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Clayton GROUP SERVICES

December 2, 2003

US EPA RECORDS CENTER REGION 5
425642

Mr. Steve Faryan
USEPA REGION 5
Emergency Response Branch
77 West Jackson Boulevard, HSE-5J
Chicago, Illinois 60604-3590

Clayton Project 15-65263

RE: Revised Quality Assurance Project Plan (Laboratory Analysis)

Dear Steve:

At the request of The Lockformer Company (Lockformer), I have attached documents to this letter in support of Lockformer's desire to have future analytical work performed by Severn Trent Laboratories (STL). Lockformer wishes to use the STL Chicago laboratory for analysis of volatile organics in soil and groundwater, and the STL Knoxville laboratory for analysis of air samples collected in Summa™ canisters. Lockformer will continue to use First Environmental Laboratories for analysis of air samples collected in Tedlar bags.

In support of the requested changes, a revised Quality Assurance Project Plan (Laboratory Analysis) cover sheet is attached, along with a revised organization chart. This cover sheet is signed by the appropriate Lockformer, Clayton, and STL personnel. Attachments following the cover sheet and organization chart are provided for the respective STL laboratory and are described below. These attachments replace their corresponding documents in Volume III: Quality Assurance Project Plan dated February 28, 2003. The replacement sections are shown in italics.

- **Attachment 1-1** – STL Chicago SOP: Sample Receipt Handling and Processing Procedures. *(Replaces corresponding section in Attachment B)*

- **Attachment 1-2** – STL Chicago SOP: Laboratory Handling, Transfer, and Preservation of VOA Soil Samples Received in EnCore™ Samples for SW-846 Method 5035 Low Concentration and 5030B. This attachment also contains an addendum to the SOP that is specific to the Lockformer project. This addendum is identified as Attachment 1-2A. *(Supplements information in Attachment B)*

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- **Attachment 1-2A** – STL Chicago SOP: Addendum for the Lockformer Work Plan. Addendum to SOP No. USP-5035.

- **Attachment 1-3** – STL Chicago SOP: Gas Chromatography Mass Spectrometry – Volatiles SW-846 Method 8260. *(Replaces corresponding section in Attachment B)*

- **Attachment 1-4** – STL Chicago Summary Tables.

  Table 1: Summary of Analytical Procedures *(replaces Table 15)*

  Table 2: Sample Holding Times, Containers, Preservatives, and Volume Requirements *(replaces Table 18)*

  Table 3: STL Detection and Reporting Limits *(replaces Table 13)*

  Table 4: Instrument Calibration Frequency *(replaces Table 14)*

  Table 5: Laboratory Preventative Maintenance and Schedules *(replaces Table 16)*

- **Attachment 1-5** – STL Chicago Performance Evaluation Samples. Water, dated July 10, 2003 and Soils dated October 2, 2003. *(Replaces information provided to USEPA after February 28, 2003)*

- **Attachment 1-6** – STL Chicago Resumes of Key Personnel *(supplemental information)*

- **Attachment 1-7** – STL Chicago SOP - Sample Discrepancy Reports / Resubmitted Data Reports / Corrective Action Reports *(expanded discussion of subject)*

- **Attachment 1-8** – STL Chicago Latest MDL Studies *(replaces information in Attachment B)*

- **Attachment 1-9** – Example of STL Chicago Analytical Report *(replaces Attachment C)*

- **Attachment 2-1** – STL Knoxville SOP: Receipt and Log-In of Commercial Samples

- **Attachment 2-2** – STL Knoxville SOP: VOA Canister Analysis. This attachment shows the chemicals routinely reported for TO-15 analyses (Tables 1 through 3). This list is slightly different from those reported by Columbia Analytical, but it contains all

of the organics of concern at the Lockformer facility. The STL list contains 58 of the same chemicals as the Columbia list. The STL list also has 16 chemicals not on the Columbia list, while the Columbia list has nine chemicals not on the STL list.

- **Attachment 2-3** – STL Knoxville Summary Tables

  Table 1: Summary of Analytical Procedures

  Table 2: Sample Holding Times, Containers, Preservatives, and Volume Requirements

  Table 3: STL Detection and Reporting Limits

  Table 4: Instrument Calibration Frequency

  Table 5: Laboratory Preventative Maintenance and Schedules

- **Attachment 2-4** – STL Knoxville Resumes of Key Personnel

- **Attachment 2-5** – STL Knoxville SOP – Nonconformance and Corrective Action System

- **Attachment 2-6** – STL Knoxville Latest MDL Studies

- **Attachment 2-7** – Example of STL Knoxville Analytical Report

Information presented in Attachments 2-1 through 2-7 supplements the February 28, 2003 Quality Assurance Project Plan.

If you have any questions or require further information, please do not hesitate to call.

Sincerely,

Hank M. Mittelhauser, Ph.D.
Senior Vice President

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Clayton GROUP SERVICES

Quality Assurance Project Plan (Laboratory Analysis)

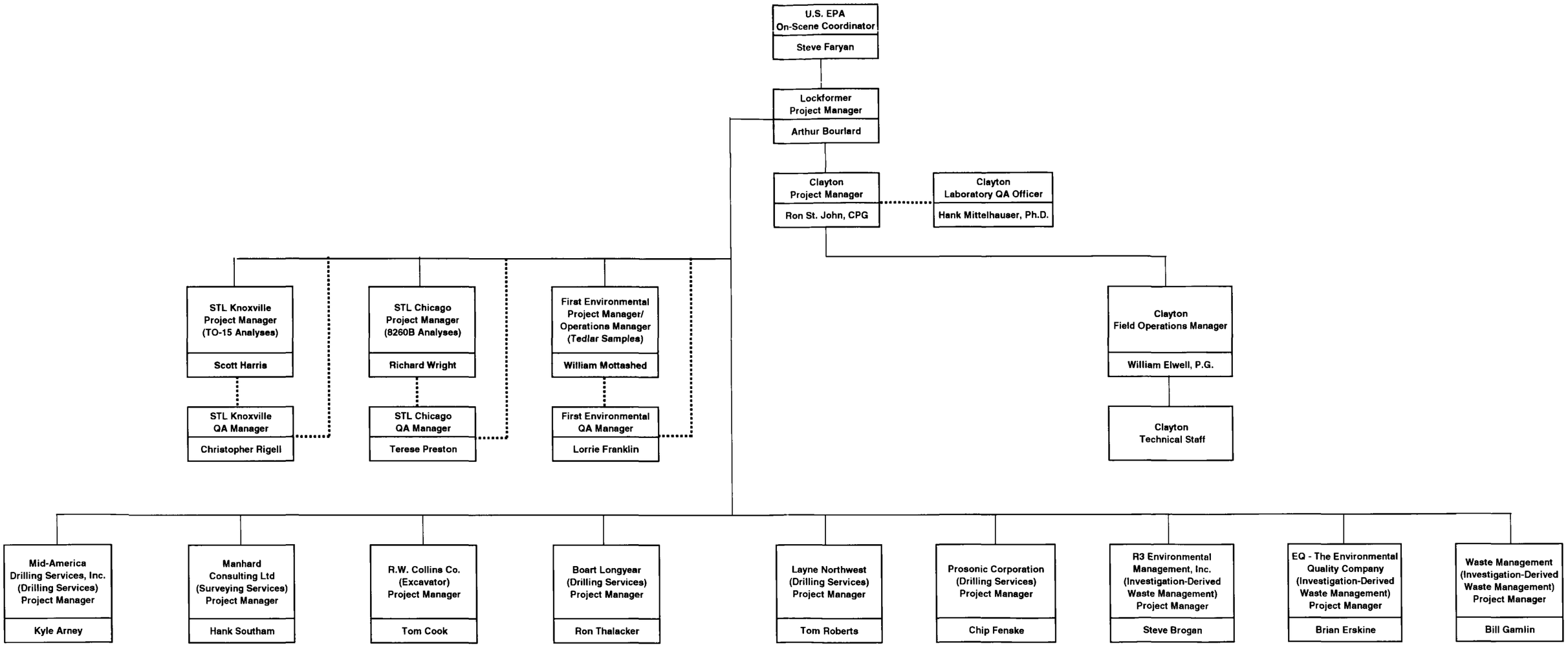
Lockformer Work Plan
The Lockformer Company
711 West Ogden Avenue
Lisle, Illinois
ILD0005110929

December 2, 2003

Submitted by:	Submitted to:	Prepared by:
The Lockformer Company	USEPA Region 5	Clayton Group Services, Inc.
711 West Ogden Avenue	77 West Jackson Boulevard	3140 Finley Road
Lisle, Illinois 60532	Chicago, Illinois 60604	Downers Grove, Illinois 60515

Arthur Bourlard, Lockformer Project Manager	Date
Ron St. John, Clayton Project Manager	Date
Dr. Hank Mittelhauser, Clayton QC Officer	Date
William Elwell, Clayton Field Project Manager	Date
Richard Wright, STL Project Manager, Chicago	Date
Terese Preston, STL QA Manager, Chicago	Date
Scott Harris, STL Project Manager, Knoxville	Date
Christopher Rigell, STL QA Manager, Knoxville	Date

Proposed Project Organization Chart



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ATTACHMENT 1-1

STL CHICAGO STANDARD OPERATING PROCEDURE

Sample Receipt – Handling and Processing Procedures

STL CHICAGO
LABORATORY STANDARD OPERATING PROCEDURE

SOP No.	Revision No.	Date	Page
USR-001	15	10/22/02	1 of 18

TITLE: SAMPLE RECEIPT
Handling and Processing Procedures

Updated by:	Signature:	Date:
Jeffrey A. James Section Manager, Sample Receipt	Jeffrey A. James	10/22/02
Donna J. McCarthy Quality Assurance Specialist	Donna J. McCarthy	10/22/02

Approved by:	Signature:	Date:
Jeffrey A. James Section Manager, Sample Receipt	Jeffrey A. James	10/22/02
Terese A. Preston Quality Manager	Terese A. Preston	10/22/02

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CONTROLLED DISTRIBUTION

COPY # : *Uncontrolled*

ISSUED TO : **William Elwell, Clayton Group**
Re: Lockformer Site QAPP

Full Signature Approvals Are Kept on File
with STL's QA Standard Practice Records

STL Chicago
STANDARD OPERATING PRACTICE (SOP) CHANGE FORM

Original SOP Number/Revision #: VSR-001 / 16 Last Mod ID (circle): NA / _____
SOP Title: SAMPLE Receipt
Affected SOP Section Number(s): 3.0 Sample Receipt
Effective Date: 10/23/02

CONTROLLED DISTRIBUTION

COPY # :
ISSUED TO :

Full Signature Approvals Are Kept on File with Severn Trent Laboratories Standard Practice Records

Revision Number with Mod ID: 15A

The following SOP change is in effect as of the stated date. This form will remain attached to the referenced SOP until such a time that the SOP is updated, approved, and redistributed, at which time it will become part of the *historical SOP record*. **Append this form to the front of the SOP copy.**

1. Reason for SOP Change: ① H&S of personnel handling AFCEE Samples in coolers.
② Add Sample Receipt Check list to SOP.

2. Summary of Procedure Change (circle to indicate if there are attachments to this form: No / Yes: # pages attached = ___)
Coolers containing AFCEE samples shall be opened in a hood in case there has been any breakage of containers within the cooler of potentially contaminated sample material.

10/23/02
Initiated/Reviewed By: Name/Date

Initiated/Reviewed By: Name/Date

10/23/02
Approval Signature/Date: Section Manager

10/23/02
Approval Signature/Date: QA Manager or Designee

CHI-22-09-039/D-1/99

rpjsckl Job Sample Receipt Checklist Report V2

Job Number.: 212915 Location.: 57222 Check List Number.: 1 Description.:
Customer Job ID.....: Job Check List Date.: 10/23/2002 Date of the Report..: 10/23/2002
Project Number.: 20001503 Project Description.: STL Chicago - Bottle Testing Project Manager.....: rjm
Customer.....: STL Chicago Laboratory QA Projects Contact.: Jeff James

Questions ?	(Y/N)	Comments
Chain-of-Custody Present?.....	Y	
Were samples dropped off at or picked up by STL?..	N	
Custocy seal on shipping container?.....	Y	
...If "yes", custody seal intact?.....	Y	
Custody seals on sample containers?.....	N	
...If "yes", custody seal intact?.....		
Samples iced?.....	Y	
Temperature of cooler acceptable? (4 deg C +/- 2).	Y	4.0
Samples received intact (good condition)?.....	Y	
Volatile samples acceptable? (no headspace).....	Y	
Correct containers used?.....	Y	
Adequate sample volume provided?.....	Y	
Samples preserved correctly?.....	Y	
Samples received within holding-time?.....	Y	
Agreement between COC and sample labels?.....	Y	
Radioactivity at or below background levels?.....	Y	
A Sample Discrepancy Report (SDR) was needed?.....	N	
If samples were shipped was there an air bill #?..		
Sample Custodian Signature/Date.....	Y	

1.0 SCOPE / APPLICATION

This Standard Operating Procedure (SOP) describes the documentation and handling processes required for the receipt, tracking and communication of environmental samples at STL Chicago (STL).

2.0 TEMPERATURE MONITORING

2.1 Sample Storage

The temperatures of the refrigerated areas are maintained at 2-6°C; with freezers at <-10°C. All samples are maintained in refrigerated or freezer storage (where appropriate) prior to and after sample analysis. All sample storage temperatures are monitored via an Electronic Monitoring System 7-days a week at 4-readings a day. The QA department reviews and saves (pdf format) the pictorial printout (Attachment 1) of all the monitored areas (standards and samples/extracts) twice daily (with at least four hours between). An EXCEL spreadsheet is automatically updated to record the 4 daily readings. Both the pictorial diagram and spreadsheet are reviewed for temperature compliance.

Any out-of-control refrigerator storage temperatures that cannot be corrected by the QA department (i.e., thermostat adjustment or defrosting) will be documented in a Sample Discrepancy Report (SDR) or e-mail. The SDR or e-mail will be forwarded to the lead Sample Custodian and Facility Manager for resolution and documentation.

If an equipment failure (compressor failure, door left open, etc..) results in the storage refrigerator temperature exceeding the upper or lower control limits or the temperature cannot be stabilized, the samples will be moved to suitably controlled storage until the equipment failure is corrected or the refrigerator temperature is stabilized.

2.2 Sample Receipt

All samples that are not hand-delivered directly from the sample site, will have temperatures taken. Sample custodians will document sample receipt temperature readings on the designated client chain-of-custody (COC) and within LabNet (LIMS). These readings will be reported to the client in the final data report.

"Samples collected in the field must be transported to the laboratory as expeditiously as possible. When a 4°C requirement for preserving the sample is indicated, the samples must be packed on ice or chemical refrigerant to keep them cool during collection and transportation. It is acknowledged that during transit it is not always possible to rigorously control the temperature of the samples.

As a general rule, storage at low temperature is the best way to preserve most samples. It is impossible to set acceptance temperature limits for the cooler temperature because of the complexity of this issue." (Reference: AFCEE IRP Manual, Section 2.2.1).

When, in the judgment of the laboratory, the temperature of the samples upon receipt may have effected the stability of the analytes of interest, the problem will be discussed by the Project Manager (PM) with the client."

In situations where a definitive sample temperature criteria is required by a QAPP, contract, etc.., the client will be notified and an SDR will be written. The samples in question will be logged into the LabNet, but the sample status will be put on "HOLD".

3.0 SAMPLE RECEIPT

Protective over garments, gloves and safety glasses will be worn.

3.1 Any samples that are received must be screened for Gamma Radioactivity with the Model 19 Micro R Meter. (Refer to USR-002.)

3.2 When samples are received from couriers, the air bills are signed, dated, and timed by the sample custodians. If the client name is not present on the air bill, it is written in by the sample custodians. Copies of the air bills are maintained with the original paperwork. Original airbills are relinquished to the Accounts Payable Department for processing.

3.3 When sample coolers are received with COC seals on them, they are cut and saved until they are checked against the seal numbers on the COC. The cooler is then opened, the COC is removed from the cooler to determine what samples were received and to match up the seal numbers. If there is a certain batch of samples that require a quick turnaround time or short hold-times, that batch is processed first. Be aware of the collection dates in reference to holding times (Attachment 3).

NOTES:

- Samples received from or sample coolers sent for North Carolina projects will utilize crushed ice as a coolant as opposed to blue ice.
- All NFESC samples will be checked for the presence of required field blanks and rinsates.

3.4 If the COC seals do not match, the difference(s) are noted in an SDR.

3.5 Empty one cooler at a time to ensure that there is no confusion of samples or paper work. A COC should be enclosed with each batch of samples. Group the sample bottles according to the client ID on the COC. If no COC is present, the samples are

arranged in an alpha-numeric order. Once all the samples are out of the cooler, compare the samples with the COC to ensure that everything is present.

3.6 All water samples that require pH preservation and Method 608 samples will be checked for preservation by using pH paper and a disposable transfer pipette (Attachment 4). The sample custodians will document this verification by signing their initials and date in the "Notes" section under "Properly Preserved" on the COC and within the sample receipt checklist in the LabNet job (a.k.a., batch number).

3.7 If the samples are not preserved, an SDR is initiated and submitted to the PM. If the PM determines by discussion with the client that the sample(s) will be preserved in the laboratory by the login personnel, this information will be noted in the SDR.

3.8 If the samples are to be preserved by the login personnel, the information is recorded in the preservative logbook. This information includes: date; client name; sample number; preservative; preservative lot number; and the name of the person preserving the sample.

3.9 If the metals water samples are not preserved, they will be preserved in login and a sticker will be placed over the lid of the sample bottle. This pre-printed sticker will document "Sample preserved in login, do not analyze for 18 hours".

3.10 The date and time of the preservation will be documented by the sample custodian on the sticker.

3.11 One water sample (unpreserved bottle) from every shipment and/or each sampling site will be checked for the presence of total residual chlorine upon receipt by the sample custodians via potassium iodide paper. If detected, an SDR will be initiated and laboratory department(s) will pretreat samples (according to the method SOPs) prior to analysis/preparation.

NOTES:

- NPDES samples requiring North Carolina DEHNR/DEM certification, will have one organic sample for every shipment and each site checked for the presence of chlorine by using potassium-iodide test paper

3.12 All water VOA vials will be checked for air bubbles, excessive head space and these items will be documented if present. Due to the nature of the sample/analysis, all water VOAs are checked for pH preservation at the time of analysis. Documentation is preformatted into each instruments run log.

3.13 Document any discrepancies on the SDR, i.e., missing samples, broken bottles, sample spillage, insufficient sample volume, incorrect preservative or discrepancies in sample ID, etc., and distribute it to the appropriate personnel.

3.14 If there are any problems, call the appropriate PM by referring to the LabNet Project Number. If the PM for the project is unavailable, the designated alternate PM should be notified.

3.15 All the COC's must be signed and dated by sample custodians.

NOTE: Login personnel will obtain a second temperature of samples during the login process when the samples have been outside of cold storage for an inordinate length of time. If, at that time, it is observed that the temperature is approaching 6°C, the samples will be stored temporarily in walk-in cooler #8. The login process will be completed electronically. The samples will be returned to the login area to complete the process.

4.0 SHIPMENT RECEIPT CUSTODY RECORD (AFTER-HOUR RECEIPTS)

The laboratory's routine working hours, which includes Saturday coverage, are defined to our clients so that trained sample custodians are available to process sample receipts. When samples are received at a time when the sample custodians are not available or when samples cannot be logged in at the time of receipt, the samples are placed in a walk-in cooler and a Shipment Receipt Custody Record (Attachment 5) is completed. These samples are promptly logged in on the next working day.

Cooler temperatures of unscheduled sample receipts are not taken by non-sample custodians. By these personnel opening and measuring the temperatures of unscheduled and after hours cooler shipments, the laboratory "accepts" custody for the samples without verification of the COC (i.e., complete sample integrity). Clients are encouraged to notify their project manager of late sample deliveries so that sample custodians are available on-site to process the receipts.

Samples dropped off after hours are subject to non-compliance due to the short amount of time that the samples are actually on ice. It will be noted that the samples were "chilled" and a temperature will be taken during the login process, the next day. This information is documented on the Shipment Receipt Custody Record.

5.0 SAMPLE LOGIN

5.1 Confirm the information on the COC against the sample labels (for example: date due, work order number, parameters).

5.2 The sample custodians pull up each clients Project from LabNet to process the samples. All the information necessary to process the samples has already been entered into the designated Project Number by the PMs to ensure smooth & efficient sample login.

5.3 The COC is reviewed to ensure comparability between the samples and the documentation on this form. The custodians complete the form by answering several questions concerning the sample condition. (These questions are also synonymous with LabNet's sample receipt checklist.) Any problems with sample condition will be noted on the COC and an SDR will be initiated and submitted to the PM. If required by the client, a cooler receipt form will be filled out containing the same information. All initial sample receipts and sample subcontracting transfers will be documented on this internal COC.

5.4 A sample number consists of a sequential number that is assigned to a sequentially assigned Job Number. For example, an assigned Job Number of 200102 for samples 1 through 10 are noted as 200102-1; 200102-2, 200102-3, etc.. Each container within a sampling point is also given a unique sample number to provide for a container-numbering system that uniquely identifies each sample container.

NOTE: All samples on "HOLD" will be assigned a sample number and logged into LabNet.

5.5 Samples received that cannot be logged in at the time of receipt, will be checked for short hold times and quick TAT, and the temperature taken. A LabNet sample receipt checklist and a copy of the COC will be completed and placed in the login pending file. The original COC will be returned to the cooler, and the cooler will be resealed with COC tags. The assigned sample numbers will be documented on the top of the cooler.

5.6 The PM will designate the QC or Deliverables within their project (i.e., P1, P2, L2QFMDL, L3QFND, L4QFRLU, L4QFAFCE; L4QFCLP, etc..). [Refer to the Data Management SOP (UDM-001) for a description of the data deliverables.]

5.7 Matrix Spike (MS) and MS Duplicate (MSDs) samples all have one sample number and are designated within LabNet.

5.8 For soluble metals analysis, the samples are either field filtered or filtered by the metals and/or TCLP preparation personnel. Login personnel transport filtered samples to the lab for filtration.

CLP metal samples are logged-in in batches of 20 samples. (Total and soluble metals may be logged in different batches.) Different matrices will be in separate batches.

If a sample requires a leachate procedure, the original material is assigned the leaching procedure. A new sample number is created for the leachate and the appropriate tests are assigned. The maximum batch size will be 20 original samples. The PM and client will determine what samples are to be spiked.

5.9 After all the COC and sample information is reviewed to be in agreement, each sample bottle is labeled with their printed LabNet sample number. In the event that sample login receives only one (1) sample bottle to be used for all analyses including Volatiles, a label will be placed over the lid of the bottle indicating that it is the only sample bottle. Volatiles must be analyzed first. The volatiles analyst will check the label after their analysis is complete, indicating that the sample can be used for the remaining analyses. The sample will be stored in the Volatiles walk-in cooler.

5.10 If a sample requires a quick turnaround time or has a short hold time, the sample is given directly to the analyst. If the sample does not receive any special treatment, it is placed in the appropriate cooler.

- **Cooler 1:** Consecutive sequence of extractable organic waters.

- **Cooler 2:** Consecutive sequence of Metals and Leachate parameters. Samples that are a waste or solid are also stored in this cooler.

- **Cooler 3:** Consecutive sequence of CLP samples and samples requiring internal COC. This cooler is kept locked at all times. When samples are needed from this Cooler, the analyst comes to the sample custodians to sign out the samples on an Internal Sample Transfer Custody Record (Attachment 6). The sample custodians (Jeff James or Jeff Lunt) will retrieve the samples from the cooler. Upon returning the samples, the analyst will relinquish them back to the sample custodians, and the samples are once again stored in the locked Cooler.

  NOTE: Metals digestates that require internal COC will be kept locked in Room 1502B (Metals Closet located in the instrument laboratory).

- **Cooler 4:** Organic extraction samples that are in process.

- **Cooler 5:** Consecutive sequence of GC and GC/MS Volatiles. This cooler is kept locked at all times. All GC/MS and CLP GC Volatile samples are relinquished directly over to this cooler / department.

- **Cooler 6:** All organic extracts.

- **Cooler 7:** Consecutive sequence of all Wet Chemistry samples.

- **Cooler 8:** (See Cooler 3)

NOTE: Unless otherwise required by Contract or QAPP, NFESC aqueous metals samples, excluding hexavalent chromium, are stored in a locked storage cabinet located across the hall from the sample receipt area.

NOTE: NPDES samples requiring North Carolina DEHNR/DEM certification must be maintained at a temperature between 1 - 4°C. To accomplish this, these samples will be stored in transferable coolers, along with wet ice, and it's own thermometer in each cooler. These coolers will then be stored within our walk-in coolers. While these samples are in house, the thermometer with these samples will be monitored at the same time as the walk-in coolers.

6.0 SAMPLE LOGIN

With LabNet, the PMs create a Project that has the pre-selected test methods. The sample custodians pull up the project file in LabNet and use the information to assign the sample numbers within the Job (set of project samples). Refer to Attachment 7 for instructions of logging samples into LabNet.

7.0 SAMPLE TRACKING

7.1 All samples will remain in the appropriate coolers prior to and after analysis. For Coolers 1 & 2, the analyst will list the samples they are taking out of the cooler on the wet/dry board posted next to these coolers.

7.2 CLP samples must be relinquished to the analyst. The analyst and sample custodian must sign the original COC or an Internal COC tracking form (by Job Number) for relinquishing custody of the samples from the sample custodian to the analyst. When the samples are returned to the appropriate cooler, the analyst will sign the custody of the returning sample(s) back to the sample custodian.

7.3 Any change in the sample during the time of custody will be noted on the COC, i.e., sample breakage or depletion. This information should be passed on to the appropriate laboratory personnel and the PM.

8.0 "SUB-OUT ANALYSES" FORMAT

When it becomes necessary to sub-contract samples, the following procedure should be followed.

8.1 The PM in charge of the samples that need to be subbed out will contact the sample custodians and supply information and paperwork regarding samples/ analyses to be subbed, location of contract laboratory, and any special instructions.

8.2 If any other laboratory personnel contact sample custodians in regards to sub-contracting samples, they will contact the PM to secure the proper paperwork.

8.3 The samples to be subbed will be removed from the cooler and inventoried to assure that all the samples are present. If only a portion of the requested analyses are to be subbed, the samples may have to be split (will be defined by the PM).

8.4 STL's practice is to log subcontract work on a separate LabNet job. This enables the laboratory to better track the subcontracted parameters. In order to link the 'parent' job to the subcontract job the following procedure will be followed:

1. Parent Job: In the 'Additional Analysis/Remarks' field, login personnel will note the Subcontracted Job Number.
2. Subcontracted Job: In the 'Additional Analysis/Remarks' field, login personnel will note the corresponding Parent Job Number.
3. LabNet: Using the job notes feature, login personnel will indicate the Parent and Subcontract Job Numbers.

8.5 Along with the paperwork supplied by the PM, the sample custodians will include a COC with the samples.

8.6 If the sub-contracting laboratory is another STL Laboratory, include the pertinent client information on the COC, i.e. client name, work order number, etc..

8.7 If the sub-contracting laboratory is a private lab, ensure that the client information remains confidential, i.e. the client name will be STL, the work order number will not be noted on the COC, etc.

8.8 One copy of all the paperwork sent with the samples must be made and attached to the original COC.

8.9 The samples with the appropriate paperwork will be packed in a cooler in *accordance with proper IATA regulations and delivered to the shipping personnel by 4:00* pm.

9.0 SAMPLE DISPOSAL

If a sample is received broken or is broken in the laboratory, the Environmental Health & Safety Coordinator (EHSC) will be contacted for proper clean-up procedures. If the

sample is known to be non-hazardous, personnel may salvage as much sample as possible without contamination and place the original broken container in a plastic bag. The EHSC and the sample custodians will be informed of the incident. The sample custodians will document the breakage on the client paperwork and inform the PM of the incident.

The waste sample disposal is handled by waste management department (UWM-001). General requirements for logins sample/digestate/extract disposal procedures are as follows:

- The standard sample disposal time is 30 days after the report is submitted.
- For standard sample disposal, a list is generated from LabNet.
- Samples requiring internal COC are disposed of 60 days after the report has been submitted, unless other arrangements have been specified by the PM.
- The water samples will be taken out of the coolers by the sample custodians. The numbers will be checked on the bottles to make sure they are the correct samples that are ready for disposal.
- The samples will be taken to the disposal room and the bottles emptied.
- Non-water samples are disposed of by the waste disposal group.
- All hazardous samples will be disposed of commercially or returned to the client.

10.0 SAMPLE BACKLOGS

1. All LabNet backlogs are printed by each department or section manager on a daily basis to review the receipt of additional samples and review holding times.

2. Copies of the COCs and all supporting LabNet paperwork are maintained in the Job's file folder that is maintained in the data management department.

3. Every morning, the Project Manager reviews all of their LabNet jobs to ensure that everything was logged in correctly. If there are corrections to be made, they are changed in the computer, the analyst, section manager, or PM is notified. (LabNet maintains a trail of changes to each job.)

11.0 ATTACHMENTS

Attachment 1: Example: Electronic Temperature Monitoring Diagram / Spreadsheet
Attachment 2: Example: STL's Chain-of-Custody
Attachment 3: Example: Sample Hold Times
Attachment 4: Example: Sample Preservatives
Attachment 5: Example: Shipment Receipt Custody Record
Attachment 6: Example: Internal Sample Transfer Custody Record
Attachment 7: Example: LabNet Computer Login Instructions

Historical File:

Revision 05: 04/15/92
Revision 06: 03/11/93
Revision 07: 11/15/93
Revision 08: 07/21/95
Revision 09: 04/08/96
Revision 10: 04/14/97
Revision 11: 11/03/97
Revision 12: 03/16/99
Revision 13: 09/27/00
Revision 14: 05/29/01
Revision 15: 10/22/02

Reasons for Change, Revision 15:

- Section 4: Clarified unscheduled 'after-hours' sample receipt/storage procedures.
- Section 5.6: Updated LabNet deliverable format names (examples).
- Section 8.4: LabNet tracking of subcontracted analyses.

U:\QC\SOP\SR\SOP-001.DOC

Attachment 1.

Example: Electronic Temperature Monitoring Diagram / Spreadsheet

Blue: Below Lower Limit

Red: Above High Limit

Green: Within Normal Limits

Black: Borderline

Cooler Temperature Tracking - REALTIME

10/8/02 8:03 AM

(Press F9 to refresh temperatures)

All temps in Celcius

Area Five

- Walk-in Cooler5 — 4.5 — VOA — 17()
- GCVOA — 4.0 — DW_354 — 16 (-1)
- GCVOA — -15 — MontWard128 — 18(-5)
- VOA — -20 — MontWrd355 — 19(-5)
- Encore — -23 — Kenmore40
- GCVOA — -17 — Baxter356 — 20 (-5)

VOA

- MS BNA — 4.4 — Refr 299 — 21(-1)
- MS BNA — -17 — Baxter 304 — 25 (2)

BNA

- Walk-in Cooler6 — 3.0 — GCPest — 24 ()
- GC Pest — 4.2 — HPLC220 — 23(-1)
- GC Pest — 4.3 — HPLC219 — 22 (-)

GC

Area Three

- Walk-in Cooler 7 — 1.8 — WetChem — 14()
- Incubator — 20.6 — Vwr 843
- WetChem — 5.0 — Baxter730 — 15(-1)
- Incubator — 20.5 — 1337

WETCHEM

Area Two

- Walk-in Cooler 8 — 4.0 — 9 ()
- Dionex — 4.0 — WC_804 — 11(0)
- Lachat — 2.6 — WCMicro — 10 ()

Area One

- Walk-in Cooler 4 — 4.9 — 4 ()
- Extractions — 4.3 — VWR 604 — 9 (-3.5)
- OrgExtract — 2.7 — FA-353 — 5 (-2.5)
- Walk-in Cooler3 — 3.6 — 1()
- Walk-in Cooler 2 — 4.2 — 2()
- Walk-in Cooler 1 — 4.8 — 7()
- Lims Room — 6
- Fieldock — 12(-) — 13 (0)
- Frigidaire Freezer 039 — -15

Tuesday

STL-Chicago Temperature Tracking

Date is 10-08-2002.

TIME	352	128	355	356	299	219	220	218	304	1337	40
5:40:47	3.1	-16.5	-20	-20.7	4	3.4	8.9	2.4	-13.7	20.5	-19.6
11:14:07	4.8	-10.9	-21.5	-20.4	4.9	3.4	6	3.9	-15.1	20.5	-12.2
16:47:27	4.4	-16	-19.4	-16.6	4.3	3.8	3.6	2.2	-16.6	20.6	-24.6
22:20:47	4.3	-12.9	-18.2	-16.4	4.6	2.9	5.9	3.2	-15.4	20.5	-23.8

djm
10/9/02

Tuesday

STL-Chicago Temperature Tracking

Date is 10-08-2002.

TIME	377	378	379	646	353	Incuba	604	380	599	804	39	853	730	354
5:40:47	2.9	4.8	2.5	5.2	2.6	20.6	4.4	3.6	2.6	4	-13.1	2.5	5	4.3
11:14:07	4.4	3.9	3.4	4.6	4.1	20.5	5.2	3.6	3.1	4.1	-13.6	2.3	5.2	4.2
16:47:27	4.6	4.6	3.8	4.9	3.8	20.6	4.5	3.7	3	4.2	-14.3	3.6	5.4	4
22:20:47	2.8	4.8	3.7	5.1	5.6	20.7	4.2	3.9	4.9	5.2	-16.3	3.6	5.1	4.2

djm
10/9/02

Attachment 2.

Example: STL's Chain-of-Custody

SEVERN TRENT SERVICES

STL Chicago
2417 Bond Street
University Park, IL 60466
Phone 708-534-5200
Fax: 708-534-5211

Report To:
Contact:
Company:
Address:
Phone:
Fax:
E-Mail:

Bill To:
Contact:
Company:
Address:
Phone:
Fax:
PO#: Quote:

Shaded Areas For Internal Use Only ____ of ____

Lab Lot#

Package Sealed	Samples Sealed
Yes No	Yes No
Received on Ice	**Samples Intact**
Yes No	Yes No

Temperature °C of Cooler

Within Hold Time	Preserv. Indicated
Yes No	Yes No NA
pH Check OK	**Res Cl_2 Check OK**
Yes No NA	Yes No NA

Sample Labels and COC Agree
Yes No COC not present

Sampler Name:
Signature:
Project Name:
Project Number:
Project Location:
Lab PM:
Date Required
Hard Copy: ___/___/___
Fax: ___/___/___

Laboratory ID	MS-MSD	Client Sample ID	Sampling Date	Sampling Time	Matrix	Comp/Grab	Refrg # / # / Cont. / Volume / Preserv										Additional Analyses / Remarks

RELINQUISHED BY	COMPANY	DATE	TIME	RECEIVED BY	COMPANY	DATE	TIME
RELINQUISHED BY	COMPANY	DATE	TIME	RECEIVED BY	COMPANY	DATE	TIME

Matrix Key
WW = Wastewater
W = Water
S = Soil
SL = Sludge
MS = Miscellaneous
OL = Oil
A = Air
SE = Sediment
SO = Solid
DS = Drum Solid
DL = Drum Liquid
L = Leachate
Wi = Wipe
O = _____

Container Key
1. Plastic
2. VOA Vial
3. Sterile Plastic
4. Amber Glass
5. Widemouth Glass
6. Other _____

Preservative Key
1. HCl, Cool to 4°
2. H2SO4, Cool to 4°
3. HNO3, Cool to 4°
4. NaOH, Cool to 4°
5. NaOH/Zn, Cool to 4°
6. Cool to 4°
7. None

COMMENTS

Date Received / /
Courier: **Hand Delivered**
Bill of Lading

Attachment 3.

Example: Sample Hold Times

STL Chicago
Maximum Sample Holding Times

Parameter	Drinking Water (1) (VTS)	Standard Methods (VTS)	40 CFR NPDES (VTS)	SW-846 (VTS)		CLP (2) (VTSR)	
	Waters	Waters	Waters	Waters	Soil/Sed.	Waters	Soil/Sed.
BACTERIAL:							
Coliform, Fecal & Total Fecal Streptococci	30 hrs. 30 hrs.	30 hrs. 30 hrs.	6 hrs. 6 hrs.				
INORGANIC TESTS:							
Acidity		14 days	14 days	14 days	14 days		
Alkalinity	14 days	14 days	14 days	14 days	14 days		
Ammonia		28 days	28 days	28 days	28 days		
Anions by IC:							
Fluoride	28 days			28 days	28 days		
Chloride	28 days	28 days		28 days	28 days		
Nitrite-N	48 hours	48 hours		48 hours	48 hours		
Bromide	28 days	28 days		28 days	28 days		
Nitrate-N	48 hours	48 hours		48 hours	48 hours		
Ortho-Phosphate P	48 hours	48 hours		48 hours	48 hours		
Sulfate	28 days	28 days		28 days	28 days		
BOD / cBOD		48 hrs.	48 hrs.	48 hrs.	48 hrs.		
Bromide		28 days	28 days	28 days	28 days		
COD		28 days	28 days	28 days	28 days		
Chloride	28 days		28 days	28 days	28 days		
Chlorine, Total Residual	On-Site	On-Site	On-Site	On-Site	On-Site		
Color	48 hrs. (NY)	48 hrs.	48 hrs.	48 hrs.	48 hrs.		
Cyanide, Total	24 hrs. (IEPA) 14 days (Other)	14 days	14 days (3)	14 days	14 days	12 days	12 days
Cyanide, Amenable to Chlorination			14 days (3)	14 days	14 days	12 days	12 days
Fluoride	28 days	28 days	28 days	28 days	28 days		
Hardness		6 mo.	6 mo.	6 mo.	6 mo.		

Parameter	Drinking Water (1) (VTS)	Standard Methods (VTS)	40 CFR NPDES (VTS)	SW-846 (VTS)		CLP (2) (VTSR)	
	Waters	Waters	Waters	Waters	Soil/Sed.	Waters	Soil/Sed.
pH	On-Site	On-Site	On-Site	On-Site	On-Site		
Kjeldahl & Organic Nitrogen (TKN)		28 days	28 days	28 days	28 days		
Nitrate	14 days (Pres.)(4) 48 hrs. (Unpres.)	48 hrs.	48 hrs.	48 hrs.	48 hrs.		
Nitrate-Nitrite	28 days	28 days	28 days	28 days	28 days		
Nitrite	48 hrs.	48 hrs.	48 hrs.	48 hrs.	48 hrs.		
Odor	24 hrs. (NY)	On-Site					
Oil & Grease		28 days	28 days	28 days	28 days		
Organic Carbon (TOC)		28 days	28 days	28 days	28 days		
Orthophosphate		48 hrs.	48 hrs.	48 hrs.	48 hrs.		
Oxygen, Dissolved Probe		On-Site	On-Site	On-Site	On-Site		
Winkler		8 hrs.	8 hrs.	8 hrs.	8 hrs.		
Petroleum Hydrocarbons		28 days	28 days	28 days	28 days		
Phenols		28 days	28 days	28 days	28 days		
Phosphorus (Elemental)		48 hrs.	48 hrs.	48 hrs.	48 hrs.		
Phosphorus, Total			28 days	28 days	28 days		
Residue, Total (TS)		7 days	7 days	7 days	7 days		
Residue, Filterable (TDS)	7 days		7 days	7 days	7 days		
Residue, Non-Filterable (TSS)			7 days	7 days	7 days		
Residue, Settleable			48 hrs.	48 hrs.	48 hrs.		
Residue, Volatile			7 days	7 days	7 days		
Silica		28 days	28 days	28 days	28 days		
Specific Conductance		28 days	28 days	28 days	28 days		
Sulfate	28 days 7 days (NY)	28 days	28 days	28 days	28 days		
Sulfide		28 days	7 days	7 days	7 days		
Sulfite			On-Site	On-Site	On-Site		
Surfactants (MBAS)	48 hrs. (NY)		48 hrs.	48 hrs.	48 hrs.		
Temperature		On-Site	On-Site	On-Site	On-Site		
TOX				28 days	28 days		

Parameter	Drinking Water (1) (VTS)	Standard Methods (VTS)	40 CFR NPDES (VTS)	SW-846 (VTS)		CLP (2) (VTSR)	
	Waters	Waters	Waters	Waters	Soil/Sed.	Waters	Soil/Sed.
Turbidity	48 hours	48 hrs.	48 hrs.	48 hrs.	48 hrs.		
METALS:							
Chromium VI		24 hrs.	24 hrs.	24 hrs.	24 hrs.		
Mercury	24 days (P) 28 days (G) 14 days (P - NY) 26 days (G - NY)	28 days	28 days	28 days (P/G)	28 days (P/G)	26 days	26 days
Silica							
Metals, All (Except Hg & Cr+6)	6 mo.	6 mo.	6 mo.	6 mo.	6 mo.	180 days	180 days
ORGANICS:							
Volatile Halocarbons	14 days (NY)	14 days	14 days	14 days	14 days		
Volatile Aromatics	14 days (NY)	14 days	14 days	14 days	14 days		
EDB / DBCP To Extract: After Extraction:				14 days 24 hours			
GRO (CA LUFT)				14 days	14 days		
Acrolein & Acrylonitrile		14 days	14 days	14 days	14 days		
Trihalomethanes	14 days						
BNA Compounds To Extract: After Extraction				7 days 40 days	14 days 40 days	5 days 40 days	10 days 40 days
VOA Compounds	14 days		14 days	14 days	14 days	10 days	10 days
Phenols To Extract: After Extraction:			7 days 40 days	7 days 40 days	14 days 40 days		
Pesticides/PCBs To Extract: After Extraction:			7 days 40 days	7 days 40 days	14 days 40 days	5 days 40 days	10 days 40 days
PAHs: To Extract: After Extraction:			7 days 40 days	7 days 40 days	14 days 40 days		
Herbicides To Extract: After Extraction:				7 days 40 days	14 days 40 days		
DRO (CA LUFT) To Extract: After Extraction:				7 days 40 days	14 days 40 days		

Parameter	Drinking Water (1) (VTS)	Standard Methods (VTS)	40 CFR NPDES (VTS)	SW-846 (VTS)		CLP (2) (VTSR)	
	Waters	Waters	Waters	Waters	Soil/Sed.	Waters	Soil/Sed.
TCDD To Extract: After Extraction:			7 days 40 days	7 days 40 days	14 days 40 days		
OP Pesticides To Extract: After Extraction:				7 days 40 days	14 days 40 days		
RADIOLOGICAL TESTS:							
alpha, beta & radium			6 mos.	6 mos.	6 mos.		

TCLP and SPLP Holding Times

Parameter	From: Field Collection To: TCLP Extraction (days)	From: TCLP Extraction To: Preparative Extraction (days)	From: Preparative Extraction To: Determinative Analysis (days)	Total Elapsed Time (days)
Volatiles	14	NA	14	28
Semi-Volatiles	14	7	40	61
Pesticides/Herbicides	14	7	40	61
Mercury	28	NA	28	56
Metals (except Hg)	180	NA	180	360

NA = Not Applicable

NOTES:

(1) VTS - The Verified Time when the Sample is taken.

(2) VTSR - The Verified Time of Sample Receipt.

(3) Cyanide holding time is 24 hours when sulfide is present.

(4) Nitrate is determined by subtracting the nitrite value from the total nitrate value. The nitrite is sampled in an unpreserved bottle with a holding time of 48 hours and the nitrate is preserved with a holding time of 14 days.

(5) Purgeable Aromatics have a holding time of 14 days if preserved with HCl.

(6) Acrolein has a holding time of 3 days if it is not preserved with HCl.

(7) Preservation is Cool 4°C, pH 5-9; 0.008% Na2S2O3 for residual chlorine if aldrin is to be determined. The holding time is 72 hours if this preservation is not completed.

UQA-SOP-ALARM.

Attachment 4.

Example: Sample Preservatives

STL Chicago
Sample Bottle and Preservation List

Description	Parameter	Preservative (1)	Color
1-Liter HDPE oblong bottle (Water Samples)	*** GENERAL:** pH, Chloride, Chlorine (Residual) Fluoride, Conductivity, Sulfate Nitrite, Solids (TSS, TDS, TS), Turbidity, Ortho-Phosphate, Color	Cool 4 ± 2°C	---
	***ALKALINITY** ***ACIDITY** (minimal headspace)	Cool 4 ± 2°C	---
	***BOD**, All Forms	Cool 4 ± 2°C	---
	***DISSOLVED OXYGEN** (No Headspace)	Cool 4 ± 2°C	---
	***AMMONIA**	4 mL of 1:1 H_2SO_4; Cool 4 + 2°C	Yellow
	***SULFIDE,** All Forms	1.3 mLs of 1% Zinc Acetate + 3.7 mLs 1:1 NaOH; Cool 4 ± 2°C	Green
	***NUTRIENTS:** COD, Phosphorus, Phosphate, TKN, Nitrate-Nitrite	4 mL of 1:1 H_2SO_4; Cool 4 + 2°C	Yellow
	***NITRATE** - 2 bottles	4 mL of 1:1 H_2SO_4; Cool 4 + 2°C Cool 4 ± 2°C	Yellow ---
	***CYANIDE - REACTIVE**	2 mL 10 N NaOH; Cool 4 ± 2°C (For chlorinated waters, add 0.6 g ascorbic acid.)	White
	***METALS,** All ***HARDNESS**	5 mL of ~~35%~~ 1:1 HNO_3 (pH < 2); Cool 4 ± 2°C 10/22/02	Red
	***LEACHATE METALS**	5 mL of ~~35%~~ HNO_3 (pH < 2); Cool 4 ± 2°C	Red
250-mL HDPE oblong (Water Samples)	***ALKALINITY** (minimal headspace)	10/22/02 1:1 Cool 4 ± 2°C	---
	***ACIDITY** (minimal headspace)	Cool 4 ± 2°C	---
	***CHROMIUM, HEXAVALENT**	Cool 4 ± 2°C	---
	***CYANIDE** Total & Amenable	2 mL 10 N NaOH. Cool 4 ± 2°C (For chlorinated waters, add 0.6 g ascorbic acid.)	White (4)
	***IC ANIONS**	Cool 4 ± 2°C	---
1-L Amber Glass (Narrow-mouth) (Teflon-lined cap) (Water Samples)	***TOX** (x1) (x4) (No Headspace)	4 mL of 1:1 H_2SO_4; Cool 4 + 2°C	Yellow
	***ODOR**	Cool 4 ± 2°C	---
	***CARBONATE / BICARBONATE**	No Headspace, Cool 4 ± 2°C	---
	***DIOXIN** (2 bottles)	Cool 4 ± 2°C	---
	***EXTRACTABLE ORGANICS:** Pesticides/PCBs; DRO; BNAs; Herbicides; PAHs; Explosives (2 bottles each)	Cool 4 ± 2°C	---
32 oz. Amber Glass (Wide-mouth) (Water Samples) **Note:** Add'l volume needed for MS/MSDs	***OIL & GREASE**	4 mL of 1:1 H_2SO_4; Cool 4 + 2°C	Yellow
	***TPH's** (EPA 1664)	4 mL of 1:1 H_2SO_4; Cool 4 + 2°C	Yellow
	***BNAs** (EPA 625 - 2 bottles)	Cool 4 ± 2°C	---
	***PAHs** (EPA 610 - 2 bottles)	Cool 4 ± 2°C	---
	***PESTICIDES/PCBS** (EPA 608 - 2 bottles)	Cool 4 ± 2°C	---
500 mL Amber Glass (Wide-mouth)	***PHENOL**	4 mL of 1:1 H_2SO_4; Cool 4 + 2°C	Yellow
4, 8, 16 or 32 oz. Straight-Sided Paragon Flint Glass (Soils) (Wide-mouth)	***EXTRACTABLE ORGANICS** Pesticides/PCBs; DRO; BNAs; Herbicides; PAHs; Explosives	Cool 4 ± 2°C	---
	***METALS** (All)	Cool 4 ± 2°C	---

STL Chicago
Sample Bottle and Preservation List

Description	Parameter	Preservative (1)	Color
(continued)	*CYANIDE	Cool 4 ± 2°C	---
	*NUTRIENTS COD, Phosphorus, Phosphate, TKN, Nitrate-Nitrite	Cool 4 ± 2°C	---
	*GENERAL pH, Chloride, Chlorine (Residual) Fluoride, Conductivity, Sulfate Nitrite, Solids (TSS, TDS, TS), Turbidity, Ortho-Phosphate, Color	Cool 4 ± 2°C	—
	*SULFIDE (All Forms)	Cool 4 ± 2°C	---
	*OIL & GREASE	Cool 4 ± 2°C	---
	*PHENOLS	Cool 4 ± 2°C	—
40 mL borosilicate Glass Vial (Water Samples)	*VOAs / THMs (DW) (No Headspace)	0.25 mL 1:1 HCl; Cool 4 + 2°C (E 524.2 Chlorinated waters: Add 25 mgs Ascorbic Acid prior to sampling.)	Blue
	*EDB /DBCP (EPA 504)	0.25 mL 1:1 HCl; Cool 4 + 2°C (Chlorinated waters: Add 25 mgs Sodium Thiosulfate prior to sampling.)	Blue
(Pre-Preserved Vials w/ HCl or H_2SO_4)	* BTEX / GRO	0.25 mL 1:1 HCl; Cool 4 + 2°C	Blue
	*TOC (x4) *DOC (x4)	0.5 mL of 1:1 H2SO4; Cool 4 + 2°C	Yellow
1 gallon HDPE (Water Samples)	*RADIOACTIVITY (4) Gross Alpha / Beta Radium 226/228	10 mL of Conc. HNO_3; Cool 4 ± 2°C	—
	*PRE-FILTRATION	Cool 4 ± 2°C	---
2-oz Straight-sided Paragon Flint Glass (Wide-mouth) (Soil Samples)	*VOAs / THMs	Cool 4 ± 2°C	
	*GRO	Cool 4 ± 2°C	---

Note:

(1) All samples/parameters are maintained at 4 ± 2°C prior to analysis and sample disposal.

(2) Nitrate - If analyzed by the IC (Ion Chromatography), then the nitrate and nitrite must be taken from the general, unpreserved, sample bottle and be analyzed within 48 hours. If analyzed by the LACHAT, the nitrite is analyzed from the general, unpreserved

(3) Dissolved oxygen that will receive subsequent BOD analysis must have no headspace in the bottle.

(4) Radioactivity is preserved upon receipt in the laboratory with 10 mL of concentrated nitric acid.

(Note: 1-L bottle used for single components

*Indicates the general category for bottle/preservation. Each successive parameter is bottled and preserved as indicated by each appropriate category.

Attachment 5.

Example: Shipment Receipt Custody Record

STL Chicago
Shipment Receipt Custody Record

STL Number: _____	COC Tape was present on outer package: Yes No
Carrier: _____	COC Tape was unbroken on outer package: Yes No
Shipping Receipt Number: _____	
Date Received: _____	
Time Received: _____	
Project Name: _____	Signature: _____
Interim Storage Location[1]: _____	Date / Time: _____
Person Receiving Shipment: _____	

[1]*Note: The sample cooler(s) (circle one): a) delivered via non-overnight carrier and placed in secured storage prior to processing the next working day.*
b) were placed in secured refrigeration storage with temperatures taken the next working day prior to processing;
c) temperatures were taken upon receipt, placed in secured refrigeration storage with the processing completed on the next working day.

COC Tape was present on outer package: Yes No
COC Tape was unbroken on outer package: Yes No

Relinquished to:
Person Unpacking Shipment: _____ Signature: _____ Date: _____ Time: _____

Comments: _____

_____

_____

_____

Signature: _____ Date: _____

CHI-22-11-010/E-10/02

Attachment 6.

Example: Internal Sample Transfer Custody Record

STL Chicago
Internal Sample Custody Transfer Record

Sample Lot#:_____ Client:_____

Sample No.	Analysis	Relinquished by:	Received by:	Date	Time	Comments

CHI-22-11-001/C-1/99

Attachment 7.

Example: LabNet Computer Login Instructions

STL Chicago
Work Instruction for LabNet Computer Log-In

I. Sample Log-In

1. Enter your initials at the "login:" prompt(enter)
2. Enter your password at the "password:" prompt(enter)
3. Enter "LabNet" at the "$" prompt

At the Main Menu:

4. Select 4-LabNet Job Login(enter)
5. At the LabNet Job Login Screen:
6. Select 1-Login Job(enter)

At the Login Job screen:

7. Location code never changes(enter)
8. Enter Job Number-Select "Enter" from your keyboard and LabNet will inquire "Do you want to start a new job?"
9. Select "Y" on your keyboard and LabNet will assign the next available job number.
10. Enter through the Job Status section and the job will be set to "A"(Active).
11. Enter Project Code-Enter the 8 digit code for the particular project you wish to access to log in the job or select F1 to look up from a list of projects.
12. A project description should appear next to the 8 digit number, after entering.
13. Your cursor should now be on the Cust. Project ID. Enter the same information found after the 8 digit project number(as much as possible). It will appear as upper case letters.
14. Enter through the JDE Acct. section
15. Enter through the Login Person section(your initials should appear).
16. Enter through the Report Code section. Note if CLP deliverable,(job should be logged as an "Internal", complete with Internal COC's filled out).
17. Enter through the TAT section(a TAT should be assigned)
18. Enter through the Date Received section(the current date should appear)
19. Enter through the Due section(the due date will be calculated based on the date received and the TAT).
20. At the Login Job Menu:
21. Cursor through the Customer information item
22. Select "Enter" at the Sample Receipt Check List-answer all of the questions with a "Y" or "N", that pertain to this job. If some questions do not pertain, then skip them. Ensure that a temperature is entered on the Check List at the temperature question.
23. Select F2 to save the Check List and return you to the Login Job Menu.
24. Cursor through the Sample Questions item
25. The Jobs' Samples line should be highlighted. Select "Enter" on your keyboard.
26. Your cursor should now be on the blank Sample# column. Select "Enter" and LabNet will inquire "Do you want to Start a New Sample?" Select "Y" on your keyboard and LabNet will bring you to the Sample Information screen.
27. At the Customer ID-Enter the customer ID as it appears on the COC(Enter). The Received Date should already appear. Enter the time(Military), of which the samples were received that day(Enter).
28. Enter the Sample Date-Time as they appear on the COC(Enter).
29. Enter through the Sample logger section(your initials should appear).

30. At the Sample Matrix prompt. Select F1 and a menu should appear with a list of Matrices. Select the matrix which applies to that sample(Enter). The menu will go away and the matrix selection you've made should appear.

31. Enter through the Report Sample section.
32. At the QA/QC Required(Y/N) section-if matrix QC is required on this sample, enter "Y". If not, leave as "N".
33. Enter through the Sample Type-one should appear.
34. Enter again and the cursor should be on the first line of the Enter Answers column.
35. At this point, the sample bottles need to be recorded for all samples. While your cursor is on the Enter Answers column, Select SF2 to get to the Job Sample Bottle List.
36. Your cursor should be on the Bottle ID column. Select Enter, and LabNet will ask you "Generate a New Bottle ID?". Select Y(yes) and a new bottle ID Number will appear and the cursor will move to the "Type" column. Select F1 and all the bottle types in the database, will appear. Find the bottle type your looking for by moving your cursor up and down the list. When you find the bottle type you need, select ENTER and that bottle type will appear on the Type line.

37. The cursor will then move to the Preservative column. Select F1 and all of the preservative types in the database will appear. As in the bottle type list, find the correct preservative by moving the cursor, select ENTER and it will appear on the Preserv. line.

38. The cursor will then move to the "F"(filtered), column. Select "Y" or "N" to document that samples' filtration.

39. The cursor will move to the Condition column. This column will accept text only. A brief comment on the condition of the sample(i.e., LTD Volume, To be Filtered, etc..), could be stated here. A blank line will be interpreted as nothing wrong with the sample. If no entry is needed TAB or ENTER through this section.

40. The cursor should now be on the Volume column. This column will also only accept text. A brief description of the volume of the sample is only needed if LTD VOLUME is rec'd. While the client may have sent in a 1-Liter bottle, it may only have 500 mLs of sample in it. A comment here will document and inform the lab.
41. If text is not needed, TAB or ENTER through to the next column.

42. Your cursor should be on the Cont/Bin column. This is where log-in designates which walk-in cooler each bottle will be stored in. Select F1 and cursor up or down to find the correct cooler for where the bottle(s) will be stored. Once the correct cooler is found, Select ENTER and the cooler number will appear and the cursor will move to the Bottle ID column to start the process over for the next bottle.

Note: If you have multiple bottles for one test (i.e., 3 - 40 mL vials for VOA's), enter the information for one of the bottles. The information for that one bottle can be copied. Place your cursor on the Bottle ID column of the first bottle to be copied. Select F1. LabNet will ask: "Would you like to Duplicate bottle ***000000***?"

43. Select "Y" and another screen will ask: "How Many Duplicate Bottles". Enter the number of bottles to be copied and LabNet will assign new numbers to them and copy all of the information from that bottle.

44. Once all of the sample bottles are entered, Select F2(SAVE). LabNet will automatically save the selections and return to the Sample Number Screen.
45. Select F2, Escape, and LabNet will return to the Jobs Samples Screen.
46. Once all sample information is entered for 1 complete sample, it is possible to "copy" that information for other samples. This will ease the sample log-in procedure. To do so, place your cursor on the first sample line. Select F6. LabNet will ask several questions:
47. Would you like to duplicate sample number 1. (select "Y")
48. Do you want to duplicate all of the sample information? Y/N
49. This sample has bottle info-create ID's and Duplicate the bottles?(select "Y")
50. A box should appear asking "how many samples". Enter the number of samples needed to complete the job. Select ENTER. Sample 1 should be duplicated exactly as it was logged. Now, change information per sample (i.e., sample ID, date, time, etc.). If there is one particular sample that has less sample bottles than sample 1, cursor down to that sample, select SF5. This will "zoom" in on that samples bottles. Cursor down to the bottle not needed, and select F3. LabNet will ask "do you want to delete this row?" Select "Y" and the row will be deleted. If you are done, select F2 and the changes will be saved.

51. Selecting Methods
52. From the Job Menu, select "Jobs' Methods and Tests in a Group of Samples"
53. This screen is used to log methods and their tests into a group(range), of samples. The cursor will be on the "Group Number" field. Select ENTER, and LabNet will prompt "Do you want to START a NEW GROUP?". Select "Y" and the system will generate a new group number and move the cursor to the "Description" field.

54. This is a text field. Enter a brief description of the samples about to be logged in (i.e., VOA/Soils, Metals/Waters, EB, TB, etc.). Select ENTER and the system will move the cursor to the "Sample Range" field.

55. Enter the range of the samples to be logged.
56. Pay particular attention to the range selection to be made:
57. Example: If you have soils and waters on the same job, log them into different Groups. If samples 1-5, and 7-10 are soils, the Sample Range should be 1-5,7-10. Use of a comma is needed for LabNet to recognize a separation of sample 5 and sample 7.

CHECK TO ENSURE THE SAMPLE RANGE SELECTED IS CORRECT! ONCE YOU MOVE FROM THE SAMPLE RANGE, IT CAN <u>NEVER</u> BE CHANGED.

58. Select ENTER after the Sample Range has been checked. The cursor should move to the first line under the "Method" column.
59. Select SF1. This will bring up a Menu, "Type of Analysis Zoom", of 3 items:
60. 1)This Jobs' Project Analysis Groups
61. 2)This Jobs Customer Analysis Groups
62. 3)General Systems Analysis Groups

63. ALWAYS SELECT #1!
64. After selecting #1, this will prompt the system to find the analytical methods, selected by the Proj. Mgr., for this Project/Client. There may be several groups of methods to choose from. At this point, cursor through the different groups, and view the methods within the different groups. The methods and their description will appear in the middle of the screen.

65. Once you find the particular group from which to log the methods, select F8 to "Zoom" into that particular group. The cursor should now be on the first method of that group. Cursor down through the group to find the particular method needed to log for the Range you've selected. Select ENTER and that method will be highlighted. If the entire group of methods is to be logged, Select F11. All of the methods within this group will be highlighted.

66. Once the method is highlighted, Select F7 to "Return Selection" to the Range of Samples to be logged for this method. The system will now return to the previous screen(where you selected the Range, its' description and Group#). The method that was highlighted and Returned will appear in the Method column along with its' Description, Method TAT, Destination, etc.
67. To complete the process, Select F2. The system will now SAVE the method to that Range of Samples. Notice at the bottom of the screen that LabNet will tell you it is "Saving Sample 1, 2, 3", etc.

Repeat this process for logging other Groups/Ranges.

II. Jobs' Reviews and Work Processes

68. At the Job Menu, Select Jobs' Reviews and Work Processes.
69. Several Reviews selected by the PM should already appear.
70. There are four (4) Reviews that EVERY job will be logged in for:
71. LOGIN
72. PRICING
73. REPORT
74. INVOICE
75. Ensure that these 4 are selected.

76. If there is data to be faxed to the client on a quick TAT:
77. Move cursor to a blank line. Select F1. A list of Reviews will appear. Cursor to the
78. FAXDATA Review and Select ENTER. This will highlight the review chosen. Select F4. This will Return the Selection to the Review list.
79. If you have selected a FAXDATA review, you MUST add a Fax Due Date.
80. Move the cursor to the FAXDATA review. TAB across to the Due Date column.
81. Enter the fax date.
82. Ensure that the DUE DATE DOES NOT fall on a Weekend day or a Holiday.

83. Once a fax date is entered, a Report Due Date *MUST* be entered.
84. Move cursor to the Report review. TAB across to the Due Date column.

85. Enter the Report Due Date. The Report Due Date should match the Hardcopy Date("Due" section at the main job menu).

III. Bottle Labels

86. From the Job Menu, select "Job Login Reports".
87. Cursor to the "Print Folder Labels". Select F4. An "X" will appear.
88. Cursor to the "Print Sample Labels". Select F4. An "X" will appear.
89. Select F7. LabNet will print the Folder label selected. When the print job is finished, another screen will appear with information about the sample labels.
    Total Number of Samples
    Beginning Sample
    Ending Sample
    Labels/Sample
    Description
    Barcode? Y or N

90. Selecting F7 will print all the sample labels for the entire job.

Note: Each label will have a unique number and exact information previously entered for that bottle (type, preservative, filtering information, Bin#, etc..).

91. It is important to ensure that the correct label assigned to a particular bottle, gets placed onto its' exact matching bottle.

    Example:
    A Plastic 1000 mL, Cool 2°C-6°C for Bin-7 label should not go on a VOA, 40 mL preserved w/HCl, for Bin-5.

92. After placing the labels on the proper bottles/jars. Move the samples to their proper walk-in coolers. Put the folder label on a folder. Put the clients' COC and any other documentation in the folder. Place the folder in the bin to be copied and distributed to the laboratory.

This completes the login process for that job. Select F2. This will save the job into the system.

STL Chicago
Internal Sample Custody Transfer Record

Sample Lot#:_____ _____ Client:_____

Sample No.	Analysis	Relinquished by:	Received by:	Date	Time	Comments

CHI-22-11-001/C-1/99

Clayton
GROUP SERVICES

ATTACHMENT 1-2

STL CHICAGO STANDARD OPERATING PROCEDURE

Laboratory Handling, Transfer and Preservation of VOA Soil Samples Received in EnCore™ Samples for SW-846 Method 5035 Low Concentration and 5030B

15-65263ca249\HMM

STL CHICAGO
LABORATORY STANDARD OPERATING PROCEDURE

SOP No.	Revision No.	Date	Page
USP-5035	03	04/14/03	1 of 10

TITLE: **Laboratory Handling, Transfer and Preservation of VOA Soil Samples Received in EnCore™ Samplers for SW-846 Method 5035 Low Concentration and 5030B**

Updated by:	Signature:	Date:
JoAnn M. Petruszak GC/MS Supervisor	JoAnn M. Petruszak	4-11-03

Approved by:	Signature:	Date:
Gary L. Rynkar GC/MS Dept. Manager	Gary Rynkar	4/11/3
David L. Kaczka Env. Health & Safety Coor.	David L. Kaczka	4/15/03
Terese A. Preston Quality Manager	Terese A. Preston	4/16/03

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ISSUED TO : William Elwell, Clayton Group
Re: Lockformer Site QAPP

Full Signature Approvals Are Kept on File
with STL's QA Standard Practice Records

1.0 SCOPE / APPLICATION

This Standard Operating Procedure (SOP) has been written using SW-846 Methods 5035 and describes the procedures for handling, transferring and preserving solid waste, soil and sediment samples for subsequent determination of volatile organic compounds when received by the laboratory in EnCore™ Disposable Samplers. The EnCore™ Sampler is a single use device which cannot be cleaned and/or reused. Samples are transferred to vials and are then suitable for analysis using preparation Methods 5035 for Low Concentration volatile compounds or 5030B for High Concentration volatile compounds. This procedure also addresses issues relating to VOC samples preserved in the field using Method 5035, however, does not discuss sample collection.

On occasion, clients request slight modifications to this SOP. These modifications are addressed on a case-by-case basis with the range of accuracy (i.e., MDLs, linearity check or PT sample) verified prior to implementation. Any modifications would be written into a Quality Assurance Plan (QAP), authorized via laboratory signature approval, and mentioned in the data package's case narrative.

1.1 Method Sensitivity

1.1.1 Method Detection Limits

Refer to the analytical SOPs.

1.1.2 Reporting Limits

Refer to the Analytical SOPs.

1.2 Summary of Method

This procedure is used when soils are sampled in the field with EnCore™ samplers and then transferred to the laboratory for preservation. The specific preparation procedures for sample vials depends on the expected concentration range of the sample, with separate procedures for "low" concentration soil samples (Section 7.1) and "high" concentration soil samples (Section 7.2). Low concentration soils are transferred to vials containing sodium bisulfate and water which forms an acid for preserving the VOC from biodegradation prior to sample preparation method 5035. High concentration VOC soils are transferred to vials containing methanol prior to sample preparation 5030B.

1.3 Definitions

Refer to Section 3.0 of the Laboratory's Quality Manual (LQM).

2.0 INTERFERENCES

Solvents, reagents, solvents, glassware and room conditions may yield volatile organic compounds. All these materials must be demonstrated to be free from interferences under the conditions of the preparation by analyzing method blanks.

3.0 SAFETY

- Employees must abide by the policies and procedures in the Corporate Safety Manual, Radiation Safety Manual and this document.

3.1 Specific Safety Concerns or Requirements

- Take careful note of those sections marked "CAUTION", "NOTE", OR "WARNING".
- When the sample is added to the vial containing sodium bisulfate and organic free water, a reaction can result with pressure build-up if the sample is immediately capped. This may result in the popping of the septum cap and splashing of corrosive liquid (acid) and, under severe pressure, may burst the sample vial. If effervescence is noted, the sample vial shall not be sealed until the reaction is complete or ends. All samples demonstrating effervescence shall be labeled "effervescent" so that any further handling by others can be done with caution.

3.2 *Primary Material Used*

- The following is a list of the materials used in this method, which have a serious or significant hazard rating. **NOTE: This list does not include all materials used in the method. The table contains a summary of the primary hazards listed in the MSDS for each of the materials listed in the table.** A complete list of materials used in the method can be found in the reagents and materials section. Employees must review the information in the MSDS for each material before using it for the first time or when there are major changes to the MSDS.

Material	Hazards	OSHA Exposure Limit	Signs and symptoms of exposure/Unusual Hazards
Methanol	Flammable Poison Irritant	200 ppm-TWA	A slight irritant to the mucous membranes. Toxic effects exerted upon nervous system, particularly the optic nerve. Symptoms of overexposure may include headache, drowsiness and dizziness. Methyl alcohol is a defatting agent and may cause skin to become dry and cracked. Skin absorption can occur; symptoms may parallel inhalation exposure. Irritant to the eyes.

4.0 EQUIPMENT AND SUPPLIES

- 40-ml, screw-cap, PTFE lined, septum-sealed glass vials
- Magnetic stir bars
- EnCore™ Extrusion Tool
- Top-loading balance capable of accurately reading to 0.01 g.
- Balance weights
- 5 g En Core™ samplers (from field in sealed containers)

- Pliers for removing En Core™ Sampler locking arms.
- Repipet suitable for dispensing methanol
- Repipet suitable for dispensing lab pure water
- 1 gram scoop; and VOC vial rack

5.0 REAGENTS AND STANDARDS

A label on any reagent bottle must contain the concentration of the reagent, name of the reagent, date prepared, expiration date and the analyst who prepared the reagent.

5.1 Reagents

- Methanol, CH_3OH - purge and trap quality of equivalent
- Organic Free Laboratory Water (OFW)
- Sodium Bisulfate, $NaHSO_4$ - ACS grade or equivalent

5.2 Quality Control (QC) Solutions

Refer to analytical SOPs.

6.0 CALIBRATION

Not Applicable.

7.0 PROCEDURE

7.1 Low Concentration Procedure

The following steps apply to the preparation vials and EnCore™ sample transfers to vials that will be analyzed for low concentration volatile compounds by the closed-system purge and trap equipment described in Method 5035.

7.1.1 Low Concentration Sample Vial Preparation

Ready-to-use sample vials for the low-level method may be purchased from a vendor which contain the sodium bisulfate preservative, water, magnetic stirrer and tare weighted. If not, steps described in 7.1.1 are to be followed to prepare the vials.

7.1.1.1 Add a clean magnetic stir bar to each clean 40 mL vial. Add 5 mLs of a 20% sodium bisulfate solution (200g sodium bisulfate/Liter OFW). Enough sodium bisulfate should be present to ensure a sample pH of ≤ 2.

7.1.1.2 The water and preservative form an acid solution that will eliminate the majority of the biological activity in the sample, preventing biodegradation of the volatile target analytes. Seal the vial with the screw-cap septum seal.

7.1.1.3 Since calcareous soils may react vigorously with sodium bisulfate, which could result in a loss of volatile compounds, an effervescence test should be performed prior to sample preparation. Add ~5 grams of sample to an empty 40-mL vial. Add ~5 mLs of 20% sodium bisulfate solution to the vial. Observe for bubbles. If the sample effervesces, then prepare the sample in OFW and freeze instead of preparing in sodium bisulfate.

WARNING: When the sample is added to the vial containing sodium bisulfate and organic free water, a reaction can result with pressure build-up if the sample is immediately capped. This may result in the popping of the septum cap and splashing of corrosive liquid (acid) and, under severe pressure, may burst the sample vial. If effervescence is noted, the sample vial shall not be sealed until the reaction is complete or ends. All samples demonstrating effervescence shall be labeled "effervescent" so that any further handling by others can be done with caution. Acid solution can cause burns, therefore, protective gloves, lab coat and eye protection shall be worn during this transfer.

NOTE: Upon transferring samples from the EnCore™ Samplers to VOA vials, samples that effervesce upon contact with the acid preservative to the degree of, for example, foaming or inability to seal the vial, the client will be immediately contacted that a new sample is required. If the amount of gas that is generated is small (i.e., several mLs), the loss is considered minimal if the vial is immediately sealed.

7.1.1.4 Weigh the prepared vial to the nearest 0.01 g, record the tare weight on the label and record the vial number and tare weight in the VOC Sample logbook (Attachment A). The vial is then ready for transferring the soil sample from the EnCore™ sampler into the vial as described in section 7.1.2.

7.1.2 Sample Transfer from EnCore™ to Low Concentration Vial

7.1.2.1 Within 48 hours of sample collection, the sample in the EnCore™ sampler must be transferred to the sample vial containing preservative or OFW depending on the effervescence test. Line up the EnCore™ sample bags with vials and record the respective sample # on the vial and in the logbook. Perform the effervescence test and record the results in the logbook.

7.1.2.2 Remove the EnCore™ sampler from its sealed bag and break off the locking arms on the cap using pliers. Do not remove the cap at this time.
(**CAUTION: Broken edges will be sharp**).

7.1.2.3 Attach the EnCore™ Sampler to the EnCore™ Extrusion Tool as follows: Depress the locking lever on the Extrusion Tool and place the sampler, plunger end first, into the open end of Extrusion Tool (aligning slots on sampler body with pins in Extrusion Tool). Turn the coring body clockwise until it locks into place. Then release the locking lever.

7.1.2.4 Place the soil core plug into the matching vial: Remove the cap from the vial and then remove the cap from the EnCore™ Sampler, which was previously inserted in the Extrusion Tool. Slowly place the sample core directly over the vial (avoid sample or vial spillage), then release the soil core by pushing down on the plunger knob of the EnCore™ Extrusion Tool. Cap the vial if sample effervescence is not apparent. In the logbook, record the time the sample was transferred into the vial. After the sample is safely transferred, remove and properly dispose of the EnCore™ Sampler.

If samples are received already preserved from the field and they show evidence of effervescence (i.e., bulging septa, fizzing, hissing when auto-sampler punctures septa, etc..), the analyst shall notify the PM at once. Additionally, the analyst needs to proceed with the analysis using either Method 5030B purge & trap using an appropriate aliquot from the VOA jar or solids jar if available or in cases where the client provides both sodium bisulfate preserved sample and OFW prepared samples use the OFW and document the reason.

7.1.2.5 Weigh the sample vial to the nearest 0.01 g and record weight on the label and in the logbook. The sample is then transferred to the GC/MS VOC refrigerator if preserved in sodium bisulfate or transferred to the GC/MS VOC freezer if prepared in water.

NOTE: Because volatile organics will partition into the headspace of the vial from the aqueous solution and will be lost when the vial is opened, surrogates, matrix spikes and internal standards should be added through the septa after the vial has been capped. These standards will be introduced by the GC/MS VOC analyst or automatically by the sample introduction system, just prior to analysis.

7.2 High Concentration Procedure

The following steps apply to the preparation vials and En Core™ sample transfer to these vials to be analyzed for High concentration volatile compounds described in Method 5030B.

7.2.1 High Concentration Sample Vial Preparation

Sample vials ready for use for the high concentration method may be purchased from a vendor which contain the methanol preservative and tare weighted. If not, steps described in 7.2.1 are to be followed to prepare the vials.

7.2.1.1 Add 5 mLs of methanol to each vial. **NOTE: Any combination of sample weight and methanol volume may be used as long as it is demonstrates that method performance objectives can be achieved.**

7.2.1.2 Seal the vial with the screw-cap septum seal and affix a label to the vials.

7.2.1.3 Weigh the prepared vial to the nearest 0.01 g, record the tare weight and write it on the label and record the vial number and tare weight in the logbook. The vial is then ready for transferring the soil sample from the EnCore™ sampler into the vial as described in Section 7.2.2.

7.2.2 Sample Transfer from En Core™ Sampler to High Concentration Vial

7.2.2.1 Within 48 hours of sample collection, the sample in the EnCore™ sampler must be transferred to the sample vial containing preservative. Line up the EnCore™ sample bags with vials and record on the vial and the logbook the respective sample #.

7.2.2.2 Remove the EnCore™ sampler from its sealed bag and break off the locking arms on the cap using pliers, but do not remove cap at this time.
(CAUTION: Broken edges will be sharp).

7.2.2.3 Attach the EnCore™ Sampler to the EnCore™ Extrusion Tool as follows: Depress the locking lever on the Extrusion Tool and place the sampler, plunger end first, into the open end of Extrusion Tool (aligning slots on sampler body with pins in Extrusion Tool). Turn the coring body clockwise until it locks into place. Then release the locking lever.

7.2.2.4 Place the soil core plug into the matching vial: Remove the cap from the vial and then remove the cap from the EnCore™ Sampler, which was previously inserted in the Extrusion Tool. Slowly place the sample core directly over the vial (avoid sample or vial spillage), then release the soil core by pushing down on the plunger knob of the En Core™ Extrusion Tool. Cap the vial but be careful not to spill. **(WARNING: Precautions must be taken when handling vials and samples. Methanol is flammable and should not be handled near a heat source or open flame. Protective gloves, lab coat and eye protection shall be worn during this transfer.)** In the logbook, record the time the sample was transferred into the vial. After the sample is safely transferred, remove and properly dispose of the EnCore™ Sampler.

7.2.2.5 Weigh the sample vial to the nearest 0.01-g and record the weight on the label and in the logbook. The sample is then transferred to the GC/MS VOC refrigerator for 24 hours. After the 24 hour contact time, draw off the methanol and put into a 1.5 mL amber vial labeled with the appropriate sample identification. Record the time the methanol is drawn off in the logbook. Surrogates, matrix spikes and internal standards should be added by the GC/MS VOC analyst at the time of analysis.

7.2.2.6 In cases where the client requires a quick turnaround time, the 24-hour contact time can be replaced by sonicating the samples for 20 minutes and then draw of the methanol. This procedure requires the client's approval.

7.3 Quality Control Checks

Refer to the analytical SOP.

7.4 Sample Preservation and Storage

The hold times for the extraction of volatile organic compounds from soils and sediments is 14 days from the date of sampling. The samples must be transferred from the EnCore™ Sampler to the preservatives or OFW and vial within 48 hours after collection. Preserved samples must be stored at 4 ± 2°C prior to analysis. Samples in OFW must be frozen at -10 ± 2°C. Frozen samples must be allowed to come to room temperature before analysis.

7.5 Calibration / Standardization

Not Applicable.

7.6 Preventive Maintenance

- Balances should be cleaned and checked for levelness prior to each use. Class "S" weights must be weighed and documented each day the balance is used. Refer to the Balance Calibration Logbook for the weights and control limits.
- Consult your section manager or supervisor if the weights are out of acceptable limits. Do not use the balance until the situation is back in control.

7.7 Documentation

All sample transfer information must be carefully documented in the VOC Sample Log. Any additional sample information may be recorded in the comment section. All problems and/or deviations from normal procedures must be documented, the section manager or supervisor should be notified and a Sample Discrepancy Report (SDR) may need to be initiated.

8.0 QUALITY CONTROL

8.1 QC Summary

Refer to the analytical SOP (UMV-8260).

8.2 Corrective Actions

All problems and/or deviations from the normal procedure must be documented in the VOC Sample Log. The section manager or supervisor should be notified and an SDR may need to be initiated.

9.0 DATA ANALYSIS AND CALCULATIONS

Not Applicable.

10.0 WASTE MANAGEMENT AND POLLUTION PREVENTION

- All waste will be disposed of in accordance with Federal, State and Local regulations. Where reasonably feasible, technological changes have been implemented to minimize the potential for pollution of the environment.

10.1 Waste Streams Produced by the Method

The following waste streams are produced when this method is carried out.

- Residual samples waste containing Methanol. This residual sample waste containing methanol will be turned into the Waste technician for disposal in the "Flammable Vials" wastestream.

11.0 METHOD PERFORMANCE CRITERIA

Refer to Sections 1, 6, 7 and 8.

12.0 REFERENCES

Refer to Section 1.

13.0 ATTACHMENTS

Attachment A: Example: EnCore™ VOC Sample Log

Historical File: Revision 00: 02/27/98 Revision 03: 04/11/03
Revision 01: 06/16/99
Revision 02: 06/22/01

Reasons for Change, Revision 03:

- Section 3 & 10: Updated the Safety and Waste Management sections.
- Sections 7.1.1.3 & 7.1.2.1: Effervescence test.
- Section 7.2.2.6: Sonicating high-level samples for quick TATs.

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Attachment A.

Example: VOC Sample Log

STL Chicago

VOC Sample Preservation 5030/5035

Job #:_____

Client:_____

Continued from Page:_____

Preserved in: (Check One)

☐ Field*

☐ Laboratory

* Note: Field Preserved Samples Do Not Have an EB1

Page No.:_____

Balance No:_____

NaHSO4 Soln. ID:_____

Methanol Lot No.:_____

Repipetor Vol. Check (Yes = OK):_____

Methanol:_____ H2SO4:_____

Water:_____

EB1 (P)	Job Number:	
	Filename:	
EB3 (F)	Job Number:	
	Filename:	
EB2 (MEOH)	Job Number:	
	Filename:	

Low Concentration VOC

5035PL Batch: _____

High Concentration VOC

Drawn Off Date:_____

Time:_____

5035PH Batch: _____

5035PG Batch: _____

	Sample #	Bottle Letter	Preserved: F - Frozen or P - Preservative	Date Preserved	Time Preserved	Tare Wt. Vial + Preserv. (g)	Final Wt. (g)	Severe Effervescence	Methanol (mLs)	Tare Wt. Vial + Preserv. (g)	Final Wt. (g)
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											

Field Prep - Weight Transcription Signature:_____ Date:_____

Preparation Analyst Signature:_____ Date:_____

CHI-22-16-050/F-01/03

GC/MS Volatile: Preparation Methods

Category	Matrix Type	Test Matrix	Analytical Method	Prep Method	Description	Preservation Method	Description
GC/MS Volatiles							
VMS	Soils	S	8260B	5035X	Prep - 5035 (5 g Soil - VMS)	5035PL	Pres. Low - 5035 (VMS)
VMS	H-Soil	H	8260B	5030ME	Prep - 5030 (Methanol Extraction - VMS)	5035PH	Pres. High - 5035 (**PREPF=50;DLFAC=1**)

4/18/03 9:51

5035 Preservation Low
Method Code..: 5035PL
Batch Code...: 80370

Status.....: RVWD
Batch Date...: 04/11/03
Batch Time...: 953

User Name.....: jab
QC Code.....:
Calc Code.....: PREPPL

Location Code..: 57222
Equipment Code.:
Import Code....:

			TEST CODE	PRES	PRESW
SAMPLE: Grp Pos	Sample ID	Dilution	TEST POS Date / Time	1	2
1 1	216198_1_s___		3/29/03 0000	0	0
1 2	216198_1_s___		3/29/03 0000	0	0
1 3	216198_1_s___		3/29/03 0000		
1 4	216198_1_s___		3/29/03 0000		
1 5	216198_2_s___		3/29/03 0000	0	0
1 6	216198_2_s___		3/29/03 0000	0	0
1 7	216198_2_s___		3/29/03 0000		
1 8	216198_2_s___		3/29/03 0000		

*** BATCH WORKSHEET *** (V2)

5035 Preservation Low

Report Date: 4/18/03 9:51

Method Code..: 5035PL	Batch Date...: 04/11/03	QC Code.....:	Equipment Code.:
Batch Code...: 80370	Batch Time...: 953	Calc Code.....: PREPPL	Import Code....:
Status.....: RVWD	User Name....: jab	Location Code..: 57222	

BATCH:	Item	Description	Description Information
	1	Comments	
	2	Comments	
	3	Comments	
	4	Comments	

SAMPLE:	Grp	Pos	Sample ID	Dilution	PRES Text	PRESW Text	WEIGHT g	IWGT g	FWGT g
	1	1	216198_1_S__		x	a	5.660	33.58	39.24
	1	2	216198_1_S__		x	b	5.900	33.70	39.60
	1	3	216198_1_S__		c	x	4.720	31.90	36.62
	1	4	216198_1_S__		d	x	5.240	31.81	37.05
	1	5	216198_2_S__		x	a	4.340	33.80	38.14
	1	6	216198_2_S__		x	b	5.370	33.36	38.73
	1	7	216198_2_S__		c	x	5.110	31.89	37.00
	1	8	216198_2_S__		d	x	5.510	31.88	37.39

SAMPLE:	Grp	Pos	Sample ID	Dilution	PREPF N/A	DLFAC N/A	EFFERV yes/no		
	1	1	216198_1_S__		0.8834	0.8834			
	1	2	216198_1_S__		0.8475	0.8475			
	1	3	216198_1_S__		1.0593	1.0593			
	1	4	216198_1_S__		0.9542	0.9542			
	1	5	216198_2_S__		1.1521	1.1521			
	1	6	216198_2_S__		0.9311	0.9311			
	1	7	216198_2_S__		0.9785	0.9785			
	1	8	216198_2_S__		0.9074	0.9074			

4/17/03 16:33

5035 Preservation High (Methanol) Method Code..: 5035PH Batch Code...: 80238	Status.....: RVWD Batch Date...: 04/10/03 Batch Time...: 1111	User Name.....: jab QC Code.....: Calc Code.....: PREPFV	Location Code..: 57222 Equipment Code.: Import Code....:

			TEST CODE	PRES
SAMPLE: Grp Pos	Sample ID	Dilution	TEST POS Date / Time	1
1 1	216474_1_H___		4/10/03 0152	0
1 2	216476_1_H___		4/10/03 0153	0
1 3	216476_2_H___		4/10/03 0154	0
1 4	__H_EB2__		4/10/03 0154	0

5035 Preservation High (Methanol) Report Date: 4/17/03 16:33

Method Code..: 5035PH	Batch Date...: 04/10/03	QC Code.....:	Equipment Code.:
Batch Code...: 80238	Batch Time...: 1111	Calc Code.....: PREPFV	Import Code....:
Status.....: RVWD	User Name....: jab	Location Code..: 57222	

BATCH:	Item	Description	Description Information
	1	Comments	
	2	Comments	
	3	Comments	
	4	Comments	

SAMPLE:	Grp	Pos	Sample ID	Dilution	PRES Text	WEIGHT g	IWGT g	FWGT g	MEVOL mL
	1	1	216474_1_H___		a	6.060	29.50	35.56	5
	1	2	216476_1_H___		a	5.200	29.43	34.63	5
	1	3	216476_2_H___		a	5.690	29.57	35.26	5
	1	4	__H_EB2__		x	5.000	30.00	35.00	5

SAMPLE:	Grp	Pos	Sample ID	Dilution	EXTVOL mL	H2OVOL mL	PREPF N/A	DLFAC N/A
	1	1	216474_1_H___		0.1	5	41.2541	0.8251
	1	2	216476_1_H___		0.1	5	48.0769	0.9615
	1	3	216476_2_H___		0.1	5	43.9367	0.8787
	1	4	__H_EB2__		0.1	5	50.0000	1.0000

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ATTACHMENT 1-2A

STL CHICAGO SOP ADDENDUM FOR THE LOCKFORMER WORK PLAN

15-65263ca249\HMM

SEVERN TRENT STL

STL Chicago
SOP Addendum for the Lockformer Work Plan
Clayton Project No. 15-65263.01-010

SOP Title: Laboratory Handling, Transfer and Preservation of VOA Soil Samples Received in EnCore™ Samplers for SW-846 Method 5035 Low Concentration and 5030B

SOP No.: USP-5035

*** Disclaimer ***

The following procedure will be implemented for the subject project only. This procedure is not inherent to STL Chicago's daily implementation of the subject SW-846 methods and will not be used for any other project not defined in this document.

Procedure

The laboratory will supply 3 x 40 mL pre-weighed Glass vials with Teflon®-lined septum. Two vials will contain stir bars for the low-level analysis; and the third vial will not contain a stir bar and will be used for the high-level analysis. **Note: No further labels are to be added to the sample vials as they add weight to the determination of the final sample weight.**

Approximately 5 grams of sample will be placed into each vial and returned to the laboratory within 48 hours. The sample must remain refrigerated (4±2°C) during transport. Upon arrival to the laboratory, the samples will be weighed back to determine the individual sample weight. The low-level samples with the stir bars will be frozen (<12°C). The sample will be assigned a 14-day holdtime from the date of collection. The Archon autosampler will add organic-free water (OFW), internal standards and surrogates to the samples via the septum at the time of analysis. The OFW will be added first so that the internal standards are not absorbed by the dry soil sample.

Upon determination of each individual sample weight for the high-level vials, 5 or 10 mLs of methanol will be added and the sample will be refrigerated (4±2°C) for 24 hours. After this time, the methanol extract will be pulled-off and assigned a 14-day holdtime from the date of collection.

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ATTACHMENT 1-3

STL CHICAGO STANDARD OPERATING PROCEDURE

Gas Chromatography Mass Spectrometry – Volatiles SW-846 Method 8260

STL CHICAGO
LABORATORY STANDARD OPERATING PROCEDURES

SOP No.	Revision No.	Date	Page
UMV-8260	13	10/24/02	1 of 64

TITLE: Gas Chromatography Mass Spectrometry - Volatiles SW-846 Method 8260

Updated by:	Signature:	Date:
JoAnn Petruszak Supervisor, GC/MS Volatiles		

Approved by:	Signature:	Date:
Gary Rynkar Section Manager, GC/MS Dept		10/22/2
David L. Kaczka Env. Health & Safety Coor.		11/6/02
Terese Preston Quality Manager		

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Re: Lockformer Site QAPP

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1.0 SCOPE / APPLICATION

To outline the guidelines for the analysis of Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS) using SW-846 Methods 8260B and 8000B as references. The preparation of all volatile samples is based on Methods 5000, 5030A and 5030B. Method 5035 is covered by a separate SOP (USP-5035), but can also be found in this SOP.

On occasion, clients request slight modifications to this SOP. These modifications are addressed on a case-by-case basis with the range of accuracy (i.e., MDLs, linearity check or PT sample) verified prior to implementation. Any modifications would be written into a Quality Assurance Plan (QAP), authorized via laboratory signature approval, and mentioned in the data package's case narrative.

1.1 Method Sensitivity

1.1.1 Method Detection Limits

The method detection limit (MDL) is the lowest concentration that can be detected for a given analytical method and sample matrix with 99% confidence that the analyte is present. The MDL is determined according to Appendix B of 40 CFR 136, "Guidelines Establishing Test Procedures for the Analysis of Pollutants". MDLs reflect a calculated (statistical) value determined under ideal laboratory conditions in a clean matrix, and may not be achievable in all environmental matrices. The laboratory maintains MDL studies for analyses performed; these are verified at least annually.

1.1.2 Reporting Limits

Reporting Limits [a.k.a., Estimated Quantitation Limits (EQLs)] are defined as the lowest concentration of an analyte determined by a given method in a given matrix that the laboratory feels can be reported with acceptable quantitative error or client requirements, values specified by the EPA methods or other project and client requirements. Because of the high level of quantitative error associated with determinations at the level of the MDL, the laboratory maintains reporting limits higher than the MDL. Wherever possible, reporting is limited to values approximately 3-5x the respective MDL to ensure confidence in the value reported.

Method detection level studies are performed annually, and reporting limits are assessed. If the MDL does not meet the routine laboratory reporting limit or the method specified limit, it is repeated or the laboratory reporting limit is reassessed. If the laboratory continually demonstrates that the method reporting limits are not achieved, equipment, technique, and the method are reviewed to assure optimal performance or appropriate

action is taken. Table 1 defines the reporting limits and analyte list for SW-846 Method 8260B.

1.1.3 Definitions

Refer to Section 3.0 of the Laboratory's Quality Manual (LQM, Revision 02).

1.2 Summary of Method

This method is used to determine volatile organic compounds in a variety of matrices. It is applicable to water, soil, sediment, sludge and waste drum samples.

This method can be used to quantify most volatile organic compounds that have a boiling point less than 200°F. It is also limited to those compounds that elute as sharp peaks from a capillary column. A listing of applicable compounds and their characteristic ions appears in Table 2.

A portion of sample, measured into a sample vessel, is purged with an inert gas. The volatile compounds are transferred to a trap, containing retarding materials. The trap is then backflushed with the inert gas and rapidly heated to effectively transfer the compounds to the GC column. The GC oven is then, temperature ramped to separate the compounds and introduce them to the source. The mass filter separates the ions, which are then detected by the analyzer. The data system then provides qualitative and quantitative information concerning the sample.

Instrument calibration occurs about every 12 hours, or prior to analysis. Instrument maintenance is performed as needed or daily basis.

2.0 INTERFERENCES

1. External interferences can be caused by contaminants from sample containers, preparative glassware and reagents, syringes and columns and manifest themselves as high background and/or discrete peaks. Some contaminants are also introduced through the sample vial seal and/or instrument sample connections. Proper glassware preparation, sample handling and instrument maintenance should eliminate these sources. A laboratory method blank (MB) is analyzed prior to any analysis to show absence of any contaminants. Reagent water sampled in the lab and carried through all field operations is also analyzed to show absence of contaminants from field sampling.

2. Carryover is also another source of contamination. Any time a high level sample is analyzed, the next sample in the batch is checked for carryover. If carryover is suspected, that sample is re-analyzed. The position is rinsed with methanol/water. If the carryover is excessive and continues into the next samples, the batch is aborted/paused, the column

and trap baked, and/or blanks analyzed until all contamination is absent. If further response is required (i.e., trap replacement), it is documented in the maintenance logbook. Refer to Section 7.4 for information on preventive maintenance.

3. Internal interferences can be purged from the sample with the target compounds and appear as elevated baselines or distinct peaks. Internal interferences most often manifest themselves as low/high recoveries of surrogate/matrix spike compounds. Matrix interferences vary from sample to sample.

4. The volatile lab must be free of solvents. All analytes must be less than their EQL (Estimated Quantitation Limit). The volatile lab is under positive pressure to reduce lab contamination, however, intermittent low levels of acetone and methylene chloride may be detected, usually below the EQL. Refer to Section 8.2 (Corrective Action) for clarification for blank contamination.

3.0 SAFETY

- All employees will adhere to the practices and policies in the STL Corporate Safety Manual (CSM) and will read the MSDS's for the materials used in this method before handling or using the material.
- Special care needs to be taken with the solvents used in this method.
- Interior parts of the GC/MS can be very hot. Care should be taken during maintenance.

4.0 EQUIPMENT AND SUPPLIES

4.1 Current Hardware/Software

- 3 Hewlett-Packard 5890 GC interfaced with a 5971 MSD. Equipped with DB-624 column.
- 3 Hewlett-Packard 5890 GC interfaced with a 5972 MSD. Equipped with DB-624 column.
- 1 Hewlett-Packard 6890 GC interfaced with a 5973 MSD. Equipped with DB-624 column.
- 6 Tekmar 3000 concentrators, 1 PTS Enchon concentrator in connection with 2 Tekmar 2016 Autosamplers for two systems and 5 Varian Archon Autosamplers for four systems.
- 1 Combi PAL Static Headspace Screener in connection with Hewlett-Packard 5890 GC interfaced with a FID equipped with DB-624 column.
- 8-Hewlett-Packard Chemstations B.02.04 software and peripheral hardware.
- 1-Hewlett-Packard Chemserver 9000 series running HP-UX10.2 OS with Target 3.5.

The GC/MS has a temperature programmable chromatograph interfaced with a mass-selective detector capable of scanning from 35 - 260 amu every second or less using 70

volts of electron energy in the electron ionization mode. The system is capable of producing an acceptable spectrum of bromofluorobenzene when 50 ng/5 mLs is purged.

4.2 Data System

The analytical systems are interfaced with stand alone PC's which are Pentium based systems running Agilent Chemstation. This system is capable of continuous acquisition and storage of mass spectral data. Completed data files are automatically transferred to the Chemserver Target 3.5 processing software which is capable of plotting specific masses versus time or scan numbers (Extracted Ion Current Profile) and integration of that abundance. The system also stores the data. The NBS Library resides on the Chemserver.

4.3 Data File Name/ Batch Directory Assignment

Each job # is assigned a code at the time that the first sample is analyzed. Tune, standard, blank, and laboratory control sample (LCS) data files are designated by specific letters unique to each instrument in conjunction with the appropriate month and day (example : 3a0318 = instrument #3, first 12 hour BFB tune, March 18). During transfer of the files to the Chemserver, a unique batch directory is created on Target per instrument, date and tune.

4.4 Miscellaneous

- assorted syringes (10, 25, 50, 100, 500 and 1000 uL)
- 5 mL luer-lock gas-tight syringes
- assorted purge vessels (water, 5/25 mL)
- top-loading balance, capable of weighing to ± 0.1 g, stainless steel spatula
- assorted amber and clear Teflon-lined screw-capped vials (1.5-2.0 mL, 3.5-5.0 mL)
- cleaned 40 mL vials w/Teflon-lined screw-caps
- assorted volumetrics (10 mL, 25 mL, 50 mL and 100 mL)

5.0 REAGENTS AND STANDARDS

The majority of the calibration standards are EPA certified, A2LA or second-source verified by the standard vendor in situations where suitable SRMs (Standard Reference Material) was available. For those compounds where standards must be made from neat material (due to instability) or some non-routine compounds, **where available**, a second-source is purchased and used in the LCS to verify the standard

Each time new standards are prepared and a new initial calibration is required, the standards are verified against a second-source LCS prior to any sample analysis. This holds for all routine compounds and those available as second-source material in the LCS.

All neat standards/kits received are entered into LabNet (LIMS) (and recorded in the Neat Standards Logbook). A code is written on the bottle/kit and entered into LabNet (and recorded in the logbook). All neat standards are then stored in a separate freezer at approximately –10 °C until needed. The standard is issued a unique ID# [i.e., Neat Standards Reference Number (NSRN)] which is used to track all standards as they are used as is or in preparation of stock/working solutions. The format of the standards in LabNet will prevent working or intermediate level solutions from being used past the expiration date of the neat or stock solutions.

5.1.1 Reagent Water

One (1) liter of water is continuously purged with pre-purified nitrogen. The reagent water is routinely demonstrated to be interference-free. All compounds are < EQL or 5x EQL for methylene chloride and acetone.

5.1.2 Methanol

Methanol is purchased from B&J (Purge and Trap interference-free). Each lot number of methanol is checked for contamination prior to laboratory use and is documented in the Methanol Lot Number Logbook in the GC/MS VOA department.

5.2 Surrogate Spiking Solution

Stock surrogates are purchased as a mix from Ultra. The following surrogates are used:

Compound	Concentration
4-Bromofluorobenzene 1,2-Dichloroethane-d_4 Toluene-d_8 Dibromofluoromethane	\ 2500 ppm /

The transfer is entered into LabNet (and recorded in the Standard Preparation Log). The standard issued is another unique ID# [i.e., SRN (Standard Reference Number)] which can be traced back to the parent ID# (i.e., NSRN with the date of receipt, date of opening, and the supplier). Working surrogate solution is prepared at the same time as the internal standard solution (Section 5.3.)

- Life of Standard: 1-year unopened; once opened, they are used for a period of 6 months or until used.
- Storage Requirements: Stored in a freezer at approximately –10 °C in the dark and kept for a period of one year unopened. *

* If the stock solution has manufacturers' expiration date, that is assigned. If the date is not evident, one year is assigned to un-opened ampules. This is applicable for all "neat" standards.

