr: 2-Fluorobiphenyl (30-120%)	*71 %*								
Surr: Terphenyl-d14 (35-130%)	*81 %*								
Surr: Phenol-d6 (10-60%)	*39 %*								
Surr: 2-Fluorophenol (10-75%)	*52 %*								
Surr: 2,4,6-Tribromophenol (45-140%)	*96 %*								
VOC Preservation Check									
pH	<2.00		units	2.00	1	01/05/06 12:39	sjn	6010138	SW
Herbicides									
2,4,5-TP (Silvex)	<0.2		ug/L	0.2	1	01/19/06 00:00		xx	8151 Herbicides
2,4-D	<0.4		ug/L	0.4	1	01/19/06 00:00		xx	8151 Herbicides
Organochlorine Pesticides/PCBs									
4,4'-DDD	<0.05		ug/L	0.05	1	01/19/06 00:00		xx	608 Pesticides
4,4'-DDE	<0.05		ug/L	0.05	1	01/19/06 00:00		xx	608 Pesticides
4,4'-DDT	<0.05		ug/L	0.05	1	01/19/06 00:00		xx	608 Pesticides
Aldrin	<0.05		ug/L	0.05	1	01/19/06 00:00		xx	608 Pesticides
alpha-BHC	<0.05		ug/L	0.05	1	01/19/06 00:00		xx	608 Pesticides
beta-BHC	<0.05		ug/L	0.05	1	01/19/06 00:00		xx	608 Pesticides
delta-BHC	<0.1		ug/L	0.1	1	01/19/06 00:00		xx	608 Pesticides
Dieldrin	<0.05		ug/L	0.05	1	01/19/06 00:00		xx	608 Pesticides
Endosulfan I	<0.05		ug/L	0.05	1	01/19/06 00:00		xx	608 Pesticides
Endosulfan II	<0.05		ug/L	0.05	1	01/19/06 00:00		xx	608 Pesticides
Endosulfan sulfate	<0.05		ug/L	0.05	1	01/19/06 00:00		xx	608 Pesticides
Endrin	<0.05		ug/L	0.05	1	01/19/06 00:00		xx	608 Pesticides
Endrin aldehyde	<0.05		ug/L	0.05	1	01/19/06 00:00		xx	608 Pesticides

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ANALYTICAL REPORT

Analyte	Sample Result	Data Qualifiers	Units	Quan. Limit	Dilution Factor	Date Analyzed	Analyst	Seq/ Batch	Method
Sample ID: COL1216-01 (Landfill Leachate - Ground Water) - cont.					**Sampled:**	**12/27/05 09:20**		**Recvd: 12/28/05 08:40**	
Organochlorine Pesticides/PCBs - cont.									
gamma-BHC (Lindane)	<0.05		ug/L	0.05	1	01/19/06 00:00		xx	608 Pesticides
Heptachlor	<0.05		ug/L	0.05	1	01/19/06 00:00		xx	608 Pesticides
Heptachlor epoxide	<0.05		ug/L	0.05	1	01/19/06 00:00		xx	608 Pesticides
Methoxychlor	<0.05		ug/L	0.05	1	01/19/06 00:00		xx	608 Pesticides

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SAMPLE EXTRACTION DATA

Parameter	Batch	Lab Number	Wt/Vol Extracted	Extracted Vol	Date	Analyst	Extraction Method
Semivolatile Organics by GC/MS							
EPA 625	5120968	COL1216-01	940	1	12/29/05 14:02	MDM	SW 3510C_MS

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LABORATORY BLANK QC DATA

Analyte	Seq/ Batch	Source Result	Spike Level	Units	MDL	MRL	Result	Dup Result	% REC	Dup %REC	% REC Limits	RPD	RPD Limit	Q
General Chemistry Parameters														
BOD - 5 Day	5120888			mg/L	N/A	3.00	<3.00							
Nitrate as N	5120914			mg/L	N/A	1.00	<1.00							
Total Kjeldahl Nitrogen	5120937			mg/L	N/A	1.00	<1.00							
Total Suspended Solids	5120951			mg/L	N/A	3.00	<3.00							
Chemical Oxygen Demand	5120970			mg/L	N/A	25.0	<25.0							
Oil & Grease	5120982			mg/L	N/A	4.00	<4.00							
Ammonia as N	5120985			mg/L	N/A	0.500	<0.500							
Total Dissolved Solids	6010003			mg/L	N/A	20.0	<20.0							
Phosphorus, Total (as P)	6010010			mg/L	N/A	0.100	<0.100							
Chloride	6010017			mg/L	N/A	5.00	<5.00							
Total Organic Carbon	6010057			mg/L	N/A	1.00	<1.00							
Total Volatile Solids	6010060			mg/L	N/A	20.0	<20.0							
Total Solids	6010062			mg/L	N/A	20.0	<20.0							
Sulfate	6010255			mg/L	N/A	10.0	<10.0							
Fluoride	6010305			mg/L	N/A	1.00	<1.00							
Total Metals by EPA 200 Series Methods														
Aluminum	5120994			mg/L	N/A	0.100	<0.100							
Arsenic	5120994			mg/L	N/A	0.0800	<0.0800							
Barium	5120994			mg/L	N/A	0.0100	<0.0100							
Cadmium	5120994			mg/L	N/A	0.0200	<0.0200							
Chromium	5120994			mg/L	N/A	0.0200	<0.0200							
Copper	5120994			mg/L	N/A	0.0200	<0.0200							
Iron	5120994			mg/L	N/A	0.100	<0.100							
Lead	5120994			mg/L	N/A	0.100	<0.100							
Manganese	5120994			mg/L	N/A	0.0100	<0.0100							
Nickel	5120994			mg/L	N/A	0.0500	<0.0500							
Potassium	5120994			mg/L	N/A	1.00	<1.00							
Selenium	5120994			mg/L	N/A	0.150	<0.150							
Silver	5120994			mg/L	N/A	0.0200	<0.0200							
Zinc	5120994			mg/L	N/A	0.0200	<0.0200							
Magnesium	5120994			mg/L	N/A	1.00	<1.00							

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FANSTEEL/WELLMAN CORP.
1746 Commerce Road
Creston, IA 50801
Joe Haller

Work Order: COL1216
Project: Landfill Leachate Permit Renewal
Project Number: Landfill Leachate Permit Renewal

Received: 12/28/05
Reported: 01/31/06 13:48

LABORATORY BLANK QC DATA

Analyte	Seq/ Batch	Source Result	Spike Level	Units	MDL	MRL	Result	Dup Result	% REC	Dup %REC	% REC Limits	RPD	RPD Limit	Q
Total Metals by EPA 200 Series Methods														
Mercury	6010059			mg/L	N/A	0.000200	<0.000200							
Volatile Organic Compounds														
Acetone	6010055			ug/L	N/A	10.0	<10.0							
Benzene	6010055			ug/L	N/A	0.500	<0.500							
Bromodichloromethane	6010055			ug/L	N/A	1.00	<1.00							
Bromoform	6010055			ug/L	N/A	5.00	<5.00							
Bromomethane	6010055			ug/L	N/A	4.00	<4.00							
Carbon Tetrachloride	6010055			ug/L	N/A	2.00	<2.00							
Chlorobenzene	6010055			ug/L	N/A	1.00	<1.00							
Chloroethane	6010055			ug/L	N/A	4.00	<4.00							
Chloroform	6010055			ug/L	N/A	1.00	<1.00							
Chloromethane	6010055			ug/L	N/A	3.00	<3.00							CIN
Bromochloromethane	6010055			ug/L	N/A	5.00	<5.00							
1,2,3-Trichloropropane	6010055			ug/L	N/A	1.00	<1.00							
Chlorodibromomethane	6010055			ug/L	N/A	5.00	<5.00							
1,2-Dibromoethane (EDB)	6010055			ug/L	N/A	10.0	<10.0							
m,p-Xylene	6010055			ug/L	N/A	2.00	<2.00							
o-Xylene	6010055			ug/L	N/A	1.00	<1.00							
1,2-Dichlorobenzene	6010055			ug/L	N/A	1.00	<1.00							
1,3-Dichlorobenzene	6010055			ug/L	N/A	1.00	<1.00							
1,4-Dichlorobenzene	6010055			ug/L	N/A	1.00	<1.00							
Dichlorodifluoromethane	6010055			ug/L	N/A	3.00	<3.00							
1,1-Dichloroethane	6010055			ug/L	N/A	1.00	<1.00							
1,2-Dichloroethane	6010055			ug/L	N/A	1.00	<1.00							
1,1-Dichloroethene	6010055			ug/L	N/A	2.00	<2.00							
cis-1,2-Dichloroethene	6010055			ug/L	N/A	1.00	<1.00							
trans-1,2-Dichloroethene	6010055			ug/L	N/A	1.00	<1.00							
1,2-Dichloropropane	6010055			ug/L	N/A	1.00	<1.00							
cis-1,3-Dichloropropene	6010055			ug/L	N/A	5.00	<5.00							
trans-1,3-Dichloropropene	6010055			ug/L	N/A	5.00	<5.00							
1,3-Dichloropropene (total)	6010055			ug/L	N/A	5.00	<5.00							
Ethylbenzene	6010055			ug/L	N/A	1.00	<1.00							
2-Hexanone	6010055			ug/L	N/A	10.0	<10.0							
2-Butanone (MEK)	6010055			ug/L	N/A	10.0	<10.0							
4-Methyl-2-pentanone (MIBK)	6010055			ug/L	N/A	10.0	<10.0							
Methylene Chloride	6010055			ug/L	N/A	5.00	<5.00							
Styrene	6010055			ug/L	N/A	1.00	<1.00							
1,1,1,2-Tetrachloroethane	6010055			ug/L	N/A	1.00	<1.00							
1,1,2,2-Tetrachloroethane	6010055			ug/L	N/A	1.00	<1.00							
Tetrachloroethene	6010055			ug/L	N/A	1.00	<1.00							
Trichloroethene	6010055			ug/L	N/A	1.00	<1.00							
1,1,2-Trichloroethane	6010055			ug/L	N/A	1.00	<1.00							
1,1,1-Trichloroethane	6010055			ug/L	N/A	1.00	<1.00							
Vinyl chloride	6010055			ug/L	N/A	1.00	<1.00							