5.3 Internal Standard Spiking Solutions

Stock internal standards are purchased as a neat solution from Ultra in 1.5 -2.0 mL ampules. The following internal standards are used:

Compound	Concentration
Pentafluorobenzene	\
Chlorobenzene-d_5	2000 ppm
1,4-Difluorobenzene	/
1,4-Dichlorobenzene-d_4	

After opening, the remaining mixture is transferred to a 1.5 - 2.0 mL amber Teflon-lined screw-capped vial. The transfer is entered into LabNet (and recorded in the Standard Preparation Log). The standard issued is another unique ID# [i.e., SRN (Standard Reference Number)] which can be traced back to the parent ID# (i.e., NSRN with the date of receipt, date of opening, and the supplier).

- Life of Standard: 1-year unopened; once opened, they are used for a period of 6 months or until used.
- Storage Requirements: Stored in a freezer at approximately –10 °C in the dark and kept for a period of one year unopened. *

* If the stock solution has manufacturers' expiration date, that is assigned. If the date is not evident, one year is assigned to un-opened ampules. This is applicable for all "neat" standards.

Compound	Volume (uLs)	MeOH (mLs)	Concentration
Internal Standard			
Pentafluorobenzene	\	\ diluted to	\
Chlorobenzene-d_5	625	25 mLs	50 ppm
1,4-Difluorobenzene	/	/	/
1,4-Dichlorobenzene-d_4			
Surrogate			
Bromofluorobenzene	\	\ diluted to	\
1,2-Dichloroethane-d_4	500	25 mLs	50 ppm
Toluene-d_8	/	/	/
Dibromofluoromethane			

NOTE: All standard 'recipes' are listed here in this SOP for guidelines for standard preparation. These 'recipes' are subject to change.

All standard preparation is entered into LabNet (and recorded in the Standards Preparation Logbook). All standard labels contain the following information: standard description, concentration, date prepared, analyst, and expiration date. Addition of 5 uL of each solution to 25 mLs of sample results in a concentration of 10 ppb per each component.

- Life of Standard: Working solutions have an expiration date of 2 weeks.
- Storage Requirements: These are stored in 1.5 - 2.0 mL amber Teflon-lined screw-capped vials at approximately –10°C in the dark.

Stock Purgeables
Calibration Standards

VOC Mix (No Gases)
2000 ug/mL in Methanol

1,1,1,2-Tetrachloroethane
1,1,1-Trichloroethane
1,1,2,2-Tetrachloroethane
1,1,2-Trichloroethane
1,1-Dichloroethane
1,1-Dichloroethylene
1,1-Dichloropropylene
1,2,3-Trichlorobenzene
1,2,3-Trichloropropane
1,2,4-Trichlorobenzene
1,2,4-Trimethylbenzene
1,2-Dibromo-3-chloropropane
1,2-Dibromoethane
1,2-Dichlorobenzene
1,2-Dichloroethane
1,2-Dichloropropane
1,3,5-Trimethylbenzene
1,3-Dichlorobenzene
1,3-Dichloropropane
1,4-Dichlorobenzene
2,2-Dichloropropane
2-Chlorotoluene
4-Chlorotoluene
4-Isopropyltoluene
Benzene
Bromobenzene
Bromochloromethane
Bromoform
Carbon tetrachloride
Chlorobenzene
Chlorodibromomethane
Chloroform
cis-1,2-Dichloroethylene
cis-1,3-Dichloropropylene
Dibromomethane
Dichlorobromomethane
Dichlorobromomethane
Dichloromethane
Ethylbenzene
Hexachlorobutadiene
Isopropylbenzene
m-Xylene
n-Butylbenzene
n-Propylbenzene
Naphthalene
o-Xylene, p-Xylene
sec-Butylbenzene
Styrene
tert-Butylbenzene
Tetrachloroethylene
Toluene
trans-1,2-Dichloroethylene
trans-1,3-Dichloropropylene
Trichloroethylene

ICAL 2 STD Custom Mix
2000 ug/ml in Methanol
2-Methylnaphthalene
1,3,5-Trichlorobenzene
1,3-Butadiene
Isopropylether
Methyl Acetate
Hexane
Heptane
Cyclohexane
Ethyl ether
Methyl Cyclohexane

APIX Custom STD
2000, 8000 & 10000 ug/mL
Allyl Chloride
Ethyl Methacrylate
Methyl Methacrylate
Methacrylonitrile
Pentachloroethane
Trans-1,4-Dichloro-2-Butene
Iodomethane
Isobutanol
Cyclohexanone
n-Butanol
2-Nitropropane
Ethyl Acetate

Chloroprene
5000 ug/mL

SS Volatile Organic Compound Mix
2000 ug/mL in Methanol
Chloroethane
Methyl Bromide (Bromomethane)
Methyl chloride (Chloromethane)
Trichlorofluoromethane
Dichlorodifluoromethane
Vinyl chloride

Vinyl Acetate
2000 ug/mL in Methanol

Trichlorotrifluoroethane
2000 ug/mL in methanol

Volatile Ketone
Acetone
2-Hexanone
Methyl ethyl ketone
4- Methyl-2-pentanone
5000 ug/mL in Methanol

Carbon Disulfide
2000 ug/mL in Methanol

MTBE
2000 ug/mL in Methanol

THF
2000 ug/mL in methanol

Chlorohexane
1000 ug/mL in methanol

Nitriles and Acrolein Mix
Acetonitrile
Acrylonitrile
Propionitrile
Acrolein

2-Chloroethylvinylether
2000 ug/mL in methanol

5.4 Stock Purgeable Standards

These are obtained as neat solutions from Ultra, Supelco and Restek. The contents of each solution and concentration appear on the previous page. Upon opening, all contents are transferred to 1.5 - 2.0 mL amber, Teflon-lined screw-capped vials. Listed are compounds in the EPA TCL and includes compounds done on a regular basis. Other standards, if needed, are either purchased as neat solutions or neat standards from Supelco, Chem Service or other certified supplier. See appropriate entries in LabNet.

5.4.1.1 Main 8260 Mix

Waters

Stock Compound/Mix	Volume (uLs)	Vol. (MeOH)	Conc.
2000 ppm VOC MegaMix™ 2000 ppm Trichlorotrifluoroethane	100 100	Diluted to 2 mLs	100 ppm each component

5.4.1.2 Gases

Waters

Mix	Volume (uLs)	MeOH (mLs)	Conc.
2000 ppm Gas Mix	100	Diluted to 2 mL	100 ppm each component

5.4.1.3 Extra Compounds

Waters

Stock Compound/Mix	Volume (uLs)	MeOH (mLs)	Conc.
5000 ppm VOA CAL Mix 1 2000 ppm CEVE 2000 ppm Carbon Disulfide 2000 ppm Vinyl Acetate	40 100 100 100	Diluted to 2 mL	100 ppm each component
2000 ppm Tetrahydrofuran 2000 ppm MTBE 1000 ppm Chlorohexane	500 50 100	Diluted to 1 mL	1000 ppm THF 100 ppm MTBE 100 ppm Chlorohexane

The Acrolein/Nitriles Working Standard is a vial transfer:

Compound / TCL Mix	Volume[1] (mL)	Concentration (ppm)
Nitriles/Acrolein Custom Mix Stock Std	1	800 ppm Nitriles 4000 ppm Acrolein

5.4.1.4 Main 8260 Mix

Soils

Stock Compound/Mix	Volume (uLs)	MeOH (mLs)	Conc.
2000 ppm VOC MegaMix™ 2000 ppm Trichlorotrifluoroethane	100 100	Diluted to 2 mL	100 ppm each component

5.4.1.5 Gases

Soils

Mix	Volume (uLs)	MeOH (mLs)	Conc.
2000 ppm Gas Mix	100	Diluted to 2 mL	100 ppm each component

5.4.1.6 Extra Compounds

Soils

Stock Compound/Mix[1]	Volume (uLs)	MeOH (mLs)	Conc.
5000 ppm VOA CAL Mix 1 2000 ppm CEVE 2000 ppm Carbon Disulfide 2000 ppm Vinyl Acetate	40 100 100 100	Diluted to 2 mL	100 ppm each component
2000 ppm Tetrahydrofuran 2000 ppm MTBE 1000 ppm Chlorohexane	50 50 100	Diluted to 1 mL	100 ppm each component

The Acrolein/Nitriles Working Standard is a vial transfer:

Compound/TCL Mix	Volume[1] (mL)	Concentration (ppm)
Nitriles/Acrolein Custom Mix Stock Std	1	800 ppm Nitriles 4000 ppm Acrolein

- Life of Standard: Working solutions have an expiration date of 2-weeks/1 week respectively.
- Storage Requirements: These mixtures are stored in 1.5-2.0 mL amber Teflon-lined screw-capped vials at approximately –10 °C in the dark

5.4.1.7 Appendix IX (either matrix)

Mix	Volume (uLs)	MeOH (mLs)	Conc.
2000 ppm Appendix IX 5000 ppm Iodomethane 20,000 ppm Isobutanol	250 100 1000	Diluted to 2 mLs	250 ppm Appendix IX 250 ppm Iodomethane 10,000 ppm Isobutanol

5.4.1.8 Low Level Standard

A low level standard is prepared by making a 1/10 dilution of the stock standards of each of the above (nitriles and acrolein included). This standard is used to prepare the low points in the initial calibration. The low level standard may contain the Main 8260 Mix, gases, nitriles and acrolein, and any other required standard. A low-level standard for the Appendix IX compounds is also prepared separately due to duplication of some compounds.

A low level surrogate solutions is also prepared by a 1/10 dilution of the working for low points in the water curve. The calibration levels may vary with the compounds. See recipes in the calibration section for the levels. The low point in the calibrations is based on each compounds reporting limit.

All solutions are stored in a 1.5 - 2.0 mLs amber Teflon-lined screw-capped vials at –10 °C in the dark. All standard preparation is recorded in the LabNet system. Solutions are prepared every two weeks (1 week for the gases; 1 month for the nitriles).

Purgeable Spike Standard Mixes
ACCUSTANDARD and Absolute Standard

VOC LIQUID MIXTURE
2000 ug/mL in Methanol

1 1,1,2-Tetrachloroethane
1,1,1-Trichloroethane
1,1,2,2-Tetrachloroethane
1,1,2-Trichloroethane
1,1-Dichloroethane
1,1-Dichloroethylene
1,1-Dichloropropylene
1,2,3-Trichlorobenzene
1,2,3-Trichloropropane
1,2,4-Trichlorobenzene
1,2,4-Trimethylbenzene
1,2-Dibromo-3-chloropropane
1,2-Dibromoethane
1,2-Dichlorobenzene
1,2-Dichloroethane
1,2-Dichloropropane
1,3,5-Trimethylbenzene
1,3-Dichlorobenzene
1,3-Dichloropropane
1 4-Dichlorobenzene
2,2-Dichloropropane
2-Chlorotoluene
4-Chlorotoluene
4-Isopropyltoluene
Benzene
Bromobenzene
Bromoform
Carbon tetrachloride
Chlorobenzene
Chlorodibromomethane
Chloroform
cis-1,2-Dichloroethylene
cis-1,3-Dichloropropylene
Dibromomethane
Dichlorobromomethane
Dichloromethane
Ethylbenzene
Hexachlorobutadiene
Isopropylbenzene
m-Xylene
n-Butylbenzene
n-Propylbenzene
Naphthalene
o-Xylene
p-Xylene
sec-Butylbenzene
Styrene
tert-Butylbenzene
Tetrachloroethylene
Toluene
trans-1,2-Dichloroethylene
trans-1,3-Dichloropropylene
Trichloroethylene

Bromochloromethane
2000 ug/mL in methanol

Heptane
2000 ug/mL in methanol

MTBE
2000 ug/mL in Methanol

1,3,5-Trichlorobenzene
2000 ug/mL in methanol

Clorohexane
1000 ug/mL in methanol

Ethyl Ether
1000 ug/mL in methanol

Hexane
1000 ug/mL in methanol

Trichlorotrifluoroethane
2000 ug/mL in methanol

Volatile Organic Compound Gas Spike
2000 ug/mL in Methanol
Chloroethane
Methyl Bromide (Bromomethane)
Methyl chloride (Chloromethane)
Trichlorofluoromethane
Dichlorodifluoromethane
Vinyl chloride

Volatile Mix Additional Spike Compounds
2000 ug/mL in Methanol
Acetone
2-Hexanone
Methyl ethyl ketone
4- Methyl-2-pentanone
Carbon Disulfide
Vinyl Acetate
2-Chloroethylvinylether
Iodomethane

THF
2000 ug/mL in methanol

5.5 Stock Matrix Spike Solution

The matrix spike compounds are obtained as solutions from a second source (i.e., Accustandard) in 1.5-2.0 mL ampules. These are listed on the previous page. A different analyst than the one who prepared the calibration solutions usually prepares matrix spike solutions. These are stored at approximately -10°C in the dark prior to use. Neat standards are kept for a period of one year un-opened or the manufacturer's expiration date. Once opened, the stock may be used for 3 months.

The matrix spike solutions are prepared as follows:

5.5.1 VOC Spike

Stock Compound/Mix	Volume (uLs)	MeOH (mLs)	Conc.
2000 ppm VOC Liquid Spike	25	Diluted to 1 mL	50 ppm each component
2000 ppm 8260 Additional Spike	25		
1000 ppm 1,3,5-Trichlorobenzene Spike	50		

5.5.2 Gas Spike

Mix	Volume (uLs)	MeOH (mLs)	Conc.
2000 ppm Gas Spike	50	Diluted to 2 mL	50 ppm each component

5.5.3 Additional Spike Compound Mix

Compound	Volume[1] (uLs)	Volume (MeOH)	Concentration
2000 ppm Bromochloromethane	25	Diluted to 1 mL	50 ppm each component
1000 ppm Ethyl Ether	50		
1000 ppm Chlorohexane	50		
1000 ppm Hexane	50		
2000 ppm MTBE	25		
1000 ppm Heptane	50		
1000 ppm Trichlorotrifluoroethane	50		

5.5.4 Tetrahydrafuran Spike

Mix	Volume (uLs)	MeOH (mLs)	Conc.
2000 ppm Tetrahydrafuran	50	Diluted to 1 mL	100 ppm

For waters, addition of 5 uLs of each solution results in all spike compounds at 10 ppb, with the exception of THF which is at 20 ppb.

For soils, addition of 5 uLs of each solution, except THF at addition of 2.5 uLs, results in all compounds at 50 ppb.

These solutions are stored at approximately -10°C in several 1.5 -2.0 mL amber Teflon-lined screw-capped vials. All standard preparation is recorded in the LabNet system. Working matrix spike solutions have a 2-week/1-week expiration date or until low recoveries of the matrix spike compounds indicate a new solution is needed. See above for label information.

5.6 Stock BFB Solution

The BFB standard is purchased as a neat solution from Supelco.

Stock	Amount	MeOH (mL)	Concentration
2000 ppm BFB	25 uLs	diluted to 2 mLs	25 ppm

- Life of Standard: This stock can be kept for a period of one year until opening. Upon opening, the solution is transferred to a 1.5 - 2.0 mL vial and assigned an SRN. Once opened, it is used for a period of 6 months.
- Storage Requirements: The standard is stored at approximately –10°C in the dark

Addition of 2 uLs to 5 mLs results in a concentration of 50 ng/5 mLs.
All preparation is recorded in the LabNet system. All labels are completed as above.

NOTE: Intermediate and Working Solutions are never assigned an expiration date exceeding the expiration date of the neat/stock standards/solutions.

5.6 Reagents

5.6.1 Reagent Water

One (1) liter of water is continuously purged with pre-purified nitrogen. The reagent water is routinely demonstrated to be interference-free. All compounds are less than their EQL.

5.6.2 Methanol

Methanol is purchased from B&J (Purge and Trap interference-free). Each lot number of methanol is checked for contamination prior to laboratory use and is documented in the Methanol Lot Number Logbook in the GC/MS VOA department.

6.0 CALIBRATION

Before an instrument is used as a measuring device, the instrument response to known reference materials must be determined. The manner in which various instruments are calibrated depends on the particular type of instrument and its intended use. All sample measurements must be made within the calibration range of the instrument. Preparation of all reference materials used for calibration is documented.

6.1 PFTBA Autotune or Manual Tune

The instrument is first tuned in one of two ways: autotune or manual tune. The ion abundances in the calibration gas are best monitored near the temperature of analysis of BFB. Monitoring at this temperature produces the most representative cal gas scan and therefore the best estimate of BFB response.

1. If an AUTOTUNE is to be done, continue below. If not, skip to step 6. An autotune is not run before every initial calibration. If the instrument has been down for any reason previously listed or major difficulties in manual tune are encountered, an autotune is performed. Autotunes are generally NOT performed when an existing initial calibration is being met.

2. The Enviroquant software has a menu driven tune program. Begin the autotune program. Key masses are 69, 219 and 502.

3. Follow instructions and retrieve a hardcopy of the autotune results. Check the following:

- passed/fail: in itself, not necessarily an indication of MS performance
- repeller and ion focus settings
- electron multiplier voltage

4. The repeller and EM voltages are good indicators of the sources' cleanliness. Generally, the lower the setting the cleaner the source. Other factors may however, supersede (i.e., the age of the multiplier) and a clean source will not always autotune these low. The EM is set by autotune program to produce a target abundance for mass 69 (varies depending on the tune program and instrument). The operator may plan on having to increase this by 100-200 to achieve normal analysis sensitivity (depends on the tune program and the instrument).

5. Observe peak shape, absence of lead-ons/tailing, the resolution between isotopes, peak width and mass axis. A hardcopy of the profile scan is desirable, and can be filed with the autotune results.

6. If an AUTOTUNE has just been performed, continue here. If not, skip to step 9. Enter MANUAL TUNE and read the autotune (which was automatically stored in a file). For volatiles, edit the scan parameters to monitor ions 69, 131 and 219.

7. Enter one of several methods available and adjust the parameters (usually the ion focus, entrance lens and amu gain) to achieve the following relative abundances:

Mass	Relative Abundance
69	100%
131	32-40%
219	35-45%

These will vary with the MS. Mass 219 is usually 5-9% greater than mass 131. If necessary, adjust the amu gain for peak shape and high-end isotope resolution. An overall peak-width of 0.500 is desirable.

Again, these adjustments and relative abundances may not guarantee that BFB will meet requirements, but is a good place to start.

8. Hardcopy the profile scan. This should be filed with the autotune results. This file can serve as a diagnostic tool and can also provide a starting point in the event the operator has trouble meeting the initial calibration.

Save the changes to the appropriate Tune File. Exit the program.

9. If an AUTOTUNE has not been performed, enter MANUAL TUNE and adjust any parameters, if need be. Adjustment may not be necessary, and not desirable, if problems in tuning or meeting the initial calibration have not been encountered. Hardcopy a profile scan and exit.

6.2 BFB Analysis

Once the instrument is tuned, a 50 ng/5 mLs injection of 4-Bromofluorobenzene must meet criteria. The BFB can be purged or directly injected. The mass spectrum must meet the following criteria:

Mass	Ion Abundance
50	15-40% of mass 95
75	30-60% of mass 95
95	Base Peak, 100% rel. abund.
96	5 - 9% of mass 95
173	<2% of mass 174
174	>50% of mass 95

Mass	Ion Abundance
175	5 - 9% of mass 174
176	>95% but <101% of mass 174
177	5 - 9% of mass 176

The BFB is analyzed by one of the methods in Attachment 1. **(Method parameters listed in the appendices are examples only. This statement applies to all references made to these methods).** Typical Tekmar conditions also appear in Attachment 1. The EM voltage may be 100-200 volts above autotune. The abundances of the designated masses above MUST meet the criteria before analyses can begin. If necessary, enter MANUAL TUNE and adjust parameters. The instrument is tuned about every 12 hours of analysis.

6.3 Description of Initial Calibration

An initial calibration may be completed:

- as needed - continuing calibration can not be met
- after a source cleaning and/or column change or any time a major repair or change has occurred with the instrument that affects calibration where a new calibration is indicated.

Confirm that the GC/MSD or bench-top is stable and equilibrated. If at all possible, allow the instrument to equilibrate overnight at all operating temperatures if the source/column has been cleaned/changed. Prior to beginning initial calibration it is a good idea to:

- check the background of air/water levels and base ion by scanning for appropriate ions and also visually inspecting the spectrum scan for any other possible and undesirable background.
- recheck the multiplier settings, after a source is cleaned the EM can most often be dropped.

6.4 Initial Calibration

Each calibration standard is analyzed according to one of the methods in Attachment 1. These are examples. The actual number of points in the calibration is determined by the calibration and acceptance criteria table (Attachment 4). The EM voltage may be 100-200 volts above autotune.

Allow standards to come to ambient temperature.

Fill ten 5 mLs or 25 mLs (must be loaded separately) luer-lock gas-tight syringes with reagent water to overflowing. Replace the plunger and invert. Adjust to 5 mLs (or 25

mLs), confirming the absence of any air bubbles. Pull back slightly on the plunger to allow addition of standards. Use the following as guides :

Waters: 25-mL Purge Volume

Conc. Level[1]						Recipe (uLs)					
Main Mix /Gas/ MTBE/ Other	Extra	THF	Nit	Acrol	APIX	Main Mix/Gas/ MTBE/THF/ Other (100 ppm)	LL Extra 5 ppm	Surr. (50 ppm)	Nit/Acrol (800/4000 ppm)	APIX (250 ppm)	ICAL 2 (100/ 1000 ppm)
0.3	NA	NA	NA	NA	NA	1.5 (LL)	NA	1.5 (LL)	1.5 (LL)	NA	NA
0.5	NA	5	16	80	NA	2.5 (LL)	NA	2.5 (LL)	5 (LL)	1(LL)	2.5 (LL)
1	2	10	32	160	2	5 (LL)	5	5 (LL)	1	2(LL)	5 (LL)
2	4	20	48	240	5	10 (LL)	10	10 (LL)	1.5	5(LL)	10 (LL)
5	5	50	80	400	10	25 (LL)	NA	2.5	2.5	1	25 (LL)
8	8	80	112	560	15	2	NA	4	3.5	1.5	2
10	10	100	160	800	20	2.5	NA	5	5	2	2.5
14	14	140	192	960	30	3.5	NA	7	6	3	3.5
20	20	200	240	1200	40	5	NA	10	7.5	4	5
40	40	400	320	1600	60	10	NA	20	10	6	10

[1] Stocks referred to here are listed on pages 7 thru 12, and include the regular compounds, Gas, Extra compounds, Appendix IX, Nitriles and Acrolein. Appendix IX and ICAL 2 curve is separate.

Soils: 5-mL Purge Volume

Conc. Level[1]						Recipe (uLs)				
Main Mix/Gas/ MTBE/Other	Extra	THF	Nit	Acrol	APIX	Main Mix/Gas/ MTBE/THF/ Extra/Other (100 ppm)	Surr. (50 ppm)	Nit/Acrol (800/4000 ppm)	APIX (250 ppm)	ICAL 2 100/1000 ppm
2	2	2	NA	NA	NA	2 (LL)	2 (LL)	1 (LL)	1 (LL)	2 (LL)
5	5	5	40	200	10	5 (LL)	5 (LL)	2.5 (LL)	2 (LL)	5 (LL)
20	20	20	160	800	40	20 (LL)	20 (LL)	10 (LL)	8 (LL)	20 (LL)
30	30	30	240	1200	50	30 (LL)	30 (LL)	15 (LL)	10 (LL)	30 (LL)
50	50	50	400	2000	100	2.5	5	2.5	2	2.5
70	70	70	560	2800	150	3.5	7	3.5	3	3.5
100	100	100	800	4000	200	5	10	5	4	5
150	150	150	1200	6000	300	7.5	15	7.5	6	7.5
200	200	200	1600	8000	400	10	20	10	8	10

[1] Stocks referred to here are listed on pages 7 thru 12, and include the regular compounds, Gas, Extra compounds, Appendix IX, Nitriles and Acrolein. The Appendix IX curve must be analyzed separately.

The same tables appear in the standard section. Immediately add the standards to a clean and baked purge vessel. Following the parameters in Table 1, analyze the 50 ppb standard (soil samples) or the 10 ppb standard (water samples). A normal standard will appear very similar to the ones in Figures 1 and 2. Quantitate the standard against the appropriate method file. A short list example of one file appears in Attachment 2. Sufficient areas for the first internal standard will vary somewhat between instruments. Acceptable areas should be based on maintaining sufficient sensitivity for poor

responders without saturating the detector at the upper end of the calibration range. Too low an area will almost guarantee poor/unsatisfactory responses of low-response compounds and too high an area will result in saturation of some compounds at higher levels, resulting in false low response factors at high concentrations.

It is helpful to analyze a medium level standard first and assess the areas before continuing with the low/high level standards.

Response factors are calculated by the data system as follows:

$$RF = \frac{A_x \times Q_s}{A_s \times Q_x}$$

Where:
A_x = ion abundance for analyte
A_s = ion abundance for its internal standard
Q_s = concentration of its internal standard
Q_x = concentration of analyte
(Response Factors have no units)

The appropriate quant ion must be in the method file. See an example of a file in Attachment 2. A listing of the target compounds with their appropriate internal standards also appears in Attachment 2. Confirm the presence of all targets and the separation of non- co-eluting compounds. Note the response factors for the gasses. If necessary, prepare new standards.

If adjustments to the acquisition parameters are necessary, make them and re-analyze the 50 ppb standard (soil samples) or the 10 ppb standard (water samples).

When a standard is analyzed and processed on target as part of the initial calibration the RF's are automatically updated in the daily method. After all initial calibration standards are processed, checked and confirmed as being accurate and passing method criteria, the initial calibration is saved to the source method. This ensures that the correct initial calibration is used for each ensuing continuing calibration check. A hardcopy of the calibration report is generated. All method criteria are assessed for compliance. Confirm that 1) all CCC's are below 30% and 2) the RF's for all SPCC compounds are >0.300 (Minimum RF for Chloromethane, Bromoform and 1,1-Dichloroethane is 0.100).

Calibration curves are evaluated following the "Evaluation and Acceptance Criteria" table (Attachment 4). For all compounds in the initial calibration with a %RSD > 15.0%, calibration curves of area ratio versus concentration using a first or higher order regression curve of the calibration curve points will be performed.

Method 8000B/8260B specifies a minimum coefficient of determination of 0.990. The methods also specify a minimum of 5 calibration points for a linear model and a minimum of 6 calibration points for a higher order regression. The laboratory, in order to meet AFCEE requirements, will analyze a minimum number of points to satisfy both the new SW846 and AFCEE. All efforts will be made to meet the minimum COD of 0.990. However, there are some compounds that historically present a problem meeting this requirement. These compounds are usually those listed in the analyte table of Method 8260B with qualifying remarks. Many of these have various known (or unknown) issues that would effect reproducibility (i.e., Acetone qualifier pp = poor purger). These typically include many of the Appendix IX compounds as well. The laboratory will take minimal action for these compounds.

The 'recipes' noted above will be modified to include the necessary calibration levels. Recipes are for guidance only and may change as needed.

An example of an acceptable initial calibration appears in Attachment 2. The BFB tune, and all standard raw data are kept near the instrument if current, otherwise can be found in a file. Each instrument has its own initial calibration.

NOTE: The actual number of points in the calibration and the low point in the calibration may vary with client and project need. Clients may have additional requirements, which would be covered in a client-specific QAP.

6.5 Daily or Continuing Calibration

Continuing calibration occurs prior to analysis.

If time remains after the initial calibration, and the 50 ppb standard (soil samples) or the 10 ppb standard (water samples) meets continuing calibration criteria, samples can be analyzed up to the 12 hour tune limit. The samples are quantitated against the average RF or appropriate as per method. See later sections describing calculations.

After having satisfied BFB tune requirements, a continuing calibration standard must be analyzed. Analyze a 50 ppb (soil samples) or 10 ppb (water samples) standard following the procedure outlined above. Confirm Form 7 that all CCC's are <20% Drift and the RF's for all SPCC's are >0.300 (Minimum RF for Chloromethane, Bromoform and 1,1-Dichloroethane is 0.100). If so, the continuing calibration is acceptable and analysis can begin.

If continuing calibration can not be met, either new standards and/or a new calibration are needed.

NOTE: Method 8260B stipulate that if the CCC's are not part of the analyte list then all compounds being reported must be < 20% drift.

All internal standard areas and retention times are assessed immediately after calibration. Areas and times compared to the mid point of the initial calibration. Internal standard areas should not deviate by a factor of two or the retention times should not deviate by > 30 s. If the situation occurs, appropriate action is taken and the standard re-analyzed. All corrective action and return to control are documented in the CAR logbook for the appropriate instrument.

7.0 PROCEDURE

7.1 Quality Control Checks

Quality Control is accomplished through 1) daily tuning and calibration checks and 2) preparation QC traceable through individual batches.

7.1.1 Initial Calibration

PFTBA BFB TUNE	Prior to Initial Cal	*limits in Section 6.2
200 or 40 ng \ 150 or 20 ng | 100 or 14 ng | 70 or 10 ng | 50 or 8 ng | 30 or 5ng | 20 or 2 ng | 5 or 1 ng | 0.5 ng /	Initial Cal need dependent on situation.	*limits in Section 6.4

NOTE: As stated, the actual number of points in the calibration and the low point in the calibration may vary with client and project need. Minimum number of points for AFCEE and/or 3rd Edition SW-846 may be 9 (nine) or 10 (ten) depending on matrix. Other clients may have additional requirements, which would be covered in a client-specific QAP.

7.1.2 Method Blank (MB)

Prior to any analysis, the reagent water must be shown to be free of interference's and target compounds.

A 5 mL or 25 mL portion of reagent water is analyzed using one of the methods in Attachment 1. All target compounds must be less than the quantitation limit (See Section 2.0). Once the MB analysis is complete and acceptable, analysis can proceed.

7.1.3 Daily Analysis

PFTBA		
BFB	Prior to continuing	* See above calibration
Daily Calibration Standard	Prior to samples	* See Section 6.5
Samples *		

*Any given 12 hour period contains a tune, standard, blank and LCS. Preparation QC is at a 5% frequency. Instrumental controls are outlined above and further discussed in the procedure section.

Prep QC	Frequency
MB	Prior to analysis
LCS	1 set per analysis batch (see below *)
MS/MSD's[1]	at least 1 set in 20
Surrogates	every blank, sample and QC Sample
QC Charting	LCS/LCD[2] set per frequency to satisfy charting requirements.

[1] The sample selection for MS/MSD is rotated among client samples so that various matrix problems may be noted and/or addressed.
[2] LCS Duplicate (LCD) is performed when insufficient sample is available for an MS/MS.

7.2 Sample Preservation and Storage

Sample containers, preservation techniques and holding times may vary and are dependent on sample matrix, method of choice, regulatory compliance and/or specific contract or client requests. Listed below are the holding times and the references that include container and preservation requirements for compliance with the Resource Conservation and Recovery Act (RCRA).

Matrix	SW-846
All	14 days

All samples received for volatile analysis are refrigerated upon receipt at 4 ± 2°C. Refrigeration is the only preservative for 5030 soil samples, while water samples are additionally preserved with 3 drops of 36% HCl to a pH >2. Water samples marked as un-preserved are analyzed within 7 days.

7.3 Sample Preparation / Analysis

7.3.1 Waters

1. Allow samples and standards to come to ambient temperature.

2. Remove the plunger from a 25 mL luer-lock gas-tight syringe and fill to near over-flowing. Replace the plunger. The pH of all samples is verified at time of analysis. If the pH < 2, a check-mark is placed in the appropriate column in the logbook. If the pH > 2, the actual estimated pH is written in the same column. pH checks and verification of hold-times are documented on the review form. Samples lacking preservation may be noted in the case narrative. Invert the syringe, and adjust the volume to 25 mLs. Confirm the absence of all air bubbles.

3. Draw back slightly on the plunger. Add 5 uLs of the working ISS/SSS solutions. Immediately add the sample to a clean purge vessel. Using the methods described in Attachment 1 analyze the sample.

4. If a batch is going to be analyzed, which is usually the case, load all samples following the procedure above. After the batch is loaded, replace all samples and standards back in storage.

5. If a dilution is required the following guidelines are followed. If the dilution is > 1/100 (250 uLs of sample) an initial dilution is made into a volumetric flask. If serial dilutions are required, no less than 1 mL is taken for further dilutions. The final sample aliquot taken for analysis from the volumetric is no less than 250 uLs. If the dilution is < 1/100, the appropriate sample amount is added directly to the 25 mL syringe. In either case, ISS and SSS are added to the 25 mL syringe.

6. Using those parameters listed in Attachment 1, analyze all samples. After analysis, remove the purge vessel from the Tekmar, rinse the purge line and vessel, and place the vessel in the oven to bake at 100°C for at least an hour.

7. Opened sample vials are used only once unless: 1) any necessary dilutions/reruns are done the same day or 2) there are no other vials for that sample.

7.3.2 Soils

1. As some clients still request method 5030 at the present time, soils are still being analyzed as indicated below. As clients convert to Method 5035 completely, this section will be removed.

2. Before weighing any samples, check the balance using the appropriate class weights. Record the actual weights in the Balance Logbook. If a problem is noted, contact the QC department.

3. Allow samples and standards to come to ambient temperature.

4. Weight out 5 grams of the sample into a clean and previously baked purge vessel. Record the weight to 0.1 g. Place the vessel on the Tekmar. Add reagent water to overflowing to a 5 mL syringe. Replace the plunger, invert the syringe, and with tapping, adjust to 5 mLs. Confirm there are no air bubbles. Add 5 uLs of the working ISS/SSS solutions. Transfer the contents to the purge vessel. Using the methods described in Attachment 1, analyze the sample. All soil samples are analyzed with a heated purge (40°C).

5. If a batch of samples is to be analyzed, prepare each as above. After the batch is loaded, replace all samples and standards in storage.

6. For blanks and LCS samples associated with soil analyses, 5 grams of pre-heated sand is weighed into a purge vessel.

7. Any sample that contains targets above the calibration range is diluted to accurately quantitate those compounds. Any sample that, based on historical data has shown to contain high concentrations of compounds is analyzed at an initial dilution. Any sample screening high, is analyzed at an initial dilution. If an initial analysis over-diluted the given sample it is re-analyzed as a low level soil. If the low-level analysis contains compounds above the calibration range, and the same compounds are within range in the dilution, both sets of data may be reported to the client.

8. If a 1/2 or 1/5 dilution is required, 2.5g/1.0g of sample is weighed into the purge vessel.

7.3.3 Medium-Level Soil Extracts

1. If a larger dilution is required, a medium-level soil extract is prepared as follows. Five grams of sample is weighed into a tarred vial. Five (5) mLs of methanol is added to the vial and the vial sealed. A portion of the extract (100 uLs maximum) is taken for analysis. Internal standard and surrogate solutions are added to the 5 mL syringe. Serial dilutions, if needed, are made from the extract and appropriate amounts taken for analysis. A portion is also removed and stored in a 1-1.5 mL Teflon-lined screw-capped vial for storage.

2. If the sample upon which a medium-level prep as been performed also required an MS/MSD, the appropriate amount of MS solution is also added.

3. All samples prepared in this manner will be analyzed against a medium-level soil curve. This standards, blanks and LCS samples will contain 100 uLs of methanol. The curve will be at ambient temperature.

NOTE: Some soils are analyzed initially at low levels due to increasing client requests for lower reporting limits. The same samples may then require large dilutions to bring compounds into the calibration range of the instrument. Some compounds, most notably the ketones, have very different responses when heated versus non-heated, despite the sample matrix. Traditionally, the lab heats soils. Therefore, the match between original analyses and dilutions for compounds such as these may not appear to correlate.

Dilution	Sample Weight	Vol. MeOH (1/2.5) Extract
1/2	2.5 grams	---
1/5	1.0 grams	---
1/50	5 grams / 5 mLs	100 uLs
1/250	5 grams / 5mLs	20 uLs
1/500	5 grams / 5 mLs	10 uLs

4. Using those parameters in Attachment 1, analyze all samples in the batch.

5. Sample vials/jars are only used once unless: 1) any dilutions/reruns are analyzed the same day or 2) there is only one jar for analysis.

6. For each new lot number of methanol used, 100 uLs is added to 5 mLs of OFW (organic free water) and analyzed. Absence of target compounds is verified and recorded in the MeOH Lot Check Logbook.

7.3.4 Method 5035

NOTE: ICAL Standards are prepared with 5 mL milli-Q water.

1. Samples for low level VOA soil analysis may be received at the lab in one of two manners: First, as replicate 5 gram core samples in 40 mL vials containing a Sodium Bisulfate preservative solution (refer to USP-5035 for collection/preservation). Alternatively, unpreserved 5 gram core samples may be received in Encore containers. These core samples must be placed in the bisulfate preservative solution within 48 hours of collection. This time requirement is currently under review by appropriate regulatory agencies and may be extended beyond the 48 hours. Until such time, the laboratory will endeavor to "fix" the sample cores in preservative within 48 hours of collection. The laboratory may receive replicate 5 gram soil cores to be used for reanalysis if needed.

2. In addition to low level samples, an additional soil aliquot should be received for use as a screen and possible use as a mid-level extraction/analysis. This additional core must also be fixed in methanol within 48 hours of collection. The amount of methanol added must closely correspond to a soil to solvent ratio of 1:1. Though not specified in the method, STL will pursue a goal of removing the methanol from the soil within 24-48 hours after the initial extraction. A portion of the methanol be removed and placed in an amber 1.5 - 2.0 mL Teflon-lined screw-capped vial for storage. This time limit should standardize the amount of time the methanol comes in contact with the sample.

3. Methanol extracts of soils will be analyzed as stated above at ambient-temperature against a medium-level soil initial calibration. All surrogate and internal standard solutions will be added at time of analysis.

4. Low level soils will be analyzed using the Archon Closed Purge and Trap Auto Sampler System. Surrogate and internal standard solutions will be added at the time of analysis. Initial concentrations of both surrogate and internal standard solutions shall be such that "sample concentrations" of the analytes conform to the method and the spike and surrogate tables provided in this SOP. The concentration of the solution and amounts spiked may vary depending on the precision obtained with a given solution/volume combination. However, the final concentrations of such compounds in the samples will follow the same guidelines as previously stated in this SOP for all other samples.

5. As with the internal standard and surrogate, all QC spike solutions must also be added to the closed sample container. This is accomplished by the addition of the spike solutions through the septum with a small gauge (10 uL) syringe just prior to the sample being placed on the instrument for analysis.

6. Some calcareous matrices may react with sodium bisulfate and cause effervescence. The method indicates that such samples need to be recollected without bisulfate preservative and analyzed within 48 hours of collection. Alternatively, some clients and/or regulatory agencies allow optional preservation and holding time criteria. On a per project basis, samples that react with sodium bisulfate may be collected and placed in vials containing water without the preservative. The vials are kept ≤ -12 °C until analysis. Such samples must be thawed prior to analysis. The maximum holding time for this type of collection and preservation is 14-days from the collection date. This alternative approach must be approved by the client/project prior to use.

7.3.5 Drum/Waste Samples

- Non-methanol Miscible
- Methanol Miscible

1. These samples are normally treated as medium level soils or waste dilutions. Waste dilutions normally consist of 1 gram of sample diluted to 10 mLs of methanol. Serial dilutions, if needed, are made from this extract. A portion of the extract is then added to the 5 mL syringe containing surrogate and internal standard. The lab can pre-spike the surrogates and spike compounds if client-specified to do so. As most drum/waste samples result in very high dilutions, it has been the labs experience that surrogates and MSs are most often diluted out and provide no useful information. Unless, specifically assigned to do so, surrogate and matrix spiking will take place at time of analysis.

7.4 Preventive Maintenance

Instrumental maintenance can be categorized as daily and "as required".

7.4.1 Daily Maintenance

The most routinely performed maintenance includes:

- position rinse
- tube baking after sample analysis
- oven bake after high level samples

7.4.2 "As Required"

Most maintenance is done on an "as needed" basis, is operator determined and can be categorized as GC, Tekmar, or MS related.

1. **GC Related**

- change column; condition new column
- clean separator; change separator
- check helium flow rate
- change gas cylinders and moisture trap

2. **MS Related**

- clean source/rods and anything associated with that activity

3. **Tekmar Related**

- rinse positions
- change positions; change parts of positions
- change transfer line; clean transfer line
- replace trap; condition new trap
- refurbish Tekmar
- check purge pressure and flow rate
- analysis of position blanks after high-level samples

- change bulk head fitting

Required maintenance may be performed for a variety of reasons. Certain trouble-flags will indicate what maintenance procedures may be required. A description of the situation, actions taken and follow-up must be documented in the instrument maintenance logbook. An example of the maintenance logbook appears in Attachment 3. In addition, the entry number must be transferred to the appropriate instrument logbook on the day of maintenance, initialed and dated.

7.5 Documentation/Tracking of Sample Analyses

1. The preparation and analysis is recorded in the GC/MS Volatiles Logbook (Attachment 3), and must be completed for each day's analysis.

2. The GC/MS VOA lab employs several forms that serve both a tracking and review function. The Sample Tracking Sheet (BigBoard) is filled out for each job. It contains information the analyst needs as for method, QC requirements, special reporting requirements, etc.., in addition for space to track the analysis of every single sample in the job and the outcome of that analysis.

3. The Tune Form is filled out for every 12 hour tune and contains several kinds of information. The forms main function is to track the analysis of all the samples analyzed during the 12 hours, initial review and data crunching documentation for the samples in the batch, tune and standard information etc.. The Tune Form is not necessarily specific to a single job. The Tune Form is discussed again in the initial review section.

4. In addition, all samples logged into the department appear on a hold-time summary sheet where ALL samples in-house are listed by hold-times and due dates. This summary is utilized by the analysts when making decisions as to methods and analyses that are needed for the day. As samples are analyzed and reviewed, the summary sheet is constantly updated to reflect those samples completely analyzed, those requiring dilutions and re-analyses (essentially a posted summary of the Sample Tracking Sheets). At the beginning of each day, the completed analyses are removed from the summary sheet by updating the analyzed samples into LabNet. The Sample Tracking Sheet and Tune Form can be found in Attachment 3.

7.5.1 Archival of Data

There are three full back-ups performed per week.

- Every Thursday a full back up of VOA data is performed.
- Every Friday a full back up of SVOA data is performed.

- Every Tuesday a system back up (minus the NBS Library) is performed. There are two tapes provided for this back up, and are rotated each week. Most current tapes are kept off site. Older tapes are in locked storage.

The system maintains a database, or logs, of each back-up session. Successful completion of each back-up can be verified each morning by accessing the job report logs in ARCServe. This is done each morning. Any missed jobs can be rescheduled and completed in the morning of the following day. As noted above, this database is re-archived after every normal back-up and can be retrieved at any time necessary.

7.5.2 Removal of Data

1. Although there is a substantial amount of space available to both BNA's and VOAs during busy periods the system can fill rather quickly. As an estimate, with a total of twelve (12) instruments, a maximum of about 2-3 months (per instrument) can be kept on the system at one time. There is not necessarily a set definite schedule of removing data from the system. As per laboratory SOP's, once the data package has been removed and all data associated from that batch has been reduced, reviewed, packaged and sent to report generation, the tune form is placed in designated location. Either by necessity or at the supervisors discretion, these are compiled and the data then actually removed from the system.

2. The tune forms are then filed in the office area. Once a year, these forms are compiled and boxed and stored in a general data storage area.

8.0 QUALITY CONTROL

8.1 QC Summary

The department will review the quality controls as follows:

8.1.1 Method Blank (MB) / Laboratory Control Standard (LCS)

At least one MB and LCS will be included in each laboratory batch. Regardless of the matrix being processed, the LCS and MBs will be in an aqueous media.

The MBs will be examined to determine if contamination is being introduced in the laboratory. The LCS will be examined to determine accuracy and precision.

8.1.2 Accuracy

Accuracy will be measured by the percent recovery (%R) of the LCS. Method 8260B list or suggest accuracy limits for an initial demonstration of precision and accuracy. There

are no further guidelines for spike recoveries. The current limits for the suggested spike compounds listed in the methods are listed in Attachment 2 of this SOP. Internally, QA/QC will monitor %R, and will plot control charts to monitor method accuracy and generate control limits when deemed necessary. The number of compounds being used for bench level control and the accuracy limits assigned to those compounds may vary with client, QAP, project etc.. This information is transmitted to the bench via the COC, kick-off meetings, tech profiles etc.., and indicated on one of the forms used at the bench. The accuracy limits are also posted on controlled boards in both the analytical and data areas (includes both method/sop limits and in-house generated limits. In-house generated limits are subject to change, but are included in Table 1).

8.1.3 Precision

Precision will be measured by the reproducibility of the LCS and will be calculated as Relative Percent Difference (RPD). The Methods list guidelines for the initial demo as noted above, but give no further guidelines for spike data. Current limits are listed in Table 1, however, RPD's are not used to assess bench level CA prior to sample analysis. Internally, QA/QC will monitor precision and calculate limits and log in LCS and LCD's at the appropriate time, at which both will be analyzed. Otherwise, only one LCS will be completed.

8.1.4 Surrogates

Surrogate Compounds will be added to every sample to measure performance of the analysis. Results must agree within statistical control limits in order to be considered acceptable. Limits are listed in Table 1. In-house surrogate limits are also generated as per method. As with LCS samples, the limits used to assess accuracy vary with client, QAP, project etc.., and the information transmitted to the bench in the same manner.

8.1.5 QC Charting

Precision and accuracy are monitored using LCS data. In-house criteria have been generated and are in use at present. Additional data may be added at QA/QC discretion during the year. During that period of time, additional LCSs will be logged into the system until adequate data are generated. Spike levels are 50 ppb/10 ppb for soils/waters. Only those compounds listed above are spiked and should be representative of the whole. The more non-routine compounds are not part of the spiking solutions. Other limitations (availability of second source) may also prevent adding these to spiking solutions. See comments in Section 6 for application of in-house control limits.

8.2 Corrective Actions

Listed below are the steps to be taken when an out-of-control situation occurs. The analyst must address the following issues as described below in the individual sections.

- demonstrate that all of the problems creating the out-of-control situation were addressed;
- document the problem and the action that was taken to correct the problem;
- document that an in-control situation has been achieved; and
- receive approval (signature) of the supervisor, section manager, QC personnel or other qualified personnel prior to release of data associated with the problem.

Bound corrective action (CA) logs are located in each run-log. In addition, a separate CA form, specific to a unique job, is attached to the COC and sample tracking form when the samples are initially entered into the sample tracking documentation used by the department. The log-book and sample # are used to note all out-of-control events, the actions taken to try and correct the problem, the return to control and qualification of data is needed.

Discussed below are the suggested and required courses of action when an out-of-control situation has occurred.

8.2.1 Surrogates

All surrogate recoveries are calculated. If ANY surrogates are outside limits in the MB, it must be re-analyzed. Analyses CAN NOT proceed until an in-control situation is demonstrated. Re-analyze the blank. If surrogates are still out, the instrument may need to be re-tuned (BFB) and/or another calibration standard analyzed. If the problem persists, further maintenance action may be required (i.e., trap replacement, clean separator).

Before pursuing other measures, check to be sure that:

- calculations are correct
- concentrations of the surrogates in the spiking solution are correct
- the correct amount of ISS/SSS solution was added
- ISS/SSS areas are reasonable

If any surrogates in a sample are outside limits, check the above first. Any sample that has a surrogate out must be re-analyzed. The re-analysis can take the form of a dilution, if there is reasonable expectation that a high concentration of a target compound is causing a matrix effect. If the surrogate(s) is/are still outside limits, a matrix effect is demonstrated and both reports are submitted. Depending on the client, the best result may be reported and the other result narrated. If all surrogates are in-control on the re-analysis, only the second analysis is reported.

Every effort is made to complete the re-analysis within hold-time. If this is impossible (i.e. , capacity hold-times preclude re-analyses hold-time)m both reports may be submitted. This is documented in the narrative.

If the sample with the out-of-control surrogates is the same sample on which the MS and MSD has been performed, and the pattern is duplicated, then re-analysis is NOT required. Documentation of the similarities is required.

Surrogate corrective action is documented on the Individual CA Sample # Report for samples, and in the CAR logbooks for blanks and LCS samples.

8.2.2 BFB Criteria

If BFB criteria can not be met, determine if the source of the problem is instrumental or tune related. Inspect overall sensitivity, possible excessive background, the proportionality of the masses, relative abundances of the target masses. If it seems tune-related, adjust the tune parameters in Manual Tune slightly, until acceptance is achieved. If the problem seems instrumental, perform suggested trouble-shooting to locate and correct the problem (Suggestions can be found in most of the manuals). NO analysis can proceed until criteria are met. Corrective action for BFB analysis is documented in the CA logbook associated with the instrument in question. 'Return to control' must be documented.

8.2.3 Initial Calibration

If initial calibration can not be met, determine if the problem is analytical or instrumental. Some suggested questions to ask would be:

- were the standards prepared correctly?
- was the proper amount analyzed?
- check the chromatogram - did something happen on one or two analyses; i.e., a leak
- check the response factors - is one concentration level very high or low? re-analyze
- how old are the standards?

All calibration criteria must be met (Section 6.4). If the ICAL does not meet specified criteria, at minimum, the appropriate levels must be re-analyzed. If necessary, new standards should be prepared and the levels re-analyzed. During analysis of an initial calibration, documentation of the re-analyses of specific levels is not required. See previous section outlining CA for minimum COD values as well.

8.2.4 Continuing Calibration

If continuing calibration can not be met, determine if the problem is analytical or instrumental. Some suggestions:

- check the chromatography
- is overall sensitivity low?
- excessive background?
- how old is the standard?
- need a new 5-point?
- has the tune shifted?

Compare the relative abundances of 69, 131 and 219 from that days manual tune to those on the day the initial calibration was analyzed. Slight adjustments to the tune may bring the standard in. Certain compounds will help indicate what the problem is.

All calibration criteria must be met (Section 6.5). If the CCAL does not meet specified criteria, at minimum the standard should be re-analyzed. A new standard may be prepared and then re-analyzed. If necessary, a new ICAL must be run. All action taken for CCAL's must be recorded in the CAR logbook for that instrument. 'Return to control' must be documented.

8.2.5 Method Blank (MB)

If the MB is/appears to be contaminated, re-analyze it on a different position. If contamination is still present, the problem may be in one of the common elements, such as the trap, transfer line, port valve or column. Baking the trap/column and running position blanks may be necessary. If contamination has occurred beyond that, and maintenance is required (i.e., replace trap) it is documented in the Maintenance Logbook. Corrective action and return to control for MBs is recorded in the CAR logbook for the appropriate instrument. Under extenuating circumstances, if analysis continues, qualification must be made as to the positive hits above the EQL for the compounds in question. Any associated samples analyzed in the tune must be noted. Any samples containing positive hits must be noted. IF, the samples containing positive hits can not be re-analyzed (i.e., past hold-time), the positive hits are flagged with "B" and the situation and data noted and qualified in a case narrative.

8.2.6 Laboratory Control Sample (LCS)

As specified in Section 8.1.2, the number of compounds and the limits used to assess accuracy vary with client, QAP, project etc.. Both method/SOP and in-house generated limits are listed in the Appendices. The in-house limits are subject to change. The need and course of corrective action varies with the number of compounds being used for

bench control and positive detected of compounds outside limits. The following guidelines are used :

(1) AFCEE : All compounds are used for bench control.

- If any compound exhibits low recoveries, the LCS is re-analyzed. If the compound is still low a new spike may be prepared and the LCS re-analyzed. Analysis should not continue until the situation is taken care of. All corrective action is documented at the time and return to control demonstrated for low compounds. IF, in extenuating circumstances, analysis is continued, the low compounds must be noted in the CAR book, associated samples must be qualified in the qualification section, absence of CA documented etc.. Data must be qualified for those compounds in the narrative.

- If any compound exhibits high recoveries, the LCS may be re-analyzed, and/or a new solution prepared, and/or a new standard prepared and calibrations repeated.

All corrective action is recorded at the time in the CAR logbook and return to control documented if applicable. AFCEE allows for high recoveries on a one time basis if the said compounds are not detected in the associated samples. Any high compounds must be noted in the CAR logbook, the associated samples listed in the qualification section, and the presence or absence of these compounds in the associated samples. If positive detects are noted, and the samples are unable to be re-analyzed, the situation must be documented and noted in the case narrative. Following the first occurrence of high recoveries, the bench will take appropriate note and follow-up with appropriate CA within a reasonable amount of time.

(2) QAP's etc.., specifying five compounds.

- ALL five compounds must be within limits for analysis to proceed. The LCS samples may be re-analyzed. New spike solutions may be prepared. Or new standards or CCAL's may be analyzed. All corrective action and return to control must be documented at the time in the CAR logbook of the appropriate instrument.

- The actual limits used for the five compounds may be QAP specific (usually those listed in the table in the appendix) or in-house generated by matrix and method. In either case, the above CA and required documentation apply.

- For all other compounds in the full-list spike, all recoveries are assessed, although no immediate corrective action may be required. If the recoveries are low, in general another LCS may be re-analyzed. The spike solution and standard may be verified for correct concentrations. However, no corrective action is absolutely required by the bench unless an error is discovered. The recoveries may or may not be documented

in the narrative, however, they are noted on the review form. The recoveries of the "un-controlled" compounds may be used for data interpretation.

- Although not strictly required to take immediate corrective action, the purpose of the full-spike is two-fold in that the bench should use it as an indicator of the status of the calibration standards, instrument conditions etc.., as well as a tool for data interpretation. Therefore, in keeping with good lab practice, the situation should be noted and assessed and any corrective action deemed necessary should be taken within a reasonable amount of time (Example: High recoveries on gases => new calibration standard may be needed).

8.2.7 Matrix Spikes (MS)

As specified in Section 8.1.2, the number of compounds and the limits used to assess accuracy vary with client, QAP, project, etc.. Both method/SOP and in-house generated limits are listed in the Appendices. The in-house limits are subject to change. The need and course of corrective action varies with the number of compounds being used for bench control and recoveries of same compounds in the associated LCS samples. The following guidelines are used :

(1) AFCEE : All compounds are used for bench level control.

- If the MS exhibits recoveries outside limits, AFCEE requires it to be re-analyzed as the MSD. No further action is required. Documentation is required however, on the individual CAR form and association made to the LCS for those compounds and in the case narrative. See above specifications for associated LCS samples.

(2) QAP's etc.., specifying five compounds.

- ALL five compounds are assessed. If recoveries are outside limits, the LCS is reviewed for those compounds. If the recoveries are within limits in the associated LCS samples, no further action is required. See above section concerning LCS CA for further information and action required for recoveries outside limits in LCS samples.

- The actual limits used for the five compounds may be QAP specific (usually those listed in the table in the appendix) or in-house generated by matrix and method. In either case, the above CA and required documentation apply.

- For all other compounds in the full-list spike, all recoveries are assessed, although no immediate corrective action may be required. The affected compounds may be compared to the same compounds in the associated LCS samples. See the above section for further information and action required for these compounds in the LCS samples. The recoveries may or may not be documented in the narrative, however,

they are noted on the review form. The recoveries of the "un-controlled" compounds may be used for data interpretation.

8.2.8 Internal Standard Policy

Method 8260 does not require re-analyses of samples for low internal standard areas. However, it is STL's policy to monitor areas and retention times, therefore, the following guidelines apply.

Situations requiring re-analyses :

- If ALL areas are outside limits the sample will be re-analyzed.
- Any sample that has a positive hit associated with any internal standard outside limits will be re-analyzed.
- If ANY surrogates are outside limits the sample will be re-analyzed.

Situations NOT requiring re-analyses :

- If all surrogates are within limits and there are no positive hits associated with those internal that are outside limits, the sample does not have to be re-analyzed. Situation should be addressed in the case narrative and noted on the sample CAR form.
- If all surrogates are within limits, but there is an obvious matrix effect occurring, even if positive hits are noted, the sample does not need to be re-analyzed. This decision will be approved by the supervisor or section manager. The situation must also be addressed on the sample CAR form and narrative.
- If there is historical evidence that shows a repeated pattern for a certain client and site, and this can be documented by reviewing past projects, the samples do not have to be re-analyzed. This decision will be approved by the supervisor or section manager.
- Internal standard areas for samples are documented on the Individual CAR form. Internal standard areas for CCAL to CCAL are documented in the appropriate CAR logbook.

Any sample showing retention times outside windows will be re-analyzed. This is documented in the appropriate manner as in the preceding paragraph.

9.0 DATA ANALYSIS AND CALCULATIONS

9.1 Computer Data Production/Reduction

The Target 3.5 software produces a Total Ion Chromatogram (TIC), header, quant report and background subtracted spectra. For those clients requiring it, a 5 tentatively identified compound (TIC) search is also performed. The data system will produce an integration listing and tentative identification of each hit found at the selected percentage of the largest peak present.

9.1.1 Quantitation of Target Compounds

Quantitation of the target compounds is performed by the data system can be accomplished as follows:

WATERs: concentration (mg/L) = $\frac{[A_x \times I_s]}{[A_{is} \times RF]} \times DF$

Where:
A_x = area of characteristic ion for target
I_s = concentration of internal standard (ng)
A_{is} = area of characteristic ion for int. std.
RF = response factor for target
DF = dilution factor (if any)

SOILs: concentration (mg/kg) = $\frac{[A_x \times I_s]}{[A_{is} \times RF \times D]} \times DF$

Where:
All variables are equal and
D = (100 - % moisture in sample/100) or 1 for wet weight. (As in the case of drum samples)

The target methods all contain calculations for waters and soils that allow automatic processing and calculations of concentrations to be completed. The user may enter some variables (Dilution Factor) and others are imported from LabNet. Sample prep info for VOA's is entered directly into LabNet. The sample volume is considered to be "constant" for calculation purposes. Less sample volume (in the case of waters) and soil weight (in the case of soils) are taken into account in the dilution factor entered by the user. For medium-level soils and waste/drum type samples medium level calculations are needed and actual weights are brought into LabNet.

NOTE: As noted previously, weights are recorded to 0.1 gram. It is SOP to weigh out 5.0 grams (or as appropriate for the dilution), however, to keep data entry and calculations simple. The same holds true for all water volumes.

9.1.2 Accuracy:

$$\%R = \frac{(A_T - A_0)}{A_F} \times 100$$

Where:
A_T = Total amount recovered in fortified sample
A_0 = Amount recovered in unfortified sample
A_F = Amount added to sample

9.1.3 Precision: $\% D = \frac{|B_1 - B_2|}{B_1} \times 100$

$$RPD = \frac{|B_1 - B_2|}{(B_1 + B_2)/2} \times 100$$

Where:
B_1 = %Recovery MS (or LCS)
B_2 = %Recovered MSD (or LCS)

9.1.4 Modifications for 8260B quantitation

1. Initial Calibration Criteria

Methods 8000B/8260B require the use of linear or higher order calibration curves for those compounds exceeding 15%.

The following equations apply :

Linear Regression :

$$y = a_0 + (1/a_1)x$$

Quadratic Curve:

$$y = a_o + (a1 * x) + (a2 * x^2)$$

Power Curve :

$$y = e^{a0} * x^{(1/a1)}$$

which is converted to :

$$\ln(y) = (1/a_1) * \ln(x) + a_0$$

$x = Area_{UKN}/Area_{ISTD}$
$y = Amount_{UNK}/Amount_{ISTD}$

Once the $Amount_{UNK}$ is solved, the value is adjusted for total solids, dilution factors etc.., to calculate a final concentration.

The quantitation of compounds using either a linear regression, quadratic curve or a power curve as performed automatically by the Target software has been confirmed to be accurate.

Method 8000B/8260B specifies a minimum COD.

The corrective action regarding an initial calibration for method 8260B as it relates to the 0.990 correlation coefficient acceptance criteria is outlined. When a compound has a correlation coefficient less than 0.990, the occurrence is documented by the analyst in the GC/MS VOA CAR section of the instrument's logbook. Any corrective action or data qualification is also documented in the CAR section of the logbook. All corrective actions taken may include those listed below.

Samples may be analyzed against an initial calibration that have compounds with a correlation coefficient less than 0.990 and the corrective actions taken may also include some but not all of the following:

- The data for these samples may be reported without qualification if the compounds with a correlation coefficient less than 0.990 are not detected in the sample, therefore no further corrective action is required.
- If a compound is detected in the sample that has a correlation coefficient less than 0.990, the samples may be reanalyzed against an initial calibration with an acceptable correlation coefficient and only the reanalysis will be reported on the sample. If this reanalysis occurs beyond analysis hold times then both analyses on the sample will be reported.
- If a compound is detected in the sample that has a correlation coefficient less than 0.990, the decision to reanalyze or to reported the data without further corrective action is made on a case by case basis with the approval of the supervisor, the section manager, the project manager and the client. The sample results may require qualification for this compound on the report and will be addressed in the case narrative.

2. Continuing Calibration Check

Prior to sample analysis a 10 ppb/ 50 ppb calibration check is completed. All minimum RF's must meet same limits. All CCC's must be less than 20% Drift as calculated below; the analysts may verify %DIFF and only calculate those that are close. (Error may only be made in favor of tighter control).

$$\%Drift = \frac{(Ci - Cc)}{Ci} \times 100$$

Where:
Ci = standard conc. (10/50)
Cc = measured conc. in cal check

9.1.5 Quantitation of TIC's (Tentatively Identified Compounds)

Quantitation of TIC's is performed by the Target processing software. The formulas above for waters and soils can be used with the following modifications. A_x and A_{is} should be taken from the total ion integration listing accompanying the TIC report produced by the data system. The nearest non-interfered with internal standard should be used. The RF is assumed to be one (1). The concentration is therefore an estimate and is flagged as such with a "J". Any TIC also found in the MB is flagged with a "JB". Any TIC identified with a CAS number is also flagged with an "N", indicating that the ID was based on the mass spectra. The operator should visually confirm that the integration is correct. If not, the peak in question must be manually integrated. The target system automatically calculates the actual concentration of the TIC's, including dilutions and total solids, once that information is retrieved from LabNet.

9.2 Operator Data Reduction/Review

The operator does on-screen review of all data and 1) makes judgments concerning the "realness" of those target compounds found and 2) makes judgments concerning the identification of the tentatively identified compounds and 3) modifies the output to produce a data package reflective of those decisions.

9.2.1 Initial Review

The GC/MS VOA area uses two kinds of corrective action documentation. The first consists of the CAR section of logbooks, that are specific to each instrument. These logbooks contain sections to report out-of-control situations, CA, return-to-control and qualification sections for documenting problems related to general QC: tune, ICAL, CCAL, internal standard areas from CCAL to CCAL, and LCS samples. The second are the Individual CAR's that refer to a single job. These are used to record events, CA and final actions for surrogates, internal standard areas, carry-over situations, analyses past tune time, MS/MSD data etc.., for each sample in the batch. These forms are attached to the COC, along with the samples tracking sheets. Both may be used during initial review of the data. Examples of both can be found in Attachment 3. See Section 8.2 of this SOP for details on CA.

All data is initially reviewed on-screen. The review is both a QC review and a general review as described below.

- The MB contains no interferences or target compounds at the EQL.
- ALL surrogates are in control in the blank. Surrogate limits are listed in Table 1;
- ALL surrogates in samples are in control;

- LCS recoveries meet the limits listed in Table 1. See Section 8.2 concerning compounds and limits for LCS samples. In-house limits have been generated and are in use.
- Internal standard areas and retention times are checked and meet guidelines. Limits are listed in Attachment 2. Additional guidelines can be found in Section 8.2.
- The sample does not require any further dilutions or analysis at a more concentrated level. Dilutions are made to keep the target in the upper half of the calibration range. The MS and MSD are never diluted to get spiked or non-spiked compounds within range, as this would reduce the matrix affect assessment.
- Visually confirm complete integration for any large and/or saturated target compounds.
- The sample does not require re-analysis for any other reason (i.e., leak, analysis past tune time, ISTD areas low, etc..).

9.2.2 Identification of Targets

The following guidelines are used in the positive identification of target compounds.

1. "elution of component at the same relative retention time as the standard component."

The elution times should compare within +- 30 s. The standard must be run on the same 12 hour period as the sample. If co-eluting analytes interfere with the comparisons of retention times, other ions characteristic to that compound can be used to confirm relative retention times.

2. "correspondence of the sample component and standard component mass spectrum." Comparisons of sample spectra to standard spectra must be made using standard spectra obtained from the GC/MS system.

All ions present in the standard spectrum at a 10% relative intensity (most abundant ion being 100%) should be present in the sample.

The relative intensities of the above ions should agree within ±20%, between the standard and sample. If an ion is 50% intensity in the standard the corresponding ion must be between 30 and 70% in the sample.

Ions >10% in the sample but not present in the standard should be considered and accounted for. (A user program exists to aid in this).

3. **Operator judgment**. If a compound can not be verified by the above, but in the operators technical judgment the ID is correct, it is reported as such.

4. Once all positive identification is made, the file is modified to reflect these decisions. At this time TIC's may also be reviewed and name. In each case where the file has been edited or manual integrations have taken place the operator must identify, initial and date the changes on the hardcopy. The following guidelines apply :

- Manual integrations should be consistent between all files integrated.
- Manual integrations should not be performed to meet QC criteria.
- Manual integrations are automatically flagged with an "M" on the raw data.
- Excessive manual integrations may reflect an instrumental or methodological problem that should be addressed.

9.2.3 Manual Integration Policy

In each case where the file has been edited or manual integrations have been performed the operator must identify, initial, and date the changes on the hardcopy report. The following guidelines apply:

- Manual integrations should be consistent between all files integrated.
- Manual integrations should not be performed to meet QC criteria.
- Manual integrations are automatically flagged with an 'M' on the raw data.
- Excessive manual integrations may reflect an instrumental or methodological problem that should be addressed.
- Manual integrations shall follow the STL Corporate SOP for manual integrations (#S-Q-004).

Manual integrations are most often performed for the following reasons:

- Assignment of correct peak that was mis-identified by the data system.
- Incomplete auto-integration due to high level of target compound detected.
- Incomplete auto-integration due to background interference.
- Incorrect auto-integration due to co-elution or near co-elution of compounds.
- Missed peaks.

The analysts review all integrations. Spectra and Extracted Ion Chromatography Profiles (EICP) are printed after any integration takes place for target compounds and are routinely included in the data packages. If EICP's for internal standards, surrogates and calibration standards are required to satisfy client deliverables, they can be provided, but will not be routinely added. Manual integrations may be documented in the case narrative if so required, however, references to this SOP will be used for explanations, and any further documentation beyond initials and dates will not be done.

9.2.4 Identification of TIC's

In general, up to as many as 5 non-target compounds are tentatively identified by the data system and operator. Compounds with responses >10% of the nearest ISTD are identified. The data system provides the operator with a SUB ADC C sample spectrum, spectra of the first three matches and a listing of two other possibilities. Molecular formulas, molecular weights and CAS #'s are included. The following guidelines are used:

Relative intensities of major ions in the reference spectrum should be present in the sample (ions >10%).

- Relative ions should agree within ±20%;
- Molecular ions in the reference should be in the samples;
- Review the possibility of background and/or co-eluting compounds for those ions present in the sample but not in the standard;
- If ions are present in the sample but not in the standard, review the possibility of the presence of background or co-eluting compounds;
- If ions are present in the standard but not in the sample, review the possibility that the ions were subtracted out because they are also common to the background or co-eluting compounds;
- In the event no valid interpretation can be made, the compound is called "unknown".
- Interpretation can be often narrowed down to a class of compounds, molecular formula or weight.

9.3 Final Review

1. Once 1) the analysis is determined to be acceptable and 2) the initial review and data reduction has occurred (verifiable on the Tune Form) and 3) the analyst has entered sample prep info into LabNet, the following steps occur. The sample prep information, client ID information and some data applicable to fields in the forms is retrieved from LabNet. At this point, the analyst then usually prints hard-copies of all the necessary raw data. The analysts review the hard-copies and initial and date them, documenting that review.

2. All required forms are then generated using the Target software. Most, if not all of these steps, are documented on the tune form. The package is then assembled and ready for the first review.

3. Upon the first 100% review, the review form is initialed and dated as reviewed. The initial review is normally done by the analyst preparing the data package. The package, with its review sheet, comments and any CAR forms is submitted to the supervisor or section manager for a second review and validation. Once the data passes review in the department, it is submitted to report generation/QA/QC for appropriate follow-up action.

4. The complete analysis scheme can be summarized below (Section 7.1.1 & 7.1.2) and in Attachment 5. The entire sample tracking system can be summarized in Attachment 5. The Tune Form is used to verify many of these steps of review and data reduction.

10.0 WASTE MANAGEMENT AND POLLUTION PREVENTION

- Waste from this procedure will enter the 'Flammable Vials' wastestream.

11.0 METHOD PERFORMANCE CRITERIA

Refer to Sections 1, 6, 7 and 8.

12.0 REFERENCES

Refer to Section 1.0

13.0 ATTACHMENTS

Table 1. Estimated Quantitation Limits for Volatile Analytes; Laboratory Statistical Control Limits
Table 2. Characteristic Mass for Purgeable Organics Compounds

Figure 1. Example: Total Ion Chromatogram for 25 mL Purge Water
Figure 2. Example: Total Ion Chromatogram for 5 mL Purge Soil

Attachment 1. Example: Method Listings; Tekmar Conditions; Flow Settings
Attachment 2. Example: Target and Internal Standards; ICAL/CCAL; Surrogate Recovery Limits; LCS / MS Recovery Limits; Internal Standard Guidelines
Attachment 3. Example: GC/MS Volatiles/CAR Logbook; Tune Form; Sample Tracking Sheet; Maintenance Logbook
Attachment 4. Calibration Evaluation and Acceptance Criteria
Attachment 5. Example: Analysis and Sample Tracking Flowcharts
Attachment 6. Example: Data Review Form

Historical File:

Revision 00: 06/22/92	Revision 07: 04/10/97
Revision 01: 04/26/93	Revision 08: 06/13/97
Revision 02: 05/26/93	Revision 09: 02/11/98
Revision 03: 01/24/94	Revision 10: 01/29/99
Revision 04: 07/15/94	Revision 11: 03/08/99
Revision 05: 11/20/95	Revision 12: 09/28/00
Revision 06: 04/09/96	Revision 13: 10/21/02

Reasons for Change, Revision 13:

- Annual review.
- Updated the Health & Safety (3.0) and Waste Disposal (10.0) sections.

U:\QC\SOP\UMV\8260.DOC

Table 1.

Example: Estimated Quantitation Limits for Volatile Analytes[a]
Laboratory Statistical Control Limits

[a]Estimated Quantitation Limit (EQL) - The lowest concentration that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions. The EQL is generally 5 to 10 times the MDL. However, it may be nominally chosen within these guidelines to simplify data reporting. For many analytes the EQL analyte concentration is selected for the lowest non-zero standard in the calibration curve. Sample EQLs are highly matrix-dependent. The EQLs listed herein are provided for guidance and may not always be achievable. See the following example information for further guidance on matrix-dependent EQLs.

[b]EQLs listed for soil/sediment are based on wet weight. Normally data is reported on a dry weight basis; therefore, EQLs will be higher, based on the percent dry weight in each sample.

STL Chicago
Method Limit Report

Project:
Updated: 3/4/02

Method Description	Analytical Method	Test Matrix	Units	MDL	Lab RL	LCL	UCL	RPD	SLL	SUL
Method: Volatile Organics (5mL Purge) (8260.5)										
1,1,1,2-Tetrachloroethane	8260B	Water-5mL	ug/L	0.96	5	78	119	20		
1,1,1-Trichloroethane	8260B	Water-5mL	ug/L	1.2	5	69	130	20		
1,1,2,2-Tetrachloroethane	8260B	Water-5mL	ug/L	1.7	5	72	121	20		
1,1,2-Trichloroethane	8260B	Water-5mL	ug/L	1.5	5	66	135	20		
1,1-Dichloroethane	8260B	Water-5mL	ug/L	1.3	5	56	124	20		
1,1-Dichloroethene	8260B	Water-5mL	ug/L	1.7	5	48	132	20		
1,1-Dichloropropene	8260B	Water-5mL	ug/L	1.1	5	57	150	20		
1,2,3-Trichlorobenzene	8260B	Water-5mL	ug/L	4.3	5	70	126	20		
1,2,3-Trichloropropane	8260B	Water-5mL	ug/L	1.2	5	68	124	20		
1,2,4-Trichlorobenzene	8260B	Water-5mL	ug/L	3.3	5	57	132	20		
1,2,4-Trimethylbenzene	8260B	Water-5mL	ug/L	1.1	5	69	128	20		
1,2-Dibromo-3-chloropropane	8260B	Water-5mL	ug/L	1.8	5	51	119	20		
1,2-Dibromoethane (EDB)	8260B	Water-5mL	ug/L	1.3	5	69	124	20		
1,2-Dichlorobenzene	8260B	Water-5mL	ug/L	1.5	5	80	117	20		
1,2-Dichloroethane	8260B	Water-5mL	ug/L	1.4	5	68	125	20		
1,2-Dichloroethene (total)	8260B	Water-5mL	ug/L	2.4	5	58	129	20		
1,2-Dichloropropane	8260B	Water-5mL	ug/L	1.1	5	67	124	20		
1,3,5-Trichlorobenzene	8260B	Water-5mL	ug/L	2.4	5	67	118	20		
1,3,5-Trimethylbenzene	8260B	Water-5mL	ug/L	1.1	5	68	126	20		
1,3-Butadiene	8260B	Water-5mL	ug/L		5					
1,3-Dichlorobenzene	8260B	Water-5mL	ug/L	1.5	5	76	118	20		
1,3-Dichloropropane	8260B	Water-5mL	ug/L	1.1	5	72	121	20		
1,4-Dichlorobenzene	8260B	Water-5mL	ug/L	1.6	5	78	119	20		
1-Chlorohexane	8260B	Water-5mL	ug/L	0.9	5	60	143	20		
2,2-Dichloropropane	8260B	Water-5mL	ug/L	4.5	5	56	139	20		
2-Butanone (MEK)	8260B	Water-5mL	ug/L	1.9	5	55	140	20		
2-Chloro-1,3-butadiene (chloroprene)	8260B	Water-5mL	ug/L	0.29	5					
2-Chloroethylvinylether	8260B	Water-5mL	ug/L	2.3	5	10	150	20		
2-Chlorotoluene	8260B	Water-5mL	ug/L	1.1	5	75	123	20		
2-Hexanone	8260B	Water-5mL	ug/L	1.4	5	50	136	20		
2-Methylnaphthalene	8260B	Water-5mL	ug/L		5					
2-Nitropropane	8260B	Water-5mL	ug/L		400					
3-Chloropropene (Allyl Chloride)	8260B	Water-5mL	ug/L	1.4	10					
4-Chlorotoluene	8260B	Water-5mL	ug/L	1.2	5	69	122	20		
4-Methyl-2-pentanone (MIBK)	8260B	Water-5mL	ug/L	1.3	5	50	138	20		
Acetone	8260B	Water-5mL	ug/L	4.8	5	33	141	20		
Acetonitrile	8260B	Water-5mL	ug/L	20.2	40					

STL Chicago
Method Limit Report

Project:
Updated: 3/4/02

Method Description	Analytical Method	Test Matrix	Units	MDL	Lab RL	LCL	UCL	RPD	SLL	SUL
Acrolein	8260B	Water-5mL	ug/L	74.5	200					
Acrylonitrile	8260B	Water-5mL	ug/L	16.3	40					
Benzene	8260B	Water-5mL	ug/L	0.96	5	68	130	20		
bis(chloromethyl)ether	8260B	Water-5mL	ug/L		2000					
Bromobenzene	8260B	Water-5mL	ug/L	1.2	5	73	127	20		
Bromochloromethane	8260B	Water-5mL	ug/L	1.5	5	64	135	20		
Bromodichloromethane	8260B	Water-5mL	ug/L	1.3	5	69	131	20		
Bromoform	8260B	Water-5mL	ug/L	1.1	5	70	128	20		
Bromomethane	8260B	Water-5mL	ug/L	0.86	5	68	144	20		
Carbon disulfide	8260B	Water-5mL	ug/L	1.6	5	50	150	20		
Carbon tetrachloride	8260B	Water-5mL	ug/L	0.89	5	66	121	20		
Chlorobenzene	8260B	Water-5mL	ug/L	1	5	77	121	20		
Chloroethane	8260B	Water-5mL	ug/L	1.3	5	48	177	20		
Chloroform	8260B	Water-5mL	ug/L	1.6	5	66	127	20		
Chloromethane	8260B	Water-5mL	ug/L	2.7	5	62	131	20		
cis-1,2-Dichloroethene	8260B	Water-5mL	ug/L	1.3	5	62	134	20		
cis-1,3-Dichloropropene	8260B	Water-5mL	ug/L	1.2	5	73	127	20		
Cyclohexanone	8260B	Water-5mL	ug/L		400					
Dibromochloromethane	8260B	Water-5mL	ug/L	1.1	5	74	119	20		
Dibromomethane	8260B	Water-5mL	ug/L	1.3	5	65	124	20		
Dichlorodifluoromethane	8260B	Water-5mL	ug/L	1.2	5	41	127	20		
Ethyl acetate	8260B	Water-5mL	ug/L	10.2	50					
Ethyl ether	8260B	Water-5mL	ug/L	0.38	5	35	121	20		
Ethylbenzene	8260B	Water-5mL	ug/L	0.93	5	78	121	20		
Ethylmethacrylate	8260B	Water-5mL	ug/L	0.99	10					
Heptane	8260B	Water-5mL	ug/L	0.59	5	17	124	20		
Hexachlorobutadiene	8260B	Water-5mL	ug/L	3.5	5	58	133	20		
Hexane	8260B	Water-5mL	ug/L	0.66	5	36	76	20		
Iodomethane	8260B	Water-5mL	ug/L	1.1	10	50	150	20		
Isobutyl alcohol	8260B	Water-5mL	ug/L	122	400					
Isopropyl alcohol	8260B	Water-5mL	ug/L							
Isopropyl ether	8260B	Water-5mL	ug/L	0.32	5					
Isopropylbenzene	8260B	Water-5mL	ug/L	0.87	5	72	118	20		
m&p-Xylenes	8260B	Water-5mL	ug/L	1.8	10	73	128	20		
Methacrylonitrile	8260B	Water-5mL	ug/L	1.8	10					
Methylene chloride	8260B	Water-5mL	ug/L	1.4	5	45	130	20		
Methylmethacrylate	8260B	Water-5mL	ug/L	1.5	10					
Methyl-tert-butyl-ether (MTBE)	8260B	Water-5mL	ug/L	2	5	49	139	20		

Method Description	Analytical Method	Test Matrix	Units	MDL	Lab RL	LCL	UCL	RPD	SLL	SUL
Naphthalene	8260B	Water-5mL	ug/L	3.6	5	60	119	20		
n-Butyl alcohol (1-Butanol)	8260B	Water-5mL	ug/L	400	400					
n-Butylbenzene	8260B	Water-5mL	ug/L	1.5	5	71	128	20		
n-Propylbenzene	8260B	Water-5mL	ug/L	0.96	5	70	124	20		
o-Xylene	8260B	Water-5mL	ug/L	0.98	5	75	123	20		
Pentachloroethane	8260B	Water-5mL	ug/L	1.1	10					
p-Isopropyltoluene	8260B	Water-5mL	ug/L	1	5	75	126	20		
Propionitrile	8260B	Water-5mL	ug/L	14.5	40					
sec-Butylbenzene	8260B	Water-5mL	ug/L	0.96	5	74	124	20		
Styrene	8260B	Water-5mL	ug/L	1.1	5	80	126	20		
tert-Butyl alcohol	8260B	Water-5mL	ug/L							
tert-Butylbenzene	8260B	Water-5mL	ug/L	0.98	5	73	123	20		
Tetrachloroethene	8260B	Water-5mL	ug/L	2.6	5	74	123	20		
Tetrahydrofuran	8260B	Water-5mL	ug/L	1.8	5	22	147	20		
Toluene	8260B	Water-5mL	ug/L	1.1	5	72	122	20		
trans-1,2-Dichloroethene	8260B	Water-5mL	ug/L	1.1	5	63	125	20		
trans-1,3-Dichloropropene	8260B	Water-5mL	ug/L	1.4	5	62	127	20		
trans-1,4-Dichloro-2-butene	8260B	Water-5mL	ug/L	1.1	10					
Trichloroethene	8260B	Water-5mL	ug/L	1.6	5	71	128	20		
Trichlorofluoromethane	8260B	Water-5mL	ug/L	3.2	5	68	133	20		
Trichlorotrifluoroethane	8260B	Water-5mL	ug/L	1	5	50	150	20		
Vinyl acetate	8260B	Water-5mL	ug/L	1.4	5	58	157	20		
Vinyl chloride	8260B	Water-5mL	ug/L	1.2	5	50	141	20		
Xylenes (total)	8260B	Water-5mL	ug/L	1.8	5	76	129	20		
Surrogate										
1,2-Dichloroethane-d4 (surr)	8260B	Water-5mL	ug/L						66	132
4-Bromofluorobenzene (surr)	8260B	Water-5mL	ug/L						79	122
Dibromofluoromethane (surr)	8260B	Water-5mL	ug/L						66	132
Toluene-d8 (surr)	8260B	Water-5mL	ug/L						78	128
Method: Volatile Organics (8260B)										
1,1,1,2-Tetrachloroethane	8260B	Water	ug/L	0.21	1	70	134	20		
1,1,1-Trichloroethane	8260B	Water	ug/L	0.22	1	66	129	20		
1,1,2,2-Tetrachloroethane	8260B	Water	ug/L	0.25	1	72	127	20		
1,1,2-Trichloroethane	8260B	Water	ug/L	0.33	1	69	138	20		
1,1-Dichloroethane	8260B	Water	ug/L	0.2	1	69	127	20		
1,1-Dichloroethene	8260B	Water	ug/L	0.19	1	54	127	20		
1,1-Dichloropropene	8260B	Water	ug/L	0.24	1	70	128	20		
1,2,3-Trichlorobenzene	8260B	Water	ug/L	0.24	1	75	123	20		

STL Chicago
Method Limit Report

Project:
Updated: 3/4/02

Method Description	Analytical Method	Test Matrix	Units	MDL	Lab RL	LCL	UCL	RPD	SLL	SUL
1,2,3-Trichloropropane	8260B	Water	ug/L	0.2	1	71	126	20		
1,2,4-Trichlorobenzene	8260B	Water	ug/L	0.23	1	77	123	20		
1,2,4-Trimethylbenzene	8260B	Water	ug/L	0.2	1	72	126	20		
1,2-Dibromo-3-chloropropane	8260B	Water	ug/L	0.46	1	66	123	20		
1,2-Dibromoethane (EDB)	8260B	Water	ug/L	0.25	1	71	135	20		
1,2-Dichlorobenzene	8260B	Water	ug/L	0.24	1	74	119	20		
1,2-Dichloroethane	8260B	Water	ug/L	0.25	1	63	133	20		
1,2-Dichloroethene (total)	8260B	Water	ug/L	0.42	1	72	121	20		
1,2-Dichloropropane	8260B	Water	ug/L	0.22	1	71	132	20		
1,3,5-Trichlorobenzene	8260B	Water	ug/L	0.24	1	72	127	20		
1,3,5-Trimethylbenzene	8260B	Water	ug/L	0.2	1	69	123	20		
1,3-Butadiene	8260B	Water	ug/L	0.25	1					
1,3-Dichlorobenzene	8260B	Water	ug/L	0.23	1	73	121	20		
1,3-Dichloropropane	8260B	Water	ug/L	0.23	1	71	133	20		
1,4-Dichlorobenzene	8260B	Water	ug/L	0.22	1	74	121	20		
1-Chlorohexane	8260B	Water	ug/L	0.23	1	71	139	20		
2,2-Dichloropropane	8260B	Water	ug/L	0.2	1	56	141	20		
2-Butanone (MEK)	8260B	Water	ug/L	1.7	5	54	145	20		
2-Chloro-1,3-butadiene (chloroprene)	8260B	Water	ug/L	0.13	1					
2-Chloroethylvinylether	8260B	Water	ug/L	1.4	2	10	200	20		
2-Chlorotoluene	8260B	Water	ug/L	0.22	1	69	120	20		
2-Hexanone	8260B	Water	ug/L	1.2	5	70	144	20		
2-Methylnaphthalene	8260B	Water	ug/L	0.27	1					
2-Nitropropane	8260B	Water	ug/L	20	100					
3-Chloropropene (Allyl Chloride)	8260B	Water	ug/L	0.45	2					
4-Chlorotoluene	8260B	Water	ug/L	0.22	1	68	120	20		
4-Methyl-2-pentanone (MIBK)	8260B	Water	ug/L	0.92	5	66	147	20		
Acetone	8260B	Water	ug/L	1.5	5	43	150	20		
Acetonitrile	8260B	Water	ug/L	6.6	40					
Acrolein	8260B	Water	ug/L	19	200					
Acrylonitrile	8260B	Water	ug/L	5.4	40					
Benzene	8260B	Water	ug/L	0.2	1	74	116	20		
bis(chloromethyl)ether	8260B	Water	ug/L	2000	2000					
Bromobenzene	8260B	Water	ug/L	0.22	1	77	121	20		
Bromochloromethane	8260B	Water	ug/L	0.19	1	57	133	20		
Bromodichloromethane	8260B	Water	ug/L	0.23	1	76	129	20		
Bromoform	8260B	Water	ug/L	0.22	1	73	139	20		
Bromomethane	8260B	Water	ug/L	0.18	1	51	152	20		

STL Chicago
Method Limit Report

Project:
Updated: 3/4/02

Method Description	Analytical Method	Test Matrix	Units	MDL	Lab RL	LCL	UCL	RPD	SLL	SUL
Carbon disulfide	8260B	Water	ug/L	0.4	5	29	136	20		
Carbon tetrachloride	8260B	Water	ug/L	0.24	1	66	136	20		
Chlorobenzene	8260B	Water	ug/L	0.22	1	76	124	20		
Chloroethane	8260B	Water	ug/L	0.21	1	68	135	20		
Chloroform	8260B	Water	ug/L	0.23	1	74	128	20		
Chloromethane	8260B	Water	ug/L	0.16	1	56	129	20		
cis-1,2-Dichloroethene	8260B	Water	ug/L	0.21	1	78	126	20		
cis-1,3-Dichloropropene	8260B	Water	ug/L	0.22	1	75	123	20		
Cyclohexane	8260B	Water	ug/L	0.1	1					
Cyclohexanone	8260B	Water	ug/L	53	100					
Dibromochloromethane	8260B	Water	ug/L	0.23	1	74	137	20		
Dibromomethane	8260B	Water	ug/L	0.26	1	66	131	20		
Dichlorodifluoromethane	8260B	Water	ug/L	0.14	1	56	136	20		
Ethyl acetate	8260B	Water	ug/L	1.9	5					
Ethyl ether	8260B	Water	ug/L	0.31	1	10	190	20		
Ethylbenzene	8260B	Water	ug/L	0.2	1	74	121	20		
Ethylmethacrylate	8260B	Water	ug/L	0.36	2					
Heptane	8260B	Water	ug/L	0.22	1	50	143	20		
Hexachlorobutadiene	8260B	Water	ug/L	0.24	1	56	147	20		
Hexane	8260B	Water	ug/L	0.2	1	50	134	20		
Iodomethane	8260B	Water	ug/L	1.3	2	36	117	20		
Isobutyl alcohol	8260B	Water	ug/L	26	100					
Isopropyl alcohol	8260B	Water	ug/L							
Isopropyl ether	8260B	Water	ug/L	0.15	1					
Isopropylbenzene	8260B	Water	ug/L	0.21	1	67	123	20		
m&p-Xylenes	8260B	Water	ug/L	0.39	2	71	125	20		
Methacrylonitrile	8260B	Water	ug/L	1.5	2					
Methyl acetate	8260B	Water	ug/L	0.52	1					
Methyl cyclohexane	8260B	Water	ug/L	0.1	1					
Methylene chloride	8260B	Water	ug/L	0.19	1	52	133	20		
Methylmethacrylate	8260B	Water	ug/L	0.67	2					
Methyl-tert-butyl-ether (MTBE)	8260B	Water	ug/L	0.21	1	52	156	20		
Naphthalene	8260B	Water	ug/L	0.34	1	69	125	20		
n-Butyl alcohol (1-Butanol)	8260B	Water	ug/L	55	100					
n-Butylbenzene	8260B	Water	ug/L	0.22	1	71	118	20		
n-Pentane	8260B	Water	ug/L							
n-Propylbenzene	8260B	Water	ug/L	0.25	1	67	123	20		
o-Xylene	8260B	Water	ug/L	0.21	1	72	124	20		

Method Description	Analytical Method	Test Matrix	Units	MDL	Lab RL	LCL	UCL	RPD	SLL	SUL
Pentachloroethane	8260B	Water	ug/L	1	2					
p-Isopropyltoluene	8260B	Water	ug/L	0.22	1	67	126	20		
Propionitrile	8260B	Water	ug/L	9.7	40					
sec-Butylbenzene	8260B	Water	ug/L	0.22	1	69	124	20		
Styrene	8260B	Water	ug/L	0.23	1	80	125	20		
tert-Butyl alcohol	8260B	Water	ug/L							
tert-Butylbenzene	8260B	Water	ug/L	0.21	1	69	123	20		
Tetrachloroethene	8260B	Water	ug/L	0.2	1	69	128	20		
Tetrahydrofuran	8260B	Water	ug/L	3	5	67	166	20		
Toluene	8260B	Water	ug/L	0.21	1	71	122	20		
trans-1,2-Dichloroethene	8260B	Water	ug/L	0.21	1	64	119	20		
trans-1,3-Dichloropropene	8260B	Water	ug/L	0.24	1	76	126	20		
trans-1,4-Dichloro-2-butene	8260B	Water	ug/L	1.3	2					
Trichloroethene	8260B	Water	ug/L	0.21	1	70	120	20		
Trichlorofluoromethane	8260B	Water	ug/L	0.22	1	62	141	20		
Trichlorotrifluoroethane	8260B	Water	ug/L	0.22	1	50	150	30		
Vinyl acetate	8260B	Water	ug/L	0.47	5	70	130	20		
Vinyl chloride	8260B	Water	ug/L	0.18	1	67	137	20		
Xylenes (total)	8260B	Water	ug/L	0.28	1	76	138	20		
Surrogate										
1,2-Dichloroethane-d4 (surr)	8260B	Water	ug/L						61	131
4-Bromofluorobenzene (surr)	8260B	Water	ug/L						73	122
Dibromofluoromethane (surr)	8260B	Water	ug/L						66	132
Toluene-d8 (surr)	8260B	Water	ug/L						78	128
Method: Volatile Organics (8260B)										
1,1,1,2-Tetrachloroethane	8260B	Solid	ug/Kg	0.73	5	83	123	20		
1,1,1-Trichloroethane	8260B	Solid	ug/Kg	0.61	5	63	133	20		
1,1,2,2-Tetrachloroethane	8260B	Solid	ug/Kg	0.64	5	68	139	20		
1,1,2-Trichloroethane	8260B	Solid	ug/Kg	0.71	5	71	143	20		
1,1-Dichloroethane	8260B	Solid	ug/Kg	0.88	5	63	133	20		
1,1-Dichloroethene	8260B	Solid	ug/Kg	1	5	51	132	20		
1,1-Dichloropropene	8260B	Solid	ug/Kg	0.8	5	78	148	20		
1,2,3-Trichlorobenzene	8260B	Solid	ug/Kg	0.99	5	75	125	20		
1,2,3-Trichloropropane	8260B	Solid	ug/Kg	1.1	5	71	129	20		
1,2,4-Trichlorobenzene	8260B	Solid	ug/Kg	0.79	5	76	127	20		
1,2,4-Trimethylbenzene	8260B	Solid	ug/Kg	0.82	5	74	133	20		
1,2-Dibromo-3-chloropropane	8260B	Solid	ug/Kg	1.1	5	59	124	20		
1,2-Dibromoethane (EDB)	8260B	Solid	ug/Kg	0.76	5	72	133	20		

Method Description	Analytical Method	Test Matrix	Units	MDL	Lab RL	LCL	UCL	RPD	SLL	SUL
1,2-Dichlorobenzene	8260B	Solid	ug/Kg	0.73	5	85	120	20		
1,2-Dichloroethane	8260B	Solid	ug/Kg	0.58	5	69	125	20		
1,2-Dichloroethene (total)	8260B	Solid	ug/Kg	1.9	5	63	144	20		
1,2-Dichloropropane	8260B	Solid	ug/Kg	0.96	5	76	132	20		
1,3,5-Trichlorobenzene	8260B	Solid	ug/Kg	1	5	70	131	20		
1,3,5-Trimethylbenzene	8260B	Solid	ug/Kg	0.58	5	72	128	20		
1,3-Butadiene	8260B	Solid	ug/Kg	0.93	5					
1,3-Dichlorobenzene	8260B	Solid	ug/Kg	0.91	5	83	122	20		
1,3-Dichloropropane	8260B	Solid	ug/Kg	0.93	5	78	127	20		
1,4-Dichlorobenzene	8260B	Solid	ug/Kg	0.89	5	84	121	20		
1-Chlorohexane	8260B	Solid	ug/Kg	1	5	62	145	20		
2,2-Dichloropropane	8260B	Solid	ug/Kg	1.3	5	67	134	20		
2-Butanone (MEK)	8260B	Solid	ug/Kg	4.2	5	50	150	30		
2-Chloro-1,3-butadiene (chloroprene)	8260B	Solid	ug/Kg	0.68	5					
2-Chloroethylvinylether	8260B	Solid	ug/Kg	0.82	5	10	182	20		
2-Chlorotoluene	8260B	Solid	ug/Kg	1	5	63	137	20		
2-Hexanone	8260B	Solid	ug/Kg	1.7	5	69	140	20		
2-Methylnaphthalene	8260B	Solid	ug/Kg	1.2	5					
2-Nitropropane	8260B	Solid	ug/Kg	139	400					
3-Chloropropene (Allyl Chloride)	8260B	Solid	ug/Kg	2.2	10					
4-Chlorotoluene	8260B	Solid	ug/Kg	0.77	5	76	123	20		
4-Methyl-2-pentanone (MIBK)	8260B	Solid	ug/Kg	3	5	68	134	20		
Acetone	8260B	Solid	ug/Kg	4.1	5	46	167	20		
Acetonitrile	8260B	Solid	ug/Kg	26	40					
Acrolein	8260B	Solid	ug/Kg	38	200					
Acrylonitrile	8260B	Solid	ug/Kg	7	40					
Benzene	8260B	Solid	ug/Kg	0.66	5	72	128	20		
bis(chloromethyl)ether	8260B	Solid	ug/Kg							
Bromobenzene	8260B	Solid	ug/Kg	0.71	5	81	123	20		
Bromochloromethane	8260B	Solid	ug/Kg	0.99	5	68	129	20		
Bromodichloromethane	8260B	Solid	ug/Kg	0.68	5	74	128	20		
Bromoform	8260B	Solid	ug/Kg	0.91	5	78	132	20		
Bromomethane	8260B	Solid	ug/Kg	2.9	5	48	127	20		
Carbon disulfide	8260B	Solid	ug/Kg	2	5	23	138	20		
Carbon tetrachloride	8260B	Solid	ug/Kg	0.83	5	67	127	20		
Chlorobenzene	8260B	Solid	ug/Kg	0.91	5	83	125	20		
Chloroethane	8260B	Solid	ug/Kg	1.6	5	59	163	20		
Chloroform	8260B	Solid	ug/Kg	0.62	5	73	135	20		

Method Description	Analytical Method	Test Matrix	Units	MDL	Lab RL	LCL	UCL	RPD	SLL	SUL
Chloromethane	8260B	Solid	ug/Kg	0.94	5	45	141	20		
cis-1,2-Dichloroethene	8260B	Solid	ug/Kg	1.2	5	68	148	20		
cis-1,3-Dichloropropene	8260B	Solid	ug/Kg	0.79	5	80	124	20		
Cyclohexane	8260B	Solid	ug/Kg		5					
Cyclohexanone	8260B	Solid	ug/Kg	280	400					
Dibromochloromethane	8260B	Solid	ug/Kg	0.69	5	77	127	20		
Dibromomethane	8260B	Solid	ug/Kg	0.69	5	70	130	20		
Dichlorodifluoromethane	8260B	Solid	ug/Kg	0.75	5	43	121	20		
Ethyl acetate	8260B	Solid	ug/Kg	9.9	50					
Ethyl ether	8260B	Solid	ug/Kg	1.2	5	50	150	30		
Ethylbenzene	8260B	Solid	ug/Kg	1.1	5	79	123	20		
Ethylmethacrylate	8260B	Solid	ug/Kg	1.5	10					
Heptane	8260B	Solid	ug/Kg	0.75	5	50	150	30		
Hexachlorobutadiene	8260B	Solid	ug/Kg	1	5	66	127	20		
Hexane	8260B	Solid	ug/Kg	0.61	5	50	150	30		
Iodomethane	8260B	Solid	ug/Kg	3.5	10	50	150	30		
Isobutyl alcohol	8260B	Solid	ug/Kg	84	400					
Isopropyl alcohol	8260B	Solid	ug/Kg							
Isopropyl ether	8260B	Solid	ug/Kg	0.64	5					
Isopropylbenzene	8260B	Solid	ug/Kg	0.75	5	77	118	20		
m&p-Xylenes	8260B	Solid	ug/Kg	2.1	10	79	123	20		
Methacrylonitrile	8260B	Solid	ug/Kg	4.3	10					
Methyl acetate	8260B	Solid	ug/Kg		5					
Methyl cyclohexane	8260B	Solid	ug/Kg		5					
Methylene chloride	8260B	Solid	ug/Kg	1.8	5	58	143	20		
Methylmethacrylate	8260B	Solid	ug/Kg	2	10					
Methyl-tert-butyl-ether (MTBE)	8260B	Solid	ug/Kg	0.64	5	61	132	20		
Naphthalene	8260B	Solid	ug/Kg	1	5	65	132	20		
n-Butyl alcohol (1-Butanol)	8260B	Solid	ug/Kg	178	400					
n-Butylbenzene	8260B	Solid	ug/Kg	0.84	5	65	138	20		
n-Pentane	8260B	Solid	ug/Kg							
n-Propylbenzene	8260B	Solid	ug/Kg	0.86	5	77	124	20		
o-Xylene	8260B	Solid	ug/Kg	0.93	5	80	123	20		
Pentachloroethane	8260B	Solid	ug/Kg	5.4	10					
p-Isopropyltoluene	8260B	Solid	ug/Kg	0.68	5	74	126	20		
Propionitrile	8260B	Solid	ug/Kg	19	40					
sec-Butylbenzene	8260B	Solid	ug/Kg	0.81	5	77	128	20		
Styrene	8260B	Solid	ug/Kg	1	5	85	126	20		

Method Description	Analytical Method	Test Matrix	Units	MDL	Lab RL	LCL	UCL	RPD	SLL	SUL
tert-Butyl alcohol	8260B	Solid	ug/Kg							
tert-Butylbenzene	8260B	Solid	ug/Kg	0.78	5	79	124	20		
Tetrachloroethene	8260B	Solid	ug/Kg	0.67	5	75	129	20		
Tetrahydrofuran	8260B	Solid	ug/Kg	2.5	5	55	135	20		
Toluene	8260B	Solid	ug/Kg	1	5	75	125	20		
trans-1,2-Dichloroethene	8260B	Solid	ug/Kg	0.94	5	58	139	20		
trans-1,3-Dichloropropene	8260B	Solid	ug/Kg	0.84	5	75	134	20		
trans-1,4-Dichloro-2-butene	8260B	Solid	ug/Kg	2.2	10					
Trichloroethene	8260B	Solid	ug/Kg	0.59	5	75	129	20		
Trichlorofluoromethane	8260B	Solid	ug/Kg	0.71	5	57	135	20		
Trichlorotrifluoroethane	8260B	Solid	ug/Kg	1.8	5	50	150	30		
Vinyl acetate	8260B	Solid	ug/Kg	0.56	5	50	150	30		
Vinyl chloride	8260B	Solid	ug/Kg	0.74	5	58	140	20		
Xylenes (total)	8260B	Solid	ug/Kg	2.9	5	82	125	20		
Surrogate										
1,2-Dichloroethane-d4 (surr)	8260B	Solid	ug/Kg						50	145
4-Bromofluorobenzene (surr)	8260B	Solid	ug/Kg						60	140
Dibromofluoromethane (surr)	8260B	Solid	ug/Kg						60	140
Toluene-d8 (surr)	8260B	Solid	ug/Kg						66	141
Method: Volatile Organics (8260B)										
1,1,1,2-Tetrachloroethane	8260B	High/MeOH	ug/Kg	25.5	100	74	120	30		
1,1,1-Trichloroethane	8260B	High/MeOH	ug/Kg	16.5	100	69	133	30		
1,1,2,2-Tetrachloroethane	8260B	High/MeOH	ug/Kg	18.5	100	70	126	30		
1,1,2-Trichloroethane	8260B	High/MeOH	ug/Kg	31.5	100	67	133	30		
1,1-Dichloroethane	8260B	High/MeOH	ug/Kg	13.5	100	68	119	30		
1,1-Dichloroethene	8260B	High/MeOH	ug/Kg	14	100	44	143	30		
1,1-Dichloropropene	8260B	High/MeOH	ug/Kg	18.5	100	65	134	30		
1,2,3-Trichlorobenzene	8260B	High/MeOH	ug/Kg	49	100	68	117	30		
1,2,3-Trichloropropane	8260B	High/MeOH	ug/Kg	49	100	64	118	30		
1,2,4-Trichlorobenzene	8260B	High/MeOH	ug/Kg	41.5	100	61	117	30		
1,2,4-Trimethylbenzene	8260B	High/MeOH	ug/Kg	23	100	69	122	30		
1,2-Dibromo-3-chloropropane	8260B	High/MeOH	ug/Kg	22.5	100	56	102	30		
1,2-Dibromoethane (EDB)	8260B	High/MeOH	ug/Kg	25.5	100	69	122	30		
1,2-Dichlorobenzene	8260B	High/MeOH	ug/Kg	17	100	76	125	30		
1,2-Dichloroethane	8260B	High/MeOH	ug/Kg	21.5	100	64	115	30		
1,2-Dichloroethene (total)	8260B	High/MeOH	ug/Kg	29	100	60	139	30		
1,2-Dichloropropane	8260B	High/MeOH	ug/Kg	17.5	100	70	122	30		
1,3,5-Trichlorobenzene	8260B	High/MeOH	ug/Kg	29	100	65	113	30		

STL Chicago
Method Limit Report

Project:
Updated: 3/4/02

Method Description	Analytical Method	Test Matrix	Units	MDL	Lab RL	LCL	UCL	RPD	SLL	SUL
1,3,5-Trimethylbenzene	8260B	High/MeOH	ug/Kg	19.5	100	66	125	30		
1,3-Butadiene	8260B	High/MeOH	ug/Kg		100					
1,3-Dichlorobenzene	8260B	High/MeOH	ug/Kg	23	100	75	119	30		
1,3-Dichloropropane	8260B	High/MeOH	ug/Kg	23.5	100	71	118	30		
1,4-Dichlorobenzene	8260B	High/MeOH	ug/Kg	20.5	100	76	127	30		
1-Chlorohexane	8260B	High/MeOH	ug/Kg	22.5	100	63	133	30		
2,2-Dichloropropane	8260B	High/MeOH	ug/Kg	11.5	100	41	131	30		
2-Butanone (MEK)	8260B	High/MeOH	ug/Kg	51	100	40	125	30		
2-Chloro-1,3-butadiene (chloroprene)	8260B	High/MeOH	ug/Kg		100					
2-Chloroethylvinylether	8260B	High/MeOH	ug/Kg	76	100	10	100	30		
2-Chlorotoluene	8260B	High/MeOH	ug/Kg	40.5	100	62	134	30		
2-Hexanone	8260B	High/MeOH	ug/Kg	52	100	50	116	30		
2-Methylnaphthalene	8260B	High/MeOH	ug/Kg		100					
2-Nitropropane	8260B	High/MeOH	ug/Kg		8000					
3-Chloropropene (Allyl Chloride)	8260B	High/MeOH	ug/Kg	17	200					
4-Chlorotoluene	8260B	High/MeOH	ug/Kg	23	100	66	131	30		
4-Methyl-2-pentanone (MIBK)	8260B	High/MeOH	ug/Kg	37.5	100	54	119	30		
Acetone	8260B	High/MeOH	ug/Kg	29	100	34	143	30		
Acetonitrile	8260B	High/MeOH	ug/Kg	522	800					
Acrolein	8260B	High/MeOH	ug/Kg	1473	4000					
Acrylonitrile	8260B	High/MeOH	ug/Kg	307	800					
Benzene	8260B	High/MeOH	ug/Kg	14	100	67	122	30		
bis(chloromethyl)ether	8260B	High/MeOH	ug/Kg							
Bromobenzene	8260B	High/MeOH	ug/Kg	27.5	100	74	133	30		
Bromochloromethane	8260B	High/MeOH	ug/Kg	24.5	100	60	124	30		
Bromodichloromethane	8260B	High/MeOH	ug/Kg	19	100	66	128	30		
Bromoform	8260B	High/MeOH	ug/Kg	18	100	70	123	30		
Bromomethane	8260B	High/MeOH	ug/Kg	10.5	100	36	164	30		
Carbon disulfide	8260B	High/MeOH	ug/Kg	20.5	100	21	124	30		
Carbon tetrachloride	8260B	High/MeOH	ug/Kg	16.5	100	59	127	30		
Chlorobenzene	8260B	High/MeOH	ug/Kg	22	100	80	125	30		
Chloroethane	8260B	High/MeOH	ug/Kg	20	100	33	207	30		
Chloroform	8260B	High/MeOH	ug/Kg	18	100	61	129	30		
Chloromethane	8260B	High/MeOH	ug/Kg	23.5	100	55	129	30		
cis-1,2-Dichloroethene	8260B	High/MeOH	ug/Kg	17	100	64	144	30		
cis-1,3-Dichloropropene	8260B	High/MeOH	ug/Kg	22.5	100	68	123	30		
Cyclohexane	8260B	High/MeOH	ug/Kg		100					
Cyclohexanone	8260B	High/MeOH	ug/Kg		8000					

Method Description	Analytical Method	Test Matrix	Units	MDL	Lab RL	LCL	UCL	RPD	SLL	SUL
Dibromochloromethane	8260B	High/MeOH	ug/Kg	19	100	70	119	30		
Dibromomethane	8260B	High/MeOH	ug/Kg	22.5	100	67	121	30		
Dichlorodifluoromethane	8260B	High/MeOH	ug/Kg	12	100	29	135	30		
Ethyl acetate	8260B	High/MeOH	ug/Kg	108	1000					
Ethyl ether	8260B	High/MeOH	ug/Kg	19	100	10	135	30		
Ethylbenzene	8260B	High/MeOH	ug/Kg	22.5	100	78	128	30		
Ethylmethacrylate	8260B	High/MeOH	ug/Kg	24	200					
Heptane	8260B	High/MeOH	ug/Kg	38	100	10	119	30		
Hexachlorobutadiene	8260B	High/MeOH	ug/Kg	38.5	100	63	126	30		
Hexane	8260B	High/MeOH	ug/Kg	27.5	100	10	108	30		
Iodomethane	8260B	High/MeOH	ug/Kg	25.5	200	50	150	30		
Isobutyl alcohol	8260B	High/MeOH	ug/Kg	3740	8000					
Isopropyl alcohol	8260B	High/MeOH	ug/Kg							
Isopropyl ether	8260B	High/MeOH	ug/Kg	9.5	100					
Isopropylbenzene	8260B	High/MeOH	ug/Kg	20	100	67	133	30		
m&p-Xylenes	8260B	High/MeOH	ug/Kg	50	200	76	133	30		
Methacrylonitrile	8260B	High/MeOH	ug/Kg	40.5	200					
Methyl acetate	8260B	High/MeOH	ug/Kg		100					
Methyl cyclohexane	8260B	High/MeOH	ug/Kg		100					
Methylene chloride	8260B	High/MeOH	ug/Kg	20	100	57	129	30		
Methylmethacrylate	8260B	High/MeOH	ug/Kg	19	200					
Methyl-tert-butyl-ether (MTBE)	8260B	High/MeOH	ug/Kg	30.5	100	47	126	30		
Naphthalene	8260B	High/MeOH	ug/Kg	38	100	51	158	30		
n-Butyl alcohol (1-Butanol)	8260B	High/MeOH	ug/Kg	8000	8000					
n-Butylbenzene	8260B	High/MeOH	ug/Kg	18.5	100	64	118	30		
n-Pentane	8260B	High/MeOH	ug/Kg							
n-Propylbenzene	8260B	High/MeOH	ug/Kg	27.5	100	69	130	30		
o-Xylene	8260B	High/MeOH	ug/Kg	23.5	100	74	127	30		
Pentachloroethane	8260B	High/MeOH	ug/Kg	83	200					
p-Isopropyltoluene	8260B	High/MeOH	ug/Kg	23.5	100	68	129	30		
Propionitrile	8260B	High/MeOH	ug/Kg	360	800					
sec-Butylbenzene	8260B	High/MeOH	ug/Kg	20.5	100	69	139	30		
Styrene	8260B	High/MeOH	ug/Kg	28.5	100	80	129	30		
tert-Butyl alcohol	8260B	High/MeOH	ug/Kg							
tert-Butylbenzene	8260B	High/MeOH	ug/Kg	13.5	100	71	125	30		
Tetrachloroethene	8260B	High/MeOH	ug/Kg	23	100	75	125	30		
Tetrahydrofuran	8260B	High/MeOH	ug/Kg	43	100	36	132	30		
Toluene	8260B	High/MeOH	ug/Kg	18	100	72	123	30		

Method Description	Analytical Method	Test Matrix	Units	MDL	Lab RL	LCL	UCL	RPD	SLL	SUL
trans-1,2-Dichloroethene	8260B	High/MeOH	ug/Kg	13.5	100	66	138	30		
trans-1,3-Dichloropropene	8260B	High/MeOH	ug/Kg	19.5	100	60	115	30		
trans-1,4-Dichloro-2-butene	8260B	High/MeOH	ug/Kg	30.5	200					
Trichloroethene	8260B	High/MeOH	ug/Kg	21.5	100	70	123	30		
Trichlorofluoromethane	8260B	High/MeOH	ug/Kg	19.5	100	59	145	30		
Trichlorotrifluoroethane	8260B	High/MeOH	ug/Kg	15	100	50	150	30		
Vinyl acetate	8260B	High/MeOH	ug/Kg	32	100	54	144	30		
Vinyl chloride	8260B	High/MeOH	ug/Kg	18	100	61	135	30		
Xylenes (total)	8260B	High/MeOH	ug/Kg	50	100	77	131	30		
Surrogate										
1,2-Dichloroethane-d4 (surr)	8260B	High/MeOH	ug/Kg						43	139
4-Bromofluorobenzene (surr)	8260B	High/MeOH	ug/Kg						57	124
Dibromofluoromethane (surr)	8260B	High/MeOH	ug/Kg						64	132
Toluene-d8 (surr)	8260B	High/MeOH	ug/Kg						70	128

Notes:

MDLs will vary based on annual performance.