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Work Order: COL1216
Project: Landfill Leachate Permit Renewal
Project Number: Landfill Leachate Permit Renewal

Received: 12/28/05
Reported: 01/31/06 13:48

LABORATORY BLANK QC DATA

Analyte	Seq/ Batch	Source Result	Spike Level	Units	MDL	MRL	Result	Dup Result	% REC	Dup %REC	% REC Limits	RPD	RPD Limit	Q
Volatile Organic Compounds														
Xylenes, total	6010055			ug/L	N/A	2.00	<2.00							
Surrogate: Dibromofluoromethane	*6010055*			ug/L					*101*		*70-130*			
Surrogate: Toluene-d8	*6010055*			ug/L					*100*		*70-130*			
Surrogate: 4-Bromofluorobenzene	*6010055*			ug/L					*88*		*70-130*			
Semivolatile Organics by GC/MS														
Acenaphthene	5120968			ug/L	N/A	10.0	<10.0							
Acenaphthylene	5120968			ug/L	N/A	10.0	<10.0							
Anthracene	5120968			ug/L	N/A	10.0	<10.0							
Benzo (a) anthracene	5120968			ug/L	N/A	10.0	<10.0							
Benzo (b) fluoranthene	5120968			ug/L	N/A	10.0	<10.0							
Benzo (k) fluoranthene	5120968			ug/L	N/A	10.0	<10.0							
Benzo (a) pyrene	5120968			ug/L	N/A	10.0	<10.0							
Benzo (g,h,i) perylene	5120968			ug/L	N/A	10.0	<10.0							
Butyl benzyl phthalate	5120968			ug/L	N/A	10.0	<10.0							
Bis(2-chloroethyl)ether	5120968			ug/L	N/A	10.0	<10.0							
Bis(2-chloroethoxy)methane	5120968			ug/L	N/A	10.0	<10.0							
Bis(2-ethylhexyl)phthalate	5120968			ug/L	N/A	10.0	<10.0							
Bis(2-chloroisopropyl) ether	5120968			ug/L	N/A	10.0	<10.0							
4-Bromophenyl phenyl ether	5120968			ug/L	N/A	10.0	<10.0							
Carbazole	5120968			ug/L	N/A	10.0	<10.0							
4-Chloroaniline	5120968			ug/L	N/A	10.0	<10.0							
2-Chloronaphthalene	5120968			ug/L	N/A	10.0	<10.0							
4-Chlorophenyl phenyl ether	5120968			ug/L	N/A	10.0	<10.0							
Chrysene	5120968			ug/L	N/A	10.0	<10.0							
Dibenzo (a,h) anthracene	5120968			ug/L	N/A	10.0	<10.0							
Dibenzofuran	5120968			ug/L	N/A	10.0	<10.0							
Di-n-butyl phthalate	5120968			ug/L	N/A	10.0	<10.0							
1,2-Dichlorobenzene	5120968			ug/L	N/A	10.0	<10.0							
1,3-Dichlorobenzene	5120968			ug/L	N/A	10.0	<10.0							
1,4-Dichlorobenzene	5120968			ug/L	N/A	10.0	<10.0							
3,3'-Dichlorobenzidine	5120968			ug/L	N/A	10.0	<10.0							
Diethyl phthalate	5120968			ug/L	N/A	10.0	<10.0							
Dimethyl phthalate	5120968			ug/L	N/A	10.0	<10.0							
2,4-Dinitrotoluene	5120968			ug/L	N/A	10.0	<10.0							
2,6-Dinitrotoluene	5120968			ug/L	N/A	10.0	<10.0							
Di-n-octyl phthalate	5120968			ug/L	N/A	10.0	<10.0							
Fluoranthene	5120968			ug/L	N/A	10.0	<10.0							
Fluorene	5120968			ug/L	N/A	10.0	<10.0							
Hexachlorobenzene	5120968			ug/L	N/A	10.0	<10.0							
Hexachlorobutadiene	5120968			ug/L	N/A	10.0	<10.0							
Hexachlorocyclopentadiene	5120968			ug/L	N/A	10.0	<10.0							
Hexachloroethane	5120968			ug/L	N/A	10.0	<10.0							
Indeno (1,2,3-cd) pyrene	5120968			ug/L	N/A	10.0	<10.0							
Isophorone	5120968			ug/L	N/A	10.0	<10.0							

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Project Number: Landfill Leachate Permit Renewal

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LABORATORY BLANK QC DATA

Analyte	Seq/ Batch	Source Result	Spike Level	Units	MDL	MRL	Result	Dup Result	% REC	Dup %REC	% REC Limits	RPD	RPD Limit	Q
Semivolatile Organics by GC/MS														
2-Methylnaphthalene	5120968			ug/L	N/A	10.0	<10.0							
Naphthalene	5120968			ug/L	N/A	10.0	<10.0							
2-Nitroaniline	5120968			ug/L	N/A	10.0	<10.0							
3-Nitroaniline	5120968			ug/L	N/A	10.0	<10.0							
4-Nitroaniline	5120968			ug/L	N/A	10.0	<10.0							
Nitrobenzene	5120968			ug/L	N/A	10.0	<10.0							
N-Nitrosodiphenylamine	5120968			ug/L	N/A	10.0	<10.0							
N-Nitrosodi-n-propylamine	5120968			ug/L	N/A	10.0	<10.0							
Phenanthrene	5120968			ug/L	N/A	10.0	<10.0							
Pyrene	5120968			ug/L	N/A	10.0	<10.0							
1,2,4-Trichlorobenzene	5120968			ug/L	N/A	10.0	<10.0							
4-Chloro-3-methylphenol	5120968			ug/L	N/A	10.0	<10.0							
2-Chlorophenol	5120968			ug/L	N/A	10.0	<10.0							
2,4-Dichlorophenol	5120968			ug/L	N/A	10.0	<10.0							
2,4-Dimethylphenol	5120968			ug/L	N/A	10.0	<10.0							
2,4-Dinitrophenol	5120968			ug/L	N/A	10.0	<10.0							
4,6-Dinitro-2-methylphenol	5120968			ug/L	N/A	10.0	<10.0							
2-Nitrophenol	5120968			ug/L	N/A	10.0	<10.0							
4-Nitrophenol	5120968			ug/L	N/A	10.0	<10.0							
Pentachlorophenol	5120968			ug/L	N/A	10.0	<10.0							
Phenol	5120968			ug/L	N/A	10.0	<10.0							
2-Methylphenol (o-Cresol)	5120968			ug/L	N/A	10.0	<10.0							
4-Methylphenol (p-Cresol)	5120968			ug/L	N/A	10.0	<10.0							
2,4,5-Trichlorophenol	5120968			ug/L	N/A	10.0	<10.0							
2,4,6-Trichlorophenol	5120968			ug/L	N/A	10.0	<10.0							
Surrogate: Nitrobenzene-d5	*5120968*			ug/L					*78*		*35-110*			
Surrogate: 2-Fluorobiphenyl	*5120968*			ug/L					*67*		*30-120*			
Surrogate: Terphenyl-d14	*5120968*			ug/L					*96*		*35-130*			
Surrogate: Phenol-d6	*5120968*			ug/L					*31*		*10-60*			
Surrogate: 2-Fluorophenol	*5120968*			ug/L					*51*		*10-75*			
Surrogate: 2,4,6-Tribromophenol	*5120968*			ug/L					*94*		*45-140*			