RLs will vary based on sample volume/size; dilution factors; dry weight reporting (soils) and annual MDL determinations.

Table 2

Characteristic Mass (m/z) for Purgeable Organic Compounds

Analyte	Primary Characteristic Ion	Secondary Characteristic Ion
Benzene	78	---
Bromobenzene	156	77,158
Bromochloromethane	128	49,130
Bromodichloromethane	83	85,127
Bromoform	173	175,254
Bromomethane	94	96
n-Butylbenzene	91	92,134
sec-Butylbenzene	105	134
tert-Butylbenzene	119	91,134
Carbon tetrachloride	117	119
Chlorobenzene	112	77,114
Chloroethane	64	66
Chloroform	83	85
Chloromethane	50	52
2-Chlorotoluene	91	126
4-Chlorotoluene	91	126
1,2-Dibromo-3-chloropropane	75	155,157
Dibromochloromethane	129	127
1,2-Dibromoethane	107	109,188
Dibromomethane	93	95,174
1,2-Dichlorobenzene	146	111,148
1,3-Dichlorobenzene	146	111,148
1,4-Dichlorobenzene	146	111,148
Dichlorodifluoromethane	85	87
1,1-Dichloroethane	63	65,83
1,2-Dichloroethane	62	98
1,1-Dichloroethene	96	61,63
cis-1,2-Dichloroethene	96	61,98
trans-1,2-Dichloroethene	96	61,98
1,2-Dichloropropane	63	112
1,3-Dichloropropane	76	78
2,2-Dichloropropane	77	97
1,1-Dichloropropene	75	110,77
Ethylbenzene	91	106
Hexachlorobutadiene	225	223,227
Isopropylbenzene	105	120
p-Isopropylbenzene	119	134, 91
Methylene chloride	84	86,49
Naphthalene	128	86, 49
n-Propylbenzene	91	120
Styrene	104	78
1,1,1,2-Tetrachloroethane	131	133, 119
1,1,2,2-Tetrachloroethane	83	131, 85
Tetrachloroethene	164	129,131,166

Table 2
(continued)
Characteristic Mass (m/z) for Purgeable Organic Compounds

Analyte	Primary Characteristic Ion	Secondary Characteristic Ion
Toluene	92	91
1,2,3-Trichlorobenzene	180	182, 145
1,2,4-Trichlorobenzene	180	182, 145
1,1,1-Trichloroethane	97	99, 61
1,1,2-Trichloroethane	83	97, 85
Trichloroethene	95	97, 130, 132
Trichlorofluoromethane	151	101,153
1,2,3-Trichloropropane	75	77
1,2,4-Trimethylbenzene	105	120
1,3,5-Trimethylbenzene	105	120
Vinyl chloride	62	64
o-Xylene	106	91
m-Xylene	106	91
p-Xylene	106	91
cis-1,3-Dichloropropene	75	77, 39
trans-1,3-Dichloropropene	75	77, 39
Internal Std./Surrogates		
4-Bromofluorobenzene (S)	95	174, 176
1,4-Dichlorobenzene-d_4 (IS)	152	115, 150
Pentafluorobenzene (IS)	168	
Chlorobenzene-d_5 (IS)	117	
1,4-Difluorobenzene (IS)	114	
1,2-Dichloroethane-d_4 (S)	65	
Toluene-d_8 (S)	98	
Dibromofluoromethane (S)	113	

*NOTE: The primary and secondary ions listed here are taken directly from SW-846 Method 8260. The laboratory uses secondary ions in the cases of Ethylbenzene, Toluene, 1,1,2-Trichloroethane, Trichloroethene, 1,2,3-Trichloropropane and Xylenes due to interferences and/or to maintain consistency between methods.

Figure 1.

Example: Total Ion Chromatogram for 25 mL Purge Water

Data File: /var/chem/gcl3.i/101802.b/3c1017.d

Date : 18-OCT-2002 08:19

Client ID: VSTD010

Sample Info: CV V02J18DAA

Purge Volume: 25.0

Column phase: Cap

Instrument: gcl3.i

Operator: DCT

Column diameter: 0.53

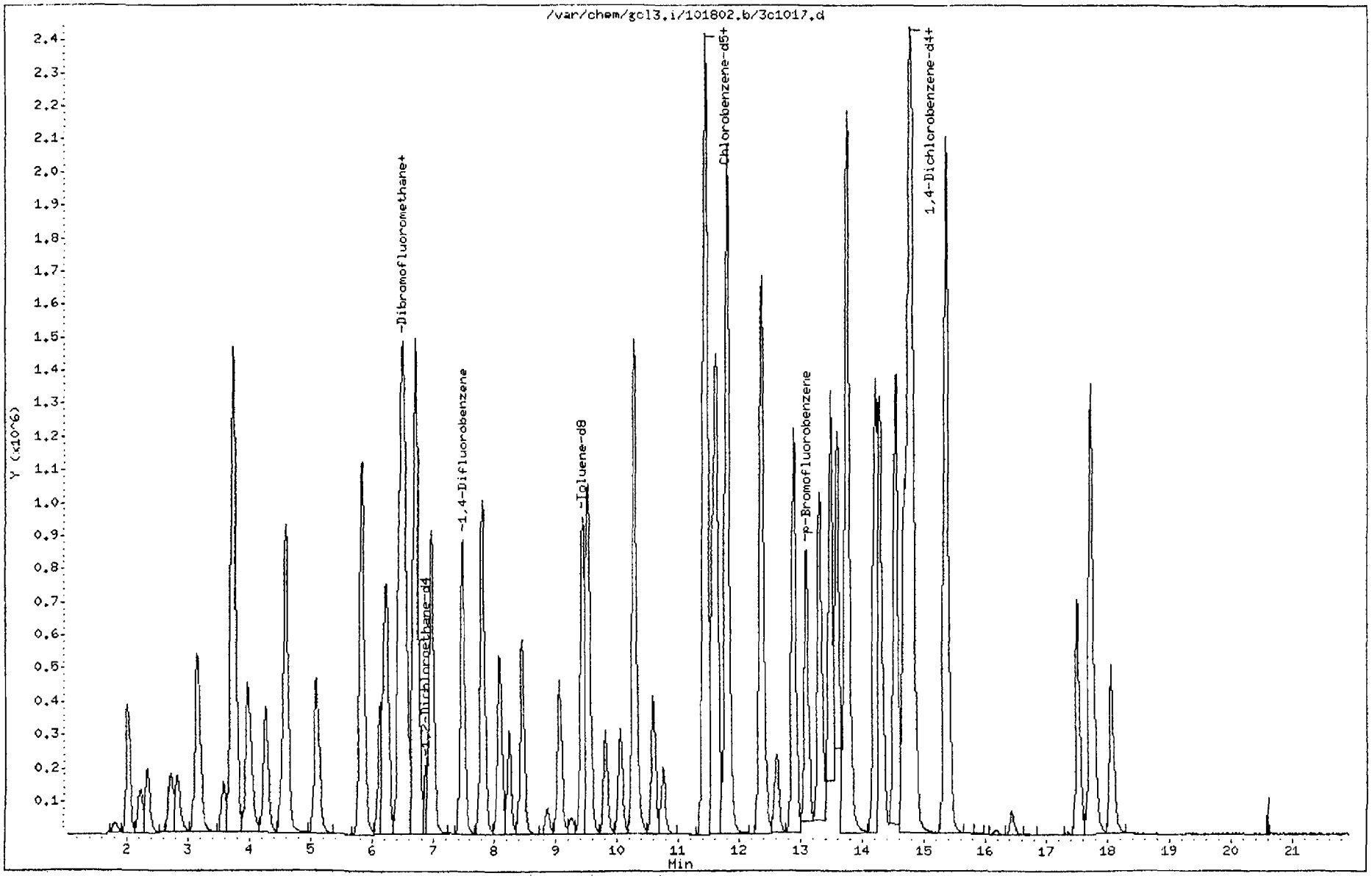
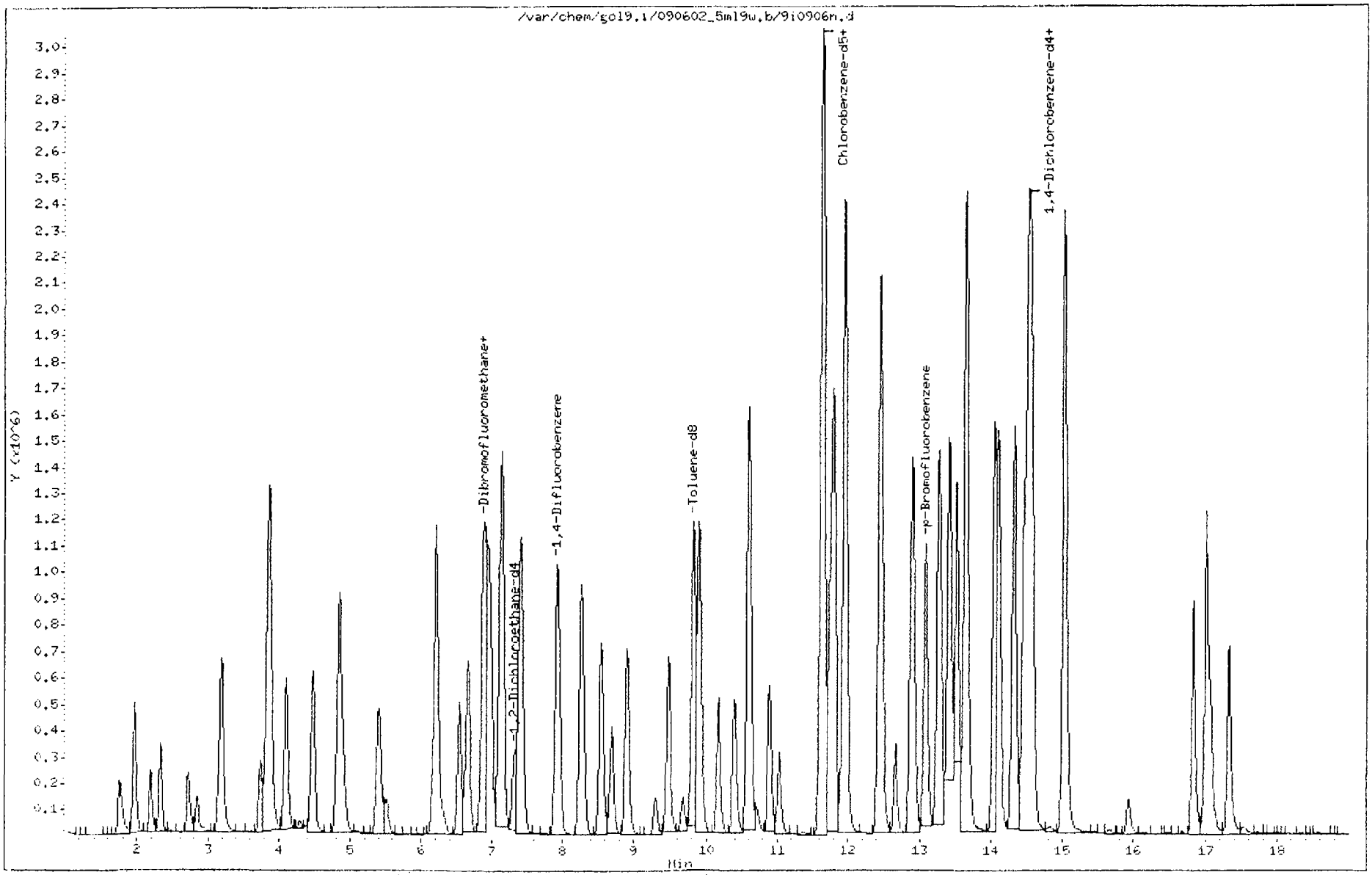


Figure 2.

Example: Total Ion Chromatogram for 5 mL Purge Soil

Data File: /var/chem/gc19.i/090602_5ml9w.b/9i0906m.d
Date : 06-SEP-2002 06:25
Client ID: VSTD050
Sample Info: VSTD050
Purge Volume: 5.0
Column phase: Cap

Instrument: gc19.i
Operator: LM
Column diameter: 0.53



Attachment 1.

Example: Method Listings; Tekmar Conditions; Flow Settings

Example: Volatiles Method for Standards and Samples

GC Oven Parameters

Initial Temperature = 40 °C
Initial Time = 2.0 minutes
Detector A Temperature = 180 °C
Detector B Temperature = 250 °C
Oven Equib. Time = 0.50 min.

Ramp Rate (°C/min.)	Final Temp. (°C)	Final Time (min.)
7.0	65	0.00
12.0	165	0.00
20.0	212	5.00

Run Time = 21.25 min.

Inlet Pressure Program

Gas = Helium
Column length = 75 m
Column Diameter = 0.530 mm
Initial Pressure = 3 psi
Rate (psi/min) = 0.00
Initial Time = 7.0 min.
Oven Temp. 50 °C
Program Time = 7.0 min.

Scan Parameters

Mass Range = 35-260
Threshold = 150
Scans/sec = 1.9
EM Voltage = 1938
Solvent Delay = 3.14 (scan start time): before the elution of the first compound.
Run Time (scan stop time): until after the elution of last compound.

Example: Volatiles Method for BFB Tune

GC Oven Parameters

Initial Temperature = 40 °C
Initial Time = 2.0 minutes
Detector A Temperature = 180 °C
Detector B Temperature = 250 °C
Oven Equib. Time = 0.50 min.

Ramp Rate (°C/min.)	Final Temp. (°C)	Final Time (min.)
7.0	65	0.00
12.0	165	0.00
20.0	212	5.00

Run Time = 16.25 min.

Inlet Pressure Program

Gas = Helium
Column length = 75 m
Column Diameter = 0.530 mm
Initial Pressure = 3 psi
Rate (psi/min) = 0.00
Initial Time = 7.0 min.
Oven Temp. 50 °C
Program Time = 7.0 min.

Scan Parameters

Mass Range = 35-260
Threshold = 150
Scans/sec = 1.9
EM Voltage = 1938
Solvent Delay = 10 min. (scan start time): before the elution of the first compound.
Run Time (scan stop time): until after the elution of last compound.

Tekmar Conditions

Trap Temp. Prior to Purge	< 35
Desorb Preheat	250
Desorb	250
Bake	260
Purge Time	11 min
Desorb	2 min
Bake Time	4 min

Trap = Vocarb 3000

Flow Conditions

Purge Pressure	20 psi
Purge Flow Rate	~40 mLs/min

Flow Adjustment

Capillary Column: 5971/5972/MSD's;

· Make-up gas off/separator pump on: flow through separator is 5-10 mLs/minutes.

· Open make-up gas: adjust until you achieve ~30 mLs/minute through the separator. (On MSD's - adjust to 0.5 torr on gauge)

(Flow into the Mass Spec is ≤ 1 mL/minute)

Approximate Vacuums

5971	~5 x 10^{-6} torr
5972	~5 x 10^{-6} torr

Attachment 2.

Example: Target and Internal Standards;
Initial Calibration/Continuing Calibration
Surrogate Recovery Limits; LCS / MS Recovery Limits
Internal Standard Guidelines

Target and Internal Standards

Pentafluorobenzene
Acetone
Acrolein
Acrylonitrile
Bromochloromethane
Bromomethane
2-Butanone
Carbon disulfide
Chloroethane
Chloroform
Chloromethane
Dichlorodifluoromethane
1,1-Dichloroethane
1,1-Dichloroethene
cis-1,2-Dichloroethene
trans-1,2-Dichloroethene
2,2-Dichloropropane
Iodomethane
Methylene chloride
1,1,1-Trichloroethane
Trichlorofluoromethane
Vinyl acetate
Vinyl Chloride

Chlorobenzene-d_5
Bromoform
Bromofluorobenzene (surrogate)
Chlorodibromomethane
Chlorobenzene
1,3-Dichloropropane
Ethylbenzene
2-Hexanone
Styrene
1,1,1,2-Tetrachloroethane
Tetrachloroethene
Xylene

1,4-Difluorobenzene
Benzene
Bromodichloromethane
Carbon tetrachloride
2-Chloroethyl vinyl ether
1,2-Dibromoethane
Dibromomethane
1,2-Dichloroethane
1,2-Dichloroethane-d_4 (surrogate)
1,2-Dichloropropane
1,1-Dichloropropene
cis-1,3-Dichloropropene
trans-1,3-Dichloropropene
4-Methyl-2-pentanone
Toluene
Toluene-d_8 (surrogate)
1,1,2-Trichloroethane
Trichloroethene

1,4-Dichlorobenzene-d_4
Bromobenzene
n-Butylbenzene
sec-Butylbenzene
tert-Butylbenzene
2-Chlorotoluene
4-Chlorotoluene
1,2-Dibromo-3-chloropropane
1,2-Dichlorobenzene
1,3-Dichlorobenzene
1,4-Dichlorobenzene
Hexachlorobutadiene
Isopropyl benzene
p-Isopropyltoluene
Naphthalene
n-Propylbenzene
1,1,2,2-Tetrachloroethane
1,2,3-Trichlorobenzene
1,2,4-Trichlorobenzene
1,2,3-Trichloropropane
1,2,4-Trimethylbenzene
1,3,5-Trimethylbenzene

INITIAL CALIBRATION DATA

Start Cal Date : 03-SEP-2002 16:36
End Cal Date : 04-SEP-2002 05:13
Quant Method : ISID
Target Version : 3.50
Integrator : HP RTE
Method file : /var/chem/gc16.i/090402_25ml6w_ical2.b/25ml6w.m
Cal Date : 20-Sep-2002 11:40 beeson

Calibration File Names:
Level 1: /var/chem/gc16.i/090402_25ml6w_ical2.b/6i0904.d
Level 2: /var/chem/gc16.i/090402_25ml6w_ical2.b/6i0904a.d
Level 3: /var/chem/gc16.i/090402_25ml6w_ical2.b/6i0904b.d
Level 4: /var/chem/gc16.i/090402_25ml6w_ical2.b/6i0904c.d
Level 5: /var/chem/gc16.i/090402_25ml6w_ical2.b/6i0904d.d
Level 6: /var/chem/gc16.i/090402_25ml6w_ical2.b/6i0904e.d
Level 7: /var/chem/gc16.i/090402_25ml6w_ical2.b/6i0904f.d
Level 8: /var/chem/gc16.i/090402_25ml6w_ical2.b/6i0904g.d
Level 9: /var/chem/gc16.i/090402_25ml6w_ical2.b/6i0904h.d

Compound	0.5000 Level 1	1 Level 2	2 Level 3	5 Level 4	8 Level 5	10 Level 6	Curve	Coefficients b	m1	m2	%RSD or R^2
	14 Level 7	20 Level 8	40 Level 9								
1 Dichlorodifluoromethane	39157	71069	139450	346832	800413	1070808					
	1337714	2115698	4000493				LINR	0.04663	0.52169		0.99787
2 Chloromethane	0.33705	0.30726	0.28187	0.26440	0.28090	0.27369					
	0.27310	0.27412	0.27691				AVRG		0.28548		7.93729
3 2-Propanol	*****	*****	*****	*****	*****	*****					
	*****	*****	*****				AVRG		0.000e+00		0.000e+00 <-
4 Vinyl chloride	0.33399	0.33547	0.32629	0.32674	0.33838	0.35039					
	0.34067	0.34890	0.35023				AVRG		0.33901		2.77218
5 1,3-Butadiene	*****	0.19071	0.16517	0.15550	0.17524	0.17008					
	0.16454	0.16167	0.15891				AVRG		0.16773		6.65034

INITIAL CALIBRATION DATA

Start Cal Date : 03-SEP-2002 16:36
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Quant Method : ISID
Target Version : 3.50
Integrator : HP RTE
Method file : /var/chem/gc16.i/090402 25ml6w_ical2.b/25ml6w.m
Cal Date : 20-Sep-2002 11:40 beeson

Compound	0.5000 Level 1	1 Level 2	2 Level 3	5 Level 4	8 Level 5	10 Level 6	Curve	Coefficients b	m1	m2	%RSD or R^2
	14 Level 7	20 Level 8	40 Level 9								
6 Bromomethane	0.23835	0.23980	0.17896	0.20284	0.22226	0.23954					
	0.25249	0.25844	0.29868				AVRG		0.23682		14.37674
7 Chloroethane	0.21870	0.21455	0.21124	0.20788	0.20578	0.20705					
	0.20279	0.20547	0.21123				AVRG		0.20941		2.38673
8 tert Butyl alcohol	+++++	+++++	+++++	+++++	+++++	+++++					
	+++++	+++++	+++++				AVRG		0.000e+00		0.000e+00
9 Trichlorofluoromethane	0.83703	0.81527	0.78708	0.78714	0.75862	0.79943					
	0.74508	0.79775	0.78188				AVRG		0.78992		3.49126
10 Ethyl ether	+++++	0.08362	0.07579	0.07203	0.08150	0.07721					
	0.07591	0.07506	0.07547				AVRG		0.07708		4.84254
11 Acrolein	+++++	0.00421	0.00411	0.00405	0.00398	0.00415					
	0.00435	0.00405	0.00427				AVRG		0.00414		3.00288
12 Trichlorotrifluoroethane	0.76959	0.75887	0.71293	0.72786	0.73643	0.73957					
	0.76697	0.73146	0.75768				AVRG		0.74460		2.62127
13 1,1 Dichloroethene	0.33191	0.34084	0.31363	0.32090	0.32449	0.31844					
	0.33942	0.32259	0.33517				AVRG		0.32749		2.95473
14 Acetone	+++++	9564	21917	23823	32764	40741					
	48500	64187	124629				LINR	-0.27751	0.01485		0.99517

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Integrator : HP RTE
Method file : /var/chem/gc16.i/090402_25ml6w_ical2.b/25ml6w.m
Cal Date : 20-Sep-2002 11:40 beeson

Compound	0.5000 Level 1 14 Level 7	1 Level 2 20 Level 8	2 Level 3 40 Level 9	5 Level 4	8 Level 5	10 Level 6	Curve	Coefficients b	m1	m2	%RSD or R^2
15 Iodomethane	+++++	0.48722	0.52068	0.66488	0.67114	0.71473					
	0.70443	0.70106	0.73275				AVRG		0.64961		14.31034
16 Carbon Disulfide	+++++	1.04025	1.04085	1.03106	1.01126	1.04452					
	1.08102	1.06338	1.11171				AVRG		1.05294		2.97886
17 3-Chloropropene	+++++	0.13576	0.13166	0.14736	0.13622	0.13873					
	0.13252	0.13223	0.13263				AVRG		0.13569		3.86439
18 Acetonitrile	+++++	0.00333	0.00306	0.00302	0.00292	0.00301					
	0.00313	0.00293	0.00317				AVRG		0.00307		4.45171
19 Methyl acetate	+++++	0.04115	0.04185	0.03764	0.03939	0.03823					
	0.03828	0.03689	0.03641				AVRG		0.03873		5.01965
20 Methylene chloride	61630	83247	134095	257213	384502	480778					
	657833	890236	1804838				LINR	-0.07949	0.22395		0.99901
21 Acrylonitrile	+++++	0.01252	0.01237	0.01190	0.01165	0.01193					
	0.01289	0.01209	0.01304				AVRG		0.01230		4.02194
22 trans-1,2 Dichloroethene	0.37667	0.37477	0.36652	0.37254	0.36192	0.36342					
	0.38164	0.36427	0.38282				AVRG		0.37162		2.13406
23 Methyl-tert-Butyl Ether	0.19519	0.19754	0.18760	0.19308	0.17962	0.18467					
	0.18447	0.18778	0.20186				AVRG		0.19020		3.77049

INITIAL CALIBRATION DATA

Start Cal Date : 03-SEP-2002 16:36
End Cal Date : 04-SEP-2002 05:13
Quant Method : ISTD
Target Version : 3.50
Integrator : HP RTE
Method file : /var/chem/gc16.i/090402_25ml6w_ical2.b/25ml6w.m
Cal Date : 20-Sep-2002 11:40 beeson

Compound	0.5000 Level 1 / 14 Level 7	1 Level 2 / 20 Level 8	2 Level 3 / 40 Level 9	5 Level 4	8 Level 5	10 Level 6	Curve	Coefficients b	m1	m2	%RSD or R^2
24 Hexane	+++++	0.47742	0.45314	0.44029	0.49657	0.47793					
	0.46598	0.46287	0.46209				AVRG		0.46704		3.66451
25 1,1-Dichloroethane	0.63074	0.65386	0.64187	0.64979	0.62827	0.61320					
	0.65432	0.62062	0.65801				AVRG		0.63896		2.55271
26 Isopropyl ether	+++++	0.69384	0.66336	0.63824	0.72288	0.69174					
	0.67710	0.67794	0.68170				AVRG		0.68035		3.59695
27 Vinyl Acetate	+++++	0.10934	0.10342	0.10442	0.09682	0.10672					
	0.11132	0.11140	0.11356				AVRG		0.10713		5.10756
28 2-Chloro-1,3 butadiene	+++++	0.49643	0.48947	0.47927	0.54544	0.52427					
	0.52092	0.51603	0.51800				AVRG		0.51123		4.19320
29 cis-1,2-Dichloroethene	0.33006	0.31885	0.31590	0.32003	0.31505	0.30871					
	0.32918	0.31067	0.32844				AVRG		0.31966		2.50455
30 2,2-Dichloropropane	0.55090	0.55456	0.53095	0.54062	0.52930	0.51855					
	0.54667	0.51410	0.53199				AVRG		0.53529		2.61558
31 2 Butanone	+++++	0.02741	0.02302	0.02200	0.02132	0.02174					
	0.02167	0.02058	0.02114				AVRG		0.02236		9.66688
32 Ethyl Acetate	0.06503	0.05755	0.05476	0.05905	0.05625	0.05647					
	0.05804	0.05488	0.04197				AVRG		0.05600		10.88497

INITIAL CALIBRATION DATA

Start Cal Date : 03-SEP-2002 16:36
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Quant Method : ISID
Target Version : 3.50
Integrator : HP RTE
Method file : /var/chem/gc16.i/090402_25ml6w_ical2.b/25ml6w.m
Cal Date : 20-Sep-2002 11:40 beeson

Compound	0.5000 Level 1 / 14 Level 7	1 Level 2 / 20 Level 8	2 Level 3 / 40 Level 9	5 Level 4	8 Level 5	10 Level 6	Curve	Coefficients b	m1	m2	%RSD or R^2
33 Propionitrile	+++++	0.00332	0.00329	0.00327	0.00329	0.00338					
	0.00356	0.00336	0.00349				AVRG		0.00337		3.08896
34 Methacrylonitrile	+++++	0.03048	0.02925	0.03130	0.02931	0.03026					
	0.02805	0.02835	0.02859				AVRG		0.02945		3.87174
35 Bromochloromethane	0.14712	0.14945	0.14583	0.15098	0.14811	0.14596					
	0.15315	0.14711	0.15547				AVRG		0.14924		2.24709
36 Tetrahydrofuran	0.01458	0.01290	0.01215	0.01143	0.01127	0.01126					
	0.01128	0.01133	0.01236				AVRG		0.01206		9.24601
37 Chloroform	0.59355	0.59702	0.60304	0.61248	0.60630	0.58623					
	0.62611	0.58572	0.61988				AVRG		0.60337		2.36083
40 1,1,1-Trichloroethane	0.63602	0.63397	0.61618	0.62727	0.61453	0.60379					
	0.63444	0.61039	0.63361				AVRG		0.62336		1.96215
41 Cyclohexane	+++++	0.61584	0.56015	0.55126	0.63389	0.60884					
	0.58981	0.57444	0.57430				AVRG		0.58856		4.89600
M 42 1,2-Dichloroethene (total)	0.35336	0.34681	0.34121	0.34629	0.33849	0.33607					
	0.35541	0.33747	0.35563				AVRG		0.34564		2.25460
43 1,1-Dichloropropene	0.58998	0.56290	0.54002	0.55507	0.53943	0.54123					
	0.56771	0.53644	0.56076				AVRG		0.55464		3.17416

INITIAL CALIBRATION DATA

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Integrator : HP RTE
Method file : /var/chem/gc16.i/090402_25ml6w_ical2.b/25ml6w.m
Cal Date : 20-Sep-2002 11:40 beeson

Compound	0.5000 Level 1 / 14 Level 7	1 Level 2 / 20 Level 8	2 Level 3 / 40 Level 9	5 Level 4	8 Level 5	10 Level 6	Curve	Coefficients b	m1	m2	%RSD or R^2
44 Carbon tetrachloride	0.49844	0.51861	0.52698	0.53588	0.54359	0.54050					
	0.56030	0.54585	0.55748				AVRG		0.53640		3.62204
45 Isobutanol	+++++	51678	86762	159054	246620	268229					
	395231	552369	855921				LINR	-4.33380	0.00138		0.99450
47 Benzene	0.70232	0.68295	0.68810	0.67813	0.68193	0.68489					
	0.70878	0.67154	0.69919				AVRG		0.68866		1.77758
48 1,2-Dichloroethane	0.15378	0.15130	0.15211	0.15301	0.15256	0.14861					
	0.15326	0.14900	0.15233				AVRG		0.15177		1.20527
49 Heptane	+++++	0.45805	0.45648	0.42780	0.51395	0.49157					
	0.47962	0.47516	0.46437				AVRG		0.47087		5.47216
51 Crotononitrile	+++++	+++++	+++++	+++++	+++++	+++++					
	+++++	+++++	+++++				AVRG		0.000e+00		0.000e+00 <-
52 n-Butanol	+++++	0.00084	0.00090	0.00089	0.00091	0.00088					
	0.00082	0.00088	0.00091				AVRG		0.00088		3.61232 <-
53 Trichloroethene	0.43224	0.41530	0.41756	0.42077	0.43010	0.42709					
	0.44027	0.42384	0.43293				AVRG		0.42668		1.89372
54 Methyl cyclohexane	+++++	0.43094	0.42949	0.42248	0.48429	0.47589					
	0.45846	0.45464	0.44922				AVRG		0.45067		4.94594

INITIAL CALIBRATION DATA

Start Cal Date : 03-SEP-2002 16:36
End Cal Date : 04-SEP-2002 05:13
Quant Method : ISTD
Target Version : 3.50
Integrator : HP RTE
Method file : /var/chem/gc16.i/090402_25ml6w_ical2.b/25ml6w.m
Cal Date : 20-Sep-2002 11:40 beesom

Compound	0.5000 Level 1 / 14 Level 7	1 Level 2 / 20 Level 8	2 Level 3 / 40 Level 9	5 Level 4	8 Level 5	10 Level 6	Curve	Coefficients b	m1	m2	%RSD or R^2	
55 1,2-Dichloropropane	0.26763	0.25355	0.24897	0.25365	0.26017	0.25860						
	0.27352	0.25464	0.26446				AVRG		0.25946		3.02396	
56 Methylmethacrylate	+++++	0.04897	0.05007	0.05367	0.05107	0.05352						
	0.05123	0.05219	0.05260				AVRG		0.05166		3.18548	
57 Dibromomethane	0.13296	0.13502	0.13056	0.13674	0.14013	0.13845						
	0.14346	0.13463	0.14008				AVRG		0.13689		2.94960	
58 Bromodichloromethane	0.35060	0.35932	0.35813	0.38080	0.40075	0.39491						
	0.41350	0.38745	0.40545				AVRG		0.38343		5.93503	
59 2-Nitropropane	+++++	0.00745	0.00808	0.01015	0.01038	0.01113						
	0.01076	0.01107	0.01118				AVRG		0.01002		14.48459	*
60 2-Chloroethylvinylether	+++++	0.05348	0.05546	0.05265	0.05730	0.05820						
	0.05841	0.05675	0.05895				AVRG		0.05640		4.14094	
61 cis-1,3-Dichloropropene	0.27279	0.26454	0.27235	0.27242	0.29143	0.28507						
	0.29986	0.27833	0.29180				AVRG		0.28096		4.15805	
62 4-Methyl 2-pentanone	+++++	0.04393	0.04801	0.04592	0.04716	0.05058						
	0.05127	0.04803	0.04879				AVRG		0.04796		4.95596	
64 Toluene	0.51253	0.48386	0.47090	0.48241	0.49247	0.48724						
	0.51041	0.47512	0.49422				AVRG		0.48991		2.91980	

INITIAL CALIBRATION DATA

Start Cal Date : 03-SEP-2002 16:36
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Target Version : 3.50
Integrator : HP RTE
Method file : /var/chem/gc16.i/090402_25ml6w_ical2.b/25ml6w.m
Cal Date : 20-Sep-2002 11:40 beeson

Compound	0.5000 Level 1 / 14 Level 7	1 Level 2 / 20 Level 8	2 Level 3 / 40 Level 9	5 Level 4	8 Level 5	10 Level 6	Curve	Coefficients b	m1	m2	%RSD or R^2
65 trans 1,3-Dichloropropene	0.16082	0.16338	0.16087	0.16413	0.17941	0.17579					
	0.16413	0.17201	0.18008				AVRG		0.17118		5.30878
66 Bis(chloromethyl)ether	+++++	+++++	+++++	+++++	+++++	+++++					
	+++++	+++++	+++++				AVRG		0.000e+00		0.000e+00
67 Ethylmethacrylate	+++++	0.13810	0.13752	0.15459	0.14804	0.14974					
	0.14641	0.14517	0.14867				AVRG		0.14603		3.96212
68 1,1,2-Trichloroethane	0.13251	0.13561	0.13344	0.13623	0.14149	0.13817					
	0.14394	0.13181	0.13924				AVRG		0.13694		3.02214
69 Tetrachloroethene	0.64754	0.61450	0.61012	0.60808	0.63078	0.64273					
	0.65249	0.61841	0.62254				AVRG		0.62747		2.65728
70 1,3-Dichloropropane	0.27671	0.26638	0.26184	0.26338	0.27963	0.27891					
	0.28467	0.26755	0.27006				AVRG		0.27212		2.96658
71 2-Hexanone	+++++	0.03946	0.03984	0.04169	0.04336	0.04725					
	0.04388	0.04405	0.04406				AVRG		0.04295		5.92456
72 Dibromochloromethane	0.32972	0.33044	0.33807	0.36214	0.39859	0.39047					
	0.40848	0.39372	0.39643				AVRG		0.37231		8.61171
73 1,2-Dibromoethane	0.17099	0.16916	0.16973	0.17168	0.18323	0.18300					
	0.18819	0.17580	0.18172				AVRG		0.17706		4.00533

INITIAL CALIBRATION DATA

Start Cal Date : 03-SEP-2002 16:36
End Cal Date : 04-SEP-2002 05:13
Quant Method : ISID
Target Version : 3.50
Integrator : HP RTE
Method file : /var/chem/gc16.i/090402_25ml6w_ical2.b/25ml6w.m
Cal Date : 20-Sep-2002 11:40 beeson

Compound	0.5000 Level 1	1 Level 2	2 Level 3	5 Level 4	8 Level 5	10 Level 6	Curve	Coefficients b	m1	m2	%RSD or R^2
	14 Level 7	20 Level 8	40 Level 9								
74 1-Chlorohexane	0.54281	0.50632	0.48831	0.48792	0.46229	0.47937					
	0.47406	0.49425	0.53410				AVRG		0.49660		5.40703
76 Chlorobenzene	0.91801	0.84232	0.83922	0.85452	0.90675	0.89054					
	0.92204	0.86387	0.87376				AVRG		0.87900		3.61105
77 1,1,1,2-Tetrachloroethane	0.38736	0.38448	0.38813	0.40500	0.43920	0.42852					
	0.44083	0.41949	0.42308				AVRG		0.41293		5.42031
78 Ethylbenzene	0.46863	0.44438	0.43900	0.44868	0.46893	0.46974					
	0.48635	0.45370	0.46020				AVRG		0.45996		3.25757
79 p,m-Xylene	1.08360	1.02516	1.03021	1.02647	1.09248	1.10006					
	1.14091	1.05148	1.08004				AVRG		1.07006		3.70207
80 o Xylene	1.03543	0.94634	0.93975	0.96149	1.02903	1.02348					
	1.06366	0.98746	0.99964				AVRG		0.99848		4.31239
81 Styrene	0.72784	0.69309	0.67601	0.70486	0.77158	0.76385					
	0.79388	0.73651	0.75509				AVRG		0.73586		5.31379
82 Bromoform	0.13141	0.13387	0.14083	0.15492	0.17588	0.17323					
	0.17993	0.17198	0.17501				AVRG		0.15967		12.29971
83 Isopropylbenzene	3.85331	3.74328	3.61636	3.65693	3.84165	3.82441					
	3.94888	3.82941	3.79850				AVRG		3.79030		2.71579

INITIAL CALIBRATION DATA

Start Cal Date : 03-SEP-2002 16:36
End Cal Date : 04-SEP-2002 05:13
Quant Method : ISID
Target Version : 3.50
Integrator : HP RTE
Method file : /var/chem/gc16.i/090402_25ml6w_ical2.b/25ml6w.m
Cal Date : 20-Sep-2002 11:40 beeson

Compound	0.5000 Level 1 / 14 Level 7	1 Level 2 / 20 Level 8	2 Level 3 / 40 Level 9	5 Level 4	8 Level 5	10 Level 6	Curve	Coefficients n	m1	m2	%RSD or R^2
84 Cyclohexanone	+++++	0.01439	0.01223	0.01183	0.01423	0.00835					
	0.00906	0.01131	0.01240				AVRG		0.01172		18.45670
86 1,1,2,2-Tetrachloroethane	0.43627	0.43994	0.41435	0.41608	0.44764	0.45138					
	0.46530	0.44661	0.44170				AVRG		0.43992		3.69894
87 Bromobenzene	0.83789	0.80309	0.78335	0.79138	0.85110	0.83909					
	0.85552	0.83495	0.81701				AVRG		0.82371		3.17448
88 trans-1,4-Dichloro-2-butene	+++++	0.04006	0.03397	0.04035	0.03915	0.03997					
	0.04040	0.04158	0.04223				AVRG		0.03971		6.32488
89 1,2,3-Trichloropropane	0.11264	0.10836	0.09902	0.10156	0.11283	0.10773					
	0.11045	0.10908	0.10663				AVRG		0.10759		4.34425
90 n-Propylbenzene	4.71647	4.43560	4.27986	4.32397	4.62684	4.61627					
	4.75229	4.49461	4.55052				AVRG		4.53294		3.62943
91 2-Chlorotoluene	2.79144	2.67380	2.59295	2.60773	2.75970	2.75567					
	2.82818	2.67041	2.70430				AVRG		2.70936		2.98199
92 1,3,5-Trimethylbenzene	2.74484	2.60556	2.54395	2.62663	2.79334	2.76719					
	2.86563	2.70901	2.73931				AVRG		2.71061		3.73369
93 4-Chlorotoluene	2.99357	2.74676	2.74577	2.71983	2.85795	2.88932					
	2.97619	2.78664	2.79864				AVRG		2.83496		3.55440

INITIAL CALIBRATION DATA

Start Cal Date : 03-SEP-2002 16:36
End Cal Date : 04-SEP-2002 05:13
Quant Method : ISTD
Target Version : 3.50
Integrator : HP RTE
Method file : /var/chem/gc16.i/090402_25ml6w_ical2.b/25ml6w.m
Cal Date : 20-Sep-2002 11:40 beeson

Compound	0.5000 Level 1 / 14 Level 7	1 Level 2 / 20 Level 8	2 Level 3 / 40 Level 9	5 Level 4	8 Level 5	10 Level 6	Curve	Coefficients b	m1	m2	%RSD or R^2
94 tert-Butylbenzene	3.35689	3.24019	3.08606	3.15558	3.32478	3.30799					
	3.41903	3.27619	3.28595				AVRG		3.27252		3.09850
95 Pentachloroethane	++++	0.17963	0.19286	0.21705	0.21213	0.23532					
	0.22747	0.22370	0.22641				AVRG		0.21432		8.86035
96 1,2,4-Trimethylbenzene	2.54668	2.39968	2.36464	2.40152	2.54693	2.55818					
	2.63501	2.43782	2.45373				AVRG		2.48269		3.69682
97 sec-Butylbenzene	4.91570	4.59409	4.42433	4.53056	4.75875	4.77394					
	4.94519	4.69174	4.74716				AVRG		4.70905		3.62438
98 1,3-Dichlorobenzene	1.57285	1.51503	1.47793	1.48569	1.58959	1.58054					
	1.63299	1.56874	1.55730				AVRG		1.55341		3.27954
99 p-Isopropyltoluene	3.52675	3.30374	3.29214	3.33214	3.50086	3.54397					
	3.67306	3.48773	3.50119				AVRG		3.46240		3.68067
101 1,4-Dichlorobenzene	1.65683	1.54618	1.44381	1.43190	1.53119	1.52426					
	1.57175	1.48176	1.50972				AVRG		1.52193		4.48826
102 n-Butylbenzene	3.61517	2.95755	3.00693	3.03937	3.30688	3.36131					
	3.46513	3.19926	3.23011				AVRG		3.24241		6.78055
103 1,2-Dichlorobenzene	1.19871	1.10039	1.05455	1.08662	1.17411	1.16897					
	1.19669	1.13386	1.12951				AVRG		1.13814		4.44649

INITIAL CALIBRATION DATA

Start Cal Date : 03-SEP-2002 16:36
End Cal Date : 04-SEP-2002 05:13
Quant Method : ISID
Target Version : 3.50
Integrator : HP RTE
Method file : /var/chem/gc16.i/090402_25ml6w_ical2.b/25ml6w.m
Cal Date : 20-Sep-2002 11:40 beeson

Compound	0.5000 Level 1	1 Level 2	2 Level 3	5 Level 4	8 Level 5	10 Level 6	Curve	Coefficients b	m1	m2	%RSD or R^2
	14 Level 7	20 Level 8	40 Level 9								
104 1,2-Dibromo-3-Chloropropane	3265	5189	8960	19793	37720	47332					
	63888	88583	173297				LINR	-0.03792	0.06187		0.99867
M 105 Xylene (total)	1.03543	0.94634	0.93975	0.96149	1.02903	1.02348					
	1.06366	0.98746	0.99964				AVRG		0.99848		4.31239
106 1,3,5-Trichlorobenzene	+++++	1.04319	1.08304	1.05171	1.22476	1.21747					
	1.21573	1.18781	1.19108				AVRG		1.15185		6.81249
107 1,2,4-Trichlorobenzene	0.73967	0.66124	0.66396	0.68413	0.72302	0.74926					
	0.74564	0.71705	0.71889				AVRG		0.71143		4.75113
108 Hexachlorobutadiene	1.04898	0.87466	0.90546	0.91523	0.96182	0.98593					
	1.00436	0.95111	0.94848				AVRG		0.95511		5.59204
109 Naphthalene	0.61701	0.42357	0.43206	0.44234	0.50338	0.52861					
	0.56214	0.48929	0.51793				AVRG		0.50070		12.52319
110 1,2,3-Trichlorobenzene	0.54795	0.48344	0.47340	0.48008	0.53329	0.53322					
	0.54786	0.51428	0.51556				AVRG		0.51434		5.65770
111 2-Methylnaphthalene	+++++	8562	12605	49429	113968	154109					
	215823	314686	684747				LINR	0.06389	0.22119		0.99671

INITIAL CALIBRATION DATA

Start Cal Date : 03-SEP-2002 16:36
End Cal Date : 04-SEP-2002 05:13
Quant Method : ISTD
Target Version : 3.50
Integrator : HP RTE
Method file : /var/chem/gc16.i/090402_25ml6w_ical2.b/25ml6w.m
Cal Date : 20-Sep-2002 11:40 beeson

Compound	0.5000 Level 1	1 Level 2	2 Level 3	5 Level 4	8 Level 5	10 Level 6	Curve	Coefficients b	m1	m2	%RSD or R^2
	14 Level 7	20 Level 8	40 Level 9								
$ 38 Dibromofluoromethane	0.62476	0.62689	0.59883	0.58005	0.57449	0.58121					
	0.60429	0.59655	0.63566				AVRG		0.60347		3.62983
$ 46 1,2-Dichloroethane-d4	0.13821	0.14374	0.13568	0.12921	0.13110	0.13482					
	0.13518	0.13361	0.13877				AVRG		0.13559		3.16286
$ 63 Toluene-d8	0.79815	0.80377	0.79859	0.77898	0.78005	0.80514					
	0.82448	0.81143	0.85300				AVRG		0.80595		2.81106
$ 85 p-Bromofluorobenzene	0.66688	0.60303	0.58396	0.59553	0.58209	0.59800					
	0.60057	0.59267	0.61080				AVRG		0.60373		4.19427

INITIAL CALIBRATION DATA

Start Cal Date : 03-SEP-2002 16:36
End Cal Date : 04-SEP-2002 05:13
Quant Method : ISTD
Target Version : 3.50
Integrator : HP RTE
Method file : /var/chem/gc16.i/090402_25ml6w_ical2.b/25ml6w.m
Cal Date : 20-Sep-2002 11:40 beeson

Average %RSD Results
Calculated Average %RSD = 4.798/3943
Maximum Average %RSD = 15
* Passed Average %RSD test.

Curve	Formula	Units
Averaged	Amt = Rsp/ml	Response
Linear	Amt = b + Rsp/ml	Response

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: gcl3.i
Lab File ID: 3c1017.d
Analysis Type: WATER
Lab Sample ID: VSTD010
Method: /var/chem/gcl3.i/101802.b/hydr3w.m

Injection Date: 18-OCT-2002 08:19
Init. Cal. Date(s): 09-OCT-2002 18-OCT-2002
Init. Cal. Times: 01:03 04:12
Quant Type: ISTD

	COMPOUND	RRF / AMOUNT	RF10	CCAL RRF10	MIN RRF	%D / %DRIFT	MAX %D / %DRIFT	CURVE TYPE	
1	Dichlorodifluoromethane	0.55178	0.54856	0.54856	0.010	2.35379	25.00000	Averaged	
2	Chloromethane	0.25846	0.24058	0.24058	0.100	6.91980	25.00000	Averaged	
3	Vinyl Chloride	0.30306	0.29342	0.29342	0.010	3.17939	20.00000	Averaged	
4	Bromomethane	10.40777	10.00000	0.25389	0.010	-4.07775	25.00000	Linear	
5	Chloroethane	0.19849	0.19521	0.19521	0.010	1.65178	25.00000	Averaged	
6	Trichlorofluoromethane	0.70821	0.65375	0.65375	0.010	7.69061	25.00000	Averaged	
7	Acrolein	0.00277	0.00267	0.00267	0.001	3.49417	50.00000	Averaged	
8	1,1-Dichloroethene	0.34860	0.33105	0.33105	0.010	5.03428	20.00000	Averaged	
9	Trichlorotrifluoroethane	0.62178	0.61637	0.61637	0.010	0.86890	25.00000	Averaged	
10	Acetone	0.01768	0.01751	0.01751	0.010	0.97800	50.00000	Averaged	
12	Carbon Disulfide	1.03796	0.97272	0.97272	0.010	10.59231	50.00000	Averaged	
13	Acetonitrile	0.00403	0.00348	0.00348	0.010	13.64135	50.00000	Averaged	<-
14	Methylene Chloride	0.26819	0.25115	0.25115	0.010	6.35439	25.00000	Averaged	
15	Acrylonitrile	0.01247	0.01217	0.01217	0.010	2.38968	50.00000	Averaged	
17	trans-1,2-Dichloroethene	0.38662	0.38320	0.38320	0.010	0.88388	25.00000	Averaged	
18	Methyl-tert-Butyl Ether	0.23934	0.22761	0.22761	0.010	4.90007	25.00000	Averaged	
21	1,1-Dichloroethane	0.63032	0.60963	0.60963	0.100	3.28208	25.00000	Averaged	
22	Vinyl Acetate	0.09111	0.07664	0.07664	0.010	15.87596	50.00000	Averaged	
27	2,2-Dichloropropane	0.56107	0.55119	0.55119	0.010	1.76090	25.00000	Averaged	
28	cis-1,2-Dichloroethene	0.32530	0.33070	0.33070	0.010	-1.66138	25.00000	Averaged	
29	2-Butanone	0.02133	0.01666	0.01666	0.010	21.89598	50.00000	Averaged	
29	Propionitrile	0.00353	0.00349	0.00349	0.010	1.34156	50.00000	Averaged	<-
30	Bromochloromethane	0.13282	0.13717	0.13717	0.010	-3.27280	25.00000	Averaged	
31	Tetrahydrofuran	0.01284	0.01229	0.01229	0.010	4.28371	25.00000	Averaged	
32	Chloroform	0.67739	0.67669	0.67669	0.010	0.10367	20.00000	Averaged	
33	Dibromofluoromethane	0.50513	0.50328	0.50328	0.010	0.36720	25.00000	Averaged	
35	1,1,1-Trichloroethane	0.67800	0.65160	0.65160	0.010	3.89408	25.00000	Averaged	
37	1,1-Dichloropropene	0.61257	0.57582	0.57582	0.010	6.01531	25.00000	Averaged	
38	Carbon tetrachloride	0.60852	0.56106	0.56106	0.010	7.79913	25.00000	Averaged	
39	1,2-Dichloroethane-d4	0.16231	0.15520	0.15520	0.010	4.38300	25.00000	Averaged	
40	Benzene	0.92161	0.88617	0.88617	0.010	3.84500	25.00000	Averaged	
41	1,2-Dichloroethane	0.17841	0.17635	0.17635	0.010	1.15337	25.00000	Averaged	
45	Trichloroethene	0.46811	0.45876	0.45876	0.010	1.99793	25.00000	Averaged	
46	1,2-Dichloropropane	0.26329	0.26861	0.26861	0.010	-2.02030	20.00000	Averaged	
51	Dibromomethane	0.15087	0.15544	0.15544	0.010	-3.03131	25.00000	Averaged	
52	Bromodichloromethane	0.48062	0.49505	0.49505	0.010	-3.00110	25.00000	Averaged	

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: gcl3.i
Lab File ID: 3c1017.d
Analysis Type: WATER
Lab Sample ID: VSTD010
Method: /var/chem/gcl3.i/101802.b/hydr3w.m

Injection Date: 18-OCT-2002 08:19
Init. Cal. Date(s): 09-OCT-2002 18-OCT-2002
Init. Cal. Times: 01:03 04:12
Quant Type: ISTD

	COMPOUND	RRF / AMOUNT	RF10	CCAL RRF10	MIN REF	%D / %DRIFT	MAX %D / %DRIFT	CURVE TYPE
	56 2-Chloroethylvinylether	0.04719	0.04546	0.04546	0.010	3.66493	25.00000	Averaged
	57 cis-1,3-Dichloropropene	0.36118	0.36223	0.36223	0.010	-3.14486	25.00000	Averaged
	58 4-Methyl-2-pentanone	0.05638	0.04753	0.04753	0.010	15.68973	50.00000	Averaged
IS	59 Toluene-d8	0.88400	0.89680	0.89680	0.010	-1.44730	25.00000	Averaged
	60 Toluene	9.88100	10.00000	9.60931	0.010	1.18997	20.00000	Linear
	61 trans-1,3-Dichloropropene	0.22272	0.23250	0.23250	0.010	-4.39171	25.00000	Averaged
	62 1,1,2-Trichloroethane	0.12911	0.13763	0.13763	0.010	-6.60241	25.00000	Averaged
	63 1,3-Dichloropropane	0.32475	0.34115	0.34115	0.010	5.05224	25.00000	Averaged
	64 Tetrachloroethene	0.79002	0.78952	0.78952	0.010	0.06293	25.00000	Averaged
	65 2-Hexanone	0.04918	0.03736	0.03736	0.010	24.02263	50.00000	Averaged
	66 Dibromochloromethane	0.41518	0.44149	0.44149	0.010	-6.33647	25.00000	Averaged
	67 1,2-Dibromoethane	0.17613	0.18706	0.18706	0.010	-6.20662	25.00000	Averaged
	68 Chlorohexane	0.52830	0.52226	0.52226	0.010	1.14384	25.00000	Averaged
	69 Chlorobenzene	0.98323	1.01837	1.01837	0.300	-3.57418	25.00000	Averaged
	70 1,1,1,2-Tetrachloroethane	0.46194	0.50779	0.50779	0.010	-5.36268	25.00000	Averaged
	71 Ethylbenzene	0.52025	0.53375	0.53375	0.010	-2.59605	20.00000	Averaged
	72 m,p-Xylene	1.43762	1.46823	1.46823	0.010	-2.12930	25.00000	Averaged
M	73 1,2-Dichloroethene (total)	0.35596	0.35695	0.35695	0.010	-0.27914	25.00000	Averaged
	74 o-Xylene	1.31381	1.35062	1.35062	0.010	-2.80176	25.00000	Averaged
	75 Styrene	0.84104	0.91004	0.91004	0.010	-8.20461	25.00000	Averaged
	76 Bromoform	0.20355	0.22597	0.22597	0.100	-11.01394	25.00000	Averaged
	77 Isopropylbenzene	3.38045	3.38829	3.38829	0.010	-0.23205	25.00000	Averaged
IS	78 p-Bromofluorobenzene	0.70610	0.72322	0.72322	0.010	-2.42485	25.00000	Averaged
	79 1,1,2,2-Tetrachloroethane	0.41264	0.43197	0.43197	0.300	-4.68397	25.00000	Averaged
	80 Bromobenzene	0.81645	0.85720	0.85720	0.010	-4.99194	25.00000	Averaged
	81 1,2,3-Trichloropropane	0.08772	0.09149	0.09149	0.010	-4.29380	25.00000	Averaged
	82 n-Propylbenzene	4.26490	4.20759	4.20759	0.010	1.34364	25.00000	Averaged
	83 2-Chlorotoluene	3.01077	2.98657	2.98657	0.010	0.80387	25.00000	Averaged
	84 1,3,5-Trimethylbenzene	2.54751	2.61229	2.61229	0.010	-2.54317	25.00000	Averaged
	85 4-Chlorotoluene	2.94200	3.02366	3.02366	0.010	-2.77565	25.00000	Averaged
	86 tert-Butylbenzene	2.95820	2.98126	2.98126	0.010	-0.77960	25.00000	Averaged
	87 1,2,4-Trimethylbenzene	2.42871	2.46613	2.46613	0.010	-2.38388	25.00000	Averaged
	88 sec-Butylbenzene	4.15921	4.17269	4.17269	0.010	-0.32413	25.00000	Averaged
	89 1,3-Dichlorobenzene	1.55533	1.57882	1.57882	0.010	-1.51011	25.00000	Averaged
	90 p-Isopropyltoluene	3.22249	3.26814	3.26814	0.010	-1.41647	25.00000	Averaged

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: gcl3.i
Lab File ID: 3c1017.d
Analysis Type: WATER
Lab Sample ID: VSTD010
Method: /var/chem/gcl3.i/101802.b/hydr3w.m

Injection Date: 18-OCT-2002 08:19
Init. Cal. Date(s): 09-OCT-2002 18-OCT-2002
Init. Cal. Times: 01:03 04:12
Quant Type: ISTD

COMPOUND	RRF / AMOUNT	RF10	CCAL RRF10	MIN RRF	%D / %DRIFT	MAX %D / %DRIFT	CURVE TYPE
95 1,4-Dichlorobenzene	1.71550	1.77446	1.77446	0.010	-3.43665	25.00000	Averaged
99 n-Butylbenzene	3.38841	3.41990	3.41990	0.010	-0.92945	25.00000	Averaged
101 1,2-Dichlorobenzene	1.19886	1.24386	1.24386	0.010	-3.75421	25.00000	Averaged
102 1,2-Dibromo-3-Chloropropane	0.08900	0.07251	0.07251	0.010	-5.09657	25.00000	Averaged
104 1,2,4-Trichlorobenzene	0.78450	0.80761	0.80761	0.010	-2.94610	25.00000	Averaged
105 Hexachlorobutadiene	1.04401	1.05231	1.05231	0.010	-0.79476	25.00000	Averaged
106 Naphthalene	0.46186	0.48093	0.48093	0.010	-4.12837	25.00000	Averaged
107 1,2,3-Trichlorobenzene	0.55649	0.57018	0.57018	0.010	-2.46004	25.00000	Averaged
M 106 Xylene (total)	1.31381	1.35062	1.35062	0.010	-2.80176	25.00000	Averaged

Average %D/Drift Results.

Calculated Average %D/Drift = 4.22211
Maximum Average %D/Drift = 15.00000
Passed Average %D/Drift Test.

VOLATILE REPORT SW846 METHOD 8260B WATERS

Data file : /var/chem/gcl3.i/101802.b/3cl017.d
Lab Smp Id: VSTD010 Client Smp ID: VSTD010
Inj Date : 18-OCT-2002 08:19
Operator : DCT Inst ID: gcl3.i
Smp Info : CV_V02J18DAA
Misc Info : VSTD010 1.7
Comment : HP 5971/ 5890 GC TEKMAR 3000/2016
Method : /var/chem/gcl3.i/101802.b/hydr3w.m
Meth Date : 21-Oct-2002 14:16 petruszj Quant Type: ISTD
Cal Date : 18-OCT-2002 02:22 Cal File: 3i1017i.d
Als bottle: 7 Continuing Calibration Sample
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: ICAL1.sub
Target Version: 3.50
Processing Host: manatee

Concentration Formula: Amt * DF * Uf * 1/Vo * CpndVariable

Name	Value	Description
DF	1.00000	Dilution Factor
Uf	25.00000	ng unit correction factor
Vo	25.00000	Sample Volume purged (mL)

Cpnd Variable Local Compound Variable

Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	AMOUNTS CAL-AMT (ug/L)	ON-COL (ug/L)
1 Dichlorodifluoromethane	85	2.010	2.010	(0.308)	1061832	10.0000	9.765
2 Chloromethane	50	2.228	2.228	(0.342)	465677	10.0000	9.308
3 Vinyl chloride	62	2.337	2.337	(0.358)	567967	10.0000	9.682
4 Bromomethane	94	2.709	2.709	(0.415)	491442	10.0000	10.408
5 Chloroethane	64	2.827	2.827	(0.434)	377853	10.0000	9.835
6 Trichlorofluoromethane	101	3.144	3.144	(0.482)	1265436	10.0000	9.231
7 Acrolein	56	3.571	3.571	(0.548)	413405	800.000	772.05
8 1,1-Dichloroethene	96	3.716	3.716	(0.570)	640800	10.0000	9.496
9 Trichlorotrifluoroethane	101	3.725	3.725	(0.571)	1193097	10.0000	9.913
10 Acetone	43	3.734	3.734	(0.573)	33885	10.0000	9.902
12 Carbon Disulfide	76	3.970	3.970	(0.609)	1882867	10.0000	8.941
13 Acetonitrile	41	4.052	4.052	(0.621)	107700	160.000	138.17
14 Methylene chloride	84	4.252	4.252	(0.652)	486135	10.0000	9.364
16 Acrylonitrile	53	4.515	4.515	(0.692)	376900	160.000	156.18
17 trans-1,2-Dichloroethene	96	4.588	4.588	(0.704)	741748	10.0000	9.912

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	AMOUNTS CAL-AMT (ug/L)	ON-COL (ug/L)
	14 Methyl tert Butyl Ether	73	4.588	4.588	(0.704)	440581	10.0000	9.510
	21 1,1-Dichloroethane	63	5.087	5.087	(0.780)	1150051	10.0000	9.672
	22 Vinyl Acetate	43	5.159	5.159	(0.791)	148354	10.0000	8.412
	27 2,2-Dichloropropane	77	5.822	5.822	(0.893)	1066914	10.0000	9.824
	28 cis-1,2-Dichloroethene	96	5.813	5.813	(0.891)	640135	10.0000	10.166
	29 2-Butanone	43	5.822	5.822	(0.893)	32250	10.0000	7.810(M)
	30 Propionitrile	54	5.885	5.885	(0.788)	115091	160.000	157.85
	30 Bromochloromethane	128	6.121	6.121	(0.939)	265518	10.0000	10.327
	31 Tetrahydrofuran	42	6.176	6.176	(0.947)	237949	100.000	95.716
	32 Chloroform	83	6.221	6.221	(0.954)	1309841	10.0000	9.990
I	33 Dibromofluoromethane	112	6.430	6.430	(0.986)	974179	10.0000	9.963
	35 1,1,1-Trichloroethane	97	6.475	6.475	(0.993)	1261279	10.0000	9.610
	37 1,1-Dichloropropene	75	6.693	6.693	(1.026)	1114596	10.0000	9.396
	38 Carbon tetrachloride	117	6.702	6.702	(0.898)	1157793	10.0000	9.220
I	39 1,2-Dichloroethane-d4	65	6.866	6.866	(0.920)	320267	10.0000	9.562
	40 Benzene	78	6.965	6.965	(0.933)	1828685	10.0000	9.616
	41 1,2-Dichloroethene	62	6.956	6.956	(0.932)	363917	10.0000	9.885
*	42 Pentafluorobenzene	165	6.521	6.521	(1.000)	1935670	10.0000	
	44 Trichloroethene	130	7.809	7.809	(1.046)	946684	10.0000	9.800
*	46 1,4-Difluorobenzene	114	7.465	7.465	(1.000)	2063579	10.0000	
	49 1,3-Dichloropropane	63	8.091	8.091	(1.084)	554292	10.0000	10.202
	51 Dibromomethane	93	8.236	8.236	(1.103)	320764	10.0000	10.303
	52 Bromodichloromethane	83	8.445	8.445	(1.131)	1021568	10.0000	10.300
	55 2-Chloroethylvinylether	63	8.871	8.871	(1.188)	93818	10.0000	9.634
	57 cis-1,3 Dichloropropene	75	9.053	9.053	(1.213)	747482	10.0000	10.314
	58 4-Methyl 2-pentanone	43	9.261	9.261	(1.241)	98083	10.0000	8.431
I	60 Toluene-d8	98	9.425	9.425	(1.263)	1850610	10.0000	10.145
	62 Toluene	92	9.516	9.516	(1.275)	1257356	10.0000	9.881
	63 trans-1,3-Dichloropropene	75	9.806	9.806	(1.314)	479783	10.0000	10.439
	64 1,1,2-Trichloroethane	97	10.051	10.051	(1.541)	266408	10.0000	10.660
	66 1,3 Dichloropropane	76	10.278	10.278	(0.901)	457036	10.0000	10.505
	67 Tetrachloroethene	166	10.278	10.278	(0.901)	1057706	10.0000	9.994
	68 2-Hexanone	43	10.414	10.414	(0.913)	50056	10.0000	7.598
	69 Dibromochloromethane	129	10.596	10.596	(0.928)	591453	10.0000	10.634
	70 1,2-Dibromoethane	107	10.750	10.750	(1.440)	386007	10.0000	10.621
	71 1-Chlorohexane	91	11.431	11.431	(1.753)	1010915	10.0000	9.886
	72 Chlorobenzene	112	11.449	11.449	(1.003)	1364294	10.0000	10.357
	73 1,1,1,2-Tetrachloroethane	131	11.567	11.567	(1.014)	680273	10.0000	10.536
	74 Ethylbenzene	106	11.621	11.621	(1.018)	715059	10.0000	10.260
	75 m,p-Xylene	91	11.784	11.784	(1.033)	3933906	20.0000	20.426
*	76 Chlorobenzene-d5	117	11.412	11.412	(1.000)	1339678	10.0000	
*	77 1,2-Dichloroethene (total)	96				1381883	20.0000	20.056
	78 o-Xylene	91	12.347	12.347	(1.082)	1809390	10.0000	10.280
	79 Styrene	104	12.365	12.365	(1.083)	1219166	10.0000	10.820
	80 Bromoform	173	12.610	12.610	(1.105)	302731	10.0000	11.101
	81 Isopropylbenzene	105	12.883	12.883	(0.872)	2562052	10.0000	10.023
I	82 p-Bromofluorobenzene	95	13.091	13.091	(1.147)	968882	10.0000	10.242

Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	AMOUNTS CAL-AMT (ug/L)	ON-COL (ug/L)
82 1,1,2,2-Tetrachloroethane	83	13.291	13.291	(0.900)	326632	10.0000	10.468
83 Bromobenzene	156	13.300	13.300	(0.900)	646172	10.0000	10.499
85 1,2,3-Trichloropropane	110	13.346	13.346	(0.904)	69180	10.0000	10.429(M)
86 n-Propylbenzene	91	13.473	13.473	(0.912)	3181561	10.0000	9.866
87 2-Chlorotoluene	91	13.581	13.581	(0.920)	2258288	10.0000	9.920
88 1,3,5-Trimethylbenzene	105	13.736	13.736	(0.930)	1975281	10.0000	10.254
89 4-Chlorotoluene	91	13.745	13.745	(0.931)	2286335	10.0000	10.278
90 tert-Butylbenzene	119	14.208	14.208	(0.962)	2254274	10.0000	10.078
91 1,2,4-Trimethylbenzene	105	14.280	14.280	(0.967)	1864759	10.0000	10.238
92 sec-Butylbenzene	105	14.534	14.534	(0.984)	3155174	10.0000	10.032
93 1,3-Dichlorobenzene	146	14.680	14.680	(0.994)	1193822	10.0000	10.151
94 p-Isopropyltoluene	119	14.752	14.752	(0.999)	2471195	10.0000	10.142
95 1,4-Dichlorobenzene	146	14.807	14.807	(1.002)	1341752	10.0000	10.344
96 n-Butylbenzene	91	15.351	15.351	(1.039)	2585952	10.0000	10.093
* 100 1,4-Dichlorobenzene-d4	152	14.770	14.770	(1.000)	756148	10.0000	
101 1,2-Dichlorobenzene	146	15.351	15.351	(1.039)	940546	10.0000	10.375
102 1,2-Dibromo-3-Chloropropane	75	16.449	16.449	(1.114)	54832	10.0000	10.510
104 1,2,4-Trichlorobenzene	180	17.502	17.502	(1.185)	610672	10.0000	10.295
105 Hexachlorobutadiene	225	17.720	17.720	(1.200)	795702	10.0000	10.079
106 Naphthalene	128	17.784	17.784	(1.204)	363651	10.0000	10.413
107 1,2,3-Trichlorobenzene	180	18.056	18.056	(1.222)	431137	10.0000	10.246
* 108 Xylene (total)	91				5743296	10.0000	32.631

QC Flag Legend

M - Compound response manually integrated.

Surrogate Spike Recovery Default Limits

Surrogate Compound	Water	Low Soil
Toluene-d_8	88-110	81-117
4-Bromofluorobenzene	86-115	74-121
1,2-Dichloroethane-d_4	80-120	80-120
Dibromofluoromethane	86-118	80-120

Note: Above are Surrogate Spike Recovery Default Limits from 8260B. These limits are for guidance only, not intended as set limits. In-house generated statistical limits or QAPP limits will be used whenever possible. See Table 1 for in-house generated statistical limits.

LCS / MS Recovery Default Limits

MS Compound	Water	Soil/Sediment
1,1-Dichloroethene	61-145	59-172
Trichloroethene	71-120	62-137
Chlorobenzene	75-130	60-133
Toluene	76-125	59-139
Benzene	76-127	66-142

Internal standard areas must be within -50% to 100% of the EICP for the corresponding continuing calibration standards. Internal standard retention times must not deviate by 30%.

Attachment 3.

Example: GC/MS Volatiles/CAR Logbook; Tune Form; Sample Tracking Sheet , Maintenance Logbook

STL Chicago
GC/MS Volatile Analysis Logbook

Instrument ID# 16

CHI-22-20-049/A-05/02

Analysis Date / Time	File Name	Sample Number	Sample ID	Sparge No.	Sample Wt. / Vol	Instr. Dil.	Int. Std. No.	pH < 2	Comments (MUST include SRN's)	Analyst Initials

Analyst Signature/Date:_____ Reviewer Signature/Date:_____ Page No.

Instrument ID# 16

STL Chicago
Corrective Action/Qualification Report GC/MS VOA

Page No._____
CHI-22-20-049/A-05/02

Analytical Methods
___SW846 8260/A/B
___40CFR 624
___OLM04.2

Tune Name:_____'02
___EPA 524.2
___OLM03.2
___OLC02.1
__Other_____

ISTD/RT report
Initial calibration / Continuing Calibration IS#_____
(For method 524 include all points in ICAL)

Data File Name:_____

	IS 1	RT1	IS2	RT2	IS3	RT3	IS4	RT4
1								
2								
3								
4								

Tune Criteria
Description of Situation:_____
Action Taken:_____
Demonstration of Control:_____

Initial Calibration Cirteria
Description of Situation:_____
Action Taken:_____
Demonstration of Control_____

Continuing Calibration Criteria
Description of Situation:_____
Action Taken:_____
Demonstration of Control:_____

Internal Standards (continuing cal to continuing cal)
Description of situation:_____
Action Taken:_____
Demonstration of Control:_____

Method Blank
Description of situation:_____
Action Taken:_____
Demonstration of Control:_____

LCS
Description of Situation:_____
Action Taken:_____
Demonstration of Control:_____

Qualification of Data
Data Affected (Client/Sample #)_____
Qualification:_____

Associated samples reanalyzed: Yes No (see below)
Explanation for no reanalysis/data MUST be qualified and narrated:_____

Analyst Signature/date_____/_____

Reviewer Signature/date_____/_____

Tune Name: _____ STD CC: _____ Labnet ID: _____ Method: _____ Tune Batch: _____

Tune Time: _____ CC: _____ Labnet ID: _____ Method: _____ Tune Batch: _____

INST: _____ LCS: _____

Sample ID:	File:	Act	H T	p H	I S	S S	Misc. Info	Prep Method	Prep Batch	Analytical Batch

Exception Reports ☐

rpjah

Job Analysis History

10/21/2002

V2

Surrogate Reagent...:

Method Code....: 8260B Volatile Organics
Job Number.....:
Project Number.:
Customer Job ID..:

Holding Time.....: 14 Day Holding Time
Customer.....:
Proj. Cat..: INDUSTRIAL PM...:

Job Report Type...: l2qfmdl
Contact.:
Hardcopy Due Date.: 10/21/2002 Fax Due Date.: 10/11/2002

Sample #	QC	Client Sample ID	Matrix	HT Date	TAT Date	File Name	Dil	Tune name	Action	Analst	Prep Batch	Comments
1	N	A90210BH01-01	SOIL	10/21/2002	10/21/2002							
2	N	A90210BH01-02	SOIL	10/21/2002	10/21/2002							
3	N	A90210BH01-GW	WATER	10/21/2002	10/21/2002							
13	N	A90210TB1	WATER	10/21/2002	10/21/2002							

STI Chicago
GC/MS VOA Maintenance Logbook
Instrument No. 16

Page No._____
CHI-22-20-051/A-09/02

Date of Maintenance:_____ Entry No.:_____

Analyst:_____

Description:_____

Follow-Up:_____

Analyst:_____ Date:_____

Date of Maintenance:_____ Entry No.:_____

Analyst:_____

Description:_____

Follow-Up:_____

Analyst:_____ Date:_____

Date of Maintenance:_____ Entry No.:_____

Analyst:_____

Description:_____

Follow-Up:_____

Analyst:_____ Date:_____

Reviewer Signature:_____ Date:_____

Attachment 4.

Evaluation and Acceptance Criteria Table

GCMS Calibration – Evaluation and Acceptance Criteria

Prepare standards	• The concentrations must cover the range of quantitation for all analytes • The lowest point of the calibration curve must be at, or below, the reporting limit	
Run calibration standards	• All analytes must contain at a minimum 5 calibration points for Linear regressions, linear curves, or average response factors • Analytes using second order fits must have a minimum of 6 calibration points on a curve • Analytes using 3rd order curves must have a minimum of 7 calibration points	• Calibration levels deemed to be statistical or visual outliers shall be dropped from the curve and replaced by a similar concentration standard. The standard shall be dropped in its entirety, not on a per analyte basis
Calculate "grand mean RSD" of all compounds	• The "grand mean RSD" is calculated before attempting to fit compounds to any calibration curves only because it is easier to do at this time. The "grand mean RSD" acceptance is only to be used as a last resort in determining whether a compound's calibration is acceptable. • Calibrations for compounds which occur on different dates (i.e. appix compounds analyzed at different dates than the HSL compounds), the "grand mean RSD" is calculated separately for each curve.	• If no %RSD for any given compound is above 15%, the "grand mean RSD will be less than 15%.
Evaluation each compound for linear fit, second order fit or 3rd order fit	• Having determined that the calibration meets minimum requirements, the laboratory will evaluate each compound to determine the best calibration fit using statistical and visual evaluation of the curve. • Using "priori" knowledge some compounds ranges may be shortened (i.e. not as low a reporting limit or not as high a range)	• Citing priori knowledge the laboratory may decide to "keep" calibrations for several compounds despite exceeding the statistical threshold allowed by the method. The compounds that fall in this category are known poor performers as indicated by the method or as indicated from historical performance data (e.g. Appendix IX compounds). These compounds will be listed in the OP as possible trouble analytes. Quantitation for these compounds may be biased and should be used only with caution.
Determine the best calibration approach for each compound	• RRF • Linear • 2nd order • Grand Mean RSD	• Even when the "grand mean RSD" indicates minimum acceptance has been met, the analyst must use discretion for quantification because some compounds may be biased. This approach must be used with caution.

Attachment 5.

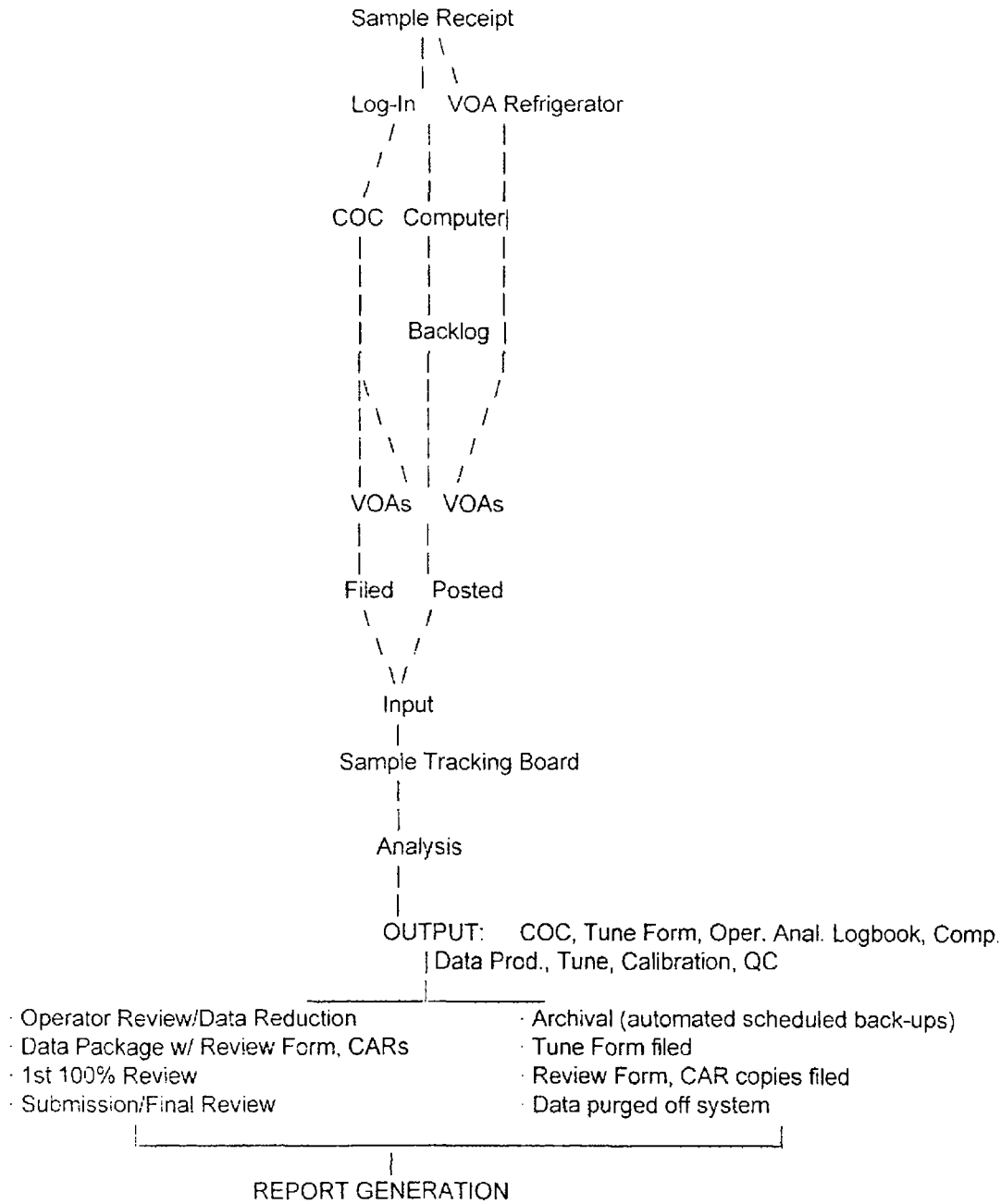
Example: Analysis and Sample Tracking Flowcharts

ANALYSIS SCHEME FLOWCHART

(Terms defined in the Section 9)

```
                PFTBA
                  |
                  |
                  |
                 BFB  (Form 5)
                /  \  Every 12 hours
               /    \
              /      \
Initial Calibration--------Continuing Calibration
   (Form 6)                (Form 7)
                      Every 12 hours
                          |
                          |
                          \|/
                       Analysis
                          |
                          |
                          \|/
                Computer Data Production/Reduction
                          |
                          |
                          \|/
                Operator Data Review/Reduction
                    (Form 1,2,3,4,5)
                          |
                          |
                          \|/
                 Final Review/Data Submission
                          |
                          |
                          \|/
                   Report Generation
```

Sample Tracking Flowchart (for EACH unique Job)



Attachment 6.

Example: Data Review Form

STL Chicago
GCMS DATA REVIEW CHECKLIST

Site Name:_____ Primary Reviewer:_____ Review Date:_____
JOB Number: _____ Secondary Reviewer:_____ Review Date:_____
No. of Samples/Matrix: a) _____ WATER b) _____ SOIL c) _____ SPLP / TCLP d) _____ Other (_____)
Method: a) VOA _____ 5030_____ Encores: 5035–High _____ 5035-Low_____ b) BNA _____
Report Type: a) MDL U b) RL U c) Breach d) P1 / P2 ("QCORG" printed QC must match PM selected Report Type)

TASK	PRI REV	SEC REV	COMMENTS
LAB CHRON: 1) Matches Big Board (Job Analysis History)			
2) Matches Raw Data (Form 4 / 5)			
3) Note Sample dilutions and list reason a) High Sample Conc. b) Interference present IF original and re-run are to be reported in LabNet Re-log Samples (Indicate data type used) Re-Analyzed (RE) Re-Extracted (RA) Dilution (DL)			Smp # Original Dilution Comments BNA Only: Final Volume Adjustment _____
4) Sample Hold Times Met (SDR written: Yes No)			
5) Proper Prep Links Created S-F6: Routine Preps; 5035PL; 5035PH S-F9: TCLP; SPLP ; 5035 Archon Purge & Trap			
Incomplete JOB Status Report reveals No Outstanding Data			
PROJ. REQ. MET 1) Sample Detection Limit Met			
2) Reported J values meet reporting criteria			
3) Method Blank Detection Limits Met (MB<1/2 RL for LCG)			
4) Project Specific Compounds of Concern : Yes No			
LabNet Report matches Quant Report. Sample weights / Volumes / % Moisture / Factors verified			
Manual Integration documentation / verification complete			
FORM 2: Surrogate Recoveries Within Limits Statistical Limits _____ Method Limits _____ Project Limits _____ (S-F10 used to Clone By Project) AFCEE___, LCG___; QAPP___ Directed Note to PM: Yes / No			Smp # Original Re-analysis Comments
FORM 3: MS/MSD Recoveries Acceptable Statistical Limits _____ Method Limits _____ Project Limits _____ (S-F10 used to Clone By Project) AFCEE___, LCG___; QAPP___ Directed Note to PM Yes / No			Smp # _____ MS MSD
FORM 3: LCS Recoveries Acceptable (LCD if no MS/MSD) Statistical Limits _____ Method Limits _____ *Project Limits _____ (S-F10 used to Clone By Project)* AFCEE___; LCG___; QAPP___ Directed Note to PM: Yes / No			Batch # _____ Batch # _____ Batch # _____ Batch # _____ Batch # _____ Batch # _____

TASK	PRI REV	SEC REV	COMMENTS
FORM 5: Tuning Criteria Met			
FORM 6: Initial Calibration Criteria Met			
ICAL Spike Required Yes No Control Limit applied: _____			
FORM 7: Daily Calibration (CCV) Criteria Met			
MRL Check Required: Yes No (LCG Requirement – Before and after Sample analysis) Control Limit Applied: _____			Before: After: Batch # _____ Batch # _____ Batch # _____ Batch # _____ Batch # _____
FORM 8: Internal Standards Criteria Met Default – Internal Standards checked against the continuing calibration LCG – Internal Standards checked against the mid-point of the ICAL Form 8 MUST BE verified for correct areas present: YES NO **It is critical that the ICAL1 be processed last. The last ICAL processed is held in the method which is what appears on the target IS report.** Directed Note to PM: Yes / No			Smp # Original Re-analysis Comments
LabNet Batch Status Report Displays Data at RPT / RVWD Status	RPT	RVWD	
RAW DATA: 1) Raw Data Verified/Complete			
2) Raw Data Matches Forms			
3) 5035 Prep Log page present / verified			
4) Quant Report Matches Spectra			
5) Manual integration reports (befores and afters) present (when required by client) and reason correctly documented and approved Manual Integration Summary Printed: Yes No			File ID:
NARRATIVE 1) Holding Times			
2) Method References			
3) % Recoveries / RPD's			
4) Analytical Difficulties/Typos/CAR's Directed Note to PM: Yes / No			
Manual Calculation of On Column result: Response Factor (Smp) x Concentration of IS IS Response Factor (Smp) Cmpd. RRF (Cont.Calib)			Sample: _____ Compound: _____

Additional Comments:

ATTACHMENT 1-4

STL CHICAGO SUMMARY TABLES

TABLE 1
Summary of Analytical Procedures

STL Chicago SOP Nos. added on 11/18/03.

The Lockformer Company / Lisle, Illinois

Analyte		Laboratory SOP No.	Method No.
Matrix:	WATER Volatile Organics	UMV-8260	SW-846 Methods 5030B and 8260B
Matrix:	SOIL Volatile Organics	USP-5035; UMV-8260	SW-846 Methods 5035 and 8260B
Matrix:	AIR Volatile Organics		EPA Compendium Method TO-15

TABLE 2
Sample Holding Times, Containers, Preservatives, and Volume Requirements
11/19/03: Updated by STL Chicago.

The Lockformer Company / Lisle, Illinois

PARAMETER	METHOD	MATRIX	HOLDING TIME (1)	CONTAINER	PRESERVATIVE	MINIMUM VOLUME REQUIRED
Volatile Organics	5030**B**/8260B	Water	14-days	3 x 40 mL Glass vials with Teflon®-lined septum	Cool 4 ± 2°C , Minimal headspace, HCl to pH < 2.	2 x 40 mLs
Volatile Organics	5035/8260B	Soil	14-days **[See Note (2)]**	2 x 40 mL pre-weighed Glass vials (containing stir bars) with Teflon®-lined septum; 1 x 40 mL pre-weighed Glass vial (without a stir bar). **[See Note (2)].**	Cool 4±2°C **[See Note (2)].**	3 x 40 mLs
Volatile Organics	TO-15	Air				

NOTES:

(1) Holding time measured from time of sampling

(2) Approximately 5 grams of sample will be placed into each vial and returned to the laboratory within 48 hours. The sample must remain cool (4+/-2°C) during transport. Upon arrival to the laboratory, the samples will be weighed back for the individual sample weight and the low-level samples with the stir bars will be frozen. The sample will be given a 14-day holdtime from the date of collection. The Archon autosampler will add organic-free water (OFW), internal standards and surrogates to the samples via the septum at the time of analysis. The OFW will be added first to ensure the ISs are not absorbed into the dry soil. The high-level samples will also be weighed back upon arrival to the laboratory. A volume of 5 or 10 mLs of methanol will be added and the sample will be cooled to 4+/-2°C for 24 hours. After this time, the methanol extract will be pulled off and assigned a 14 day hold time from the date of collection. **No further labels are to be added to the sample vials as they add weight to the determination of the final sample weight.**

TABLE 3
STL Detection and Reporting Limits
VOCs -- Target Compound List -- Method 8260B

The Lockformer Company / Lisle, Illinois

Chemical Name	Water		Soil (Low Level)		Soil (High Level)	
	MDL (ug/L)	RQL (ug/L)	MDL (ug/kg)	RQL (ug/kg)	MDL (ug/kg)	RQL (ug/kg)
1,1,1-Trichloroethane	0.079	1	1.13	5	23	100
1,1,2,2-Tetrachloroethane	0.093	1	0.96	5	27.2	100
1,1,2-Trichloroethane	0.15	1	1.06	5	21.8	100
1,1-Dichloroethane	0.11	1	1.02	5	21.9	100
1,1-Dichloroethene	0.12	1	1.29	5	28.9	100
1,2-Dichlorobenzene	0.12	1	1.31	5	33.3	100
1,2-Dichloroethane	0.093	1	0.94	5	24.1	100
1,2-Dichloropropane	0.12	1	1.04	5	30.6	100
1,3-Dichlorobenzene	0.088	1	1.24	5	32.9	100
1,4-Dichlorobenzene	0.13	1	1.21	5	35.6	100
2-Butanone	1.2	5	3.91	5	42.1	100
2-Hexanone	0.53	5	1.14	5	42.6	100
4-Methyl-2-Pentanone	0.65	5	1.01	5	37.8	100
Acetone	1.8	5	4.63	5	165.5	200
Benzene	0.089	1	1.1	5	15.7	25
Bromodichloromethane	0.11	1	0.96	5	16.8	100
Bromoform	0.11	1	0.75	5	22.7	100
Bromomethane	0.1	1	1.26	5	43.8	100
Carbon Disulfide	0.2	5	1.2	5	21.1	100
Carbon Tetrachloride	0.13	1	1.05	5	16.3	100
Chlorobenzene	0.075	1	1.13	5	21.3	100
Chloroethane	0.08	1	1.01	5	37.9	100
Chloroform	0.11	1	1.06	5	25.6	100
Chloromethane	0.08	1	1.05	5	25.1	100
cis-1,2-Dichloroethene	0.09	1	1.07	5	24.5	100
cis-1,3-Dichloropropene	0.12	1	0.93	5	17.6	100
Dibromochloromethane	0.063	1	0.79	5	20.7	100
Ethylbenzene	0.066	1	1.11	5	23.2	25
Total xylenes	0.28	1	3.4	5	59.3	75
Methylene Chloride	0.35	1	2.9	5	88.8	100
Styrene	0.13	1	1.07	5	19	100
Tetrachloroethene	0.093	1	1.18	5	33.5	100
Toluene	0.1	1	1.12	5	19.8	25
trans-1,2-Dichloroethene	0.14	1	1.05	5	17.1	100
trans-1,3-Dichloropropene	0.15	1	0.79	5	16.7	100
Trichloroethene	0.1	1	1.13	5	44.8	100
Vinyl Acetate	0.69	5	0.83	5	23.1	100
Vinyl Chloride	0.08	1	1.06	5	25.6	100

NOTES:

MDL = Method Detection Limit (as defined and calculated in 40CFR, Part 136, Appendix B). Based on MDL Study Final Reports provided in Appendix B.