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Analyte	Seq/ Batch	Source Result	Spike Level	Units	MDL	MRL	Result	Dup Result	% REC	Dup %REC	% REC Limits	RPD	RPD Limit	Q
Volatile Organic Compounds														
Acetone	6010055		100	ug/L	N/A	N/A	100		100		50-150			
Benzene	6010055		100	ug/L	N/A	N/A	98.3		98		80-120			
Bromodichloromethane	6010055		100	ug/L	N/A	N/A	103		103		80-120			
Bromoform	6010055		100	ug/L	N/A	N/A	110		110		80-120			
Bromomethane	6010055		100	ug/L	N/A	N/A	140		140		50-150			
Carbon Tetrachloride	6010055		100	ug/L	N/A	N/A	103		103		80-120			
Chlorobenzene	6010055		100	ug/L	N/A	N/A	105		105		80-120			
Chloroethane	6010055		100	ug/L	N/A	N/A	106		106		80-120			
Chloroform	6010055		100	ug/L	N/A	N/A	95.0		95		80-120			
Chloromethane	6010055		100	ug/L	N/A	N/A	124		124		50-150			FIN
Bromochloromethane	6010055		100	ug/L	N/A	N/A	115		115		80-120			
1,2,3-Trichloropropane	6010055		100	ug/L	N/A	N/A	94.2		94		80-120			
Chlorodibromomethane	6010055		100	ug/L	N/A	N/A	111		111		80-120			
1,2-Dibromoethane (EDB)	6010055		100	ug/L	N/A	N/A	97.1		97		80-120			
m,p-Xylene	6010055		200	ug/L	N/A	N/A	215		108		80-120			
o-Xylene	6010055		100	ug/L	N/A	N/A	107		107		80-120			
1,2-Dichlorobenzene	6010055		100	ug/L	N/A	N/A	110		110		80-120			
1,3-Dichlorobenzene	6010055		100	ug/L	N/A	N/A	107		107		80-120			
1,4-Dichlorobenzene	6010055		100	ug/L	N/A	N/A	106		106		80-120			
Dichlorodifluoromethane	6010055		100	ug/L	N/A	N/A	90.4		90		80-120			
1,1-Dichloroethane	6010055		100	ug/L	N/A	N/A	97.8		98		80-120			
1,2-Dichloroethane	6010055		100	ug/L	N/A	N/A	106		106		80-120			
1,1-Dichloroethene	6010055		100	ug/L	N/A	N/A	100		100		80-120			
cis-1,2-Dichloroethene	6010055		100	ug/L	N/A	N/A	102		102		80-120			
trans-1,2-Dichloroethene	6010055		100	ug/L	N/A	N/A	101		101		80-120			
1,2-Dichloropropane	6010055		100	ug/L	N/A	N/A	98.2		98		80-120			
cis-1,3-Dichloropropene	6010055		100	ug/L	N/A	N/A	93.8		94		50-150			
trans-1,3-Dichloropropene	6010055		100	ug/L	N/A	N/A	95.5		96		50-150			
1,3-Dichloropropene (total)	6010055		200	ug/L	N/A	N/A	189		94		80-120			
Ethylbenzene	6010055		100	ug/L	N/A	N/A	102		102		80-120			
2-Hexanone	6010055		100	ug/L	N/A	N/A	119		119		50-150			
2-Butanone (MEK)	6010055		100	ug/L	N/A	N/A	99.3		99		50-150			
4-Methyl-2-pentanone (MIBK)	6010055		100	ug/L	N/A	N/A	112		112		50-150			
Methylene Chloride	6010055		100	ug/L	N/A	N/A	93.2		93		50-150			
Styrene	6010055		100	ug/L	N/A	N/A	109		109		80-120			
1,1,1,2-Tetrachloroethane	6010055		100	ug/L	N/A	N/A	109		109		80-120			
1,1,2,2-Tetrachloroethane	6010055		100	ug/L	N/A	N/A	119		119		80-120			
Tetrachloroethene	6010055		100	ug/L	N/A	N/A	103		103		80-120			
Trichloroethene	6010055		100	ug/L	N/A	N/A	99.2		99		80-120			
1,1,2-Trichloroethane	6010055		100	ug/L	N/A	N/A	104		104		80-120			
1,1,1-Trichloroethane	6010055		100	ug/L	N/A	N/A	99.7		100		80-120			
Vinyl chloride	6010055		100	ug/L	N/A	N/A	97.6		98		80-120			
Xylenes, total	6010055		300	ug/L	N/A	N/A	322		107		80-120			
Surrogate: Dibromofluoromethane	*6010055*			ug/L					*101*		*80-120*			
Surrogate: Toluene-d8	*6010055*			ug/L					*105*		*80-120*			

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CCV QC DATA

Analyte	Seq/ Batch	Source Result	Spike Level	Units	MDL	MRL	Result	Dup Result	% REC	Dup %REC	% REC Limits	RPD	RPD Limit	Q
Volatile Organic Compounds														
Surrogate: 4-Bromofluorobenzene	*6010055*			ug/L					*102*		*80-120*			
Semivolatile Organics by GC/MS														
Acenaphthene	6A11001		50.0	ug/L	N/A	N/A	50.4		101		80-120			
Acenaphthylene	6A11001		50.0	ug/L	N/A	N/A	50.8		102		80-120			
Anthracene	6A11001		50.0	ug/L	N/A	N/A	51.0		102		80-120			
Benzo (a) anthracene	6A11001		50.0	ug/L	N/A	N/A	51.3		103		80-120			
Benzo (b) fluoranthene	6A11001		50.0	ug/L	N/A	N/A	51.6		103		80-120			
Benzo (k) fluoranthene	6A11001		50.0	ug/L	N/A	N/A	50.4		101		80-120			
Benzo (a) pyrene	6A11001		50.0	ug/L	N/A	N/A	51.3		103		80-120			
Benzo (g,h,i) perylene	6A11001		50.0	ug/L	N/A	N/A	48.2		96		80-120			
Butyl benzyl phthalate	6A11001		50.0	ug/L	N/A	N/A	58.7		117		80-120			
Bis(2-chloroethyl)ether	6A11001		50.0	ug/L	N/A	N/A	50.0		100		80-120			
Bis(2-chloroethoxy)methane	6A11001		50.0	ug/L	N/A	N/A	52.1		104		80-120			
Bis(2-ethylhexyl)phthalate	6A11001		50.0	ug/L	N/A	N/A	59.1		118		80-120			
Bis(2-chloroisopropyl) ether	6A11001		50.0	ug/L	N/A	N/A	51.4		103		80-120			
Carbazole	6A11001		50.0	ug/L	N/A	N/A	50.6		101		80-120			
4-Chloroaniline	6A11001		50.0	ug/L	N/A	N/A	51.2		102		80-120			
2-Chloronaphthalene	6A11001		50.0	ug/L	N/A	N/A	51.1		102		80-120			
4-Chlorophenyl phenyl ether	6A11001		50.0	ug/L	N/A	N/A	50.8		102		80-120			
Chrysene	6A11001		50.0	ug/L	N/A	N/A	50.9		102		80-120			
Dibenzo (a,h) anthracene	6A11001		50.0	ug/L	N/A	N/A	48.6		97		80-120			
Dibenzofuran	6A11001		50.0	ug/L	N/A	N/A	50.0		100		80-120			
Di-n-butyl phthalate	6A11001		50.0	ug/L	N/A	N/A	54.9		110		80-120			
1,2-Dichlorobenzene	6A11001		50.0	ug/L	N/A	N/A	50.2		100		80-120			
1,3-Dichlorobenzene	6A11001		50.0	ug/L	N/A	N/A	50.3		101		80-120			
1,4-Dichlorobenzene	6A11001		50.0	ug/L	N/A	N/A	49.4		99		80-120			
3,3'-Dichlorobenzidine	6A11001		50.0	ug/L	N/A	N/A	53.6		107		80-120			
Diethyl phthalate	6A11001		50.0	ug/L	N/A	N/A	51.9		104		80-120			
Dimethyl phthalate	6A11001		50.0	ug/L	N/A	N/A	51.1		102		80-120			
2,4-Dinitrotoluene	6A11001		50.0	ug/L	N/A	N/A	51.6		103		80-120			
2,6-Dinitrotoluene	6A11001		50.0	ug/L	N/A	N/A	53.4		107		80-120			
Di-n-octyl phthalate	6A11001		50.0	ug/L	N/A	N/A	66.1		132		80-120			C
Fluoranthene	6A11001		50.0	ug/L	N/A	N/A	49.7		99		80-120			
Fluorene	6A11001		50.0	ug/L	N/A	N/A	50.2		100		80-120			
Hexachlorobenzene	6A11001		50.0	ug/L	N/A	N/A	51.9		104		80-120			
Hexachlorobutadiene	6A11001		50.0	ug/L	N/A	N/A	50.9		102		80-120			
Hexachlorocyclopentadiene	6A11001		50.0	ug/L	N/A	N/A	54.8		110		80-120			
Hexachloroethane	6A11001		50.0	ug/L	N/A	N/A	51.0		102		80-120			
Indeno (1,2,3-cd) pyrene	6A11001		50.0	ug/L	N/A	N/A	49.8		100		80-120			
Isophorone	6A11001		50.0	ug/L	N/A	N/A	52.7		105		80-120			
2-Methylnaphthalene	6A11001		50.0	ug/L	N/A	N/A	50.8		102		80-120			
Naphthalene	6A11001		50.0	ug/L	N/A	N/A	50.2		100		80-120			
2-Nitroaniline	6A11001		50.0	ug/L	N/A	N/A	52.0		104		80-120			
3-Nitroaniline	6A11001		50.0	ug/L	N/A	N/A	51.4		103		80-120			

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Received: 12/28/05
Reported: 01/31/06 13:48

CCV QC DATA

Analyte	Seq/ Batch	Source Result	Spike Level	Units	MDL	MRL	Result	Dup Result	% REC	Dup %REC	% REC Limits	RPD	RPD Limit	Q
Semivolatile Organics by GC/MS														
4-Nitroaniline	6A11001		50.0	ug/L	N/A	N/A	50.3		101		80-120			
Nitrobenzene	6A11001		50.0	ug/L	N/A	N/A	51.2		102		80-120			
N-Nitrosodiphenylamine	6A11001		50.0	ug/L	N/A	N/A	51.8		104		80-120			
N-Nitrosodi-n-propylamine	6A11001		50.0	ug/L	N/A	N/A	50.3		101		80-120			
Phenanthrene	6A11001		50.0	ug/L	N/A	N/A	50.5		101		80-120			
Pyrene	6A11001		50.0	ug/L	N/A	N/A	54.8		110		80-120			
1,2,4-Trichlorobenzene	6A11001		50.0	ug/L	N/A	N/A	50.8		102		80-120			
4-Chloro-3-methylphenol	6A11001		50.0	ug/L	N/A	N/A	51.3		103		80-120			
2-Chlorophenol	6A11001		50.0	ug/L	N/A	N/A	49.9		100		80-120			
2,4-Dichlorophenol	6A11001		50.0	ug/L	N/A	N/A	51.7		103		80-120			
2,4-Dimethylphenol	6A11001		50.0	ug/L	N/A	N/A	51.6		103		80-120			
2,4-Dinitrophenol	6A11001		50.0	ug/L	N/A	N/A	47.9		96		80-120			
4,6-Dinitro-2-methylphenol	6A11001		50.0	ug/L	N/A	N/A	52.9		106		80-120			
2-Nitrophenol	6A11001		50.0	ug/L	N/A	N/A	53.7		107		80-120			
4-Nitrophenol	6A11001		50.0	ug/L	N/A	N/A	50.8		102		80-120			
Pentachlorophenol	6A11001		50.0	ug/L	N/A	N/A	52.1		104		80-120			
Phenol	6A11001		50.0	ug/L	N/A	N/A	49.1		98		80-120			
2-Methylphenol (o-Cresol)	6A11001		50.0	ug/L	N/A	N/A	50.0		100		80-120			
4-Methylphenol (p-Cresol)	6A11001		50.0	ug/L	N/A	N/A	49.9		100		80-120			
2,4,5-Trichlorophenol	6A11001		50.0	ug/L	N/A	N/A	52.5		105		80-120			
2,4,6-Trichlorophenol	6A11001		50.0	ug/L	N/A	N/A	52.7		105		80-120			
Surrogate: Nitrobenzene-d5	*6A11001*			ug/L					*105*		*80-110*			
Surrogate: 2-Fluorobiphenyl	*6A11001*			ug/L					*102*		*80-120*			
Surrogate: Terphenyl-d14	*6A11001*			ug/L					*111*		*80-120*			
Surrogate: Phenol-d6	*6A11001*			ug/L					*99*		*80-120*			
Surrogate: 2-Fluorophenol	*6A11001*			ug/L					*99*		*80-120*			
Surrogate: 2,4,6-Tribromophenol	*6A11001*			ug/L					*103*		*80-120*			

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Work Order: COL1216
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LABORATORY DUPLICATE QC DATA

Analyte	Seq/ Batch	Source Result	Spike Level	Units	MDL	MRL	Result	% REC	Dup %REC	% REC Limits	RPD	RPD Limit	Q
General Chemistry Parameters													
QC Source Sample: COL1204-02													
BOD - 5 Day	5120888	60.0		mg/L	N/A	3.00	61.0				2	20	
QC Source Sample: COL1204-01													
pH	5120896	8.1		pH Units	N/A	0.1	8.1				0	10	
QC Source Sample: COL1207-03													
Total Suspended Solids	5120951	60.0		mg/L	N/A	3.00	74.0				21	20	R
QC Source Sample: COL1248-04													
Total Suspended Solids	5120951	3030		mg/L	N/A	3.00	2900				4	20	
QC Source Sample: COL1214-01													
Oil & Grease	5120982	1.79		mg/L	N/A	5.00	1.47				20	20	
QC Source Sample: COL1216-01													
Total Dissolved Solids	6010003	7720		mg/L	N/A	20.0	7680				1	15	
QC Source Sample: COL1216-01													
Total Volatile Solids	6010060	2960		mg/L	N/A	20.0	2880				3	20	
QC Source Sample: COL1216-01													
Total Solids	6010062	9140		mg/L	N/A	20.0	9080				1	15	

TestAmerica Analytical - Cedar Falls
Derrick Klinkenberg
Organics Manager

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LCS/LCS DUPLICATE QC DATA

Analyte	Seq/ Batch	Source Result	Spike Level	Units	MDL	MRL	Result	Dup Result	% REC	Dup %REC	% REC Limits	RPD	RPD Limit	Q
General Chemistry Parameters														
BOD - 5 Day	5120888		198	mg/L	N/A	N/A	205		104		85-115			
pH	5120896		7.00	pH Units	N/A	N/A	7.0		100		98-102			
Nitrate as N	5120914		1.10	mg/L	N/A	0.250	1.15		105		90-110			
Total Kjeldahl Nitrogen	5120937		4.00	mg/L	N/A	1.00	4.12		103		90-110			
Total Suspended Solids	5120951		100	mg/L	N/A	N/A	106		106		80-110			
Alkalinity, Total (CaCO3)	5120954		44.4	mg/L	N/A	N/A	44.6		100		90-110			
Chemical Oxygen Demand	5120970		250	mg/L	N/A	N/A	254		102		80-120			
Oil & Grease	5120982		42.1	mg/L	N/A	N/A	38.2		91		78-114			
Ammonia as N	5120985		3.33	mg/L	N/A	0.500	3.28		98		90-115			
Total Dissolved Solids	6010003		1000	mg/L	N/A	N/A	1010		101		90-110			
Phosphorus, Total (as P)	6010010		3.39	mg/L	N/A	0.100	3.40		100		90-110			
Chloride	6010017		95.7	mg/L	N/A	5.00	101		106		90-110			
Total Organic Carbon	6010057		19.5	mg/L	N/A	2.00	20.5		105		80-120			
Total Solids	6010062		1000	mg/L	N/A	N/A	1010		101		90-110			
Sulfate	6010255		12.3	mg/L	N/A	10.0	11.6		94		80-120			
Fluoride	6010305		15.0	mg/L	N/A	1.00	14.4		96		80-115			
Total Metals by EPA 200 Series Methods														
Aluminum	5120994		2.00	mg/L	N/A	0.100	1.97		98		85-110			
Arsenic	5120994		2.00	mg/L	N/A	0.0800	1.96		98		85-115			
Barium	5120994		1.00	mg/L	N/A	0.0100	0.950		95		85-115			
Cadmium	5120994		1.00	mg/L	N/A	0.0200	0.972		97		85-110			
Chromium	5120994		1.00	mg/L	N/A	0.0200	0.980		98		85-110			
Copper	5120994		2.00	mg/L	N/A	0.0200	1.96		98		85-110			
Lead	5120994		2.00	mg/L	N/A	0.100	1.98		99		85-110			
Manganese	5120994		1.00	mg/L	N/A	0.0100	0.965		96		85-110			
Nickel	5120994		2.00	mg/L	N/A	0.0500	1.91		96		85-110			
Potassium	5120994		4.00	mg/L	N/A	1.00	4.05		101		85-115			
Selenium	5120994		4.00	mg/L	N/A	0.150	3.90		98		85-110			
Zinc	5120994		1.00	mg/L	N/A	0.0200	0.976		98		85-110			
Magnesium	5120994		2.00	mg/L	N/A	1.00	1.97		98		85-115			

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LCS/LCS DUPLICATE QC DATA

Analyte	Seq/ Batch	Source Result	Spike Level	Units	MDL	MRL	Result	Dup Result	% REC	Dup %REC	% REC Limits	RPD	RPD Limit	Q
Total Metals by EPA 200 Series Methods														
Silver	5120994		1.00	mg/L	N/A	0.0200	0.971		97		85-105			
Mercury	6010059		0.00167	mg/L	N/A	0.000200	0.00164		98		80-120			
Volatile Organic Compounds														
Acetone	6010055		20.0	ug/L	N/A	N/A	31.4		157		40-135			1
Benzene	6010055		20.0	ug/L	N/A	N/A	19.8		99		70-135			
Bromomethane	6010055		20.0	ug/L	N/A	N/A	21.6		108		30-125			
Carbon Tetrachloride	6010055		20.0	ug/L	N/A	N/A	20.2		101		50-135			
Chlorobenzene	6010055		20.0	ug/L	N/A	N/A	21.1		106		65-130			
Chloroform	6010055		20.0	ug/L	N/A	N/A	19.4		97		70-130			
Bromochloromethane	6010055		20.0	ug/L	N/A	N/A	22.8		114		65-130			
1,2,3-Trichloropropane	6010055		20.0	ug/L	N/A	N/A	19.7		98		55-125			
1,4-Dichlorobenzene	6010055		20.0	ug/L	N/A	N/A	20.6		103		65-130			
1,2-Dichloroethane	6010055		20.0	ug/L	N/A	N/A	21.9		110		65-135			
1,1-Dichloroethene	6010055		20.0	ug/L	N/A	N/A	19.6		98		70-135			
Ethylbenzene	6010055		20.0	ug/L	N/A	N/A	18.6		93		65-130			
Methylene Chloride	6010055		20.0	ug/L	N/A	N/A	20.0		100		70-135			
Tetrachloroethene	6010055		20.0	ug/L	N/A	N/A	20.9		104		70-130			
Trichloroethene	6010055		20.0	ug/L	N/A	N/A	19.5		98		65-130			
1,1,2-Trichloroethane	6010055		20.0	ug/L	N/A	N/A	20.5		102		65-130			
1,1,1-Trichloroethane	6010055		20.0	ug/L	N/A	N/A	19.4		97		60-135			
Vinyl chloride	6010055		20.0	ug/L	N/A	N/A	18.8		94		60-135			
Xylenes, total	6010055		60.0	ug/L	N/A	N/A	64.3		107		70-135			
Surrogate: Dibromofluoromethane	*6010055*			ug/L					*102*		*70-130*			
Surrogate: Toluene-d8	*6010055*			ug/L					*106*		*70-130*			
Surrogate: 4-Bromofluorobenzene	*6010055*			ug/L					*100*		*70-130*			
Semivolatile Organics by GC/MS														
Acenaphthene	5120968		100	ug/L	N/A	10.0	75.2		75		35-120			
Acenaphthylene	5120968		100	ug/L	N/A	10.0	70.4		70		30-115			
Anthracene	5120968		100	ug/L	N/A	10.0	79.6		80		35-125			
Benzo (a) anthracene	5120968		100	ug/L	N/A	10.0	84.3		84		40-130			
Benzo (b) fluoranthene	5120968		100	ug/L	N/A	10.0	82.9		83		40-135			
Benzo (k) fluoranthene	5120968		100	ug/L	N/A	10.0	81.4		81		40-130			
Benzo (a) pyrene	5120968		100	ug/L	N/A	10.0	82.2		82		40-130			
Benzo (g,h,i) perylene	5120968		100	ug/L	N/A	10.0	78.5		78		40-135			
Chrysene	5120968		100	ug/L	N/A	10.0	83.1		83		40-130			
Dibenzo (a,h) anthracene	5120968		100	ug/L	N/A	10.0	82.6		83		40-135			
1,4-Dichlorobenzene	5120968		100	ug/L	N/A	10.0	70.2		70		30-90			
2,4-Dinitrotoluene	5120968		100	ug/L	N/A	10.0	81.8		82		45-120			
Fluoranthene	5120968		100	ug/L	N/A	10.0	78.6		79		40-130			
Fluorene	5120968		100	ug/L	N/A	10.0	77.3		77		40-125			
Indeno (1,2,3-cd) pyrene	5120968		100	ug/L	N/A	10.0	82.1		82		40-135			
2-Methylnaphthalene	5120968		100	ug/L	N/A	10.0	71.1		71		35-100			
Naphthalene	5120968		100	ug/L	N/A	10.0	69.2		69		30-100			