RQL = Reportable Quantitation Limit

Soil MDLs and RQLs listed above are based upon 100% solids. Sample results will be elevated due to the percent moisture present in the sample.

[1] MDLs are determined annually and are subject to change.

[2] Reporting Limits will vary depending on dilution factors, sample weight/volume, dry weight reporting (soils) and annual MDL determinations.

TABLE 4
Instrument Calibration Frequency

11/18/03: STL Chicago text amended.

Instrument	Method Reference	# Standards Initial Calibration	Acceptance/Rejection Criteria Initial Calibration	Frequency of Calibration	Frequency of Initial Calibration Verification	Acceptance/ Rejection Criteria Initial Calibration Verification	Frequency of Continuing Calibration Verification	Acceptance/ Rejection Criteria Continuing Calibration Verification
STL Chicago	SW-846 8260B	5-6 (mininum)	CCCs < 30%; RF's for all SPCCs >0.300 (except Chloromethane, Bromoform; 1,1-DCA @ 0.100). Calibration Curves of area ratio vs. conc. using a first or higher order regression may be used for compounds with a %RSD >15%.	Initially; thereafter as the continuing calibration fails	As needed	CCCs < 20% Drift; RF's for SPCCs >0.300 (excpet Chloromethane, Bromoform, 1,1-DCA @ 0.100).	Every 12 hours	CCCs < 20% Drift
GC/MS volatiles	SW-846 8260B	5-8	% RSD (CCC) <30% 1,1-dichloroethene chloroform 1,2-dichloropropane toluene ethyl benzene vinyl chloride RF (SPCC) chloromethane (0.1) 1,1-dichloroethane (0.1) bromoform (0.1) 1,1,2,2-tetrachloroethane (0.3) chlorobenzene (0.3)	As needed	As needed	CCC <20% D other analyses 50% D	Every 12 hours	CCC %D <20% Same SPCC criteria as initial calibration
GC/MS volatiles	EPA Compendium Method TO-15	5	The % RSD for the RRF for each target compound must be <30% with, at most, two exceptions up to a limit of 40%.	As needed	Following Initial Calibration	% Difference for each target compound must be within +/- 30%	Initially and once per 24-hour period of operation	% Difference for each target compound must be within +/- 30%

TABLE 5
Laboratory Preventative Maintenance and Schedules

11/18/03: Acceptable to STL Chicago.

The Lockformer Company / Lisle, Illinois

INSTRUMENT	MAINTENANCE PROCEDURES/SCHEDULE	SPARE PARTS IN STOCK
Gas Chromatograph Spectrometer (GC/MS)	1. Replace pump oil as needed. 2. Disassemble and clean "source" as needed. 3. Change septa weekly or as often as needed. 4. Replace electron multiplier and filaments as often as needed. 5. Replace GC injector glass liner weekly or as often as needed. 6. Replace GC column as needed. 7. Check to ensure that gas supply is sufficient for the day's activity.	1. Syringes 2. Septa 3. Various electronic and mechanical components 4. Glass jet separator 5. GC columns 6. Glass liner 7. Rough pump
Gas Chromatograph	1. Change septa weekly or as often as needed. 2. Replace GC injector glass liner weekly or as often as needed. 3. Replace GC column as needed. 4. Clean/replace GC detector as needed. 5. Check to ensure that gas supply is sufficient for the day's activity.	1. Syringes 2. Septa 3. Detectors 4. Glass liner 5. GC columns
Purge and Trap	1. Replace trap as needed. 2. Decontaminate system after running high concentration samples or as required components by blank analysis. 3. Leak-check system often as needed. 4. Check to ensure the gas supply is sufficient for the day's activity.	1. Spare traps 2. Spare sparger 3. Various electronic and mechanical components 4. Plumbing supplies, valves, tubing fitting, & transfer lines

Clayton
GROUP SERVICES

ATTACHMENT 1-5

STL CHICAGO PERFORMANCE EVALUATION SAMPLES

15-65263ca249\HMM

ENVIRONMENTAL RESOURCE ASSOCIATES

WP-100 Final Complete Report

Donna McCarthy
QA/Project Specialist
STL Chicago
2417 Bond St
University Park, IL 60466-3182
708-534-5200

EPA ID: IL00035
ERA Laboratory Code: T2661-14
Report Issued: 07/10/03

Anal. No.	Analyte	Units	Reported Value	Assigned Value	Acceptance Limits	Warning Limits	Performance Evaluation	Method Description
Volatiles								
4315	Acetone	µg/L	< 5.0	0.00			Acceptable	EPA 8260B
4320	Acetonitrile	µg/L	< 40	0.00			Acceptable	EPA 8260B
4340	Acrylonitrile	µg/L	< 40	0.00			Acceptable	EPA 8260B
4325	Acrolein	µg/L	< 200	0.00			Acceptable	EPA 8260B
0065	Benzene †	µg/L	39.1	44.3	31.9 - 57.1	36.1 - 52.9	Acceptable	EPA 8260B
0060	Bromodichloromethane †	µg/L	13.6	12.5	8.61 - 16.5	9.92 - 15.2	Acceptable	EPA 8260B
0062	Bromoform †	µg/L	< 1.0	0.00			Acceptable	EPA 8260B
4950	Bromomethane	µg/L	< 1.0	0.00			Acceptable	EPA 8260B
4410	2-Butanone (MEK)	µg/L	< 5.0	0.00			Acceptable	EPA 8260B
4450	Carbon disulfide	µg/L	< 5.0	0.00			Acceptable	EPA 8260B
0058	Carbon tetrachloride †	µg/L	< 1.0	0.00			Acceptable	EPA 8260B
0064	Chlorobenzene †	µg/L	33.4	37.2	26.5 - 47.3	29.9 - 43.8	Acceptable	EPA 8260B
0061	Chlorodibromomethane †	µg/L	60.5	62.5	41.3 - 83.0	48.3 - 76.1	Acceptable	EPA 8260B
4485	Chloroethane	µg/L	< 1.0	0.00			Acceptable	EPA 8260B
4500	2-Chloroethylvinylether	µg/L	< 2.0	0.00			Acceptable	EPA 8260B
0055	Chloroform †	µg/L	76.9	69.9	48.4 - 89.5	55.2 - 82.6	Acceptable	EPA 8260B
4960	Chloromethane	µg/L	< 1.0	0.00			Acceptable	EPA 8260B
4570	DBCP	µg/L	< 1.0	0.00			Acceptable	EPA 8260B
4585	1,2-Dibromoethane (EDB)	µg/L	< 1.0	0.00			Acceptable	EPA 8260B
4595	Dibromomethane	µg/L	< 1.0	0.00			Acceptable	EPA 8260B
0094	1,2-Dichlorobenzene †	µg/L	15.2	16.5	11.3 - 21.4	13.0 - 19.7	Acceptable	EPA 8260B
0096	1,3-Dichlorobenzene †	µg/L	30.9	33.0	23.2 - 41.3	26.2 - 38.3	Acceptable	EPA 8260B
0095	1,4-Dichlorobenzene †	µg/L	20.0	20.0	13.6 - 26.2	15.7 - 24.1	Acceptable	EPA 8260B
4625	Dichlorodifluoromethane	µg/L	< 1.0	0.00			Acceptable	EPA 8260B
4630	1,1-Dichloroethane	µg/L	< 1.0	0.00			Acceptable	EPA 8260B
0054	1,2-Dichloroethane †	µg/L	67.3	64.4	44.4 - 85.5	51.3 - 78.7	Acceptable	EPA 8260B
4640	1,1-Dichloroethylene	µg/L	< 1.0	0.00			Acceptable	EPA 8260B
4645	cis-1,2-Dichloroethylene	µg/L	< 1.0	0.00			Acceptable	EPA 8260B
4700	trans-1,2-Dichloroethylene	µg/L	< 1.0	0.00			Acceptable	EPA 8260B
4655	1,2-Dichloropropane	µg/L	31.4	34.8	24.3 - 43.9		Acceptable	EPA 8260B
4680	cis-1,3-Dichloropropylene	µg/L	< 1.0	0.00			Acceptable	EPA 8260B
4685	trans-1,3-Dichloropropylene	µg/L	< 1.0	0.00			Acceptable	EPA 8260B
0066	Ethylbenzene †	µg/L	8.49	9.90	6.90 - 12.7	7.87 - 11.7	Acceptable	EPA 8260B
4360	2-Hexanone	µg/L	< 5.0	0.00			Acceptable	EPA 8260B
0063	Methylene chloride †	µg/L	< 1.0	0.00			Acceptable	EPA 8260B
4995	MIBK	µg/L	< 5.0	0.00			Acceptable	EPA 8260B
5100	Styrene	µg/L	< 1.0	0.00			Acceptable	EPA 8260B

All analytes are included in ERA's A2LA accreditation. Lab Code: 1539-01

† Indicates analytes included in ERA's NIST/NVLAP accreditation. Lab Code 200386-0

NVLAP

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EPA ID: IL00035
ERA Laboratory Code: T2661-14
Report Issued: 07/10/03

Anal. No.	Analyte	Units	Reported Value	Assigned Value	Acceptance Limits	Warning Limits	Performance Evaluation	Method Description
Volatiles (Cont.)								
5105	1,1,1,2-Tetrachloroethane	µg/L	< 1.0	0.00			Acceptable	EPA 8260B
5110	1,1,2,2-Tetrachloroethane	µg/L	76.6	74.7	43.7 - 104		Acceptable	EPA 8260B
0059	Tetrachloroethylene †	µg/L	35.8	45.1	29.8 - 57.8	34.5 - 53.2	Acceptable	EPA 8260B
0067	Toluene †	µg/L	62.6	60.9	43.9 - 75.9	49.2 - 70.5	Acceptable	EPA 8260B
0056	1,1,1-Trichloroethane †	µg/L	37.2	43.8	28.4 - 57.8	33.3 - 52.9	Acceptable	EPA 8260B
5165	1,1,2-Trichloroethane	µg/L	< 1.0	0.00			Acceptable	EPA 8260B
0057	Trichloroethylene †	µg/L	64.5	64.1	41.5 - 82.8	48.4 - 75.9	Acceptable	EPA 8260B
5175	Trichlorofluoromethane	µg/L	66.4	57.5	13.1 - 99.7		Acceptable	EPA 8260B
5180	1,2,3-Trichloropropane	µg/L	< 1.0	0.00			Acceptable	EPA 8260B
5225	Vinyl acetate	µg/L	< 5.0	0.00			Acceptable	EPA 8260B
5235	Vinyl chloride	µg/L	< 1.0	0.00			Acceptable	EPA 8260B
5260	Xylenes, total	µg/L	103	117	66.9 - 158		Acceptable	EPA 8260B

All analytes are included in ERA's A2LA accreditation. Lab Code: 1539-01
† ndicates analytes included in ERA's NIST/NVLAP accreditation. Lab Code 200386-0

NVLAP

ENVIRONMENTAL RESOURCE ASSOCIATES®

SOIL-43 Final Complete Report

Donna J. McCarthy
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708-534-5200

EPA ID: IL00035
ERA Laboratory Code: T2661-14
Report Issued: 10/02/03
Study Dates: 07/28/03 - 09/11/03

Anal. No.	Analyte	Units	Reported Value	Assigned Value	Acceptance Limits	Performance Evaluation	Method Description
Additional Base / Neutrals and Acids in Soil (Cont.)							
6865	2,4,6-Trichlorophenyl-4-nitrophenylether	µg/kg		0.00			
6870	3,4,5-Trichlorophenyl-4-nitrophenylether	µg/kg		0.00			
Pesticides in Soil							
7025	Aldrin	µg/kg	151	155	62.9 - 217	Acceptable	SW 8081A
7110	alpha-BHC	µg/kg	353	373	146 - 521	Acceptable	SW 8081A
7115	beta-BHC	µg/kg	33.5	203	20.8 - 323	Acceptable	SW 8081A
7105	delta-BHC	µg/kg	383	394	104 - 568	Acceptable	SW 8081A
7120	gamma-BHC(Lindane)	µg/kg	248	186	44.1 - 310	Acceptable	SW 8081A
7240	alpha-Chlordane	µg/kg	291	285	114 - 410	Acceptable	SW 8081A
7245	gamma-Chlordane	µg/kg	< 17	0.00		Acceptable	SW 8081A
7355	4,4'-DDD	µg/kg	113	137	37.1 - 219	Acceptable	SW 8081A
7360	4,4'-DDE	µg/kg	296	276	93.5 - 433	Acceptable	SW 8081A
7365	4,4'-DDT	µg/kg	98.8	126	14.7 - 213	Acceptable	SW 8081A
7470	Dieldrin	µg/kg	353	340	113 - 513	Acceptable	SW 8081A
7540	Endrin	µg/kg	198	178	92.2 - 264	Acceptable	SW 8081A
7530	Endrin aldehyde	µg/kg	87.4	200	0.00 - 249	Acceptable	SW 8081A
7535	Endrin ketone	µg/kg	318	365	102 - 514	Acceptable	SW 8081A
7510	Endosulfan I	µg/kg	381	390	147 - 505	Acceptable	SW 8081A
7515	Endosulfan II	µg/kg	101	152	44.0 - 188	Acceptable	SW 8081A
7520	Endosulfan sulfate	µg/kg	172	203	58.2 - 302	Acceptable	SW 8081A
7685	Heptachlor	µg/kg	342	318	110 - 458	Acceptable	SW 8081A
7690	Heptachlor epoxide	µg/kg	263	263	116 - 372	Acceptable	SW 8081A
7810	Methoxychlor	µg/kg	374	430	96.3 - 612	Acceptable	SW 8081A
Chlordane in Soil							
7250	Chlordane, Technical	µg/kg	126	193	38.0 - 242	Acceptable	SW 8081A
Toxaphene in Soil							
8250	Toxaphene	µg/kg	72.2	182	0.00 - 298	Acceptable	SW 8081A
Volatiles in Soil							
4315	Acetone	µg/kg	74.0	156	0.00 - 321	Acceptable	SW 8260B
4320	Acetonitrile	µg/kg	< 40	0.00		Acceptable	SW 8260B
4325	Acrolein	µg/kg	< 200	0.00		Acceptable	SW 8260B
4375	Benzene	µg/kg	80.6	118	75.7 - 160	Acceptable	SW 8260B
4395	Bromodichloromethane	µg/kg	< 5	0.00		Acceptable	SW 8260B
4400	Bromoform	µg/kg	62.4	70.6	38.7 - 103	Acceptable	SW 8260B

All analytes are included in ERA's A2LA accreditation. Lab Code: 1539-01
† Indicates analytes included in ERA's NIST/NVLAP accreditation. Lab Code 200386-0

NVLAP

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EPA ID: IL00035
ERA Laboratory Code: T2661-14
Report Issued: 10/02/03
Study Dates: 07/28/03 - 09/11/03

Anal. No.	Analyte	Units	Reported Value	Assigned Value	Acceptance Limits	Performance Evaluation	Method Description
Volatiles in Soil (Cont.)							
4950	Bromomethane	µg/kg	< 5	0.00		Acceptable	SW 8260B
4410	2-Butanone (MEK)	µg/kg	73.7	106	0.800 - 169	Acceptable	SW 8260B
4450	Carbon disulfide	µg/kg	< 5	0.00		Acceptable	SW 8260B
4455	Carbon tetrachloride	µg/kg	< 5	0.00		Acceptable	SW 8260B
4475	Chlorobenzene	µg/kg	< 5	0.00		Acceptable	SW 8260B
4575	Chlorodibromomethane	µg/kg	132	159	95.6 - 214	Acceptable	SW 8260B
4485	Chloroethane	µg/kg	< 5	0.00		Acceptable	SW 8260B
4500	2-Chloroethylvinylether	µg/kg	< 5	0.00		Acceptable	SW 8260B
4505	Chloroform	µg/kg	142	168	103 - 235	Acceptable	SW 8260B
4960	Chloromethane	µg/kg	< 5	0.00		Acceptable	SW 8260B
4570	1,2-Dibromo-3-chloropropane	µg/kg	111	145	59.1 - 223	Acceptable	SW 8260B
4535	1,2-Dibromoethane (EDB)	µg/kg	24.1	27.9	17.4 - 38.6	Acceptable	SW 8260B
4595	Dibromomethane	µg/kg	82.0	94.0	60.3 - 128	Acceptable	SW 8260B
4610	1,2-Dichlorobenzene	µg/kg	< 5	0.00		Acceptable	SW 8260B
4615	1,3-Dichlorobenzene	µg/kg	< 5	0.00		Acceptable	SW 8260B
4620	1,4-Dichlorobenzene	µg/kg	60.0	88.6	28.8 - 131	Acceptable	SW 8260B
4625	Dichlorodifluoromethane	µg/kg	< 5	0.00		Acceptable	SW 8260B
4630	1,1-Dichloroethane	µg/kg	188	191	106 - 280	Acceptable	SW 8260B
4635	1,2-Dichloroethane	µg/kg	130	178	104 - 248	Acceptable	SW 8260B
4640	1,1-Dichloroethylene	µg/kg	< 5	0.00		Acceptable	SW 8260B
4645	cis-1,2-Dichloroethylene	µg/kg	< 5	0.00		Acceptable	SW 8260B
4700	trans-1,2-Dichloroethylene	µg/kg	< 5	0.00		Acceptable	SW 8260B
4655	1,2-Dichloropropane	µg/kg	69.6	83.2	55.0 - 112	Acceptable	SW 8260B
4680	cis-1,3-Dichloropropylene	µg/kg	< 5	0.00		Acceptable	SW 8260B
4685	trans-1,3-Dichloropropylene	µg/kg	< 5	0.00		Acceptable	SW 8260B
4765	Ethylbenzene	µg/kg	162	189	106 - 274	Acceptable	SW 8260B
4860	2-Hexanone	µg/kg	< 5	< 10.0		Acceptable	SW 8260B
4975	Methylene chloride	µg/kg	79.4	86.7	27.0 - 143	Acceptable	SW 8260B
4995	4-Methyl-2-pentanone (MIBK)	µg/kg	91.5	119	38.1 - 178	Acceptable	SW 8260B
5100	Styrene	µg/kg	128	157	80.3 - 224	Acceptable	SW 8260B
5105	1,1,1,2-Tetrachloroethane	µg/kg	25.7	30.4	19.0 - 41.6	Acceptable	SW 8260B
5110	1,1,2,2-Tetrachloroethane	µg/kg	102	126	53.6 - 202	Acceptable	SW 8260B
5115	Tetrachloroethylene	µg/kg	< 5	0.00		Acceptable	SW 8260B
5140	Toluene	µg/kg	63.1	73.1	46.1 - 101	Acceptable	SW 8260B
5160	1,1,1-Trichloroethane	µg/kg	114	132	71.2 - 195	Acceptable	SW 8260B
5165	1,1,2-Trichloroethane	µg/kg	117	122	71.2 - 171	Acceptable	SW 8260B
5170	Trichloroethylene	µg/kg	< 5	0.00		Acceptable	SW 8260B

All analytes are included in ERA's A2LA accreditation. Lab Code: 1539-01

† Indicates analytes included in ERA's NIST/NVLAP accreditation. Lab Code 200386-0

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ENVIRONMENTAL RESOURCE ASSOCIATES®

SOIL-43 Final Complete Report

Donna J. McCarthy
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708-534-5200

EPA ID: IL00035
ERA Laboratory Code: T2661-14
Report Issued: 10/02/03
Study Dates: 07/28/03 - 09/11/03

Anal. No.	Analyte	Units	Reported Value	Assigned Value	Acceptance Limits	Performance Evaluation	Method Description
Volatiles in Soil (Cont.)							
5175	Trichlorofluoromethane	µg/kg	< 5	0.00		Acceptable	SW 8260B
5180	1,2,3-Trichloropropane	µg/kg	141	171	62.5 - 264	Acceptable	SW 8260B
5225	Vinyl acetate	µg/kg	< 5	0.00		Acceptable	SW 8260B
5235	Vinyl chloride	µg/kg	< 5	0.00		Acceptable	SW 8260B
5250	Total, Xylenes	µg/kg	236	275	148 - 392	Acceptable	SW 8260B
Herbicides in Soil							
8545	2,4-D	µg/kg	375	353	0.00 - 609	Acceptable	EPA 8151A
8555	Dalapon	µg/kg	< 330	0.00		Acceptable	EPA 8151A
8550	2,4-DB	µg/kg	< 330	0.00		Acceptable	EPA 8151A
8595	Dicamba	µg/kg	217	268	0.00 - 465	Acceptable	EPA 8151A
8620	Dinoseb	µg/kg	< 33	0.00		Acceptable	EPA 8151A
7780	MCPP	µg/kg		0.00			
6605	Pentachlorophenol	µg/kg	665	890	0.00 - 1350	Acceptable	EPA 8151A
8655	2,4,5-T	µg/kg	126	168	0.00 - 283	Acceptable	EPA 8151A
8650	2,4,5-TP (Silvex)	µg/kg	134	182	0.00 - 310	Acceptable	EPA 8151A
PCBs in Soil							
8880	Aroclor 1016	mg/kg	< 0.17	0.00		Acceptable	EPA 8082
8885	Aroclor 1221	mg/kg	< 0.17	0.00		Acceptable	EPA 8082
8890	Aroclor 1232	mg/kg	< 0.17	0.00		Acceptable	EPA 8082
8895	Aroclor 1242	mg/kg	< 0.17	0.00		Acceptable	EPA 8082
8900	Aroclor 1248	mg/kg	2.96	3.07	0.704 - 4.56	Acceptable	EPA 8082
8905	Aroclor 1254	mg/kg	< 0.17	0.00		Acceptable	EPA 8082
8910	Aroclor 1260	mg/kg	< 0.17	0.00		Acceptable	EPA 8082
Organophosphorus Pesticides in Soil							
7610	Diazinon	µg/kg		1910	0.00 - 2350		
8610	Dichlorvos (DDVP)	µg/kg		0.00			
8625	Disulfoton	µg/kg	184	389	0.00 - 389	Acceptable	EPA 8141A
7770	Malathion	µg/kg	1540	2200	360 - 2820	Acceptable	EPA 8141A
7985	Phorate	µg/kg	462	1080	206 - 1080	Acceptable	EPA 8141A
8110	Ronnel	µg/kg		1840	219 - 1940		
8200	Stirophos (tetrachlorovinphos)	µg/kg		1710	0.00 - 2160		

All analytes are included in ERA's A2LA accreditation. Lab Code: 1539-01
† Indicates analytes included in ERA's NIST/NVLAP accreditation. Lab Code 200386-0

NVLAP® Lab code: 200386-0

Clayton
GROUP SERVICES

ATTACHMENT 1-6

STL CHICAGO RESUMES OF KEY PERSONNEL

STL CHICAGO KEY PERSONNEL

STL prides itself on the quality of its personnel. The dedicated staff of experienced professional chemists and technicians is the key element in the laboratory's position as a leader in environmental analytical chemistry. The majority of the staff have a Bachelors Degree or higher in chemistry, biology, environmental science or another related field. The section immediately below describes the qualifications and experience of our key management personnel. An Organization Chart and Laboratory Personnel Experience Summary are provided in the attachment.

Laboratory Director, Michael J. Healy

Mr. Healy has a B.S. in Environmental Biology from Eastern Illinois University. He has 19+ years of environmental laboratory experience and is Laboratory Director for Severn Trent Laboratories-Chicago operation, responsible for this full-service laboratory in University Park, IL, generating yearly revenues in excess of $7.5M annually, while employing 75+ professionals. His extensive experience includes laboratory operations management project management, bench-level analysis and field sampling activities. Mr. Healy was previously Vice President and Operations Manager with Recra LabNet and the Analytics Division of Roy F. Weston.

Quality Manager, Terese A. Preston

Ms. Preston has a B.A. degree in Biology from Jamestown College, Jamestown, ND. Ms. Preston is STL Chicago's Quality Manager. She has been with the Chicago laboratory since 1984 and is experienced in environmental laboratory quality assurance practices, management, communications and analytical chemistry. Ms. Preston is responsible for the development and management of the laboratory's quality assurance program. She has considerable experience in preparing and implementing laboratory quality assurance and project specific plans, which include RI/FS and other projects for both the IEPA and U.S. EPA Region V contracts. She is an experienced laboratory data auditor, and performs contract and method compliance monitoring.

Project Manager, Richard C. Wright

Mr. Wright holds a M.S. in Environmental Science from Governors State University. He has been with the Chicago laboratory for 18 years and has considerable environmental laboratory experience. Mr. Wright oversees analytical projects for a variety of industrial, engineering and government clients. His experience includes laboratory project management; project pricing and proposal preparation; project methodology review; QAPP preparation; and sampling of groundwaters, soils, leachates and industrial waste streams. He has expertise in sampling requirements and the design of sampling plans, and previously managed the field sampling department.

Sample Receipt Manager, Jeffrey A. James

Mr. James holds a B.A. in Music Education from Eastern Illinois University. He has been with the Chicago laboratory since 1989. Mr. James previously served as a project manager for several large industrial programs, including NPDES, municipal and wastewater clients. He now manages the Sample Receipt Department. His expertise includes consultation on the most cost effective approaches for environmental sampling. His experience includes sampling of a variety of matrices, well development, combustible gas monitoring, and field data collection. He has extensive training in environmental health and safety procedures, and hazardous shipping. Mr. James previously served as Field Sampling Unit Leader, Bottle Project Unit Leader, Facility Manager, and Field Technician.

Clayton
GROUP SERVICES

ATTACHMENT 1-7

STL CHICAGO STANDARD OPERATING PROCEDURE

Sample Discrepancy Reports / Resubmitted Data Reports / Corrective Action Reports (SDR / RDR / CAR)

STL CHICAGO
LABORATORY STANDARD OPERATING PROCEDURE

SOP No.	Revision No.	Date	Page
UQA-029	07	09/26/03	1 of 13

TITLE: QUALITY ASSURANCE
Sample Discrepancy Reports / Resubmitted Data Reports / Corrective Action Reports (SDR / RDR / CAR)

Updated by:	Signature:	Date
Terese A. Preston Quality Manager	Terese A. Preston	9/25/03

Approved by:	Signature:	Date
Terese A. Preston Quality Manager	Terese A. Preston	9/25/03

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1.0 SCOPE / APPLICATION

This Standard Operating Procedure (SOP) describes the laboratory process for responding to client complaints, sample-related discrepancies, and analytical non-conformances. The reporting procedures used to document the issues, the resolution process and final approval of activities are described. These included: 1) A Sample Discrepancy Report (SDR) form, 2) Resubmitted Data Request (RDR) form and 3) Corrective Action Report (CAR) form. This SOP provides instructions for completing these forms.

2.0 DISCUSSION

The SDR, RDR and CAR are communication vehicles for documenting events and decisions. This documentation provides the laboratory with information in which to recreate the situation and understand the circumstances that led to the ultimate resolution. Review of these reports can be a diagnostic quality tool for measuring system or process performance.

An SDR is generated prior to the release of data to the client. It is applicable for any sample-related situation noted during sample receipt, sample analysis, and data reporting. The SDR is initiated either by the sample custodian, project manager (PM), data management personnel, section manager (SM), analyst, or Quality Assurance (QA) personnel. All information discrepancies associated with the sample Chain-of-Custody (COC) must be documented with an SDR.

The RDR is used after the client has received the analytical report and their specifications, expectations, or client satisfaction were not achieved. RDRs are prepared when clients request re-evaluation of submitted data, when additional information is requested or for client complaints, which require a formal response. The RDR is initiated either by project management (PM) or data management personnel, however, section managers, Quality Assurance (QA) or anyone with direct customer contact can initiate this process. An RDR may also be initiated by the laboratory when an error has been identified internally.

CARs are prepared prior to the reporting of the data for any quality-related non-conformance to requirements, excluding sample specific situations in which an SDR is completed. The CAR can be initiated by anyone, but is typically initiated by the analyst or QA. Typical 'non-conformance to requirements' documented with a CAR are:

- Analytical Quality Control criteria deviation
- Regulatory method deviation
- Laboratory policy or procedure deviation
- Certification/agency program requirement deviation

- Contract deviation

3.0 Sample Discrepancy Report

An SDR (Attachment 1), electronic SDR (U/Groups/Everyone/SDR_Template.doc), or email version (Attachment 2a) is initiated at the time the discrepancy is observed, prior to the release of sample data. The individual (Initiator) identifying the discrepancy completes the header information indicating the client, analyses, samples affected and project related information. The type of deficiency and an explanation of details are recorded, then the SDR is transferred to the PM for coordinating or approving an action plan. The PM may have to contact the client to develop an action plan or obtain client approval of the action plan recommended by the laboratory. If the PM is not available, submit the SDR to the QA department for assistance in formulating an action plan. It is critical that sufficient time be given to the PM to determine the best course of action to meet the client's needs. The laboratory must not lose sight of the ultimate 'end use' of the client's data. The SDR is composed of six (6) sections which are described further below.

3.1 Initiator

The initiator documents the SDR with his/her name, date of the occurrence, pertinent client, sample, and data deliverable information. The initiator, PM or data management section manager will complete the contact information for forwarding effective documents.

3.2 Type of Sample Discrepancy

In this section, the initiator typically checks off or describes the type of sample discrepancy and lists specific concerns. The initiator signs/dates this section of the SDR in recognition that all the information is complete and accurate to the best of their knowledge. Upon completion of this section, the PM is then given the SDR.

3.3 PM Establish Action Plan

The PM, with assistance from any of the operating sections and or QA, will develop an action plan and indicate the steps for resolution of the discrepancy. The required personnel and specific actions to be taken are listed on the SDR. Data management personnel will route the SDR to the appropriate people indicated for action plan responsibilities. Upon completion of the requested task, each person will initial and date the actions taken and route the package to the next department for which action is required.

3.4 PM Final Approval

Once all actions are completed and before the analytical report is delivered to the client, the PM will review the SDR, assuring that all actions were completed. If all corrective actions are acceptable, the PM will sign the 'Final Approval' section. The SDR is scanned for inclusion in the client data report if PM indicates such routing. The electronic file is stored on the LAN (T:/RepGen/Sent/JobNumber.pdf or JobNumberMisc.pdf).
The original SDR is then routed to the QA department.

3.5 Receipt of Copies

Sample Log-in or Data management personnel distribute copies of the SDR to those people indicated by the PM. All actions taken are to be documented on the original SDR. This routing occurs through the SM and PM signature baskets located in the data management section.

3.6 Quality Assurance (QA)

All completed SDRs are routed to the QA department after scanning for placement in the respective Job folder. SDRs can be periodically reviewed to help resolve systematic or recurring problems. Quality goals can be established and action plans implemented for the vital few recurring or systemic problems. Any SDR involving missed holding times (HTs) are, on a monthly basis, evaluated, and the information entered onto a missed HT tracking spreadsheet. This information is tabulated and summarized for inclusion in the monthly QA Reports. (U/Groups/Everyone/Holdtime.xls)

4.0 RESUBMITTED DATA REQUEST (RDRs)

RDRs are initiated for client requested review of data, requests for additional information or client complaints, which require a formal response (Attachment 2). The individual receiving the request completes the header information indicating the client samples affected and project related information. The type of deficiency and an explanation of the details are recorded. An action plan must be determined and clearly defined on the RDR. Depending on the nature of the problem, consultation with other sections such as project management, QA, data management, accounting, or operating sections may be needed to develop and approve an action plan. The RDR is composed of seven (7) sections, which are described further below.

An RDR may also take the form of an e-mail, (preferably the formatted electronic RDR - Attachment 2a) The request is typically initiated via e-mail by the client or data validator to the PM requesting a correction, additional information or clarification of data that was submitted. As with a paper RDR, an action plan must be determined and routed to appropriate personnel for completion. It is critical that the electronic request for data

correction clearly outlines the actions required and taken by the laboratory just as if the RDR Form were used.

An RDR tracking number must be assigned to each RDR at the time that it is initiated. The RDR Tracking sheet is located in the All Public directory on the LAN. (U\Groups\Everyone\RDR_Tracking.xls) The initiator of the RDR assigns the next available tracking number to the RDR prior to routing it for completion. All completed RDR's are turned into the data management section leader, who on a monthly basis insures that the RDR Tracking table is complete, and a completion date entered on the spreadsheet. A check is also performed to ensure that a pdf file exists for the each RDR located in its associated job number folder on the LAN (T/Groups/RepGen/Sent/Job NumberREV_.pdf). The revision and number is appended to the job number.

4.1 Initiator

The initiator documents the RDR with his/her name, date of the occurrence, pertinent client, sample, and data deliverable information and assigns a tracking number to it. The initiator, PM or data management section manager will complete the contact information for forwarding the completed response.

4.2 Type of Data Deficiency

In this section, the initiator describes the type of data deficiency and lists specific concerns in the 'Explanation of Details' section. The initiator signs/dates this section of the RDR to indicate who initiated it and recognition that all the information is complete and accurate to the best of their knowledge.

4.3 Action Plan

This section documents the 'action plan' developed by the PM, reporting staff, section manager, or QA for the deficiency previously identified in detail. The necessary personnel and detailed actions to be taken are listed. Upon completion of the requested task, each person will initial and date this section, attach any corrected item, and route it to the next person listed on the action plan. Please note that if the corrected item is to replace a page from the original report, the page number it is replacing needs to be written on the bottom right hand corner of the page. If it is to be added as an additional page, the page it is to follow in the original report is added to the page with a letter designation starting with 'A', 'B', etc. for as many pages as is necessary.

4.3.1 Data Management

The RDR tracking number is used to gauge the progress and turnaround time of the designated action plan. This tracking list is maintained by the data management section,

project management and QA and is available to all lab personnel on the laboratory's LAN. (U:/Groups/Everyone/RDR Tracking.xls) (Attachment 2b)
The data management section will assist in the routing of the RDR, which occurs through the Section Manager and PM signature baskets located in the data management section. They will also facilitate the submittal of the final product to the client and the documentation within LabNet how the data was submitted to the client in the form of Job Notes.

4.3.2 Project Manager (PM)

Once all actions are completed and before the report correction or other subsequent actions items are delivered to the client, the PM for the associated project will review the RDR, assuring that all actions were completed and then, if acceptable, will sign the 'Final Approval' section. The RDR and subsequent corrections are then scanned and stored electronically on the LAN (T:/RepGen/Sent/Job NumberREV_.pdf) with the identification of Job number followed by revision number.

4.3.3 Quality Assurance (QA)

Completed RDRs are routed to the QA department. RDRs are reviewed on a monthly basis. A summary and details of this review is included in the monthly QA report and is used to help resolve systematic or recurring problems. Quality goals can be established and action plans implemented for the vital few recurring or systemic problems.

5.0 CORRECTIVE ACTION REPORTS (CARs)

CARs are prepared for any quality related non-conformance to requirements other than sample specific client requirements, which should be addressed with an SDR. When CARs are initiated by the analyst or section manager, the form typically follows the example identified in Attachment 3. However, to expedite reporting, each laboratory section has specific formats to meet their needs and that contain the four basic reporting requirements.

CARs may be produced in a tabular or a custom format to deal with audit/assessment-identified non-conformance, or for other situations which identify more than a single non-conformance item. All corrective action reports will consist of four (4) basic elements. These are described further below.

5.1 Initiator

The initiator documents the CAR with his/her name, date of the occurrence, associated method or application and the client data that is directly affected by the non-conformance.

5.2 Description of the Non-conformance

The initiator details the type of non-conformance; lists specific concerns; and signs/dates this section of the CAR. This signature indicates that all the information is complete and accurate to the best of their knowledge. However, if the information is transmitted via e-mail, memo, or other format (i.e., tabular or audit report) indicating the initiator/date, then this information is sufficient and a signature is not required. The CAR may be routed for the development of an action plan to their immediate supervisor, when the situation is such that no clear guidance is listed in the associated method SOP.

5.3 Action Steps to Resolve the Non-Conformance

This section documents the "action plan" developed for the discrepancy or in the case of a request for response, such as an audit, this space may be blank and requested to be completed by an appropriate party. After resolution of the issue, the appropriate person will sign their response. However, if the information is transmitted via e-mail, memo, or other format (i.e., tabular or audit report) indicating the initiator/date, then this information is sufficient and a signature is not required.

5.4 Acknowledgment of Return-to-Control

In the case of an individual non-conformance, after all actions are complete, the analyst or supervisor will review the actions and document the return-to-control. If return-to-control has not been demonstrated, an SDR may be necessary to obtain further corrective action to meet specific project requirements. If the issue is a multiple non-conformance such as an audit report, the QA section or appropriate witness will assess the situation to assure that the corrective action has been effectively implemented.

6.0 PREVENTIVE ACTION

The quality assurance section uses various sources of information to determine preventive action measures. Proficiency Testing (PT) studies, CARs, SDRs, RDRs, internal and external audit reports, and other quality records are reviewed. Vital issues, suitable for preventive action recourse, can be determined by any laboratory staff member and submitted to the QA section.

The QA section summarizes vital issues in the monthly QA report. Potential corrective action steps are determined for the various vital issues and resources are directed to those issues which directly impact the quality of analytical data or laboratory services. The monthly quality assurance report is then distributed and submitted to laboratory management for review and acknowledgment of corrective and preventive measures to be taken.

The monthly QA report is also an information vehicle used to document the effectiveness of corrective actions, status of tasks and new vital issues. This vehicle provides a continuous improvement loop to ensure that the application of actions and controls are effective. Also, it implicitly enacts a plan-do-check-act process loop with regard to preventive as well as corrective actions.

Since monthly QA reports, as well as the preventive information sources, are subsequently reviewed and summarized in the Quality Systems Management Review (UQA-002), the ultimate effectiveness of the preventive action process is again reviewed on a broader time scale.

7.0 ATTACHMENTS

Attachment 1: Example: Sample Discrepancy Report (SDR) Form
Attachment 2: Example: Resubmitted Data Request (RDR) Form
Attachment 2a: Example: Electronic (e-mail) RDR and SDR
Attachment 2b: Example: RDR Tracking Sheet
Attachment 3: Example: Corrective Action Report (CAR) Form

Historical File:
Revision 00: 12/12/94
Revision 01: 04/10/96
Revision 02: 05/16/96
Revision 03: 02/24/98
Revision 04: 07/19/99
Revision 05: 08/07/00
Revision 06: 04/02/02
Revision 07: 09/25/03

Reasons for Change; Revision 07:

- Annual Review - Update to include current details regarding the creation, use and approval process of the SDRs, RDRs and CARs within the laboratory. Updated the formats for the SDR, RDR, electronic RDR/SDR, and RDR Tracking summary.

U:\QC\SOP\QA\SOP-029.DOC

Attachment 1.

Example: Sample Discrepancy Report (SDR) Form

STL Chicago
Sample Discrepancy Report (SDR)

Lab Job #:

Client: _____
Contact: _____
Project: _____
Phone #: _____
FAX #:

Analyses:
Matrix: Water Soil Other
Deliverable/Report Type: (circle)
Level: 1 2 3 4 Type: MDL'U' RL'U' ND
Other

1.a. Type of Sample Discrepancy COC received: Yes No Quote from PM: Yes No

COC / Sample				LOG-IN		Client		Unit	
	ID Discrepancy		Rec'd past hold time		Log-in past hold time		Changed Analyses		Analyzed past hold time
	Date Discrepancy		Improper Preserv.		Log-in Error		Improper bottle type		Missing sample/extract
	Incomplete		Missing sample/extract				Label unreadable		Insufficient sample
	Unreadable		Container broken				Insufficient sample		
	Cooler temp._____C		- sample lost						
	Quote Discrepancy		- suspect contamination						
			Bubbles in VOA vials						
									EDD

1.b. Lab ID (COC/Client ID) Deficiency/Discrepancy

Initiator sign: Date:

2.a. PM Establish Action Plan:

	Cancel		Bottle/jar replaced		Change Test Code from_____ to _____
	Add		Lid replaced		Change Due Date from_____ to _____
	Place on hold		Analyze samples		Include in Case Narrative
	Log-in		Analyze Past Hold		Amend EDD
	Subcontract		Preserve then Analyze		

2.b. Special Action:

Name:		Action Initiator Initial & Date:		Action Completion Initial & Date:	

3. Receipt of Copies: (INITIAL AND DATE)

1. GC	4. WC
2. GC/MS	5. Digestions
3. Metals	6. Extractions

Distribution and Copy to QA:

4. PM Final Approval of All Actions Taken:

_____ Send copy to Client

Signature: Date:

5. QA For Quality Measurement Only:

Final Distribution - pdf to job file and send original to QA

CHI-22-08-011/F-09/03

STL CHICAGO

Sample Discrepancy Report (SDR)

Lab Job #

Client _____
Contact _____
Project _____
Phone _____
Fax _____

Analyses _____

Matrix ☐ Water ☐ Soil ☐ Other _____

Deliverable **Level** ☐ 1 ☐ **2** ☐ **3** ☐ **4** ☐ MDL'U' ☐ RL'U' ☐ ND ☐ Other

COC Received: ☐ Yes ☐ No Quote from PM: ☐ Yes ☐ No

1A Type of Discrepancy

COC/Sample		LOG-IN	Client	Unit
☐ ID Discrepancy	☐ Rec'd past Hold Time	☐ Log-in past hold time	☐ Changed Analyses	☐ Analyzed past hold time
☐ Incomplete	☐ Improper Preservative	☐ Log-in error	☐ Improper Bottle Type	☐ Missing Sample/Extract
☐ Unreadable	☐ Missing Sample/Extract		☐ Label unreadable	☐ Insufficient Sample
☐ Cooler Temp. _____oC	☐ Container Broken		☐ Insufficient Sample	
☐ Quote Discrepancy	☐-Sample lost			
☐ Bubbles in VOA Vials	☐-Suspect Contamination			
☐ **Other** _____				☐ **EDD**

1B Lab ID COC/Client ID Description of Deficiency or Discrepancy

Initiator: | Date:

2A PM Established Action Plan

☐ Cancel	☐ Bottle/jar replaced	☐ Change Test code from: _____ To: _____
☐ Add	☐ Lid replaced	☐ Change due date from: _____ To: _____
☐ Place on Hold	☐ Analyze past hold time	☐ Include in case narrative
☐ Log-in	☐ Preserve then analyze	☐ Amend EDD
☐ Subcontract	☐ Analyze	☐ **Other** _____

2B

Name	Special Actions	Initiator Initial	Initiator Date	Completion Initial	Completion Date
1	1				
2					
3					
4					
5					
6					
7					
8					
9					

3 Distribution

☐ GC	☐ Wet Chem
☐ GC/MS	☐ Digestions
☐ Metals	☐ Extractions
☐ Distribution to QA	☐ **Other** _____

4 Final Approval of All Actions

☐ Send Copy to Client

Notes:

PM Signature:

Date:

Attachment 2.

Example: Resubmitted Data Request (RDR) Form

STL Chicago

Resubmitted Data Request (RDR)

Tracking No:

Date:	**Lab Lot #**	**Send Response to:**
	Analyses:	Name:
Client:		Address:
	Client ID#:	
Contact:	**Date Needed:**	
Project:	**Deliverable/Report Type (circle)**	Phone:
	Level: 1 2 3 4 Type: MDL'U' RL'U' ND	FAX:
	Other:	

1. Type of Data Deficiency:

2. Explanation of Details:

____ Missing Sample/Analysis

____ Wrong Sample Identification

____ Missing Pages

____ Calibration in Question

____ Results in Question

____ Holdtime Violation

____ Insufficient Data for Validation

____ Explanation of Analysis

____ EDD

____ Other

Initiator Signature: _____ Date: _____

3. Establish an Action Plan: (PM, SM, RG, QA)

4. Actions Completed:

Name:	Actions Required:	Initials:	Date:

6. Final Approval of All Actions Taken:

_____ Copy to Accounting for Invoice

PM Signature: _____ Date: _____

7. For Quality Improvement Measurement Only:

Final Distribution - pdf to job file and send original to QA

CHI-22-05-008/G-09/03

Attachment 2a.

Example:
Electronic (e-mail) Resubmitted Data Request (RDR) Format
Electronic (e-mail) Sample Discrepancy Report (SDR)

Resubmitted Data Request (RDR)

Client:
Contact:
Project:
Job:
RDR #:
Date:

Analysis in Question:
Explain Problem:

Date CA Needed:

Action Plan:

- Include whether changes in results should be PDF'd, HC sent, EDD updated.

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708-534-5200; 708-534-5211 fax; **rwright@stl-inc.com**

Sample Discrepancy Report (SDR)

Client:
Contact:
Project:
Job:
Date:

Deficiency/Discrepancy:

Action Plan:

-

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Attachment 2b.

Example: Resubmitted Data Request (RDR) Tracking Summary

STL Chicago

RDR Tracking Form-Active

Required Actions:	Check	Initials/Date	Additional Comments
Raw Data re-submittal Required			
Reprint Report			
Repint QC Report			
Revise Case Narrative			
Revise EDD			

RDR Tracking #	Date Initiated	Client	PM	Job Number	Unit of Error	Description of Error	Indicate (x) How Correction is to be Sent					Requested Due Date	Completion Date
							PDF	FAX	Hardcopy	EDD	Other		
1926													

Attachment 3.

Example: Corrective Action Report (CAR) Form

STL Chicago

Organics Corrective Action Report (CAR)

Test Code:_____ **Job #:**_____

Sample Matrix Resulted in:	Sample Prep. Information:	Analysis Information:
___ Florisil	___ Blown Hold Time	___ Initial Calibration
___ Acid	___ Smaller Sample Size	___ Retention Times Out
___ Mercury	___ Spiked Improperly	___ Cont. Calibration Out
___ Copper	___ Re-extraction Required	___ QC out of control
___ GPC	___ Other	___ Other (refer to Comments Section)
___ Dilution		
___ Other		

Comments:_____

_____ (Additional Comments on Back)

Action Required:_____

Follow Up:_____

Initiated By:_____ **Date:**_____ **Case Narrative Written By:**_____

Contributors:_____ **Date:** _____

_____ **Date:** _____

Approved:_____ **Date:**_____

CHI-22-17-010/C-1/99

Comments:

Clayton
GROUP SERVICES

ATTACHMENT 1-8

STL CHICAGO RESULTS OF LATEST MDL STUDIES

STL Chicago
GC/MS Volatiles - MDL Study 2003
Method: SW846-8260B (25 mL purge volume)
Matrix: Water

CHI-22-09-169.O-08/03

Compound	Cas #	Report Limit ug/L	**Highest Instr. MDL ug/L**	Std. Conc. ug/L	08/05/2003 Instr. 03 MDL ug/L	04/20/2003 Instr. 09 MDL ug/L
1,1,1,2-Tetrachloroethane	630-20-6	1.0	0.095	0.5	0.095	0.047
1,1,1-Trichloroethane	71-55-6	1.0	0.079	0.5	0.079	0.036
1,1,2,2-Tetrachloroethane	79-34-5	1.0	0.093	0.5	0.093	0.066
1,1,2-Trichloroethane	79-00-5	1.0	0.15	0.5	0.150	0.042
1,1-Dichloroethane	75-34-3	1.0	0.11	0.5	0.107	0.053
1,1-Dichloroethene	75-35-4	1.0	0.12	0.5	0.119	0.038
1,1-Dichloropropene	563-58-6	1.0	0.11	0.5	0.103	0.110
1,2,3-Trichlorobenzene	87-61-6	1.0	0.16	0.5	0.159	0.117
1,2,3-Trichloropropane	96-18-4	1.0	0.13	0.5	0.131	0.116
1,2,4-Trichlorobenzene	120-82-1	1.0	0.13	0.5	0.117	0.131
1,2,4-Trimethylbenzene	95-63-6	1.0	0.073	0.5	0.073	0.045
1,2-Dibromo-3-chloropropane	96-12-8	1.0	0.19	0.5	0.159	0.193
1,2-Dibromoethane (EDB)	106-93-4	1.0	0.13	0.5	0.130	0.045
1,2-Dichlorobenzene	95-50-1	1.0	0.12	0.5	0.117	0.060
1,2-Dichloroethane	107-06-2	1.0	0.093	0.5	0.093	0.052
1,2-Dichloroethene (total)	540-59-0	1.0	0.23	1.0	0.227	0.103
1,2-Dichloropropane	78-87-5	1.0	0.12	0.5	0.120	0.082
1,3,5-Trichlorobenzene	108-70-3	1.0	0.22	0.5	0.072	0.215
1,3,5-Trimethylbenzene	108-67-8	1.0	0.085	0.5	0.085	0.033
1,3-Butadiene		1.0	0.30	1.0	0.172	0.296
1,3-Dichlorobenzene	541-73-1	1.0	0.088	0.5	0.087	0.088
1,3-Dichloropropane	142-28-9	1.0	0.087	0.5	0.087	0.051
1,4-Dichlorobenzene	106-46-7	1.0	0.13	0.5	0.127	0.043
1-Chlorohexane	544-10-5	1.0	0.10	0.5	0.100	0.067
2,2-Dichloropropane	594-20-7	1.0	0.14	0.5	0.144	0.045
2-Butanone (MEK)	78-93-3	5.0	1.2	2.0	0.713	1.20
2-Chloro-1,3-butadiene (chloropren	126-99-8	1.0	0.13	0.5	0.061	0.126
2-Chloroethylvinylether	110-75-8	2.0	1.4	2.0	0.51	1.38
2-Chlorotoluene	95-49-8	1.0	0.11	0.5	0.110	0.086
2-Hexanone	591-78-6	5.0	0.53	2.0	0.402	0.533
2-Methylnaphthalene		1.0	0.57	0.5	0.572	0.412
2-Nitropropane		100	15.6	80.0	5.02	15.56
3-Chloropropene (Allyl Chloride)	107-05-1	2.0	0.26	2	0.170	0.258
4-Chlorotoluene	106-43-4	1.0	0.082	0.5	0.064	0.082
4-Methyl-2-pentanone (MIBK)	108-10-1	5.0	0.65	2.0	0.646	0.322
Acetone	67-64-1	5.0	1.8	2.0	0.586	1.80
Acetonitrile	75-05-8	40	6.7	16	6.70	5.22
Acrolein	107-02-8	200	14.3	80	14.32	4.29
Acrylonitrile	107-13-1	40	4.3	16	4.33	1.12
Benzene	71-43-2	1.0	0.089	0.5	0.089	0.058
Bromobenzene	108-86-1	1.0	0.12	0.5	0.123	0.060
Bromochloromethane	74-97-5	1.0	0.097	0.5	0.097	0.059
Bromodichloromethane	75-27-4	1.0	0.11	0.5	0.113	0.044
Bromoform	75-25-2	1.0	0.11	0.5	0.106	0.051
Bromomethane	74-83-9	1.0	0.10	0.5	0.074	0.102
Carbon disulfide	75-15-0	5.0	0.20	2.0	0.204	0.140
Carbon tetrachloride	56-23-5	1.0	0.13	0.5	0.134	0.122
Chlorobenzene	108-90-7	1.0	0.075	0.5	0.075	0.036
Chloroethane	75-00-3	1.0	0.08	0.5	0.077	0.080
Chloroform	67-66-3	1.0	0.11	0.5	0.115	0.052
Chloromethane	74-87-3	1.0	0.08	0.5	0.080	0.062
cis-1,2-Dichloroethene	156-59-2	1.0	0.09	0.5	0.088	0.061
cis-1,3-Dichloropropene	10061-01-5	1.0	0.12	0.5	0.122	0.032
Crotononitrile	4786-20-3	40		16		

STL Chicago
GC/MS Volatiles - MDL Study 2003
Method: SW846-8260B (25 mL purge volume)
Matrix: Water

Compound	Cas #	Report Limit ug/L	**Highest Instr. MDL ug/L**	Std. Conc. ug/L	08/05/2003 Instr. 03 MDL ug/L	04/20/2003 Instr. 09 MDL ug/L
Cyclohexane		1.0	0.11	0.5	0.071	0.112
Cyclohexanone		100	56.1	80.0	55.25	56.15
Dibromochloromethane	124-48-1	1.0	0.063	0.5	0.063	0.056
Dibromomethane	74-95-3	1.0	0.14	0.5	0.145	0.070
Dichlorodifluoromethane	75-71-8	1.0	0.15	0.5	0.154	0.100
Ethyl acetate	141-78-6	5.0	1.9	5	1.713	1.947
Ethyl ether	60-29-7	1.0	0.16	0.5	0.138	0.157
Ethylbenzene	100-41-4	1.0	0.066	0.5	0.065	0.066
Ethylmethacrylate	97-63-2	2.0	0.38	2	0.267	0.376
Heptane	142-82-5	1.0	0.10	0.5	0.092	0.102
Hexachlorobutadiene	87-68-3	1.0	0.14	0.5	0.135	0.106
Hexane	110-54-3	1.0	0.22	0.5	0.088	0.223
Iodomethane	74-88-4	2.0	0.52	2.0	0.416	0.524
Isobutyl alcohol	78-83-1	100	28.7	100	18.75	28.66
Isopropyl ether	108-20-3	1.0	0.21	0.5	0.065	0.212
Isopropylbenzene	98-82-8	1.0	0.081	0.5	0.081	0.034
Methacrylonitrile	126-98-7	2.0	0.93	2	0.931	0.841
Methyl acetate		1.0	0.49	0.5	0.422	0.491
Methyl cyclohexane		1.0	0.090	0.5	0.072	0.090
Methylene chloride	75-09-2	1.0	0.35	0.5	0.248	0.347
Methylmethacrylate	80-62-6	2.0	0.42	2.0	0.420	0.300
Methyl-tert-butyl-ether (MTBE)	1634-04-4	1.0	0.14	0.5	0.139	0.052
Naphthalene	91-20-3	1.0	0.35	0.5	0.350	0.161
n-Butyl alcohol (1-Butanol)		100	19.1	80.0	17.59	19.12
n-Butylbenzene	104-51-8	1.0	0.089	0.5	0.089	0.074
n-Propylbenzene	103-65-1	1.0	0.078	0.5	0.078	0.042
o-Xylene	95-47-6	1.0	0.083	0.5	0.083	0.046
p,m-Xylene	000-00-0	2.0	0.18	1.0	0.179	0.094
Pentachloroethane	76-01-7	2.0	0.14	2.0	0.144	
p-Isopropyltoluene	99-87-6	1.0	0.079	0.5	0.079	0.043
Propionitrile	107-12-0	40	4.2	16	4.16	1.86
sec-Butylbenzene	135-98-8	1.0	0.074	0.5	0.074	0.051
Styrene	100-42-5	1.0	0.13	0.5	0.129	0.048
tert-Butylbenzene	98-06-6	1.0	0.082	0.5	0.082	0.056
Tetrachloroethene	127-18-4	1.0	0.093	0.5	0.093	0.052
Tetrahydrofuran	109-99-9	5.0	1.5	5.0	1.51	0.85
Toluene	108-88-3	1.0	0.10	0.5	0.102	0.051
trans-1,2-Dichloroethene	156-60-5	1.0	0.14	0.5	0.142	0.050
trans-1,3-Dichloropropene	10061-02-6	1.0	0.15	0.5	0.154	0.051
trans-1,4-Dichoro-2-butene	110-57-6	2.0	0.57	2.0	0.384	0.573
Trichloroethene	79-01-6	1.0	0.10	0.5	0.102	0.027
Trichlorofluoromethane	75-69-4	1.0	0.11	0.5	0.106	0.051
Trichlorotrifluoroethane	76-13-1	1.0	0.11	0.5	0.111	0.053
Vinyl acetate	108-05-4	5.0	0.69	2.0	0.694	0.306
Vinyl chloride	75-01-4	1.0	0.08	0.5	0.081	0.056
Xylene (total)	1330-20-7	1.0	0.28	1.5	0.278	0.137
Dichlorofluoromethane		1.0	0.10	0.50	0.10	

STL Chicago
GC/MS Volatiles - MDL Summary Table 2003
Method: SW846-8260B
Matrix: Soil

(5973)

Compound	Cas #	Report Limit ug/kg	**Highest Instr. MDL** ug/kg	Std. Conc. ug/kg	02/04/2003 Instr. 06 MDL ug/kg	04/17/2003 Instr. 07 MDL ug/kg	04/21/2003 Instr. 09 MDL ug/kg	04/01/2003 Instr. 16 MDL ug/kg	02/03/2003 Instr. 17 MDL ug/kg
1,1,1,2-Tetrachloroethane	630-20-6	5	1.10	5	0.37	0.48	0.16	1.10	
1,1,1-Trichloroethane	71-55-6	5	1.13	5	0.41	0.50	0.28	1.13	
1,1,2,2-Tetrachloroethane	79-34-5	5	0.96	5	0.50	0.64	0.25	0.96	
1,1,2-Trichloroethane	79-00-5	5	1.06	5	0.20	0.68	0.44	1.06	
1,1-Dichloroethane	75-34-3	5	1.02	5	0.35	0.46	0.22	1.02	
1,1-Dichloroethene	75-35-4	5	1.29	5	0.28	0.46	0.40	1.29	
1,1-Dichloropropene	563-58-6	5	1.24	5	0.32	0.73	0.38	1.24	
1,2,3-Trichlorobenzene	87-61-6	5	1.50	5	0.51	0.64	0.51	1.50	
1,2,3-Trichloropropane	96-18-4	5	1.10	5	0.40	0.77	0.30	1.10	
1,2,4-Trichlorobenzene	120-82-1	5	1.35	5	0.68	0.75	0.49	1.35	
1,2,4-Trimethylbenzene	95-63-6	5	1.35	5	0.42	0.57	0.27	1.35	0.76
1,2-Dibromo-3-chloropropane	96-12-8	5	1.18	5	0.63	0.79	0.38	1.18	
1,2-Dibromoethane (EDB)	106-93-4	5	0.82	5	0.33	0.66	0.26	0.82	
1,2-Dichlorobenzene	95-50-1	5	1.31	5	0.32	0.65	0.27	1.31	
1,2-Dichloroethane	107-06-2	5	0.94	5	0.26	0.59	0.24	0.94	
1,2-Dichloroethene (total)	540-59-0	5	2.08	10	0.71	0.96	0.62	2.08	
1,2-Dichloropropane	78-87-5	5	1.04	5	0.25	0.57	0.40	1.04	
1,3,5-Trichlorobenzene	108-70-3	5	1.90	5	1.31	1.65	0.68	1.90	
1,3,5-Trimethylbenzene	108-67-8	5	1.27	5	0.37	0.56	0.19	1.27	0.77
1,3-Butadiene		5	1.10	5	0.52	1.10	0.42	0.90	
1,3-Dichlorobenzene	541-73-1	5	1.24	5	0.30	0.77	0.39	1.24	
1,3-Dichloropropane	142-28-9	5	0.94	5	0.35	0.57	0.21	0.94	
1,4-Dichlorobenzene	106-46-7	5	1.21	5	0.31	0.60	0.44	1.21	
1-Chlorohexane	544-10-5	5	1.14	5	0.48	0.55	0.18	1.14	
2,2-Dichloropropane	594-20-7	5	0.92	5	0.12	0.49	0.39	0.92	
2-Butanone (MEK)	78-93-3	5	3.91	5	1.42	1.65	3.91	1.26	
2-Chloro-1,3-butadiene (chloroprene)	126-99-8	5	0.72	5	0.59	0.62	0.22	0.72	
2-Chloroethylvinylether	110-75-8	5	1.02	5	0.36		0.73	1.02	
2-Chlorotoluene	95-49-8	5	1.26	5	0.41	0.63	0.46	1.26	
2-Hexanone	591-78-6	5	1.14	5	0.98	1.14	1.07	0.84	
2-Methylnaphthalene		5	2.51	5		2.51	0.76	2.29	
2-Nitropropane		400	81.3	400	45.75	60.59	53.03	81.31	
3-Chloropropene (Allyl Chloride)	107-05-1	10	2.40	10	1.53	2.40	1.32	2.03	
4-Chlorotoluene	106-43-4	5	1.28	5	0.37	0.58	0.53	1.28	
4-Methyl-2-pentanone (MIBK)	108-10-1	5	1.01	5	0.44	0.95	0.61	1.01	
Acetone	67-64-1	5	4.63	5	3.50	1.34	4.63	4.15	
Acetonitrile	75-05-8	40	11.7	40	4.54	11.70	6.32	10.56	
Acrolein	107-02-8	200	38.6	200	20.67	27.08	11.35	38.59	
Acrylonitrile	107-13-1	40	7.97	40	4.45	6.56	3.23	7.97	
Benzene	71-43-2	5	1.10	5	0.12	0.62	0.29	1.10	0.63
Bromobenzene	108-86-1	5	1.01	5	0.44	0.50	0.21	1.01	
Bromochloromethane	74-97-5	5	1.14	5	0.34	0.66	0.20	1.14	
Bromodichloromethane	75-27-4	5	0.96	5	0.17	0.56	0.28	0.96	
Bromoform	75-25-2	5	0.75	5	0.50	0.60	0.29	0.75	
Bromomethane	74-83-9	5	1.26	5	1.08	0.86	0.60	1.26	
Carbon disulfide	75-15-0	5	1.20	5	0.24	0.41	0.27	1.20	
Carbon tetrachloride	56-23-5	5	1.05	5	0.38	0.76	0.76	1.05	
Chlorobenzene	108-90-7	5	1.13	5	0.45	0.53	0.25	1.13	
Chloroethane	75-00-3	5	1.01	5	0.99	1.01	0.37	0.95	
Chloroform	67-66-3	5	1.06	5	0.25	0.50	0.19	1.06	
Chloromethane	74-87-3	5	1.05	5	0.40	0.54	0.43	1.05	
cis-1,2-Dichloroethene	156-59-2	5	1.07	5	0.35	0.45	0.26	1.07	
cis-1,3-Dichloropropene	10061-01-5	5	0.93	5	0.27	0.52	0.25	0.93	

STL Chicago
GC/MS Volatiles - MDL Summary Table 2003
Method: SW846-8260B
Matrix: Soil

Compound	Cas #	Report Limit ug/kg	**Highest Instr. MDL** ug/kg	Std. Conc. ug/kg	(5973) 02/04/2003 Instr. 06 MDL ug/kg	04/17/2003 Instr. 07 MDL ug/kg	04/21/2003 Instr. 09 MDL ug/kg	04/01/2003 Instr. 16 MDL ug/kg	02/03/2003 Instr. 17 MDL ug/kg
Crotononitrile	4786-20-3	40		40					
Cyclohexane		5	0.94	5	0.53	0.83	0.28	0.94	
Cyclohexanone		400	298.6	400	200.38	125.87	84.84	298.62	
Dibromochloromethane	124-48-1	5	0.79	5	0.20	0.52	0.20	0.79	
Dibromomethane	74-95-3	5	1.11	5	0.29	0.67	0.31	1.11	
Dichlorodifluoromethane	75-71-8	5	0.73	5	0.31	0.55	0.45	0.73	
Ethyl acetate	141-78-6	50	12.1	50	5.52	11.79	9.64	12.14	
Ethyl ether	60-29-7	5	0.82	5	0.39	0.82	0.33	0.56	
Ethylbenzene	100-41-4	5	1.11	5	0.41	0.49	0.27	1.11	0.71
Ethylmethacrylate	97-63-2	10	2.20	10	1.01	1.50	1.26	2.20	
Heptane	142-82-5	5	1.63	5	0.54	1.63	0.32	0.91	
Hexachlorobutadiene	87-68-3	5	1.42	5	1.04	0.62	0.35	1.42	
Hexane	110-54-3	5	1.24	5	0.55	1.24	0.47	0.90	
Iodomethane	74-88-4	10	4.74	10	4.74	1.71	1.01	2.11	
Isobutyl alcohol	78-83-1	400	141.0	400	39.24	83.80	61.00	141.03	
Isopropyl ether	108-20-3	5	0.60	5	0.35	0.60	0.19	0.57	
Isopropylbenzene	98-82-8	5	1.14	5	0.35	0.52	0.15	1.14	
Methacrylonitrile	126-98-7	10	4.22	10	1.02	4.22	2.05	2.17	
Methyl acetate		5	1.42	5	0.55	1.42	0.62	1.13	
Methyl cyclohexane		5	1.06	5	0.69	1.06	0.16	0.99	
Methylene chloride	75-09-2	5	2.90	5	0.44	1.91	2.90	1.99	
Methylmethacrylate	80-62-6	10	4.46	10	1.72	4.46	1.48	2.33	
Methyl-tert-butyl-ether (MTBE)	1634-04-4	5	1.04	5	0.16	0.61	0.34	1.04	0.70
Naphthalene	91-20-3	5	1.29	5	0.34	0.69	0.31	1.29	0.75
n-Butyl alcohol (1-Butanol)		400	114.5	400	99.87	53.29	63.03	114.46	
n-Butylbenzene	104-51-8	5	1.26	5	0.56	0.64	0.42	1.26	
n-Propylbenzene	103-65-1	5	1.25	5	0.47	0.54	0.43	1.25	
o-Xylene	95-47-6	5	1.11	5	0.31	0.49	0.22	1.11	0.67
p,m-Xylenes	000-00-0	10	2.31	10	0.53	1.05	0.46	2.31	1.39
Pentachloroethane	76-01-7	10	1.79	10	1.79	1.50	1.25	1.77	
p-Isopropyltoluene	99-87-6	5	1.27	5	0.52	0.55	0.31	1.27	
Propionitrile	107-12-0	40	9.60	40	6.59	9.60	6.44	8.43	
sec-Butylbenzene	135-98-8	5	1.24	5	0.55	0.56	0.25	1.24	
Styrene	100-42-5	5	1.07	5	0.35	0.56	0.27	1.07	0.64
tert-Butylbenzene	98-06-6	5	1.18	5	0.50	0.58	0.18	1.18	
Tetrachloroethene	127-18-4	5	1.18	5	0.32	0.56	0.20	1.18	
Tetrahydrofuran	109-99-9	5	1.90	5	1.90	1.70	0.69	1.32	
Toluene	108-88-3	5	1.12	5	0.35	0.60	0.34	1.12	0.70
trans-1,2-Dichloroethene	156-60-5	5	1.05	5	0.46	0.53	0.42	1.05	
trans-1,3-Dichloropropene	10061-02-6	5	0.79	5	0.34	0.57	0.32	0.79	
trans-1,4-Dichloro-2-butene	110-57-6	10	3.29	10	2.01	3.29	1.48	2.53	
Trichloroethene	79-01-6	5	1.13	5	0.31	0.65	0.31	1.13	
Trichlorofluoromethane	75-69-4	5	1.41	5	0.34	0.40	0.32	1.41	
Trichlorotrifluoroethane	76-13-1	5	1.32	5	0.32	0.43	0.34	1.32	
Vinyl acetate	108-05-4	5	0.83	5	0.41	0.77	0.34	0.83	
Vinyl chloride	75-01-4	5	1.06	5	0.24	0.45	0.45	1.06	
Xylenes (total)	1330-20-7	5	3.40	15	0.70	1.54	0.69	3.40	2.04

STL Chicago
GC/MS Volatiles - MDL Summary Table 2003
Method: SW846-8260B: 5035-High (Methanol Extraction)
Matrix: Soil

Compound	Cas #	MB/LCS Report Limit ug/kg	SMP/EB1 Report Limit ug/kg	**Highest Instr. MDL ug/kg**	Std. Conc. ug/kg	09/03/2003 Instr. 06 MDL ug/kg	04/07/2003 Instr. 16 MDL ug/kg	07/22/2003 Instr. 17 MDL ug/kg
1,1,1,2-Tetrachloroethane	630-20-6	2.0	100	19.0	100	19.0	15.8	
1,1,1-Trichloroethane	71-55-6	2.0	100	23.0	100	23.0	16.0	
1,1,2,2-Tetrachloroethane	79-34-5	2.0	100	27.2	100	18.7	27.2	
1,1,2-Trichloroethane	79-00-5	2.0	100	21.8	100	21.8	12.4	
1,1-Dichloroethane	75-34-3	2.0	100	21.9	100	21.9	14.5	
1,1-Dichloroethene	75-35-4	2.0	100	28.9	100	28.9	20.1	
1,1-Dichloropropene	563-58-6	2.0	100	18.9	100	18.9	17.4	
1,2,3-Trichlorobenzene	87-61-6	2.0	100	78.9	100	34.8	78.9	
1,2,3-Trichloropropane	96-18-4	2.0	100	31.5	100	31.5	30.7	
1,2,4-Trichlorobenzene	120-82-1	2.0	100	57.3	100	35.7	57.3	
1,2,4-Trimethylbenzene	95-63-6	2.0	100	26.4	100	24.7	26.4	16.9
1,2-Dibromo-3-chloropropane	96-12-8	2.0	100	60.5	100	35.0	60.5	
1,2-Dibromoethane (EDB)	106-93-4	2.0	100	28.0	100	28.0	17.1	
1,2-Dichlorobenzene	95-50-1	2.0	100	33.3	100	19.5	33.3	
1,2-Dichloroethane	107-06-2	2.0	100	24.1	100	24.1	11.2	
1,2-Dichloroethene (total)	540-59-0	4.0	200	38.8	200	38.8	31.4	
1,2-Dichloropropane	78-87-5	2.0	100	30.6	100	30.6	13.6	
1,3,5-Trimethylbenzene	108-67-8	2.0	100	25.6	100	21.3	25.6	17.6
1,3-Dichlorobenzene	541-73-1	2.0	100	32.9	100	32.9	32.5	
1,3-Dichloropropane	142-28-9	2.0	100	20.0	100	20.0	18.0	
1,4-Dichlorobenzene	106-46-7	2.0	100	35.6	100	21.9	35.6	
1-Chlorohexane	544-10-5	2.0	100	26.7	100	26.7	15.6	
2,2-Dichloropropane	594-20-7	2.0	100	19.0	100	19.0	15.2	
2-Butanone	78-93-3	2.0	100	42.1	100	42.1	21.9	
2-Chloroethylvinylether	110-75-8	2.0	100	42.5	100	42.5	17.4	
2-Chlorotoluene	95-49-8	2.0	100	27.4	100	27.4	24.9	
2-Hexanone	591-78-6	2.0	100	42.6	100	42.6	30.5	
4-Chlorotoluene	106-43-4	2.0	100	28.4	100	15.9	28.4	
4-Methyl-2-pentanone	108-10-1	2.0	100	37.8	100	37.8	14.1	
Acetone	67-64-1	4.0	200	165.5	100	35.7	165.5	
Acetonitrile	75-05-8	16	800	800.6	800	800.6	509.2	
Acrolein	107-02-8	80	4000	853.0	4000	853.0	775.5	
Acrylonitrile	107-13-1	16	800	155.8	800	155.8	127.0	
Benzene	71-43-2	2.0	25	15.7	100	13.4	15.7	13.8
Bromobenzene	108-86-1	2.0	100	25.4	100	25.1	25.4	
Bromochloromethane	74-97-5	2.0	100	26.5	100	19.1	26.5	
Bromodichloromethane	75-27-4	2.0	100	16.8	100	16.8	12.3	
Bromoform	75-25-2	2.0	100	22.7	100	17.8	22.7	
Bromomethane	74-83-9	2.0	100	43.8	100	22.3	43.8	
Carbon Disulfide	75-15-0	2.0	100	21.1	100	21.1	17.0	
Carbon Tetrachloride	56-23-5	2.0	100	16.3	100	16.3	14.4	
Chlorobenzene	108-90-7	2.0	100	21.3	100	21.3	18.1	
Chloroethane	75-00-3	2.0	100	37.9	100	32.4	37.9	
Chloroform	67-66-3	2.0	100	25.6	100	25.6	15.1	
Chloromethane	74-87-3	2.0	100	25.1	100	22.0	25.1	
cis-1,2-Dichloroethene	156-59-2	2.0	100	24.5	100	24.5	15.4	
cis-1,3-Dichloropropene	10061-01-5	2.0	100	17.6	100	15.2	17.6	
Dibromochloromethane	124-48-1	2.0	100	20.7	100	20.7	17.7	
Dibromomethane	74-95-3	2.0	100	55.1	100	55.1	15.4	
Dichlorodifluoromethane	75-71-8	2.0	100	25.2	100	18.3	25.2	
Ethylbenzene	100-41-4	2.0	25	23.2	100	23.2	22.9	17.1
Hexachlorobutadiene	87-68-3	2.0	100	43.4	100	39.3	43.4	
Isopropylbenzene	98-82-8	2.0	100	22.0	100	17.8	22.0	
m&p-Xylenes	000-00-0	4.0	50	41.0	200	38.0	41.0	29.5
Methylene Chloride	75-09-2	2.0	100	88.8	100	79.5	88.8	
Methyl-tert-butyl ether	1634-04-4	2.0	100	16.4	100	16.4	12.8	15.0

STL Chicago
GC/MS Volatiles - MDL Summary Table 2003
Method: SW846-8260B 5035-High (Methanol Extraction)
Matrix: Soil

Compound	Cas #	MB/LCS Report Limit ug/kg	SMP/EB1 Report Limit ug/kg	**Highest Instr. MDL** ug/kg	Std. Conc. ug/kg	09/03/2003 Instr. 06 MDL ug/kg	04/07/2003 Instr. 16 MDL ug/kg	07/22/2003 Instr. 17 MDL ug/kg
Naphthalene	91-20-3	2.0	100	77.3	100	26.9	77.3	32.5
n-Butylbenzene	104-51-8	2.0	100	32.8	100	30.3	32.8	
n-Propylbenzene	103-65-1	2.0	100	22.6	100	20.9	22.6	
o-Xylene	95-47-6	2.0	25	18.3	100	14.7	18.3	14.8
p-Isopropyltoluene	99-87-6	2.0	100	28.7	100	24.6	28.7	
Propionitrile	107-12-0	16	800	280.5	800	280.5	171.3	
sec-Butylbenzene	135-98-8	2.0	100	27.9	100	19.3	27.9	
Styrene	100-42-5	2.0	100	19.0	100	19.0	18.2	14.5
tert-Butylbenzene	98-06-6	2.0	100	25.7	100	21.0	25.7	
Tetrachloroethene	127-18-4	2.0	100	33.5	100	33.5	22.7	
Tetrahydrofuran	109-99-9	2.0	100	94.1	100	94.1	38.9	
Toluene	108-88-3	2.0	25	19.8	100		19.8	15.8
trans-1,2-Dichloroethene	156-60-5	2.0	100	17.1	100	16.7	17.1	
trans-1,3-Dichloropropene	10061-02-6	2.0	100	16.7	100	13.6	16.7	
Trichloroethene	79-01-6	5.0	100	44.8	100	37.6	44.8	
Trichlorofluoromethane	75-69-4	2.0	100	21.7	100	21.7	20.5	
Trichlorotrifluoroethane	76-13-1	2.0	100	82.3	100	18.5	82.3	
Vinyl acetate	108-05-4	2.0	100	23.1	100	23.1	14.7	
Vinyl chloride	75-01-4	2.0	100	25.6	100	10.9	25.6	
Xylene (total)	1330-20-7	2.0	75	59.3	300	54.0	59.3	44.8

ATTACHMENT 1-9

EXAMPLE OF STL CHICAGO ANALYTICAL REPORT

SEVERN TRENT LABORATORIES
ANALYTICAL REPORT

JOB NUMBER: 214010

Prepared For:

Project:

Attention:

Date: 04/03/2003

Signature

Date

Name: Eric A. Lang

Title: Project Manager

E-Mail: elang@stl-inc.com

STL Chicago
2417 Bond Street
University Park, IL 60466

PHONE: (708) 534-5200
FAX..: (708) 534-5211

STL Chicago is part of Severn Trent Laboratories, Inc.

SAMPLE INFORMATION
Date: 04/03/2003

Job Number.: 214010
Customer...:
Attn.....:

Project Number.....: 20001792
Customer Project ID....:
Project Description....:

Laboratory Sample ID	Customer Sample ID	Sample Matrix	Date Sampled	Time Sampled	Date Received	Time Received
214010-1	MW45S	Water	12/10/2002	08:00	12/10/2002	12:00
214010-2	TRIP BLANK	Water	12/10/2002	08:00	12/10/2002	12:00

STL Chicago is part of Severn Trent Laboratories, Inc.

LABORATORY TEST RESULTS

Job Number: 214010

Date:04/03/2003

CUSTOMER:

PROJECT:

ATTN:

Customer Sample ID: MW45S
Date Sampled.....: 12/10/2002
Time Sampled.....: 08:00
Sample Matrix.....: Water

Laboratory Sample ID: 214010-1
Date Received.....: 12/10/2002
Time Received.....: 12:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	RL	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH
8015M WIDRO	TPH - Diesel Range Organics (WI-DRO)											
	Diesel Range Organics (DRO)	0.40			0.030	0.10	1.00000	mg/L	71824		12/14/02 0527	mgk
8015M WIGRO	TPH - Gasoline Range Organics (WI-GRO)											
	Gasoline Range Organics (GRO)	30	U		12	30	1.00000	ug/L	72438		12/11/02 0811	dpk
8270C	Semivolatile Organics											
	n-Nitrosodimethylamine	9.9	U		4.7	9.9	1.00000	ug/L	72368		12/20/02 2203	da
	Pyridine	20	U		3.8	20	1.00000	ug/L	72368		12/20/02 2203	da
	Aniline	9.9	U		3.0	9.9	1.00000	ug/L	72368		12/20/02 2203	da
	Phenol	9.9	U		3.8	9.9	1.00000	ug/L	72368		12/20/02 2203	da
	Bis(2-chloroethyl)ether	9.9	U		4.8	9.9	1.00000	ug/L	72368		12/20/02 2203	da
	1,3-Dichlorobenzene	9.9	U		5.6	9.9	1.00000	ug/L	72368		12/20/02 2203	da
	1,4-Dichlorobenzene	9.9	U		5.7	9.9	1.00000	ug/L	72368		12/20/02 2203	da
	1,2-Dichlorobenzene	9.9	U		5.3	9.9	1.00000	ug/L	72368		12/20/02 2203	da
	Benzyl alcohol	9.9	U		4.7	9.9	1.00000	ug/L	72368		12/20/02 2203	da
	2-Methylphenol (o-cresol)	9.9	U		5.0	9.9	1.00000	ug/L	72368		12/20/02 2203	da
	2,2-oxybis (1-chloropropane)	9.9	U		4.2	9.9	1.00000	ug/L	72368		12/20/02 2203	da
	n-Nitroso-di-n-propylamine	9.9	U		3.9	9.9	1.00000	ug/L	72368		12/20/02 2203	da
	Hexachloroethane	9.9	U		7.9	9.9	1.00000	ug/L	72368		12/20/02 2203	da
	4-Methylphenol (m/p-cresol)	9.9	U		3.8	9.9	1.00000	ug/L	72368		12/20/02 2203	da
	2-Chlorophenol	9.9	U		4.4	9.9	1.00000	ug/L	72368		12/20/02 2203	da
	Nitrobenzene	9.9	U		3.9	9.9	1.00000	ug/L	72368		12/20/02 2203	da
	Bis(2-chloroethoxy)methane	9.9	U		4.8	9.9	1.00000	ug/L	72368		12/20/02 2203	da
	1,2,4-Trichlorobenzene	9.9	U		5.6	9.9	1.00000	ug/L	72368		12/20/02 2203	da
	Isophorone	9.9	U		3.3	9.9	1.00000	ug/L	72368		12/20/02 2203	da
	2,4-Dimethylphenol	9.9	U		4.6	9.9	1.00000	ug/L	72368		12/20/02 2203	da
	Hexachlorobutadiene	9.9	U		8.3	9.9	1.00000	ug/L	72368		12/20/02 2203	da
	Naphthalene	9.9	U		4.3	9.9	1.00000	ug/L	72368		12/20/02 2203	da

* In Description = Dry Wgt.

STL Chicago is part of Severn Trent Laboratories, Inc.

LABORATORY TEST RESULTS

Job Number: 214010

Date:04/03/2003

CUSTOMER:

PROJECT:

ATTN:

Customer Sample ID: MW45S
Date Sampled.....: 12/10/2002
Time Sampled.....: 08:00
Sample Matrix.....: Water

Laboratory Sample ID: 214010-1
Date Received.....: 12/10/2002
Time Received.....: 12:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	RL	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH
	2,4-Dichlorophenol	9.9	U		4.3	9.9	1.00000	ug/L	72368		12/20/02 2203	da
	4-Chloroaniline	9.9	U		2.7	9.9	1.00000	ug/L	72368		12/20/02 2203	da
	2,4,6-Trichlorophenol	9.9	U		2.8	9.9	1.00000	ug/L	72368		12/20/02 2203	da
	2,4,5-Trichlorophenol	50	U		3.6	50	1.00000	ug/L	72368		12/20/02 2203	da
	Hexachlorocyclopentadiene	9.9	U		1.6	9.9	1.00000	ug/L	72368		12/20/02 2203	da
	2-Methylnaphthalene	9.9	U		4.3	9.9	1.00000	ug/L	72368		12/20/02 2203	da
	2-Nitroaniline	50	U		4.0	50	1.00000	ug/L	72368		12/20/02 2203	da
	2-Chloronaphthalene	9.9	U		3.6	9.9	1.00000	ug/L	72368		12/20/02 2203	da
	4-Chloro-3-methylphenol	9.9	U		3.8	9.9	1.00000	ug/L	72368		12/20/02 2203	da
	2,6-Dinitrotoluene	9.9	U		3.0	9.9	1.00000	ug/L	72368		12/20/02 2203	da
	2-Nitrophenol	9.9	U		4.3	9.9	1.00000	ug/L	72368		12/20/02 2203	da
	3-Nitroaniline	50	U		3.5	50	1.00000	ug/L	72368		12/20/02 2203	da
	Dimethyl phthalate	9.9	U		3.1	9.9	1.00000	ug/L	72368		12/20/02 2203	da
	2,4-Dinitrophenol	50	U		12	50	1.00000	ug/L	72368		12/20/02 2203	da
	Acenaphthylene	9.9	U		3.2	9.9	1.00000	ug/L	72368		12/20/02 2203	da
	2,4-Dinitrotoluene	9.9	U		3.1	9.9	1.00000	ug/L	72368		12/20/02 2203	da
	Acenaphthene	9.9	U		3.1	9.9	1.00000	ug/L	72368		12/20/02 2203	da
	Dibenzofuran	9.9	U		3.4	9.9	1.00000	ug/L	72368		12/20/02 2203	da
	4-Nitrophenol	50	U		7.0	50	1.00000	ug/L	72368		12/20/02 2203	da
	Fluorene	9.9	U		4.0	9.9	1.00000	ug/L	72368		12/20/02 2203	da
	4-Nitroaniline	50	U		6.0	50	1.00000	ug/L	72368		12/20/02 2203	da
	4-Bromophenyl phenyl ether	9.9	U		2.9	9.9	1.00000	ug/L	72368		12/20/02 2203	da
	Hexachlorobenzene	9.9	U		2.8	9.9	1.00000	ug/L	72368		12/20/02 2203	da
	Diethyl phthalate	9.9	U		4.1	9.9	1.00000	ug/L	72368		12/20/02 2203	da
	4-Chlorophenyl phenyl ether	9.9	U		3.6	9.9	1.00000	ug/L	72368		12/20/02 2203	da
	Pentachlorophenol	50	U		4.6	50	1.00000	ug/L	72368		12/20/02 2203	da
	n-Nitrosodiphenylamine	9.9	U		3.8	9.9	1.00000	ug/L	72368		12/20/02 2203	da
	4,6-Dinitro-2-methylphenol	50	U		6.3	50	1.00000	ug/L	72368		12/20/02 2203	da
	Phenanthrene	9.9	U		2.5	9.9	1.00000	ug/L	72368		12/20/02 2203	da

* In Description = Dry Wgt.

STL Chicago is part of Severn Trent Laboratories, Inc.

LABORATORY TEST RESULTS

Job Number: 214010

Date:04/03/2003

CUSTOMER:

PROJECT:

ATTN:

Customer Sample ID: MW45S
Date Sampled.....: 12/10/2002
Time Sampled.....: 08:00
Sample Matrix.....: Water

Laboratory Sample ID: 214010-1
Date Received.....: 12/10/2002
Time Received.....: 12:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	RL	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH
	Anthracene	9.9	U		2.5	9.9	1.00000	ug/L	72368		12/20/02 2203	da
	Di-n-butyl phthalate	9.9	U		3.5	9.9	1.00000	ug/L	72368		12/20/02 2203	da
	Fluoranthene	9.9	U		4.5	9.9	1.00000	ug/L	72368		12/20/02 2203	da
	Pyrene	9.9	U		3.9	9.9	1.00000	ug/L	72368		12/20/02 2203	da
	Butyl benzyl phthalate	9.9	U		5.0	9.9	1.00000	ug/L	72368		12/20/02 2203	da
	Benzo(a)anthracene	9.9	U		2.5	9.9	1.00000	ug/L	72368		12/20/02 2203	da
	Chrysene	9.9	U		3.0	9.9	1.00000	ug/L	72368		12/20/02 2203	da
	3,3-Dichlorobenzidine	20	U		4.4	20	1.00000	ug/L	72368		12/20/02 2203	da
	Bis(2-ethylhexyl)phthalate	9.9	U		5.9	9.9	1.00000	ug/L	72368		12/20/02 2203	da
	Di-n-octyl phthalate	9.9	U		4.3	9.9	1.00000	ug/L	72368		12/20/02 2203	da
	Benzo(b)fluoranthene	9.9	U		3.6	9.9	1.00000	ug/L	72368		12/20/02 2203	da
	Benzo(k)fluoranthene	9.9	U		3.7	9.9	1.00000	ug/L	72368		12/20/02 2203	da
	Benzo(a)pyrene	9.9	U		3.7	9.9	1.00000	ug/L	72368		12/20/02 2203	da
	Indeno(1,2,3-cd)pyrene	9.9	U		5.0	9.9	1.00000	ug/L	72368		12/20/02 2203	da
	Dibenzo(a,h)anthracene	9.9	U		3.6	9.9	1.00000	ug/L	72368		12/20/02 2203	da
	Benzo(ghi)perylene	9.9	U		4.3	9.9	1.00000	ug/L	72368		12/20/02 2203	da
	Methyl methane sulfonate	20	U		7.9	20	1.00000	ug/L	72368		12/20/02 2203	da
	2-Picoline	9.9	U		9.5	9.9	1.00000	ug/L	72368		12/20/02 2203	da
	n-Nitrosomethylethylamine	20	U		5.1	20	1.00000	ug/L	72368		12/20/02 2203	da
	n-Nitrosodiethylamine	20	U		5.3	20	1.00000	ug/L	72368		12/20/02 2203	da
	Ethyl methane sulfonate	9.9	U		8.9	9.9	1.00000	ug/L	72368		12/20/02 2203	da
	n-Nitrosopyrolidine	50	U		15	50	1.00000	ug/L	72368		12/20/02 2203	da
	Acetophenone	9.9	U		8.6	9.9	1.00000	ug/L	72368		12/20/02 2203	da
	n-Nitrosomorpholine	20	U		8.7	20	1.00000	ug/L	72368		12/20/02 2203	da
	o-Toluidine	9.9	U		9.4	9.9	1.00000	ug/L	72368		12/20/02 2203	da
	n-Nitrosopiperidine	9.9	U		6.2	9.9	1.00000	ug/L	72368		12/20/02 2203	da
	Hexachloropropene	50	U		8.5	50	1.00000	ug/L	72368		12/20/02 2203	da
	n-Nitrosodi-n-butylamine	9.9	U		8.7	9.9	1.00000	ug/L	72368		12/20/02 2203	da
	2,6-Dichlorophenol	9.9	U		9.5	9.9	1.00000	ug/L	72368		12/20/02 2203	da

* In Description = Dry Wgt.

STL Chicago is part of Severn Trent Laboratories, Inc.

LABORATORY TEST RESULTS

Job Number: 214010

Date:04/03/2003

CUSTOMER:

PROJECT:

ATTN:

Customer Sample ID: MW45S
Date Sampled.....: 12/10/2002
Time Sampled.....: 08:00
Sample Matrix.....: Water

Laboratory Sample ID: 214010-1
Date Received.....: 12/10/2002
Time Received.....: 12:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	RL	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH
	Safrole	9.9	U		6.5	9.9	1.00000	ug/L	72368		12/20/02 2203	da
	1,2,4,5-Tetrachlorobenzene	9.9	U		7.3	9.9	1.00000	ug/L	72368		12/20/02 2203	da
	a,a-Dimethylphenethylamine	50	U		47	50	1.00000	ug/L	72368		12/20/02 2203	da
	Isosafrole	9.9	U		6.0	9.9	1.00000	ug/L	72368		12/20/02 2203	da
	1,4-Naphthoquinone	50	U		27	50	1.00000	ug/L	72368		12/20/02 2203	da
	m-Dinitrobenzene	20	U		9.9	20	1.00000	ug/L	72368		12/20/02 2203	da
	Sym-Trinitrobenzene	40	U		23	40	1.00000	ug/L	72368		12/20/02 2203	da
	Pentachlorobenzene	9.9	U		3.7	9.9	1.00000	ug/L	72368		12/20/02 2203	da
	1-Naphthylamine	20	U		15	20	1.00000	ug/L	72368		12/20/02 2203	da
	2,3,4,6-Tetrachlorophenol	9.9	U		9.6	9.9	1.00000	ug/L	72368		12/20/02 2203	da
	2-Naphthylamine	20	U		15	20	1.00000	ug/L	72368		12/20/02 2203	da
	5-Nitro-o-toluidine	20	U		7.7	20	1.00000	ug/L	72368		12/20/02 2203	da
	Diphenylamine	9.9	U		8.6	9.9	1.00000	ug/L	72368		12/20/02 2203	da
	4-Aminobiphenyl	20	U		13	20	1.00000	ug/L	72368		12/20/02 2203	da
	Diallate	9.9	U		6.8	9.9	1.00000	ug/L	72368		12/20/02 2203	da
	Phenacetin	20	U		11	20	1.00000	ug/L	72368		12/20/02 2203	da
	Pronamide	20	U		9.9	20	1.00000	ug/L	72368		12/20/02 2203	da
	Pentachloronitrobenzene	9.9	U		6.2	9.9	1.00000	ug/L	72368		12/20/02 2203	da
	4-Nitroquinoline-1-oxide	50	U		35	50	1.00000	ug/L	72368		12/20/02 2203	da
	3,3-Dimethylbenzidine	50	U		25	50	1.00000	ug/L	72368		12/20/02 2203	da
	Methapyrilene	50	U		46	50	1.00000	ug/L	72368		12/20/02 2203	da
	p-Dimethylaminoazobenzene	20	U		12	20	1.00000	ug/L	72368		12/20/02 2203	da
	Chlorobenzilate	9.9	U		9.8	9.9	1.00000	ug/L	72368		12/20/02 2203	da
	2-Acetylaminofluorene	20	U		11	20	1.00000	ug/L	72368		12/20/02 2203	da
	7,12-Dimethylbenz(a)anthracene	20	U		11	20	1.00000	ug/L	72368		12/20/02 2203	da
	3-Methylcholanthrene	9.9	U		5.6	9.9	1.00000	ug/L	72368		12/20/02 2203	da
8260B	Volatile Organics											
	Dichlorodifluoromethane	1.0	U		0.14	1.0	1.00000	ug/L	72105		12/11/02 1638	jab

* In Description = Dry Wgt.

STL Chicago is part of Severn Trent Laboratories, Inc.

LABORATORY TEST RESULTS

Job Number: 214010

Date:04/03/2003

CUSTOMER:

PROJECT:

ATTN:

Customer Sample ID: MW45S
Date Sampled.....: 12/10/2002
Time Sampled.....: 08:00
Sample Matrix.....: Water

Laboratory Sample ID: 214010-1
Date Received.....: 12/10/2002
Time Received.....: 12:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	RL	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH
	Chloromethane	1.0	U		0.16	1.0	1.00000	ug/L	72105		12/11/02 1638	jab
	Vinyl chloride	1.0	U		0.18	1.0	1.00000	ug/L	72105		12/11/02 1638	jab
	Bromomethane	1.0	U		0.18	1.0	1.00000	ug/L	72105		12/11/02 1638	jab
	Chloroethane	1.0	U		0.21	1.0	1.00000	ug/L	72105		12/11/02 1638	jab
	Trichlorofluoromethane	1.0	U		0.22	1.0	1.00000	ug/L	72105		12/11/02 1638	jab
	Acrolein	200	U		19	200	1.00000	ug/L	72105		12/11/02 1638	jab
	1,1-Dichloroethene	1.0	U		0.19	1.0	1.00000	ug/L	72105		12/11/02 1638	jab
	Iodomethane	2.0	U		1.3	2.0	1.00000	ug/L	72105		12/11/02 1638	jab
	Carbon disulfide	5.0	U		0.40	5.0	1.00000	ug/L	72105		12/11/02 1638	jab
	Acetone	5.0	U		1.5	5.0	1.00000	ug/L	72105		12/11/02 1638	jab
	Acetonitrile	40	U		6.6	40	1.00000	ug/L	72105		12/11/02 1638	jab
	Methylene chloride	1.0	U		0.19	1.0	1.00000	ug/L	72105		12/11/02 1638	jab
	trans-1,2-Dichloroethene	1.0	U		0.21	1.0	1.00000	ug/L	72105		12/11/02 1638	jab
	Acrylonitrile	40	U		5.4	40	1.00000	ug/L	72105		12/11/02 1638	jab
	Methyl-tert-butyl-ether (MTBE)	1.0	U		0.21	1.0	1.00000	ug/L	72105		12/11/02 1638	jab
	1,1-Dichloroethane	1.0	U		0.20	1.0	1.00000	ug/L	72105		12/11/02 1638	jab
	Vinyl acetate	5.0	U		0.47	5.0	1.00000	ug/L	72105		12/11/02 1638	jab
	cis-1,2-Dichloroethene	1.0	U		0.21	1.0	1.00000	ug/L	72105		12/11/02 1638	jab
	2-Butanone (MEK)	5.0	U		1.7	5.0	1.00000	ug/L	72105		12/11/02 1638	jab
	Propionitrile	40	U		9.7	40	1.00000	ug/L	72105		12/11/02 1638	jab
	Tetrahydrofuran	5.0	U		3.0	5.0	1.00000	ug/L	72105		12/11/02 1638	jab
	Chloroform	1.0	U		0.23	1.0	1.00000	ug/L	72105		12/11/02 1638	jab
	1,1,1-Trichloroethane	1.0	U		0.22	1.0	1.00000	ug/L	72105		12/11/02 1638	jab
	Carbon tetrachloride	1.0	U		0.24	1.0	1.00000	ug/L	72105		12/11/02 1638	jab
	Benzene	1.0	U		0.20	1.0	1.00000	ug/L	72105		12/11/02 1638	jab
	1,2-Dichloroethane	1.0	U		0.25	1.0	1.00000	ug/L	72105		12/11/02 1638	jab
	Trichloroethene	1.0	U		0.21	1.0	1.00000	ug/L	72105		12/11/02 1638	jab
	1,2-Dichloropropane	1.0	U		0.22	1.0	1.00000	ug/L	72105		12/11/02 1638	jab
	Dibromomethane	1.0	U		0.26	1.0	1.00000	ug/L	72105		12/11/02 1638	jab

* In Description = Dry Wgt.