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LCS/LCS DUPLICATE QC DATA

Analyte	Seq/ Batch	Source Result	Spike Level	Units	MDL	MRL	Result	Dup Result	% REC	Dup %REC	% REC Limits	RPD	RPD Limit	Q
Semivolatile Organics by GC/MS														
N-Nitrosodiphenylamine	5120968		100	ug/L	N/A	10.0	79.0		79		30-120			
N-Nitrosodi-n-propylamine	5120968		100	ug/L	N/A	10.0	75.9		76		40-100			
Phenanthrene	5120968		100	ug/L	N/A	10.0	79.2		79		40-125			
Pyrene	5120968		100	ug/L	N/A	10.0	87.3		87		40-125			
4-Chloro-3-methylphenol	5120968		100	ug/L	N/A	10.0	74.8		75		40-115			
2-Chlorophenol	5120968		100	ug/L	N/A	10.0	67.3		67		35-100			
2-Nitrophenol	5120968		100	ug/L	N/A	10.0	76.1		76		35-110			
4-Nitrophenol	5120968		100	ug/L	N/A	10.0	33.1		33		10-70			
Pentachlorophenol	5120968		100	ug/L	N/A	10.0	79.9		80		30-125			
Phenol	5120968		100	ug/L	N/A	10.0	28.4		28		10-60			
Surrogate: Nitrobenzene-d5	*5120968*			ug/L					*76*		*35-110*			
Surrogate: 2-Fluorobiphenyl	*5120968*			ug/L					*74*		*30-120*			
Surrogate: Terphenyl-d14	*5120968*			ug/L					*90*		*35-130*			
Surrogate: Phenol-d6	*5120968*			ug/L					*29*		*10-60*			
Surrogate: 2-Fluorophenol	*5120968*			ug/L					*45*		*10-75*			
Surrogate: 2,4,6-Tribromophenol	*5120968*			ug/L					*88*		*35-140*			

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MATRIX SPIKE/MATRIX SPIKE DUPLICATE QC DATA

Analyte	Seq/ Batch	Source Result	Spike Level	Units	MDL	MRL	Result	Dup Result	% REC	Dup %REC	% REC Limits	RPD	RPD Limit	Q
General Chemistry Parameters														
QC Source Sample: COL1216-01														
Nitrate as N	5120914	0.553	2.00	mg/L	N/A	1.00	2.12	2.21	78	83	75-125	4	20	
QC Source Sample: COL1204-02														
Total Kjeldahl Nitrogen	5120937	9.05	5.00	mg/L	N/A	1.25	15.9	15.4	137	127	90-110	3	15	M1
QC Source Sample: COL0984-02														
Alkalinity, Total (CaCO3)	5120954	945	114	mg/L	N/A	N/A	1070	1080	110	118	80-125	1	10	
QC Source Sample: COL1051-04														
Chemical Oxygen Demand	5120970	229	50.0	mg/L	N/A	25.0	271	277	84	96	75-125	2	20	
QC Source Sample: COL1125-09														
Oil & Grease	5120982	0.860	42.1	mg/L	N/A	N/A	38.0		88		78-114			
QC Source Sample: COL1192-02														
Ammonia as N	5120985	1.29	3.33	mg/L	N/A	0.500	4.88	5.19	108	117	75-125	6	20	
QC Source Sample: COL1194-01														
Phosphorus, Total (as P)	6010010	6.86	2.00	mg/L	N/A	0.200	9.71	9.68	142	141	90-110	0	15	M1
QC Source Sample: COL1058-02														
Chloride	6010017	15.8	25.0	mg/L	N/A	5.00	39.7	40.0	96	97	90-110	1	10	
QC Source Sample: COL0986-01														
Total Organic Carbon	6010057	27.1	20.0	mg/L	N/A	4.00	46.0	47.5	94	102	75-125	3	20	ET
QC Source Sample: COL1216-01														
Sulfate	6010255	1070	333	mg/L	N/A	333	1290	1290	66	66	75-125	0	20	M1
QC Source Sample: COL1216-01														
Fluoride	6010305	110	25.0	mg/L	N/A	14.5	138	132	112	88	75-125	4	15	
Total Metals by EPA 200 Series Methods														
QC Source Sample: COL1214-02														
Aluminum	5120994	0.197	2.00	mg/L	N/A	0.100	2.12	2.14	96	97	75-125	1	10	
Arsenic	5120994	0.0837	2.00	mg/L	N/A	0.0800	2.07	2.03	99	97	85-120	2	10	
Barium	5120994	0.325	1.00	mg/L	N/A	0.0100	1.25	1.26	92	94	75-120	1	10	
Cadmium	5120994	<0.020	1.00	mg/L	N/A	0.0200	0.948	0.950	95	95	80-115	0	10	
Chromium	5120994	<0.020	1.00	mg/L	N/A	0.0200	0.950	0.960	95	96	80-115	1	10	
Copper	5120994	0.0331	2.00	mg/L	N/A	0.0200	1.89	1.92	93	94	85-115	2	10	
Lead	5120994	<0.10	2.00	mg/L	N/A	0.100	1.93	1.97	96	98	80-115	2	10	
Manganese	5120994	0.0380	1.00	mg/L	N/A	0.0100	0.973	0.981	94	94	75-125	1	10	
Nickel	5120994	0.0268	2.00	mg/L	N/A	0.0500	1.85	1.86	91	92	80-110	1	10	
Potassium	5120994	2.85	4.00	mg/L	N/A	1.00	6.82	6.89	99	101	75-125	1	10	
Selenium	5120994	<0.15	4.00	mg/L	N/A	0.150	3.93	3.93	98	98	80-120	0	10	
Silver	5120994	<0.020	1.00	mg/L	N/A	0.0200	0.974	0.983	97	98	75-125	1	20	
Zinc	5120994	0.0164	1.00	mg/L	N/A	0.0200	0.964	0.971	95	95	75-125	1	20	
Magnesium	5120994	36.3	2.00	mg/L	N/A	1.00	38.3	38.5	100	110	80-115	1	10	
QC Source Sample: COL0831-01														
Mercury	6010059	0.0000212	0.00167	mg/L	N/A	0.000200	0.00179	0.00181	106	107	75-125	1	10	
Volatile Organic Compounds														
QC Source Sample: COL1216-01														
Acetone	6010055	6.15	20.0	ug/L	N/A	N/A	21.7	20.0	78	69	20-115	8	30	
Benzene	6010055	0.610	20.0	ug/L	N/A	N/A	17.7	17.2	85	83	60-135	3	15	
Bromomethane	6010055	<4.00	20.0	ug/L	N/A	N/A	21.8	19.8	109	99	30-125	10	35	
Carbon Tetrachloride	6010055	<2.00	20.0	ug/L	N/A	N/A	15.5	14.7	78	74	25-120	5	30	
Chlorobenzene	6010055	<1.00	20.0	ug/L	N/A	N/A	19.9	18.8	100	94	50-140	6	15	
Chloroform	6010055	<1.00	20.0	ug/L	N/A	N/A	17.4	17.0	87	85	45-140	2	30	
Bromochloromethane	6010055	<5.00	20.0	ug/L	N/A	N/A	22.5	21.6	112	108	45-140	4	35	
1,2,3-Trichloropropane	6010055	<1.00	20.0	ug/L	N/A	N/A	22.2	20.8	111	104	55-150	7	15	

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704 Enterprise Drive Cedar Falls, IA 50613 * 800-750-2401 * Fax 319-277-2425

FANSTEEL/WELLMAN CORP.
1746 Commerce Road
Creston, IA 50801
Joe Haller

Work Order: COL1216
Project: Landfill Leachate Permit Renewal
Project Number: Landfill Leachate Permit Renewal

Received: 12/28/05
Reported: 01/31/06 13:48

MATRIX SPIKE/MATRIX SPIKE DUPLICATE QC DATA

Analyte	Seq/ Batch	Source Result	Spike Level	Units	MDL	MRL	Result	Dup Result	% REC	Dup %REC	% REC Limits	RPD	RPD Limit	Q
Volatile Organic Compounds														
QC Source Sample: COL1216-01														
1,4-Dichlorobenzene	6010055	<1.00	20.0	ug/L	N/A	N/A	20.5	19.4	102	97	45-140	6	15	
1,2-Dichloroethane	6010055	<1.00	20.0	ug/L	N/A	N/A	22.0	21.3	110	106	55-135	3	10	
1,1-Dichloroethene	6010055	0.460	20.0	ug/L	N/A	N/A	16.0	15.8	78	77	45-135	1	20	
Ethylbenzene	6010055	0.280	20.0	ug/L	N/A	N/A	16.4	15.4	81	76	50-135	6	15	
Methylene Chloride	6010055	<5.00	20.0	ug/L	N/A	N/A	18.9	18.6	94	93	60-140	2	15	
Tetrachloroethene	6010055	<1.00	20.0	ug/L	N/A	N/A	17.4	15.6	87	78	50-135	11	35	
Trichloroethene	6010055	<1.00	20.0	ug/L	N/A	N/A	15.9	15.0	80	75	50-130	6	25	
1,1,2-Trichloroethane	6010055	<1.00	20.0	ug/L	N/A	N/A	20.6	20.4	103	102	50-145	1	35	
1,1,1-Trichloroethane	6010055	<1.00	20.0	ug/L	N/A	N/A	15.5	14.8	78	74	40-135	5	10	
Vinyl chloride	6010055	5.06	20.0	ug/L	N/A	N/A	16.9	16.3	59	56	40-135	4	15	
Xylenes, total	6010055	2.53	60.0	ug/L	N/A	N/A	59.8	56.4	95	90	45-140	6	30	
Surrogate: Dibromofluoromethane	*6010055*			ug/L					*105*	*107*	*70-130*			
Surrogate: Toluene-d8	*6010055*			ug/L					*108*	*104*	*70-130*			
Surrogate: 4-Bromofluorobenzene	*6010055*			ug/L					*99*	*97*	*70-130*			
Semivolatile Organics by GC/MS														
QC Source Sample: COL1191-04														
Acenaphthene	5120968	<10.0	222	ug/L	N/A	22.2	122	152	55	68	10-90	22	35	
Acenaphthylene	5120968	<10.0	222	ug/L	N/A	22.2	116	143	52	64	10-90	21	35	
Anthracene	5120968	<10.0	222	ug/L	N/A	22.2	129	158	58	71	10-95	20	35	
Benzo (a) anthracene	5120968	<10.0	222	ug/L	N/A	22.2	134	167	60	75	10-95	22	35	
Benzo (b) fluoranthene	5120968	<10.0	222	ug/L	N/A	22.2	133	166	60	75	10-95	22	35	
Benzo (k) fluoranthene	5120968	<10.0	222	ug/L	N/A	22.2	130	162	59	73	10-95	22	35	
Benzo (a) pyrene	5120968	<10.0	222	ug/L	N/A	22.2	133	163	60	73	10-95	20	35	
Benzo (g,h,i) perylene	5120968	<10.0	222	ug/L	N/A	22.2	123	153	55	69	10-95	22	35	
Chrysene	5120968	<10.0	222	ug/L	N/A	22.2	133	165	60	74	10-85	21	35	
Dibenzo (a,h) anthracene	5120968	<10.0	222	ug/L	N/A	22.2	130	162	59	73	10-100	22	35	
1,4-Dichlorobenzene	5120968	<10.0	222	ug/L	N/A	22.2	109	144	49	65	10-85	28	35	
2,4-Dinitrotoluene	5120968	<10.0	222	ug/L	N/A	22.2	139	174	63	78	10-95	22	35	
Fluoranthene	5120968	<10.0	222	ug/L	N/A	22.2	131	159	59	72	10-95	19	35	
Fluorene	5120968	<10.0	222	ug/L	N/A	22.2	128	159	58	72	10-95	22	35	
Indeno (1,2,3-cd) pyrene	5120968	<10.0	222	ug/L	N/A	22.2	129	158	58	71	10-100	20	35	
2-Methylnaphthalene	5120968	<10.0	222	ug/L	N/A	22.2	118	153	53	69	10-90	26	35	
Naphthalene	5120968	<10.0	222	ug/L	N/A	22.2	112	145	50	65	10-85	26	35	
N-Nitrosodiphenylamine	5120968	<10.0	222	ug/L	N/A	22.2	123	160	55	72	10-95	26	35	
N-Nitrosodi-n-propylamine	5120968	<10.0	222	ug/L	N/A	22.2	135	172	61	77	10-90	24	35	
Phenanthrene	5120968	<10.0	222	ug/L	N/A	22.2	128	157	58	71	10-95	20	35	
Pyrene	5120968	<10.0	222	ug/L	N/A	22.2	140	176	63	79	10-95	23	35	
4-Chloro-3-methylphenol	5120968	<10.0	222	ug/L	N/A	22.2	127	165	57	74	10-100	26	35	
2-Chlorophenol	5120968	<10.0	222	ug/L	N/A	22.2	112	144	50	65	10-90	25	35	
2-Nitrophenol	5120968	<10.0	222	ug/L	N/A	22.2	127	160	57	72	10-95	23	35	
4-Nitrophenol	5120968	<10.0	222	ug/L	N/A	22.2	60.4	78.7	27	35	10-75	26	35	
Pentachlorophenol	5120968	<10.0	222	ug/L	N/A	22.2	129	186	58	84	10-105	36	35	
Phenol	5120968	<10.0	222	ug/L	N/A	22.2	47.5	62.8	21	28	10-60	28	35	
Surrogate: Nitrobenzene-d5	*5120968*			ug/L					*57*	*73*	*35-110*			
Surrogate: 2-Fluorobiphenyl	*5120968*			ug/L					*54*	*67*	*30-120*			

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704 Enterprise Drive Cedar Falls, IA 50613 * 800-750-2401 * Fax 319-277-2425

FANSTEEL/WELLMAN CORP.
1746 Commerce Road
Creston, IA 50801
Joe Haller

Work Order: COL1216
Project: Landfill Leachate Permit Renewal
Project Number: Landfill Leachate Permit Renewal

Received: 12/28/05
Reported: 01/31/06 13:48

MATRIX SPIKE/MATRIX SPIKE DUPLICATE QC DATA

Analyte	Seq/ Batch	Source Result	Spike Level	Units	MDL	MRL	Result	Dup Result	% REC	Dup %REC	% REC Limits	RPD	RPD Limit	Q
Semivolatile Organics by GC/MS														
QC Source Sample: COL1191-04														
Surrogate: Terphenyl-d14	*5120968*			ug/L					*64*	*64*	*35-130*			
Surrogate: Phenol-d6	*5120968*			ug/L					*22*	*30*	*10-60*			
Surrogate: 2-Fluorophenol	*5120968*			ug/L					*33*	*44*	*10-75*			
Surrogate: 2,4,6-Tribromophenol	*5120968*			ug/L					*67*	*85*	*45-140*			

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CERTIFICATION SUMMARY

TestAmerica Analytical - Cedar Falls

Method	Matrix	Nelac	Iowa
ASTM D516-90	Water - NonPotable	X	X
EPA 150.1	Water - NonPotable	X	X
EPA 160.4	Water - NonPotable	X	X
EPA 1664	Water - NonPotable	X	X
EPA 200.7	Water - NonPotable	X	X
EPA 245.2	Water - NonPotable	X	X
EPA 351.2	Water - NonPotable	X	X
EPA 353.3	Water - NonPotable	X	X
EPA 365.1	Water - NonPotable	X	X
EPA 608	Water - NonPotable	X	X
EPA 624	Water - NonPotable	X	X
EPA 625	Water - NonPotable	X	X
SM 2320B	Water - NonPotable	X	X
SM 2540B	Water - NonPotable	X	X
SM 4500Cl E	Water - NonPotable	X	X
SM 4500F BC	Water - NonPotable	X	X
SM 4500NH3 B,E	Water - NonPotable	X	X
SM 5210B	Water - NonPotable	X	X
SM 5220D	Water - NonPotable	X	X
SM 5310C	Water - NonPotable	X	X
SM2320B	Water - NonPotable	X	X
SM2540C	Water - NonPotable	X	X
SW 8151	Water - NonPotable		
SW	Water - NonPotable		
USGS I-3765-85	Water - NonPotable	X	X

Subcontracted Laboratories

UHL - Iowa City

102 Oakdale Campus, #h101 OH - Iowa City, IA 52242-5002

Method Performed: 608 Pesticides
Samples: COL1216-01

Method Performed: 8151 Herbicides
Samples: COL1216-01

Any abnormalities or departures from sample acceptance policy shall be documented on the 'Sample Receipt and Termperature Log Form' and 'Sample Non-conformance Form' (if applicable) included with this report.

For information concerning certifications of this facility or another TestAmerica facility, please visit our website at www.TestAmericaInc.com

Samples collected by TestAmerica Field Services personnel are noted on the Chain of Custody (COC) and are sampled in accordance with TA-CF SOP CF09-01.

TestAmerica Analytical - Cedar Falls
Derrick Klinkenberg
Organics Manager

FANSTEEL/WELLMAN CORP.
1746 Commerce Road
Creston, IA 50801
Joe Haller

Work Order: COL1216
Project: Landfill Leachate Permit Renewal
Project Number: Landfill Leachate Permit Renewal

Received: 12/28/05
Reported: 01/31/06 13:48

DATA QUALIFIERS AND DEFINITIONS

C	Calibration Verification recovery was above the method control limit for this analyte. Analyte not detected, data not impacted.
CIN	The % RSD for this compound was above 15%. The average % RSD for all compounds in the calibration met the 15% criteria specified in EPA methods 8260B/8270C.
ET	Matrix interference in sample is causing an endpoint timeout.
H3	Sample was received and analyzed past holding time.
L	Laboratory Control Sample and/or Laboratory Control Sample Duplicate recovery was above the control limits. Analyte not detected, data not impacted.
M1	The MS and/or MSD were outside control limits. See Blank Spike (LCS).
R	Duplicate RPD exceeded the laboratory control limit.

ADDITIONAL COMMENTS

TestAmerica ANALYTICAL TESTING CORPORATION

Cedar Falls Division
704 Enterprise Drive
Cedar Falls, IA 50613

Phone 319-277-2401 or 800-750-2401
Fax 319-277-2425

To assist us in using the proper analytical methods, is this work being conducted for regulatory purposes?
Compliance Monitoring _____

Client Name: Fansteel Wellman Dynamics Client #: _____
Address: 1746 Commerce Road
City/State/Zip Code: Creston, IA 50801
Project Manager: Joe Haller
Telephone Number: 641-782-8521 ext 206 Fax: 641-782-4844
Sampler Name: (Print Name) Joe Haller
Sampler Signature: Joe Haller
Email Address: jhaller@weldyn.net

Project Name: Landfill Leachate Permit Renewal
Project #: _____
Site/Location ID: _____ State: _____
Report To: _____
Invoice To: _____
Quote #: _____ PO#: 72933

TAT / Date Needed / Fax Results / Email Results / SAMPLE ID	Date Sampled	Time Sampled	G = Grab, C = Composite	Field Filtered	Matrix (SL - Sludge, DW - Drinking Water, GW - Groundwater, S - Soil/Solid, WW - Wastewater, Specify Other)	Preservation & # of Containers: HNO_3	HCl	NaOH	H_2SO_4	Methanol	None	Other (Specify)	Analyze For: O,G & Grease	TOC	COD, TKN, PO4	Chloride, Fluoride, NO3, pH, TDS, TSS, TVS	Sulfate	Total Metals	BNA, Pests, Herbs	VOC's			QC Deliverables / REMARKS
12/27/05 Bottles # 1,2,3,10	12/27	9:20	G		GW				X				X	X	X								
12/27/05 Bottles # 4,5,6,7,8,9	12/27	9:20	G		GW						X					X	X		X				
12/27/05 # 11	12/27	9:20	G		GW	X												X					
12/27/05 Bottles 12, 13, 14	12/27	9:20	G		GW		X													X			

TAT: ___ Standard; ___ Rush (surcharges may apply); Date Needed: _____; Fax Results: Y N; Email Results: Y N

QC Deliverables: ___ None; ___ Level 2 (Batch QC); ___ Level 3; ___ Level 4; Other: _____

Special Instructions: See Quote 10: Landfill Leachate Permit Renewal, for parameters To be tested or call if there is questions JH
* Include all quote parameters.