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LABORATORY TEST RESULTS

Job Number: 214010

Date:04/03/2003

CUSTOMER:

PROJECT:

ATTN:

Customer Sample ID: MW45S
Date Sampled.....: 12/10/2002
Time Sampled.....: 08:00
Sample Matrix.....: Water

Laboratory Sample ID: 214010-1
Date Received.....: 12/10/2002
Time Received.....: 12:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	RL	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH
	Bromodichloromethane	1.0	U		0.23	1.0	1.00000	ug/L	72105		12/11/02 1638	jab
	cis-1,3-Dichloropropene	1.0	U		0.22	1.0	1.00000	ug/L	72105		12/11/02 1638	jab
	4-Methyl-2-pentanone (MIBK)	5.0	U		0.92	5.0	1.00000	ug/L	72105		12/11/02 1638	jab
	Toluene	1.0	U		0.21	1.0	1.00000	ug/L	72105		12/11/02 1638	jab
	trans-1,3-Dichloropropene	1.0	U		0.24	1.0	1.00000	ug/L	72105		12/11/02 1638	jab
	1,1,2-Trichloroethane	1.0	U		0.33	1.0	1.00000	ug/L	72105		12/11/02 1638	jab
	Tetrachloroethene	1.0	U		0.20	1.0	1.00000	ug/L	72105		12/11/02 1638	jab
	2-Hexanone	5.0	U		1.2	5.0	1.00000	ug/L	72105		12/11/02 1638	jab
	Dibromochloromethane	1.0	U		0.23	1.0	1.00000	ug/L	72105		12/11/02 1638	jab
	1,2-Dibromoethane (EDB)	1.0	U		0.25	1.0	1.00000	ug/L	72105		12/11/02 1638	jab
	Chlorobenzene	1.0	U		0.22	1.0	1.00000	ug/L	72105		12/11/02 1638	jab
	1,1,1,2-Tetrachloroethane	1.0	U		0.21	1.0	1.00000	ug/L	72105		12/11/02 1638	jab
	Ethylbenzene	1.0	U		0.20	1.0	1.00000	ug/L	72105		12/11/02 1638	jab
	m&p-Xylenes	2.0	U		0.39	2.0	1.00000	ug/L	72105		12/11/02 1638	jab
	o-Xylene	1.0	U		0.21	1.0	1.00000	ug/L	72105		12/11/02 1638	jab
	Styrene	1.0	U		0.23	1.0	1.00000	ug/L	72105		12/11/02 1638	jab
	Bromoform	1.0	U		0.22	1.0	1.00000	ug/L	72105		12/11/02 1638	jab
	trans-1,4-Dichloro-2-butene	2.0	U		1.3	2.0	1.00000	ug/L	72105		12/11/02 1638	jab
	1,1,2,2-Tetrachloroethane	1.0	U		0.25	1.0	1.00000	ug/L	72105		12/11/02 1638	jab
	1,2,3-Trichloropropane	1.0	U		0.20	1.0	1.00000	ug/L	72105		12/11/02 1638	jab
	1,2-Dibromo-3-chloropropane	1.0	U		0.46	1.0	1.00000	ug/L	72105		12/11/02 1638	jab
	3-Chloropropene (Allyl Chloride)	2.0	U		0.45	2.0	1.00000	ug/L	72105		12/11/02 1638	jab
	2-Chloro-1,3-butadiene (chloroprene)	1.0	U		0.13	1.0	1.00000	ug/L	72105		12/11/02 1638	jab
	Methylmethacrylate	2.0	U		0.67	2.0	1.00000	ug/L	72105		12/11/02 1638	jab
	Ethylmethacrylate	2.0	U		0.36	2.0	1.00000	ug/L	72105		12/11/02 1638	jab
	Pentachloroethane	2.0	U		1.0	2.0	1.00000	ug/L	72105		12/11/02 1638	jab

* In Description = Dry Wgt.

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Job Number: 214010

L A B O R A T O R Y T E S T R E S U L T S

Date:04/03/2003

CUSTOMER: PROJECT: ATTN:

Customer Sample ID: TRIP BLANK
Date Sampled.....: 12/10/2002
Time Sampled.....: 08:00
Sample Matrix.....: Water

Laboratory Sample ID: 214010-2
Date Received.....: 12/10/2002
Time Received.....: 12:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	RL	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH
8260B	Volatile Organics											
	Dichlorodifluoromethane	1.0	U		0.14	1.0	1.00000	ug/L	72105		12/11/02 1134	jab
	Chloromethane	1.0	U		0.16	1.0	1.00000	ug/L	72105		12/11/02 1134	jab
	Vinyl chloride	1.0	U		0.18	1.0	1.00000	ug/L	72105		12/11/02 1134	jab
	Bromomethane	1.0	U		0.18	1.0	1.00000	ug/L	72105		12/11/02 1134	jab
	Chloroethane	1.0	U		0.21	1.0	1.00000	ug/L	72105		12/11/02 1134	jab
	Trichlorofluoromethane	1.0	U		0.22	1.0	1.00000	ug/L	72105		12/11/02 1134	jab
	Acrolein	200	U		19	200	1.00000	ug/L	72105		12/11/02 1134	jab
	1,1-Dichloroethene	1.0	U		0.19	1.0	1.00000	ug/L	72105		12/11/02 1134	jab
	Iodomethane	2.0	U		1.3	2.0	1.00000	ug/L	72105		12/11/02 1134	jab
	Carbon disulfide	5.0	U		0.40	5.0	1.00000	ug/L	72105		12/11/02 1134	jab
	Acetone	5.0	U		1.5	5.0	1.00000	ug/L	72105		12/11/02 1134	jab
	Acetonitrile	40	U		6.6	40	1.00000	ug/L	72105		12/11/02 1134	jab
	Methylene chloride	1.4			0.19	1.0	1.00000	ug/L	72105		12/11/02 1134	jab
	trans-1,2-Dichloroethene	1.0	U		0.21	1.0	1.00000	ug/L	72105		12/11/02 1134	jab
	Acrylonitrile	40	U		5.4	40	1.00000	ug/L	72105		12/11/02 1134	jab
	Methyl-tert-butyl-ether (MTBE)	1.0	U		0.21	1.0	1.00000	ug/L	72105		12/11/02 1134	jab
	1,1-Dichloroethane	1.0	U		0.20	1.0	1.00000	ug/L	72105		12/11/02 1134	jab
	Vinyl acetate	5.0	U		0.47	5.0	1.00000	ug/L	72105		12/11/02 1134	jab
	cis-1,2-Dichloroethene	1.0	U		0.21	1.0	1.00000	ug/L	72105		12/11/02 1134	jab
	2-Butanone (MEK)	5.0	U		1.7	5.0	1.00000	ug/L	72105		12/11/02 1134	jab
	Propionitrile	40	U		9.7	40	1.00000	ug/L	72105		12/11/02 1134	jab
	Tetrahydrofuran	5.0	U		3.0	5.0	1.00000	ug/L	72105		12/11/02 1134	jab
	Chloroform	1.0	U		0.23	1.0	1.00000	ug/L	72105		12/11/02 1134	jab
	1,1,1-Trichloroethane	1.0	U		0.22	1.0	1.00000	ug/L	72105		12/11/02 1134	jab
	Carbon tetrachloride	1.0	U		0.24	1.0	1.00000	ug/L	72105		12/11/02 1134	jab
	Benzene	1.0	U		0.20	1.0	1.00000	ug/L	72105		12/11/02 1134	jab
	1,2-Dichloroethane	1.0	U		0.25	1.0	1.00000	ug/L	72105		12/11/02 1134	jab
	Trichloroethene	1.0	U		0.21	1.0	1.00000	ug/L	72105		12/11/02 1134	jab

* In Description = Dry Wgt.

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LABORATORY TEST RESULTS

Job Number: 214010

Date:04/03/2003

CUSTOMER:

PROJECT:

ATTN:

Customer Sample ID: TRIP BLANK
Date Sampled.....: 12/10/2002
Time Sampled.....: 08:00
Sample Matrix.....: Water

Laboratory Sample ID: 214010-2
Date Received.....: 12/10/2002
Time Received.....: 12:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	RL	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH
	1,2-Dichloropropane	1.0	U		0.22	1.0	1.00000	ug/L	72105		12/11/02 1134	jab
	Dibromomethane	1.0	U		0.26	1.0	1.00000	ug/L	72105		12/11/02 1134	jab
	Bromodichloromethane	1.0	U		0.23	1.0	1.00000	ug/L	72105		12/11/02 1134	jab
	cis-1,3-Dichloropropene	1.0	U		0.22	1.0	1.00000	ug/L	72105		12/11/02 1134	jab
	4-Methyl-2-pentanone (MIBK)	5.0	U		0.92	5.0	1.00000	ug/L	72105		12/11/02 1134	jab
	Toluene	1.0	U		0.21	1.0	1.00000	ug/L	72105		12/11/02 1134	jab
	trans-1,3-Dichloropropene	1.0	U		0.24	1.0	1.00000	ug/L	72105		12/11/02 1134	jab
	1,1,2-Trichloroethane	1.0	U		0.33	1.0	1.00000	ug/L	72105		12/11/02 1134	jab
	Tetrachloroethene	1.0	U		0.20	1.0	1.00000	ug/L	72105		12/11/02 1134	jab
	2-Hexanone	5.0	U		1.2	5.0	1.00000	ug/L	72105		12/11/02 1134	jab
	Dibromochloromethane	1.0	U		0.23	1.0	1.00000	ug/L	72105		12/11/02 1134	jab
	1,2-Dibromoethane (EDB)	1.0	U		0.25	1.0	1.00000	ug/L	72105		12/11/02 1134	jab
	Chlorobenzene	1.0	U		0.22	1.0	1.00000	ug/L	72105		12/11/02 1134	jab
	1,1,1,2-Tetrachloroethane	1.0	U		0.21	1.0	1.00000	ug/L	72105		12/11/02 1134	jab
	Ethylbenzene	1.0	U		0.20	1.0	1.00000	ug/L	72105		12/11/02 1134	jab
	m&p-Xylenes	2.0	U		0.39	2.0	1.00000	ug/L	72105		12/11/02 1134	jab
	o-Xylene	1.0	U		0.21	1.0	1.00000	ug/L	72105		12/11/02 1134	jab
	Styrene	1.0	U		0.23	1.0	1.00000	ug/L	72105		12/11/02 1134	jab
	Bromoform	1.0	U		0.22	1.0	1.00000	ug/L	72105		12/11/02 1134	jab
	trans-1,4-Dichloro-2-butene	2.0	U		1.3	2.0	1.00000	ug/L	72105		12/11/02 1134	jab
	1,1,2,2-Tetrachloroethane	1.0	U		0.25	1.0	1.00000	ug/L	72105		12/11/02 1134	jab
	1,2,3-Trichloropropane	1.0	U		0.20	1.0	1.00000	ug/L	72105		12/11/02 1134	jab
	1,2-Dibromo-3-chloropropane	1.0	U		0.46	1.0	1.00000	ug/L	72105		12/11/02 1134	jab
	3-Chloropropene (Allyl Chloride)	2.0	U		0.45	2.0	1.00000	ug/L	72105		12/11/02 1134	jab
	2-Chloro-1,3-butadiene (chloroprene)	1.0	U		0.13	1.0	1.00000	ug/L	72105		12/11/02 1134	jab
	Methylmethacrylate	2.0	U		0.67	2.0	1.00000	ug/L	72105		12/11/02 1134	jab
	Ethylmethacrylate	2.0	U		0.36	2.0	1.00000	ug/L	72105		12/11/02 1134	jab
	Pentachloroethane	2.0	U		1.0	2.0	1.00000	ug/L	72105		12/11/02 1134	jab

* In Description = Dry Wgt.

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L A B O R A T O R Y C H R O N I C L E

Job Number: 214010 Date: 04/03/2003

CUSTOMER: PROJECT: ATTN:

Lab ID: 214010-1 Client ID: MW45S Date Recvd: 12/10/2002 Sample Date: 12/10/2002

METHOD	DESCRIPTION	RUN#	BATCH#	PREP BT #(S)	DATE/TIME ANALYZED		DILUTION
5030B	5030 25 mL Purge Prep	1	71521		12/11/2002	1638	
5030A	5030 Purge & Trap	1	72436		12/11/2002	0230	
EDD	Electronic Data Deliverable	1	72567				
3520C	Extraction Continuous Liq/Liq (SVOC)	1	71653		12/13/2002	0950	
WI DRO	Extraction Sep. Funnel (Diesel)	1	71493		12/11/2002	1600	
8270C	Semivolatile Organics	1	72368	71653	12/20/2002	2203	1.00000
8015M WIDRO	TPH - Diesel Range Organics (WI-DRO)	1	71824	71493	12/14/2002	0527	1.00000
8015M WIGRO	TPH - Gasoline Range Organics (WI-GRO)	1	72438	72436	12/11/2002	0811	1.00000
8260B	Volatile Organics	1	72105	71521	12/11/2002	1638	1.00000

Lab ID: 214010-2 Client ID: TRIP BLANK Date Recvd: 12/10/2002 Sample Date: 12/10/2002

METHOD	DESCRIPTION	RUN#	BATCH#	PREP BT #(S)	DATE/TIME ANALYZED		DILUTION
5030B	5030 25 mL Purge Prep	1	71521		12/11/2002	1134	
8260B	Volatile Organics	1	72105	71521	12/11/2002	1134	1.00000

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SURROGATE RECOVERIES REPORT

Job Number.: 214010

Report Date.: 04/03/2003

CUSTOMER:

PROJECT:

ATTN:

Method.....: Volatile Organics
Method Code...: 8260B

Test Matrix...: Water
Batch(s).....: 72105

Prep Batch..: 71521

Lab ID	DT	Sample ID	Date	12DCED	BRFLBE	DBRFLM	TOLD8
LCS			12/11/2002	80	88	84	89
MB			12/11/2002	87	97	95	104
214010	1	MW45S	12/11/2002	94	106	105	110
214010	2	TRIP BLANK	12/11/2002	79	94	87	104

Test	Test Description	Limits
12DCED	1,2-Dichloroethane-d4 (surr)	61 - 131
BRFLBE	4-Bromofluorobenzene (surr)	73 - 122
DBRFLM	Dibromofluoromethane (surr)	66 - 132
TOLD8	Toluene-d8 (surr)	78 - 128

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SURROGATE RECOVERIES REPORT

Job Number.: 214010 Report Date.: 04/03/2003

CUSTOMER: PROJECT: ATTN:

Method.....: Semivolatile Organics Test Matrix...: Water Prep Batch..: 71653
Method Code...: 8270 Batch(s).....: 72368

Lab ID	DT	Sample ID	Date	246TBP	2FLUBP	2FLUPH	NITRD5	PHEND5	TERD14
LCS			12/20/2002	73	57	45	56	57	66
MB			12/20/2002	92	64	58	62	78	81
214010-	1	MW45S	12/20/2002	65	54	44	60	63	26

Test	Test Description	Limits
246TBP	2,4,6-Tribromophenol (surr)	29 - 126
2FLUBP	2-Fluorobiphenyl (surr)	34 - 112
2FLUPH	2-Fluorophenol (surr)	21 - 100
NITRD5	Nitrobenzene-d5 (surr)	38 - 113
PHEND5	Phenol-d5 (surr)	18 - 100
TERD14	Terphenyl-d14 (surr)	10 - 119

QUALITY CONTROL RESULTS

Job Number.: 214010 Report Date.: 04/03/2003

CUSTOMER: PROJECT: ATTN:

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date	Time

Test Method.....: 8015M WIDRO Equipment Code....: INST09 Analyst...: mgk
Method Description.: TPH - Diesel Range Organics (WI-DRO) Batch.....: 71824

LCD	Laboratory Control Sample Duplicate	E02LWLWIDA	71493 -003		12/13/2002	2127

Parameter/Test Description	Units	QC Result	QC Resu.t	True Value	Orig. Value	QC Calc.	*	Limits	F
Diesel Range Organics (DRO)	mg/L	0.414705	0.440394	0.500000	0.100000 U	83	%	75-115	
						6	R	20	

 * %=% REC, R=RPD, A=ABS Diff., D=% Diff.

QUALITY CONTROL RESULTS

Job Number.: 214010

Report Date.: 04/03/2003

CUSTOMER: PROJECT: ATTN:

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date	Time

Test Method.....: 8015M WIDRO
Method Description.: TPH - Diesel Range Organics (WI-DRO)
Equipment Code....: INST09
Batch.....: 71824
Analyst...: mgk

LCS	Laboratory Control Sample	E02LWLWIDA	71493 -002		12/13/2002	2049

Parameter/Test Description	Units	QC Result	QC Result	True Value	Orig. Value	QC Calc.	*	Limits	F
Diesel Range Organics (DRO)	mg/L	0.440394		0.500000	0.100000 U	88	%	75-115	

* %=% REC, R=RPD, A=ABS Diff., D=% Diff.

QUALITY CONTROL RESULTS

Job Number.: 214010

Report Date.: 04/03/2003

CUSTOMER: PROJECT: ATTN:

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date	Time

Test Method.....: 8015M WIDRO
Method Description.: TPH - Diesel Range Organics (WI-DRO)
Equipment Code....: INST09
Batch.....: 71824
Analyst...: mgk

MB	Method Blank		71493 -001		12/13/2002	2013

Parameter/Test Description	Units	QC Result	QC Result	True Value	Orig. Value	QC Calc.	*	Limits	F
Diesel Range Organics (DRO)	mg/L	0.100000 U							

* %=% REC, R=RPD, A=ABS Diff., D=% Diff.

QUALITY CONTROL RESULTS

Job Number.: 214010

Report Date.: 04/03/2003

CUSTOMER: PROJECT: ATTN:

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date	Time

Test Method.....: 8015M WIGRO
Method Description.: TPH - Gasoline Range Organics (WI-GRO)
Equipment Code....: INST1314
Batch.....: 72438
Analyst...: dpk

LCS	Laboratory Control Sample	G02L10DAA	72436 -002		12/11/2002	0337

Parameter/Test Description	Units	QC Result	QC Result	True Value	Orig. Value	QC Calc.	*	Limits	F
Gasoline Range Organics (GRO)	ug/L	372.200		400.000	30.000 U	93	%	70-130	

* %=% REC, R=RPD, A=ABS Diff., D=% Diff.

QUALITY CONTROL RESULTS

Job Number.: 214010

Report Date.: 04/03/2003

CUSTOMER: PROJECT: ATTN:

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date Time

Test Method.....: 8015M WIGRO
Method Description.: TPH - Gasoline Range Organics (WI-GRO)
Equipment Code....: INST1314
Batch.....: 72438
Analyst...: dpk

MB	Method Blank		72436 -001		12/11/2002 0303

Parameter/Test Description	Units	QC Result	QC Result	True Value	Orig. Value	QC Calc.	*	Limits	F
Gasoline Range Organics (GRO)	ug/L	30.000	U						

* %=% REC, R=RPD, A=ABS Diff., D=% Diff.

QUALITY CONTROL RESULTS

Job Number.: 214010

Report Date.: 04/03/2003

CUSTOMER: PROJECT: ATTN:

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date	Time

Test Method.....: 8015M WIGRO
Method Description.: TPH - Gasoline Range Organics (WI-GRO)
Equipment Code....: INST1314
Batch.....: 72438
Analyst...: dpk

MS	Matrix Spike	G02L10DAA	213993-1		12/11/2002	0446

Parameter/Test Description	Units	QC Result	QC Result	True Value	Orig. Value	QC Calc.	*	Limits	F
Gasolire Range Organics (GRO)	ug/L	363.890		400.000	30.000 U	91	%	70-130	

* %=% REC, R=RPD, A=ABS Diff., D=% Diff.

QUALITY CONTROL RESULTS

Job Number.: 214010

Report Date.: 04/03/2003

CUSTOMER: PROJECT: ATTN:

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date	Time

Test Method.....: 8015M WIGRO
Methoc Description.: TPH - Gasoline Range Organics (WI-GRO)
Equipment Code....: INST1314
Batch.....: 72438
Analyst...: dpk

MSD	Matrix Spike Duplicate	G02L10DAA	213993-1		12/11/2002	0520

Parameter/Test Description	Units	QC Result	QC Result	True Value	Orig. Value	QC Calc.	*	Limits	F
Gasoline Range Organics (GRO)	ug/L	386.870	363.890	400.000	30.000 U	97	%	70-130	
						6	R	20	

* %=% REC, R=RPD, A=ABS Diff., D=% Diff.

QUALITY CONTROL RESULTS

Job Number.: 214010 Report Date.: 04/03/2003

CUSTOMER: PROJECT: ATTN:

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date	Time

Test Method.....: 8270C Equipment Code....: GCL1 Analyst...: da
Method Description.: Semivolatile Organics Batch.....: 72368

LCS	Laboratory Control Sample	002KWLBNAB	71653 -002		12/20/2002	1243

Parameter/Test Description	Units	QC Result	QC Result	True Value	Orig. Value	QC Calc.	*	Limits	F
n-Nitrosodimethylamine	ug/L	55.687		100.000	10.000	U 56	%	28-101	
Pyridine	ug/L	27.041		100.000	20.000	U 27	%	16-100	
Aniline	ug/L	37.265		100.000	10.000	U 37	%	17-111	
Phenol	ug/L	58.829		100.000	10.000	U 59	%	29-100	
Bis(2-chloroethyl)ether	ug/L	50.082		100.000	10.000	U 50	%	42-100	
1,3-Dichlorobenzene	ug/L	52.357		100.000	10.000	U 52	%	38-100	
1,4-Dichlorobenzene	ug/L	52.906		100.000	10.000	U 53	%	38-100	
1,2-Dichlorobenzene	ug/L	60.003		100.000	10.000	U 60	%	36-100	
Benzyl alcohol	ug/L	44.873		100.000	10.000	U 45	%	41-105	
2-Methylphenol (o-cresol)	ug/L	55.549		100.000	10.000	U 56	%	37-100	
2,2-oxybis (1-chloropropane)	ug/L	64.073		100.000	10.000	U 64	%	35-107	
n-Nitroso-di-n-propylamine	ug/L	69.838		100.000	10.000	U 70	%	41-107	
Hexachloroethane	ug/L	50.122		100.000	10.000	U 50	%	34-100	
4-Methylphenol (m/p-cresol)	ug/L	55.920		100.000	10.000	U 56	%	35-106	
2-Chlorophenol	ug/L	55.718		100.000	10.000	U 56	%	43-100	
Nitrobenzene	ug/L	62.514		100.000	10.000	U 63	%	41-105	
Bis(2-chloroethoxy)methane	ug/L	63.860		100.000	10.000	U 64	%	48-106	
1,2,4-Trichlorobenzene	ug/L	54.800		100.000	10.000	U 55	%	45-100	
Isophorone	ug/L	64.293		100.000	10.000	U 64	%	47-100	
2,4-Dimethylphenol	ug/L	55.471		100.000	10.000	U 55	%	35-100	
Hexachlorobutadiene	ug/L	51.656		100.000	10.000	U 52	%	41-100	
Naphthalene	ug/L	62.162		100.000	10.000	U 62	%	51-100	
2,4-Dichlorophenol	ug/L	62.131		100.000	10.000	U 62	%	52-100	
4-Chloroaniline	ug/L	56.144		100.000	10.000	U 56	%	38-114	
2,4,6-Trichlorophenol	ug/L	61.157		100.000	10.000	U 61	%	51-101	
2,4,5-Trichlorophenol	ug/L	63.834		100.000	50.000	U 64	%	54-107	
Hexachlorocyclopentadiene	ug/L	13.644		100.000	10.000	U 14	%	10-100	
2-Methylnaphthalene	ug/L	63.402		100.000	10.000	U 63	%	48-119	
2-Nitroaniline	ug/L	72.460		100.000	50.000	U 72	%	50-112	
2-Chloronaphthalene	ug/L	63.676		100.000	10.000	U 64	%	53-100	
4-Chloro-3-methylphenol	ug/L	63.744		100.000	10.000	U 64	%	50-105	
2,6-Dinitrotoluene	ug/L	77.304		100.000	10.000	U 77	%	57-110	
2-Nitrophenol	ug/L	56.229		100.000	10.000	U 56	%	48-100	
3-Nitroaniline	ug/L	80.542		100.000	50.000	U 81	%	50-109	
Dimethyl phthalate	ug/L	73.681		100.000	10.000	U 74	%	58-104	
2,4-Dinitrophenol	ug/L	89.280		100.000	50.000	U 89	%	40-125	
Acenaphthylene	ug/L	66.354		100.000	10.000	U 66	%	56-102	
2,4-Dinitrotoluene	ug/L	89.430		100.000	10.000	U 89	%	56-115	
Acenaphthene	ug/L	67.767		100.000	10.000	U 68	%	58-102	
Dibenzofuran	ug/L	66.684		100.000	10.000	U 67	%	57-100	
4-Nitrophenol	ug/L	83.294		100.000	50.000	U 83	%	30-116	
Fluorene	ug/L	74.842		100.000	10.000	U 75	%	56-104	
4-Nitroaniline	ug/L	81.780		100.000	50.000	U 82	%	40-124	
4-Bromophenyl phenyl ether	ug/L	66.248		100.000	10.000	U 66	%	54-112	
Hexachlorobenzene	ug/L	67.804		100.000	10.000	U 68	%	50-113	
Diethyl phthalate	ug/L	84.775		100.000	10.000	U 85	%	55-107	
4-Chlorophenyl phenyl ether	ug/L	70.298		100.000	10.000	U 70	%	58-103	
Pentachlorophenol	ug/L	72.767		100.000	50.000	U 73	%	50-112	
n-Nitrosodiphenylamine	ug/L	64.620		100.000	10.000	U 65	%	49-109	
4,6-Dinitro-2-methylphenol	ug/L	72.829		100.000	50.000	U 73	%	56-125	

 * %=% REC, R=RPD, A=ABS Diff., D=% Diff.

QUALITY CONTROL RESULTS

Job Number.: 214010

Report Date.: 04/03/2003

CUSTOMER: PROJECT: ATTN:

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date	Time
LCS	Laboratory Control Sample	002KWLBNAB	71653 -002		12/20/2002	1243

Parameter/Test Description	Units	QC Result	QC Result	True Value	Orig. Value	QC Calc.	*	Limits	F
Phenanthrene	ug/L	70.520		100.000	10.000 U	71	%	57-105	
Anthracene	ug/L	71.117		100.000	10.000 U	71	%	56-106	
Di-n-butyl phthalate	ug/L	84.350		100.000	10.000 U	84	%	55-113	
Fluoranthene	ug/L	81.878		100.000	10.000 U	82	%	51-111	
Pyrene	ug/L	80.914		100.000	10.000 U	81	%	43-118	
Butyl benzyl phthalate	ug/L	74.037		100.000	10.000 U	74	%	52-111	
Benzo(a)anthracene	ug/L	74.138		100.000	10.000 U	74	%	52-110	
Chrysene	ug/L	68.676		100.000	10.000 U	69	%	53-105	
3,3-Dichlorobenzidine	ug/L	67.603		100.000	20.000 U	68	%	30-104	
Bis(2-ethylhexyl)phthalate	ug/L	81.685		100.000	10.000 U	82	%	54-113	
Di-n-octyl phthalate	ug/L	69.912		100.000	10.000 U	70	%	31-152	
Benzo(b)fluoranthene	ug/L	68.783		100.000	10.000 U	69	%	54-129	
Benzo(k)fluoranthene	ug/L	60.006		100.000	10.000 U	60	%	48-126	
Benzo(a)pyrene	ug/L	65.821		100.000	10.000 U	66	%	40-129	
Indeno(1,2,3-cd)pyrene	ug/L	91.760		100.000	10.000 U	92	%	41-140	
Dibenzo(a,h)anthracene	ug/L	96.294		100.000	10.000 U	96	%	42-141	
Benzo(ghi)perylene	ug/L	103.248		100.000	10.000 U	103	%	38-144	

 * %=% REC, R=RPD, A=ABS Diff., D=% Diff.

QUALITY CONTROL RESULTS

Job Number.: 214010 Report Date.: 04/03/2003

CUSTOMER: PROJECT: ATTN:

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date	Time

Test Method.....: 8270C Equipment Code....: GCL1 Analyst...: da
Method Description.: Semivolatile Organics Batch.....: 72368

MB	Method Blank		71653 -001		12/20/2002	1212

Parameter/Test Description	Units	QC Result		QC Result	True Value	Orig. Value	QC Calc.	*	Limits	F
n-Nitrosodimethylamine	ug/L	10.000	U							
Pyridine	ug/L	20.000	U							
Aniline	ug/L	10.000	U							
Phenol	ug/L	10.000	U							
Bis(2-chloroethyl)ether	ug/L	10.000	U							
1,3-Dichlorobenzene	ug/L	10.000	U							
1,4-Dichlorobenzene	ug/L	10.000	U							
1,2-Dichlorobenzene	ug/L	10.000	U							
Benzyl alcohol	ug/L	10.000	U							
2-Methylphenol (o-cresol)	ug/L	10.000	U							
2,2-oxybis (1-chloropropane)	ug/L	10.000	U							
n-Nitroso-di-n-propylamine	ug/L	10.000	U							
Hexachloroethane	ug/L	10.000	U							
4-Methylphenol (m/p-cresol)	ug/L	10.000	U							
2-Chlorophenol	ug/L	10.000	U							
Nitrobenzene	ug/L	10.000	U							
Bis(2-chloroethoxy)methane	ug/L	10.000	U							
1,2,4-Trichlorobenzene	ug/L	10.000	U							
Isophorone	ug/L	10.000	U							
2,4-Dimethylphenol	ug/L	10.000	U							
Hexachlorobutadiene	ug/L	10.000	U							
Naphthalene	ug/L	10.000	U							
2,4-Dichlorophenol	ug/L	10.000	U							
4-Chloroaniline	ug/L	10.000	U							
2,4,6-Trichlorophenol	ug/L	10.000	U							
2,4,5-Trichlorophenol	ug/L	50.000	U							
Hexachlorocyclopentadiene	ug/L	10.000	U							
2-Methylnaphthalene	ug/L	10.000	U							
2-Nitroaniline	ug/L	50.000	U							
2-Chloronaphthalene	ug/L	10.000	U							
4-Chloro-3-methylphenol	ug/L	10.000	U							
2,6-Dinitrotoluene	ug/L	10.000	U							
2-Nitrophenol	ug/L	10.000	U							
3-Nitroaniline	ug/L	50.000	U							
Dimethyl phthalate	ug/L	10.000	U							
2,4-Dinitrophenol	ug/L	50.000	U							
Acenaphthylene	ug/L	10.000	U							
2,4-Dinitrotoluene	ug/L	10.000	U							
Acenaphthene	ug/L	10.000	U							
Dibenzofuran	ug/L	10.000	U							
4-Nitrophenol	ug/L	50.000	U							
Fluorene	ug/L	10.000	U							
4-Nitroaniline	ug/L	50.000	U							
4-Bromophenyl phenyl ether	ug/L	10.000	U							
Hexachlorobenzene	ug/L	10.000	U							
Diethyl phthalate	ug/L	10.000	U							
4-Chlorophenyl phenyl ether	ug/L	10.000	U							
Pentachlorophenol	ug/L	50.000	U							
n-Nitrosodiphenylamine	ug/L	10.000	U							
4,6-Dinitro-2-methylphenol	ug/L	50.000	U							

 * %=% REC, R=RPD, A=ABS Diff., D=% Diff.

QUALITY CONTROL RESULTS

Job Number.: 214010

Report Date.: 04/03/2003

CUSTOMER:

PROJECT:

ATTN:

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date	Time
MB	Method Blank		71653-001		12/20/2002	1212

Parameter/Test Description	Units	QC Result		QC Result	True Value	Orig. Value	QC Calc.	*	Limits	F
Phenanthrene	ug/L	10.000	U							
Anthracene	ug/L	10.000	U							
Di-n-butyl phthalate	ug/L	10.000	U							
Fluoranthene	ug/L	10.000	U							
Pyrene	ug/L	10.000	U							
Butyl benzyl phthalate	ug/L	10.000	U							
Benzo(a)anthracene	ug/L	10.000	U							
Chrysene	ug/L	10.000	U							
3,3-Dichlorobenzidine	ug/L	20.000	U							
Bis(2-ethylhexyl)phthalate	ug/L	10.000	U							
Di-n-octyl phthalate	ug/L	10.000	U							
Benzo(b)fluoranthene	ug/L	10.000	U							
Benzo(k)fluoranthene	ug/L	10.000	U							
Benzo(a)pyrene	ug/L	10.000	U							
Indeno(1,2,3-cd)pyrene	ug/L	10.000	U							
Dibenzo(a,h)anthracene	ug/L	10.000	U							
Benzo(ghi)perylene	ug/L	10.000	U							
Methyl methane sulfonate	ug/L	20.000	U							
2-Picoline	ug/L	10.000	U							
n-Nitrosomethylethylamine	ug/L	20.000	U							
n-Nitrosodiethylamine	ug/L	20.000	U							
Ethyl methane sulfonate	ug/L	10.000	U							
n-Nitrosopyrolidine	ug/L	50.000	U							
Acetophenone	ug/L	10.000	U							
n-Nitrosomorpholine	ug/L	20.000	U							
o-Toluidine	ug/L	10.000	U							
n-Nitrosopiperidine	ug/L	10.000	U							
Hexachloropropene	ug/L	50.000	U							
n-Nitrosodi-n-butylamine	ug/L	10.000	U							
2,6-Dichlorophenol	ug/L	10.000	U							
Safrole	ug/L	10.000	U							
1,2,4,5-Tetrachlorobenzene	ug/L	10.000	U							
a,a-Dimethylphenethylamine	ug/L	50.000	U							
Isosafrole	ug/L	10.000	U							
1,4-Naphthoquinone	ug/L	50.000	U							
m-Dinitrobenzene	ug/L	20.000	U							
Sym-Trinitrobenzene	ug/L	40.000	U							
Pentachlorobenzene	ug/L	10.000	U							
1-Naphthylamine	ug/L	20.000	U							
2,3,4,6-Tetrachlorophenol	ug/L	10.000	U							
2-Naphthylamine	ug/L	20.000	U							
5-Nitro-o-toluidine	ug/L	20.000	U							
Diphenylamine	ug/L	10.000	U							
4-Aminobiphenyl	ug/L	20.000	U							
Diallate	ug/L	10.000	U							
Phenacetin	ug/L	20.000	U							
Pronamide	ug/L	20.000	U							
Pentachloronitrobenzene	ug/L	10.000	U							
4-Nitroquinoline-1-oxide	ug/L	50.000	U							
3,3-Dimethylbenzidine	ug/L	50.000	U							
Methapyrilene	ug/L	50.000	U							
p-Dimethylaminoazobenzene	ug/L	20.000	U							
Chlorobenzilate	ug/L	10.000	U							
2-Acetylaminofluorene	ug/L	20.000	U							

* %=% REC, R=RPD, A=ABS Diff., D=% Diff.

QUALITY CONTROL RESULTS

Job Number.: 214010

Report Date.: 04/03/2003

CUSTOMER:

PROJECT:

ATTN:

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date	Time
MB	Method Blank		71653 -001		12/20/2002	1212

Parameter/Test Description	Units	QC Result	QC Result	True Value	Orig. Value	QC Calc.	*	Limits	F
7,12-Dimethylbenz(a)anthracene	ug/L	20.000	U						
3-Methylcholanthrene	ug/L	10.000	U						

* %=% REC, R=RPD, A=ABS Diff., D=% Diff.

QUALITY CONTROL RESULTS

Job Number.: 214010 Report Date.: 04/03/2003

CUSTOMER: PROJECT: ATTN:

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date	Time

Test Method.....: 8270C Equipment Code....: GCL1 Analyst...: da
Method Description.: Semivolatile Organics Batch.....: 72368

MS	Matrix Spike	002KWLBNAB	213993-1		12/20/2002	1346

Parameter/Test Description	Units	QC Result	QC Result	True Value	Orig. Value	QC Calc.	*	Limits	F
n-Nitrosodimethylamine	ug/L	86.738		99.010	9.901	U 88	%	28-101	
Pyridine	ug/L	41.186		99.010	19.802	U 42	%	16-100	
Aniline	ug/L	51.537		99.010	9.901	U 52	%	17-111	
Phenol	ug/L	77.389		99.010	9.901	U 78	%	29-100	
Bis(2-chloroethyl)ether	ug/L	72.270		99.010	9.901	U 73	%	42-100	
1,3-Dichlorobenzene	ug/L	66.433		99.010	9.901	U 67	%	38-100	
1,4-Dichlorobenzene	ug/L	66.126		99.010	9.901	U 67	%	38-100	
1,2-Dichlorobenzene	ug/L	70.425		99.010	9.901	U 71	%	36-100	
Benzyl alcohol	ug/L	62.035		99.010	9.901	U 63	%	41-105	
2-Methylphenol (o-cresol)	ug/L	76.027		99.010	9.901	U 77	%	37-100	
2,2-oxybis (1-chloropropane)	ug/L	86.842		99.010	9.901	U 88	%	35-107	
n-Nitroso-di-n-propylamine	ug/L	88.514		99.010	9.901	U 89	%	41-107	
Hexachloroethane	ug/L	63.160		99.010	9.901	U 64	%	34-100	
4-Methylphenol (m/p-cresol)	ug/L	80.889		99.010	9.901	U 82	%	35-106	
2-Chlorophenol	ug/L	72.991		99.010	9.901	U 74	%	43-100	
Nitrobenzene	ug/L	80.616		99.010	9.901	U 81	%	41-105	
Bis(2-chloroethoxy)methane	ug/L	83.155		99.010	9.901	U 84	%	48-106	
1,2,4-Trichlorobenzene	ug/L	72.064		99.010	9.901	U 73	%	45-100	
Isophorone	ug/L	80.298		99.010	9.901	U 81	%	47-100	
2,4-Dimethylphenol	ug/L	72.563		99.010	9.901	U 73	%	35-100	
Hexachlorobutadiene	ug/L	57.836		99.010	9.901	U 58	%	41-100	
Naphthalene	ug/L	76.332		99.010	9.901	U 77	%	51-100	
2,4-Dichlorophenol	ug/L	78.071		99.010	9.901	U 79	%	52-100	
4-Chloroaniline	ug/L	51.127		99.010	9.901	U 52	%	38-114	
2,4,6-Trichlorophenol	ug/L	83.401		99.010	9.901	U 84	%	51-101	
2,4,5-Trichlorophenol	ug/L	83.865		99.010	49.505	U 85	%	54-107	
Hexachlorocyclopentadiene	ug/L	18.424		99.010	9.901	U 19	%	10-100	
2-Methylnaphthalene	ug/L	76.906		99.010	9.901	U 78	%	48-119	
2-Nitroaniline	ug/L	100.289		99.010	49.505	U 101	%	50-112	
2-Chloronaphthalene	ug/L	83.557		99.010	9.901	U 84	%	53-100	
4-Chloro-3-methylphenol	ug/L	80.726		99.010	9.901	U 82	%	50-105	
2,6-Dinitrotoluene	ug/L	96.276		99.010	9.901	U 97	%	57-110	
2-Nitrophenol	ug/L	71.717		99.010	9.901	U 72	%	48-100	
3-Nitroaniline	ug/L	102.471		99.010	49.505	U 103	%	50-109	
Dimethyl phthalate	ug/L	90.228		99.010	9.901	U 91	%	58-104	
2,4-Dinitrophenol	ug/L	114.340		99.010	49.505	U 115	%	40-125	
Acenaphthylene	ug/L	84.982		99.010	9.901	U 86	%	56-102	
2,4-Dinitrotoluene	ug/L	113.491		99.010	9.901	U 115	%	56-115	
Acenaphthene	ug/L	91.559		99.010	9.901	U 92	%	58-102	
Dibenzofuran	ug/L	86.087		99.010	9.901	U 87	%	57-100	
4-Nitrophenol	ug/L	111.793		99.010	49.505	U 113	%	30-116	
Fluorene	ug/L	92.511		99.010	9.901	U 93	%	56-104	
4-Nitroaniline	ug/L	110.106		99.010	49.505	U 111	%	40-124	
4-Bromophenyl phenyl ether	ug/L	74.629		99.010	9.901	U 75	%	54-112	
Hexachlorobenzene	ug/L	75.788		99.010	9.901	U 77	%	50-113	
Diethyl phthalate	ug/L	102.000		99.010	9.901	U 103	%	55-107	
4-Chlorophenyl phenyl ether	ug/L	84.609		99.010	9.901	U 85	%	58-103	
Pentachlorophenol	ug/L	95.553		99.010	49.505	U 97	%	50-112	
n-Nitrosodiphenylamine	ug/L	74.591		99.010	9.901	U 75	%	49-109	
4,6-Dinitro-2-methylphenol	ug/L	93.846		99.010	49.505	U 95	%	56-125	

 * %=% REC, R=RPD, A=ABS Diff., D=% Diff.

QUALITY CONTROL RESULTS

Job Number.: 214010 Report Date.: 04/03/2003

CUSTOMER: PROJECT: ATTN:

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date Time
MS	Matrix Spike	002KWLBNAB	213993-1		12/20/2002 1346

Parameter/Test Description	Units	QC Result	QC Result	True Value	Orig. Value	QC Calc.	*	Limits	F
Phenanthrene	ug/L	81.642		99.010	9.901	U 82	%	57-105	
Anthracene	ug/L	84.834		99.010	9.901	U 86	%	56-106	
Di-n-butyl phthalate	ug/L	93.369		99.010	9.901	U 94	%	55-113	
Fluoranthene	ug/L	93.977		99.010	9.901	U 95	%	51-111	
Pyrene	ug/L	115.290		99.010	9.901	U 116	%	43-118	
Butyl benzyl phthalate	ug/L	106.298		99.010	9.901	U 107	%	52-111	
Benzo(a)anthracene	ug/L	85.455		99.010	9.901	U 86	%	52-110	
Chrysene	ug/L	81.848		99.010	9.901	U 83	%	53-105	
3,3-Dichlorobenzidine	ug/L	67.024		99.010	19.802	U 68	%	30-104	
Bis(2-ethylhexyl)phthalate	ug/L	93.681		99.010	9.901	U 95	%	54-113	
Di-n-octyl phthalate	ug/L	85.495		99.010	9.901	U 86	%	31-152	
Benzo(b)fluoranthene	ug/L	73.937		99.010	9.901	U 75	%	54-129	
Benzo(k)fluoranthene	ug/L	72.257		99.010	9.901	U 73	%	48-126	
Benzo(a)pyrene	ug/L	75.994		99.010	9.901	U 77	%	40-129	
Indeno(1,2,3-cd)pyrene	ug/L	82.935		99.010	9.901	U 84	%	41-140	
Dibenzo(a,h)anthracene	ug/L	85.775		99.010	9.901	U 87	%	42-141	
Benzo(ghi)perylene	ug/L	87.477		99.010	9.901	U 88	%	38-144	

 * %=% REC, R=RPD, A=ABS Diff., D=% Diff.

QUALITY CONTROL RESULTS

Job Number.: 214010 Report Date.: 04/03/2003

CUSTOMER: PROJECT: ATTN:

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date Time

Test Method.....: 8270C Equipment Code....: GCL1 Analyst...: da
Method Description.: Semivolatile Organics Batch.....: 72368

MS	Matrix Spike	002KWLBNAB	213993-8		12/20/2002 1652

Parameter/Test Description	Units	QC Result	QC Result	True Value	Orig. Value	QC Calc.	*	Limits	F
n-Nitrosodimethylamine	ug/L	77.422		99.010	9.901	U 78	%	28-101	
Pyridine	ug/L	25.171		99.010	19.802	U 25	%	16-100	
Aniline	ug/L	18.544		99.010	9.901	U 19	%	17-111	
Phenol	ug/L	66.212		99.010	9.901	U 67	%	29-100	
Bis(2-chloroethyl)ether	ug/L	64.894		99.010	9.901	U 66	%	42-100	
1,3-Dichlorobenzene	ug/L	58.140		99.010	9.901	U 59	%	38-100	
1,4-Dichlorobenzene	ug/L	64.083		99.010	9.901	U 65	%	38-100	
1,2-Dichlorobenzene	ug/L	65.816		99.010	9.901	U 66	%	36-100	
Benzyl alcohol	ug/L	55.728		99.010	9.901	U 56	%	41-105	
2-Methylphenol (o-cresol)	ug/L	68.926		99.010	9.901	U 70	%	37-100	
2,2-oxybis (1-chloropropane)	ug/L	84.213		99.010	9.901	U 85	%	35-107	
n-Nitroso-di-n-propylamine	ug/L	83.449		99.010	9.901	U 84	%	41-107	
Hexachloroethane	ug/L	48.545		99.010	9.901	U 49	%	34-100	
4-Methylphenol (m/p-cresol)	ug/L	71.088		99.010	9.901	U 72	%	35-106	
2-Chlorophenol	ug/L	59.457		99.010	9.901	U 60	%	43-100	
Nitrobenzene	ug/L	80.650		99.010	9.901	U 81	%	41-105	
Bis(2-chloroethoxy)methane	ug/L	80.067		99.010	9.901	U 81	%	48-106	
1,2,4-Trichlorobenzene	ug/L	55.167		99.010	9.901	U 56	%	45-100	
Isophorone	ug/L	80.225		99.010	9.901	U 81	%	47-100	
2,4-Dimethylphenol	ug/L	75.932		99.010	9.901	U 77	%	35-100	
Hexachlorobutadiene	ug/L	22.239		99.010	9.901	U 22	%	41-100	*
Naphthalene	ug/L	67.025		99.010	9.901	U 68	%	51-100	
2,4-Dichlorophenol	ug/L	65.575		99.010	9.901	U 66	%	52-100	
4-Chloroaniline	ug/L	28.842		99.010	9.901	U 29	%	38-114	*
2,4,6-Trichlorophenol	ug/L	62.589		99.010	9.901	U 63	%	51-101	
2,4,5-Trichlorophenol	ug/L	66.846		99.010	49.505	U 68	%	54-107	
Hexachlorocyclopentadiene	ug/L	5.184	J	99.010	9.901	U 5	%	10-100	*
2-Methylnaphthalene	ug/L	59.088		99.010	9.901	U 60	%	48-119	
2-Nitroaniline	ug/L	94.965		99.010	49.505	U 96	%	50-112	
2-Chloronaphthalene	ug/L	53.389		99.010	9.901	U 54	%	53-100	
4-Chloro-3-methylphenol	ug/L	73.177		99.010	9.901	U 74	%	50-105	
2,6-Dinitrotoluene	ug/L	82.714		99.010	9.901	U 84	%	57-110	
2-Nitrophenol	ug/L	60.708		99.010	9.901	U 61	%	48-100	
3-Nitroaniline	ug/L	79.500		99.010	49.505	U 80	%	50-109	
Dimethyl phthalate	ug/L	73.439		99.010	9.901	U 74	%	58-104	
2,4-Dinitrophenol	ug/L	92.725		99.010	49.505	U 94	%	40-125	
Acenaphthylene	ug/L	57.122		99.010	9.901	U 58	%	56-102	
2,4-Dinitrotoluene	ug/L	97.746		99.010	9.901	U 99	%	56-115	
Acenaphthene	ug/L	56.576		99.010	9.901	U 57	%	58-102	*
Dibenzofuran	ug/L	51.683		99.010	9.901	U 52	%	57-100	*
4-Nitrophenol	ug/L	91.739		99.010	49.505	U 93	%	30-116	
Fluorene	ug/L	61.358		99.010	9.901	U 62	%	56-104	
4-Nitroaniline	ug/L	100.186		99.010	49.505	U 101	%	40-124	
4-Bromophenyl phenyl ether	ug/L	27.043		99.010	9.901	U 27	%	54-112	*
Hexachlorobenzene	ug/L	22.421		99.010	9.901	U 23	%	50-113	*
Diethyl phthalate	ug/L	85.872		99.010	9.901	U 87	%	55-107	
4-Chlorophenyl phenyl ether	ug/L	41.896		99.010	9.901	U 42	%	58-103	*
Pentachlorophenol	ug/L	38.276	J	99.010	49.505	U 39	%	50-112	*
n-Nitrosodiphenylamine	ug/L	64.423		99.010	9.901	U 65	%	49-109	
4,6-Dinitro-2-methylphenol	ug/L	75.741		99.010	49.505	U 76	%	56-125	

 * %=% REC, R=RPD, A=ABS Diff., D=% Diff.

QUALITY CONTROL RESULTS

Job Number.: 214010 Report Date.: 04/03/2003

CUSTOMER: PROJECT: ATTN:

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date	Time
MS	Matrix Spike	002KWLBNAB	213993-8		12/20/2002	1652

Parameter/Test Description	Units	QC Result	QC Result	True Value	Orig. Value	QC Calc.	*	Limits	F
Phenanthrene	ug/L	36.045		99.010	9.901 U	36	%	57-105	*
Anthracene	ug/L	34.518		99.010	9.901 U	35	%	56-106	*
Di-n-butyl phthalate	ug/L	43.086		99.010	9.901 U	44	%	55-113	*
Fluoranthene	ug/L	30.856		99.010	9.901 U	31	%	51-111	*
Pyrene	ug/L	34.734		99.010	9.901 U	35	%	43-118	*
Butyl benzyl phthalate	ug/L	36.607		99.010	9.901 U	37	%	52-111	*
Benzo(a)anthracene	ug/L	24.295		99.010	9.901 U	25	%	52-110	*
Chrysene	ug/L	23.339		99.010	9.901 U	24	%	53-105	*
3,3-Dichlorobenzidine	ug/L	12.874	J	99.010	19.802 U	13	%	30-104	*
Bis(2-ethylhexyl)phthalate	ug/L	41.258		99.010	9.901 U	42	%	54-113	*
Di-n-octyl phthalate	ug/L	38.073		99.010	9.901 U	38	%	31-152	
Benzo(b)fluoranthene	ug/L	26.583		99.010	9.901 U	27	%	54-129	*
Benzo(k)fluoranthene	ug/L	20.809		99.010	9.901 U	21	%	48-126	*
Benzo(a)pyrene	ug/L	21.239		99.010	9.901 U	21	%	40-129	*
Indeno(1,2,3-cd)pyrene	ug/L	27.389		99.010	9.901 U	28	%	41-140	*
Dibenzo(a,h)anthracene	ug/L	28.982		99.010	9.901 U	29	%	42-141	*
Benzo(ghi)perylene	ug/L	31.243		99.010	9.901 U	32	%	38-144	*

 * %=% REC, R=RPD, A=ABS Diff., D=% Diff.

QUALITY CONTROL RESULTS

Job Number.: 214010 Report Date.: 04/03/2003

CUSTOMER: PROJECT: ATTN:

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date	Time

Test Method.....: 8270C Equipment Code....: GCL1 Analyst...: da
Method Description.: Semivolatile Organics Batch.....: 72368

MSD	Matrix Spike Duplicate	002KWLBNAB	213993-1		12/20/2002	1417

Parameter/Test Description	Units	QC Result	QC Result	True Value	Orig. Value	QC Calc.	*	Limits	F
n-Nitrosodimethylamine	ug/L	81.960	86.738	98.040	9.804 U	84	%	28-101	
						5	R	20	
Pyridine	ug/L	33.252	41.186	98.040	19.608 U	34	%	16-100	
						21	R	20	*
Aniline	ug/L	37.614	51.537	98.040	9.804 U	38	%	17-111	
						31	R	20	*
Phenol	ug/L	77.422	77.389	98.040	9.804 U	79	%	29-100	
						1	R	20	
Bis(2-chloroethyl)ether	ug/L	71.671	72.270	98.040	9.804 U	73	%	42-100	
						0	R	20	
1,3-Dichlorobenzene	ug/L	63.235	66.433	98.040	9.804 U	64	%	38-100	
						5	R	20	
1,4-Dichlorobenzene	ug/L	64.389	66.126	98.040	9.804 U	66	%	38-100	
						2	R	20	
1,2-Dichlorobenzene	ug/L	64.970	70.425	98.040	9.804 U	66	%	36-100	
						7	R	20	
Benzyl alcohol	ug/L	54.941	62.035	98.040	9.804 U	56	%	41-105	
						12	R	20	
2-Methylphenol (o-cresol)	ug/L	77.049	76.027	98.040	9.804 U	79	%	37-100	
						3	R	20	
2,2-oxybis (1-chloropropane)	ug/L	81.108	86.842	98.040	9.804 U	83	%	35-107	
						6	R	20	
n-Nitroso-di-n-propylamine	ug/L	82.292	88.514	98.040	9.804 U	84	%	41-107	
						6	R	20	
Hexachloroethane	ug/L	63.858	63.160	98.040	9.804 U	65	%	34-100	
						2	R	20	
4-Methylphenol (m/p-cresol)	ug/L	79.937	80.889	98.040	9.804 U	82	%	35-106	
						0	R	20	
2-Chlorophenol	ug/L	71.820	72.991	98.040	9.804 U	73	%	43-100	
						1	R	20	
Nitrobenzene	ug/L	79.614	80.616	98.040	9.804 U	81	%	41-105	
						0	R	20	
Bis(2-chloroethoxy)methane	ug/L	81.103	83.155	98.040	9.804 U	83	%	48-106	
						1	R	20	
1,2,4-Trichlorobenzene	ug/L	74.027	72.064	98.040	9.804 U	76	%	45-100	
						4	R	20	
Isophorone	ug/L	78.139	80.298	98.040	9.804 U	80	%	47-100	
						1	R	20	
2,4-Dimethylphenol	ug/L	72.250	72.563	98.040	9.804 U	74	%	35-100	
						1	R	20	
Hexachlorobutadiene	ug/L	57.604	57.836	98.040	9.804 U	59	%	41-100	
						2	R	20	
Naphthalene	ug/L	75.773	76.332	98.040	9.804 U	77	%	51-100	
						0	R	20	
2,4-Dichlorophenol	ug/L	75.885	78.071	98.040	9.804 U	77	%	52-100	
						3	R	20	
4-Chloroaniline	ug/L	46.907	51.127	98.040	9.804 U	48	%	38-114	
						8	R	20	
2,4,6-Trichlorophenol	ug/L	91.506	83.401	98.040	9.804 U	93	%	51-101	
						10	R	20	

 * %=% REC, R=RPD, A=ABS Diff., D=% Diff.

QUALITY CONTROL RESULTS

Job Number.: 214010 | Report Date.: 04/03/2003

CUSTOMER: | PROJECT: | ATTN:

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date	Time
MSD	Matrix Spike Duplicate	002KWLBNAB	213993-1		12/20/2002	1417

Parameter/Test Description	Units	QC Result	QC Result	True Value	Orig. Value		QC Calc.	*	Limits	F
2,4,5-Trichlorophenol	ug/L	83.782	83.865	98.040	49.020	U	85 0	% R	54-107 20	
Hexachlorocyclopentadiene	ug/L	16.732	18.424	98.040	9.804	U	17 11	% R	10-100 20	
2-Methylnaphthalene	ug/L	72.961	76.906	98.040	9.804	U	74 5	% R	48-119 20	
2-Nitroaniline	ug/L	100.616	100.289	98.040	49.020	U	103 2	% R	50-112 20	
2-Chloronaphthalene	ug/L	83.815	83.557	98.040	9.804	U	85 1	% R	53-100 20	
4-Chloro-3-methylphenol	ug/L	79.355	80.726	98.040	9.804	U	81 1	% R	50-105 20	
2,6-Dinitrotoluene	ug/L	101.110	96.276	98.040	9.804	U	103 6	% R	57-110 20	
2-Nitrophenol	ug/L	74.252	71.717	98.040	9.804	U	76 5	% R	48-100 20	
3-Nitroaniline	ug/L	105.415	102.471	98.040	49.020	U	108 5	% R	50-109 20	
Dimethyl phthalate	ug/L	96.062	90.228	98.040	9.804	U	98 7	% R	58-104 20	
2,4-Dinitrophenol	ug/L	117.926	114.340	98.040	49.020	U	120 4	% R	40-125 20	
Acenaphthylene	ug/L	84.234	84.982	98.040	9.804	U	86 0	% R	56-102 20	
2,4-Dinitrotoluene	ug/L	105.036	113.491	98.040	9.804	U	107 7	% R	56-115 20	
Acenaphthene	ug/L	92.989	91.559	98.040	9.804	U	95 3	% R	58-102 20	
Dibenzofuran	ug/L	86.108	86.087	98.040	9.804	U	88 1	% R	57-100 20	
4-Nitrophenol	ug/L	113.486	111.793	98.040	49.020	U	116 3	% R	30-116 20	
Fluorene	ug/L	90.009	92.511	98.040	9.804	U	92 1	% R	56-104 20	
4-Nitroaniline	ug/L	111.609	110.106	98.040	49.020	U	114 3	% R	40-124 20	
4-Bromophenyl phenyl ether	ug/L	74.949	74.629	98.040	9.804	U	76 1	% R	54-112 20	
Hexachlorobenzene	ug/L	80.594	75.788	98.040	9.804	U	82 6	% R	50-113 20	
Diethyl phthalate	ug/L	104.438	102.000	98.040	9.804	U	107 4	% R	55-107 20	
4-Chlorophenyl phenyl ether	ug/L	90.036	84.609	98.040	9.804	U	92 8	% R	58-103 20	
Pentachlorophenol	ug/L	94.866	95.553	98.040	49.020	U	97 0	% R	50-112 20	
n-Nitrosodiphenylamine	ug/L	80.385	74.591	98.040	9.804	U	82 9	% R	49-109 20	
4,6-Dinitro-2-methylphenol	ug/L	104.638	93.846	98.040	49.020	U	107 12	% R	56-125 20	
Phenanthrene	ug/L	85.027	81.642	98.040	9.804	U	87 6	% R	57-105 20	
Anthracene	ug/L	88.082	84.834	98.040	9.804	U	90 5	% R	56-106 20	

* %=% REC, R=RPD, A=ABS Diff., D=% Diff.

QUALITY CONTROL RESULTS

Job Number.: 214010 Report Date.: 04/03/2003

CUSTOMER: PROJECT: ATTN:

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date Time
MSD	Matrix Spike Duplicate	D02KWLBNAB	213993-1		12/20/2002 1417

Parameter/Test Description	Units	QC Result	QC Result	True Value	Orig. Value	QC Calc.	*	Limits	F
Di-n-butyl phthalate	ug/L	96.763	93.369	98.040	9.804	U 99 5	% R	55-113 20	
Fluoranthene	ug/L	102.196	93.977	98.040	9.804	U 104 9	% R	51-111 20	
Pyrene	ug/L	120.492	115.290	98.040	9.804	U 123 6	% R	43-118 20	*
Butyl benzyl phthalate	ug/L	105.405	106.298	98.040	9.804	U 108 1	% R	52-111 20	
Benzo(a)anthracene	ug/L	86.007	85.455	98.040	9.804	U 88 2	% R	52-110 20	
Chrysene	ug/L	84.305	81.848	98.040	9.804	U 86 4	% R	53-105 20	
3,3-Dichlorobenzidine	ug/L	78.653	67.024	98.040	19.608	U 80 16	% R	30-104 20	
Bis(2-ethylhexyl)phthalate	ug/L	90.380	93.681	98.040	9.804	U 92 3	% R	54-113 20	
Di-n-octyl phthalate	ug/L	79.341	85.495	98.040	9.804	U 81 6	% R	31-152 20	
Benzo(b)fluoranthene	ug/L	75.723	73.937	98.040	9.804	U 77 3	% R	54-129 20	
Benzo(k)fluoranthene	ug/L	72.337	72.257	98.040	9.804	U 74 1	% R	48-126 20	
Benzo(a)pyrene	ug/L	72.212	75.994	98.040	9.804	U 74 4	% R	40-129 20	
Indeno(1,2,3-cd)pyrene	ug/L	97.427	82.935	98.040	9.804	U 99 16	% R	41-140 20	
Dibenzo(a,h)anthracene	ug/L	102.393	85.775	98.040	9.804	U 104 18	% R	42-141 20	
Benzo(ghi)perylene	ug/L	103.338	87.477	98.040	9.804	U 105 18	% R	38-144 20	

 * %=% REC, R=RPD, A=ABS Diff., D=% Diff.

QUALITY CONTROL RESULTS

Job Number.: 214010

Report Date.: 04/03/2003

CUSTOMER: PROJECT: ATTN:

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date	Time

Test Method.....: 8270C
Method Description.: Semivolatile Organics

Equipment Code....: GCL1
Batch.....: 72368

Analyst...: da

MSD	Matrix Spike Duplicate	002KWLBNAB	213993-8		12/20/2002	1723

Parameter/Test Description	Units	QC Result	QC Result	True Value	Orig. Value		QC Calc.	*	Limits	F
n-Nitrosodimethylamine	ug/L	80.469	77.422	99.010	9.901	U	81.4	% R	28-101 20	
Pyridine	ug/L	25.506	25.171	99.010	19.802	U	26.4	% R	16-100 20	
Aniline	ug/L	18.293	18.544	99.010	9.901	U	18.5	% R	17-111 20	
Phenol	ug/L	68.314	66.212	99.010	9.901	U	69.3	% R	29-100 20	
Bis(2-chloroethyl)ether	ug/L	65.341	64.894	99.010	9.901	U	66.0	% R	42-100 20	
1,3-Dichlorobenzene	ug/L	60.669	58.140	99.010	9.901	U	61.3	% R	38-100 20	
1,4-Dichlorobenzene	ug/L	63.176	64.083	99.010	9.901	U	64.2	% R	38-100 20	
1,2-Dichlorobenzene	ug/L	65.567	65.816	99.010	9.901	U	66.0	% R	36-100 20	
Benzyl alcohol	ug/L	58.800	55.728	99.010	9.901	U	59.5	% R	41-105 20	
2-Methylphenol (o-cresol)	ug/L	69.139	68.926	99.010	9.901	U	70.0	% R	37-100 20	
2,2-oxybis (1-chloropropane)	ug/L	82.674	84.213	99.010	9.901	U	84.1	% R	35-107 20	
n-Nitroso-di-n-propylamine	ug/L	83.074	83.449	99.010	9.901	U	84.0	% R	41-107 20	
Hexachloroethane	ug/L	51.875	48.545	99.010	9.901	U	52.6	% R	34-100 20	
4-Methylphenol (m/p-cresol)	ug/L	69.361	71.088	99.010	9.901	U	70.3	% R	35-106 20	
2-Chlorophenol	ug/L	59.299	59.457	99.010	9.901	U	60.0	% R	43-100 20	
Nitrobenzene	ug/L	76.572	80.650	99.010	9.901	U	77.5	% R	41-105 20	
Bis(2-chloroethoxy)methane	ug/L	74.877	80.067	99.010	9.901	U	76.6	% R	48-106 20	
1,2,4-Trichlorobenzene	ug/L	56.581	55.167	99.010	9.901	U	57.2	% R	45-100 20	
Isophorone	ug/L	71.609	80.225	99.010	9.901	U	72.12	% R	47-100 20	
2,4-Dimethylphenol	ug/L	66.992	75.932	99.010	9.901	U	68.12	% R	35-100 20	
Hexachlorobutadiene	ug/L	26.390	22.239	99.010	9.901	U	27.20	% R	41-100 20	*
Naphthalene	ug/L	68.329	67.025	99.010	9.901	U	69.1	% R	51-100 20	
2,4-Dichlorophenol	ug/L	62.867	65.575	99.010	9.901	U	63.5	% R	52-100 20	
4-Chloroaniline	ug/L	28.833	28.842	99.010	9.901	U	29.0	% R	38-114 20	*
2,4,6-Trichlorophenol	ug/L	60.541	62.589	99.010	9.901	U	61.3	% R	51-101 20	

* %=% REC, R=RPD, A=ABS Diff., D=% Diff.

QUALITY CONTROL RESULTS

Job Number.: 214010

Report Date.: 04/03/2003

CUSTOMER: PROJECT: ATTN:

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date	Time
MSD	Matrix Spike Duplicate	002KWLBNAB	213993-8		12/20/2002	1723

Parameter/Test Description	Units	QC Result		QC Result		True Value	Orig. Value		QC Calc.	*	Limits	F
2,4,5-Trichlorophenol	ug/L	64.659		66.846		99.010	49.505	U	65	%	54-107	
									5	R	20	
Hexachlorocyclopentadiene	ug/L	6.389	J	5.184	J	99.010	9.901	U	6	%	10-100	*
									18	R	20	
2-Methylnaphthalene	ug/L	61.918		59.088		99.010	9.901	U	63	%	48-119	
									5	R	20	
2-Nitroaniline	ug/L	86.260		94.965		99.010	49.505	U	87	%	50-112	
									10	R	20	
2-Chloronaphthalene	ug/L	58.238		53.389		99.010	9.901	U	59	%	53-100	
									9	R	20	
4-Chloro-3-methylphenol	ug/L	63.071		73.177		99.010	9.901	U	64	%	50-105	
									14	R	20	
2,6-Dinitrotoluene	ug/L	80.474		82.714		99.010	9.901	U	81	%	57-110	
									4	R	20	
2-Nitrophenol	ug/L	56.666		60.708		99.010	9.901	U	57	%	48-100	
									7	R	20	
3-Nitroaniline	ug/L	81.745		79.500		99.010	49.505	U	83	%	50-109	
									4	R	20	
Dimethyl phthalate	ug/L	68.171		73.439		99.010	9.901	U	69	%	58-104	
									7	R	20	
2,4-Dinitrophenol	ug/L	83.851		92.725		99.010	49.505	U	85	%	40-125	
									10	R	20	
Acenaphthylene	ug/L	58.302		57.122		99.010	9.901	U	59	%	56-102	
									2	R	20	
2,4-Dinitrotoluene	ug/L	95.715		97.746		99.010	9.901	U	97	%	56-115	
									2	R	20	
Acenaphthene	ug/L	61.399		56.576		99.010	9.901	U	62	%	58-102	
									8	R	20	
Dibenzofuran	ug/L	51.696		51.683		99.010	9.901	U	52	%	57-100	*
									0	R	20	
4-Nitrophenol	ug/L	76.629		91.739		99.010	49.505	U	77	%	30-116	
									19	R	20	
Fluorene	ug/L	62.588		61.358		99.010	9.901	U	63	%	56-104	
									2	R	20	
4-Nitroaniline	ug/L	78.114		100.186		99.010	49.505	U	79	%	40-124	
									24	R	20	*
4-Bromophenyl phenyl ether	ug/L	32.325		27.043		99.010	9.901	U	33	%	54-112	*
									20	R	20	
Hexachlorobenzene	ug/L	26.213		22.421		99.010	9.901	U	26	%	50-113	*
									12	R	20	
Diethyl phthalate	ug/L	75.730		85.872		99.010	9.901	U	76	%	55-107	
									13	R	20	
4-Chlorophenyl phenyl ether	ug/L	42.743		41.896		99.010	9.901	U	43	%	58-103	*
									2	R	20	
Pentachlorophenol	ug/L	42.047	J	38.276	J	99.010	49.505	U	42	%	50-112	*
									7	R	20	
n-Nitrosodiphenylamine	ug/L	62.584		64.423		99.010	9.901	U	63	%	49-109	
									3	R	20	
4,6-Dinitro-2-methylphenol	ug/L	78.422		75.741		99.010	49.505	U	79	%	56-125	
									4	R	20	
Phenanthrene	ug/L	42.566		36.045		99.010	9.901	U	43	%	57-105	*
									18	R	20	
Anthracene	ug/L	39.668		34.518		99.010	9.901	U	40	%	56-106	*
									13	R	20	

* %=% REC, R=RPD, A=ABS Diff., D=% Diff.

QUALITY CONTROL RESULTS

Job Number.: 214010

Report Date.: 04/03/2003

CUSTOMER: PROJECT: ATTN:

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date	Time
MSD	Matrix Spike Duplicate	002KWLBNAB	213993-8		12/20/2002	1723

Parameter/Test Description	Units	QC Result	QC Result	True Value	Orig. Value	QC Calc.	*	Limits	F
Di-n-butyl phthalate	ug/L	46.710	43.086	99.010	9.901 U	47	%	55-113	*
						7	R	20	
Fluoranthene	ug/L	32.977	30.856	99.010	9.901 U	33	%	51-111	*
						6	R	20	
Pyrene	ug/L	47.165	34.734	99.010	9.901 U	48	%	43-118	
						31	R	20	*
Butyl benzyl phthalate	ug/L	44.614	36.607	99.010	9.901 U	45	%	52-111	*
						20	R	20	
Benzo(a)anthracene	ug/L	31.926	24.295	99.010	9.901 U	32	%	52-110	*
						25	R	20	*
Chrysene	ug/L	30.302	23.339	99.010	9.901 U	31	%	53-105	*
						25	R	20	*
3,3-Dichlorobenzidine	ug/L	17.758 J	12.874 J	99.010	19.802 U	18	%	30-104	*
						32	R	20	*
Bis(2-ethylhexyl)phthalate	ug/L	51.870	41.258	99.010	9.901 U	52	%	54-113	*
						21	R	20	*
Di-n-octyl phthalate	ug/L	37.006	38.073	99.010	9.901 U	37	%	31-152	
						3	R	20	
Benzo(b)fluoranthene	ug/L	31.319	26.583	99.010	9.901 U	32	%	54-129	*
						17	R	20	
Benzo(k)fluoranthene	ug/L	24.780	20.809	99.010	9.901 U	25	%	48-126	*
						17	R	20	
Benzo(a)pyrene	ug/L	26.765	21.239	99.010	9.901 U	27	%	40-129	*
						25	R	20	*
Indeno(1,2,3-cd)pyrene	ug/L	31.115	27.389	99.010	9.901 U	31	%	41-140	*
						10	R	20	
Dibenzo(a,h)anthracene	ug/L	36.994	28.982	99.010	9.901 U	37	%	42-141	*
						24	R	20	*
Benzo(ghi)perylene	ug/L	35.296	31.243	99.010	9.901 U	36	%	38-144	*
						12	R	20	

* %=% REC, R=RPD, A=ABS Diff., D=% Diff.

QUALITY CONTROL RESULTS

Job Number.: 214010

Report Date.: 04/03/2003

CUSTOMER: PROJECT: ATTN:

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date	Time
LCS	Laboratory Control Sample	V02L11DSA	71521 -026		12/11/2002	1056

Test Method.....: 8260B
Method Description.: Volatile Organics

Equipment Code....: GCL9
Batch.....: 72105

Analyst...: jab

Parameter/Test Description	Units	QC Result	QC Result	True Value	Orig. Value	QC Calc.	*	Limits	F
Dichlorodifluoromethane	ug/L	9.083		10.000	1.000 U	91	%	56-136	
Chloromethane	ug/L	9.661		10.000	1.000 U	97	%	56-129	
Vinyl chloride	ug/L	10.007		10.000	1.000 U	100	%	67-137	
Bromomethane	ug/L	11.729		10.000	1.000 U	117	%	51-152	
Chloroethane	ug/L	10.047		10.000	1.000 U	100	%	68-135	
Trichlorofluoromethane	ug/L	8.676		10.000	1.000 U	87	%	62-141	
1,1-Dichloroethene	ug/L	7.359		10.000	1.000 U	74	%	54-127	
Iodomethane	ug/L	9.457		10.000	2.000 U	95	%	36-117	
Carbon disulfide	ug/L	6.937		10.000	5.000 U	69	%	29-136	
Acetone	ug/L	8.418		10.000	5.000 U	84	%	43-150	
Methylene chloride	ug/L	8.908		10.000	1.000 U	89	%	52-133	
trans-1,2-Dichloroethene	ug/L	8.070		10.000	1.000 U	81	%	64-119	
Methyl-tert-butyl-ether (MTBE)	ug/L	7.900		10.000	1.000 U	79	%	52-156	
1,1-Dichloroethane	ug/L	8.504		10.000	1.000 U	85	%	69-127	
Vinyl acetate	ug/L	7.442		10.000	5.000 U	74	%	70-130	
cis-1,2-Dichloroethene	ug/L	8.648		10.000	1.000 U	86	%	78-126	
2-Butanone (MEK)	ug/L	7.799		10.000	5.000 U	78	%	54-145	
Tetrahydrofuran	ug/L	8.643		10.000	5.000 U	86	%	67-166	
Chloroform	ug/L	8.489		10.000	1.000 U	85	%	74-128	
1,1,1-Trichloroethane	ug/L	8.201		10.000	1.000 U	82	%	66-129	
Carbon tetrachloride	ug/L	8.433		10.000	1.000 U	84	%	66-136	
Benzene	ug/L	8.593		10.000	1.000 U	86	%	74-116	
1,2-Dichloroethane	ug/L	8.030		10.000	1.000 U	80	%	63-133	
Trichloroethene	ug/L	8.682		10.000	1.000 U	87	%	70-120	
1,2-Dichloropropane	ug/L	8.610		10.000	1.000 U	86	%	71-132	
Dibromomethane	ug/L	8.589		10.000	1.000 U	86	%	66-131	
Bromodichloromethane	ug/L	8.783		10.000	1.000 U	88	%	76-129	
cis-1,3-Dichloropropene	ug/L	8.923		10.400	1.000 U	86	%	75-123	
4-Methyl-2-pentanone (MIBK)	ug/L	7.684		10.000	5.000 U	77	%	66-147	
Toluene	ug/L	8.655		10.000	1.000 U	87	%	71-122	
trans-1,3-Dichloropropene	ug/L	8.108		9.600	1.000 U	84	%	76-126	
1,1,2-Trichloroethane	ug/L	8.390		10.000	1.000 U	84	%	69-138	
Tetrachloroethene	ug/L	9.228		10.000	1.000 U	92	%	69-128	
2-Hexanone	ug/L	8.061		10.000	5.000 U	81	%	70-144	
Dibromochloromethane	ug/L	9.131		10.000	1.000 U	91	%	74-137	
1,2-Dibromoethane (EDB)	ug/L	8.626		10.000	1.000 U	86	%	71-135	
Chlorobenzene	ug/L	9.100		10.000	1.000 U	91	%	76-124	
1,1,1,2-Tetrachloroethane	ug/L	9.283		10.000	1.000 U	93	%	70-134	
Ethylbenzene	ug/L	9.362		10.000	1.000 U	94	%	74-121	
m&p-Xylenes	ug/L	18.462		20.000	2.000 U	92	%	71-125	
o-Xylene	ug/L	8.907		10.000	1.000 U	89	%	72-124	
Styrene	ug/L	9.415		10.000	1.000 U	94	%	80-125	
Bromoform	ug/L	9.400		10.000	1.000 U	94	%	73-139	
1,1,2,2-Tetrachloroethane	ug/L	8.632		10.000	1.000 U	86	%	72-127	
1,2,3-Trichloropropane	ug/L	9.054		10.000	1.000 U	91	%	71-126	
1,2-Dibromo-3-chloropropane	ug/L	7.736		10.000	1.000 U	77	%	66-123	

* %=% REC, R=RPD, A=ABS Diff., D=% Diff.

QUALITY CONTROL RESULTS

Job Number.: 214010 | Report Date.: 04/03/2003

CUSTOMER: | PROJECT: | ATTN:

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date	Time

Test Method.....: 8260B
Method Description.: Volatile Organics
Equipment Code....: GCL9
Batch.....: 72105
Analyst...: jab

MB	Method Blank		71521 -025		12/11/2002	1020

Parameter/Test Description	Units	QC Result		QC Result	True Value	Orig. Value	QC Calc.	*	Limits	F
Dichlorodifluoromethane	ug/L	1.000	U							
Chloromethane	ug/L	1.000	U							
Vinyl chloride	ug/L	1.000	U							
Bromomethane	ug/L	1.000	U							
Chloroethane	ug/L	1.000	U							
Trichlorofluoromethane	ug/L	1.000	U							
Acrolein	ug/L	200.000	U							
1,1-Dichloroethene	ug/L	1.000	U							
Iodomethane	ug/L	2.000	U							
Carbon disulfide	ug/L	5.000	U							
Acetone	ug/L	5.000	U							
Acetonitrile	ug/L	40.000	U							
Methylene chloride	ug/L	1.000	U							
trans-1,2-Dichloroethene	ug/L	1.000	U							
Acrylonitrile	ug/L	40.000	U							
Methyl-tert-butyl-ether (MTBE)	ug/L	1.000	U							
1,1-Dichloroethane	ug/L	1.000	U							
Vinyl acetate	ug/L	5.000	U							
cis-1,2-Dichloroethene	ug/L	1.000	U							
2-Butanone (MEK)	ug/L	5.000	U							
Propionitrile	ug/L	40.000	U							
Tetrahydrofuran	ug/L	5.000	U							
Chloroform	ug/L	1.000	U							
1,1,1-Trichloroethane	ug/L	1.000	U							
Carbon tetrachloride	ug/L	1.000	U							
Benzene	ug/L	1.000	U							
1,2-Dichloroethane	ug/L	1.000	U							
Trichloroethene	ug/L	1.000	U							
1,2-Dichloropropane	ug/L	1.000	U							
Dibromomethane	ug/L	1.000	U							
Bromodichloromethane	ug/L	1.000	U							
cis-1,3-Dichloropropene	ug/L	1.000	U							
4-Methyl-2-pentanone (MIBK)	ug/L	5.000	U							
Toluene	ug/L	1.000	U							
trans-1,3-Dichloropropene	ug/L	1.000	U							
1,1,2-Trichloroethane	ug/L	1.000	U							
Tetrachloroethene	ug/L	1.000	U							
2-Hexanone	ug/L	5.000	U							
Dibromochloromethane	ug/L	1.000	U							
1,2-Dibromoethane (EDB)	ug/L	1.000	U							
Chlorobenzene	ug/L	1.000	U							
1,1,1,2-Tetrachloroethane	ug/L	1.000	U							
Ethylbenzene	ug/L	1.000	U							
m&p-Xylenes	ug/L	2.000	U							
o-Xylene	ug/L	1.000	U							
Styrene	ug/L	1.000	U							
Bromoform	ug/L	1.000	U							
trans-1,4-Dichloro-2-butene	ug/L	2.000	U							
1,1,2,2-Tetrachloroethane	ug/L	1.000	U							
1,2,3-Trichloropropane	ug/L	1.000	U							

* %=% REC, R=RPD, A=ABS Diff., D=% Diff.

QUALITY CONTROL RESULTS

Job Number.: 214010

Report Date.: 04/03/2003

CUSTOMER: PROJECT: ATTN:

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date	Time
MB	Method Blank		71521 -025		12/11/2002	1020

Parameter/Test Description	Units	QC Result	QC Result	True Value	Orig. Value	QC Calc.	*	Limits	F
1,2-Dibromo-3-chloropropane	ug/L	1.000	U						
3-Chloropropene (Allyl Chloride)	ug/L	2.000	U						
2-Chloro-1,3-butadiene (chloroprene)	ug/L	1.000	U						
Methylmethacrylate	ug/L	2.000	U						
Ethylmethacrylate	ug/L	2.000	U						
Pentachloroethane	ug/L	2.000	U						

* %=% REC, R=RPD, A=ABS Diff., D=% Diff.

QUALITY ASSURANCE METHODS

REFERENCES AND NOTES

Report Date: 04/03/2003

REPORT COMMENTS

1) All pages of this report are integral parts of the analytical data. Therefore, this report should be reproduced only in its entirety.
2) Soil, sediment and sludge sample results are reported on a "dry weight" basis except when analyzed for landfill disposal or incineration parameters. All other solid matrix samples are reported on an "as received" basis unless noted differently.
3) Reporting limits are adjusted for sample size used, dilutions and moisture content if applicable.
4) The test results for the noted analytical method(s) meet the requirements of NELAC. Lab Cert. ID# 100201
5) Arizona Environmental Laboratory License number AZ0603.
6) According to 40CFR Part 136.3, pH, Chlorine Residual and Dissolved Oxygen analyses are to be performed immediately after aqueous sample collection. When these parameters are not indicated as field (e.g. pH Field) they were not analyzed immediately, but as soon as possible on laboratory receipt.

Glossary of flags, qualifiers and abbreviations (any number of which may appear in the report)

Inorganic Qualifiers (Q-Column)

U Analyte was not detected at or above the stated limit.
< Not detected at or above the reporting limit.
J Result is less than the RL, but greater than or equal to the method detection limit.
B Result is less than the CRDL/RL, but greater than or equal to the IDL/MDL.
S Result was determined by the Method of Standard Additions.
F AFCEE: Result is less than the RL, but greater than or equal to the method detection limit.

Inorganic Flags (Flag Column)

- ICV,CCV,ICB,CCB,ISA,ISB,CRI,CRA,MRL: Instrument related QC exceed the upper or lower control limits.
* LCS, LCD, MD: Batch QC exceeds the upper or lower control limits.
+ MSA correlation coefficient is less than 0.995.
4 MS, MSD: The analyte present in the original sample is 4 times greater than the matrix spike concentration; therefore, control limits are not applicable.
E SD: Serial dilution exceeds the control limits.
+ MB, EB1, EB2, EB3: Batch QC is greater than reporting limit or had a negative instrument reading lower than the absolute value of the reporting limit.
N MS, MSD: Spike recovery exceeds the upper or lower control limits.
W AS(GFAA) Post-digestion spike was outside 85-115% control limits.

Organic Qualifiers (Q - Column)

U Analyte was not detected at or above the stated limit.
ND Compound not detected.
. Result is an estimated value below the reporting limit or a tentatively identified compound (TIC).
C Result was qualitatively confirmed, but not quantified.
C Pesticide identification was confirmed by GC/MS.
Y The chromatographic response resembles a typical fuel pattern.
Z The chromatographic response does not resemble a typical fuel pattern.
E Result exceeded calibration range, secondary dilution required.
F AFCEE:Result is an estimated value below the reporting limit or a tentatively identified compound (TIC)

Organic Flags (Flags Column)

B MB: Batch QC is greater than reporting limit.
* LCS, LCD, ELC, ELD, CV, MS, MSD, Surrogate: Batch QC exceeds the upper or lower control limits.
- EB1, EB2, EB3, MLE: Batch QC is greater than reporting Limit
A Concentration exceeds the instrument calibration range
a Concentration is below the method Reporting Limit (RL)
B Compound was found in the blank and sample.
D Surrogate or matrix spike recoveries were not obtained because the extract was diluted for analysis; also compounds analyzed at a dilution will be flagged with a D.
+ Alternate peak selection upon analytical review
I Indicates the presence of an interfence, recovery is not calculated.
M Manually integrated compound.

P The lower of the two values is reported when the % difference between the results of two GC columns is greater than 25%.

Abbreviations

AS	Post Digestion Spike (GFAA Samples - See Note 1 below)
Batch	Designation given to identify a specific extraction, digestion, preparation set, or analysis set
CAP	Capillary Column CCB Continuing Calibration Blank
CCV	Continuing Calibration Verification
C=	Confirmation analysis of original
C1	Confirmation analysis of A1 or D1
C2	Confirmation analysis of A2 or D2
C3	Confirmation analysis of A3 or D3
CRA	Low Level Standard Check - GFAA; Mercury
CRI	Low Level Standard Check - ICP
CV	Calilbration Verification Standard
Dil Fac	Dilution Factor - Secondary dilution analysis
D1	Dilution 1
D2	Dilution 2
D3	Dilution 3
DLFac	Detection Limit Factor
DSH	Distilled Standard - High Level
DSL	Distilled Standard - Low Level
DSM	Distilled Standard - Medium Level
EB1	Extraction Blank 1
EB2	Extraction Blank 2
EB3	DI Blank
ELC	Method Extracted LCS
ELD	Method Extracted LCD
ICAL	Initial calibration
ICB	Initial Calibration Blank
ICV	Initial Calibration Verification
IDL	Instrument Detection Limit
ISA	Interference Check Sample A - ICAP
ISB	Interference Check Sample B - ICAP
Job No.	The first six digits of the sample ID which refers to a specific client, project and sample group Lab ID An 8 number unique laboratory identification
LCD	Laboratory Control Standard Duplicate
LCS	Laboratory Control Standard with reagent grade water or a matrix free from the analyte of interest
MB	Method Blank or (PB) Preparation Blank
MD	Method Duplicate
MDL	Method Detection Limit
MLE	Medium Level Extraction Blank
MRL	Method Reporting Limit Standard
MSA	Method of Standard Additions
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ND	Not Detected
PREPF	Preparation factor used by the Laboratory's Information Management System (LIMS)
PDS	Post Digestion Spike (ICAP)
RA	Re-analysis of original
A1	Re-analysis of D1
A2	Re-analysis of D2
A3	Re-analysis of D3
RD	Re-extraction of dilution
RE	Re-extraction of original
RC	Re-extraction Confirmation
RL	Reporting Limit
RPD	Relative Percent Difference of duplicate (unrounded) analyses
RRF	Relative Response Factor

QUALITY ASSURANCE METHODS

REFERENCES AND NOTES

Report Date: 04/03/2003

RT	Retention Time
RTW	Retention Time Window Sample ID A 9 digit number unique for each sample, the first six digits are referred as the job number
SCB	Seeded Control Blank
SD	Serial Dilution (Calculated when sample concentration exceeds 50 times the MDL)
LCB	*Unseeded Control Blank*
SSV	Second Source Verification Standard
SLCS	Solid Laboratory Control Standard(LCS)
PHC	pH Calibration Check LCSP pH Laboratory Control Sample
LCDP	pH Laboratory Control Sample Duplicate
MDPH	pH Sample Duplicate
MDFP	Flashpoint Sample Duplicate
LCFP	Flashpoint LCS
C1	Gelex Check Standard Range 0-1
C2	Gelex Check Standard Range 1-10
C3	Gelex Check Standard Range 10-100
C4	Gelex Check Standard Range 100-1000

Note 1: The Post Spike Designation on Batch QC for GFAA is designated with an "S" added to the current abbreviation used. EX. LCS S=LCS Post Spike (GFAA); MSS=MS Post Spike (GFAA)

Note 2: The MD calculates an absolute difference (A) when the sample concentration is less than 5 times the reporting limit. The control limit is represented as +/- the RL.

Clayton
GROUP SERVICES

ATTACHMENT 2-1

STL KNOXVILLE STANDARD OPERATING PROCEDURE

Receipt and Log In of Commercial Samples

STL KNOXVILLE

STANDARD OPERATING PROCEDURE

TITLE: RECEIPT AND LOG IN OF COMMERCIAL SAMPLES

(SUPERSEDES: KNOX-SC-0003, Rev. 5)

Prepared By: 3-5-03

Reviewed By: 03-05-03
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1. Purpose

1.1. This standard operating procedure describes the receipt and log in activities that are the responsibility of the STL Knoxville sample receiving associates.

2. Responsibilities

2.1. It is the responsibility of the STL Knoxville sample receiving associates to perform the tasks as they are documented in this standard operating procedure.

2.2. It is the responsibility of the Laboratory Director and Customer Service Manager to supply adequate training, material and equipment to enable the associates to perform these tasks correctly.

3. Safety

3.1. Procedures shall be carried out in a manner that protects the health and safety of all associates.

3.2. Eye protection that satisfies ANSI Z87.1 (as per the STL Corporate Safety Manual), laboratory coat and appropriate gloves must be worn while samples, standards, solvents and reagents are being handled. Disposable gloves that have become contaminated will be removed and discarded, other gloves will be cleaned immediately. VITON gloves may be worn when halogenated solvents are used for extractions or sample preparation. Nitrile gloves may be used when other solvents are handled. [Note: VITON is readily degraded by acetone; all solvents will readily pass through disposable latex rubber gloves.]

3.3. Exposure to chemicals will be maintained **as low as reasonably achievable**, therefore, unless they are known to be non-hazardous, all samples will be opened, transferred and prepared in a fume hood, or under other means of mechanical ventilation. Solvent, and waste containers will be kept closed unless transfers are being made.

3.4. The preparation of all standards and reagents and glassware cleaning procedures that involve solvents such as methylene chloride will be conducted in a fume hood with the sash closed as far as the operations will permit.

3.5. All work must be stopped in the event of a known, or potential compromise to the health or safety of an associate. The situation must be reported **immediately** to a laboratory supervisor.

4. Procedure

4.1. Before samples arrive at the laboratory, the laboratory must provide to the sample collection personnel the sample acceptance policy. This is normally sent by the Project Manager to the client with the quote. See Appendix I.

4.2. Project Managers should make a reasonable effort to determine if samples to be received are radioactive in nature.

4.3. The shipping container is opened under a vented fume hood. If there are noxious fumes, work is stopped and the Health and Safety coordinator is notified. If there are broken or leaking samples that are known or suspected to contain radioactive material, the work is stopped and the Radiation Safety Officer, or designee, is notified.

4.4. If the samples are known or suspected to contain radioactive material, the shipping containers and samples are surveyed according to the following.

NOTE: If radioactive samples are to be received, the Project Manager should make a reasonable effort to obtain screening data (either Gross Alpha/Gross Beta data (activity and specific activity), or specific radionuclide data (activity and specific activity)) from the client for each of the samples. The Radiation Safety Officer shall make a reasonable effort to ensure that any screening data received is acceptable.

4.4.1. If the package is labeled as a RADIOACTIVE MATERIAL shipment (as defined by 49 CFR 173.403), the sample control associate shall ensure that the external surfaces of the package are monitored by performing the following within 3 hours of receipt of the package, if received during the hours of 8:00 a.m. to 5:00 p.m. Monday through Friday, excluding holidays. If received at other times, the package shall be monitored within 3 hours after the beginning of the next working day.

4.4.2. Wipe Survey

4.4.2.1. Place a filter paper disc on the surface to be sampled.

4.4.2.2. Move the disc over an "s"-shaped area using moderate pressure, covering at least approximately 100 cm^2 (6 in^2), or at least approximately 20 inches in length, or the entire surface, if it is less than 100 cm^2 in area.

4.4.2.3. Place the disc smear in a container such that individual smears are separated from each other to prevent cross contamination.

4.4.2.4. Count each smear for alpha and beta activity in the Protean IPC9025 for five minutes. A shorter count time may be used if the

count is long enough to have a detection limit below the contamination limit.

4.4.3. Exposure Rate

4.4.3.1. Measure the contact exposure rate of the package with a Ludlum Model 19 Micro-R Meter according to the STL Knoxville SOP KNOX-HS-0014, current revision, "Background and Source Check and Use of Portable Radiation Survey Instruments."

4.4.3.2. Measure the exposure rate of the package at 1 meter with a Ludlum Model 19 Micro-R Meter.

4.4.3.3. If the monitoring data of the package exceeds the site license criteria, contact the RSO, or designee.

4.5. The sample control associate shall open the package and ensure that the external surfaces of the containers are monitored by performing Section 4.4.2 on each container (or as a composite of any number of the containers), and Section 4.4.3 on each container.

4.6. If the monitoring data of any sample exceeds the site license criteria, contact the RSO, or designee.

4.7. Record all monitoring data, of both packages and containers, on a Radiological Survey form.

4.8. Classification of samples shall be performed according to THE STL Knoxville SOP KNOX-HS-0001, current revision, "Radiological Sample Screening and Classification".

4.9. The sample control associate shall ensure that all radiological documents are available for second level review by the RSO, or designee prior to release of the samples to the laboratory.

4.10. The sample control associate shall ensure that each container holding a radioactive sample is labeled/marked as CAT I or CAT II, as appropriate.

4.11. If the package is known to contain samples that are radioactive, but the package is not labeled as RADIOACTIVE MATERIAL, the following procedure is followed:

NOTE: The indication that a package contains radioactive samples may be through verbal or written communication from a client, historical knowledge of a site/project by a sample control associate, or through

labeling/marking of containers within the package with a recognized radioactive label/marking.

4.11.1. The sample control associate shall open the package and ensure that the external surfaces of the containers are monitored by performing the following.

4.11.1.1. Wipe Survey

4.11.1.1.1. Perform the procedure specified in Section 4.4.2 on each container (or as a composite of any number of the containers).

4.11.1.2. Count Rate

4.11.1.2.1. Measure the count rate of the package with a Ludlum Model 3 with Model 44-9 Pancake G-M Detector according to STL Knoxville SOP, KNOX-HS-0014, current revision, "Background and Source Check and Use of Portable Radiation Survey Instruments".

4.11.2. If the monitoring data of any sample exceeds the site license criteria, contact the RSO, or designee. Additionally, the sample control associate shall proceed back to Section 4.4.2, and perform additional monitoring of packages and containers described in that section.

4.11.3. Record all container monitoring data on a Radiological Survey form.

4.11.4. Classification of samples shall be performed according to the STL Knoxville SOP KNOX-HS-0001, current revision, "Radiological Sample Screening and Classification".

NOTE: If historical screening information is available for a sample, this data may be used for sample classification.

4.11.5. The sample control associate shall ensure that all radiological documents are available for second level review by the RSO, or designee prior to release of the samples to the laboratory.

4.11.6. The sample control associate shall ensure that each container holding a radioactive sample is labeled/marked as CAT I or CAT II, as appropriate.

4.12. If the package is suspected to contain samples that are radioactive:

NOTE: Suspicion that a package contains samples that are radioactive can be the result of keywords such as, but not limited to: FUSRAP, national laboratory,

nuclear, uranium mine, Hanford, Las Vegas, Los Alamos, Mound, Oak Ridge, and Paducah. Additionally, shipping papers should be examined for contamination survey information, or screening data as an indication of the potential radioactive nature of samples.

4.12.1. Contact the RSO, or designee, who shall, working with information supplied by the Project Manager/client, determine whether or not the samples are to be processed as radioactive samples, or non-radioactive samples.

4.12.2. If the samples are determined to be radioactive, the sample control associate will proceed to process the samples as specified in Section 4.11.1

4.13. If the package is known or suspected to contain radioactive materials, and is treated as containing radioactive sample(s) based on the previous assessment(s) and the package or containers are crushed, wet, or damaged, the sample control associate shall proceed to monitor the packages and containers as specified in Section 4.4.2

4.14. The sample control associate will open and examine the shipping container and remove the enclosed sample documents. The following are recorded on the client's chain of custody form:

- Were custody seals present?
- The temperature of the cooler. If a temperature vial is present, it is used to take the temperature. Otherwise, the temperature is taken along the side of the bottle containers. The way the temperature was taken is recorded. The acceptable temperature range for sample coolers is 4°C $\pm$ 2°C.
- The shipper's tracking number.
- Signature/initials and date.

4.15. The following information is then recorded on the Cooler Receipt Form/Sample Receiving Checklist (See Appendix II):

- Presence of custody seals on the outside of the cooler.
- Presence of chain-of-custody forms inside the cooler.
- The chain-of-custody forms were properly filled out in ink.

- The chain-of-custody forms were signed and dated in the appropriate places.

- Presence of the shipper's packing slip and/or request for analysis.

- Conditions of samples at receipt (chilled, etc.). If a temperature vial is present, it is used to take the temperature. Otherwise, the temperature is taken along the side of the bottle containers. The way the temperature was taken is recorded. The acceptable temperature range for sample coolers is 4°C $\pm$ 2°C. Summa canisters should be received at ambient temperature.

- Condition of bottles upon receipt (good condition, broken, etc.).

- Complete bottle labels (date, signed, analysis, and preservations).

- Information on bottle labels and tags agree with custody papers.

- *Correct bottles used for the tests indicated.*

- VOA bottles checked for the presence of air bubbles. If headspace is noted, the sample receiving associate will affix a round label (approximately ¾") and mark the vial with "HS" with indelible ink.

- Verify sample pH as appropriate (does not include VOAs). This is also noted on the client's chain of custody form. When the laboratory performs sample preservation, the preservative used and the lot number of the preservative will be documented on the COC or CUR.

- Sufficient amount of sample sent for each analyses requested.

- Samples were verified received within holding time as specified in QAMP.

- Samples were received via overnight courier, client drop off or other means.

4.16. The sample control associate then removes all sample containers. Any broken, leaking or dirty sample containers are placed inside the fume hood. Dirty sample containers are cleaned appropriately so as not to contaminate the sample storage area.

4.17. The sample control associate examines all documents and compares the information from the sample container labels and chain-of-custody records to ensure that there are no discrepancies between the documents and that all documents are properly completed and signed.

4.18. If any problems or discrepancies are noted during the sample receiving process, such as improper paperwork or broken or leaking samples, the sample control associate signs for the shipment and documents the problems on a Condition Upon Receipt Variance form (CUR, see Appendix II). All discrepancies are also recorded on the Sample Receipt Checklist. The sample control associate immediately notifies the project manager. The project manager contacts the client to rectify the situation.

4.19. If all samples recorded on the chain-of-custody record were received by the laboratory and there are no problems observed with the sample shipment, the sample control associate signs, dates and times the chain-of-custody record in the "Received for Laboratory by:" box on the document.

4.20. After the samples have been removed from shipping containers and organized according to client's chain-of-custody form and the appropriate sample receipt paperwork (e.g., CUR, Sample Receipt Checklist) has been completed, the sample control associate notifies the project managers to "greet" their client's samples. The project managers review the client's chain-of-custody records and CUR's (if any). If the project manager cannot review the sample receiving documentation immediately, the samples requiring temperature preservation are placed in a sample storage refrigerator (volatiles samples stored separately) until the project manager review is completed. At this time, the project manager gives the sample custody associate or designee the appropriate quote number, so that sample log-in may be performed under the correct quote.

4.21. After the project manager greets the samples, the samples are ready to be logged into the laboratory information system, QuantIMS.

4.22. The project information is taken from the designated quote and the following information is entered into QuantIMS

- Date and time of receipt
- Client sample IDs
- Collection dates/times
- Storage location
- Test parameters (Method codes and Target Analyte Lists as defined by the Project Manager in the quote and requested by the client on the chain of custody)
- Sample Type (Refer to the QuantIMS checklist as defined by the PM)
- Refer to the QuantIMS general comments/checklist comments for any other fields that must be populated to meet electronic deliverable (EDD) requirements.

4.22.1.1. Some clients request that the samples be reported by Sample Delivery Group (SDG). The SDG is a group of samples received

over a client-specified time period (therefore, different lots) that are reported together. The SDGs are tracked by sample receiving and documented in an Excel spreadsheet in Qmidtn01/public/SDG/numerical and/or alphabetic name of SDG.

4.22.1.2. All water samples requesting either total or dissolved/filtered metals analyses will be processed as follows:

- The sample receiving associate will assign the work order for total metals analysis SAC, and the work order for dissolved metals SAC from the quote. Note that the last three work order characters will be discreet for both SACs.
- The sample receiving associate will enter QIMS sample comments as either "field filtered" or "needs to be filtered at the lab".
- The sample receiving associate will either write on the container or affix a label on the filtered metals container as either "LF" for lab filtered or "FF" for field filtered.
- The samples needing to be lab filtered will be stored at $4^{\circ} \pm 2\,^{\circ}C$ until the metals group filters and preserves the samples; after filtering and preservation, the samples may be stored at room temperature.
- The sample receiving will verbally notify the metals group when the client requests the lab to filter samples.

4.23. QuantIMS assigns unique numbers and/or letter combinations to all projects, lots, samples and tests.

4.23.1. The first set of numbers/letters for a group of samples entering the laboratory is called the lot or lab ID number. Samples also receive a work order number that describes the type of test a sample will receive. As an analyst receives notice of the sample for their respective department, they batch groups of similar samples together and the samples are then assigned a batch number.

4.23.2. Each group of samples received or shipped from a specific site on the same day is logged in under a unique lot number. Each sample within a given lot receives a laboratory number or ID. Each lab ID is 12 of a possible 13 characters (H3A010121-001).

4.23.3. Lot number: The lot number is 9 characters long. Lot number **H1A010121** is described as follows:

- **H** - the alpha character indicates the STL location where the samples were

received. (H = Knoxville)

- **3** - the numeric character indicates the last digit of the year (i.e., 2003)
- **A** - the alpha character indicates the month (A = January, B = February, etc.)
- *the next 2 numeric characters identify the day of the month, in this case* the first day of the month.
- **0121**- the last 4 numeric characters are the sequential assignment of numbers specific to each lot received. Each day the first lot logged in receives the number 0001. Batch specific QC samples (method blanks, LCS, LCSD) receive a sequential assignment of 0000.