LABORATORY COMMENTS:

Relinquished By	Date	Time	Received By	Date	Time
Joe Haller	12/27	3PM	Tina Mueller	12/28/05	8:40
Relinquished By:	Date:	Time:	Received By:	Date:	Time:
Relinquished By:	Date:	Time:	Received By:	Date:	Time:

TestAmerica ANALYTICAL TESTING CORPORATION

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704 Enterprise Drive
Cedar Falls, IA 50613

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To assist us in using the proper analytical methods, is this work being conducted for regulatory purposes?
Compliance Monitoring _____

Client Name: Fansteel Wellman Dynamics Client #: _____
Address: 1746 Commerce Road
City/State/Zip Code: Creston, IA 50801
Project Manager: Joe Haller
Telephone Number: 641-782-8521 ext 206 Fax: 641-782-4844
Sampler Name: (Print Name) Joe Haller
Sampler Signature: Joe Haller
Email Address: jhaller@weldyn.net

Project Name: Landfill Leachate Permit Renewal
Project #: _____
Site/Location ID: _____ State: _____
Report To: _____
Invoice To: _____
Quote #: _____ PO#: 72933

TAT
___ Standard
___ Rush (surcharges may apply)
Date Needed: _____
Fax Results: Y N
Email Results: Y N

SAMPLE ID	Date Sampled	Time Sampled	G = Grab, C = Composite	Field Filtered	Matrix: SL - Sludge, DW - Drinking Water, GW - Groundwater, S - Soil/Solid, WW - Wastewater, Specify Other	Preservation & # of Containers: HNO_3	HCl	NaOH	H_2SO_4	Methanol	None	Other (Specify)	Analyze For: Oil & Grease	TOC	COD, TKN, PO4	Chloride, Fluoride, NO3, pH, TDS, TSS, TVS, Sulfate	Total Metals	BNA, Pests, Herbs	VOC's			QC Deliverables: ___ None ___ Level 2 (Batch QC) ___ Level 3 ___ Level 4 Other: _____ REMARKS
12/27/05 Bottles #1,2,3,10	12/27	9:20	G		GW				X				X	X	X							
12/27/05 Bottles #4,5,6,7,8,9	12/27	9:20	G		GW						X					X	X		X				
12/27/05 #11	12/27	9:20	G		GW	X												X					
12/27/05 Bottles 12,13,14	12/27	9:20	G		GW		X												X				

Special Instructions: See Quote 10: Landfill Leachate Permit Renewal, for parameters To be tested or call if there is questions JH
* Include all quote parameters.

LABORATORY COMMENTS:

Relinquished By:	Date:	Time:	Received By:	Date:	Time:
Joe Haller	12/27	3PM	Tina Mueller	12/28/05	8:40
Relinquished By:	Date:	Time:	Received By:	Date:	Time:
Relinquished By:	Date:	Time:	Received By:	Date:	Time:

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Sample Receipt and Temperature Log Form

Client: Fansteel Wellman Project: Landfill Leachate Permit Renewal

City: _____

Date: 12-28-05 Receiver's Initials JPH Time (Delivered): 8:40

Temperature Record

Cooler ID# (If Applicable)
TACF5603

2 ° C / On Ice

[X] Temp Blank

[ ] Temperature out of compliance

Thermometer:

[X] IR – 905085 "A"
[ ] IR – 809065 "B"
[ ] CF07-03-T2
[ ] 22126775

Courier:

[ ] Airborne	[ ] Speedy
[X] UPS	[ ] TA Courier
[ ] Velocity	[ ] TA Field Svs
[ ] FedEx	[ ] Client
[ ] DHL	
[ ] US Postal	[ ] Other

Custody seals present?
[X] Yes
Custody seals intact?
[X] Yes [ ] No

[ ] Non-Conformance report started

Exceptions Noted

[ ] Sample(s) not received in a cooler.

[ ] Samples(s) received same day of sampling.

[ ] Evidence of a chilling process

[ ] Temperature not taken:

_____

Log-In by:
CW MF (EM)
OT _____

*Refer to SOP CF01-01 for Temperature Criteria

APPENDIX H

Standard Operating Procedure

Low Flow - Stabilization Purging and Sampling Procedure

Introduction

Before groundwater quality samples or measurements are gathered, stagnate water must be removed from the source being monitored. Stabilization purging is one option for groundwater monitoring points (wells, piezometer, etc.) that do not go dry. The primary objective of purging a well using the stabilization purging method is to remove any stagnant water residing in the well screen, filter pack, and casing interval before sample collection. Other purging methods may require a specific well volume removed. All well sampling events should specify the purging method used prior to sampling.

Representative sampling of groundwater data means that the sample represents in-situ, unaltered groundwater conditions having the same physical and chemical composition of the aquifer in the surrounding geologic formation being monitored. Purging by stabilization procedures provides a consistent method and process for collecting representative groundwater samples. Successful stabilization purging increases confidence of sample data collected in the field.

Low flow purging and sampling low-flow refers to the velocity that water enters the pump intake and is imparted to the formation pore water in the immediate vicinity of the well screen. It does not necessarily refer to the flow rate of water discharged at the surface that can be affected by flow regulators or restrictions. Water level drawdown provides the best indication of the stress imparted by a given flow-rate for a given hydrological situation. The objective is to pump in a manner that minimizes stress (drawdown) to the system to the extent practical, taking into account established site sampling objectives. Typically, flow rates on the order of 0.1 - 0.5 liters per minute (L/min) are used; however this depends on site-specific hydrogeology.

Stabilization refers to the measurements of water quality indicator parameters taken during the purging process. It is recommended that water quality indicator parameters be used to determine purging needs prior to sample collection in each well. Stabilization of parameters such as pH, specific conductance, dissolved oxygen, oxidation-reduction potential, temperature and turbidity should be used to determine when formation water is accessed during purging. In general, the order of stabilization is pH, temperature, and specific conductance, followed by oxidation-reduction potential, dissolved oxygen, and turbidity.

Equipment and Supplies

- Purging system options
  - Bailers are an option but not recommended
  - Dedicated pumps are the best choice
  - Portable pumps
    - Appropriate decontamination supplies
    - QED Micro Purge System – Sample Pro Kit
- Multi parameter probe
  - Hydrolab or similar meter
  - Closed flow through cell
- Water level indicator
- Five-gallon pail or other bulk size container to measure discharge volume
- Appropriate field recording data sheets or electronic data recording methods

Procedures

Decontamination
Field instruments and all non-disposable sampling equipment will be decontaminated before and after each use. Whenever possible, disposable sampling supplies (i.e. nitrile gloves) will be used to minimize the possibility of cross-contamination. Decontamination of field instruments and sampling equipment will be conducted using the following procedures:

1. Rinse or scrub equipment thoroughly using a phosphate-free, low-sudsing detergent solution (i.e. Liquinox or Alconox).
2. Rinse equipment with deionized water by submerging and/or spraying.
3. Allow equipment to air-dry.

Pump Placement
When using portable or dedicated systems, the pump intake should be located within the screened interval. Pump placement within the middle of the screened interval or slightly above is generally recommended. This will minimize mixing of stagnant water above the screened interval and re-suspension of solids which may have collected at the bottom of the well.

Purge Rate
To obtain the highest quality, most representative, and consistent groundwater quality measurements, the purge volume rate should be less than or equal to the natural flow conditions existing in the aquifer influenced by the well. When natural flow rates are not known, typical flow rates are on the order of 0.1-0.5 L/min.

Drawdown
Drawdown during purging should be minimal and the water level in the well should stabilize before commencing sampling. Water level measurement (depth to water) should be taken at intervals from 30 seconds to 5 minutes (depending on flow rate; more frequently for higher flow rates) to document drawdown.

If the soil surrounding the well has a low hydraulic conductivity, it may be impractical to completely avoid drawdown. It may be necessary to turn off the pump and allow some recharge to occur before proceeding. As an alternative, no-purge techniques may be considered for wells with recharge less than 100 mL/min.

Stabilization Readings
While purging, the sampling team should monitor indicator parameters from the discharge until the readings have stabilized. Recommended indicator parameters for well stability during purging are dissolved oxygen (DO), oxidation-reduction potential (ORP), pH, specific conductance, temperature, and turbidity. Preferably, a closed flow-through cell should be used. Another method of monitoring indicator parameters includes down-hole or in-situ measurements. Manufacturer's calibration procedures should be followed for the specific instrument(s) to monitor indicator parameters.

Purging should be conducted at each well until the indicator parameters stabilize. Three consecutives readings shall be within the limits listed on the table below. Measurements shall be spaced apart so that the volume of water in the flow-through cell or pump and

sampling tubing is completely replaced. Stabilization measurements shall be recorded to verify that samples were taken after stabilization purging was successfully completed.