4.23.4. Sample Numbers: The samples in each lot are assigned a sample number that is attached to the lot number and are reset at each new lot. For example, the first and second samples in the lot above are labeled H3A010121-**001** and H3A010121-**002**.

4.23.5. Suffixes: Each sample also has a 1 character field (which may not be needed for all samples) called the suffix which identifies it as a:

Client sample - no suffix
Method blank - B
Check/Control Sample - C
Check dup/Dup control - L
Matrix spike (MS) - S
Matrix spike dup (MSD) - D
Sample dup/dup analysis - X
Serial dilution - P

4.23.6. 4.10.6 Each test has an 8 digit work order number. Work order number **A1234-2-01** is described as follows:

- **A1234** - The first 5 characters identify each sample.
- **2** - The 'modifier' indicates the type of run. In this case this is the second time the sample had to be run. *If it needs reextraction/repreparation and* run again the number would indicate a "3".
- **01** - The suffix is the test number of that specific sample. For example the "01" may indicate the 'silver' analysis, "02" may indicate the 'arsenic' analysis, an "03" may indicate a 'BOD', etc.
- The client requested analytical and preparatory methods and analyte lists defined by the project manager in the quote are linked to the work order number.

4.24. QuantIMS generates the sample labels based on the information from the quote and the login process. The sample containers are labeled, with the sample receiving associate carefully matching the client ID and analysis on the container

with that on the QuantIMS label.

4.25. The samples are then placed in the sample storage refrigerators. Volatiles are stored separate from other analyses and metals samples are stored on shelves.

4.26. All sample receiving documents relevant to the lot are labeled with the lot number. All paperwork received from the client as well as that generated during sample login is filed in the lot project folder. The folder is divided into sections, with specific information going in each section. Refer to the STL Knoxville SOP KNOX-AD-0002, "Project Records", current revision.

4.27. Once the sample login process is complete, the project file is ready for the project manager to review and the samples are ready for analysis.

4.28. Any deviations from this procedure by STL associates must be documented as a nonconformance, with a cause and corrective action described.

5. Definitions

5.1. None

6. Appendices

6.1. Appendix I: Example Sample Acceptance Policy

6.2. Appendix II: Example Sample Receipt/Condition Upon Receipt Anomaly Checklist

Appendix I: Example Sample Acceptance Policy

STL Knoxville
Sample Acceptance Policy

The information below outlines the circumstances under which sample will be accepted by STL Knoxville. Failure to meet the following criteria will be noted in the project narrative. Please notify your PM with any questions.

Area of Concern
1. Proper, full and complete documentation, which includes sample identification, the location, data and time of collection, collector's name, preservation type, sample type, test requested and any special remarks concerning the samples shall be provided with the samples.
2. The samples shall be properly labeled to include unique identification. The labels must be durable (water resistant) and indelible ink must be used.
3. The samples shall be collected in the appropriate sample containers.
4. The samples shall arrive at the laboratory within the specified holding time for the analyses requested.
5. Sufficient sample volume must be available to perform the necessary tests.
6. The client will be notified upon sample receipt if the samples exhibit obvious signs of damage, contamination or inadequate preservation.

Appendix II: Example Sample Receipt/Condition Upon Receipt Anomaly Checklist

STL KNOXVILLE
SAMPLE RECEIPT/CONDITION UPON RECEIPT ANOMALY CHECKLIST
Page 1 of _____

CLIENT: _____ PROJECT: _____ Lot No.: _____

TO BE COMPLETED BY SAMPLE RECEIPT ASSOCIATE:

1. Sample Receipt:	YES	NO	NA
a. Do sample container labels match COC? (IDs, Dates, Times)	___	___	___
b. Is the cooler temperature within acceptance limits? (NOTE: North Carolina, 1668, 1613B: 0-4°C; VOST: 10°C)	___	___	___
c. Were samples received with correct preservative (excluding Encore)?	___	___	___
d. Were custody seals present/intact on cooler and/or containers?	___	___	
e. Were all of the samples listed on the COC received?	___	___	___
f. Were all of the sample containers received intact?	___	___	___
g. Were containers received for VOAs received without headspace?	___	___	___
h. Were samples received in the appropriate containers?	___	___	___
i. Did you check for residual chlorine, if necessary?	___	___	___
j. Were samples received within 1/2 of the holding time?	___	___	___
k. Were samples screened for radioactivity?	___		___
l. Were client's sample documents (RFA/COC) received?	___	___	___
m. Has the RFA/COC been relinquished? (Signed, Dated, Timed)	___	___	___
n. Are test/parameters listed for each sample?	___	___	___
o. Is the matrix of the samples noted?	___	___	___
p. Is the date/time of sample collection noted?	___	___	___
q. Is the client and project name/No. identified?	___	___	___
p. Was the sampler identified on the RFA/COC?	___	___	___

SAMPLE RECEIVING ASSOCIATE: _____ DATE: _____

TO BE COMPLETED BY PROJECT MANAGER :

1. Project manager "Sample Greet":	YES	NO	NA
a. Quote number to be logged-in under _____			
b. Informed Login associates of special instructions ?	___	___	___
_____			
_____			
2. If custody seals were missing/not intact, was client notified?	___	___	___

PROJECT MANAGER : _____ DATE: _____

Client Sample ID	Analysis Requested	Condition (see legend)	Comments/Action

☐ Client informed on _____ by _____. Person contacted: _____.
☐ Noted actions in comments section above.
☐ No action necessary; process as is.
Project Manager: _____ Date: _____

Appendix II: Example Sample Receipt/Condition Upon Receipt Anomaly Checklist, cont'd.

STL KNOXVILLE
SAMPLE RECEIPT/CONDITION UPON RECEIPT ANOMALY CHECKLIST
Page 1 of _____

CLIENT: _____ PROJECT: _____ Lot No.: _____

TO BE COMPLETED BY SAMPLE RECEIPT ASSOCIATE:

1. Sample Receipt:	YES	NO	NA
a. Do sample container labels match COC? (IDs, Dates, Times)	___	___	___
b. Is the cooler temperature within acceptance limits? (NOTE: North Carolina, 1668, 1613B: 0-4°C; VOST: 10°C)	___	___	___
c. Were samples received with correct preservative (excluding Encore)?	___	___	___
d. Were custody seals present/intact on cooler and/or containers?	___	___	
e. Were all of the samples listed on the COC received?	___	___	___
f. Were all of the sample containers received intact?	___	___	___
g. Were containers received for VOAs received without headspace?	___	___	___
h. Were samples received in the appropriate containers?	___	___	___
i. Did you check for residual chlorine, if necessary?	___	___	___
j. Were samples received within 1/2 of the holding time?	___	___	___
k. Were samples screened for radioactivity?	___		___
l. Were client's sample documents (RFA/COC) received?	___	___	___
m. Has the RFA/COC been relinquished? (Signed, Dated, Timed)	___	___	___
n. Are test/parameters listed for each sample?	___	___	___
o. Is the matrix of the samples noted?	___	___	___
p. Is the date/time of sample collection noted?	___	___	___
q. Is the client and project name/No. identified?	___	___	___
p. Was the sampler identified on the RFA/COC?	___	___	___

SAMPLE RECEIVING ASSOCIATE: _____ DATE: _____

TO BE COMPLETED BY PROJECT MANAGER :

1. Project manager "Sample Greet":	YES	NO	NA
a. Quote number to be logged-in under _____			
b. Informed Login associates of special instructions ?	___	___	___
_____			
_____			
2. If custody seals were missing/not intact, was client notified?	___	___	___

PROJECT MANAGER : _____ DATE: _____

Client Sample ID	Analysis Requested	Condition (see legend)	Comments/Action

☐ Client informed on _____ by _____. Person contacted: _____.
☐ Noted actions in comments section above.
☐ No action necessary; process as is.
Project Manager: _____ Date: _____

Clayton
GROUP SERVICES

ATTACHMENT 2-2

STL KNOXVILLE STANDARD OPERATING PROCEDURE

VOA Canister Analysis

Control Copy
Copy No. UNCONTROLLED COPY

SOP No.: KNOX-MS-0001
Revision No.: 4
Revision Date: 8/25/03
Implementation Date: 9/3/03

STL KNOXVILLE

STANDARD OPERATING PROCEDURE

TITLE: VOA CANISTER ANALYSIS

(SUPERSEDES: KNOX-MS-0001, Revision 3)

Prepared By: _____

Reviewed By: Charlie Jarman 8/29/03
Technical Specialist

Approved By: Christopher White Rugell 08/29/03
Quality Assurance Manager

Approved By: Benjamin Clerby 9-2-03
Environmental, Health and Safety Coordinator

Approved By: _____ 8/29/03
Laboratory Director

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1. Scope and Application

1.1. The purpose of this standard operating procedure is to define the procedures and quality control necessary to analyze samples collected in "SUMMA™ passivated" stainless steel canisters.

1.2. This procedure is applicable to the analysis of ambient air, indoor air, landfill gases and other gaseous samples. It is based on EPA Methods TO-14, TO14A and TO-15.

1.3. Responsibilities to perform this procedure in the lab are as follows:

Position	Responsibilities
Analyst	- Prepares and analyzes samples - Summarizes/assembles data package - Reviews the data package
Team/Group Leader	- Schedules/assigns analyses - Reviews data package

2. Summary of Method

2.1. Microscale Purge and Trap (MSPT): A precisely measured aliquot is removed from the canister and concentrated on a cryogenic trap. The cryogenic trap is desorbed. Polar and nonpolar compounds are quantitatively transferred to a subambient Tenax™ trap. Most of the water remains on the Cryotrap and CO2 passes through the Tenax trap and is vented. The Tenax™ trap is thermally desorbed to the on-column cryofocuser. Sample components are separated by temperature programmed gas chromatography and detected with a quadrupole mass spectrometer.

2.2. The compounds analyzed by this method are listed in Tables 1, 2 and 3.

3. Definitions

3.1. Canister - a stainless steel container, typically 6-liter volume, equipped with a stainless steel shut-off valve, suitable for use from vacuum to 40 psig.

3.2. SUMMATM Passivation - a proprietary treatment process used to deactivate stainless steel surfaces. It produces a pure chrome/nickel oxide surface that features a high level of inertness.

3.3. Absolute pressure - pressure measured with reference to absolute zero pressure, expressed as kpa, mmHg, or psia.

3.4. Gauge pressure - pressure above atmospheric pressure as measured by a standard gauge. Zero gauge pressure is equal to ambient atmospheric pressure, expressed as mmHg, inches Hg, or psig.

3.5. Polar compound - Oxygen-containing compound capable of forming hydrogen bonds in water; compound having significant solubility in water.

3.6. Batch – A batch is a set of up to 20 samples of the same matrix processed using the same procedures and reagents within the same 24 hour time period. The Quality Control batch must contain a blank and a Laboratory Control Sample (LCS). Refer to the QC Program document (QA-003, current revision) for further details of the batch definition.

4. Interferences

4.1. Only compounds having both a similar mass spectrum and GC retention time would be expected to interfere in the method. The most common occurrence of this would be with structural isomers.

4.2. Large concentrations of water, methane, or carbon dioxide may limit the size of the aliquot that can be effectively cryotrapped. This may elevate the quantitation limits obtainable for samples of this type.

4.3. Matrix interferences may be caused by non-target contaminants that are present in the sample. The extent of matrix interferences will vary considerably from source to source depending upon the nature and diversity of the site being sampled.

4.4. Cross-contamination can occur whenever high-level and low-level samples are analyzed sequentially or in the same purge position on an autosampler. Whenever an unusually concentrated sample is analyzed, it should be followed by one or more blanks to check for cross-contamination, or evaluate the next sample for blank acceptance criteria. The autosampler and concentrator may require extensive bake-out and cleaning after a high-level sample.

5. Safety

5.1. Procedures shall be carried out in a manner that protects the health and safety of all associates.

5.2. Eye protection that satisfies ANSI Z87.1 (as per the STL Corporate Safety Manual), laboratory coat and appropriate gloves must be worn while samples, standards, solvents and reagents are being handled. Disposable gloves that have become contaminated will be removed and discarded, other gloves will be cleaned immediately. VITON gloves may be worn when halogenated solvents are used for extractions or sample preparation. Nitrile gloves may be used when other solvents are handled. [Note: VITON is readily degraded by acetone; all solvents will readily pass through disposable latex rubber gloves.]

5.3. The health and safety hazards of many of the chemicals used in this procedure have not been fully defined. Additional health and safety information can be obtained from the MSDS files maintained in the laboratory. The following specific hazards are known:

5.3.1. Chemicals that have been classified as carcinogens, or potential carcinogens, under OSHA include benzene, carbon tetrachloride, chloroform, 1,4-dichlorobenzene, methylene chloride and vinyl chloride.

5.3.2. Chemicals known to be **flammable** are methanol, acetonitrile, hexane, acetone and methylene chloride.

5.4. Exposure to chemicals will be maintained as low as reasonably achievable, therefore, unless they are known to be non-hazardous, all samples will be opened, transferred and prepared in a fume hood, or under other means of mechanical ventilation. Solvent, and waste containers will be kept closed unless transfers are being made.

5.5. The preparation of all standards and reagents and glassware cleaning procedure that involve solvents such as methylene chloride will be conducted in a fume hood with the sash closed as far as the operations will permit.

5.6. All work must be stopped in the event of a known, or potential compromise to the health or safety of an associate. The situation must be reported immediately to a laboratory supervisor.

6. Equipment and Supplies

6.1. Canisters, 6-, 15-, and 30-liter sizes, preferably equipped with two valves and integral vacuum/pressure gauge, Scientific Instrumentation Specialists or equivalent.

6.2. Static gas dilution bottles (SGDB), nominally 2000 ml, with mininert valves, Tekmar Co., or equivalent.

6.3. Syringes, gas-tight, 10 uL, 50 uL, 500 uL, 1000 uL, 2.5 mL, 50 mL, 500 mL, all side port needle, Hamilton, Inc., or equivalent.

6.4. Gas Chromatograph/Mass Spectrometer System, Agilent HP 6890 GC and 5973 MSD or equivalent.

6.5. Fused silica capillary column, 60 m x 0.32 x 1um film DB-5, J&W Scientific, or equivalent.

6.6. Vacuum pump, Model 726.3 TTP, KNF Newberger, or equivalent.

6.7. Canister concentrator system, Model 7100, Entech Co., with a Model 7016CA, 16-position auto sampler.

6.8. Gauges: The following gauges are certified annually

6.8.1. Test gauge, 0 to 30 in. Hg vacuum, Ashcroft Co., or equivalent

6.8.2. Test gauge, 0-60 psi, Ashcroft Co., or equivalent

6.8.3. Test gauge, 0 to 100 in. Hg pressure, Ashcroft Co., or equivalent

7. Reagents and Standards

7.1. Helium, ultra high purity, 99.999+%, Air Products, or equivalent.

7.2. Liquid nitrogen, 22 psig, Air Products, or equivalent.

7.3. Nitrogen, ultra high purity, Air Products or equivalent

7.4. Internal/Surrogate Standard: bromochloromethane, 1,4-difluorobenzene, chlorobenzene-d5, 1,2-dichloroethane-d4, toluene-d8 and 4-bromofluorobenzene (all at 100 ppb) in nitrogen, 2000 psig, Scott Specialty Gases, or equivalent.

7.4.1. Approximately 40 uL of reagent water is injected through a septum inserted into a 1/4 inch nut, into a clean evacuated 15-liter canister. The canister is allowed to stand for at least 20 minutes to allow all the water to evaporate from the valve area.

7.4.2. A sufficient volume from the internal/surrogate standard cylinder is transferred to the 15-liter summa canister to produce a positive pressure.

7.4.3. The working internal/surrogate standard may be used as long as the pressure in the canister remains above ambient pressure and is not past its expiration date.

7.5. Primary Target and Laboratory Control Sample Gaseous Standards: target compounds, 300 ppb v/v, vendor-certified high-pressure aluminum cylinders.

7.5.1. The expiration date for the gaseous standards contained in the certified high-pressure aluminum cylinders has not been specified by the vendor. No significant degradation in response been observed for over 9 years. Due to this stability, a nominal expiration date of 20 years has been assigned to this standards and it is subject to ongoing monitoring of target analytes through second source standards.

7.5.2. If the vendor supplies an expiration date, that expiration date would be used.

7.6. Initial Calibration Verification Standard (2nd source) stock cylinder (ICV): TO-14 list compounds, 100 ppb v/v, vendor-certified high-pressure aluminum cylinder (see table 1). Spectra Gases or equivalent.

7.6.1. The calibration verification standard stock cylinder may be used for 20 years from date of certification or until the vendor assigned expiration date, whichever is earlier.

7.7. Standard grade neat compounds of hexachlorobutadiene (HCB) and naphthalene, 99+% or of known purity, Chem Service, or equivalent.

7.7.1. Naphthalene/Hexachlorobutadiene (HCB) Stock Standard: Approximately 3.6 mg of naphthalene is weighed into a glass container small enough to be dropped into a SGDB. The glass container is introduced into the SGDB and the bottle is capped with a mininert valve. Approximately 4.4 uL of HCB is added to the SGDB using a 10 uL syringe. The exact weight/volume to be added is calculated from the volume of the SGDB such that adding 5 milliliters from the SGDB to the working standard

yields a concentration of 50 ppb(v/v) of HCB and Naphthalene in the working standard. The SGDB is placed in an oven at 60°C.

7.8. Prepared Standard, polar compounds, vendor certified mix containing methanol, ethyl ether, acetone, acrylonitrile, vinyl acetate, 2-butanone, 1-butanol, 4-methyl-2-pentanone, 2-hexanone, methyl-tert-butyl ether, acrolein, acetonitrile, 99+% or of known purity, Ultra Scientific or equivalent.

7.9. 1,2,3-trichloropropane, 99+% or of known purity, Chem Service or equivalent.

7.9.1. Polar Stock Standard: Approximately 30 µL of the polar standard mix (section 7.8) and approximately 1.3 uL of 1,2,3-trichloropropane is injected into a SGDB via a 50 µL syringe. The exact volume to be added is calculated from the volume of the SGDB such that adding 10 mL from the SGDB to the working standard yields a concentration of 200 ppb (v/v) for methanol and 100 ppb(v/v) for the other polar compounds and 50 ppb (v/v) of 1,2,3-trichloropropane in the working standard.

7.10. Additional Standards: Neat materials, not contained in the certified cylinders, can be added to a SGDB either individually or as a mix.

7.10.1. If the desired compound is a gas at room temperature, a measured volume should be injected into an evacuated summa canister and pressurized. For example, 5 mL of the gas are added to an evacuated 6 liter summa canister. The canister is pressurized with ultra-high purity (UHP) nitrogen to exactly 3 atm gauge pressure. A 7.2 mL injection of this standard to a humidified 15 liter canister will result in a concentration of 50 ppb v/v in the final canister standard.

7.10.2. If the desired compound is a liquid or solid at room temperature, the volume of each compound to be added to the SGDB should be back calculated so that the final concentration in the canister standard is exactly 50 ppb v/v. For example, if the standard is a liquid with a density of 1 g/mL and a molecular weight of 100 g/mole, and 3 mL of the SGDB will be transferred to a humidified canister, then 4.1 µL of the standard would be added to a 2000 mL SGDB.

7.11. 50 ppb v/v Canister Working Standard.

7.11.1. 100 µL of reagent water is injected through a septum (inserted into a 1/4-in. nut) into a clean evacuated 15-liter canister. The canister is allowed to stand for at least 20 minutes to allow all the water to evaporate from the valve area.

7.11.2. 10 mL of the polar stock and 5 mL of the naphthalene/HCB stock are injected through the septum. This step should be done quickly and the syringe used should be heated in the oven along with the SGDB. The canister is then brought up to exactly zero inches gauge pressure with UHP nitrogen.

7.11.3. 10 in. (Hg) of each high-pressure gas standard (300 ppb v/v) is added to the 15-liter canister, for a final volume of 30L and final concentration of 50 ppb v/v.

7.12. Low Standard Preparation: 1 ppb v/v calibration point

7.12.1. 40 µL of reagent water is injected through a septum (inserted into a 1/4 inch nut) into a clean evacuated 6-liter canister. The canister is allowed to stand for at least 20 minutes to allow all the water to evaporate from the valve area.

7.12.2. 240-mL of the 50 ppb (v/v) standard are injected through the septum.

7.12.3. The canister is pressurized to 30 in. Hg with UHP nitrogen added to the 6-liter canister.

7.13. 50 ppb v/v Initial Calibration Verification Standard (ICV)

7.13.1. 100 µL of reagent water is injected through a septum (inserted into a 1/4-in. nut) into a clean evacuated 15-liter canister. The canister is allowed to equilibrate for at least 20 minutes to allow all the water to evaporate from the valve area.

7.13.2. The canister is brought up to exactly zero inches gauge pressure with UHP nitrogen.

7.13.3. 30 in. (Hg) of the laboratory control standard stock cylinder is added to the 15 liter canister.

7.14. Approved SGDB and canister stock standards (section 7.7, 7.8, 7.9 and 7.11) may be used for 6 months from the date of preparation or the earliest expiration of parent standard, whichever comes first. Working canister standards (7.10 and 7.12) may be used for two months from the date of preparation or the earliest expiration of parent standard, whichever comes first.

7.15. The HCB/naphthalene SGDB is stored at 60°C. Other SGDB and canister standards are stored at room temperature. If the analytes prove to be plating/condensing in the SGDB at room temperature, then the SGDB should be stored at 60°C. Mixes and neat compounds (that are not in SGDB, cans, or cylinders) are stored at the manufacturer's recommended storage conditions.

7.16. Approval of Stock and Working Standards

7.16.1. When a new stock is prepared, it can either be verified at the SGDB stage or at the working level stage.

7.16.2. To compare the SGDB standards, humidify two 6 liter canisters with 40 µL of water each, and spike with equal known volumes (typically 5 - 10 mL) from the SGDB, and bring to an equal final pressure of nominally 15 psig.

7.16.2.1. The two standards must agree to within 20 percent difference after taking into account nominal volume differences between the two bottles.

7.16.3. Working canister standards are approved for use by passing the daily standard acceptance criteria given in Section 9.

7.16.4. The working LCS canister is approved for use by passing the LCS acceptance criteria. The acceptance criteria are given in Section 9.

8. Sample Collection, Preservation and Storage

Container Type	Preservative	Holding Time
SUMMA canister	None	30 days
TEDLAR bag	None	72 hours from collection to analysis or transfer to a can.

9. Quality Control

9.1. Internal/Surrogate Standards

9.1.1. Internal standards and surrogates are added to each analytical standard, blank and sample. The acceptance criteria for each internal standard's area for every analysis must be ± 40% recovery of the internal standard area

from the continuing calibration standard. The acceptance criteria for each internal standard's retention time in every analysis must be within ± 20 seconds (0.33 minutes) of the internal standard retention time from the continuing calibration standard.

9.1.2. Surrogate recoveries must fall within 70% to 130%, or within laboratory historical control limits if available.

9.1.3. If the internal standard areas or surrogate recoveries for a sample are outside their limits, the cause is determined. If it is a result of a system problem, then the problem must be corrected and the sample reanalyzed with acceptable results. If it is the result of a matrix effect, the sample must be reanalyzed to confirm this, unless the effect is caused by high levels of target or non-target compounds co-eluting with or interfering with the surrogates or internal standards.

9.2. System Blanks

9.2.1. For each 24-hour tune in which samples are analyzed or every 20 samples, whichever is more frequent, an acceptable system blank must be analyzed before samples analysis may begin.

9.2.1.1. A system blank is defined as a cleaned canister, humidified with reagent water and filled with UHP nitrogen.

9.2.1.2. Typically, a 30L canister, humidified with 200 uL of reagent water and pressurized to 25-30 psi with nitrogen is used for the blank. A lot check from the can cleaning system can be used a system blank (See section 9.5).

9.2.1.3. An acceptable system blank is one with all target analytes less than the laboratory reporting limit (see Tables 1, 2 and 3), and meets internal standard and surrogate requirements in section 9.1.

9.2.2. If a system blank does not meet the above criteria, then the blank must be reanalyzed or a new blank prepared and analyzed with acceptable results.

9.3. Laboratory Control Standard (LCS)

9.3.1. The LCS is defined as a working standard made by the same method as analytical standards, using the same source materials. It is used to assess

analytical control of this procedure. The LCS is analyzed every 24 hour tune or every 20 samples, whichever is more frequent.

9.3.2. All non-polar analytes in the LCS must be within 70-130% recovery with the allowance of up to two non-polar analytes having 60-140% recovery. All polar analytes in the LCS must be within 60-140% recovery with the allowance of up to two polar analytes having 45-155% recovery.

9.3.3. The internal standards and surrogates must pass criteria specified in section 9.1.

9.3.4. If the above criteria cannot be met, corrective action must take place.

9.4. Duplicate Analysis

9.4.1. A duplicate is analyzed with every 20 samples. It is not reported unless specifically requested.

9.4.2. The acceptance criteria for the duplicate analysis are $\leq$ 25% RPD for target compounds that are greater than 5 times the RL. No criteria for methanol and n-butanol. The calculations are given in section 12.16.

9.5. Canister Blank Checking

9.5.1. From each cleaned lot of canisters, a canister is selected, humidified with 40 µL reagent water, and pressurized with UHP nitrogen. (See SOP KNOX-SC-0001, current revision, "Canister Cleaning and Preparation").

9.5.2. A blank check is analyzed within 24 hours of a valid tune check and calibration.

9.5.3. A blank check passes if there are no target analytes above the reporting limit, and the internal standards and surrogates pass criteria in section 9.1.

9.5.4. If a blank check canister does not pass, the can may be re-analyzed. If the acceptance criteria are still not met, the entire lot of canisters must be re-cleaned, and a blank check from the re-cleaned lot must pass.

9.6. Nitrogen check

9.6.1. Before a new nitrogen cylinder is used for pressurization of samples or standards, it must be analyzed as a blank and pass all the criteria in section 9.2.1.3.

9.7. Annual gauge calibration: The gauges that are used in calculations to measure cylinder and canister pressure or vacuum must be certified annually.

10. Calibration and Standardization

10.1. Instrument Conditions: The following steps are part of the software's automatic tuning procedure and are performed as needed.

10.1.1. Mass assignments of the mass spectrometer are checked and adjusted using perfluorotributylamine (PFTBA FC43).

10.1.2. The mass spectrometer is tuned to meet the criteria for BFB (see Figure 1).

10.1.3. The mass spectrometer is adjusted to minimize noise (see instrument manufacturer instruction manuals).

10.1.4. See Appendix III for examples of GC/MS and GC instrument parameters.

10.2. Daily Tune Check

10.2.1. 50 ng of BFB is analyzed for each 24-hour time tune period; the 24-hour time period begins at the moment of injection of BFB. All abundance criteria for BFB in Figure 1 must be met before the analysis of standards, QC samples or client samples.

10.2.2. The BFB must be acquired in the following manner: Three scans (the apex scan, and the scans immediately preceding and following the apex) are acquired and averaged. Background subtraction is conducted using a single scan prior to the elution of BFB.

10.2.3. Once the BFB passes criteria, the same mass spectral conditions used for the BFB must be used to acquire the data, until the next BFB event.

10.3. Initial Calibration

10.3.1. The GC/MS system must be calibrated with at least 5 concentrations that span the monitoring range of interest. The dynamic range of the curve is

generally 0.2 ppb v/v to 30 ppb v/v for most analytes. The concentration of the low standard of the calibration must be at or below the reporting limit. If quadratic fit is required, there must be at least 6 points. See Appendix IV for the recommended calibration amounts.

10.3.2. To obtain the desired levels of quantitation, the 50-ppb (v/v) can is analyzed at 300 mL, 150 mL, 100 mL, and 50 mL. The 1-ppb (v/v) can is analyzed at 500 mL, 250 mL and 100 mL. These correspond to a concentration of 30, 15, 10, 5, 1, 0.5, and 0.2 ppb (v/v), respectively, for most analytes. (A 10-mL analysis of the 50-ppb can may be used instead of 500 mL of the 1-ppb (v/v) can for the 1ppb (v/v) standard.) The calculation is based on a nominal 500-mL analysis of the samples.

10.3.3. See Tables 1, 2 and 3 for suggested quantitation ions.

10.3.4. A calibration curve is valid for all target analytes if the relative standard deviation (RSD) of the relative response factors is $\leq$30% for each target analyte, with the following allowance: up to two target analytes may have an RSD $\leq$ 40%.

10.3.5. The internal standard area response at each calibration level must be within 40% of the mean area response over the initial calibration range for each internal standard.

10.3.6. The retention time (RT) shift for each of the internal standards at each calibration level must be within 20 seconds of the retention time of the mean calibration for each internal standard.

10.3.7. Each analyte at each level must be within 0.06 RRT units of the mean RRT.

10.3.8. If the curve is acceptable and there is time remaining in the 24-hour tune, blanks, LCSs and samples may be analyzed.

10.3.9. The concentrations in the samples, LCSs and blanks are calculated using the response factors from the initial calibration curve.

10.3.10. Linear or quadratic curve fits may be used. Use of 1/Concentration^2 weighting may be used to improve the accuracy of quantitation at the low end of the curve. The analyst should consider instrument maintenance to improve the linearity of response. The correlation coefficient (coefficient of determination for non-linear curves, r^2) must be $\geq$ 0.990.

10.3.11. Analyst may elect to drop points from the calibration to improve subsequent quantitation. The rules for dropping points are:

- May drop points below the RL as long as there is a point remaining at or below the RL.
- May drop high points, decreasing linear range.
- May NOT drop a point between points.

For more guidance see "Selection of Calibration Points" Policy P-T-001, current revision.

Rules for curve use/acceptability:

- The Y intercept must be below the RL.
- The r^2 value obtained from Target must be ≥0.990.
- At least 5 points must be used for average or linear curve.
- At least 6 points must be used for a quadratic curve.
- Do not include the origin or force the curve through the origin.
- For quadratic curves, the tangent line to the slope of the curve must be continuous and positive (i.e. no parabola's or breaks in the curve).

10.4. Initial Calibration Verification (ICV)

10.4.1. The ICV is a second source standard containing the TO-14 list compounds at 10 ppb (Table 1) and is analyzed after the initial calibration and before any samples are analyzed. For each analyte, a percent recovery (%R) is calculated using the response factor from the daily continuing calibration standard.

10.4.2. The ICV is valid for all analytes if the %R is between 65% and 135% for each TO-14 list analyte in the ICV. Benzyl chloride ICV acceptance criteria is 20-180%.

10.5. Daily Calibration Verification

10.5.1. The mid-level standard is analyzed following the daily tune check (section 10.2) as the calibration verification standard. This is 100 mL of the 50-ppb (v/v) can. For all target analytes, a percent difference (%D) or percent drift is calculated using the response from the calibration verification standard and compared to the current initial calibration curve.

10.5.2. A calibration verification standard is acceptable if the %D or % drift is ≤30% for all target analytes. However, up to four target analytes may have %D or % drift ≤40% and those analytes must be noted in the narrative.

10.5.3. If the calibration verification standard does not meet the above criteria, corrective action must be taken and/or a new initial calibration performed unless project specific analytes or client specified QC criteria are met.

11. Procedure

11.1. Canister Preparation

11.1.1. Samples that have an initial pressure of less than 0 psig upon receipt must be pressurized to a pressure greater than 0 psig prior to analysis. If a can is received under pressure, the can is ready for analysis. If a serial dilution of the can is needed, the pressure may have to be increased.

11.1.1.1. Measure the initial pressure of the canister using an NIST traceable, certified vacuum gauge.

11.1.1.2. The analyst may elect to add 40 uL of deionized water to the canister through a septum sealed nut (See Section 11.4 for guidance on addition of water.).

11.1.2. Fill the canister with UHP nitrogen to the desired pressure. This pressure should be between 0 and 40 psig.

11.1.3. The final pressure is measured using an NIST traceable, certified gauge.

11.1.4. The canister is allowed to equilibrate for approximately one hour. If the canister was pressurized to greater than 15 psig, pressure should be released from the canister to bring the pressure below 15 psig.

11.1.5. The barometric pressure, the aliquot volume, initial pressure and final pressure are recorded in a laboratory notebook, and used to calculate the dilution factor caused by pressurizing the can to working conditions.

11.1.6. This canister may be further diluted, if necessary, by any dilution methods.

11.1.7. Cans received where no sample was taken (i.e, trip blanks) are pressurized and considered having a dilution factor of 1.

11.2. Following a successful initial or calibration verification and prior to analysis of actual samples, an acceptable system blank must be analyzed (see section 9.2). Following successful system blank analysis, actual sample analysis may begin.

The LCS is analyzed every 24 hour tune or every 20 samples, whichever is more frequent (See section 9.3).

11.2.1. The desired sample size of each sample to be analyzed is determined by screening the cans according to SOP KNOX-MS-0010, current revision, Volatile Analyte Screening By Purge and Trap. The standard aliquot size is 500 mL. Sample volume injected can range from 10 mL to 1000 mL. For sample volumes below 50 mL, the can pressure must be reduced to below 7 psi to more accurately measure the volume injected. Volumes larger than 1000 mL can cause trap freeze-up when high humidity samples are trapped. If samples have been adequately pressurized with nitrogen, has been diluted, or only a small amount of sample collected in the can, then volumes larger than 1000 mL can be trapped, and the internal standards and surrogates monitored closely for breakthrough or freeze-up problems.

11.2.2. The pressure of each sample canister is checked. If the pressure is above 15 psig, the excess pressure is vented.

11.2.3. Each sample name, volume (aliquot), method, and manifold position are typed into the Entech sequence table.

11.2.4. The automated flush function is used to sweep each manifold line in the name list with helium.

11.2.5. The cans are then securely tightened onto the tree with the canister valves closed.

11.2.6. An automated leak check is run on each position. A hard copy of the leak check results is included with the daily calibration package.

11.2.7. If all positions pass the leak check, the canister valves are opened.

11.2.8. A name list similar to the Entech name list is written to the GC/MS sample log table. The sample volume programmed, the can number and a notation for in-can or serial dilution are noted in the analytical run log.

11.2.8.1. If the actual sample amount trapped is greater than 5% from the programmed volume, the actual volume trapped is used in calculating the results.

11.2.9. The Entech autosampler is started and the GC/MS acquisition program is started. (Note: The scan and GC parameters are controlled by the HP GC/MS method.)

11.2.10. 50 ml of the surrogate/internal standard is trapped on the Entech concentrator prior to sample introduction.

11.2.11. The analysis proceeds automatically for each name in the Entech autosampler program.

11.2.12. The internal standards and surrogates must pass all the criteria specified in section 9.1.

11.3. Instrument Dilutions

11.3.1. Volumes of 10 to 1000 mL may be analyzed by the instrument (see section 11.2.1). The standard aliquot is 500 mL, which equals a dilution factor of one.

11.3.2. If an analyte found in the sample is over the curve by less than a factor of fifty (when analyzed at 500 ml), then the aliquot size of the sample may be reduced to a volume as low as 10 mL. This dilution factor is multiplied with all other dilution factors for this sample to obtain the final dilution factor.

11.3.3. If an instrument dilution is performed to bring one or more analytes within the curve, the analyte having the highest concentration should not be diluted to less than 20% of the calibration range unless there are significant amounts of non-target compounds present.

11.3.4. If the sample is initially run at a dilution and the baseline rise is less than half the height of the internal standards, or if individual non target peaks are less than twice the height of the internal standards, then the sample should be reanalyzed at a more concentrated dilution (up to 500 mL). This requirement is approximate and subject to analyst judgment.

11.3.5. Only the most concentrated dilution with no target compounds above the calibration range will be reported. Other dilutions will only be reported at client request.

11.3.6. The internal standards and surrogates must pass all the criteria specified in section 9.1.

11.4. Water addition

11.4.1. The analyst should be aware that humidity plays an important role in the recovery of certain target compounds, particularly polar compounds, and should be prepared to add humidity to canisters where appropriate. The addition of water helps to stabilize the behavior of these compounds, which might otherwise interact with the interior surface of the summa canister or with the stainless-steel lines of the sample manifold.

11.4.2. Since it is not practical to know the relative humidity of all canisters received at the laboratory, the analyst should assume that canisters are received at approximately 80 percent relative humidity. When making canister dilutions (see Sections 11.5, and 11.6), the analyst should attempt to preserve the relative humidity of canisters at a level that will minimize recovery loss due to low canister relative humidity.

11.4.3. Under normal laboratory conditions, a 6 liter summa canister at ambient pressure will have a relative humidity of 100 percent if approximately 100 uL of water is evaporated in the canister.

11.4.3.1. The minimum relative humidity at which canisters containing polar analytes can be analyzed before polar target recovery is negatively affected is approximately 20 - 30 percent.

11.4.3.2. The minimum relative humidity at which canisters containing nonpolar analytes can be analyzed before nonpolar target recovery is negatively affected is approximately 10 percent.

11.5. Serial Dilution

11.5.1. High-level samples, for example, are those containing ppm levels of volatile organic compounds.

11.5.2. The original sample canister must have a pressure of between 0 to 15 psig. If the pressure is less than 0 psig, then proceed to Section 11.1.

11.5.3. A septum cap is attached to the sample canister and a 50-mL gas-tight syringe is purged with UHP nitrogen. A septum cap is attached to a clean evacuated 6-liter canister (the dilution canister).

11.5.4. The syringe is inserted into the septum cap of the canister containing the sample and the canister valve is opened. The syringe is purged twice with sample and vented. The desired volume is then withdrawn and transferred

into the dilution canister. 40 uL of deionized water is also added to the dilution canister (See Section 11.4 for guidance on addition of water.). The dilution canister is then pressurized using UHP nitrogen.

11.5.5. The final pressure is measured in the serial dilution canister using a NIST traceable, certified gauge.

11.5.6. The barometric pressure, the aliquot volume, final canister pressure and canister serial number are recorded in a laboratory notebook. The serial dilution factor is calculated.

11.5.7. If a high level dilution is performed to bring one or more analytes within the curve, the analyte having the highest concentration should not be diluted to less than 20% of the upper calibration range, unless there are significant amounts of non-target compounds present. It is imperative that non-target analytes not contaminate the analytical system.

11.5.8. This serial dilution canister may be further diluted, if necessary, by any dilution method. The final dilution factor is the product of all the dilution factors for the sample.

11.6. In-canister Dilutions

11.6.1. If an analyte found or suspected to be in the sample is over the curve by greater than a factor of ten, an in-canister dilution may be performed.

11.6.2. The canister is bled to ambient pressure. The analyst may elect to add 40 uL of deionized water to the canister prior to pressurization (See Section 11.4 for guidance on addition of water.)

11.6.3. The canister is pressurized to the desired pressure. This pressure should be between 10 and 40 psig.

11.6.4. The final pressure is measured using an NIST traceable, certified gauge.

11.6.5. If the canister was pressurized to greater than 15 psig, pressure should be released from the canister to bring the pressure below 15 psig.

11.6.6. The barometric pressure and the initial and final pressures are recorded in a laboratory notebook and the in-can dilution factor is calculated.

11.6.7. If an in-canister dilution is performed to bring one or more analytes within the curve, the analyte having the highest concentration should not be

diluted to less than 20% of the upper calibration range, unless there are significant amounts of non-target compounds present. Care should be taken to avoid over-dilution for in-canister dilutions since the original sample is affected.

11.6.8. This canister can be further diluted, if necessary, by any dilution method. This dilution factor is multiplied with all other dilution factors for this sample to obtain the final dilution factor.

11.7. Major Maintenance

11.7.1. A new initial calibration is necessary following major maintenance. Major maintenance includes changing the column, cleaning or repairing the source, replacing filaments, changing electronics, replacing the multiplier, changing traps or the transfer line.

11.8. Minor Maintenance

11.8.1. Minor maintenance includes cleaning the injector port, replacing filters, changing the pump oil, autotuning, switching filaments (instrument contains two filaments under vacuum), replacing the syringe or injector tower, change/refill the calibration vial, changing seals and o-rings, ballasting pump, replacing fuses, or replacing roughing pumps.

11.9. One time procedural variations are allowed only if deemed necessary in the professional judgment of supervision to accommodate variation in sample matrix, radioactivity, chemistry, sample size, or other parameters. Any variation in procedure, except those specified by project specific instructions, shall be completely documented using a Nonconformance Memo and approved by a Technical Specialist, Project Manager and QA Manager. If contractually required, the client shall be notified.

11.10. Any unauthorized deviations from this procedure must also be documented as a nonconformance, with a cause and corrective action described.

12. Data Analysis and Calculations

12.1. Calculation legend:

A	=	amount of neat compound, uL
CB	=	concentration in SGDB, ug/mL
CC	=	concentration in canister, ppb v/v
CS	=	concentration in mix, ug/uL

Cx	=	the value determined by vendor certification analyses is used in the following calculations, ppb v/v (300 ppb nominal)
d	=	density of neat compound, g/mL
DF	=	dilution factor, unitless
FV	=	final volume in a pressurized canister, liters
GC	=	gas constant at 21°C and standard pressure, 24.12 nL/n mole
MW	=	molecular weight, ng/n mole
PB	=	barometric pressure
PF	=	final pressure, units specified
PI	=	initial pressure, units specified
PT	=	transfer pressure, units specified
Px	=	pressure in X = inches, psia or mmHg
TK	=	temperature in Kelvin
TV	=	transfer volume, liters or uL
Vbottle	=	volume of static gas dilution bottle, mL
Vmix	=	volume of mix, µL

12.2. Calculations:

12.2.1. Final Canister Volume

$$FV = \frac{Canister\ size\,(L)\ x\ P_F(mm\ Hg\ Abs)}{P_B(mm\ Hg\ Abs)}$$

Pmm Hg = P inches x 25.4
P inches = Ppsi * 2.036
Pmm Hg = P_{psi} x 51.7149

12.3. Polar stock:

12.3.1. $$CS\ \mu g / uL = \frac{A * d * 1000}{V_{mix}}$$

12.3.2. $$CB\ \mu g / mL = \frac{CS * TV,\ \mu L}{V_{bottle}}$$

12.4. Polar concentration in target dilution standard

$$CC,\ ppb\ v/v = \frac{TV,\ \mu L\ *\ CB\ x\ GC}{MW\ *\ FV}$$

12.5. Hexachlorobutadiene/naphthalene stock

12.5.1.

$$CB_{HCB},\ \mu g/mL = \frac{2.5\ \mu L\ *\ d\ *\ 1000}{V_{bottle}}$$

12.5.2.

$$CB_{NAPHTH},\ \mu g/mL = \frac{2\ mg\ *\ 1000}{V_{bottle}}$$

12.6. Concentration of HCB/naphthalene in primary target standard.

$$CC,\ ppb\ v/v = \frac{0.8829\ *\ TV,\ mL\ *\ CB\ x\ 1000\ *\ GC}{FV\ *\ MW}$$

where 0.8829 is a temperature correction factor (60°C).

12.7. Concentration of Cylinder Standards: Concentration of Nonpolar Analytes in Primary Target Standard

$$CC,\ ppb\ v/v = \frac{(P_T\ -\ P_I,\ psi)(Cx)}{(P_F,\ psi\ +\ PB,\ psi)}$$

12.8. Target Dilution Standard (CC is the concentration of the Primary Target Standard).

$$CC,\ ppb\ v/v = \frac{(P_T\ -\ P_I)(CC)}{(P_F\ +\ PB,\ psi)}$$

12.9. Dilution Factor of original sample canisters

$$DF = \frac{P_{f\,(mm\,Abs)}}{P_{i\,(mm\,Abs)}} \; x \; \frac{Sample\ volume\ injected}{500\ ml}$$

12.9.1. Serial Dilution Factor

DF = FV/TV

12.10. Response Factor (RF)

$$RF = \frac{Ax * Cis}{Ais * Cx}$$

where:

x	=	area of the characteristic ion for the target compound.
Ais	=	area of the characteristic ion for the internal standard.
Cx	=	amount of the target compound.
Cis	=	amount of the internal standard.

12.11. Average Response Factor (ARF)

$$ARF = \frac{RF_1 + RF_2 + \ldots + RF_n}{n}$$

where:

n	=	the number of calibration points

12.12. Standard deviation of the ARF:

$$S = \sqrt{\frac{\sum_1^n (ARF - RF_n)^2}{n-1}}$$

12.13. Relative standard deviation (RSD) of the ARF:

$$RSD = \frac{S}{ARF} * 100\%$$

12.14. Calibration Verification : Percent deviation (% D) of the daily RF values as compared with the initial ARF values:

$$\%D = \frac{|RF - ARF|}{ARF} * 100\%$$

12.15. Laboratory Control Sample percent recovery (%R):

$$\%R = \frac{FoundAmount, ppb}{SpikeAmount, ppb} * 100\%$$

12.16. Duplicate relative percent difference (RPD):

$$RPD = \frac{|A_1 - A_2|}{\bar{A}} x\ 100\%$$

where:

A_1	=	amount determined in first analysis
A_2	=	amount determined in second analysis
A	=	average determination, $(A_1 + A_2)/2$

12.17. Calibration verification percent drift and difference from the initial calibration:

$$\%\ Drift = \frac{C_{expected} - C_{found}}{C_{expected}} \times 100$$

Where

$C_{expected}$ = Known concentration in standard

C_{found} = Measured concentration using selected quantitation method

$$\%Difference = \frac{\overline{RF} - RF}{\overline{RF}} \times 100$$

$\overline{RF}$ = Average Analyte Response Factor from Initial Calibration

RF = Measured Analyte Response Factor from Calibration Verification

12.17.1. Target analyte concentrations in samples are typically calculated using the average response factor from the initial calibration. Quantitation may also be determined using linear or second order curves at the analyst's discretion to improve the quantitation of target analytes.

12.17.1.1. Calculation of concentration using Average Response Factors

$$C_{pv} = \frac{R_x C_{is}}{R_{is}\overline{RF}}$$

12.17.1.2. Calculation of concentration using Linear fit

$$C_{pv} = A + B\frac{(R_x C_{is})}{R_{is}}$$

C_{pv} = Concentration, ppb (v/v)
R_x = Response for analyte (area of quantitation ion)
R_{is} = Response for internal standard (area of quantitation ion)
C_{is} = Concentration of internal standard
A = Intercept
B = Slope

The corresponding Target software calculation is as follows:

$$Cpv = Cis(b + \frac{1}{ml} \times \frac{Rx}{Ris})$$

b = Concentration Ratio Intercept
ml = Inverse of Slope

12.17.1.3. Calculation of concentration using Quadratic fit

$$Cpv = A + B\left(\frac{RxCis}{Ris}\right) + C\left(\frac{RxCis}{Ris}\right)^2$$

C = Curvature

The corresponding Target software calculation is as follows:

$$Cpv = Cis\left(b + m1 \times \frac{Rx}{Ris} + m2 \times \left(\frac{Rx}{Ris}\right)^2\right)$$

m1 = First order coefficient
m2 = Curvature (Second order coefficient)

12.18. Sample Quantitation: The amount of target compound detected is determined using the average RF or calibration curve values from the initial calibration (not the continuing calibration):

$$\text{Amount} = Cpv * DF$$

12.19. Unit conversions

12.19.1.

$$\text{Amount}, \mu g/m^3 = \frac{\text{Amount, ppb}(v/v) * MW}{GC}$$

12.19.2.

$$\text{Amount, ppm v/v} = \text{amount}, \frac{\text{ppb}(v/v)}{1000}$$

12.20. Quantitation of Unknowns

12.20.1. If required, nontarget peaks are reported with probable identifications as Tentatively Identified Compounds (TICs). These are quantitated using the nearest internal standard and assuming a response factor of 1; correction for dilution factor is also made. Search criteria are those in the STL Knoxville SOP KNOX-MS-0014, current revision, Tentatively Identified Compounds (TICs).

13. Method Performance

13.1. Method Detection Limit (MDL) - An MDL must be determined for each analyte in each routine matrix prior to the analysis of any samples. The procedure for determination of the method detection limit is given in the SOP S-Q-003 current

revision based on 40 CFR Part 136 Appendix B. The result of the MDL determination must support the reporting limit.

13.2. Initial Demonstration of Capability – Each analyst must perform an initial demonstration of capability (IDOC) for each target analyte prior to performing the analysis independently. The IDOC is determined by analyzing four replicate spikes (e.g., LCSs) as detailed in STL Knoxville SOP KNOX-QA-0009.

13.3. Training Qualification: The group/team leader has the responsibility to ensure that this procedure is performed by an associate who has been properly trained in its use and has the required experience. Refer to SOP KNOX-QA-0009 current revision for further requirements for performing and documenting initial and on-going demonstrations of capability.

14. Pollution Prevention

14.1. All attempts will be made by laboratory personnel to minimize the use of solvents when performing this procedure.

15. Waste Management

15.1. Waste generated in this procedure must be segregated and disposed according to the facility hazardous waste procedures.

16. References

16.1. Compendium Method TO-14, "The Determination of Volatile Organic Compounds (VOCs) in Ambient Air Using SUMMATM Passivated Canister Sampler and Gas Chromatographic Analysis," U.S. EPA 600/4-89/017, June 1988.

16.2. Compendium Method TO-14A, "Determination of Volatile Organic Compounds (VOCs) in Ambient Air Using Specially Prepared Canisters With Subsequent Analysis by Gas Chromatography," U.S. EPA 625/R-96/010b, January 1999.

16.3. Compendium Method TO-15, "Determination of Volatile Organic Compounds (VOCs) in Air Collected in Specially-Prepared Canisters and Analyzed by Gas Chromatography/Mass Spectrometry (GCMS)", U.S. EPA 625/R-96/010b, January 1999.

16.4. STL Quality Management Plan (current revision).

16.5. Entech Instruments Inc. 7100 Operators Manual. Version 2.0 for the 7100 Preconcentrator and Accessories.

17. Miscellaneous

17.1. Other SOPs cross-referenced in this SOP: KNOX-SC-0001, "Canister Cleaning and Preparation", latest revision.

17.2. Modification from the referenced methods

17.2.1. The TO-15 tune criteria were not used in this procedure. The tune criteria listed in TO-14 is tighter and thus was used in this procedure.

17.2.2. The continuing calibration listed in this procedure allows up to 4 target analytes with a %D of $\leq$ 40%, with a narrative of those target analytes that are over 30% D, but $\leq$ 40% D.

17.2.3. This procedure uses purified nitrogen in place of zero humid air specified in the reference methods.

17.2.4. TO-14 requires that the RT shift for the internal standards at each calibration level must be within 20 seconds of the RT of the mid-level calibration for each internal standard. TO-15 specifies that the comparison is made to the mean RT over the initial calibration range for each internal standard. This SOP uses the TO-15 criteria.

17.2.5. Section 7.13 Method TO-15 states that the working standard may be stored for 30 days. This laboratory experience has allowed the standard expiration date to be 2 months with no significant degradation of the standards.

17.2.6. Surrogates are not required by the methods. This SOP adds surrogates to every sample to help monitor for matrix effects and method performance.

17.2.7. The TO-15 method states that the scan time must give 10 scans per peak, not to exceed 1 second per scan. The GC/MS software is set for a sampling rate of 3, which corresponds to approximately 2 to 3 scans per second, depending on the instrument. See the GC/MS operator's manual or "help" on the software for more information about the sampling rate.

17.3. List of Appendices

17.3.1. Appendix I: Target Analyte Tables

17.3.1.1.Table 1: Target Analytes - TO-14 and TO-15 Compounds

17.3.1.2.Table 2: Target Analytes - Other Nonpolar Compounds

17.3.1.3.Table 3: Target Analytes - Other Polar Compounds

17.3.2. Appendix II: Figures

17.3.2.1.Figure 1: BFB Tuning Criteria

17.3.2.2.Figure 2: Example of a Data Review Checklist

17.3.2.3.Figure 3: Flow Chart

17.3.3. Appendix III: Example Instrument Parameters

17.3.4. Appendix IV: Recommended Calibration Levels

Appendix I: Target Analyte Tables

Table 1: Target Analytes - TO-14/TO-15 Compounds

CAS NUMBER	METHOD TO-14 COMPOUND	REPORTING LIMIT (ppb, v/v)	MOLECULAR WEIGHT (ng/n mole)	RETENTION TIME [a] (minutes)	SUGGESTED ION
75-71-8	Dichlorodifluoromethane (b)	0.2	120.91	2.83	85
76-14-2	1,2-Dichlorotetrafluoroethane (c)	0.2	170.93	2.97	135
74-87-3	Chloromethane	0.5	50.49	2.97	52
75-01-4	Vinyl Chloride	0.2	62.5	3.11	62
74-83-9	Bromomethane	0.2	94.94	3.42	94
75-00-3	Chloroethane	0.2	64.52	3.53	64
75-69-4	Trichlorofluoromethane (d)	0.2	137.38	3.96	101
75-35-4	1,1-Dichloroethene	0.2	96.94	4.50	96
76-13-1	1,1,2-Trichlorotrifluoroethane (e,f)	0.2	187.38	4.64	101
75-09-2	Methylene Chloride (f)	0.5	84.93	4.77	84
76-34-3	1,1-Dichloroethane	0.2	98.96	5.73	63
156-59-2	cis-1,2-Dichloroethene	0.2	96.94	6.52	96
67-66-3	Chloroform	0.2	119.38	6.81	83
71-55-6	1,1,1-Trichloroethane	0.2	133.41	7.67	97
56-23-5	Carbon Tetrachloride	0.2	153.82	8.22	117
71-43-2	Benzene	0.2	78.12	8.20	78
107-06-2	1,2-Dichloroethane	0.2	98.96	7.77	62
79-01-6	Trichloroethene	0.2	131.39	9.44	130
78-87-5	1,2-Dichloropropane	0.2	112.99	9.40	63
10061-01-5	cis-1,3-Dichloropropene	0.2	110.97	10.83	75
108-88-3	Toluene	0.2	92.15	11.87	91
10061-02-6	trans-1,3-Dichloropropene	0.2	110.97	11.72	75
79-00-5	1,1,2-Trichloroethane	0.2	133.41	11.97	97
127-18-4	Tetrachloroethene	0.2	165.83	13.32	129
106-93-4	1,2-Dibromoethane	0.2	187.87	13.22	107
108-90-7	Chlorobenzene	0.2	112.56	14.32	112
100-41-4	Ethylbenzene	0.2	106.17	14.65	91
1T5-30-5	m/p-Xylene (g)	0.2	106.17	14.83	91
95-47-6	o-Xylene	0.2	106.17	15.39	91
100-42-5	Styrene	0.2	104.16	15.33	104
79-34-5	1,1,2,2-Tetrachloroethane	0.2	167.85	15.73	83
108-67-8	1,3,5-Trimethylbenzene	0.2	120.19	16.78	105 or 120
95-63-6	1,2,4-Trimethylbenzene	0.2	120.19	17.22	105
541-73-1	1,3-Dichlorobenzene	0.2	147.01	17.49	146
106-46-7	1,4-Dichlorobenzene	0.2	147.01	17.58	146
100-44-7	Benzyl Chloride	0.2	126.59	17.57	91
95-50-1	1,2-Dichlorobenzene	0.2	147.01	17.95	146
120-82-1	1,2,4-Trichlorobenzene	0.2	181.46	19.75	180
87-68-3	Hexachlorobutadiene	0.2	260.76	20.10	225

a) Approximate Times
b) Freon 12
c) Freon 114
d) Freon 11
e) Freon 113
f) This is a common laboratory solvent
g) m-xylene and p-xylene coelute

Table 2: Target Analytes - Other Nonpolar Compounds

CAS NUMBER	OTHER NON-POLAR COMPOUNDS	REPORTING LIMITS (ppb, v/v)	MOLECULAR WEIGHT (ng/n mole)	RETENTION TIME [a] (minutes)	SUGGESTED ION
75-45-6	Chlorodifluoromethane (b)	0 2	86.47	2.78	51
106-97-8	n-Butane	0.2	58.13	3.18	43
106-99-0	1,3-Butadiene	0.2	54.09	3.17	54
109-66-0	Pentane	0.5	72.15	4.14	57
75-15-0	Carbon Disulfide	0 2	76.14	4.89	76
107-05-1	3-Chloropropene	0 2	76.53	4.78	39
156-60-5	trans-1,2-Dichloroethene	0 2	96.94	5.40	96
110-54-3	n-Hexane	0.2	86.18	6.19	56
110-82-7	Cyclohexane	0 5	84.16	8.19	69
142-82-5	n-Heptane	0.2	100.21	9.32	43
74-95-3	Dibromomethane	0.2	173.85	9.52	93
75-27-4	Bromodichloromethane	0.2	163.86	9.68	83
111-65-9	n-Octane	0.2	114.13	12.81	85
124-48-1	Dibromochloromethane	0.2	208.29	12.87	129
111-84-2	Nonane	0.2	128.26	15.33	57
75-25-2	Bromoform	0.2	252.75	15.28	173
98-82-8	Cumene	0.2	120.2	16.00	105
103-65-1	n-Propylbenzene	0.2	120.19	16.54	91
622-96-8	4-ethyltoluene	0.2	120.19	16.6	105
124-18-5	Decane	0.2	142.29	17.10	57
98-83-9	alpha-Methylstyrene	0.2	118.18	17.01	118
1120-21-4	n-Undecane	0.2	156.32	18.45	57
112-40-3	n-Dodecane	0.2	170.34	19.55	57
91-20-3	Naphthalene	0.2	128.19	19.90	128

96) Approximate Times
96) Freon 22

Table 3: Target Analytes – Other Polar Compounds

CAS NUMBER	OTHER POLAR COMPOUNDS	REPORTING LIMITS (ppb, v/v)	MOLECULAR WEIGHT (ng/n mole)	RETENTION TIME [a] (minutes)	SUGGESTED ION
67-56-1	Methanol	10	32.04	3.11	31
60-29-7	Ethyl Ether	0.5	74.12	4.26	31
67-64-1	Acetone	5	58.08	4.09	58
107-13-1	Acrylonitrile	0.5	53.06	4.60	53
108-05-4	Vinyl Acetate	0.5	86.09	5.83	43
78-93-9	2-Butanone	0.5	72.12	6.19	72
71-36-3	1-Butanol	0.5	74.12	8.19	31
108-10-1	4-Methyl-2-Pentanone	0.5	100.16	10.79	43
591-78-6	2-Hexanone	0.5	100.16	12.51	58
1634-04-4	Methyl-t-Butylether	0.5	88.09	5.51	73
107-02-8	Acrolein	0.5	56.06	3.99	56
75-05-8	Acetonitrile	1.0	41.05	4.05	40 (or 41)
96-18-4	1,2,3-Trichloropropane	0.5	255.5	13.03	110

a) Approximate Times

Appendix II: Figures

Figure 1: BFB Tuning Criteria

Mass	Abundance Criteria
50	15 to 40% of mass 95
75	30 to 60% of mass 95
95	Base peak, 100% relative abundance
96	5 to 9% of mass 95
173	Less than 2% of mass 174
174	Greater than 50% of mass 95
175	5 to 9% of mass 174
176	95% to 101% of mass 174
177	5 to 9 % of mass 176

Note: All ion abundances must be normalized to m/z 95, the nominal base peak, even though m/z 174 may be over 100 % of m/z 95.

Figure 2: Example Data Review Checklist

STL Knoxville GC/MS Air Initial Calibration Data Review / Narrative Checklist
Method: TO-14 and TO-15 - KNOX-MS-0001, Rev 4

Analysis Date:		Instrument::		ICAL Batch/Scan Name:		Scanned ☐

Review Items	N/A	Yes	No	If No, why is data reportable?	2nd ⇒
1. Did BFB meet tune criteria?					
2. Were all standards injected within 24 hr of BFB?					
3. Is the second source analysis of a reference standard within limits? (65-135% R; 20-180% for benzyl chloride)					
4. Was date/time of analysis verified between analysis header and logbook as correct?					
5. Is low level std at or <RL and are the remaining points consecutive?					
6 Were at least 5 levels of each compound analyzed?					
7. Is %RSD for all target analytes ≤ 30%? (with up to 2 compounds with RSD ≤ 40%)					
8 Have all peaks been auto identified? If not, list:					
9. If curves were used, is correlation coefficient ≥0.990?					
10. At least 6 consecutive points used for quadratic curves, and at least 5 consecutive points for linear curves?					
11. For linear or quadratic: is a tangent's slope to the curve entirely positive or negative and continuous.					
12. For linear or quadratic: origin NOT included or forced?					
13. Is the "Y" intercept less than the RL for each curve?					
14. RT for each IS ±20 sec avg. RT?					
15. Area for each IS ± 40% avg. area?					
16. Each analyte ± 0.06 RRT of avg. RRT?					
17. If manual integrations were performed, are they clearly identified, initialed, dated and reason given?				Reasons: 1)Corrected split peak; 2)Unresolved peak; 3)tailing; 4)RT shift; 5)wrong peak selected; 6)other	
18. Have alternate hits/manual integrations been verified as correct and are correct RFs listed in ICAL summary?					
19. Was ICAL summary form processed using correct methods and files?					
20. Are the ICAL start and end dates/times correct on ICAL summary?					
21. Elution order checked on isomeric pairs?					
• dichlorodifluoromethane / 1,2-dichlorotetrafluoroethane					
• trichlorofluoromethane / 1,1,2-trichlorotrifluoroethane					
• vinyl acetate / hexane					
• cis- and trans- isomers					
• ethyl benzene / m/p-xylene / o-xylene					
• 4-ethyl toluene/1,3,5-trimethylbenzene/1,2,4-trimethylbenzene					
• 1,3- , 1,4- , and 1,2-dichlorobenzene					
22. If criteria were not met, was a NCM generated, approved by supervisor, and copy included in folder?					
23. Does the ICAL folder contain complete data in the following order: Data review checklist, a complete runlog, Entech report, BFB info, ICAL summary, curves, followed by [Quan reports, chromatograms, manual integrations] in increasing amount order.					

Analyst:	Date:	2nd Level Reviewer :	Date:
Comments:		Comments:	

MS017r15, 6/3/03

Figure 2: Example Data Review Checklist (continued)

STL Knoxville GC/MS Air Continuing Calibration Review / Narrative Checklist
Method: TO-14 and TO-15 - KNOX-MS-0001, Rev 4

Analysis Date:		CCAL Batch/ Scan Name:		Instrument:		ICAL Batch/ Scan Name:		Scanned ☐

Review Items	N/A	Yes	No	If No, why is data reportable?	2nd ➔
1. Did BFB meet tune criteria?					
2. Were all standards injected within 24 hr of BFB?					
3. Have the Entech position no. & vol. been verified with run log & sample vol. corrected if actual amount differs >5%?					
4. Was date/time of analysis verified between analysis header and logbook as correct?					
5. Was the CCAL compared to the correct ICAL?					
6. Was a mid-level standard used for CCAL?					
7. Is the %D ≤ 30% for all target analytes? Narrate up to 4 target analytes over 30% but ≤ 40% D.					
8 Have all peaks been auto identified? If not, list:					
9. If manual integrations were performed, are they clearly identified, initialed, dated and reason given?				Reasons: 1)Corrected split peak; 2)Unresolved peak; 3)tailing; 4)RT shift; 5)wrong peak selected; 6)other	
10. Have alternate hits/manual integrations been verified as correct and are correct RFs listed in CCAL summary?					
11. Is the first IS documented correctly on the log?					
12. Is the ICAL date & time on the CCAL correct?					
24. Elution order checked on isomeric pairs?					
• dichlorodifluoromethane / 1,2-dichlorotetrafluoroethane					
• trichlorofluoromethane / 1,1,2-trichlorotrifluoroethane					
• vinyl acetate / hexane					
• cis- and trans- isomers					
• ethyl benzene / m/p-xylene / o-xylene					
• 4-ethyl toluene/1,3,5-trimethylbenzene/1,2,4-trimethylbenzene					
• 1,3- , 1,4- , and 1,2-dichlorobenzene					
13. Did the LCS meet criteria (nonpolar target analytes 70-130%, with up to 2 nonpolars 60-140%; polar target analytes 60-140%, with up to 2 polars 45-155%)?					
14. If criteria were not met, was a NCM generated, approved by supervisor, and copy included in folder?					
15. Does the CCAL folder contain **complete** data in the following order: data review checklist, a **complete** runlog, Entech report, tune pass/fail page, m/z list, tune chromatogram, Target CCAL summary, Quan report, chromatogram, manual integrations and leak check report.					

Analyst:	Date:	2nd Level Reviewer :	Date:
Comments:		Comments:	

MS017r15, 6/3/03

Figure 2: Example Data Review Checklist (continued)

STL Knoxville GC/MS Air Data Review / Narrative Checklist **LOT/Project #_____**
Method: TO-14 and TO-15 - KNOX-MS-0001, Rev 4 **Page 1 of 1**

Instrument:		
Scanned File:		

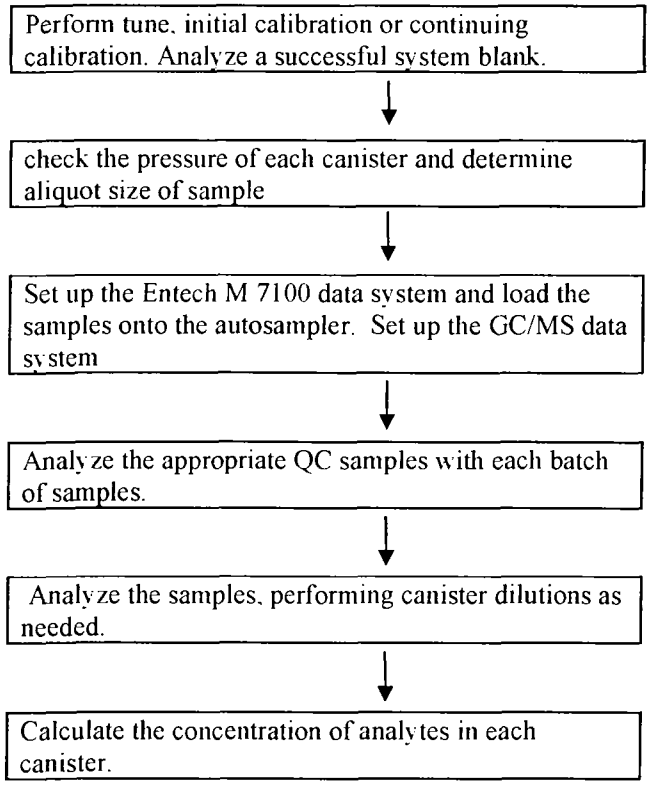
Review Items **A. Tune / Continuing Calibration**	N/A	Yes	No	**Why is data reportable?**	2nd
1. Were all samples injected within 24 hr of BFB?					
2. Has a Continuing Calibration Checklist been completed for each analytical batch?					
3. Was the correct ICAL used for quantitation?					
B. CLIENT SAMPLE AND QC SAMPLE Results	N/A	Yes	No	**Why is data reportable?**	
1. Were all special project requirements met?					
2. Were dilution factors/can prep information verified?					
3. Have the can number & lab ID been verified between the analysis log & sample prep log?					
4. Were samples received in cans?				❑ [Tedlar1] Samples rec'd on (date) in Tedlar bags & ana by TO-14 (TO-15) within 72 hours from sampling. ❑ [Tedlar2] Samples rec'd on (date) in Tedlar bags & transferred into Summa canisters within 72 hours*	
5. Sample analyses done within analytical holding time (HT)? *If no, list samples:* _____				❑ [ht2] Client requested analysis after HT expired. ❑ Other: _____	
6. Are surrogates and internal standards within QC limits? (70-130% R for surr.; 60-140%R from CCAL for IS) *If no, list samples reason (e.g.,* **sur1***):* Sample Reason Sample Reason ____ ____ ____ ____ ____ ____ ____ ____				❑ [sur1] DUP surr %R demonstrated same effect. ❑ [sur2] Reanalysis demonstrated same effect. ❑ **[sur5] At client's request, data was flagged as estimated & released without further investigation.*** ❑ **[is1] Per client, reanalysis was not performed *** ❑ [is2] Reanalysis confirmed a matrix effect. ❑ Obvious matrix effect	
7. Were positive hits evaluated using qualitative identification criteria and technical judgement?					
8. For dilutions, is highest concentration hit ≥ 20% cal range and not above calibration range? *List samples and reason (e.g.,* **elev1***):* Sample Reason Sample Reason ____ ____ ____ ____ ____ ____ ____ ____				❑ [elev1] Elevated RL for (ANALYTE) due to sample matrix interferences. ❑ [elev3] Elevated RLs for all analytes due to difficult sample matrix. ❑ [elev5] Elevated RLs for all analytes due to presence of non-target compounds.	
9. If manual integrations were performed, are they clearly identified, initialed, dated and reason given?				Reasons: 1)Corrected split peak; 2)Unresolved peak; 3)tailing; 4)RT shift; 5)wrong peak selected; 6)other	
10. Have alternate hits/manual integrations been verified as correct?					
11. Final report acceptable? (Results correct, RLs calculated correctly, units correct, surrogate %R correct, appropriate flags used, dilution factor correct, analysis dates correct.)					
12. Was a narrative prepared and all deviations noted?					
13. Analytes >30% D, ≤ 40% D on CCAL noted in narrative?					
C. Preparation QC					
1. System blank run every 24 hours prior to samples?					
2. System blank surrogate recoveries within QC limits (70-130% R) ?				❑ **[mb1] All sample surrogates OK and there is no analyte >RL in samples associated with blank.***	
3. Are all analytes present in the system blank < RL? *If no, list blank ID.* _____				❑ **[mb3] No analyte > RL in associated samples.*** ❑ **[mb4] Sample results > 20x higher than blank.**	
4. DUP done per 20 samples and are all RPDs within limits? (for target analytes >5x RL, ≤25% RPD; no criteria for methanol and n-butanol) *If no, list DUP ID* _____					
D. Other					
1. Are all nonconformances documented appropriately and copy included with deliverable?					
2. Were the standards scanned properly?					

Analyst:	**Date:**	**2nd Level Reviewer:**	**Date:**
Comments:		**Comments:**	

* Such action must be taken in consultation with client.

MS017r15, 6/3/03

Figure 3: Flow Chart



Appendix III: Example Instrument parameters

```
                    TOPLEVEL PARAMETERS
                    -------------------

Method Information For: C:\MSDCHEM\1\METHODS\T014 M

Method Sections To Run:

  [ ] Save Copy of Method With Data
  [ ] Pre-Run Cmd/Macro =
  [X] Data Acquisition
  [ ] Data Analysis
  [ ] Post-Run Cmd/Macro =

Method Comments:
  .014 METHOD USING HP-DB-5 60M X 0.32MM X 1.0 FILM THICKNESS

                    END OF TOPLEVEL PARAMETERS
                    --------------------------



                    INSTRUMENT CONTROL PARAMETERS
                    -----------------------------

Sample Inlet:         GC
Injection Source:     Manual
Injection Location:   Front
Mass Spectrometer:    Enabled

-------------------------------------------------------------------------
                    HP6890 GC METHOD
-------------------------------------------------------------------------

OVEN
   Initial temp:  35 °C (On)                Maximum temp:  230 °C
   Initial time:  5.00 min                  Equilibration time:  0.00 min
   Ramps:
      #  Rate  Final temp  Final time
      1  5.00       65        0.00
      2 12.00      155        0.00
      3 25.00      220        7.00
      4   0.0(Off)
   Post temp:  35 °C
   Post time:  0.00 min
   Run time:  27.10 min

FRONT INLET (UNKNOWN)                       BACK INLET ()
   Mode:  Split
   Initial temp:  230 °C (On)
   Pressure:  7.89 psi (On)
   Split ratio:  2:1
   Split flow:  3.0 mL/min
   Total flow:  7.5 mL/min
   Gas saver:  Off
   Gas type:  Helium

COLUMN 1                                    COLUMN 2
   Capillary Column                            (not installed)
   Model Number:  HP 190915-216
   HP-5 5% Phenyl Methyl Siloxane
   Max temperature:  325 °C
   Nominal length:  59.0 m
   Nominal diameter:  320.00 µm
   Nominal film thickness:  1.00 µm
   Mode:  constant flow
   Initial flow:  1.5 mL/min
   Nominal init pressure:  7.90 psi
   Average velocity:  31 cm/sec

Method: T014 M          Wed Apr 30 14:03:13 2003          Page: 1
```

```
   Inlet:  Front Inlet
   Outlet:  MSD
   Outlet pressure:  vacuum

FRONT DETECTOR (NO DET)                    BACK DETECTOR (NO DET)

SIGNAL 1                                   SIGNAL 2
   Data rate:  20 Hz                          Data rate:  20 Hz
   Type:  test plot                           Type:  test plot
   Save Data:  Off                            Save Data:  Off
   Zero:  0.0 (Off)                           Zero:  0.0 (Off)
   Range:  0                                  Range:  0
   Fast Peaks:  Off                           Fast Peaks:  Off
   Attenuation:  0                            Attenuation:  0

COLUMN COMP 1                              COLUMN COMP 2
   (No Detectors Installed)                   (No Detectors Installed)

THERMAL AUX 2
   Use:  MSD Transfer Line Heater
   Description:
   Initial temp:  150 °C (On)
   Initial time:  0.00 min
      #  Rate  Final temp  Final time
      1   0.0(Off)

                                           POST RUN
                                              Post Time: 0.00 min

TIME TABLE
   Time        Specifier                      Parameter & Setpoint

                              7673 Injector

     Front Injector
         Injector not configured, use these parameters if it becomes configured
        Sample Washes                  2
        Sample Pumps                   4
        Injection Volume             1.0 microliters
        Syringe Size                10.0 microliters
        PostInj Solvent A Washes       4
        PostInj Solvent B Washes       0
        Viscosity Delay                0 seconds
        Plunger Speed               Fast

     Back Injector:
No parameters specified
                              MS ACQUISITION PARAMETERS

General Information
-------------------

Tune File                  : bfb.u
Acquisition Mode             Scan

MS Information
--------------

Solvent Delay                3.80 min

EM Absolute                : False
EM Offset                    0
Resulting EM Voltage         1858.8

[Scan Parameters]

Low Mass                   : 28.5
High Mass                  : 260.5
Threshold                  : 200
Sample #                     3       A/D Samples    8
Plot 2 low mass            : 28.5
Plot 2 high mass           : 260.5

[MSZones]

MS Quad                    : 106 C   maximum 200 C
MS Source                  : 230 C   maximum 250 C

                              END OF MS ACQUISITION PARAMETERS

PostRun InstCntl macro(s) exist, msacq2.mac

                              END OF INSTRUMENT CONTROL PARAMETERS
```

Appendix IV: Recommended Calibration levels

compound	level 6	level 7	level 1	level 2	level 3	level 4	level 5
* 1 Bromochloromethane	10	10	10	10	10	10	10
* 2 1,4-Difluorobenzene	10	10	10	10	10	10	10
* 3 Chlorobenzene-d5	10	10	10	10	10	10	10
$ 4 1,2-Dichloroethane-d4	10	10	10	10	10	10	10
$ 5 Toluene-d8	10	10	10	10	10	10	10
$ 6 4-Bromofluorobenzene	10	10	10	10	10	10	10
7 Chlorodifluoromethane	0.2	0.5	1	5	10	15	30
8 Dichlorodifluoromethan	0.2	0.5	1	5	10	15	30
9 Chloromethane	-	0.5	1	5	10	15	30
10 1,2-Dichlorotetrafluor	0.2	0.5	1	5	10	15	30
11 Vinyl Chloride	0.2	0.5	1	5	10	15	30
12 Methanol	-	-	4	20	40	60	120
13 1,3-Butadiene	0.2	0.5	1	5	10	15	30
14 n-Butane	0.2	0.5	1	5	10	15	30
15 Bromomethane	0.2	0.5	1	5	10	15	30
16 Chloroethane	0.2	0.5	1	5	10	15	30
17 Trichlorofluoromethane	0.2	0.5	1	5	10	15	30
18 Acrolein	0.4	1	2	10	20	30	60
19 Acetonitrile	-	1	2	10	20	30	60
20 Acetone	-	-	2	10	20	15	60
21 Pentane	-	0.5	1	5	10	15	30
22 Ethyl Ether	0.4	1	2	10	20	30	60
23 1,1-Dichloroethene	0.2	0.5	1	5	10	15	30
24 Acrylonitrile	0.4	1	2	10	20	30	60
25 1,1,2-Trichlorotrifluo	0.2	0.5	1	5	10	15	30
26 Methylene Chloride	-	0.5	1	5	10	15	30
27 3-Chloropropene	0.2	0.5	1	5	10	15	30
28 Carbon Disulfide	0.2	0.5	1	5	10	15	30
29 trans-1,2-Dichloroethe	0.2	0.5	1	5	10	15	30
30 Methyl-t-Butyl Ether	0.4	1	2	10	20	30	60
31 1,1-Dichloroethane	0.2	0.5	1	5	10	15	30
32 Vinyl Acetate	0.4	1	2	10	20	30	60
33 2-Butanone	-	1	2	10	20	30	60
34 Hexane	0.2	0.5	1	5	10	15	30
35 cis 1,2-Dichloroethene	0.2	0.5	1	5	10	15	30
36 Chloroform	0.2	0.5	1	5	10	15	30
37 1,1,1-Trichloroethane	0.2	0.5	1	5	10	15	30
38 1,2-Dichloroethane	0.2	0.5	1	5	10	15	30
39 Benzene	0.2	0.5	1	5	10	15	30
40 1-Butanol	0 4	1	2	10	20	30	60
41 Cyclohexane	0.2	0.5	1	5	10	15	30
42 Carbon Tetrachloride	0.2	0.5	1	5	10	15	30
43 Heptane	0.2	0.5	1	5	10	15	30
44 1,2-Dichloropropane	0.2	0.5	1	5	10	15	30
45 Trichloroethene	0.2	0.5	1	5	10	15	30
46 Dibromomethane	0.2	0.5	1	5	10	15	30
47 Bromodichloromethane	0.2	0.5	1	5	10	15	30
48 4-Methyl-2-pentanone	0.4	1	2	10	20	30	60
49 cis-1,3-Dichloropropen	0.2	0.5	1	5	10	15	30
50 trans-1,3-Dichloroprop	0.2	0.5	1	5	10	15	30

Appendix IV: Recommended Calibration levels, continued

51 Toluene	0.2	0.5	1	5	10	15	30
52 1,1,2-Trichloroethane	0.2	0.5	1	5	10	15	30
53 2-Hexanone	0.4	1	2	10	20	30	60
54 Octane	0.2	0.5	1	5	10	15	30
55 Dibromochloromethane	0.2	0.5	1	5	10	15	30
56 1.2-Dibromoethane	0.2	0.5	1	5	10	15	30
57 Tetrachloroethene	0.2	0.5	1	5	10	15	30
58 Chlorobenzene	0.2	0.5	1	5	10	15	30
59 Ethylbenzene	0.2	0.5	1	5	10	15	30
60 m-Xylene (For p-)	0.2	0.5	1	5	10	15	30
61 Bromoform	0.2	0.5	1	5	10	15	30
62 Nonane	0.2	0.5	1	5	10	15	30
63 Styrene	0.2	0.5	1	5	10	15	30
64 o-Xylene	0.2	0.5	1	5	10	15	30
65 1,1,2,2-Tetrachloroeth	0.2	0.5	1	5	10	15	30
66 1.2,3-Trichloropropane	-	0.5	1	5	10	15	30
67 Cumene	0.2	0.5	1	5	10	15	30
68 n-Propylbenzene	0.2	0.5	1	5	10	15	30
69 4-Ethyltoluene	0.2	0.5	1	5	10	15	30
70 1.3,5-Trimethylbenzene	0.2	0.5	1	5	10	15	30
71 Alpha-Methylstyrene	0.2	0.5	1	5	10	15	30
72 Decane	0.2	0.5	1	5	10	15	30
73 1,2,4-Trimethylbenzene	0.2	0.5	1	5	10	15	30
74 1.3-Dichlorobenzene	0.2	0.5	1	5	10	15	30
75 Benzyl Chloride	0.2	0.5	1	5	10	15	30
76 1.4-Dichlorobenzene	0.2	0.5	1	5	10	15	30
77 1,2-Dichlorobenzene	0.2	0.5	1	5	10	15	30
78 Undecane	0.2	0.5	1	5	10	15	30
79 Dodecane	0.2	0.5	1	5	10	15	30
80 1,2,4-Trichlorobenzene	0.2	0.5	1	5	10	15	30
81 Napthalene	0.2	0.5	1	5	10	15	30
82 Hexachlorobutadiene	0.2	0.5	1	5	10	15	30

ATTACHMENT 2-3

STL KNOXVILLE SUMMARY TABLES

TABLE 1
Summary of Analytical Procedures

The Lockformer Company / Lisle, Illinois

Analyte		Laboratory SOP No.	Method No.
Matrix:	WATER Volatile Organics		SW-846 Method 8260B
Matrix:	SOIL Volatile Organics		EPA Method 5035/SW-846 Method 8260B
Matrix:	AIR Volatile Organics	KNOX-MS-0001, current revision, VOA Canister Analysis	EPA Compendium Method TO-15

TABLE 2
Sample Holding Times, Containers, Preservatives, and Volume Requirements

The Lockformer Company / Lisle, Illinois

PARAMETER	METHOD	MATRIX	HOLDING TIME (1)	CONTAINER	PRESERVATIVE	MINIMUM VOLUME REQUIRED
Volatile Organics	5030/8260B	Water				
Volatile Organics	5035/8260B	Soil				
Volatile Organics	TO-15	Air	30 days	SUMMA canister	None	NA

NOTES:

(1) Holding time measured from time of sampling

Table 3

STL Knoxville TO15 RLs and MDLs 11/25/03

Compound	RL	Units	MDL	Units
Dichlorodifluoromethane	0.2	ppb(v/v)	0.05	ppb(v/v)
Chlorodifluoromethane	0.2	ppb(v/v)	0.03	ppb(v/v)
1,2-Dichloro-1,1,2,2-tetrafluor	0.2	ppb(v/v)	0.06	ppb(v/v)
Chloromethane	0.5	ppb(v/v)	0.06	ppb(v/v)
Vinyl chloride	0.2	ppb(v/v)	0.05	ppb(v/v)
n-Butane	0.2	ppb(v/v)	0.04	ppb(v/v)
1,3-Butadiene	0.2	ppb(v/v)	0.06	ppb(v/v)
Bromomethane	0.2	ppb(v/v)	0.06	ppb(v/v)
Chloroethane	0.2	ppb(v/v)	0.05	ppb(v/v)
Trichlorofluoromethane	0.2	ppb(v/v)	0.04	ppb(v/v)
Pentane	0.5	ppb(v/v)	0.05	ppb(v/v)
1,1-Dichloroethene	0.2	ppb(v/v)	0.04	ppb(v/v)
1,1,2-Trichloro-1,2,2-trifluoroe	0.2	ppb(v/v)	0.05	ppb(v/v)
Carbon disulfide	0.2	ppb(v/v)	0.04	ppb(v/v)
3-Chloropropene	0.2	ppb(v/v)	0.05	ppb(v/v)
Methylene chloride	0.5	ppb(v/v)	0.24	ppb(v/v)
trans-1,2-Dichloroethene	0.2	ppb(v/v)	0.05	ppb(v/v)
n-Hexane	0.2	ppb(v/v)	0.05	ppb(v/v)
1,1-Dichloroethane	0.2	ppb(v/v)	0.05	ppb(v/v)
cis-1,2-Dichloroethene	0.2	ppb(v/v)	0.05	ppb(v/v)
Chloroform	0.2	ppb(v/v)	0.04	ppb(v/v)
1,1,1-Trichloroethane	0.2	ppb(v/v)	0.05	ppb(v/v)
Cyclohexane	0.5	ppb(v/v)	0.06	ppb(v/v)
Carbon tetrachloride	0.2	ppb(v/v)	0.06	ppb(v/v)
Benzene	0.2	ppb(v/v)	0.06	ppb(v/v)
1,2-Dichloroethane	0.2	ppb(v/v)	0.05	ppb(v/v)
n-Heptane	0.2	ppb(v/v)	0.05	ppb(v/v)
Trichloroethene	0.2	ppb(v/v)	0.06	ppb(v/v)
1,2-Dichloropropane	0.2	ppb(v/v)	0.05	ppb(v/v)
Dibromomethane	0.2	ppb(v/v)	0.05	ppb(v/v)
Bromodichloromethane	0.2	ppb(v/v)	0.05	ppb(v/v)
cis-1,3-Dichloropropene	0.2	ppb(v/v)	0.06	ppb(v/v)
Toluene	0.2	ppb(v/v)	0.09	ppb(v/v)
n-Octane	0.2	ppb(v/v)	0.04	ppb(v/v)
trans-1,3-Dichloropropene	0.2	ppb(v/v)	0.05	ppb(v/v)
1,1,2-Trichloroethane	0.2	ppb(v/v)	0.06	ppb(v/v)
Tetrachloroethene	0.2	ppb(v/v)	0.06	ppb(v/v)
Dibromochloromethane	0.2	ppb(v/v)	0.05	ppb(v/v)
1,2-Dibromoethane (EDB)	0.2	ppb(v/v)	0.06	ppb(v/v)
Chlorobenzene	0.2	ppb(v/v)	0.06	ppb(v/v)
Ethylbenzene	0.2	ppb(v/v)	0.05	ppb(v/v)
m-Xylene & p-Xylene	0.2	ppb(v/v)	0.05	ppb(v/v)
Nonane	0.2	ppb(v/v)	0.04	ppb(v/v)
o-Xylene	0.2	ppb(v/v)	0.05	ppb(v/v)
Styrene	0.2	ppb(v/v)	0.06	ppb(v/v)
Bromoform	0.2	ppb(v/v)	0.04	ppb(v/v)
Cumene	0.2	ppb(v/v)	0.06	ppb(v/v)
1,1,2,2-Tetrachloroethane	0.2	ppb(v/v)	0.04	ppb(v/v)

n-Propylbenzene	0.2	ppb(v/v)	0.05	ppb(v/v)
1,3,5-Trimethylbenzene	0.2	ppb(v/v)	0.06	ppb(v/v)
n-Decane	0.2	ppb(v/v)	0.05	ppb(v/v)
alpha-Methylstyrene	0.2	ppb(v/v)	0.06	ppb(v/v)
1,2,4-Trimethylbenzene	0.2	ppb(v/v)	0.05	ppb(v/v)
1,3-Dichlorobenzene	0.2	ppb(v/v)	0.04	ppb(v/v)
1,4-Dichlorobenzene	0.2	ppb(v/v)	0.05	ppb(v/v)
Benzyl chloride	0.2	ppb(v/v)	0.05	ppb(v/v)
1,2-Dichlorobenzene	0.2	ppb(v/v)	0.05	ppb(v/v)
n-Undecane	0.2	ppb(v/v)	0.06	ppb(v/v)
n-Dodecane	0.2	ppb(v/v)	0.08	ppb(v/v)
1,2,4-Trichlorobenzene	0.2	ppb(v/v)	0.06	ppb(v/v)
Hexachlorobutadiene	0.2	ppb(v/v)	0.03	ppb(v/v)
Naphthalene	0.2	ppb(v/v)	0.09	ppb(v/v)
Methanol	10	ppb(v/v)	0.09	ppb(v/v)
Ethyl ether	0.5	ppb(v/v)	0.07	ppb(v/v)
Acetone	5	ppb(v/v)	0.24	ppb(v/v)
Acrylonitrile	0.5	ppb(v/v)	0.05	ppb(v/v)
Vinyl acetate	0.5	ppb(v/v)	0.13	ppb(v/v)
2-Butanone (MEK)	0.5	ppb(v/v)	0.13	ppb(v/v)
1-Butanol	0.5	ppb(v/v)	0.12	ppb(v/v)
4-Methyl-2-pentanone (MIBK)	0.5	ppb(v/v)	0.37	ppb(v/v)
2-Hexanone	0.5	ppb(v/v)	0.27	ppb(v/v)
Methyl tert-butyl ether	0.5	ppb(v/v)	0.09	ppb(v/v)
Acrolein	0.5	ppb(v/v)	0.05	ppb(v/v)
Acetonitrile	1	ppb(v/v)	0.13	ppb(v/v)
4-Ethyltoluene	0.2	ppb(v/v)	0.04	ppb(v/v)
1,2,3-Trichloropropane	0.5	ppb(v/v)	0.03	ppb(v/v)

TABLE 4
Instrument Calibration Frequency

Instrument	Method Reference	# Standards Initial Calibration	Acceptance/Rejection Criteria Initial Calibration	Frequency of Calibration	Frequency of Initial Calibration Verification	Acceptance/ Rejection Criteria Initial Calibration Verification	Frequency of Continuing Calibration Verification	Acceptance/ Rejection Criteria Continuing Calibration Verification
Severn Trent Laboratories, Inc.								
GC/MS volatiles	SW-846 8260B	5-8	% RSD (CCC) <30% 1,1-dichloroethene chloroform 1,2-dichloropropane toluene ethyl benzene vinyl chloride RF (SPCC) chloromethane (0.1) 1,1-dichloroethane (0.1) bromoform (0.1) 1,1,2,2-tetrachloroethane (0.3) chlorobenzene (0.3)	As needed	As needed	CCC <20% D other analyses 50% D	Every 12 hours	CCC %D <20% Same SPCC criteria as initial calibration
GC/MS volatiles	EPA Compendium Method TO-15	5	The % RSD for the RRF for each target compound must be <30% with, at most, two exceptions up to a limit of 40%.	As needed	Following Initial Calibration	% Difference for each target compound must be within +/- 30%	Initially and once per 24-hour period of operation	% Difference for each target compound must be within +/- 30%

NOTES:

All of the information listed for Severn Trent Laboratories, Inc. meets the specific requirements (where applicable) outlined in EPA Compendium Method TO-15.

TABLE 5
Laboratory Preventative Maintenance and Schedules

The Lockformer Company / Lisle, Illinois

INSTRUMENT	MAINTENANCE PROCEDURES/SCHEDULE	SPARE PARTS IN STOCK
Gas Chromatograph Spectrometer (GC/MS)	1. Replace pump oil as needed. 2. Disassemble and clean "source" as needed. 3. Change septa weekly or as often as needed. 4. Replace electron multiplier and filaments as often as needed. 5. Replace GC injector glass liner weekly or as often as needed. 6. Replace GC column as needed. 7. Check to ensure that gas supply is sufficient for the day's activity.	1. Syringes 2. Septa 3. Various electronic and mechanical components 4. Glass jet separator 5. GC columns 6. Glass liner 7. Rough pump
Gas Chromatograph	1. Change septa weekly or as often as needed. 2. Replace GC injector glass liner weekly or as often as needed. 3. Replace GC column as needed. 4. Clean/replace GC detector as needed. 5. Check to ensure that gas supply is sufficient for the day's activity.	1. Syringes 2. Septa 3. Detectors 4. Glass liner 5. GC columns
Purge and Trap Sample Concentrator	1. Replace trap as needed. 2. Decontaminate system after running high concentration samples or as required components by blank analysis. 3. Leak-check system often as needed. 4. Check to ensure the gas supply is sufficient for the day's activity.	1. Spare traps 2. Spare sparger 3. Various electronic and mechanical components 4. Plumbing supplies, valves, tubing fitting, & transfer lines

ATTACHMENT 2-4

STL KNOXVILLE RESUMES OF KEY PERSONNEL

SCOTT HARRIS

Professional Qualifications

Mr. Harris has experience in many areas of the laboratory including analyst and group leader responsibilities in Sample Login, Wet Chemistry, GC, HPLC, GC/MS and Project Management.

Education

Analysis of Water and Waste in Environmental Matrices, IT Corporation, Knoxville, Tennessee; 1989
Lab Safety Training, IT Corporation, Knoxville, Tennessee; 1989
B.A., Magna Cum Laude, Business Administration, Belmont Abbey College, Belmont, North Carolina; 1988

Experience and Background

April 2002 Present — Project Manager, STL Knoxville, Knoxville, Tennessee
Responsible for scheduling and coordinating sample analysis. Serves as the interface between the customer and laboratory.

Oct 2000 April 2002 — Chemist, STL Knoxville, Knoxville, Tennessee
Responsible for the analysis and interpretation of data from environmental samples for the volatile GC/MS laboratory.

May 1995 Oct 2000 — Group Leader, GC/HPLC Group, STL Knoxville, Knoxville, Tennessee
Responsible for the following duties: Primary coordinator and troubleshooter for EPA methods 8081, 8082, 8330, and CLP GC methods, the setup, maintenance and coordination for all GC and HPLC methods, backup analyst for analyses in the group, sample tracking and job assignments, HPLC method development and standard operating procedures development, maintenance of HPLC and GC equipment and data review and reporting.

Jan. 1995- May 1995 — Group Leader, Wet Chemistry Group, Quanterra Environmental Services, Knoxville, Tennessee. Responsible for the following duties: all routine water and wastewater chemical analyses, training personnel in correct lab protocol, ion chromatography analyses, documentation and update of Standard Operating Procedures, ensuring the correct QC checks are analyzed and adhering to corporate QA policies, and coordinating and prioritizing projects.

1993 - 1995	Chemist, Quanterra Environmental Services, (formerly IT Corporation), Knoxville, Tennessee. Responsible for the analysis of samples for volatile hydrocarbons by gas chromatography.
1990 - 1993	Coding Supervisor, IT Corporation, Knoxville, Tennessee. Responsible for the following duties: coding samples into the laboratory; routing samples to proper personnel; sample handling from receipt to disposal; reviewing project records; contacting clients with project irregularities; and direct supervision of coding specialists.
1989 - 1990	Coding Specialist, IT Corporation, Knoxville, Tennessee. Responsible for sample receiving and routing of samples and documentation.

CHRISTOPHER W. RIGELL

Professional Qualifications

Experienced with advanced analytical techniques and quality systems management, Dr. Rigell is the Quality Assurance Manager for the STL Knoxville Laboratory. This experience includes managing the implementation of a variety of quality systems within the laboratory to ensure compliance with various state and federal environmental programs.

Education

Ph.D., Biochemistry, University of Tennessee, Knoxville, Tennessee; 1986
M.S., Biochemistry, University of Tennessee, Knoxville, Tennessee; 1985
B.A., Chemistry and Mathematics, Maryville College, Maryville, Tennessee; 1979

Experience and Background

June 1993-Present — Quality Assurance Manager, STL Knoxville, Knoxville, Tennessee
Responsible for assuring and improving quality within facility operations. Specific duties include:

- Recommending resolutions for ongoing or recurrent nonconformances within the laboratory.
- Supervising and providing guidance to laboratory QA staff.
- Suspending processing when quality requirements are not met.
- Performing QA assessments of the laboratory. Coordinating audit activities at the laboratory. Providing timely responses to audit findings and performance evaluation sample deficiencies through cooperative effort with facility operations representatives. Closing findings of QA audits.
- Providing training for the laboratory on issues pertaining to the QA program.
- Assisting in preparation of and approving Quality Assurance Project Plans.
- Maintaining certification and accreditation programs.
- Maintaining controlled quality documents.
- Preparing monthly quality reports to management.

Feb. 1992 - May 1993 — Manager - Inorganics Section, IT Corporation, Knoxville, Tennessee.
Duties included: Coordination of efforts among the individual laboratories to produce a high quality product in a timely manner. Assuring that the laboratory uses appropriate methodology. Serving as a liaison between project managers and the laboratory. Resolving technical problems. Maintaining awareness of laboratory capacity. Working with quality assurance department to assure the laboratory is operating within corporate and external QA/QC requirements.

Assisting project managers in handling technical questions from clients. Assisting in implementing the laboratory safety program.

Jan 1987 - Feb. 1992 — Chemist, IT Corporation, Knoxville, Tennessee.
Duties included:
Operation and maintenance of a Finnigan Gas Chromatograph Mass Spectrometer System; preparation of standards, blanks, and samples; data system operation including calculations and specific interpretations of data; completion and review of data forms; and development and implementation of new analytical techniques.

Sept.1981 - Aug.1986 — Graduate Research/Teaching Assistant, Biochemistry Department, University of Tennessee, Knoxville, Tennessee.
Researched interactions of protein and lipid using high sensitivity differential scanning calorimetry. Developed an electrophoretic technique for measuring denaturation of membrane proteins. Instructed undergraduate students in biochemistry and biology.

Sept.1979 - July 1981 — Chemist, Kenwill, Inc., Maryville, Tennessee.
Sampled, prepared, and analyzed water, soil, coal, and geologic samples. Operated bomb calorimeter to obtain heats of combustion of coal samples. Used atomic absorption spectrophotometry to analyze for metals in water and geologic samples.

Publications

Freire, Ernesto, Tom Markello, Christopher Rigell, and Peter Holloway, 1983, "Calorimetric and Fluorescence Characterization of Interactions Between Cytochrome b_5 and Phosphatidylcholine Bilayers", Biochemistry 22, pp. 1675-1680.

Rigell, Christopher W., Claire de Saussure, and Ernesto Freire, 1985, "Protein and Lipid Structural Transitions in Cytochrome c Oxidase-Dimyristoylphosphatidylcholine Reconstitutions", Biochemistry 24, pp. 5638-5646.

Clayton
GROUP SERVICES

ATTACHMENT 2-5

STL KNOXVILLE STANDARD OPERATING PROCEDURE

Nonconformance and Corrective Action System

STL KNOXVILLE

STANDARD OPERATING PROCEDURE

TITLE: NONCONFORMANCE AND CORRECTIVE ACTION SYSTEM

(SUPERSEDES: CORP-QA-0010, Revision 2)

Prepared By: _____

Reviewed By: _____ 07/15/02
Technical Specialist

Approved By: _____ 07/15/02
Quality Assurance Manager

Approved By: _____ 7-15-02
Environmental, Health and Safety Coordinator

Approved By: _____ 7-22-02
Laboratory Director

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1. PURPOSE

1.1. The purpose of this document is to establish procedures for the identification and documentation of nonconformances and the corrective actions taken as a result of these events. The STL Quality Management Plan (QMP) and STL Knoxville Laboratory Quality Manual (LQM) require documentation of instances of deviations from established control limits, approved standard operating procedure (SOPs), or client-specified requirements. The Nonconformance Memo (NCM) described in this procedure is used to document deviations from STL Knoxville policies and procedures and documented client specifications including root causes and corrective actions taken to remedy the nonconformance. The NCM will be stored in electronic form in a database called Clouseau, with any supporting material filed in QA as necessary.

1.2. This document applies to procedures, services, analytical data, reports or materials purchased by the laboratory or supplied by the laboratory to its clients. The system used to handle the sample receiving and client-related issues, including holding time violations (HTVs), emphasizes the immediate notification of the Project Manager (PM). This will allow the PM to initiate immediate client notification and resolution of how to proceed. See Section 5, Definitions, for further clarification of application.

1.3. Nonconformances can be identified by associates in the course of their daily operations or by external parties (i.e., customers and representatives of customers) through reviews of records, audit, or proficiency testing.

2. RESPONSIBILITIES

2.1. **Laboratory Associate:** During the course of their work, all employees are responsible for identifying and documenting problems, using a Nonconformance Memo, that might affect the quality of STL Knoxville's product. They should also identify or attempt to seek out possible measures to correct the problem. By signing or initialing laboratory notebooks, forms, bench sheets, data reports, and other quality-related documents, associates are verifying that procedures have been followed. Any deviation that might render a measurement suspect shall be documented.

2.2. **Group Leader/Supervisor:** Each supervisor is responsible for the review of NCMs to ensure that problems which might affect quality are adequately described and that personnel are assigned to correct them. Supervisors review hardcopy or electronic versions of NCMs and forward them to the appropriate project manager. Together with project managers and Quality Assurance personnel, supervisors are responsible for determining the appropriateness of planned corrective actions.

2.3. **Project Manager (PM):** The project manager is responsible for relaying project requirements to staff so that special project requirements are understood and nonconformances recognized. The project manager communicates conformance issues to clients and documents decisions made with clients. The project manager ensures that short-term corrective actions for routine analytical QC failures are completed. An example would be making sure that repreparation and analysis of a sample was done. The project manager may withhold final reports to clients until corrective actions agreed to with the client have been completed. Project managers are also responsible for initiating an NCM for client complaints or inquiries.

2.4. **QA Manager:** The Quality Assurance manager or designee is responsible for reviewing all initiated NCMs to ensure that actions taken are appropriate, and assisting in resolving QA/QC discrepancies. The QA staff will maintain a nonconformance tracking system to guarantee that each nonconformance is brought to closure. The system will also be used to monitor for trends that might indicate long-term quality problems. Systematic problems are investigated, NCMs issued and reviewed, and assessments conducted to ensure that long-term corrective actions have been successfully completed. If review of an area reveals a significant problem with data quality, the Quality Assurance manager has the authority and responsibility to stop production in that laboratory area.

2.5. **Operations Manager:** The operations manager shall ensure that corrective actions are correct and have been implemented. The operations manager review and concurrence shall be documented in the database as the responsible manager, if required, for a specific corrective action. Along with the laboratory manager, the operations manager shall emphasize the importance of quality requirements and require all employees to report any problem that might adversely affect the quality of work.

2.6. **Laboratory Manager:** The laboratory manager shall emphasize the importance of quality requirements and require all employees to report any problem that might adversely affect the quality of work. The laboratory manager is also responsible for the implementation of the NCM system in the laboratory.

3. SAFETY

3.1. Normal office dependent safety precautions must be taken in performing this SOP. If personnel are required to perform any portion of the procedure in laboratory areas, appropriate personal protective equipment and precautions must be utilized.

3.2. Procedures shall be carried out in a manner that protects the health and safety of all associates.

3.3. All work must be stopped in the event of a known or potential compromise to the health and safety of an associate. The situation must be reported **immediately** to a laboratory supervisor.

4. PROCEDURE

4.1. When to Initiate a Nonconformance Memo

4.1.1. Lab associates are to initiate an electronic nonconformance memo (NCM) whenever procedures, services, data, reports, electronic disk deliverables (EDDs), or standard materials deviate from established specifications. All nonconformances with the exception of matrix-related failures require an NCM (see definitions of nonconformance, anomalies, and deficiencies in Section 5 and Section 1.2 for exceptions). Holding time violations (HTVs) that occur as a result of laboratory activity require an NCM. Holding time violations at sample receipt are noted on the CUR and are not documented on an NCM.

4.1.2. All standard operating procedures (SOPs) shall be followed. By signing or initialing laboratory notebooks, bench sheets, data reports, and other quality-related documents, employees are verifying that the SOPs have been followed with the exceptions of the pre-approved deviations (as described in QAPjPs quality assurance summaries (QAS) or equivalent systems). Any intentional deviation from an SOP must be pre-approved by the QA manager and Supervisor. Any deviation from an SOP or client requirement not previously approved must be documented using the NCM process.

4.1.3. An NCM is to be completed for each instance of a nonconformance. A single NCM can be used for a single event affecting multiple lot numbers and samples, but a separate NCM would be initiated for different nonconformance issues. If the nonconformance involves projects for multiple project managers, then the NCM is routed to each project manager.

4.2. How to Process the NCM using Clouseau

4.2.1. Initiating the NCM

4.2.1.1. While properly logged into a PC where Clouseau has been installed, start the Clouseau program.

4.2.1.2. At the Main Menu, select New.

4.2.1.3. Enter the information required by the wizard. At a minimum select the Production Area, Category (anomaly or deficiency), NCM Type, and NCM Description. Note that the observation feature in Clouseau is not used at STL Knoxville.

4.2.1.4. Select whether the nonconformance affects the entire lot, entire batch, specific sample, specific analysis (work order) or other. Other should only be used in cases such as client complaints or instrument tag outs that do not affect specific samples. If using one of the "entire" options, extra samples may be deleted by highlighting and using the delete key on the keyboard. The view may be resorted by clicking on one of the headers.

4.2.1.5. Complete the Comments/Details and Corrective Action sections of the Create NCM Form. These sections may be filled out jointly with the area leader. Consult the project manager or the operations manager and QA manager if the area leader and associate are uncertain of corrective actions. Be objective and specific but brief. Include enough information that decisions to approve the NCM can be made easily (include pertinent QC information).

4.2.1.5.1. Design corrective actions to correct the immediate problem (short-term corrective actions) and to minimize the possibility of its recurrence (long-term corrective actions). Examples of corrective actions are modifications to nonconforming procedures, repair or replacement of deficient equipment, training personnel, and reanalysis of any affected samples.

4.2.1.5.2. Where operational corrective actions are required, they shall be supported with reference to recovery data, control charts or other documentation.

4.2.1.6. If the corrective action involved retraining, the training must be documented with the signatures of the trainees and submitted to the QA staff before the NCM is considered closed.

4.2.1.7. Save the NCM using the appropriate command in Clouseau. When presented with the Send E-Mail form, the area leader of the affected Production Area will be listed in the "Notify Now" box, while affected Project Managers and QA staff will be listed in the "Notify Later" box. Verify that these names are correct. If any personnel should be informed that are not listed, add their names to the "Notify Now" box by double-clicking on their names in the Personnel box.

4.2.1.8. Initiate the NCM notification process by selecting SEND MAIL.

4.2.2. Supervisor Review and Approval

4.2.2.1. The area leader will receive notification of the NCM via e-mail. The area leader must log into a computer workstation where Clouseau has been installed, and run Clouseau.

4.2.2.2. Using the Review NCM form, select the NCM to be reviewed and highlight.

4.2.2.3. With the NCM on screen, review the information provided. Add necessary comments or corrective actions to the appropriate areas. If the corrective action has not been determined, the situation must be referred to the project manager and the operations manager for resolution to ensure client requirements can be satisfied. The QA staff should be consulted if there are questions as to how to proceed. If the above input was not needed, the operations manager does not need to have every NCM routed to him or her. If, upon receipt and review of the NCM by the QA staff, it is felt the operations manager needs to be made aware of the issues, the QA staff will notify the operations manager using the Under Review/Send Email options of Clouseau.

4.2.2.4. The area leader will be responsible for the completion of the corrective action unless otherwise indicated. The area leader selects the "Approved" option on the Review NCM form and selects SAVE. This initiates the NCM routing process, which will now route the NCM to the project manager. The project manager must receive the NCM in a timely manner, generally within 48 hours. If the NCM is for a holding time violation, a project manager ***must*** be notified ***immediately***.

4.2.3. Project Manager Review, Client Notification, and Project Documentation

4.2.3.1. The project manager shall determine if client notification is required to either assist in the definition of corrective action or to notify the client of problems related to sample analysis. The project manager shall indicate using the Client Notification Form in Clouseau the date and method of notification and client's response .

4.2.3.2. With the NCM on screen, review the information provided. Add necessary comments or corrective actions to the appropriate areas.

Notify the area leader of any changes made to the corrective action plan.

4.2.3.3. The project manager must select the "PM" button and document how client notification was done, and what, if any, response was made. If multiple projects are associated with one NCM, each project must be highlighted in this screen, and appropriate notification documented.

4.2.3.4. The project manager selects the "Approved" option on the Review NCM form and selects SAVE. This initiates the NCM routing to the QA office. The QA office then must review the NCM in a timely manner.

4.2.3.5. If the nonconformance involves analytical work in process, the **final** report cannot be released until a project manager has approved the NCM.

4.2.3.6. If it is found that erroneous analytical data (e.g., from data validation comments or phone requests, etc.; inaccurate chromatograms, spectra, calculations, or final reports) have been released by the laboratory, this fact must be documented on an NCM and forwarded to the QA office. Prior to making the corrections, proper documentation shall be filled out in Clouseau (i.e., tests affected, # of samples affected and type/description of error) if corrections are needed in the database (QuantIMS). The original data shall be maintained for historical purposes. The corrective action shall include prompt client notification and issuance of amended reports.

4.2.4. Quality Assurance Review and Trending

4.2.4.1. The QA staff shall review all NCMs for conformance with standard laboratory practices and policies.

4.2.4.2. NCMs will be reviewed to ensure that the corrective action was completed and effective in addressing the root cause of the nonconformity to prevent recurrence.

4.2.4.3. Clouseau's reporting and tracking system will be used to monitor for repetitive failures that might indicate systematic problems. Tracking records would (when applicable) include:

- NCM log number
- Date initiated
- Project number

- Lab sample ID numbers
- Method or parameter
- Nonconformance description
- Corrective action required
- Characterization as an anomaly or deficiency
- Closure of NCM

4.2.4.4. The QA staff shall identify repetitive quality issues that may be systematic in nature and may require corrective actions to prevent recurrence. Recurrent technical or Information Technology problems shall be referred to the appropriate technical group for corrective actions. Correction of systematic problems could take the form of modifications of nonconforming procedures, repair or replacement of deficient equipment, training or replacement of personnel. Findings and corrective actions from these investigations or audits shall also be documented. Resolution of corrective actions for systematic problems must be documented by the responsible laboratory area along with supporting evidence.

4.2.4.5. The QA staff may conduct spot assessments to confirm that correction of systematic problems have been successful.

4.2.4.6. The approval of the QA manager or designee is required in Clouseau to indicate that the NCM has been closed.

4.2.4.7. The Clouseau database is used to maintain a central file/record of all closed NCMs.

4.2.4.8. Instrument/Equipment Nonconformance Tag

4.2.4.8.1. Instruments and equipment which habitually fail to meet calibration criteria or are out of service due to needed repair or other reasons must be marked with a clearly visible tag or sign indicating the nonconforming condition.

4.2.4.8.2. If the reason for the nonconformance tag caused sample data to be impacted, initiate an NCM. Identify the instrument by name and/or identification number and briefly describe the problem.

4.2.4.8.3. Upon saving the NCM, the NCM number indicated by Clouseau shall be recorded in the instrument's maintenance log.

4.2.4.8.4. The corrective action will be to either permanently remove the instrument from service or to have the instrument repaired. If an instrument is repaired, its reliability must be demonstrated through successful recalibration before the nonconformance can be closed. The nonconformance tag remains in effect during the demonstration period. Ensure the back to control information is recorded in the instrument maintenance logbook or runlog. Return the tag and return the tag to the QA staff for closure of the NCM.

5. DEFINITIONS

5.1. ***Nonconformance:*** an unplanned deviation from an established protocol or plan. The deviation may be the result of STL Knoxville 's actions, then termed a **deficiency**, or the result of events beyond the control of STL Knoxville , then termed an **anomaly**. A nonconformance exists when:

- Any laboratory QC sample (e.g., method blank, laboratory control sample, duplicate laboratory control sample, matrix spike, matrix spike duplicate, and surrogate spike) component result is outside established control limits and demonstrates a **systematic** deficiency.

- Any matrix spike or matrix spike duplicate or sample related QC outside of established control limits attributed to matrix effects must be documented, but an NCM is not required.

- A procedure is not performed as described in the applicable SOP or QA Policy, ***except*** in cases where the procedure has been performed according to a client-specified document STL Knoxville has agreed to follow (e.g., EPA SOWs and QAPjPs).

- A practice or procedure is not performed as described according to a client or project document that STL Knoxville has agreed to follow.

- Purchased materials or services are determined to be defective and their use would affect data quality.

- A holding time violation (HTV) occurring as a result of laboratory actions.

- A formal NCM is not required for routine minor instrument maintenance, malfunctions, and power failures which can be documented in instrument maintenance logbooks.

5.2. ***Corrective action:*** Measures taken to rectify conditions adverse to quality and, where possible, to prevent their reoccurrence.

5.2.1. Corrective actions may vary from reporting the data as is—with appropriate documentation—to a complete reevaluation and restructure of a system.

5.2.2. Many corrective actions can be implemented immediately; however, some will take time to implement.

6. MISCELLANEOUS

6.1. Associated Reference Documents

6.1.1. STL Knoxville Laboratory Quality Manual (LQM), current revision.

6.1.2. STL Quality Management Plan (QMP), current revision

6.1.3. ANSI/ASME NQA-1, Chapter II, Basic Requirement 15 "Control of Nonconforming Items." Supplement 15S-1 "Supplementary Requirements for the Control of Nonconforming Items."

6.1.4. ANSI/ASQC Q94-1987, "Quality Management and Quality System Elements - Guidelines," Section 14.0 "Nonconformity" and Section 15.0 "Corrective Action."

6.1.5. Clouseau Program Documentation.

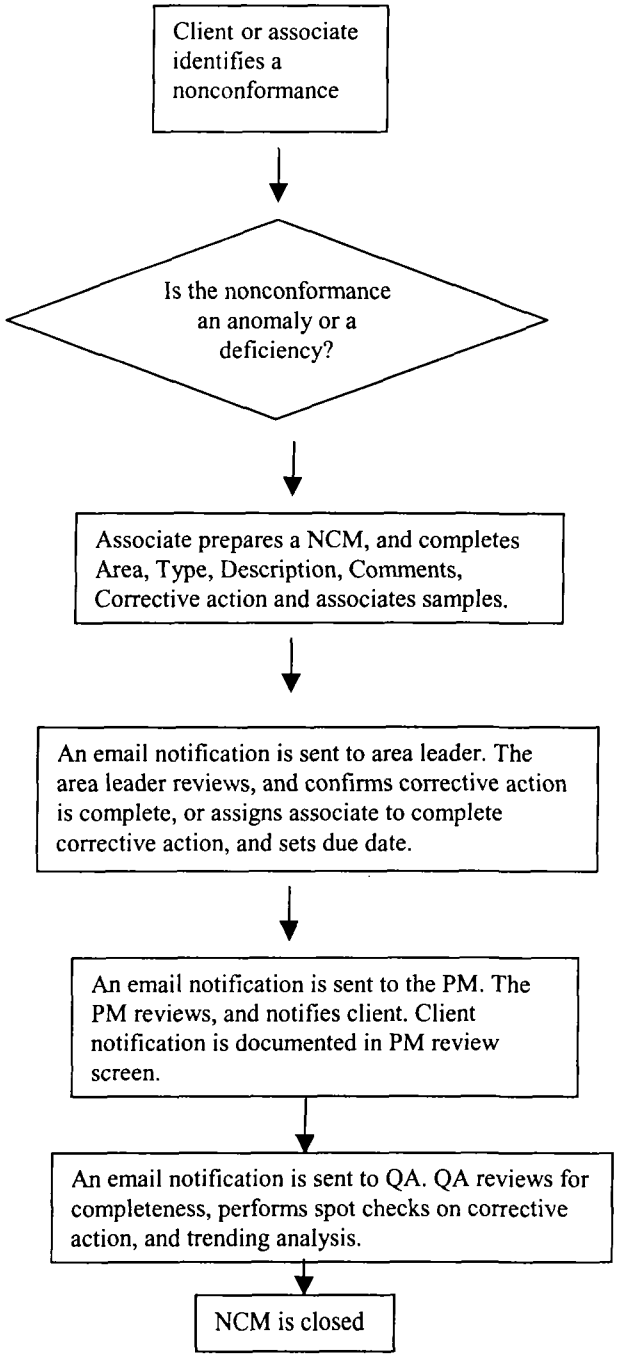
6.2. Appendices

6.2.1. Appendix I: Flow Chart

6.2.2. Appendix II: Nonconformance Memo Generated from Clouseau

6.2.3. Appendix III: Example Instrument Tag Out

Appendix I: Flow Chart for Internal NCM



Appendix II: Example Clouseau NCM

Clouseau Nonconformance Memo

SEVERN TRENT SERVICES

NCM #: 08-02453
NCM Initiated By: Kevin Woodcock
Date Opened: 06/14/2002
Date Closed: 07/12/2002

Classification: **Anomaly**
Status: **CLOSED**
Production Area: Dioxin
Tests: 23
Lot #'s (Sample #'s) H2D190193 (1,2,3,4,5),
QC Batches: 2112132,

Nonconformance: Reissued deliverable
Subcategory: Client induced: report format (C2)

Problem Description / Root Cause

Name	Date	Description
Kevin Woodcock	06/14/2002	The client requested additions or changes to the report format/sample IDs after sample analysis or reporting had begun. Test(s) affected: Method 23 Number of Samples: 5 Type of error: Client has now requested that we report the total homolog values on the report. This was requested after the report was originally completed.

Corrective Action

Name	Date	Corrective Action
Kevin Woodcock	06/14/2002	Please Un-Mail the Lot. PM will add an additional test to include the total homologs on the analyte list. GCMS will reprocess the data to include total numbers on the report. The report will then be re-issued to the client.

Client Notification Summary

Client	Project Manager	Notified	Response	How Notified	Note	Response	Response Note

Quality Assurance Verification

Verified By	Due Date	Status	Notes
TYLERM		*Verified/completed*	*The report was reissued on 6/25/02.*

Approval History

Date Approved	Approved By	Position

Date Printed: 7/15/02

Page 1 of 1

Appendix III: Example Tag Out

STL KNOXVILLE

NONCONFORMING ITEM

CAUTION: DO NOT USE

AFFECTED ITEM_____

_____

ANALYST DATE

If the reason for the nonconformance tag caused sample data to be affected, initiate an NCM. NCM # _____.

QA029R2 03/27/00

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ATTACHMENT 2-6

STL KNOXVILLE RESULTS OF LATEST MDL STUDIES

STL Knoxville Method Detection Limit Study

Analysis Method:	TO14A/TO15							
Prep Method:	TO14A/TO15							
MDL Study Date:		9/20/01	9/13/01	9/13/01	9/14/01	9/14/01	9/15/01	
Project Code:	NA							
Raw Data File:		mdl1	mdl2	mdl3	mdl4	mdl5	mdl6	mdl7
Instrument:	me	E092001	E091301i	E091301i	E091401	E091401	E091501	E091501
Column:	DB-5							
Analyst:	SAH							
Matrix:	air							
Units:	ppb v/v							
Template File	Template.xls Revision 1							

Parameter	Spiked amt	Run #1	Run #2	Run #3	Run #4	Run #5	Run #6	Run #7	Average	Average Recovery	Standard Deviation	MDL	Reporting Limit
75-45-6---------Chlorodifluoromethane	0.20	0.21	0.20	0.20	0.19	0.19	0.20	0.19	0.20	99%	0.01	0.03	0.2
75-71-8---------Dichlorodifluoromethane	0.20	0.21	0.18	0.18	0.17	0.17	0.17	0.17	0.18	90%	0.02	0.05	0.2
74-87-3---------Chloromethane	0.20	0.26	0.23	0.21	0.21	0.21	0.21	0.21	0.22	109%	0.02	0.06	0.2
76-14-2---------1,2-Dichlorotetrafluoroethan	0.20	0.23	0.19	0.19	0.18	0.19	0.18	0.18	0.19	95%	0.02	0.06	0.5
75-01-4---------Vinyl Chloride	0.20	0.21	0.18	0.18	0.18	0.17	0.17	0.17	0.18	90%	0.01	0.05	0.2
67-56-1---------Methanol	0.80	0.90	0.92	0.91	0.95	0.91	0.85	0.89	0.91	113%	0.03	0.09	10
106-99-0--------1,3-Butadiene	0.20	0.22	0.18	0.17	0.17	0.18	0.18	0.17	0.18	91%	0.02	0.06	0.2
106-97-8--------n-Butane	0.20	0.25	0.23	0.24	0.23	0.22	0.23	0.21	0.23	116%	0.01	0.04	0.2
74-83-9---------Bromomethane	0.20	0.22	0.19	0.17	0.17	0.18	0.18	0.17	0.18	91%	0.02	0.06	0.2
75-00-3---------Chloroethane	0.20	0.20	0.18	0.17	0.16	0.17	0.16	0.16	0.17	86%	0.02	0.05	0.2
75-69-4---------Trichlorofluoromethane	0.40	0.21	0.19	0.18	0.18	0.18	0.18	0.17	0.19	47%	0.01	0.04	0.2
107-02-8--------Acrolein	0.20	0.36	0.39	0.38	0.38	0.37	0.38	0.35	0.38	188%	0.01	0.05	0.5
75-05-8---------Acetonitrile	0.40	0.36	0.34	0.26	0.25	0.28	0.28	0.25	0.29	72%	0.04	0.13	1
67-64-1---------Acetone	0.40	0.67	0.68	0.48	0.69	0.68	0.64	0.65	0.64	160%	0.08	0.24	5
109-66-0--------Pentane	0.20	0.26	0.25	0.23	0.23	0.24	0.24	0.22	0.24	120%	0.02	0.05	0.5
60-29-7---------Ethyl Ether	0.40	0.40	0.36	0.35	0.34	0.35	0.36	0.35	0.36	90%	0.02	0.07	0.5
75-35-4---------1,1-Dichloroethene	0.20	0.21	0.18	0.17	0.17	0.17	0.18	0.17	0.18	89%	0.01	0.04	0.2
107-13-1--------Acrylonitrile	0.40	0.35	0.34	0.32	0.32	0.33	0.33	0.30	0.33	81%	0.01	0.05	0.5
76-13-1---------1,1,2-Trichlorotrifluoroetha	0.20	0.23	0.20	0.19	0.18	0.19	0.19	0.19	0.19	97%	0.01	0.05	0.2
75-09-2---------Methylene Chloride	0.20	0.42	0.63	0.63	0.61	0.61	0.63	0.62	0.59	296%	0.08	0.24	0.5
107-05-1--------3-Chloropropene	0.20	0.22	0.19	0.18	0.18	0.18	0.18	0.17	0.18	91%	0.02	0.05	0.2
75-15-0---------Carbon Disulfide	0.20	0.20	0.18	0.17	0.17	0.17	0.17	0.17	0.18	88%	0.01	0.04	0.2
156-60-5--------trans-1,2-Dichloroethene	0.20	0.21	0.18	0.18	0.17	0.17	0.18	0.17	0.18	91%	0.02	0.05	0.2
1634-04-4-------Methyl-t-Butyl Ether	0.40	0.39	0.31	0.33	0.33	0.33	0.32	0.33	0.34	84%	0.03	0.09	0.5
75-34-3---------1,1-Dichloroethane	0.20	0.22	0.18	0.18	0.17	0.17	0.18	0.17	0.18	91%	0.02	0.05	0.2
108-05-4--------Vinyl Acetate	0.40	0.45	0.34	0.35	0.35	0.38	0.32	0.38	0.37	92%	0.04	0.13	0.5
78-93-3---------2-Butanone	0.40	0.46	0.36	0.36	0.35	0.36	0.35	0.35	0.37	93%	0.04	0.13	0.5
110-54-3--------Hexane	0.20	0.23	0.20	0.20	0.19	0.19	0.20	0.19	0.20	100%	0.02	0.05	0.2
156-59-2--------cis 1,2-Dichloroethene	0.20	0.22	0.19	0.18	0.17	0.18	0.18	0.18	0.19	93%	0.02	0.05	0.2
67-66-3---------Chloroform	0.20	0.21	0.18	0.18	0.18	0.17	0.18	0.17	0.18	90%	0.01	0.04	0.2

$Spiked amount is > 10x the MDL. Therefore, the MDL in QuantIMS will be set to 1/10 the spiked amount per policy QA-005.

71-55-6---------1,1,1-Trichloroethane	0.20	0.21	0.18	0.18	0.17	0.17	0.17	0.16	0.18	89%	0.02	0.05	0.2
107-06-2--------1,2-Dichloroethane	0.20	0.22	0.19	0.18	0.18	0.17	0.18	0.17	0.19	93%	0.02	0.05	0.2
71-43-2---------Benzene	0.40	0.27	0.23	0.23	0.22	0.22	0.23	0.22	0.23	58%	0.02	0.06	0.2
71-36-3---------1-Butanol	0.20	0.16	0.08	0.13	0.09	0.18	0.17	0.14	0.14	68%	0.04	0.12	0.5
110-82-7--------Cyclohexane	0.20	0.28	0.25	0.25	0.24	0.24	0.22	0.23	0.24	122%	0.02	0.06	0.5
56-23-5---------Carbon Tetrachloride	0.20	0.13	0.19	0.18	0.18	0.17	0.18	0.17	0.17	86%	0.02	0.06	0.2
142-82-5--------Heptane	0.20	0.23	0.21	0.20	0.19	0.19	0.19	0.19	0.20	100%	0.02	0.05	0.2
78-87-5---------1,2-Dichloropropane	0.20	0.24	0.21	0.20	0.19	0.19	0.20	0.20	0.20	102%	0.01	0.05	0.2
79-01-6---------Trichloroethene	0.20	0.26	0.21	0.20	0.20	0.20	0.21	0.20	0.21	106%	0.02	0.06	0.2
74-95-3---------Dibromomethane	0.20	0.24	0.21	0.20	0.19	0.19	0.20	0.20	0.20	102%	0.02	0.05	0.2
75-27-4---------Bromodichloromethane	0.20	0.22	0.18	0.17	0.17	0.17	0.17	0.17	0.18	90%	0.02	0.05	0.5
108-10-1--------4-Methyl-2-pentanone	0.40	0.45	0.15	0.15	0.20	0.14	0.10	0.18	0.20	49%	0.12	0.37	0.2
10061-01-5------cis-1,3-Dichloropropene	0.20	0.23	0.20	0.20	0.18	0.18	0.18	0.18	0.19	97%	0.02	0.06	0.2
10061-02-6------trans-1,3-Dichloropropene	0.20	0.22	0.20	0.19	0.17	0.18	0.18	0.18	0.19	94%	0.01	0.05	0.2
108-88-3--------Toluene	0.20	0.31	0.25	0.23	0.23	0.23	0.24	0.23	0.24	122%	0.03	0.09	0.2
79-00-5---------1,1,2-Trichloroethane	0.20	0.25	0.21	0.21	0.20	0.20	0.20	0.21	0.21	105%	0.02	0.06	0.5
591-78-6--------2-Hexanone	0.40	0.44	0.25	0.21	0.24	0.21	0.22	0.19	0.25	62%	0.08	0.27	0.2
111-65-9--------Octane	0.20	0.25	0.21	0.24	0.22	0.21	0.23	0.21	0.23	113%	0.01	0.04	0.2
124-48-1--------Dibromochloromethane	0.20	0.21	0.19	0.18	0.18	0.17	0.18	0.17	0.18	91%	0.01	0.05	0.2
106-93-4--------1,2-Dibromoethane	0.20	0.23	0.20	0.19	0.18	0.18	0.19	0.18	0.19	97%	0.02	0.06	0.2
127-18-4--------Tetrachloroethene	0.20	0.25	0.22	0.21	0.19	0.20	0.20	0.21	0.21	106%	0.02	0.06	0.2
108-90-7--------Chlorobenzene	0.20	0.25	0.20	0.20	0.20	0.19	0.20	0.19	0.21	103%	0.02	0.06	0.2
100-41-4--------Ethylbenzene	0.20	0.24	0.20	0.21	0.19	0.19	0.20	0.20	0.20	102%	0.02	0.05	0.2
136777-61-2-----m-Xylene (For p-)	0.20	0.26	0.23	0.22	0.22	0.22	0.22	0.22	0.23	113%	0.02	0.05	0.2
75-25-2---------Bromoform	0.20	0.21	0.19	0.18	0.17	0.17	0.18	0.18	0.18	92%	0.01	0.04	0.2
111-84-2--------Nonane	0.20	0.26	0.23	0.24	0.22	0.23	0.23	0.23	0.23	117%	0.01	0.04	0.2
100-42-5--------Styrene	0.20	0.26	0.23	0.21	0.21	0.21	0.21	0.21	0.22	110%	0.02	0.06	0.2
95-47-6---------o-Xylene	0.20	0.24	0.21	0.21	0.20	0.19	0.20	0.20	0.21	104%	0.02	0.05	0.2
79-34-5---------1,1,2,2-Tetrachloroethane	0.20	0.25	0.24	0.21	0.21	0.22	0.22	0.22	0.22	112%	0.01	0.04	0.2
96-18-4---------1,2,3-Trichloropropane	0.20	0.22	0.20	0.19	0.18	0.19	0.19	0.20	0.20	98%	0.01	0.03	0.2
98-82-8---------Cumene	0.20	0.25	0.22	0.21	0.20	0.20	0.20	0.20	0.21	106%	0.02	0.06	0.2
103-65-1--------n-Propylbenzene	0.20	0.24	0.21	0.21	0.20	0.20	0.20	0.20	0.21	105%	0.01	0.05	0.2
622-96-8--------4-Ethyltoluene	0.20	0.24	0.22	0.22	0.20	0.20	0.21	0.20	0.21	107%	0.01	0.04	0.2
108-67-8--------1,3,5-Trimethylbenzene	0.20	0.27	0.24	0.23	0.22	0.22	0.23	0.23	0.23	116%	0.02	0.06	0.2
98-83-9---------Alpha-Methylstyrene	0.20	0.24	0.21	0.20	0.19	0.20	0.19	0.19	0.20	101%	0.02	0.06	0.2
124-18-5--------Decane	0.20	0.26	0.25	0.23	0.22	0.21	0.22	0.22	0.23	116%	0.02	0.05	0.2
95-63-6---------1,2,4-Trimethylbenzene	0.20	0.26	0.24	0.23	0.22	0.22	0.23	0.22	0.23	116%	0.01	0.05	0.2
541-73-1--------1,3-Dichlorobenzene	0.20	0.26	0.25	0.24	0.23	0.23	0.23	0.23	0.24	119%	0.01	0.04	0.2
100-44-7--------Benzyl Chloride	0.20	0.23	0.22	0.21	0.19	0.19	0.19	0.19	0.20	101%	0.02	0.05	0.2
106-46-7--------1,4-Dichlorobenzene	0.20	0.29	0.28	0.26	0.25	0.25	0.26	0.26	0.26	131%	0.01	0.05	0.2
95-50-1---------1,2-Dichlorobenzene	0.20	0.27	0.25	0.23	0.23	0.22	0.24	0.23	0.24	119%	0.02	0.05	0.2
1120-21-4-------Undecane	0.20	0.28	0.26	0.24	0.23	0.23	0.24	0.23	0.24	122%	0.02	0.06	0.2
112-40-3--------Dodecane	0.20	0.27	0.26	0.23	0.21	0.25	0.20	0.22	0.23	117%	0.03	0.08	0.2
120-82-1--------1,2,4-Trichlorobenzene	0.20	0.27	0.30	0.27	0.24	0.25	0.25	0.24	0.26	130%	0.02	0.06	0.2

[$]Spiked amount is > 10x the MDL. Therefore, the MDL in QuantIMS will be set to 1/10 the spiked amount per policy QA-005.

91-20-3---------Napthalene	0.20	0.29	0.26	0.23	0.22	0.21	0.21	0.21	0.23	116%	0.03	0.09	0.2
87-68-3---------Hexachlorobutadiene	0.20	0.23	0.23	0.21	0.21	0.21	0.21	0.21	0.22	108%	0.01	0.03	0.2

[$]Spiked amount is > 10x the MDL. Therefore, the MDL in QuantIMS will be set to 1/10 the spiked amount per policy QA-005.

Clayton
GROUP SERVICES

ATTACHMENT 2-7

EXAMPLE OF STL KNOXVILLE ANALYTICAL REPORT

ANALYTICAL METHODS SUMMARY

H3I190149

PARAMETER	ANALYTICAL METHOD
Volatile Organics by TO15	EPA-2 TO-15

References:

EPA-2 "Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air", EPA-625/R-96/0106, January 1997.

SAMPLE SUMMARY

H3I190149

WO #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
FJN8L	001	EFF091803	09/18/03	08:45
FJN8T	002	INF091803	09/18/03	08:50
FJN80	003	PREDIL091803	09/18/03	08:55

NOTE(S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

PROJECT NARRATIVE
H3I190149

The results reported herein are applicable to the samples submitted for analysis only.

This report shall not be reproduced except in full, without the written approval of the laboratory.

The original chain of custody documentation is included with this report.

Sample Receipt

There were no custody seals present upon receipt at STL Knoxville.

Quality Control

Unless otherwise noted, all holding times and QC criteria were met and the test results shown in this report meet all applicable NELAC requirements.

STL Knoxville maintains the following certifications, approvals and accreditations: Arkansas DEQ Cert. # 03-049-0, California DHS ELAP Cert. #2423, Colorado DPHE, Connecticut DPH Cert. #PH-0223, Florida DOH Cert. #E87177, Georgia DNR Cert. #906, Hawaii DOH, Illinois EPA Cert. # 000687, Indiana DOH Cert. #C-TN-02, Kansas DHE Cert. # E-10349, Kentucky DEP Lab ID #90101, Louisiana DEQ Cert. #03079, Louisiana DOHH Cert. #LA030024, Maryland DHMH Cert. #277, Massachusetts DEP Cert. #M-TN009, Michigan DEQ Lab ID #9933, New Jersey DEP Cert. #TN001, New York DOH Lab #10781, North Carolina DPH Lab ID #21705, North Carolina DEHNR Cert. #64, Oklahoma DEQ ID #9415, Pennsylvania DEP Cert. # 68-576, South Carolina DHEC Lab ID #84001001, Tennessee DOH Lab ID #02014, Utah DOH Cert. #QUAN3, Virginia DGS Lab ID #00165, Washington DOE Lab #C120, Wisconsin DNR Lab ID #998044300, US Army Corps of Engineers, Naval Facilities Engineering Service Center, US EPA Perchlorate Approval and USDA Soil Permit #S-46424. This list of approvals is subject to change and does not imply that laboratory certification is available for all parameters reported in this environmental sample data report.

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Client Sample ID: EFF091803

GC/MS Volatiles

Lot-Sample #...: H3I190149-001 **Work Order #...:** F0N8L1AA **Matrix.....:** AIR
Date Sampled...: 09/18/03 **Date Received..:** 09/19/03
Prep Date.....: 10/14/03 **Analysis Date..:** 10/14/03
Prep Batch #...: 3288164
Dilution Factor: 3.1 **Method.....:** EPA-2 TO-15

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Dichlorodifluoromethane	**0.56 J**	**0.62**	**ppb(v/v)**
Chlorodifluoromethane	**0.45 J**	**0.62**	**ppb(v/v)**
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	0.62	ppb(v/v)
Chloromethane	**1.3 J**	**1.6**	**ppb(v/v)**
Vinyl chloride	ND	0.62	ppb(v/v)
n-Butane	**1.3**	**0.62**	**ppb(v/v)**
1,3-Butadiene	ND	0.62	ppb(v/v)
Bromomethane	ND	0.62	ppb(v/v)
Chloroethane	ND	0.62	ppb(v/v)
Trichlorofluoromethane	ND	0.62	ppb(v/v)
Pentane	ND	1.6	ppb(v/v)
1,1-Dichloroethene	ND	0.62	ppb(v/v)
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	0.62	ppb(v/v)
Carbon disulfide	**0.83**	**0.62**	**ppb(v/v)**
3-Chloropropene	ND	0.62	ppb(v/v)
Methylene chloride	**1.2 J**	**1.6**	**ppb(v/v)**
trans-1,2-Dichloroethene	ND	0.62	ppb(v/v)
n-Hexane	**0.16 J**	**0.62**	**ppb(v/v)**
1,1-Dichloroethane	**0.17 J**	**0.62**	**ppb(v/v)**
cis-1,2-Dichloroethene	ND	0.62	ppb(v/v)
Chloroform	ND	0.62	ppb(v/v)
1,1,1-Trichloroethane	**0.18 J**	**0.62**	**ppb(v/v)**
Cyclohexane	ND	1.6	ppb(v/v)
Carbon tetrachloride	ND	0.62	ppb(v/v)
Benzene	ND	0.62	ppb(v/v)
1,2-Dichloroethane	ND	0.62	ppb(v/v)
n-Heptane	**0.20 J**	**0.62**	**ppb(v/v)**
Trichloroethene	ND	0.62	ppb(v/v)
1,2-Dichloropropane	ND	0.62	ppb(v/v)
Dibromomethane	ND	0.62	ppb(v/v)
Bromodichloromethane	ND	0.62	ppb(v/v)
cis-1,3-Dichloropropene	ND	0.62	ppb(v/v)
Toluene	**0.37 J**	**0.62**	**ppb(v/v)**
n-Octane	ND	0.62	ppb(v/v)
trans-1,3-Dichloropropene	ND	0.62	ppb(v/v)
1,1,2-Trichloroethane	ND	0.62	ppb(v/v)
Tetrachloroethene	ND	0.62	ppb(v/v)

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Client Sample ID: EFF091803

GC/MS Volatiles

Lot-Sample #...: H3I190149-001 **Work Order #...:** F0N8L1AA **Matrix.....:** AIR

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Dibromochloromethane	ND	0.62	ppb(v/v)
1,2-Dibromoethane (EDB)	ND	0.62	ppb(v/v)
Chlorobenzene	ND	0.62	ppb(v/v)
Ethylbenzene	ND	0.62	ppb(v/v)
m-Xylene & p-Xylene	**0.19 J**	**0.62**	**ppb(v/v)**
Nonane	ND	0.62	ppb(v/v)
o-Xylene	ND	0.62	ppb(v/v)
Styrene	ND	0.62	ppb(v/v)
Bromoform	ND	0.62	ppb(v/v)
Cumene	ND	0.62	ppb(v/v)
1,1,2,2-Tetrachloroethane	ND	0.62	ppb(v/v)
n-Propylbenzene	ND	0.62	ppb(v/v)
1,3,5-Trimethylbenzene	ND	0.62	ppb(v/v)
n-Decane	ND	0.62	ppb(v/v)
alpha-Methylstyrene	ND	0.62	ppb(v/v)
1,2,4-Trimethylbenzene	ND	0.62	ppb(v/v)
1,3-Dichlorobenzene	ND	0.62	ppb(v/v)
1,4-Dichlorobenzene	ND	0.62	ppb(v/v)
Benzyl chloride	ND	0.62	ppb(v/v)
1,2-Dichlorobenzene	ND	0.62	ppb(v/v)
n-Undecane	ND	0.62	ppb(v/v)
n-Dodecane	ND	0.62	ppb(v/v)
1,2,4-Trichloro-benzene	ND	0.62	ppb(v/v)
Hexachlorobutadiene	ND	0.62	ppb(v/v)
Naphthalene	ND	0.62	ppb(v/v)
Methanol	**83**	**31**	**ppb(v/v)**
Ethyl ether	ND	1.6	ppb(v/v)
Acetone	**50**	**16**	**ppb(v/v)**
Acrylonitrile	**0.16 J**	**1.6**	**ppb(v/v)**
Vinyl acetate	**6.2**	**1.6**	**ppb(v/v)**
2-Butanone (MEK)	**5.2**	**1.6**	**ppb(v/v)**
1-Butanol	ND	1.6	ppb(v/v)
4-Methyl-2-pentanone (MIBK)	ND	1.6	ppb(v/v)
2-Hexanone	ND	1.6	ppb(v/v)
Methyl tert-butyl ether	ND	1.6	ppb(v/v)
Acrolein	**2.6**	**1.6**	**ppb(v/v)**
Acetonitrile	**0.59 J**	**3.1**	**ppb(v/v)**

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
1,2-Dichloroethane-d4	109	(70 - 130)
Toluene-d8	104	(70 - 130)
4-Bromofluorobenzene	109	(70 - 130)

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Client Sample ID: INF091803

GC/MS Volatiles

Lot-Sample #...: H3I190149-002 **Work Order #...:** F0N8T1AA **Matrix.....:** AIR
Date Sampled...: 09/18/03 **Date Received..:** 09/19/03
Prep Date.....: 10/14/03 **Analysis Date..:** 10/14/03
Prep Batch #...: 3288164
Dilution Factor: 1206.16 **Method.....:** EPA-2 TO-15

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Dichlorodifluoromethane	ND	240	ppb(v/v)
Chlorodifluoromethane	ND	240	ppb(v/v)
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	240	ppb(v/v)
Chloromethane	ND	600	ppb(v/v)
Vinyl chloride	ND	240	ppb(v/v)
n-Butane	ND	240	ppb(v/v)
1,3-Butadiene	ND	240	ppb(v/v)
Bromomethane	ND	240	ppb(v/v)
Chloroethane	ND	240	ppb(v/v)
Trichlorofluoromethane	ND	240	ppb(v/v)
Pentane	**73 J**	**600**	**ppb(v/v)**
1,1-Dichloroethene	ND	240	ppb(v/v)
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	240	ppb(v/v)
Carbon disulfide	ND	240	ppb(v/v)
3-Chloropropene	ND	240	ppb(v/v)
Methylene chloride	ND	600	ppb(v/v)
trans-1,2-Dichloroethene	ND	240	ppb(v/v)
n-Hexane	ND	240	ppb(v/v)
1,1-Dichloroethane	ND	240	ppb(v/v)
cis-1,2-Dichloroethene	ND	240	ppb(v/v)
Chloroform	ND	240	ppb(v/v)
1,1,1-Trichloroethane	ND	240	ppb(v/v)
Cyclohexane	ND	600	ppb(v/v)
Carbon tetrachloride	ND	240	ppb(v/v)
Benzene	ND	240	ppb(v/v)
1,2-Dichloroethane	**530**	**240**	**ppb(v/v)**
n-Heptane	ND	240	ppb(v/v)
Trichloroethene	ND	240	ppb(v/v)
1,2-Dichloropropane	ND	240	ppb(v/v)
Dibromomethane	ND	240	ppb(v/v)
Bromodichloromethane	ND	240	ppb(v/v)
cis-1,3-Dichloropropene	ND	240	ppb(v/v)
Toluene	ND	240	ppb(v/v)
n-Octane	ND	240	ppb(v/v)
trans-1,3-Dichloropropene	ND	240	ppb(v/v)
1,1,2-Trichloroethane	ND	240	ppb(v/v)
Tetrachloroethene	ND	240	ppb(v/v)

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Client Sample ID: INF091803

GC/MS Volatiles

Lot-Sample #...: H3I190149-002 Work Order #...: F0N8T1AA Matrix.....: AIR

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Dibromochloromethane	ND	240	ppb(v/v)
1,2-Dibromoethane (EDB)	ND	240	ppb(v/v)
Chlorobenzene	ND	240	ppb(v/v)
Ethylbenzene	**640**	**240**	**ppb(v/v)**
m-Xylene & p-Xylene	**3200**	**240**	**ppb(v/v)**
Nonane	ND	240	ppb(v/v)
o-Xylene	**1300**	**240**	**ppb(v/v)**
Styrene	ND	240	ppb(v/v)
Bromoform	ND	240	ppb(v/v)
Cumene	ND	240	ppb(v/v)
1,1,2,2-Tetrachloroethane	ND	240	ppb(v/v)
n-Propylbenzene	ND	240	ppb(v/v)
1,3,5-Trimethylbenzene	ND	240	ppb(v/v)
n-Decane	ND	240	ppb(v/v)
alpha-Methylstyrene	ND	240	ppb(v/v)
1,2,4-Trimethylbenzene	**63 J**	**240**	**ppb(v/v)**
1,3-Dichlorobenzene	ND	240	ppb(v/v)
1,4-Dichlorobenzene	ND	240	ppb(v/v)
Benzyl chloride	ND	240	ppb(v/v)
1,2-Dichlorobenzene	ND	240	ppb(v/v)
n-Undecane	ND	240	ppb(v/v)
n-Dodecane	ND	240	ppb(v/v)
1,2,4-Trichloro-benzene	ND	240	ppb(v/v)
Hexachlorobutadiene	ND	240	ppb(v/v)
Naphthalene	ND	240	ppb(v/v)
Methanol	**540 J**	**12000**	**ppb(v/v)**
Ethyl ether	ND	600	ppb(v/v)
Acetone	**620 J**	**6000**	**ppb(v/v)**
Acrylonitrile	ND	600	ppb(v/v)
Vinyl acetate	ND	600	ppb(v/v)
2-Butanone (MEK)	ND	600	ppb(v/v)
1-Butanol	ND	600	ppb(v/v)
4-Methyl-2-pentanone (MIBK)	**54000**	**600**	**ppb(v/v)**
2-Hexanone	ND	600	ppb(v/v)
Methyl tert-butyl ether	ND	600	ppb(v/v)
Acrolein	ND	600	ppb(v/v)
Acetonitrile	ND	1200	ppb(v/v)

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
1,2-Dichloroethane-d4	109	(70 - 130)
Toluene-d8	107	(70 - 130)
4-Bromofluorobenzene	109	(70 - 130)

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Client Sample ID: PREDIL091803

GC/MS Volatiles

Lot-Sample #...: H3I190149-003 **Work Order #...:** F0N801AA **Matrix.....:** AIR
Date Sampled...: 09/18/03 **Date Received..:** 09/19/03
Prep Date.....: 10/14/03 **Analysis Date..:** 10/14/03
Prep Batch #...: 3288164
Dilution Factor: 38592.86 **Method.....:** EPA-2 TO-15

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Dichlorodifluoromethane	ND	7700	ppb(v/v)
Chlorodifluoromethane	ND	7700	ppb(v/v)
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	7700	ppb(v/v)
Chloromethane	ND	19000	ppb(v/v)
Vinyl chloride	ND	7700	ppb(v/v)
n-Butane	**2500 J**	**7700**	**ppb(v/v)**
1,3-Butadiene	ND	7700	ppb(v/v)
Bromomethane	ND	7700	ppb(v/v)
Chloroethane	ND	7700	ppb(v/v)
Trichlorofluoromethane	ND	7700	ppb(v/v)
Pentane	ND	19000	ppb(v/v)
1,1-Dichloroethene	ND	7700	ppb(v/v)
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	7700	ppb(v/v)
Carbon disulfide	ND	7700	ppb(v/v)
3-Chloropropene	ND	7700	ppb(v/v)
Methylene chloride	ND	19000	ppb(v/v)
trans-1,2-Dichloroethene	ND	7700	ppb(v/v)
n-Hexane	ND	7700	ppb(v/v)
1,1-Dichloroethane	ND	7700	ppb(v/v)
cis-1,2-Dichloroethene	ND	7700	ppb(v/v)
Chloroform	ND	7700	ppb(v/v)
1,1,1-Trichloroethane	ND	7700	ppb(v/v)
Cyclohexane	ND	19000	ppb(v/v)
Carbon tetrachloride	ND	7700	ppb(v/v)
Benzene	ND	7700	ppb(v/v)
1,2-Dichloroethane	ND	7700	ppb(v/v)
n-Heptane	ND	7700	ppb(v/v)
Trichloroethene	ND	7700	ppb(v/v)
1,2-Dichloropropane	ND	7700	ppb(v/v)
Dibromomethane	ND	7700	ppb(v/v)
Bromodichloromethane	ND	7700	ppb(v/v)
cis-1,3-Dichloropropene	ND	7700	ppb(v/v)
Toluene	ND	7700	ppb(v/v)
n-Octane	ND	7700	ppb(v/v)
trans-1,3-Dichloropropene	ND	7700	ppb(v/v)
1,1,2-Trichloroethane	ND	7700	ppb(v/v)
Tetrachloroethene	ND	7700	ppb(v/v)

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Client Sample ID: PREDIL091803

GC/MS Volatiles

Lot-Sample #...: H3I190149-003 **Work Order #...:** F0N801AA **Matrix.....:** AIR

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Dibromochloromethane	ND	7700	ppb(v/v)
1,2-Dibromoethane (EDB)	ND	7700	ppb(v/v)
Chlorobenzene	ND	7700	ppb(v/v)
Ethylbenzene	**15000**	**7700**	**ppb(v/v)**
m-Xylene & p-Xylene	**75000**	**7700**	**ppb(v/v)**
Nonane	ND	7700	ppb(v/v)
o-Xylene	**33000**	**7700**	**ppb(v/v)**
Styrene	ND	7700	ppb(v/v)
Bromoform	ND	7700	ppb(v/v)
Cumene	ND	7700	ppb(v/v)
1,1,2,2-Tetrachloroethane	ND	7700	ppb(v/v)
n-Propylbenzene	**22000**	**7700**	**ppb(v/v)**
1,3,5-Trimethylbenzene	ND	7700	ppb(v/v)
n-Decane	ND	7700	ppb(v/v)
alpha-Methylstyrene	ND	7700	ppb(v/v)
1,2,4-Trimethylbenzene	ND	7700	ppb(v/v)
1,3-Dichlorobenzene	ND	7700	ppb(v/v)
1,4-Dichlorobenzene	ND	7700	ppb(v/v)
Benzyl chloride	ND	7700	ppb(v/v)
1,2-Dichlorobenzene	ND	7700	ppb(v/v)
n-Undecane	ND	7700	ppb(v/v)
n-Dodecane	ND	7700	ppb(v/v)
1,2,4-Trichloro-benzene	ND	7700	ppb(v/v)
Hexachlorobutadiene	ND	7700	ppb(v/v)
Naphthalene	ND	7700	ppb(v/v)
Methanol	**13000 J**	**390000**	**ppb(v/v)**
Ethyl ether	ND	19000	ppb(v/v)
Acetone	ND	190000	ppb(v/v)
Acrylonitrile	ND	19000	ppb(v/v)
Vinyl acetate	ND	19000	ppb(v/v)
2-Butanone (MEK)	ND	19000	ppb(v/v)
1-Butanol	ND	19000	ppb(v/v)
4-Methyl-2-pentanone (MIBK)	**1200000**	**19000**	**ppb(v/v)**
2-Hexanone	ND	19000	ppb(v/v)
Methyl tert-butyl ether	ND	19000	ppb(v/v)
Acrolein	ND	19000	ppb(v/v)
Acetonitrile	ND	39000	ppb(v/v)

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
1,2-Dichloroethane-d4	103	(70 - 130)
Toluene-d8	104	(70 - 130)
4-Bromofluorobenzene	106	(70 - 130)

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METHOD BLANK REPORT

GC/MS Volatiles

Client Lot #...: H3I190149 **Work Order #...:** F2J311AA **Matrix.....:** AIR
MB Lot-Sample #: H3J150000-164

Prep Date.....: 10/14/03
Analysis Date..: 10/14/03 **Prep Batch #...:** 3288164
Dilution Factor: 1

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD
Dichlorodifluoromethane	ND	0.20	ppb(v/v)	EPA-2 TO-15
Chlorodifluoromethane	ND	0.20	ppb(v/v)	EPA-2 TO-15
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	0.20	ppb(v/v)	EPA-2 TO-15
Chloromethane	ND	0.50	ppb(v/v)	EPA-2 TO-15
Vinyl chloride	ND	0.20	ppb(v/v)	EPA-2 TO-15
n-Butane	ND	0.20	ppb(v/v)	EPA-2 TO-15
1,3-Butadiene	ND	0.20	ppb(v/v)	EPA-2 TO-15
Bromomethane	ND	0.20	ppb(v/v)	EPA-2 TO-15
Chloroethane	ND	0.20	ppb(v/v)	EPA-2 TO-15
Trichlorofluoromethane	ND	0.20	ppb(v/v)	EPA-2 TO-15
Pentane	ND	0.50	ppb(v/v)	EPA-2 TO-15
1,1-Dichloroethene	ND	0.20	ppb(v/v)	EPA-2 TO-15
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	0.20	ppb(v/v)	EPA-2 TO-15
Carbon disulfide	ND	0.20	ppb(v/v)	EPA-2 TO-15
3-Chloropropene	ND	0.20	ppb(v/v)	EPA-2 TO-15
Methylene chloride	ND	0.50	ppb(v/v)	EPA-2 TO-15
trans-1,2-Dichloroethene	ND	0.20	ppb(v/v)	EPA-2 TO-15
n-Hexane	ND	0.20	ppb(v/v)	EPA-2 TO-15
1,1-Dichloroethane	ND	0.20	ppb(v/v)	EPA-2 TO-15
cis-1,2-Dichloroethene	ND	0.20	ppb(v/v)	EPA-2 TO-15
Chloroform	ND	0.20	ppb(v/v)	EPA-2 TO-15
1,1,1-Trichloroethane	ND	0.20	ppb(v/v)	EPA-2 TO-15
Cyclohexane	ND	0.50	ppb(v/v)	EPA-2 TO-15
Carbon tetrachloride	ND	0.20	ppb(v/v)	EPA-2 TO-15
Benzene	ND	0.20	ppb(v/v)	EPA-2 TO-15
1,2-Dichloroethane	ND	0.20	ppb(v/v)	EPA-2 TO-15
n-Heptane	ND	0.20	ppb(v/v)	EPA-2 TO-15
Trichloroethene	ND	0.20	ppb(v/v)	EPA-2 TO-15
1,2-Dichloropropane	ND	0.20	ppb(v/v)	EPA-2 TO-15
Dibromomethane	ND	0.20	ppb(v/v)	EPA-2 TO-15
Bromodichloromethane	ND	0.20	ppb(v/v)	EPA-2 TO-15
cis-1,3-Dichloropropene	ND	0.20	ppb(v/v)	EPA-2 TO-15
Toluene	ND	0.20	ppb(v/v)	EPA-2 TO-15
n-Octane	ND	0.20	ppb(v/v)	EPA-2 TO-15
trans-1,3-Dichloropropene	ND	0.20	ppb(v/v)	EPA-2 TO-15
1,1,2-Trichloroethane	ND	0.20	ppb(v/v)	EPA-2 TO-15
Tetrachloroethene	ND	0.20	ppb(v/v)	EPA-2 TO-15
Dibromochloromethane	ND	0.20	ppb(v/v)	EPA-2 TO-15
1,2-Dibromoethane (EDB)	ND	0.20	ppb(v/v)	EPA-2 TO-15

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METHOD BLANK REPORT

GC/MS Volatiles

Client Lot #...: H3I190149 Work Order #...: F2J311AA Matrix.....: AIR

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD
Chlorobenzene	ND	0.20	ppb(v/v)	EPA-2 TO-15
Ethylbenzene	ND	0.20	ppb(v/v)	EPA-2 TO-15
m-Xylene & p-Xylene	ND	0.20	ppb(v/v)	EPA-2 TO-15
Nonane	ND	0.20	ppb(v/v)	EPA-2 TO-15
o-Xylene	ND	0.20	ppb(v/v)	EPA-2 TO-15
Styrene	ND	0.20	ppb(v/v)	EPA-2 TO-15
Bromoform	ND	0.20	ppb(v/v)	EPA-2 TO-15
Cumene	ND	0.20	ppb(v/v)	EPA-2 TO-15
1,1,2,2-Tetrachloroethane	ND	0.20	ppb(v/v)	EPA-2 TO-15
n-Propylbenzene	ND	0.20	ppb(v/v)	EPA-2 TO-15
1,3,5-Trimethylbenzene	ND	0.20	ppb(v/v)	EPA-2 TO-15
n-Decane	ND	0.20	ppb(v/v)	EPA-2 TO-15
alpha-Methylstyrene	ND	0.20	ppb(v/v)	EPA-2 TO-15
1,2,4-Trimethylbenzene	ND	0.20	ppb(v/v)	EPA-2 TO-15
1,3-Dichlorobenzene	ND	0.20	ppb(v/v)	EPA-2 TO-15
1,4-Dichlorobenzene	ND	0.20	ppb(v/v)	EPA-2 TO-15
Benzyl chloride	ND	0.20	ppb(v/v)	EPA-2 TO-15
1,2-Dichlorobenzene	ND	0.20	ppb(v/v)	EPA-2 TO-15
n-Undecane	ND	0.20	ppb(v/v)	EPA-2 TO-15
n-Dodecane	ND	0.20	ppb(v/v)	EPA-2 TO-15
1,2,4-Trichloro-benzene	ND	0.20	ppb(v/v)	EPA-2 TO-15
Hexachlorobutadiene	ND	0.20	ppb(v/v)	EPA-2 TO-15
Naphthalene	ND	0.20	ppb(v/v)	EPA-2 TO-15
Methanol	ND	10	ppb(v/v)	EPA-2 TO-15
Ethyl ether	ND	0.50	ppb(v/v)	EPA-2 TO-15
Acetone	ND	5.0	ppb(v/v)	EPA-2 TO-15
Acrylonitrile	ND	0.50	ppb(v/v)	EPA-2 TO-15
Vinyl acetate	ND	0.50	ppb(v/v)	EPA-2 TO-15
2-Butanone (MEK)	ND	0.50	ppb(v/v)	EPA-2 TO-15
1-Butanol	ND	0.50	ppb(v/v)	EPA-2 TO-15
4-Methyl-2-pentanone (MIBK)	ND	0.50	ppb(v/v)	EPA-2 TO-15
2-Hexanone	ND	0.50	ppb(v/v)	EPA-2 TO-15
Methyl tert-butyl ether	ND	0.50	ppb(v/v)	EPA-2 TO-15
Acrolein	ND	0.50	ppb(v/v)	EPA-2 TO-15
Acetonitrile	ND	1.0	ppb(v/v)	EPA-2 TO-15

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
1,2-Dichloroethane-d4	100	(70 - 130)
Toluene-d8	102	(70 - 130)
4-Bromofluorobenzene	105	(70 - 130)

NOTE(S):

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

LABORATORY CONTROL SAMPLE EVALUATION REPORT

GC/MS Volatiles

Client Lot #...: H3I190149 Work Order #...: F2J311AC Matrix.....: AIR
LCS Lot-Sample#: H3J150000-164
Prep Date.....: 10/14/03 Analysis Date..: 10/14/03
Prep Batch #...: 3288164
Dilution Factor: 1

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	METHOD
1,1-Dichloroethene	**108**	**(70 - 130)**	**EPA-2 TO-15**
Benzene	**101**	**(70 - 130)**	**EPA-2 TO-15**
Trichloroethene	**107**	**(70 - 130)**	**EPA-2 TO-15**
Toluene	**103**	**(70 - 130)**	**EPA-2 TO-15**
Chlorobenzene	**112**	**(70 - 130)**	**EPA-2 TO-15**

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
1,2-Dichloroethane-d4	100	(70 - 130)
Toluene-d8	96	(70 - 130)
4-Bromofluorobenzene	95	(70 - 130)

NOTE(S):

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

Bold print denotes control parameters

LABORATORY CONTROL SAMPLE DATA REPORT

GC/MS Volatiles

Client Lot #...: H3I190149 Work Order #...: F2J311AC Matrix.....: AIR
LCS Lot-Sample#: H3J150000-164
Prep Date.....: 10/14/03 Analysis Date..: 10/14/03
Prep Batch #...: 3288164
Dilution Factor: 1

PARAMETER	SPIKE AMOUNT	MEASURED AMOUNT	UNITS	PERCENT RECOVERY	METHOD
1,1-Dichloroethene	**10.0**	**10.8**	**ppb(v/v)**	**108**	**EPA-2 TO-15**
Benzene	**10.0**	**10.1**	**ppb(v/v)**	**101**	**EPA-2 TO-15**
Trichloroethene	**10.0**	**10.7**	**ppb(v/v)**	**107**	**EPA-2 TO-15**
Toluene	**10.0**	**10.3**	**ppb(v/v)**	**103**	**EPA-2 TO-15**
Chlorobenzene	**10.0**	**11.2**	**ppb(v/v)**	**112**	**EPA-2 TO-15**

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
1,2-Dichloroethane-d4	100	(70 - 130)
Toluene-d8	96	(70 - 130)
4-Bromofluorobenzene	95	(70 - 130)

NOTE(S):

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

Bold print denotes control parameters

F= Mail to Arthur
→ Monday Start to (STL)

TABLE 1
Ambient Air Monitoring Analyte Evaluation Table
All VOCs Detected

The Lockformer Company / Lisle, Illinois

Primary Contaminants to be included in STL Summa Method

(1) CHEMICAL	MAXIMUM CONCENTRATION IDENTIFIED (ppmV)			MAXIMUM CONCENTRATION ALLOWABLE
	Stack Effluent	Perimeter	Residential	Residential
Primary Contaminants of Concern				
TCE	0.23	0.00098	0.00071	0.50
1,2-DCE (*cis + trans*)	(2) 2.0			1.00
Vinyl chloride	0.24			0.15
1,1,-DCE	0.015			0.10
1,1,1-TCA	0.0079			3.50
1,1,-DCA	0.0091			NE
PCE	0.002	0.01	0.003	0.20
Other VOCs				
Acetone	0.014	0.033	0.2	NE
Acetonitrile	0.022	0.0014	0.0055	NE
Acrolein	0.0012	0.0044	0.0016	NE
Alpha-Pinene	0.00029		0.00037	NE
Benzene	0.0031			NE
Bromomethane	0.00035	0.00089		NE
2-Butanone		0.0055		NE
Carbon Disulfide	0.027		0.012	NE
Chloroethane	0.0017	0.00097		NE
Chloromethane	0.011	0.0019		NE
Chloroform	0.0067	0.00033		NE
Cumene	0.00029			NE
Dibromochloromethane		0.00021		NE
1,3-Dichlorobenzene	0.0014			NE
1,4-Dichlorobenzene			0.0003	NE
1,4-Dioxane	0.0015			NE
Ethanol	0.18			NE
Ethylbenzene			0.0037	NE
4-Ethyltoluene	0.00069	0.00099	0.00048	NE
Isopropyl Alcohol	0.037			NE
n-Hexane	0.0086			NE
2-Hexanone		0.00053		NE
d-Limonene	0.0009	0.00041	0.00055	NE
Methane	130			NE
Methylene Chloride			0.0088	NE
4-Methyl-2-Pentanone	0.0016	0.00066		NE
Methyl tert-Butyl Ether			0.0018	NE
n-Nonane		0.0024		NE
Styrene	0.0046		0.00089	NE
Toluene	0.01	0.016	0.04	NE
Trichlorofluoromethane	0.0019		0.00059	NE
1,2,4-Trimethylbenzene	0.0025	0.0063	0.0027	NE
1,3,5-Trimethylbenzene	0.0009	0.0019	0.00095	NE
Vinyl acetate	0.071	0.006		NE
m,p-Xylenes		0.0036	0.013	NE
o-Xylene			0.0039	NE

TOC →

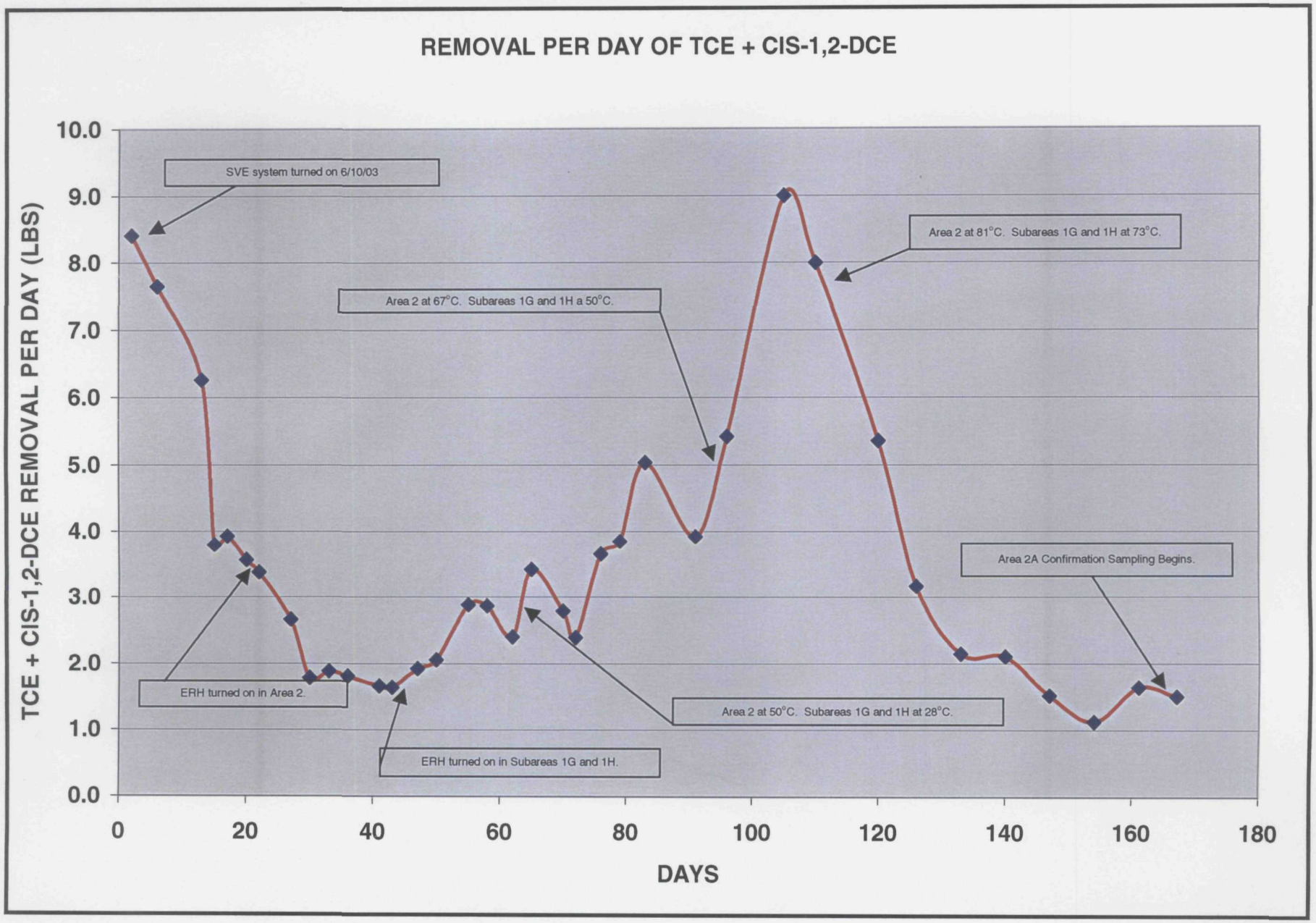
NOTES:

(1) Includes all VOCs detected by the TO-15 analysis conducted during the Lockformer Ambient Air Monitoring Program.

(2) Value just before carbon change. Typical value <0.02.

NE = Not established

Lockformer - Lisle, IL
Remediation Performance Summary



15-65263.01\Air Data Summary\Conversion Chart.xls

Historical Impact Evaluation Summary Table

ERH Confirmation Sampling

The Lockformer Company / Lisle, Illinois

ERH Subarea	Confirmation Sampling Subarea (1)	Confirmation Soil Boring Location (5)	Ground Surface Elevation (ft. msl)	Elevation of Subject Interval (ft. msl) (1)	Depth to Subject Interval (ft. bgs) (2)
1A	1-1	MM2	712.16	671 to 673	39.2 to 41.2
		NN2	712.16	671 to 673	39.2 to 41.2
		OO2	712.16	671 to 673	39.2 to 41.2
		NN3	712.16	671 to 673	39.2 to 41.2
		OO3	712.16	671 to 673	39.2 to 41.2
1B	1-2	MM3	712.16	704 to 706	6.2 to 8.2
		MM4	712.16	704 to 706	6.2 to 8.2
		NN4	712.16	704 to 706	6.2 to 8.2
		OO4	712.16	704 to 706	6.2 to 8.2
		NN5	712.16	704 to 706	6.2 to 8.2
		OO5	712.16	704 to 706	6.2 to 8.2
		PP5	712.16	704 to 706	6.2 to 8.2
		NN6	712.16	704 to 706	6.2 to 8.2
		OO6	712.16	704 to 706	6.2 to 8.2
		OO7	712.16	704 to 706	6.2 to 8.2
		OO8	712.16	704 to 706	6.2 to 8.2
	1-3	PP6	712.16	694 to 696	16.2 to 18.2
		PP7	712.16	694 to 696	16.2 to 18.2
		PP8	712.16	694 to 696	16.2 to 18.2
1C		QQ6	712.16	694 to 696	16.2 to 18.2
		QQ7	712.16	694 to 696	16.2 to 18.2
		QQ9	712.16	694 to 696	16.2 to 18.2
		RR8	712.16	694 to 696	16.2 to 18.2
		PP9	712.16	694 to 696	16.2 to 18.2
		QQ9	712.16	694 to 696	16.2 to 18.2
		RR9	712.16	694 to 696	16.2 to 18.2
		PP10	712.16	694 to 696	16.2 to 18.2
		QQ10	712.16	694 to 696	16.2 to 18.2
		RR10	712.16	694 to 696	16.2 to 18.2
1D	1-4	KK3	710.37	689 to 697	13.4 to 21.4
		LL3	710.96	689 to 697	14.0 to 22.0
		KK4	709.58	689 to 697	12.6 to 20.6
		LL4	710.01	689 to 697	13.0 to 21.0
		KK5	709.14	689 to 697	12.1 to 20.1
		LL5	709.81	689 to 697	12.8 to 20.8
		MM5	710.28	689 to 697	13.3 to 21.3
		LL6	709.81	689 to 697	12.8 to 20.8
		MM6	709.75	689 to 697	12.8 to 20.8
		LL7	708.63	689 to 697	11.6 to 19.6
		MM7	709.27	689 to 697	12.3 to 20.3
		NN7	709.51	689 to 697	12.5 to 20.5
		KK8	707.56	689 to 697	10.6 to 18.6
		LL8	708.05	689 to 697	11.1 to 19.1
		MM8	708.76	689 to 697	11.8 to 19.8
		NN8	709.18	689 to 697	12.2 to 20.2
	1-5	KK9	707.20	694 to 698	9.2 to 13.2
		LL9	707.46	694 to 698	9.5 to 13.5
		MM9	707.99	694 to 698	10.0 to 14.0
		NN9	708.40	694 to 698	10.4 to 14.4
		OO9	709.26	694 to 698	11.3 to 15.3
		OO10	708.24	694 to 698	10.2 to 14.2

Historical Impact Evaluation Summary Table

ERH Confirmation Sampling

The Lockformer Company / Lisle, Illinois

ERH Subarea	Confirmation Sampling Subarea (1)	Confirmation Soil Boring Location (5)	Ground Surface Elevation (ft. msl)	Elevation of Subject Interval (ft. msl) (1)	Depth to Subject Interval (ft. bgs) (2)
1E	1-5	LL10	706.96	694 to 698	9.0 to 13.0
		MM10	707.38	694 to 698	9.4 to 13.4
		NN10	707.64	694 to 698	9.6 to 13.6
	1-6	LL11	706.56	692 to 696	10.6 to 14.6
		MM11	706.77	692 to 696	10.8 to 14.8
		NN11	706.94	692 to 696	10.9 to 14.9
		OO11	707.26	692 to 696	11.3 to 15.3
1F		JJ11	706.27	692 to 696	10.3 to 14.3
		KK11	706.26	692 to 696	10.3 to 14.3
		(3)JJ12		692 to 696	to
		KK12	706.14	692 to 696	10.1 to 14.1
		(4)LL12		692 to 696	to
		(4)MM12		692 to 696	to
		(4)NN12		692 to 696	to
		JJ13	706.86	692 to 696	10.9 to 14.9
		KK13	706.00	692 to 696	10.0 to 14.0
		LL13	705.70	692 to 696	9.7 to 13.7
		MM13	705.79	692 to 696	9.8 to 13.8
		NN13	705.85	692 to 696	9.9 to 13.9
		OO13	705.82	692 to 696	9.8 to 13.8
		KK14	706.43	692 to 696	10.4 to 14.4
		LL14	705.31	692 to 696	9.3 to 13.3
		MM14	705.24	692 to 696	9.2 to 13.2
		NN14	705.37	692 to 696	9.4 to 13.4
		OO14	705.44	692 to 696	9.4 to 13.4
		(3)LL15		692 to 696	to
		MM15	704.98	692 to 696	9.0 to 13.0
		NN15	704.83	692 to 696	8.8 to 12.8
		OO15	704.98	692 to 696	9.0 to 13.0
		NN16	704.49	692 to 696	8.5 to 12.5
		OO16	704.57	692 to 696	8.6 to 12.6
		OO17	704.20	692 to 696	8.2 to 12.2
1G	1-7	KK15	706.31	690 to 698	8.3 to 16.3
		JJ16	707.08	690 to 698	9.1 to 17.1
		KK16	706.34	690 to 698	8.3 to 16.3
		LL16	705.70	690 to 698	7.7 to 15.7
		MM16	704.83	690 to 698	6.8 to 14.8
		KK17	706.33	690 to 698	8.3 to 16.3
		LL17	705.59	690 to 698	7.6 to 15.6
		(3)MM17		690 to 698	to
		NN17	704.26	690 to 698	6.3 to 14.3
		LL18	705.87	690 to 698	7.9 to 15.9
		MM18	705.02	690 to 698	7.0 to 15.0
		NN18	704.14	690 to 698	6.1 to 14.1
		OO18	703.84	690 to 698	5.8 to 13.8
		MM19	705.09	690 to 698	7.1 to 15.1
		(3)NN19		690 to 698	to
		OO19	703.65	690 to 698	5.6 to 13.7

Historical Impact Evaluation Summary Table
ERH Confirmation Sampling

The Lockformer Company / Lisle, Illinois

ERH Subarea	Confirmation Sampling Subarea (1)	Confirmation Soil Boring Location (5)	Ground Surface Elevation (ft. msl)	Elevation of Subject Interval (ft. msl) (1)	Depth to Subject Interval (ft. bgs) (2)
1H	1-7	II17	707.35	690 to 698	9.4 to 17.4
		JJ17	707.03	690 to 698	9.0 to 17.0
		II18	707.54	690 to 698	9.5 to 17.5
		JJ18	707.08	690 to 698	9.1 to 17.1
		KK18	706.55	690 to 698	8.5 to 16.6
		JJ19	707.26	690 to 698	9.3 to 17.3
		KK19	706.60	690 to 698	8.6 to 16.6
		LL19	706.16	690 to 698	8.2 to 16.2
2A	2-1	CC1	710.34	694 to 696	14.3 to 16.3
		DD1	710.24	694 to 696	14.2 to 16.2
		BB2	710.70	694 to 696	14.7 to 16.7
		CC2	710.22	694 to 696	14.2 to 16.2
		DD2	709.96	694 to 696	14.0 to 16.0
		EE2	709.84	694 to 696	13.8 to 15.8
		FF2	709.56	694 to 696	13.6 to 15.6
		CC3	710.23	694 to 696	14.2 to 16.2
		DD3	709.79	694 to 696	13.8 to 15.8
		EE3	709.66	694 to 696	13.7 to 15.7
		FF3	709.49	694 to 696	13.5 to 15.5
		CC4	710.24	694 to 696	14.2 to 16.2
		DD4	709.73	694 to 696	13.7 to 15.7
		EE4	709.44	694 to 696	13.4 to 15.4
		FF4	709.19	694 to 696	13.2 to 15.2
		DD5	709.76	694 to 696	13.8 to 15.8
		EE5	709.32	694 to 696	13.3 to 15.3
		DD6	709.78	694 to 696	13.8 to 15.8
		EE6	709.44	694 to 696	13.4 to 15.4
2B	2-2	CC7	709.87	691 to 694	15.9 to 18.9
		DD7	709.71	691 to 694	15.7 to 18.7
		EE7	709.44	691 to 694	15.4 to 18.4
		FF7	709.12	691 to 694	15.1 to 18.1
		CC8	709.80	691 to 694	15.8 to 18.8
		DD8	709.57	691 to 694	15.6 to 18.6
		EE8	709.35	691 to 694	15.4 to 18.4
		FF8	709.05	691 to 694	15.1 to 18.1
		GG8	708.48	691 to 694	14.5 to 17.5
		DD9	709.51	691 to 694	15.5 to 18.5
		EE9	709.36	691 to 694	15.4 to 18.4
		FF9	708.95	691 to 694	15.0 to 18.0
		GG9	708.59	691 to 694	14.6 to 17.6
		EE10	709.26	691 to 694	15.3 to 18.3
		FF10	708.89	691 to 694	14.9 to 17.9

Historical Impact Evaluation Summary Table
ERH Confirmation Sampling

The Lockformer Company / Lisle, Illinois

ERH Subarea	Confirmation Sampling Subarea (1)	Confirmation Soil Boring Location (5)	Ground Surface Elevation (ft. msl)	Elevation of Subject Interval (ft. msl) (1)	Depth to Subject Interval (ft. bgs) (2)
2C	2-3	CC10	709.63	691 to 695	14.6 to 18.6
		DD10	709.43	691 to 695	14.4 to 18.4
		DD11	709.37	691 to 695	14.4 to 18.4
		EE11	709.22	691 to 695	14.2 to 18.2
		FF11	708.97	691 to 695	14.0 to 18.0
		FF12	708.86	691 to 695	13.9 to 17.9
	2-4	AA11	710.16	690 to 692	18.2 to 20.2
		BB11	709.82	690 to 692	17.8 to 19.8
		CC11	709.52	690 to 692	17.5 to 19.5
		AA12	710.00	690 to 692	18.0 to 20.0
		BB12	709.78	690 to 692	17.8 to 19.8
		CC12	709.42	690 to 692	17.4 to 19.4
		AA13	709.96	690 to 692	18.0 to 20.0
	2-5	DD12	709.26	688 to 690	19.3 to 21.3
		EE12	709.10	688 to 690	19.1 to 21.1
		BB13	709.74	688 to 690	19.7 to 21.7
		CC13	709.32	688 to 690	19.3 to 21.3
		DD13	709.21	688 to 690	19.2 to 21.2
		EE13	709.08	688 to 690	19.1 to 21.1
		FF13	708.86	688 to 690	18.9 to 20.9
		BB14	709.67	688 to 690	19.7 to 21.7
		CC14	709.36	688 to 690	19.4 to 21.4
		DD14	709.16	688 to 690	19.2 to 21.2
		EE14	708.95	688 to 690	19.0 to 21.0
		FF14	708.78	688 to 690	18.8 to 20.8
2D	2-6	BB15	709.47	686 to 688	21.5 to 23.5
		CC15	709.33	686 to 688	21.3 to 23.3
		DD15	709.15	686 to 688	21.2 to 23.2
		EE15	708.95	686 to 688	21.0 to 23.0
		FF15	708.59	686 to 688	20.6 to 22.6
		DD16	709.01	686 to 688	21.0 to 23.0
		EE16	708.90	686 to 688	20.9 to 22.9
		FF16	708.40	686 to 688	20.4 to 22.4
		EE17	708.54	686 to 688	20.5 to 22.5
		FF17	708.34	686 to 688	20.3 to 22.3
		FF18	707.96	686 to 688	20.0 to 22.0
D1	D1	SS2	712.16	705 to 709	3.2 to 7.2
		TT2	712.16	705 to 709	3.2 to 7.2
		UU2	712.16	705 to 709	3.2 to 7.2
		RR3	712.16	705 to 709	3.2 to 7.2
		SS3	712.16	705 to 709	3.2 to 7.2
		TT3	712.16	705 to 709	3.2 to 7.2
		UU3	712.16	705 to 709	3.2 to 7.2
		SS4	712.16	705 to 709	3.2 to 7.2
		TT4	712.16	705 to 709	3.2 to 7.2
		UU4	712.16	705 to 709	3.2 to 7.2
		VV4	712.16	705 to 709	3.2 to 7.2
		TT5	712.16	705 to 709	3.2 to 7.2
		UU5	712.16	705 to 709	3.2 to 7.2

ERH SYSTEM VACUUM PIEZOMETER MONITORING DATA - Pressure

Lockformer - Lisle, IL

Date	Probe Identification																												
	VPZ-1	VPZ-2	VPZ-3	VPZ-4	VPZ-5	VPZ-6	VPZ-7	VPZ-8	VPZ-9	VPZ-10	VPZ-11	VPZ-12	VPZ-13	VPZ-14	VPZ-15	VPZ-16	VPZ-17	VPZ-18	VPZ-19	VPZ-20	VPZ-21	VPZ-22	VPZ-23	VPZ-24	VPZ-25	VPZ-26	VPZ-27	VPZ-28	VPZ-29
05-Jun-03	1.10	3.40	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	3.80	0.00	0.00	(0.64)	0.08	(0.08)	(0.02)	0.01	0.00	0.00	(0.01)	0.00	0.00	0.00	0.24				
16-Jun-03	1.90	7.50	0.00	0.00	(0.22)	0.00	0.14	0.00	0.00	3.60	4.00	0.00	0.00	0.68	0.18	(0.38)	(0.58)	(0.57)	(0.30)	0.14	(0.36)	0.00	0.00	0.00	0.26				
17-Jun-03	1.90	7.50					0.14			3.60	4.00			0.68	0.18					0.14					0.26				
18-Jun-03	2.50	4.50	0.00	0.00	0.00	0.00	(0.25)	0.00	0.00	4.10	3.80	0.00	0.00	0.00	0.12	(0.22)	(0.48)	(0.43)	(0.08)	0.10	(0.10)	0.00	0.00	0.00	0.10				
16-Jul-03												0.00	0.00					(0.17)		0.00	(0.54)	0.00	(0.21)	0.00	0.00				
25-Jul-03			0.00	**0.16**	(0.04)	**0.60**	**1.75**					0.00	0.00	**1.90**	**1.05**	**2.40**	(0.49)	(0.94)	**0.30**	0.00	**1.30**	**0.42**	(1.10)	0.00	0.00				
31-Jul-03		3.60	0.00	**2.10**	(0.30)	0.00	**>5**					0.00	0.00	0.00	**>5**	**4.60**	(0.45)	(0.80)	(0.22)	**>5**	**2.00**	**0.10**	0.00	0.00	0.00				
07-Aug-03		**>5**	**0.03**	(0.53)	(0.74)	**0.14**	**>5**					**1.35**	0.00	(0.06)	**>5**	**>5**	(1.40)	2.00	(0.60)	**>5**	**4.20**	(0.15)	0.00	(0.20)					
13-Aug-03		**>5**	(0.90)	0.00	(0.06)	0.00	2.40					0.00	0.00	**1.10**	**>5**	**>5**	(0.45)	(1.20)	(0.23)	**>5**	**>5**	**0.05**	0.00	0.00	0.00				
14-Aug-03		**0.10**												**(2.20)**	**(3.50)**	**26.50**				**6.00**	**9.50**	**0.06**							
15-Aug-03														(3.90)	(3.50)	25.00				7.00	10.00	0.08							
20-Aug-03	**3.35**		0.00	**2.35**	(1.80)	0.00		**0.27**	**1.30**	0.33		0.00	0.00				(3.50)	(3.00)	(0.09)		**9.00**	0.00	0.00	**0.12**	0.00				
21-Aug-03	0.00	**1.05**	0.00	0.00	0.00	**0.07**	**0.00**	0.00	**1.60**	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**16.50**	0.00	0.00	(0.01)	**(0.02)**	**8.00**	**0.04**	0.00	0.10	0.00				
22-Aug-03	0.00	**0.00**	0.00	0.00	(1.20)	**0.08**	**0.02**	(0.36)	**1.80**	(0.01)	(0.07)	**0.00**	0.00	**0.00**	**0.01**	**26.00**	(4.60)	(4.00)	(0.42)	**0.02**	**11.00**	**0.00**	(0.02)	0.01	(0.02)				
25-Aug-03	0.00	**>(40.0)**	0.00	0.00	(1.30)	0.00	**0.00**	0.00	0.00	0.00	0.00	**>(40.0)**	0.00	**0.00**	**0.00**	**2.10**	(4.00)	(3.40)	(0.10)	**(23.00)**	**6.00**	**(5.50)**	0.00	0.00					
26-Aug-03	0.00	**(31.00)**	0.00	0.00	(1.20)	0.00	**0.00**	0.00	0.00	0.00	0.00	**0.00**	0.00	**0.00**	**0.00**	**(0.10)**	(4.20)	(3.45)	0.00	**(20.00)**	**6.00**	**0.00**	0.00	0.00	0.00				
27-Aug-03	0.00	**0.00**	0.00	0.00	(2.10)	0.00	**0.00**	(1.35)	**1.20**	0.23	0.00	**0.00**	0.00	**0.00**	**0.00**	**0.00**	(0.18)	(0.23)	0.00	**0.00**	**2.20**	**0.00**	0.00	0.00	0.00				
28-Aug-03	0.00	**0.00**	**0.20**	0.00	(0.31)	0.00	**0.00**	(0.31)	**2.00**	0.44	0.68	**0.00**	0.00	**0.00**	**0.00**	**1.60**	(0.18)	(0.19)	0.00	**0.00**	**3.00**	**0.00**	0.00	0.00	0.00				
29-Aug-03	0.00	**0.00**	**0.22**	0.00	(1.00)	**0.28**	**2.10**	**2.25**	**5.00**	2.50	2.40	(0.30)	0.00	**(1.00)**	**0.00**	**(0.10)**	(4.70)	(2.90)	(0.57)	**0.00**	**(4.50)**	**(4.50)**	(0.06)	0.00	0.00				
02-Sep-03	0.00	**0.42**	**1.45**	0.00	(3.10)	**1.95**	**(4.50)**	0.00	0.00	2.10	4.20	**(0.10)**	0.00	**(4.50)**	**(0.10)**	**(0.10)**	(5.00)	(0.73)	(0.11)	**(0.10)**	**0.30**	**(0.24)**	0.00	0.00	0.00				
03-Sep-03	0.00	**(0.06)**	**0.58**	0.00	(2.00)	0.00	**(0.22)**	0.00	**1.80**	**5.00**	1.10	**(0.06)**	0.00	**(0.10)**	**(0.04)**	**(0.10)**	(3.80)	(0.55)	(0.30)	**0.00**	**0.40**	**0.00**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
04-Sep-03	0.00	**0.00**	0.00	0.00	(0.19)	**0.06**	**0.00**	0.00	**0.24**	(0.67)	0.00	**(0.03)**	0.00	**0.00**	**0.00**	**0.00**	(0.74)	(0.16)	(0.12)	**0.00**	**(0.30)**	**0.00**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
05-Sep-03	0.00	**0.00**	0.00	0.00	(0.14)	0.00	**0.00**	(1.30)	**0.06**	(0.53)	0.00	**(0.20)**	0.00	**(0.49)**	**0.00**	**0.00**	(0.69)	(0.40)	(0.10)	**0.00**	**0.36**	**0.00**	(0.04)	0.00	0.00	0.00	0.00	0.00	0.00
08-Sep-03	0.00	**0.00**	0.00	0.00	(0.68)	0.00	**0.00**	(1.00)	0.00	(0.50)	0.00	**(0.15)**	0.00	**(0.30)**	**0.00**	**0.00**	(3.20)	(1.00)	(0.04)	**0.00**	**(1.40)**	**0.00**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
09-Sep-03	0.00	**0.00**	0.00	0.00	(0.56)	**0.16**	**(1.20)**	(3.00)	**2.90**	**4.10**	0.00	**(0.10)**	0.00	**(1.30)**	**0.00**	**(1.40)**	(2.80)	(0.83)	(0.08)	**0.00**	**4.00**	**0.00**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10-Sep-03	0.00	**0.00**	0.00	0.00	(0.50)	**0.14**	**(1.10)**	(2.50)	**2.00**	**4.00**	0.00	**0.00**	0.00	**(1.20)**	**0.00**	**(1.00)**	(1.40)	(0.80)	0.00	**0.00**	**3.00**	**0.00**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11-Sep-03	0.90	0.00	**0.44**	0.00	0.00	0.00	**0.04**	(0.52)	0.00	2.20	0.00	**0.00**	0.00	**0.00**	**0.00**	**4.90**	0.00	**0.04**	0.00	**0.00**	**7.00**	**0.00**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12-Sep-03	1.30	**0.00**	(0.35)	0.00	0.00	0.00	**0.00**	0.00	**1.90**	**6.00**	0.00	**0.00**	0.00	**0.00**	**0.00**	**4.00**	(0.05)	0.00	0.00	**0.00**	**6.00**	**0.00**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15-Sep-03	1.00	**0.00**	(0.25)	0.00	(0.28)	0.00	**0.00**	0.00	1.70	5.00	0.00	**0.00**	0.00	**0.00**	**0.00**	**3.50**	(0.80)	(0.06)	0.00	**0.00**	**6.00**	**0.00**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16-Sep-03	0.00	**0.00**	**0.68**	0.00	(0.34)	0.00	**0.00**	**0.52**	**1.20**	**0.55**	0.00	**0.00**	0.00	**0.00**	**0.00**	**5.00**	(0.88)	(0.36)	(0.42)	**0.00**	**10.50**	**0.00**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17-Sep-03	0.00	**0.00**	**0.65**	0.00	(0.36)	0.00	**0.00**	**0.48**	**1.16**	**0.49**	0.00	**0.00**	0.00	**0.00**	**0.00**	**4.52**	(0.89)	(0.32)	(0.38)	**0.00**	**10.00**	**0.00**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18-Sep-03	0.00	**0.00**	0.00	0.00	0.00	0.00	**0.03**	0.00	**0.24**	0.00	0.00	**0.00**	0.00	**0.00**	**0.00**	**5.50**	0.00	**0.05**	0.00	**0.00**	**5.00**	**0.00**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19-Sep-03	0.00	**0.00**	(0.80)	0.00	(0.30)	**0.10**	**(0.22)**	(1.40)	**0.60**	1.70	0.04	**0.00**	0.00	**0.00**	**0.00**	**3.90**	(1.00)	(0.40)	0.00	**0.00**	**8.00**	**0.00**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22-Sep-03	0.00	**0.00**	**2.50**	0.00	(0.04)	0.00	**(1.20)**	**1.20**	**2.70**	**6.00**	0.00	**(0.08)**	0.00	**(0.40)**	**0.00**	**5.00**	(0.22)	(0.20)	0.00	**0.00**	**1.00**	**0.00**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23-Sep-03	0.00	**0.00**	0.00	0.00	(0.10)	0.00	**0.00**	(0.34)	**1.90**	(0.72)	0.00	**0.00**	0.00	**0.00**	**0.00**	**5.00**	(0.07)	0.00	0.00	**(0.07)**	**1.00**	**0.00**	0.00	(0.27)	0.00	0.00	0.00	0.00	0.00
24-Sep-03	0.22	**0.00**	**0.35**	0.00	0.00	0.00	**0.00**	0.00	**0.76**	0.51	0.06	**0.00**	0.00	**0.00**	**0.00**	**2.50**	0.00	0.00	0.00	**5.00**	**9.00**	**0.00**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25-Sep-03	0.45	**0.00**	0.00	0.00	0.00	0.00	**0.00**	0.00	**0.80**	0.50	0.10	**0.00**	0.00	**0.00**	**0.00**	**2.00**	0.00	0.00	0.00	**4.80**	**8.50**	**0.00**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29-Sep-03	0.00	**0.00**	0.00	0.00	0.00	0.00	**0.00**	0.00	**0.70**	0.00	0.00	**0.22**	0.00	**0.00**	**0.00**	**8.00**	(0.14)	(0.09)	0.00	**0.00**	**7.00**	**0.00**	0.00	0.00	0.00	**0.90**	0.00	0.00	0.00
30-Sep-03	0.00	**0.00**	0.00	0.00	0.00	0.00	**0.00**	0.00	0.00	0.00	0.00	**0.00**	0.00	**0.00**	**0.00**	**9.00**	0.00	0.00	0.00	**0.23**	**8.00**	**0.00**	0.00	0.00	0.00	**0.46**	0.00	0.00	0.00
01-Oct-03	0.00	**0.00**	0.00	0.00	0.00	0.00	**0.02**	0.00	0.00	0.00	0.08	**0.00**	0.00	**0.00**	**0.00**	**5.00**	(0.18)	(0.12)	0.00	**0.00**	**6.00**	**0.00**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
02-Oct-03	0.08	**0.00**	0.00	0.00	0.00	0.00	**0.00**	(0.08)	0.00	0.00	**0.06**	**0.00**	0.00	**0.00**	**0.00**	**0.00**	(0.09)	(0.13)	0.00	**0.00**	**3.40**	**0.00**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
06-Oct-03	0.06	**0.00**	0.00	0.00	0.00	0.00	**0.00**	0.00	0.00	0.00	0.00	**0.00**	0.00	**0.00**	**0.00**	**2.00**	0.00	0.00	0.00	**0.00**	**9.00**	**0.00**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
07-Oct-03	0.00	**0.00**	(0.02)	0.00	(0.10)	0.00	**0.00**	(2.40)	(0.26)	1.30	0.00	**0.00**	0.00	**0.00**	**0.00**	**1.50**	(0.13)	(0.24)	0.00	**0.00**	N/M	**0.00**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
08-Oct-03	(0.92)	**0.00**	0.00	0.00	(0.12)	0.00	**(0.04)**	(2.40)	(0.60)	0.72	0.04	**0.00**	0.00	**0.00**	**(0.04)**	**(1.10)**	(0.47)	(0.54)	0.00	**0.00**	N/M	**0.00**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
09-Oct-03	0.00	**0.00**	0.00	0.00	(0.08)	0.00	**0.00**	(2.90)	(0.41)	2.00	0.07	**0.00**	0.00	**0.00**	**0.00**	**(0.23)**	(0.72)	(0.66)	(0.09)	**0.00**	N/M	**0.00**	0.00	0.00	0.00	0.00	0.00	0.00	0.00

ERH SYSTEM VACUUM PIEZOMETER MONITORING DATA - Pressure

Lockformer - Lisle, IL

Date	Probe Identification																											
	VPZ-1	VPZ-2	VPZ-3	VPZ-4	VPZ-5	VPZ-6	VPZ-7	VPZ-8	VPZ-9	VPZ-10	VPZ-11	VPZ-12	VPZ-13	VPZ-14	VPZ-15	VPZ-16	VPZ-17	VPZ-18	VPZ-19	VPZ-20	VPZ-21	VPZ-22	VPZ-23	VPZ-24	VPZ-25	VPZ-26	VPZ-27	VPZ-28	VPZ-29
10-Oct-03	(0.62)	**0.00**	(0.50)	0.00	(0.10)	0.00	**(0.20)**	(3.10)	(0.23)	2.40	0.00	**(0.12)**	0.00	**0.00**	**0.00**	**(1.50)**	(1.50)	(0.92)	(0.13)	**0.00**	N/M	**0.00**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13-Oct-03	0.00	**2.30**	0.00	(0.77)	0.00	0.00	**0.00**	(0.96	**0.64**	**4.00**	0.00	**0.00**	0.00	**0.00**	**0.00**	**1.30**	(1.25)	0.00	0.00	**0.00**	N/M	**0.00**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15-Oct-03	0.00	**0.50**	0.00	0.00	0.00	0.00	**0.00**	0.00	0.00	0.00	0.00	**0.00**	0.00	**0.00**	**0.00**	**(0.10)**	(0.08)	0.00	0.00	**0.00**	N/M	**0.00**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16-Oct-03	0.00	**0.00**	0.00	0.00	0.00	0.00	**0.00**	0.00	0.00	0.00	0.05	**0.00**	0.00	**0.00**	**0.00**	**(0.16)**	(0.12)	(0.06)	0.00	**0.00**	N/M	**0.00**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17-Oct-03	0.00	**0.00**	0.00	0.00	0.00	0.00	**0.00**	0.00	0.00	0.00	0.00	**0.00**	0.00	**0.00**	**0.00**	**(0.06)**	(1.00)	(0.10)	0.00	**0.00**	N/M	**0.00**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20-Oct-03	0.00	**0.00**	0.00	0.00	0.00	0.00	**0.00**	0.00	**1.20**	**5.00**	0.00	**0.00**	0.00	**0.00**	**0.00**	**0.00**	0.00	0.00	0.00	**0.00**	N/M	**0.00**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21-Oct-03	0.00	**0.00**	0.00	0.00	0.00	0.00	**0.00**	0.00	0.00	0.00	0.00	**0.00**	0.00	**0.00**	**0.00**	**0.00**	0.00	0.00	0.00	**0.00**	N/M	**0.00**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22-Oct-03	0.00	**0.00**	0.00	0.00	0.00	0.00	**0.00**	0.00	0.00	0.00	0.00	**0.00**	0.00	**0.00**	**0.00**	**0.00**	0.00	0.00	0.00	**0.00**	N/M	**0.00**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23-Oct-03	0.00	**0.00**	0.00	0.00	0.00	0.00	**0.00**	0.00	0.00	0.00	0.00	**0.00**	0.00	**0.00**	**0.00**	**0.00**	0.00	0.00	0.00	**0.00**	N/M	**0.00**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24-Oct-03	0.00	**0.00**	0.00	0.00	0.00	0.00	**0.00**	0.00	0.00	0.00	0.00	**0.00**	0.00	**0.00**	**0.00**	**(0.23)**	(0.22)	(0.10)	0.00	**0.00**	N/M	**0.00**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27-Oct-03	0.00	**(0.20)**	0.00	0.00	(0.75)	0.00	**(0.08)**	(0.64)	**0.42**	2.85	0.00	**(0.10)**	0.00	**(1.00)**	**(0.09)**	**(5.00)**	(2.40)	(1.50)	0.00	**0.00**	N/M	**0.00**	0.00	0.00	0.00	**0.49**	0.00	0.00	**0.70**
28-Oct-03	0.00	**(1.20)**	0.00	**3.20**	(0.76)	0.00	**0.00**	**1.30**	**1.80**	**6.00**	0.00	**(0.07)**	**0.78**	**0.00**	**(0.80)**	**(5.00)**	(2.50)	(1.40)	0.00	**(0.55)**	N/M	**0.00**	0.00	0.00	0.00	**1.45**	0.00	0.00	0.00
29-Oct-03	(1.65)	**(0.20)**	0.00	(5.00)	(0.76)	0.00	**(1.05)**	(5.50)	(1.15)	(6.00)	0.00	**0.00**	(3.70)	**(0.08)**	**0.00**	**(4.00)**	(2.00)	(1.25)	**0.00**	**(0.08)**	N/M	**(0.34)**	0.00	0.00	(0.26)	(4.00)	0.00	0.00	0.00
30-Oct-03	0.00	**(1.00)**	0.00	(3.20)	(0.75)	0.00	**(0.80)**	(3.70)	(0.30)	(2.75)	0.00	**(0.25)**	(3.50)	**(0.60)**	**(0.30)**	**(5.00)**	**2.00**	(1.30)	0.00	**(0.70)**	N/M	**(0.20)**	(0.04)	(0.05)	0.00	0.00	0.00	0.00	0.00
31-Oct-03	(1.50)	**(0.90)**	0.00	(6.00)	(0.86)	0.00	**(0.50)**	(5.00)	(2.00)	(3.00)	0.00	**(0.50)**	0.00	**(0.30)**	**0.00**	**(7.00)**	(2.00)	(1.30)	**0.00**	**(0.70)**	N/M	**(0.40)**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
03-Nov-03	0.00	**(2.50)**	0.00	(2.40)	(1.00)	0.00	**(0.60)**	**4.00**	0.00	0.60		**(0.90)**	0.00	**(0.40)**	**(0.80)**	**(6.00)**	(3.00)	(1.70)	0.00	**(4.00)**	N/M	**0.00**	**1.00**	(0.60)	**1.50**	**1.50**	(0.50)	0.00	(0.20)
04-Nov-03	**3.50**	**(2.80)**	0.00	(3.50)	(0.75)	0.00	**(0.30)**	(4.00)	0.00	3.40	0.00	**(0.20)**	0.00	**(1.20)**	**(0.60)**	**(7.00)**	(3.20)	(1.50)	0.00	**(6.00)**	N/M	**(0.20)**	(1.50)	(0.20)	**1.30**	**0.90**	(0.80)	0.00	0.00
05-Nov-03	**3.00**	**(2.50)**	0.00	(2.80)	(2.00)	0.00	**0.00**	**2.00**	**2.00**	3.00	0.00	**(0.10)**	(3.00)	**(0.50)**	**0.00**	**(6.00)**	(3.00)	(1.00)	0.00	**(3.00)**	N/M	**0.00**	**0.80**	(0.20)	0.00	**2.00**	(1.00)	0.00	0.00
06-Nov-03	**0.80**	**(16.00)**	0.00	(5.10)	(1.50)	0.00	**0.00**	(4.00)	(1.00)	(1.00)	0.00	**(0.20)**	**0.60**	**(0.10)**	**(0.20)**	**(4.00)**	(4.00)	(2.00)	0.00	**(7.00)**	N/M	**(0.30)**	(2.20)	(0.10)	(0.80)	**1.20**	(3.80)	0.00	0.00
07-Nov-03	**1.00**	**(12.00)**	0.00	(6.00)	(0.40)	0.00	**(0.50)**	(6.00)	(1.00)	(0.50)	(0.20)	**(1.00)**	0.00	**(4.00)**	**(0.60)**	**(5.00)**	(4.00)	(3.20)	0.00	**(8.40)**	N/M	**(1.20)**	(5.00)	(0.80)	(6.00)	**1.00**	(0.60)	0.00	0.00
10-Nov-03	1.40	**(0.60)**	**3.60**	0.00	(0.38)	0.00	**0.00**	(2.40)	**2.30**	**5.00**	0.00	**(0.04)**	0.00	**(0.40)**	**(0.30)**	**(5.00)**	(3.35)	(1.50)	**0.00**	**0.00**	N/M	**(0.10)**	(0.20)	0.00	(1.30)	**1.50**	(0.74)	**0.10**	0.00
12-Nov-03	0.90	**(0.07)**	**1.80**	0.00	(1.50)	0.00	**(0.20)**	(5.00)	**1.00**	0.00	0.00	**0.00**	0.00	**(0.30)**	**0.00**	**(6.00)**	(4.90)	(1.80)	**0.00**	**0.00**	N/M	**(0.40)**	(1.20)	0.00	(4.40)	**2.10**	(3.00)	0.00	0.00
13-Nov-03	(0.30)	**(0.20)**	(2.15)	0.00	(1.40)	0.00	**(0.34)**	(2.75)	(2.50)	(4.25)	0.00	**(2.20)**	0.00	**(0.10)**	**(0.08)**	**(7.00)**	(5.00)	(2.20)	**0.00**	**(0.10)**	N/M	**(0.42)**	(0.06)	0.00	(0.06)	(4.55)	(2.00)	0.00	0.00
14-Nov-03	(0.06)	**(1.20)**	(0.49)	0.00	(1.20)	0.00	**(0.10)**	(4.30)	(0.32)	(1.90)	0.27	**(2.40)**	**0.10**	**(1.20)**	**(1.10)**	**(7.00)**	(4.10)	(2.20)	**0.00**	**0.00**	N/M	**(0.20)**	(0.70)	0.00	(0.52)	(1.55)	(1.60)	0.00	0.00

NOTES: Blank space indicates no reading taken
Blue reading indicate a Tedlar bag sample for PID analysis was obtained
[ ] identifies locations currently connected to the vapor extraction system.