Parameter	Limits
Dissolved Oxygen	+/- 0.2 mg/L or 10% (whichever is greater)
ORP	+/- 10 mV
pH	+/- 0.1 pH unit
Specific Conductance	+/- 3%
Temperature	+/- 3%
Turbidity	+/- 10% or less than 5 NTU

Sample Collection

When indicator parameters have stabilized, the well may be considered purged and sample collection may commence. Sample bottles shall be filled in accordance with the project sampling and analysis plan and/or industry standards. Rates at or below the purging rate will be utilized for metals and other inorganic parameters. Lower flow rates (100 mL/min) are recommended for volatile organic compounds (VOCs) and filtered samples. Larger sample bottles may be filled prior to reducing the flow rate for VOCs in order to prevent unnecessarily extending sample collection times.

References

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APPENDIX I

Standard Operating Procedure
No Purge Sampling

Introduction

Representative sampling of groundwater data means that the sample represents in-situ, unaltered groundwater conditions having the same physical and chemical composition of the aquifer in the surrounding geologic formation being monitored. Historically, volumetric or low-flow methods were the preferred techniques for well purging prior to sample collection. If the soil surrounding the well has a low hydraulic conductivity, it may be impractical to conduct volumetric or low-flow purging techniques. Traditionally, low yield wells were purged dry and sampled upon sufficient recovery of the well. However, concerns with purging a well dry include:

- As the well recovers, cascading water into the well may result in a change of dissolved gases or redox state and/or strip volatile organic constituents;
- Purging the well dry stresses the formation which may increase sample turbidity by inducing soil fines into the well or re-suspend sediments that may have accumulated in the bottom of the well;
- Draining the filter pack may cause air to be trapped in the pore spaces, which could impact dissolved gases or redox states and aerate the samples;
- Time required for sufficient recovery may be excessive, affecting sample chemistry through prolonged exposure to atmospheric conditions (Ohio EPA, 2012).

No purge sampling techniques have been suggested for several reasons. First, no purge techniques were suggested in lieu of purging low yield wells dry and allowing recovery, and were considered less disruptive than purging the well dry and allowing recovery (Ohio EPA, 2012). Secondly, no purge samples were suggested as a method which induces no hydraulic stress or transport on the aquifer. No purge sampling is based on the assumption that groundwater that flows within the well screen is in equilibrium with the surrounding formation groundwater. Therefore, collection of an undisturbed sample of this groundwater within the well screen interval is considered representative of the formation (KDHE, 2011).

The main advantages of no purge sampling are that it can be used in most wells, is relatively simple, generates less fluids, lower cost, can be used at discrete depth intervals, no depth limit, and reduces field variability. Some of the disadvantages include sample volume and analyte limitations, free-phase product limitations, limitations when contaminant stratification occurs.

This standard operating procedure (SOP) includes procedures for no purge sampling by pumping and for no purge sampling using passive sampling devices.

Equipment and Supplies

- Purging system options for no purge sampling by pumping
  - Bailers are an option but not recommended
  - Dedicated pumps are the best choice
  - Portable pumps (i.e., bladder, low-flow submersible, or peristaltic pumps)
- Grab-type no purge samplers (HydraSleeve™, Snap Sampler®)
- Diffusion-equilibrium samplers (passive diffusion bags)
- Water level indicator

- Five-gallon pail or other bulk size container to measure discharge volume
- Appropriate field recording data sheets or electronic data recording methods
- Appropriate decontamination supplies

No Purge by Pumping Procedures

Review of Well Recharge Rates
For no purge by pumping, an evaluation of well recharge rates must be conducted prior to implementing no purge techniques. Wells must be demonstrated to have low yield (i.e., recharge rates less than 100 mL/min). The evaluation may be conducted by several methods including slug testing or evaluation of draw-down while pumping at 100 mL/min.

Decontamination
Field instruments and all non-disposable sampling equipment will be decontaminated before and after each use. Whenever possible, disposable sampling supplies (i.e. nitrile gloves) will be used to minimize the possibility of cross-contamination. The following procedures will be used for conducting decontamination of field instruments and sampling equipment:

1. Rinse or scrub equipment thoroughly using a phosphate-free, low-sudsing detergent solution (i.e. Liquinox or Alconox).
2. Rinse equipment with deionized water by submerging and/or spraying.
3. Allow equipment to air-dry.

Pump Placement
When using portable or dedicated systems, the pump intake should be located within the screened interval. Since draw-down is anticipated based on the low yield of the wells, pump placement one or two feet above the bottom of the well is generally recommended. Note that pump placement too close to the bottom of the well may re-suspend sediments accumulated in the bottom of the well or draw in settled sediments during pumping, and pump placement too close to the top of the screened interval may cause mixing of stagnant water above the screened interval. Care will be taken when placing non-dedicated pumps or tubing into the well to limit disturbances due to pump placement, including preventing contact with sediment accumulating in the bottom of the well.

Purge Rate
Since purge rates less than or equal to the natural flow conditions existing in the aquifer are not possible due to low yield, purge rates of 100 mL/min or less are recommended for no purge sampling. Drawdown should be measured prior to and during pumping to ensure that water above the screened interval is not drawn into the pump. It may be necessary to discontinue sampling if the allowable drawdown level is reached. Sample collection should continue when the well has recovered sufficiently to meet the remaining sample volume requirements.

Field Parameter Readings
Field parameter measurements may be collected to monitor well stability between events. If conducted, field parameters will be measured either prior to or after sample collection.

As with sample collection, water above the screened interval shall not be drawn into the pump during field parameter measurements. Recommended field parameters for well stability are dissolved oxygen, oxidation-reduction potential, pH, specific conductance, temperature, and turbidity. Field parameters should be measured through a closed flow-through cell or using down-hole/in-situ methods. Manufacturer's calibration procedures for the specific instrument(s) to monitor field parameters should be followed.

Sample Collection
When the equipment volume (i.e., pump and discharge tubing volume) has been discharged, sample collection may commence. Sample bottles shall be filled in accordance with the project sampling and analysis plan and/or industry standards. Rates at or below the purging rate (100 mL/min) will be utilized.

No Purge – Passive Sampling Procedures

Sampler Type
The mechanism and sampler type utilized will be dependent on site-specific conditions for the target analytes being sampled. Manufacturer's directions should be consulted to determine whether the target analyte may be collected using the selected no purge sampler. For example, passive diffusion bags should not be used for metals, nitrates, and sulfates.

Sampler Placement
Grab-type no purge samplers, diffusion equilibrium samplers, and diffusion-sorption samplers shall be installed and sampled only within the screened interval of a well. A sufficient amount of time will be allowed prior to sample collection to allow for aquifer re-stabilization after sampler placement in the well. The stabilization time required is dependent on aquifer characteristics such as hydraulic conductivity and transmissivity. Shorter stabilization times (on the order of hours or days) are required for higher conductivity aquifers, such as sand or gravel. Longer stabilization times (on the order of weeks to months) are required for lower conductivity aquifers, such as silty sand, silt, or clay. The proper stabilization time should be determined on a site-specific basis. The minimum recommended amount of time between deploying and sampling is two weeks.

No Purge Grab Sampling with HydraSleeve™ or Similar

1. Assemble the HydraSleeve™ or similar sampler in accordance with manufacturer directions.
2. Tie the suspension line to the top of the clip on the sampler. Sampler is ready for deployment.
3. To deploy, place HydraSleeve into the well down to the desired depth within the well screen. Note: some sleeves are intended to be suspended within the screen interval (using a bottom weight to indicate when bottom of sleeve is sitting at the bottom of the screen); while others are intended to be compacted at the bottom of the well (using a top weight to ensure the sleeve is reduced to the bottom of the well). Generally, screened intervals of 5' or less will require the sleeve to be compacted at the bottom of the well, as opposed to suspended within the screened

interval. This is determined by the length of the sampler versus the length of the screened interval. Care must be taken when lowering the sampler into the well to ensure that incidental opening of the check valve and filling of the sampler during deployment does not occur.

4. Secure the tether to the outside of the well to prevent loss of the sampler to the bottom of the well.
5. Allow aquifer stabilization time to occur.
6. To collect the sample, move the sleeve upward in a rapid motion (i.e. one foot per second) to allow water to pass through the check valve and into the sleeve for collection. Sample collection may be completed by one continuous pull or multiple short strokes or oscillations. For shorter well screen intervals, several oscillations may be required to fill the sampler within the screen interval and obtain the volume required.
7. Prior to filling sample containers, squeeze the full sleeve just below the rigid plastic top to expel extra water resting above the check valve. Use the short plastic discharge tube to assist with sample transfer from the sleeve into the appropriate sample containers. Use care to not over agitate the sleeve or water during transfer.

No Purge Grab Sampling with Diffusion-Equilibrium Samplers

Passive diffusion bag samplers generally consist of a narrow water-filled bag that relies on diffusion of contaminants in groundwater across the sampler membrane into the bag to reach and maintain equilibrium with the ambient well water. Passive diffusion samplers can be made up of different material types including rigid porous polyethylene or regenerated cellulose dialysis membrane.

1. Assemble the diffusion bag in accordance with manufacturer directions.
2. Install any necessary weights and deployment tether.
3. To deploy, place the diffusion sampler into the well down to the desired depth within the well screen.
4. Secure the tether to the outside of the well to prevent loss of the sampler and tether inside the well.
5. Allow aquifer stabilization time to occur. Note: the proper equilibration time for passive diffusion bags is also dependent on the target analytes being sampled and the material type of the bag. Some samplers have time limits in which the bag can be deployed in the well due to bag integrity issues or biodegradation.
6. Retrieve the sample bag by pulling the tether line until the sampler is retrieved from the well.
7. Carefully transfer bag contents into the appropriate sample containers. Use care to not over agitate the bag or water during transfer.

References

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