ERH SYSTEM VACUUM PIEZOMETER MONITORING DATA - PID

Lockformer - Lisle, IL

Date	Average Soil Temperature (degrees C)		Probe Identification																								
	Area 2	Area 1	VPZ-1	VPZ-2	VPZ-3	VPZ-4	VPZ-5	VPZ-6	VPZ-7	VPZ-8	VPZ-9	VPZ-10	VPZ-11	VPZ-12	VPZ-13	VPZ-14	VPZ-15	VPZ-16	VPZ-17	VPZ-18	VPZ-19	VPZ-20	VPZ-21	VPZ-22	VPZ-23	VPZ-24	VPZ-25
05-Jun-03			12.8	5.8	3.4	8.9	0.4	2.3	0.3	0.1	0.0	0.7	0.2	2.1	0.0	0.0	0.1	0.2	0.3	0.0	0.0	0.0	0.0	0.4	3.9	0.8	2.6
16-Jun-03																											
17-Jun-03																											
18-Jun-03																											
16-Jul-03	30	15																									
25-Jul-03	41	20				0.7		0.1	1.8							1.3	0.8	0.4			3.2		4.8	1.5			
31-Jul-03	44	23				6.7			4.8								4.2	7.6				0.5	5.8	2.4			
07-Aug-03	50	28		6.9	3.3			0.0	3.4					0.8			1.3	11.0				0.0	49.1				
13-Aug-03	55	33		4.1												2.0	2.2	13.0				0.0	112.0	3.8			
14-Aug-03	57	35		6.5												3.2	5.0	10.2				0.0	128.0	2.2			
20-Aug-03	60	41	3.8			3.6				8.7	0.9												119.0			1.2	
21-Aug-03	62	45		5.6				9.1	1.3		0.0					2.5	3.3					0.0	168.0	2.7			
22-Aug-03	62	45		2.2				0.0	1.8		0.0			0.0		0.4	1.5	15.2				0.4	216.0	2.3			
25-Aug-03	64	49																23.2					270.0				
26-Aug-03	64	49		29.8					20.1					7.3		11.3	8.6	21.0				93.5	332.0	0.8			
27-Aug-03	65	51		7.2					25.8		3.7			3.2		18.4	10.7	32.2				52.5	343.1	4.7			
28-Aug-03	65	51		8.2	8.8				16.3		0.1			7.7		12.2	10.5	9.4				25.1	136.0	3.1			
29-Aug-03	67	52		6.2	5.1			0.0	5.9	4.8	0.0			4.1		5.8	3.9	3.9				6.5	58.7	4.8			
02-Sep-03	69	54		1.0	2.9			0.4	5.0				1.6	4.0		3.3	2.0	8.4				0.5	37.4	2.8			
03-Sep-03				1.9	2.7				9.3		2.0	2.4		2.4		3.8	6.4	18.8				0.6	65.4	1.9			
04-Sep-03				2.5				1.1	4.9		2.8			1.2		5.7	6.1	8.3				11.3	60.2	2.0			
05-Sep-03				2.9					8.3		1.4			3.3		4.4	5.5	16.4				4.8	38.1	4.9			
08-Sep-03				1.4					4.4					2.6		1.8	2.2	11.3				3.2	7.3	2.1			
09-Sep-03				5.6				1.2	13.3		0.3	5.3		12.8		13.9	10.1	13.1				38.5	289.0	1.6			
10-Sep-03				6.0				0.8	8.0		0.0	4.0		14.0		9.2	12.0	10.0				26.2	250.0	1.0			
11-Sep-03					30.8				35.6					27.9		26.1	37.3	30.3		14.1		17.3	90.7	22.2			
12-Sep-03				93.3					40.2		32.8	30.2		33.5		33.9	33.9	53.1				17.7	120.2	47.1			
15-Sep-03				80.0					36.1					20.7		27.9	29.4	45.2				15.0	86.2	40.0			
16-Sep-03				37.7	44.4				24.4	8.0	1.2	12.3		25.3		18.7	17.6	28.5				51.8	300.0	3.9			
17-Sep-03				39.9	41.1				25.5	10.0	2.8	8.9		27.1		20.4	16.2	29.2				47.2	298.5	2.8			
18-Sep-03				*					*		*			*		*	*	*		*		*	*	*			
19-Sep-03				28.7				3.1	19.0		2.6			12.4		11.3	14.6	18.2				11.0	393.0	5.7			
22-Sep-03				10.9	12.8				9.7	13.3	1.3	6.3		15.1		10.7	12.9	32.2				7.0	146.2	5.6			
23-Sep-03				149.0					20.3		5.1			15.6		22.0	21.9	35.4				16.4	277.0	2.7			
24-Sep-03				28.5	34.2				16.2		9.2			7.4		15.3	14.5	21.0				15.3	345.0	6.1			
25-Sep-03				32.1					14.4		10.6			6.2		20.1	17.9	19.5				18.1	406.0	10.2			
29-Sep-03				7.6					23.0		3.1			6.0		4.0	8.8	9.6				30.3	583.0	3.3			
30-Sep-03				32.3					16.0					6.3		2.5	3.0	8.6				5.1	298.0	286.0			
01-Oct-03				44.7					45.3					8.6		6.4	7.2	6.3				12.1	275.0	15.5			
02-Oct-03				38.6					33.7					14.0		19.9	15.9	22.0				13.5	483.0	11.5			
06-Oct-03				10.0					13.0					9.1		9.5	5.7	38.3				8.9	634.0	4.3			
07-Oct-03				51.8					13.0					21.2		53.2	31.0	49.2				11.8		8.6			
08-Oct-03				8.6					7.4					8.9		6.4	6.5	9.2				3.6		9.6			
09-Oct-03				6.3					7.1					5.8		17.6	6.9	27.5				4.8		6.9			
10-Oct-03				4.8					4.4					2.2		3.9	3.7	5.3				3.1		4.1			

ERH SYSTEM VACUUM PIEZOMETER MONITORING DATA - PID

Lockformer - Lisle, IL

Date	Average Soil Temperature (degrees C)		Probe Identification																								
	Area 2	Area 1	VPZ-1	VPZ-2	VPZ-3	VPZ-4	VPZ-5	VPZ-6	VPZ-7	VPZ-8	VPZ-9	VPZ-10	VPZ-11	VPZ-12	VPZ-13	VPZ-14	VPZ-15	VPZ-16	VPZ-17	VPZ-18	VPZ-19	VPZ-20	VPZ-21	VPZ-22	VPZ-23	VPZ-24	VPZ-25
13-Oct-03					2.5				11.9		0.0	8.6		5.0		3.0	2.4	60.5				2.4		4.1			
15-Oct-03				3.3					1.9					2.8		1.5	2.3	2.8				0.0		2.5			
16-Oct-03				4.5					3.2					3.5		2.6	3.0	6.0				1.6		3.5			
17-Oct-03				4.0					3.7					2.6		3.2	3.5	5.8				2.1		3.9			
20-Oct-03				22.7					4.9		0.0	5.4		4.4		5.4	3.8	32.0				4.2		3.6			
21-Oct-03				14.7					5.8					2.7		3.9	6.2	21.9				3.9		2.4			
22-Oct-03				15.2					6.3					3.8		4.1	5.4	25.5				4.6		3.6			
23-Oct-03				18.3					6.2					5.1		5.6	4.0	38.0				5.0		2.9			
24-Oct-03				4.0					2.3					1.8		1.6	2.0	2.7				2.5		2.1			
27-Oct-03				0.9					0.8		0.0			0.7		0.6	0.7	1.8				0.8		1.3			
28-Oct-03				2.2		1.1			1.0	1.4	0.0	5.8		0.4	0.6	1.9	0.6	1.8				0.9		1.1			
29-Oct-03				6.6					1.0					0.4		0.6	0.7	4.0			1.1	0.7		1.1			
30-Oct-03				5.6					1.1					1.1		1.1	1.4	4.5	1.1			1.1		1.0			
31-Oct-03				2.2					1.0					0.8		0.6	1.1	3.6			1.6	0.7					
03-Nov-03				1.7					0.4	1.2				1.1		0.4	1.4	2.3				0.8		0.9	1.9		5.5
04-Nov-03			1.0	1.2					0.9					0.8		0.6	1.4	2.1				0.6		1.3			5.0
05-Nov-03			0.9	1.1					0.6	1.0	0.0			0.3		0.4	1.1	1.6				0.2		0.5	0.2		
06-Nov-03			0.8	1.1					0.4					0.5	0.8	0.7	0.5	0.5				0.6		1.0			
07-Nov-03			0.6	0.9					0.4					0.4		0.3	1.3	1.2				0.6		0.7			
10-Nov-03				1.3	2.0				0.7		0.0	4.9		0.3		0.3	0.4	6.9			0.6	0.0		0.2			
12-Nov-03				0.2	1.7				0.0		0.0			0.0		0.0	0.0	0.6			0.5	0.0		0.0			
13-Nov-03				1.6					0.5					0.3		0.3	0.4	1.3			0.6	0.0		0.5			
14-Nov-03				1.4					0.3					0.2	0.4	0.3	0.4	0.9			0.4	0.2		0.5			

VPZ-26

NOTES: Blank space indicates no reading taken.
Samples collected in Tedlar bag and analyzed with PID.
[ ] identifies locations currently connected to the vapor extraction system.
* identifies suspect PID results associated with faulty PID calibration.
PID readings are in ppmv

TABLE 1
Summary of Analytical Results
Background Sampling

The Lockformer Company / Lisle, Illinois

SAMPLE DATE	LOCATION	PID (PPM)	TOTAL HYDROCARBON ANALYZER (PPM)	FIRST ENVIRONMENTAL LABORATORIES		COLUMBIA ANALYTICAL	
				COMPOUND	RESULTS (PPM)	COMPOUND	RESULTS (PPM)
06/03/03	PML01	NA	NA	NA	NA	See Note (1)	See Note (1)
	PML02	NA	NA	NA	NA	See Note (1)	See Note (1)
	PML03	NA	NA	NA	NA	See Note (1)	See Note (1)
	PML04	NA	NA	NA	NA	See Note (1)	See Note (1)
06/10/03	Residential #1 (2)	NA	NA	NA	NA	See Note (1)	See Note (1)
	Residential #2 (2)	NA	NA	NA	NA	See Note (1)	See Note (1)
	Residential #3 (2)	NA	NA	NA	NA	See Note (1)	See Note (1)
	Residential #4 (2)	NA	NA	NA	NA	See Note (1)	See Note (1)

NOTES:

NA = Not Analyzed

(1) Background samples. Table 1A summarizes the maximum background levels detected for each chemical. Future results of analyses for these chemicals will be reported if they exceed 2 x's the background levels shown in Table 1A.

(2) Prior to start-up, permanent residential sampling locations had not been established. Residential locations shown in this table were at or near the property perimeter. Residential sampling locations after start-up are shown in Figure 1.

TABLE 1A
Maximum Detected Background Values

The Lockformer Company / Lisle, Illinois

Compound	Sample ID	Results (ppbV)
1,2,4-Trimethylbenzene	RSML02	0.62
2-Butanone (MEK)	PML03	2.5
2-Hexanone	PML01	0.38
Acetone	PML02	1.6
Benzene	RSML01	0.51
Carbon Disulfide	RSML01	1.5
Cloromethane	RSML01	0.91
Dichlorodifluoromethane (CFC 12)	RSML02	0.68
Ethanol	RSML02	42
Ethylbenzene	RSML02	1.4
Isopropyl Alcohol	RSML02	7.9
m,p-Xylenes	RSML02	1.6
Methylene chloride	RSML02	3.3
Naphthalene	RSML02	0.62
n-Hexane	PML04	1.6
n-Nonane	RSML02	0.65
o-Xylene	RSML02	0.69
Toluene	RSML02	3.3
Trichlorofluoromethane	PML04	0.29
Vinyl Acetate	PML04	1.9

TABLE 2
Summary of Analytical Results
Remediation System Granulated Activated Carbon Units

The Lockformer Company / Lisle, Illinois

SAMPLE DATE	LOCATION	PID (PPM)	TOTAL HYDROCARBON ANALYZER (PPM)	FIRST ENVIRONMENTAL LABORATORIES		COLUMBIA ANALYTICAL	
				COMPOUND	RESULTS (PPM)	COMPOUND	RESULTS (PPM)
06/10/03	VPGAC01 (Before First Carbon)	21.3	14.9	TCE Cis-1,2-DCE	12.4 2.0	TCE Cis-1,2-DCE Butanone Methane	11.0 2.6 0.54 4.6
	VPGAC02 (Between Carbon Units)	1.6	2.5	TCE Cis-1,2-DCE	<1 <1.3	TCE Cis-1,2-DCE Acetone 2-Butanone Styrene Methane	0.0035 0.00053 0.0065 0.0074 0.00074 4.3
	VPGAC03 (After Last Carbon Unit)	2.2	2.3	TCE Cis-1,2-DCE	<1 <1.3	TCE Cis-1,2-DCE Ethanol Vinyl Acetate Cumene Methane	0.0016 <0.00033 0.09 0.058 0.00029 4.4
06/11/03	VPGAC01	19.7	24.5	TCE Cis-1,2-DCE	12.5 2.4	NA	NA
	VPGAC02	1.3	13.7	TCE Cis-1,2-DCE	<1 <1.3	NA	NA
	VPGAC03	1.7	13.9	TCE Cis-1,2-DCE	<1 <1.3	NA	NA
06/12/03	VPGAC01	20.3	29.5	NA	NA	TCE Cis-1,2-DCE PCE Methane	9.5 2.0 0.099 33
	VPGAC02	2.6	18.3	NA	NA	TCE Cis-1,2-DCE Styrene 1,3-Dichlorobenzene Methane	<0.00023 <0.00031 0.00035 0.0005 34

TABLE 2
Summary of Analytical Results
Remediation System Granulated Activated Carbon Units

The Lockformer Company / Lisle, Illinois

SAMPLE DATE	LOCATION	PID (PPM)	TOTAL HYDROCARBON ANALYZER (PPM)	FIRST ENVIRONMENTAL LABORATORIES		COLUMBIA ANALYTICAL	
				COMPOUND	RESULTS (PPM)	COMPOUND	RESULTS (PPM)
06/12/03	VPGAC03	3.2	18.4	NA	NA	TCE	<0.00023
						Cis-1,2-DCE	<0.00032
						Ethanol	0.18
						Acetone	0.0054
						Isopropyl Alcohol	0.037
						Vinyl Acetate	0.071
						1,3-Dichlorobenzene	0.0014
						d-Limonene	0.0009
						Methane	33
06/16/03	VPGAC01	15.8	27.4	TCE	8.1	NA	NA
				Cis-1,2-DCE	1.3		
	VPGAC02	1.4	21.1	TCE	<1	NA	NA
				Cis-1,2-DCE	<1.3		
	VPGAC03	2.0	20.8	TCE	<1	NA	NA
				Cis-1,2-DCE	<1.3		
06/17/03	VPGAC01	NA	34.9	NA	NA	TCE	9.2
						Cis-1,2-DCE	2.1
						Methane	41
	VPGAC02	NA	23.4	NA	NA	TCE	0.00064
						Cis-1,2-DCE	<0.00033
						Vinyl chloride	0.0019
						Acetone	0.0038
						Styrene	0.00045
						Methane	41
	VPGAC03	NA	23.5	NA	NA	TCE	0.0011
						Cis-1,2-DCE	<0.00032
						Acetone	0.0033
						Vinyl Acetate	0.035
						alpha-Pinene	0.00029
						d-Limonene	0.00048
						Methane	40
06/18/03	VPGAC01	17.8	34.1	TCE	9.6	NA	NA
				Cis-1,2-DCE	1.9		
	VPGAC02	2.2	23.3	TCE	<1	NA	NA
				Cis-1,2-DCE	<1.3		
	VPGAC03	2.6	23.3	TCE	<1	NA	NA
				Cis-1,2-DCE	<1.3		

TABLE 2
Summary of Analytical Results
Remediation System Granulated Activated Carbon Units

The Lockformer Company / Lisle, Illinois

SAMPLE DATE	LOCATION	PID (PPM)	TOTAL HYDROCARBON ANALYZER (PPM)	FIRST ENVIRONMENTAL LABORATORIES		COLUMBIA ANALYTICAL	
				COMPOUND	RESULTS (PPM)	COMPOUND	RESULTS (PPM)
06/24/03	VPGAC01	NA	25.4	NA	NA	TCE	5.9
						Cis-1,2-DCE	1.1
						Methane	30
	VPGAC02	NA	16.3	NA	NA	TCE	0.0003
						Cis-1,2-DCE	0.0035
						Vinyl Chloride	0.00085
						PCE	0.00026
						Styrene	0.00069
						Methane	32
	VPGAC03	NA	17.9	NA	NA	TCE	<0.00025
						Cis-1,2-DCE	<0.00033
						Vinyl Chloride	0.0016
						Vinyl Acetate	0.024
						Alpha-Pinene	0.00029
						d-Limonene	0.00025
						Methane	31
06/25/03	VPGAC01	6.9	NA	TCE	4.2	NA	NA
				Cis-1,2-DCE	<1.3		
	VPGAC02	0.6	NA	TCE	<1	NA	NA
				Cis-1,2-DCE	<1.3		
	VPGAC03	0.8	NA	TCE	<1	NA	NA
				Cis-1,2-DCE	<1.3		
06/26/03	VPGAC01	NA	62.0	NA	NA	TCE	3.4
						cis-1,2-DCE	0.65
						PCE	0.018
						Methane	60
	VPGAC02	NA	38.0	NA	NA	TCE	0.00082
						cis-1,2-DCE	0.0049
						Vinyl chloride	0.00071
						Methane	57
	VPGAC03	NA	30.4	NA	NA	TCE	<0.00024
						cis-1,2-DCE	<0.00032
						Vinyl chloride	0.0014
						Vinyl Acetate	0.024
						d-Limonene	0.00036
						Methane	59

TABLE 2
Summary of Analytical Results
Remediation System Granulated Activated Carbon Units

The Lockformer Company / Lisle, Illinois

SAMPLE DATE	LOCATION	PID (PPM)	TOTAL HYDROCARBON ANALYZER (PPM)	FIRST ENVIRONMENTAL LABORATORIES		COLUMBIA ANALYTICAL	
				COMPOUND	RESULTS (PPM)	COMPOUND	RESULTS (PPM)
06/28/03	VPGAC01	NA	26.1	NA	NA	TCE	3.1
						cis-1,2-DCE	0.57
						Methane	39
	VPGAC02	NA	22.1	NA	NA	TCE	0.0017
						cis-1,2-DCE	0.0086
						Vinyl chloride	0.00068
						Acetone	0.0044
						Styrene	0.00041
						Methane	38
	VPGAC03	NA	21.9	NA	NA	TCE	0.00036
						cis-1,2-DCE	<0.00032
						Vinyl Chloride	0.0011
						Vinyl Acetate	0.028
						d-Limonene	0.00043
						Methane	38
07/01/03	VPGAC01	NA	22.5	NA	NA	TCE	2.9
						Cis-1,2-DCE	0.47
						Methane	32
	VPGAC02	NA	19.0	NA	NA	TCE	0.0021
						cis-1,2-DCE	0.011
						Vinyl Chloride	0.00062
						Methane	32
	VPGAC03	NA	19.2	NA	NA	TCE	0.00032
						cis-1,2-DCE	<0.00032
						Vinyl Chloride	0.00071
						Acrolein	0.00075
						Acetone	0.0085
						Vinyl Acetate	0.023
						d-Limonene	0.00056
						Methane	32

TABLE 2
Summary of Analytical Results
Remediation System Granulated Activated Carbon Units

The Lockformer Company / Lisle, Illinois

SAMPLE DATE	LOCATION	PID (PPM)	TOTAL HYDROCARBON ANALYZER (PPM)	FIRST ENVIRONMENTAL LABORATORIES		COLUMBIA ANALYTICAL	
				COMPOUND	RESULTS (PPM)	COMPOUND	RESULTS (PPM)
07/03/03	VPGAC01	NA	NA	NA	NA	TCE	2.9
						Cis-1,2-DCE	0.45
						Vinyl chloride	0.00091
						Acetonitrile	0.0011
						Acrolein	0.00053
						Acetone	0.014
						1,1-DCE	0.00073
						Trichlorotrifluorethane	0.00016
						trans-1,2-DCE	0.0073
						1,1-DCA	0.0007
						Vinyl acetate	0.0039
						2-Butanone	0.022
						Chloroform	0.0016
						1,1,1-TCA	0.0047
						4-Methyl-2-pentanone	0.0019
						1,1,2-TCA	0.00023
						PCE	0.015
						4-Ethyltoluene	0.00024
						1,3,5-Trimethylbenzene	0.00063
						1,2,4-Trimethylbenzene	0.0015
						Methane	36
	VPGAC02	NA	NA	NA	NA	TCE	0.004
						cis-1,2-DCE	0.020
						Vinyl chloride	0.0011
						Acetone	0.0037
						trans-1,2-DCE	0.00048
						Styrene	0.00081
						1,3,5-Trimethylbenzene	0.00030
						Methane	35
	VPGAC03	NA	NA	NA	NA	TCE	0.001
						cis-1,2-DCE	0.00033
						Vinyl chloride	0.00083
						Acrolein	0.00074
						Acetone	0.0039
						Carbon disulfide	0.0036
						Vinyl acetate	0.023
						d-Limonene	0.00025
						Methane	33

TABLE 2
Summary of Analytical Results
Remediation System Granulated Activated Carbon Units

The Lockformer Company / Lisle, Illinois

SAMPLE DATE	LOCATION	PID (PPM)	TOTAL HYDROCARBON ANALYZER (PPM)	FIRST ENVIRONMENTAL LABORATORIES		COLUMBIA ANALYTICAL	
				COMPOUND	RESULTS (PPM)	COMPOUND	RESULTS (PPM)
07/08/03	VPGAC01	5.4	82.7	TCE	0.4	TCE	1.6
				Cis-1,2-DCE	0.5	cis-1,2-DCE	0.32
						Methane	74
	VPGAC02	1.1	45.0	TCE	<0.04	TCE	0.0056
				Cis-1,2-DCE	<0.05	cis-1,2-DCE	0.038
						Vinyl chloride	0.0022
						trans-1,2-DCE	0.00079
						Styrene	0.00031
						Methane	79
	VPGAC03	0.0	42.0	TCE	<0.04	TCE	<0.00023
				Cis-1,2-DCE	<0.05	cis-1,2-DCE	<0.00032
						Vinyl chloride	0.0011
						Carbon disulfide	0.0051
						Vinyl acetate	0.014
						4-Methyl-2-pentanone	0.0016
						d-Limonene	0.00031
						Methane	75
	VPERH01 (Vapors from ERH system)	1.9	43.3	TCE	0.2	NA	NA
				Cis-1,2-DCE	<0.05		
07/11/03	VPGAC01	NA	39.5	NA	NA	TCE	1.4
						cis-1,2-DCE	0.21
						Methane	19
	VPGAC02	NA	11.6	NA	NA	TCE	0.0065
						cis-1,2-DCE	0.044
						Vinyl chloride	0.0073
						Acetone	0.0038
						trans-1,2-DCE	0.0009
						Chloroform	0.00066
						Methane	19
	VPGAC03	NA	9.9	NA	NA	TCE	<0.00023
						cis-1,2-DCE	<0.00032
						Vinyl chloride	0.0018
						Vinyl acetate	0.0091
						d-Limonene	0.00024
						Methane	18

TABLE 2
Summary of Analytical Results
Remediation System Granulated Activated Carbon Units

The Lockformer Company / Lisle, Illinois

SAMPLE DATE	LOCATION	PID (PPM)	TOTAL HYDROCARBON ANALYZER (PPM)	FIRST ENVIRONMENTAL LABORATORIES		COLUMBIA ANALYTICAL	
				COMPOUND	RESULTS (PPM)	COMPOUND	RESULTS (PPM)
07/14/03	VPGAC01	NA	104.0	NA	NA	TCE	1.8
						cis-1,2-DCE	0.29
						Methane	79
	VPGAC01 DUP	NA	104.0	NA	NA	TCE	1.8
						cis-1,2-DCE	0.28
	VPGAC02	NA	47.4	NA	NA	TCE	0.01
						cis-1,2-DCE	0.053
						Vinyl chloride	0.0066
						trans-1,2-DCE	0.0013
						Styrene	0.00032
						Methane	79
	VPGAC03	NA	45.4	NA	NA	TCE	<0.00023
						cis-1,2-DCE	<0.00032
						Vinyl chloride	0.0079
						Acetonitrile	0.00088
						Acrolein	0.0012
						Acetone	0.014
						Vinyl acetate	0.0088
						d-Limonene	0.00037
						Methane	81
07/17/03	VPGAC01	6.8	38.5	NA	NA	TCE	1.3
						cis-1,2-DCE	0.19
						2-Butanone (MEK)	2.2
						Methane	41
	VPGAC02	0.0	21.9	NA	NA	TCE	0.018
						cis-1,2-DCE	0.07
						Vinyl chloride	0.0045
						Carbon disulfide	0.0039
						trans-1,2-DCE	0.0017
						Styrene	0.00054
						Methane	41
	VPGAC03	0.0	23.0	NA	NA	TCE	<0.00023
						cis-1,2-DCE	<0.00032
						Vinyl chloride	0.0062
						Carbon disulfide	0.0032
						Vinyl acetate	0.0098
						d-Limonene	0.00049
						Methane	41

TABLE 2
Summary of Analytical Results
Remediation System Granulated Activated Carbon Units

The Lockformer Company / Lisle, Illinois

SAMPLE DATE	LOCATION	PID (PPM)	TOTAL HYDROCARBON ANALYZER (PPM)	FIRST ENVIRONMENTAL LABORATORIES		COLUMBIA ANALYTICAL	
				COMPOUND	RESULTS (PPM)	COMPOUND	RESULTS (PPM)
07/17/03	VPERH01	Instrument Error	79.5	NA	NA	TCE	0.12
						cis-1,2-DCE	0.046
						Acetone	0.46
						2-Butanone (MEK)	10
						Methane	79
07/22/03	VPGAC01	2.8	50.1	NA	NA	TCE	1.5
						cis-1,2-DCE	0.3
						Vinyl chloride	0.046
						Toluene	0.034
						Methane	54
	VPGAC02	0.5	25.3	NA	NA	TCE	0.021
						cis-1,2-DCE	0.092
						Vinyl chloride	0.0073
						Carbon disulfide	0.0049
						trans-1,2-DCE	0.0017
						Methane	56
07/22/03	VPGAC03	0.3	22.9	NA	NA	TCE	<0.00023
						cis-1,2-DCE	<0.00032
						Vinyl chloride	0.0057
						n-Hexane	0.0086
						Benzene	0.0031
						d-Limonene	0.00075
						Methane	55
	VPERH01	1.1	23.5	NA	NA	NA	NA
07/24/03	VPGAC01	2.9	25.4	NA	NA	TCE	1.2
						cis-1,2-DCE	0.25
						Toluene	0.13
						Methane	42
	VPGAC02	1.2	22.6	NA	NA	TCE	0.022
						cis-1,2-DCE	0.073
						Vinyl chloride	0.0096
						Acetone	0.0037
						trans-1,2-DCE	0.002
						Methane	42

TABLE 2
Summary of Analytical Results
Remediation System Granulated Activated Carbon Units

The Lockformer Company / Lisle, Illinois

SAMPLE DATE	LOCATION	PID (PPM)	TOTAL HYDROCARBON ANALYZER (PPM)	FIRST ENVIRONMENTAL LABORATORIES		COLUMBIA ANALYTICAL	
				COMPOUND	RESULTS (PPM)	COMPOUND	RESULTS (PPM)
07/24/03	VPGAC03	0.6	23.5	NA	NA	TCE	0.00045
						cis-1,2-DCE	<0.00031
						Vinyl chloride	0.0064
						Acetone	0.011
						d-Limonene	0.00026
						Methane	40
	VPERH01	1.3	51.8	NA	NA		
07/28/03	VPGAC01	4.4	40.4	NA	NA	TCE	1.9
						cis-1,2-DCE	0.53
						Vinyl chloride	0.092
						Methane	61
	VPGAC02	1.9	36.8	NA	NA	TCE	0.41
						cis-1,2-DCE	0.36
						Vinyl chloride	0.14
						trans-1,2-DCE	0.0094
						Bromodichloromethane	0.0038
						Methane	69
	VPGAC03	0.9	38.1	NA	NA	TCE	<0.00023
						cis-1,2-DCE	<0.00032
						Vinyl chloride	0.048
						Acetonitrile	0.00085
						Vinyl acetate	0.0047
						d-Limonene	0.00024
						Methane	67
	VPERH01	3.1	83.4	NA	NA	NA	NA
07/31/03	VPGAC01	3.3	25.4	NA	NA	TCE	1.4
						cis-1,2-DCE	0.29
						Methane	42
	VPGAC02	1.9	22.2	NA	NA	TCE	0.16
						cis-1,2-DCE	0.28
						Vinyl chloride	0.034
						Carbon disulfide	0.004
						trans-1,2-DCE	0.008
						Methane	43

TABLE 2
Summary of Analytical Results
Remediation System Granulated Activated Carbon Units

The Lockformer Company / Lisle, Illinois

SAMPLE DATE	LOCATION	PID (PPM)	TOTAL HYDROCARBON ANALYZER (PPM)	FIRST ENVIRONMENTAL LABORATORIES		COLUMBIA ANALYTICAL	
				COMPOUND	RESULTS (PPM)	COMPOUND	RESULTS (PPM)
07/31/03	VPGAC03	1.5	23.7	NA	NA	TCE	<0.00024
						cis-1,2-DCE	<0.00032
						Vinyl chloride	0.11
						Vinyl acetate	0.0043
						d-Limonene	0.00047
						Methane	43
	VPERH01	4.8	47.5	NA	NA	NA	NA
08/05/03	VPGAC01	6.9	39.3	NA	NA	TCE	3.3
						cis-1,2-DCE	0.83
						Vinyl chloride	0.13
						Toluene	0.063
						Methane	64
	VPGAC02	3.4	33.6	NA	NA	TCE	1.2
						cis-1,2-DCE	1.1
						Vinyl chloride	0.14
						trans-1,2-DCE	0.03
						Methane	63
	VPGAC03	2.3	35.9	NA	NA	TCE	<0.00023
						cis-1,2-DCE	<0.00032
						Chloromethane	0.0021
						Vinyl chloride	0.15
						Acetronile	0.00083
						Acrolein	0.0006
						Acetone	0.0051
						Vinyl acetate	0.0042
						d-Limonene	0.00057
						Methane	62
	VPERH01	15.2	86.2	NA	NA	NA	NA
08/08/03	VPGAC01	8.6	88.6	NA	NA	TCE	1.5
						cis-1,2-DCE	0.17
						Methane	20
	VPGAC02	7.4	31.1	NA	NA	TCE	0.52
						cis-1,2-DCE	0.91
						Vinyl chloride	0.045
						trans-1,2-DCE	0.024
						Methane	73

TABLE 2
Summary of Analytical Results
Remediation System Granulated Activated Carbon Units

The Lockformer Company / Lisle, Illinois

SAMPLE DATE	LOCATION	PID (PPM)	TOTAL HYDROCARBON ANALYZER (PPM)	FIRST ENVIRONMENTAL LABORATORIES		COLUMBIA ANALYTICAL	
				COMPOUND	RESULTS (PPM)	COMPOUND	RESULTS (PPM)
08/08/03	VPGAC03	3.3	43.6	NA	NA	TCE	<0.00023
						cis-1,2-DCE	<0.00031
						Vinyl chloride	0.085
						Acetone	0.005
						d-Limonene	0.00047
						Methane	68
	VPERH01	17.4	40.8	NA	NA	NA	NA
08/12/03	VPGAC01	7.6	80.7	NA	NA	TCE	0.81
						cis-1,2-DCE	3.0
						Toluene	0.077
						Methane	53
	VPGAC02	9.4	34.3	NA	NA	TCE	2.8
						cis-1,2-DCE	2.1
						Vinyl chloride	0.063
						trans-1,2-DCE	0.078
						Methane	52
	VPGAC03	3.7	28.0	NA	NA	TCE	0.031
						cis-1,2-DCE	0.00063
						Chloromethane	0.003
						Vinyl chloride	0.094
						Acetonitrile	0.0018
						Acetone	0.0095
						Trichlorofluoromethane	0.0019
						Carbon disulfide	0.0056
						trans-1,2-DCE	0.0013
						1,1-DCA	0.00059
						d-Limonene	0.00037
						Methane	51
	VPERH01	22.4	32.0	NA	NA	NA	NA

TABLE 2
Summary of Analytical Results
Remediation System Granulated Activated Carbon Units

The Lockformer Company / Lisle, Illinois

SAMPLE DATE	LOCATION	PID (PPM)	TOTAL HYDROCARBON ANALYZER (PPM)	FIRST ENVIRONMENTAL LABORATORIES		COLUMBIA ANALYTICAL	
				COMPOUND	RESULTS (PPM)	COMPOUND	RESULTS (PPM)
08/15/03	VPGAC01	11.6	142.9	NA	NA	TCE	3.5
						cis-1,2-DCE	1.0
						Vinyl chloride	0.069
						Carbon disulfide	0.045
						trans-1,2-DCE	0.059
						Toluene	0.3
						Methane	76
	VPGAC01 DUP					Methane	76.0
	VPGAC02	12.7	53.2	NA	NA	TCE	5.3
						cis-1,2-DCE	3.7
						trans-1,2-DCE	0.11
						Methane	78
	VPGAC03	3.3	44.7	NA	NA	TCE	0.046
						cis-1,2-DCE	0.86
						Vinyl chloride	0.11
						1,1-DCE	0.015
						Carbon disulfide	0.027
						trans-1,2-DCE	0.028
						1,1-DCA	0.0091
						Toluene	0.01
						Methane	67
	VPERH01	19.0	53.7	NA	NA	NA	NA
08/20/03	VPGAC01	5.1	57.5	NA	NA	TCE	1.4
						cis-1,2-DCE	0.13
						Methane	17
	VPGAC02	10.3	51.8	NA	NA	TCE	3.1
						cis-1,2-DCE	1.5
						Vinyl chloride	0.095
						trans-1,2-DCE	0.066
						Methane	82

TABLE 2
Summary of Analytical Results
Remediation System Granulated Activated Carbon Units

The Lockformer Company / Lisle, Illinois

SAMPLE DATE	LOCATION	PID (PPM)	TOTAL HYDROCARBON ANALYZER (PPM)	FIRST ENVIRONMENTAL LABORATORIES		COLUMBIA ANALYTICAL	
				COMPOUND	RESULTS (PPM)	COMPOUND	RESULTS (PPM)
08/20/03	VPGAC03	5.3	54.9	NA	NA	TCE	0.210
						cis-1,2-DCE	2.0
						Vinyl chloride	0.14
						1,1-DCE	0.014
						Carbon disulfide	0.026
						trans-1,2-DCE	0.078
						1,1-DCA	0.006
						Chloroform	0.0067
						1,1,1-TCA	0.0079
						Methane	83
	VPERH01	19.2	155.1	NA	NA	NA	NA
08/22/03	VPGAC01	8.0	60.2	NA	NA	TCE	2.6
						cis-1,2-DCE	1.1
						Vinyl chloride	0.096
						trans-1,2-DCE	0.081
						Toluene	0.26
						Methane	77
	VPGAC01 DUP					Methane	79.0
	VPGAC02	5.4	53.4	NA	NA	TCE	1.9
						cis-1,2-DCE	0.96
						Vinyl chloride	0.078
						trans-1,2-DCE	0.046
						Methane	79
	VPGAC03	3.6	54.6	NA	NA	TCE	0.23
						cis-1,2-DCE	2.0
						Vinyl chloride	0.089
						1,1-DCE	0.0056
						Carbon disulfide	0.021
						trans-1,2-DCE	0.07
						1,1-DCA	0.0042
						Chloroform	0.0052
						1,1,1-TCA	0.0077
						Methane	76
	VPERH01	17.2	165.1	NA	NA	NA	NA

TABLE 2
Summary of Analytical Results
Remediation System Granulated Activated Carbon Units

The Lockformer Company / Lisle, Illinois

SAMPLE DATE	LOCATION	PID (PPM)	TOTAL HYDROCARBON ANALYZER (PPM)	FIRST ENVIRONMENTAL LABORATORIES		COLUMBIA ANALYTICAL	
				COMPOUND	RESULTS (PPM)	COMPOUND	RESULTS (PPM)
08/26/03	VPGAC01	7.5	56.8	NA	NA	TCE	3.1
						cis-1,2-DCE	1.3
						Vinyl chloride	0.11
						trans-1,2-DCE	0.11
						Toluene	0.39
						Methane	68
	VPGAC02	1.9	46.7	NA	NA	TCE	0.093
						cis-1,2-DCE	0.91
						Vinyl chloride	0.12
						trans-1,2-DCE	0.028
						Methane	69
	VPGAC03	0.3	48.1	NA	NA	TCE	<0.00024
						cis-1,2-DCE	0.00052
						Chloromethane	0.0047
						Acetone	0.0078
						Tetrachloroethene	0.002
						Styrene	0.0046
						d-Limonene	0.00028
						Methane	68
	VPERH01	14.1	146.3	NA	NA	NA	NA
08/29/03	VPGAC01	8.9	54.4	TCE	1.88	TCE	2.9
				Cis-1,2-DCE	0.71	cis-1,2-DCE	1.1
						Vinyl chloride	0.110
						Acetone	0.360
						trans-1,2-DCE	0.085
						2-Butanone (MEK)	0.062
						Toluene	0.260
						Methane	68
	VPGAC01 DUP					TCE	2.8
						cis-1,2-DCE	1.0
						Vinyl chloride	0.100
						Acetone	0.350
						trans-1,2-DCE	0.082
						2-Butanone (MEK)	0.063
						Toluene	0.250

TABLE 2
Summary of Analytical Results
Remediation System Granulated Activated Carbon Units

The Lockformer Company / Lisle, Illinois

SAMPLE DATE	LOCATION	PID (PPM)	TOTAL HYDROCARBON ANALYZER (PPM)	FIRST ENVIRONMENTAL LABORATORIES		COLUMBIA ANALYTICAL	
				COMPOUND	RESULTS (PPM)	COMPOUND	RESULTS (PPM)
08/29/03	VPGAC02	1.2	46.1	TCE	<0.19	TCE	0.0065
				Cis-1,2-DCE	<0.25	Cis-1,2-DCE	0.250
						Vinyl chloride	0.130
						Carbon disulfide	0.0095
						trans-1,2-DCE	0.012
						Methane	70
	VPGAC03	2.1	46.8	TCE	<0.19	TCE	<0.00029
				Cis-1,2-DCE	<0.25	Cis-1,2-DCE	<0.00032
						Tetrachloroethene	0.0018
						Chloromethane	0.0023
						Vinyl chloride	0.040
						Acrolein	0.00087
						Acetone	0.0041 M
						Toluene	0.0038
						Styrene	0.00065
						1.3.5-Trimethylbenzene	0.00041
						1,2,4-Trimethylbenzene	0.0015
						d-Limonene	0.00027
						Methane	67
	VPERH01	17.8	130.5	NA	NA	NA	NA
09/02/03	VPGAC01	16.9	51.0	TCE	4.77	NA	NA
				Cis-1,2-DCE	2.73		
				Vinyl chloride	<0.78		
	VPGAC02	2.4	31.4	TCE	<0.93	NA	NA
				Cis-1,2-DCE	<1.26		
				Vinyl chloride	<0.78		
	VPGAC03	1.9	32.2	TCE	<0.93	TCE	<0.00023
				Cis-1,2-DCE	<1.26	cis-1,2-DCE	<0.00032
				Vinyl chloride	<0.78	Chloromethane	0.0029
						Vinyl chloride	0.090
						Acetonitrile	0.0028
						Acetone	0.0033
						d-Limonene	0.00035
						Methane	46
	VPGAC03 DUP	1.9	32.2	NA	NA	Methane	46
	VPERH01	37.4	134.7	NA	NA	NA	NA

TABLE 2
Summary of Analytical Results
Remediation System Granulated Activated Carbon Units

The Lockformer Company / Lisle, Illinois

SAMPLE DATE	LOCATION	PID (PPM)	TOTAL HYDROCARBON ANALYZER (PPM)	FIRST ENVIRONMENTAL LABORATORIES		COLUMBIA ANALYTICAL	
				COMPOUND	RESULTS (PPM)	COMPOUND	RESULTS (PPM)
09/08/03	VPGAC03	2.6	34.6	TCE	<0.19	NA	NA
				Cis-1,2-DCE	<0.25		
09/10/03	VPGAC01	3.6	10.9	TCE	1.27	NA	NA
				Cis-1,2-DCE	0.20		
				Vinyl chloride	<0.16		
	VPGAC02			TCE	<0.04	NA	NA
				Cis-1,2-DCE	0.13		
		2.7	8.6	Vinyl chloride	<0.16		
	VPGAC03	2.3	7.3	TCE	<0.04	TCE	<0.00023
				Cis-1,2-DCE	<0.05	cis-1,2-DCE	<0.00032
				Vinyl chloride	0.31	Vinyl chloride	0.240
						Chloroethane	0.00049
						Acetonitrile	0.0037
						Acetone	0.0048
						d-Limonene	0.00053
						Methane	11
	VPERH01	4.5	7.4	NA	NA	NA	NA
09/12/03	VPGAC03	34.9	25.4	TCE	<0.04	NA	NA
				Cis-1,2-DCE	<0.05		
				Vinyl chloride	<0.08		
09/15/03	VPGAC01	27.5	47.2	TCE	4.26	NA	NA
				Cis-1,2-DCE	7.3		
				trans-1,2-DCE	0.15		
				Vinyl chloride	0.16		
	VPGAC02	41.2	26.2	TCE	0.15	NA	NA
				Cis-1,2-DCE	0.78		
				Vinyl chloride	<0.16		
	VPGAC03	27.4	30.9	TCE	<0.04	NA	NA
				Cis-1,2-DCE	<0.05		
				Vinyl chloride	<0.16		
	VPERH01	46.5	120.0	NA	NA	NA	NA
09/17/03	VPGAC01	2.1	8.8	NA	NA	NA	NA
	VPGAC02	2.4	8.6	NA	NA	NA	NA
	VPGAC03	0.6	6.6	TCE	<0.04	NA	NA
				Cis-1,2-DCE	<0.05		
				Vinyl chloride	<0.16		
	VPERH01	2.3	10.2	NA	NA	NA	NA

TABLE 2
Summary of Analytical Results
Remediation System Granulated Activated Carbon Units

The Lockformer Company / Lisle, Illinois

SAMPLE DATE	LOCATION	PID (PPM)	TOTAL HYDROCARBON ANALYZER (PPM)	FIRST ENVIRONMENTAL LABORATORIES		COLUMBIA ANALYTICAL	
				COMPOUND	RESULTS (PPM)	COMPOUND	RESULTS (PPM)
09/18/03	VPGAC03	NA	40.1	NA	NA	TCE	<0.00023
						Cis-1,2-DCE	0.0051
						Vinyl chloride	0.067
						Chloromethane	0.0038
						Chloroethane	0.00058
						Acetonitrile	0.0054
						Acetone	0.0033
						Carbon disulfide	0.0036
						trans-1,2-DCE	0.00041
						1,4-Dioxane	0.0015
						Methane	0.052
09/19/03	VPGAC03	0.9	33.8	TCE	<0.04	NA	NA
				Cis-1,2-DCE	<0.05		
				Vinyl chloride	<0.16		
09/23/03	VPGAC03	0.9	8.5	TCE	<0.04	NA	NA
				Cis-1,2-DCE	<0.05		
				Vinyl chloride	<0.16		
09/24/03	VPGAC01	17.4	NA	TCE	6.74	NA	NA
				Cis-1,2-DCE	2.27		
				trans-1,2-DCE	0.20		
				Vinyl chloride	<0.16		
	VPGAC02	10.3	NA	TCE	<0.04	NA	NA
				Cis-1,2-DCE	0.86		
				trans-1,2-DCE	0.08		
				Vinyl chloride	<0.16		
	VPGAC03	4.4	NA	TCE	<0.04	NA	NA
				Cis-1,2-DCE	<0.05		
				Vinyl chloride	<0.16		
	VPERH01	71.8	NA	NA	NA	NA	NA
09/25/03	VPGAC03	NA	33.0	NA	NA	TCE	0.00084
						Cis-1,2-DCE	0.014
						Vinyl chloride	0.098
						Chloromethane	0.010
						Acetonitrile	0.0029
						1,1-Dichloroethene	0.0016
						trans-1,2-DCE	0.0015
						Methane	44

TABLE 2
Summary of Analytical Results
Remediation System Granulated Activated Carbon Units

The Lockformer Company / Lisle, Illinois

SAMPLE DATE	LOCATION	PID (PPM)	TOTAL HYDROCARBON ANALYZER (PPM)	FIRST ENVIRONMENTAL LABORATORIES		COLUMBIA ANALYTICAL	
				COMPOUND	RESULTS (PPM)	COMPOUND	RESULTS (PPM)
09/26/03	VPGAC03		46.9	TCE	<0.04	NA	NA
				Cis-1,2-DCE	<0.05		
				Vinyl chloride	0.16		
09/29/03	VPGAC03	0.9	38.7	TCE	<0.04	NA	NA
				Cis-1,2-DCE	<0.05		
				Vinyl chloride	<0.16		
10/01/03	VPGAC01	15.9	51.7	TCE	5.55	NA	NA
				Cis-1,2-DCE	2.22		
				Vinyl chloride	0.16		
	VPGAC02	1.8	42.0	TCE	<0.04	NA	NA
				Cis-1,2-DCE	0.50		
				trans-1,2-DCE	0.5		
				Vinyl chloride	0.16		
	VPGAC03	1.3	42.7	TCE	<0.04	TCE	0.00025
				Cis-1,2-DCE	<0.05	Cis-1,2-DCE	0.012
				Vinyl chloride	<0.16	Vinyl chloride	0.110
						Chloromethane	0.011
						Chloroethane	0.00065
						Acetonitrile	0.0024
						Carbon disulfide	0.0052
						trans-1,2-DCE	0.0012
						4-Ethyltoluene	0.00069
						1,3,5-Trimethylbenzene	0.00090
						1,2,4-Trimethylbenzene	0.0025
						Methane	58
	VPGAC03 DUP					Methane	59
	VPERH01	44.4	132.6	NA	NA	NA	NA
10/03/03	VPGAC03	2.4	7.6	TCE	<0.04	NA	NA
				Cis-1,2-DCE	<0.05		
				Vinyl chloride	<0.16		
	VPERH01	4.4	11.6	NA	NA	NA	NA
10/06/03	VPGAC03	2.8	34.6	TCE	<0.04	NA	NA
				Cis-1,2-DCE	<0.05		
				Vinyl chloride	<0.16		

TABLE 2
Summary of Analytical Results
Remediation System Granulated Activated Carbon Units

The Lockformer Company / Lisle, Illinois

SAMPLE DATE	LOCATION	PID (PPM)	TOTAL HYDROCARBON ANALYZER (PPM)	FIRST ENVIRONMENTAL LABORATORIES		COLUMBIA ANALYTICAL	
				COMPOUND	RESULTS (PPM)	COMPOUND	RESULTS (PPM)
10/09/03	VPGAC01	11.8	77.5	TCE	3.28	NA	NA
				Cis-1,2-DCE	1.26		
				trans-1,2-DCE	0.15		
				Vinyl chloride	<0.16		
	VPGAC02	2.1	63.7	TCE	<0.04	NA	NA
				Cis-1,2-DCE	0.63		
				trans-1,2-DCE	0.05		
				Vinyl chloride	<0.16		
	VPGAC03	0.9	65.6	TCE	<0.04	TCE	<0.00023
				Cis-1,2-DCE	<0.05	Cis-1,2-DCE	0.00026
				Vinyl chloride	<0.16	Chloromethane	0.0039
						Vinyl chloride	0.048
						Chloroethane	0.0017
						Acetonitrile	0.022
						Acetone	0.0041 M
						1,1-DCE	0.0024 M
						Carbon disulfide	0.0091
						trans-1,2-DCE	0.0029
						Styrene	0.00071
						Methane	89
	VPERH01	21.4	185.8	NA	NA	NA	NA
10/10/03	VPGAC03	0.8	44.7	TCE	<0.04	NA	NA
				Cis-1,2-DCE	<0.05		
				Vinyl chloride	<0.16		
	VPERH01	18.9	124.8	NA	NA	NA	NA
10/13/03	VPGAC03			TCE	<0.04		
				Cis-1,2-DCE	<0.05		
				Vinyl chloride	<0.16		
10/15/03	VPGAC01	8.9	47.5	TCE	1.62	NA	NA
				Cis-1,2-DCE	0.43		
				trans-1,2-DCE	0.05		
				Vinyl chloride	<0.16		
	VPGAC02	2.1	37.9	TCE	<0.04	NA	NA
				Cis-1,2-DCE	0.35		
				Vinyl chloride	<0.16		

TABLE 2
Summary of Analytical Results
Remediation System Granulated Activated Carbon Units

The Lockformer Company / Lisle, Illinois

SAMPLE DATE	LOCATION	PID (PPM)	TOTAL HYDROCARBON ANALYZER (PPM)	FIRST ENVIRONMENTAL LABORATORIES		COLUMBIA ANALYTICAL	
				COMPOUND	RESULTS (PPM)	COMPOUND	RESULTS (PPM)
10/15/03	VPGAC03	1.5	43.2	TCE	<0.04	TCE	<0.00023
				Cis-1,2-DCE	<0.05	Cis-1,2-DCE	0.020
				Vinyl chloride	<0.16	Chloromethane	0.0057
						Vinyl chloride	0.032
						Acetonitrile	0.012
						1,1-DCE	0.00048
						Carbon disulfide	0.0076
						trans-1,2-DCE	0.002
						Methane	56
	VPGAC03 DUP	1.5	43.2	NA	NA	TCE	<0.00023
						Cis-1,2-DCE	0.021
						Chloromethane	0.0049
						Vinyl chloride	0.033
						Acetonitrile	0.013
						1,1-DCE	0.00050
						Carbon disulfide	0.0078
						trans-1,2-DCE	0.0021
	VPERH01	15.3	114.0	NA	NA	NA	NA
10/17/03	VPGAC03	1.6	34.1	TCE	<0.04	NA	NA
				Cis-1,2-DCE	<0.05		
				Vinyl chloride	<0.16		
10/21/03	VPGAC03	0.7	45.9	TCE	<0.04	NA	NA
				Cis-1,2-DCE	<0.05		
				Vinyl chloride	<0.16		
10/22/03	VPGAC01	10.2	87.8	TCE	2.07	NA	NA
				Cis-1,2-DCE	0.45		
				trans-1,2-DCE	0.05		
				Vinyl chloride	<0.16		
	VPGAC02	3.0	77.7	TCE	<0.04	NA	NA
				Cis-1,2-DCE	0.61		
				trans-1,2-DCE	0.08		
				Vinyl chloride	<0.16		
	VPGAC03	1.8	80.2	TCE	<0.04		
				Cis-1,2-DCE	<0.05		
				Vinyl chloride	<0.16		
	VPERH01	22.4	264.0	NA	NA	NA	NA

TABLE 2
Summary of Analytical Results
Remediation System Granulated Activated Carbon Units

The Lockformer Company / Lisle, Illinois

SAMPLE DATE	LOCATION	PID (PPM)	TOTAL HYDROCARBON ANALYZER (PPM)	FIRST ENVIRONMENTAL LABORATORIES		COLUMBIA ANALYTICAL	
				COMPOUND	RESULTS (PPM)	COMPOUND	RESULTS (PPM)
10/24/03	VPGAC03	1.0	46.7	TCE	<0.04	NA	NA
				Cis-1,2-DCE	<0.05		
				Vinyl chloride	<0.16		
	VPERH01	12.7	147.0	NA	NA	NA	NA
10/27/03	VPGAC03	0.2		TCE	<0.04	NA	NA
				Cis-1,2-DCE	<0.05		
				Vinyl chloride	<0.16		
10/29/03	VPGAC01	5.5	54.4	TCE	1.47	NA	NA
				Cis-1,2-DCE	0.43		
				trans-1,2-DCE	0.05		
				Vinyl chloride	<0.16		
	VPGAC02	1.9	47.6	TCE	<0.04	NA	NA
				Cis-1,2-DCE	0.71		
				trans-1,2-DCE	0.08		
				Vinyl chloride	<0.16		
	VPGAC03	0.4	49.6	TCE	<0.04		
				Cis-1,2-DCE	<0.05		
				Vinyl chloride	<0.16		
	VPERH01	12.3	144.0	NA	NA	NA	NA
10/31/03	VPGAC03	0.7	41.5			NA	NA
	VPERH01	NA	130.5	NA	NA	NA	NA

NOTES: NA = Not Analyzed Blank cells = Samples submitted. Results not yet received.

TABLE 3
Summary of Analytical Results
Remediation Area Perimeter

The Lockformer Company / Lisle, Illinois

SAMPLE DATE	START TIME	RAP 1	RAP 2	RAP 3	RAP 4
06/26/03	9:26	<1	<1	<1	<1
	14:42	<1	<1	<1	<1
06/27/03	11:20	<1	<1	<1	<1
	12:46	<1	<1	<1	<1
	16:39	<1	<1	<1	<1
06/28/03	8:11	<1	<1	<1	<1
	12:52	<1	<1	<1	<1
	17:25	<1	<1	<1	<1
06/29/03	9:44	<1	<1	<1	<1
	13:40	<1	<1	<1	<1
	17:56	<1	<1	<1	<1
06/30/03	9:01	<1	<1	<1	<1
	13:50	<1	<1	<1	<1
	17:10	<1	<1	<1	<1
07/01/03	8:30	<1	<1	<1	<1
	12:50	<1	<1	<1	<1
	16:33	<1	<1	<1	<1
07/02/03	8:55	<1	<1	<1	<1
	12:31	<1	<1	<1	<1
	17:05	<1	<1	<1	<1
07/03/03	8:30	<1	<1	<1	<1
	12:35	<1	<1	<1	<1
	16:25	<1	<1	<1	<1
07/04/03	8:05	<1	<1	<1	<1
07/05/03	9:52	<1	<1	<1	<1
	17:55	<1	<1	<1	<1
07/06/03	10:00	<1	<1	<1	<1
	17:30	<1	<1	<1	<1
07/07/03	8:25	<1	<1	<1	<1
	12:01	<1	<1	<1	<1
	14:20	<1	<1	<1	<1
07/08/03	8:55	<1	<1	<1	<1
	12:06	<1	<1	<1	<1
	17:03	<1	<1	<1	<1
07/09/03	8:48	<1	<1	<1	<1
	16:00	<1	<1	<1	<1
07/10/03	8:20	<1	<1	<1	<1
	11:27	<1	<1	<1	<1
	16:45	<1	<1	<1	<1
07/11/03	8:38	<1	<1	<1	<1
	12:35	<1	<1	<1	<1
	16:40	<1	<1	<1	<1
07/12/03	10:04	<1	<1	<1	<1
07/13/03	11:02	<1	<1	<1	<1
07/14/03	9:21	<1	<1	<1	<1
	13:30	<1	<1	<1	<1
	16:52	<1	<1	<1	<1
07/15/03	9:42	<1	<1	<1	<1
	12:50	<1	<1	<1	<1
	17:21	<1	<1	<1	<1
07/16/03	9:05	<1	<1	<1	<1
	13:41	<1	<1	<1	<1
	17:00	<1	<1	<1	<1

TABLE 3
Summary of Analytical Results
Remediation Area Perimeter

The Lockformer Company / Lisle, Illinois

SAMPLE DATE	START TIME	RAP 1	RAP 2	RAP 3	RAP 4
07/17/03	8:40	<1	<1	<1	<1
	12:52	<1	<1	<1	<1
	16:20	<1	<1	<1	<1
07/18/03	8:18	<1	<1	<1	<1
	13:45	<1	<1	<1	<1
	17:02	<1	<1	<1	<1
07/19/03	9:30	<1	<1	<1	<1
07/20/03	10:50	<1	<1	<1	<1
07/21/03	9:15	<1	<1	<1	<1
	13:35	<1	<1	<1	<1
	17:35	<1	<1	<1	<1
07/22/03	9:05	<1	<1	<1	<1
	13:57	<1	<1	<1	<1
	16:40	<1	<1	<1	<1
07/23/03	8:45	<1	<1	<1	<1
	13:24	<1	<1	<1	<1
	17:09	<1	<1	<1	<1
07/24/03	9:18	<1	<1	<1	<1
	13:31	<1	<1	<1	<1
	16:30	<1	<1	<1	<1
07/25/03	9:59	<1	<1	<1	<1
	13:35	<1	<1	<1	<1
	17:30	<1	<1	<1	<1
07/26/03	10:30	<1	<1	<1	<1
07/27/03	10:34	<1	<1	<1	<1
07/28/03	14:30	<1	<1	<1	<1
	16:41	<1	<1	<1	<1
07/29/03	9:10	<1	<1	<1	<1
	11:55	<1	<1	<1	<1
	14:25	<1	<1	<1	<1
07/30/03	9:05	<1	<1	<1	<1
	13:02	<1	<1	<1	<1
	16:42	<1	<1	<1	<1
07/31/03	8:35	<1	<1	<1	<1
	11:00	<1	<1	<1	<1
	16:27	<1	<1	<1	<1
08/01/03	8:50	<1	<1	<1	<1
08/04/03	8:30	<1	<1	<1	<1
	13:15	<1	<1	<1	<1
	17:32	<1	<1	<1	<1
08/05/03	12:05	<1	<1	<1	<1
	16:46	<1	<1	<1	<1
08/06/03	9:24	<1	<1	<1	<1
08/07/03	8:47	<1	<1	<1	<1
	14:00	<1	<1	<1	<1
	16:48	<1	<1	<1	<1
08/08/03	12:00	<1	<1	<1	<1
	16:57	<1	<1	<1	<1
08/09/03	10:13	<1	<1	<1	<1
08/10/03	10:56	<1	<1	<1	<1
08/11/03	9:00	<1	<1	<1	<1
	13:25	<1	<1	<1	<1
	16:25	<1	<1	<1	<1
08/12/03	8:20	<1	<1	<1	<1

TABLE 3
Summary of Analytical Results
Remediation Area Perimeter

The Lockformer Company / Lisle, Illinois

SAMPLE DATE	START TIME	RAP 1	RAP 2	RAP 3	RAP 4
08/13/03	8:32	<1	<1	<1	<1
	11:30	<1	<1	<1	<1
	16:41	<1	<1	<1	<1
08/14/03	8:35	<1	<1	<1	<1
	13:20	<1	<1	<1	<1
	17:19	<1	<1	<1	<1
08/15/03	9:50	<1	<1	<1	<1
	14:00	<1	<1	<1	<1
	16:57	<1	<1	<1	<1
08/16/03	9:11	<1	<1	<1	<1
08/17/03	9:30	<1	<1	<1	<1
08/18/03	9:40	<1	<1	<1	<1
08/19/03	9:27	<1	<1	<1	<1
	15:21	<1	<1	<1	<1
08/20/03	9:05	<1	<1	<1	<1
	13:55	<1	<1	<1	<1
	18:32	<1	<1	<1	<1
08/21/03	9:36	<1	<1	<1	<1
	12:10	<1	<1	<1	<1
	19:08	<1	<1	<1	<1
08/22/03	8:40	<1	<1	<1	<1
	13:04	<1	<1	<1	<1
	17:17	<1	<1	<1	<1
08/25/03	10:40	<1	<1	<1	<1
	14:00	<1	<1	<1	<1
	18:05	<1	<1	<1	<1
08/26/03	9:25	<1	<1	<1	<1
	13:30	<1	<1	<1	<1
	17:00	<1	<1	<1	<1
08/27/03	10:00	<1	<1	<1	<1
	15:00	<1	<1	<1	<1
	17:06	<1	<1	<1	<1
08/28/03	8:10	<1	<1	<1	<1
	13:20	<1	<1	<1	<1
	16:15	<1	<1	<1	<1
08/29/03	10:51	<1	<1	<1	<1
	13:16	<1	<1	<1	<1
	16:20	<1	<1	<1	<1
09/02/03	10:13	<1	<1	<1	<1
	12:21	<1	<1	<1	<1
	16:00	<1	<1	<1	<1
09/03/03	9:13	<1	<1	<1	<1
	11:17	<1	<1	<1	<1
	15:47	<1	<1	<1	<1
09/04/03	9:55	<1	<1	<1	<1
	12:50	<1	<1	<1	<1
	17:20	<1	<1	<1	<1
09/05/03	9:40	<1	<1	<1	<1
	12:22	<1	<1	<1	<1
	13:47	<1	<1	<1	<1
09/08/03	9:50	<1	<1	<1	<1
	12:18	<1	<1	<1	<1
	14:42	<1	<1	<1	<1

TABLE 3
Summary of Analytical Results
Remediation Area Perimeter

The Lockformer Company / Lisle, Illinois

SAMPLE DATE	START TIME	RAP 1	RAP 2	RAP 3	RAP 4
09/09/03	8:48	<1	<1	<1	<1
	11:05	<1	<1	<1	<1
	13:40	<1	<1	<1	<1
09/10/03	8:38	<1	<1	<1	<1
	11:00	<1	<1	<1	<1
	14:10	<1	<1	<1	<1
09/11/03	7:35	<1	<1	<1	<1
	11:10	<1	<1	<1	<1
	14:40	<1	<1	<1	<1
09/12/03	10:19	<1	<1	<1	<1
	13:25	<1	<1	<1	<1
	15:51	<1	<1	<1	<1
09/15/03	7:35	<1	<1	<1	<1
	11:21	<1	<1	<1	<1
	13:59	<1	<1	<1	<1
09/16/03	9:10	<1	<1	<1	<1
	11:27	<1	<1	<1	<1
	13:16	<1	<1	<1	<1
09/17/03	7:13	<1	<1	<1	<1
	12:01	<1	<1	<1	<1
	17:11	<1	<1	<1	<1
09/18/03	8:55	<1	<1	<1	<1
	11:50	<1	<1	<1	<1
	15:20	<1	<1	<1	<1
09/19/03	7:34	<1	<1	<1	<1
	11:55	<1	<1	<1	<1
	13:25	<1	<1	<1	<1
09/22/03	8:15	<1	<1	<1	<1
	12:45	<1	<1	<1	<1
	16:46	<1	<1	<1	<1
09/23/03	8:21	<1	<1	<1	<1
	10:31	<1	<1	<1	<1
	15:54	<1	<1	<1	<1
09/24/03	7:21	<1	<1	<1	<1
	12:03	<1	<1	<1	<1
	14:39	<1	<1	<1	<1
09/25/03	11:35	<1	<1	<1	<1
	14:03	<1	<1	<1	<1
	16:39	<1	<1	<1	<1
09/29/03	8:45	<1	<1	<1	<1
	11:16	<1	<1	<1	<1
	16:10	<1	<1	<1	<1
09/30/03	8:11	<1	<1	<1	<1
	11:25	<1	<1	<1	<1
	16:38	<1	<1	<1	<1
10/01/03	9:11	<1	<1	<1	<1
	11:10	<1	<1	<1	<1
	16:42	<1	<1	<1	<1
10/02/03	8:28	<1	<1	<1	<1
	11:50	<1	<1	<1	<1
	14:54	<1	<1	<1	<1

TABLE 3
Summary of Analytical Results
Remediation Area Perimeter

The Lockformer Company / Lisle, Illinois

SAMPLE DATE	START TIME	RAP 1	RAP 2	RAP 3	RAP 4
10/03/04	8:21	<1	<1	<1	<1
	9:41	<1	<1	<1	<1
	15:24	<1	<1	<1	<1
10/06/03	9:15	<1	<1	<1	<1
	10:56	<1	<1	<1	<1
	16:26	<1	<1	<1	<1
10/07/03	8:33	<1	<1	<1	<1
	11:40	<1	<1	<1	<1
	16:35	<1	<1	<1	<1
10/08/03	8:13	<1	<1	<1	<1
	10:54	<1	<1	<1	<1
	16:00	<1	<1	<1	<1
10/09/03	8:15	<1	<1	<1	<1
	10:30	<1	<1	<1	<1
	12:17	<1	<1	<1	<1
10/10/03	8:17	<1	<1	<1	<1
	10:29	<1	<1	<1	<1
	11:17	<1	<1	<1	<1
10/13/03	9:10	<1	<1	<1	<1
	13:25	<1	<1	<1	<1
	16:14	<1	<1	<1	<1
10/15/03	8:50	<1	<1	<1	<1
	11:20	<1	<1	<1	<1
	15:45	<1	<1	<1	<1
10/16/03	9:15	<1	<1	<1	<1
	13:15	<1	<1	<1	<1
	17:53	<1	<1	<1	<1
10/17/03	8:35	<1	<1	<1	<1
	11:15	<1	<1	<1	<1
	15:25	<1	<1	<1	<1
10/20/03	10:10	<1	<1	<1	<1
	14:45	<1	<1	<1	<1
	17:00	<1	<1	<1	<1
10/21/03	9:21	<1	<1	<1	<1
	11:33	<1	<1	<1	<1
	13:54	<1	<1	<1	<1
10/22/03	8:35	<1	<1	<1	<1
	11:23	<1	<1	<1	<1
	15:05	<1	<1	<1	<1
10/23/03	8:49	<1	<1	<1	<1
	11:25	<1	<1	<1	<1
	13:30	<1	<1	<1	<1
10/24/03	8:20	<1	<1	<1	<1
	10:46	<1	<1	<1	<1
	16:25	<1	<1	<1	<1
10/27/03	9:10	<1	<1	<1	<1
	12:50	<1	<1	<1	<1
	16:30	<1	<1	<1	<1
10/28/03	8:40	<1	<1	<1	<1
	13:30	<1	<1	<1	<1
	16:00	<1	<1	<1	<1

TABLE 3
Summary of Analytical Results
Remediation Area Perimeter

The Lockformer Company / Lisle, Illinois

SAMPLE DATE	START TIME	RAP 1	RAP 2	RAP 3	RAP 4
10/29/03	9:45	<1	<1	<1	<1
	12:03	<1	<1	<1	<1
	14:51	<1	<1	<1	<1
10/30/03	9:05	<1	<1	<1	<1
	11:45	<1	<1	<1	<1
	15:30	<1	<1	<1	<1
10/31/03	8:45	<1	<1	<1	<1
	13:00	<1	<1	<1	<1
	16:30	<1	<1	<1	<1

NOTES: PID values in PPM.

TABLE 4
Summary of Analytical Results
Property Perimeter

The Lockformer Company / Lisle, Illinois

SAMPLE DATE	LOCATION	Prevailing Wind Direction [1]	PID (PPM)	TOTAL HYDROCARBON ANALYZER (PPM)	FIRST ENVIRONMENTAL LABORATORIES		COLUMBIA ANALYTICAL			
					COMPOUND	RESULTS (PPM)	COMPOUND	RESULTS (PPM)	ACTION LEVEL (PPM)	8-HOUR STANDARD (PPM)
06/26/03	PML01	Northwest	NA	NA	NA	NA	TCE	<0.00031	0.048	0.875
							cis-1,2-DCE	<0.00042	0.088	1.75
							Acrolein	0.0009	N/A	N/A
							Acetone	0.011	N/A	N/A
06/27/03	PML01	Northwest	NA	NA	NA	NA	TCE	<0.00032	0.048	0.875
							cis-1,2-DCE	<0.00044	0.088	1.75
							Acrolein	0.00091	N/A	N/A
							Acetone	0.0078	N/A	N/A
07/01/03	PML04	Northeast	NA	NA	NA	NA	TCE	<0.00034	0.048	0.875
							cis-1,2-DCE	<0.00046	0.088	1.75
							Acrolein	0.00086	N/A	N/A
							Acetone	0.013	N/A	N/A
07/03/03	PML04	Northeast	NA	NA	NA	NA	TCE	0.00098	0.048	0.875
							cis-1,2-DCE	<0.00047	0.088	1.75
							Acrolein	0.0013	N/A	N/A
							Acetone	0.015	N/A	N/A
							d-Limonene	0.0004	N/A	N/A
07/05/03	PML04	Northeast	NA	NA	NA	NA	TCE	0.0006	0.048	0.875
							cis-1,2-DCE	<0.00043	0.088	1.75
							Acetone	0.0071	N/A	N/A
07/05/03	PML04 DUP	Northeast	NA	NA	NA	NA	TCE	0.0006	0.048	0.875
							cis-1,2-DCE	<0.00043	0.088	1.75
							Acetone	0.0071	N/A	N/A
07/10/03	PML01	Northwest	NA	NA	NA	NA	TCE	<0.00025	0.048	0.875
							cis-1,2-DCE	<0.00033	0.088	1.75
							Acrolein	0.0015	N/A	N/A
							Acetone	0.013	N/A	N/A
07/15/03	PML01	Northwest	NA	NA	NA	NA	TCE	<0.00028	0.048	0.875
							cis-1,2-DCE	<0.00037	0.088	1.75
							Acetone	0.0065	N/A	N/A
07/18/03	PML02	Southwest	NA	NA	NA	NA	TCE	<0.00031	0.048	0.875
							cis-1,2-DCE	<0.00041	0.088	1.75
							Acetone	0.0046	N/A	N/A

TABLE 4
Summary of Analytical Results
Property Perimeter

The Lockformer Company / Lisle, Illinois

SAMPLE DATE	LOCATION	Prevailing Wind Direction [1]	PID (PPM)	TOTAL HYDROCARBON ANALYZER (PPM)	FIRST ENVIRONMENTAL LABORATORIES		COLUMBIA ANALYTICAL			
					COMPOUND	RESULTS (PPM)	COMPOUND	RESULTS (PPM)	ACTION LEVEL (PPM)	8-HOUR STANDARD (PPM)
07/18/03	PML02 DUP	Southwest	NA	NA	NA	NA	TCE	<0.00031	0.048	0.875
							cis-1,2-DCE	<0.00041	0.088	1.75
							Acetone	0.0047	N/A	N/A
07/22/03	PML02	Southwest	NA	NA	NA	NA	TCE	<0.00035	0.048	0.875
							cis-1,2-DCE	<0.00048	0.088	1.75
							Acrolein	0.00095	N/A	N/A
							Acetone	0.0083	N/A	N/A
07/25/03	PML04	Northeast	NA	NA	NA	NA	TCE	<0.00028	0.048	0.875
							cis-1,2-DCE	<0.00038	0.088	1.75
							Acrolein	0.0016	N/A	N/A
							Acetone	0.021	N/A	N/A
							n-Nonane	0.0024	N/A	N/A
							4-Ethyltoluene	0.00099	N/A	N/A
							1,3,5-Trimethylbenzene	0.0019	N/A	N/A
							1,2,4-Trimethylbenzene	0.0063	N/A	N/A
							d-Limonene	0.00041	N/A	N/A
07/30/03	PML04	Northeast	NA	NA	NA	NA	TCE	<0.00031	0.048	0.875
							cis-1,2-DCE	<0.00041	0.088	1.75
							Acrolein	0.0015	N/A	NA
							Acetone	0.017	N/A	NA
							4-Ethyltoluene	0.00044	N/A	NA
							1,3,5-Trimethylbenzene	0.00074	N/A	NA
							1,2,4-Trimethylbenzene	0.0028	N/A	NA
08/01/03	PML04	Northeast	NA	NA	NA	NA	TCE	<0.00034	0.048	0.875
							cis-1,2-DCE	<0.00046	0.088	1.75
							Acrolein	0.00085	N/A	NA
							Acetone	0.011	N/A	NA
							1,3,5-Trimethylbenzene	0.00054	N/A	NA
							1,2,4-Trimethylbenzene	0.0022	N/A	NA
08/07/03	PML02	Southwest	NA	NA	NA	NA	TCE	<0.00031	0.048	0.875
							cis-1,2-DCE	<0.00043	0.088	1.75
							Acetone	0.0092	N/A	N/A

TABLE 4
Summary of Analytical Results
Property Perimeter

The Lockformer Company / Lisle, Illinois

SAMPLE DATE	LOCATION	Prevailing Wind Direction [1]	PID (PPM)	TOTAL HYDROCARBON ANALYZER (PPM)	FIRST ENVIRONMENTAL LABORATORIES		COLUMBIA ANALYTICAL			
					COMPOUND	RESULTS (PPM)	COMPOUND	RESULTS (PPM)	ACTION LEVEL (PPM)	8-HOUR STANDARD (PPM)
08/08/03	PML02	Southwest	NA	NA	NA	NA	TCE	<0.00025	0.048	0.875
							cis-1,2-DCE	<0.00034	0.088	1.75
							Acrolein	0.00067	N/A	N/A
							Acetone	0.0061	N/A	N/A
08/08/03	PML02 DUP	Southwest	NA	NA	NA	NA	TCE	<0.00025	0.048	0.875
							cis-1,2-DCE	<0.00034	0.088	1.75
							Acrolein	0.00070	N/A	N/A
							Acetone	0.0060	N/A	N/A
08/11/03	PML02	Southwest	NA	NA	NA	NA	TCE	<0.00031	0.048	0.875
							cis-1,2-DCE	<0.00042	0.088	1.75
							Acrolein	0.0038	N/A	N/A
							Acetone	0.014	N/A	N/A
08/15/03	PML01	Northwest	NA	NA	NA	NA	TCE	<0.00037	0.048	0.875
							cis-1,2-DCE	<0.00050	0.088	1.75
							Acetone	0.011	N/A	N/A
08/20/03	PML04	Northeast	NA	NA	NA	NA	TCE		0.048	0.875
							cis-1,2-DCE		0.088	1.75
08/22/03	PLM02	Southwest	NA	NA	NA	NA	TCE	<0.00027	0.048	0.875
							cis-1,2-DCE	<0.00036	0.088	1.75
							Acrolein	0.0012	N/A	N/A
							Acetone	0.02	N/A	N/A
08/26/03	PLM04	Northeast	NA	NA	NA	NA	TCE	<0.00075	0.048	0.875
							cis-1,2-DCE	<0.0001	0.088	1.75
							PCE	0.010	N/A	0.350
							Acrolein	0.0018	N/A	N/A
							Acetone	0.024 M	N/A	N/A
							Vinyl acetate	0.006	N/A	N/A
08/28/03	PLM04	Northeast	NA	NA	NA	NA	TCE	<0.00031	0.048	0.875
							cis-1,2-DCE	<0.00042	0.088	1.75
							PCE	0.001	N/A	0.350
							Acetone	0.0069	N/A	N/A
09/03/03	PLM01	Northwest	NA	NA	NA	NA	TCE	<0.00032	0.048	0.875
							cis-1,2-DCE	<0.00043	0.088	1.75
							Acrolein	0.00086	N/A	N/A
							Acetone	0.0087	N/A	N/A

TABLE 4
Summary of Analytical Results
Property Perimeter

The Lockformer Company / Lisle, Illinois

SAMPLE DATE	LOCATION	Prevailing Wind Direction [1]	PID (PPM)	TOTAL HYDROCARBON ANALYZER (PPM)	FIRST ENVIRONMENTAL LABORATORIES		COLUMBIA ANALYTICAL			
					COMPOUND	RESULTS (PPM)	COMPOUND	RESULTS (PPM)	ACTION LEVEL (PPM)	8-HOUR STANDARD (PPM)
09/05/03	PLM04	Northeast	NA	NA	NA	NA	TCE	<0.00026	0.048	0.875
							cis-1,2-DCE	<0.00035	0.088	1.75
							Acetone	0.0067	N/A	N/A
09/09/03	PLM03	Southeast	NA	NA	NA	NA	TCE	<0.00066	0.048	0.875
							cis-1,2-DCE	<0.00036	0.088	1.75
							PCE	0.00049	N/A	0.350
							Chloromethane	0.0019	N/A	N/A
							Bromomethane	0.00089	N/A	N/A
							Chloroethane	0.00097	N/A	N/A
							Acetronile	0.0014	N/A	N/A
							Acrolein	0.0044	N/A	N/A
							Acetone	0.033	N/A	N/A
							2-Butanone	0.0055	N/A	N/A
							Chloroform	0.00033	N/A	N/A
							4-Methyl-2-pentanone	0.00066	N/A	N/A
							2-Hexanone	0.00053	N/A	N/A
							Dibromochloromethane	0.00021	N/A	N/A
							m,p-Xylenes	0.0036	N/A	N/A
09/11/03	PLM03	Southeast	NA	NA	NA	NA	TCE	<0.00024	0.048	0.875
							cis-1,2-DCE	<0.00032	0.088	1.75
							Acetone	0.0066	N/A	N/A
09/15/03	PML01	Northwest	NA	NA	NA	NA	TCE	<0.00028	0.048	0.875
							cis-1,2-DCE	<0.00039	0.088	1.75
							Acetone	0.0083	N/A	N/A
09/17/03	PML03	Southeast	NA	NA	NA	NA	TCE	<0.00029	0.048	0.875
							cis-1,2-DCE	<0.00039	0.088	1.75
							Acetone	0.0056	N/A	N/A
09/17/03	PML03 DUP	Southeast	NA	NA	NA	NA	TCE	<0.00029	0.048	0.875
							cis-1,2-DCE	<0.00039	0.088	1.75
							Acetone	0.0056	N/A	N/A
09/23/03	PML04	Northeast	NA	NA	NA	NA	TCE	0.00034	0.048	0.875
							cis-1,2-DCE	<0.00032	0.088	1.75
							Acetone	0.0037	N/A	N/A

TABLE 4
Summary of Analytical Results
Property Perimeter

The Lockformer Company / Lisle, Illinois

SAMPLE DATE	LOCATION	Prevailing Wind Direction [1]	PID (PPM)	TOTAL HYDROCARBON ANALYZER (PPM)	FIRST ENVIRONMENTAL LABORATORIES		COLUMBIA ANALYTICAL			
					COMPOUND	RESULTS (PPM)	COMPOUND	RESULTS (PPM)	ACTION LEVEL (PPM)	8-HOUR STANDARD (PPM)
09/23/03	PML04	Northeast	NA	NA	NA	NA	TCE	0.00033	0.048	0.875
	DUP						cis-1,2-DCE	<0.00032	0.088	1.75
							Acetone	0.0036	N/A	N/A
09/25/03	PML01	Northwest	NA	NA	NA	NA	TCE	<0.00023	0.048	0.875
							cis-1,2-DCE	<0.00032	0.088	1.75
							Acetone	0.0043	N/A	N/A
09/29/03	PML01	Northwest	NA	NA	NA	NA	TCE	0.00036	0.048	0.875
							cis-1,2-DCE	<0.00035	0.088	1.75
							Acetone	0.0036	N/A	N/A
10/01/03	PML01	Northwest	NA	NA	NA	NA	TCE	<0.00023	0.048	0.875
							cis-1,2-DCE	<0.00031	0.088	1.75
10/01/03	PML01	Northwest	NA	NA	NA	NA	TCE	<0.00023	0.048	0.875
	DUP						cis-1,2-DCE	<0.00031	0.088	1.75
10/06/03	PML03	Southeast	NA	NA	NA	NA	TCE	0.00043	0.048	0.875
							cis-1,2-DCE	<0.00039	0.088	1.75
							Acetone	0.0039 M	N/A	N/A
10/06/03	PML03	Southeast	NA	NA	NA	NA	TCE	0.00042	0.048	0.875
	DUP						cis-1,2-DCE	<0.00039	0.088	1.75
							Acetone	0.0037 M	N/A	N/A
10/08/03	PML04	Northeast	NA	NA	NA	NA	TCE	0.00070	0.048	0.875
							cis-1,2-DCE	<0.00032	0.088	1.75
							Acetone	0.0058 M	N/A	N/A
10/13/03	PML04	Northeast	NA	NA	NA	NA	TCE	<0.00030	0.048	0.875
							cis-1,2-DCE	<0.00041	0.088	1.75
10/16/03	PML01	Northwest	NA	NA	NA	NA				
10/22/03	PML01	Northwest	NA	NA	NA	NA				
10/24/03	PML04	Northeast	NA	NA	NA	NA				
10/29/03	PML04	Northeast	NA	NA	NA	NA				
10/31/03	PML04	Northeast	NA	NA	NA	NA				

NOTES: NA = Not Analyzed Blank cells = Samples submitted. Results not yet received.

[1] Based on meterological conditions determined by A. Bourlard.

TABLE 5
Summary of Analytical Results
Residential Sampling

The Lockformer Company / Lisle, Illinois

SAMPLE DATE	LOCATION	Prevailing Wind Direction [1]	PID (PPM)	TOTAL HYDROCARBON ANALYZER (PPM)	FIRST ENVIRONMENTAL LABORATORIES		COLUMBIA ANALYTICAL			
					COMPOUND	RESULTS (PPM)	COMPOUND	RESULTS (PPM)	ACTION LEVEL (PPM)	24-HOUR STANDARD (PPM)
06/27/03	RSML01	West	NA	NA	NA	NA	TCE	<0.00029	0.025	0.50
							cis-1,2-DCE	<0.00039	0.05	1.00
							Acetone	0.0034	N/A	N/A
06/28/03	RSML01	West	NA	NA	NA	NA	TCE	<0.00029	0.025	0.50
							cis-1,2-DCE	<0.00039	0.05	1.00
							Acetone	0.0039	N/A	N/A
06/29/03	RSML05	North	NA	NA	NA	NA	TCE	<0.00024	0.025	0.50
							cis-1,2-DCE	<0.00033	0.05	1.00
							Acetone	0.005	N/A	N/A
							Carbon Disulfide	0.0042	N/A	N/A
							1,3,5-Trimethylbenzene	0.00046	N/A	N/A
							1,2,4-Trimethylbenzene	0.0013	N/A	N/A
06/30/03	RSML01	West	NA	NA	NA	NA	TCE	<0.00024	0.025	0.50
							cis-1,2-DCE	<0.00033	0.05	1.00
							Acetone	0.0047	N/A	N/A
07/01/03	RSML05	North	NA	NA	NA	NA	TCE	<0.00026	0.025	0.50
							cis-1,2-DCE	<0.00035	0.05	1.00
							Acetone	0.0056	N/A	N/A
07/02/03	RSML05	North	NA	NA	NA	NA	TCE	<0.00030	0.025	0.50
							cis-1,2-DCE	<0.00041	0.05	1.00
							Acrolein	0.0011	N/A	N/A
							Acetone	0.013	N/A	N/A
07/03/03	RSML05	North	NA	NA	NA	NA	TCE	<0.00028	0.025	0.50
							cis-1,2-DCE	<0.00038	0.05	1.00
							Acetone	0.0088	N/A	N/A
07/04/03	RSML06	Southwest	NA	NA	NA	NA	TCE	<0.00035	0.025	0.50
							cis-1,2-DCE	<0.00048	0.05	1.00
							Acetronile	0.0055	N/A	N/A
							Acrolein	0.0016	N/A	N/A
							Acetone	0.011	N/A	N/A
07/05/03	RSML01	West	NA	NA	NA	NA	TCE	<0.00028	0.025	0.50
							cis-1,2-DCE	<0.00037	0.05	1.00
							Acrolein	0.0011	N/A	N/A
							Acetone	0.01	N/A	N/A

TABLE 5
Summary of Analytical Results
Residential Sampling

The Lockformer Company / Lisle, Illinois

SAMPLE DATE	LOCATION	Prevailing Wind Direction [1]	PID (PPM)	TOTAL HYDROCARBON ANALYZER (PPM)	FIRST ENVIRONMENTAL LABORATORIES		COLUMBIA ANALYTICAL			
					COMPOUND	RESULTS (PPM)	COMPOUND	RESULTS (PPM)	ACTION LEVEL (PPM)	24-HOUR STANDARD (PPM)
07/06/03	RSML06	Southwest	NA	NA	NA	NA	TCE	<0.00027	0.025	0.50
							cis-1,2-DCE	<0.00037	0.05	1.00
							Acrolein	0.00074	N/A	N/A
							Acetone	0.0069	N/A	N/A
07/06/03	RSML06 DUP	Southwest	NA	NA	NA	NA	TCE	<0.00027	0.025	0.50
							cis-1,2-DCE	<0.00037	0.05	1.00
							Acrolein	0.00075	N/A	N/A
							Acetone	0.0067	N/A	N/A
07/07/03	RSML01	West	NA	NA	NA	NA	TCE	<0.00027	0.025	0.50
							cis-1,2-DCE	<0.00037	0.05	1.00
							Acrolein	0.00075	N/A	N/A
							Acetone	0.0068	N/A	N/A
07/09/03	RSML04	Southeast	NA	NA	NA	NA	TCE	0.00071	0.025	0.50
							cis-1,2-DCE	<0.00039	0.05	1.00
							Acetone	0.0051	N/A	N/A
07/10/03	RSML04	Southeast	NA	NA	NA	NA	TCE	<0.00027	0.025	0.50
							cis-1,2-DCE	<0.00037	0.05	1.00
							Acetone	0.0051	N/A	N/A
07/11/03	RSML01	West	NA	NA	NA	NA	TCE	<0.00028	0.025	0.50
							cis-1,2-DCE	<0.00038	0.05	1.00
							Acetone	0.0062	N/A	N/A
07/12/03	RSML03	South	NA	NA	NA	NA	TCE	<0.00026	0.025	0.50
							cis-1,2-DCE	<0.00035	0.05	1.00
							Acetone	0.008	N/A	N/A
07/12/03	RSML03 DUP	South	NA	NA	NA	NA	TCE	<0.00026	0.025	0.50
							cis-1,2-DCE	<0.00035	0.05	1.00
							Acrolein	0.00063	N/A	N/A
							Acetone	0.008	N/A	N/A
07/13/03	RSML03	South	NA	NA	NA	NA	TCE	<0.00033	0.025	0.50
							cis-1,2-DCE	<0.00045	0.05	1.00
							Acetone	0.011	N/A	N/A
07/14/03	RSML01	West	NA	NA	NA	NA	TCE	<0.00030	0.025	0.50
							cis-1,2-DCE	<0.00041	0.05	1.00
							Acetone	0.0078	N/A	N/A

TABLE 5
Summary of Analytical Results
Residential Sampling

The Lockformer Company / Lisle, Illinois

SAMPLE DATE	LOCATION	Prevailing Wind Direction [1]	PID (PPM)	TOTAL HYDROCARBON ANALYZER (PPM)	FIRST ENVIRONMENTAL LABORATORIES		COLUMBIA ANALYTICAL			
					COMPOUND	RESULTS (PPM)	COMPOUND	RESULTS (PPM)	ACTION LEVEL (PPM)	24-HOUR STANDARD (PPM)
07/15/03	RSML05	North	NA	NA	NA	NA	TCE	<0.00031	0.025	0.50
							cis-1,2-DCE	<0.00041	0.05	1.00
							Acetone	0.008	N/A	N/A
07/16/03	RSML02	Northwest	NA	NA	NA	NA	TCE	<0.00023	0.025	0.50
							cis-1,2-DCE	<0.00032	0.05	1.00
							Acetone	0.0054	N/A	N/A
07/17/03	RSML02	Northwest	NA	NA	NA	NA	TCE	<0.00030	0.025	0.50
							cis-1,2-DCE	<0.00041	0.05	1.00
							Acetone	0.0057	N/A	N/A
							Methylene chloride	0.0067	N/A	N/A
07/18/03	RSML06	Southwest	NA	NA	NA	NA	TCE	<0.00029	0.025	0.50
							cis-1,2-DCE	<0.00039	0.05	1.00
							Acetone	0.0078	N/A	N/A
07/19/03	RSML03	South	NA	NA	NA	NA	TCE	<0.00028	0.025	0.50
							cis-1,2-DCE	<0.00038	0.05	1.00
							Acrolein	0.00075	N/A	N/A
							Acetone	0.0087	N/A	N/A
07/20/03	RSML05	North	NA	NA	NA	NA	TCE	<0.00035	0.025	0.50
							cis-1,2-DCE	<0.00047	0.05	1.00
							Acetone	0.004	N/A	N/A
07/21/03	RSML01	West	NA	NA	NA	NA	TCE	<0.00029	0.025	0.50
							cis-1,2-DCE	<0.00039	0.05	1.00
							Acetone	0.0056	N/A	N/A
							4-Ethyltoluene	0.00038	N/A	N/A
							1,3,5-Trimethylbenzene	0.00046	N/A	N/A
							1,2,4-Trimethylbenzene	0.002	N/A	N/A
07/22/03	RSML01	West	NA	NA	NA	NA	TCE	<0.00061	0.025	0.50
							cis-1,2-DCE	<0.00082	0.05	1.00
							Acetone	0.012	N/A	N/A
07/23/03	RSML03	South	NA	NA	NA	NA	TCE	<0.00028	0.025	0.50
							cis-1,2-DCE	<0.00039	0.05	1.00
							Acetone	0.0066	N/A	N/A
07/24/03	RSML03	South	NA	NA	NA	NA	TCE	<0.00027	0.025	0.50
							cis-1,2-DCE	<0.00037	0.05	1.00
							Acetone	0.0067	N/A	N/A

TABLE 5
Summary of Analytical Results
Residential Sampling

The Lockformer Company / Lisle, Illinois

SAMPLE DATE	LOCAT ON	Prevailing Wind Direction [1]	PID (PPM)	TOTAL HYDROCARBON ANALYZER (PPM)	FIRST ENVIRONMENTAL LABORATORIES		COLUMBIA ANALYTICAL			
					COMPOUND	RESULTS (PPM)	COMPOUND	RESULTS (PPM)	ACTION LEVEL (PPM)	24-HOUR STANDARD (PPM)
07/25/03	RSML05	North	NA	NA	NA	NA	TCE	<0.00026	0.025	0.50
							cis-1,2-DCE	<0.00035	0.05	1.00
							Acrolein	0.00092	N/A	N/A
							Acetone	0.0069	N/A	N/A
							4-Ethyltoluene	0.00033	N/A	N/A
							1,3,5-Trimethylbenzene	0.00056	N/A	N/A
							1,2,4-Trimethylbenzene	0.002	N/A	N/A
07/26/03	RSML06	Southwest	NA	NA	NA	NA	TCE	<0.00028	0.025	0.50
							cis-1,2-DCE	<0.00037	0.05	1.00
							Acrolein	0.0028	N/A	N/A
							Acetone	0.014	N/A	N/A
							4-Ethyltoluene	0.00048	N/A	N/A
							1,3,5-Trimethylbenzene	0.00095	N/A	N/A
							1,2,4-Trimethylbenzene	0.0027	N/A	N/A
							d-Limonene	0.00027	N/A	N/A
07/27/03	RSML06	Southwest	NA	NA	NA	NA	TCE	<0.00029	0.025	0.50
							cis-1,2-DCE	<0.00040	0.05	1.00
							Acrolein	0.0012	N/A	N/A
							Acetone	0.0098	N/A	N/A
07/28/03	RSML06	Southwest	NA	NA	NA	NA	TCE	<0.00028	0.025	0.50
							cis-1,2-DCE	<0.00038	0.05	1.00
							Acetone	0.0047	N/A	N/A
07/29/03	RSML07	Northeast	NA	NA	NA	NA	TCE	<0.00025	0.025	0.50
							cis-1,2-DCE	<0.00034	0.05	1.00
							Acrolein	0.00075	N/A	N/A
							Acetone	0.012	N/A	N/A
07/30/03	RSML03	South	NA	NA	NA	NA	TCE	<0.00026	0.025	0.50
							cis-1,2-DCE	<0.00036	0.05	1.00
							Acrolein	0.00072	N/A	N/A
							Acetone	0.0076	N/A	N/A
07/31/03	RSML06	Southwest	NA	NA	NA	NA	TCE	<0.00035	0.025	0.50
							cis-1,2-DCE	<0.00047	0.05	1.00
							Acrolein	0.0014	N/A	N/A
							Acetone	0.013	N/A	N/A

TABLE 5
Summary of Analytical Results
Residential Sampling

The Lockformer Company / Lisle, Illinois

SAMPLE DATE	LOCATION	Prevailing Wind Direction [1]	PID (PPM)	TOTAL HYDROCARBON ANALYZER (PPM)	FIRST ENVIRONMENTAL LABORATORIES		COLUMBIA ANALYTICAL			
					COMPOUND	RESULTS (PPM)	COMPOUND	RESULTS (PPM)	ACTION LEVEL (PPM)	24-HOUR STANDARD (PPM)
07/31/03	RSML06 DUP	Southwest	NA	NA	NA	NA	TCE	<0.00035	0.025	0.50
							cis-1,2-DCE	<0.00047	0.05	1.00
							Acrolein	0.0014	N/A	N/A
							Acetone	0.013	N/A	N/A
08/01/03	RSML06	Southwest	NA	NA	NA	NA	TCE	<0.00030	0.025	0.50
							cis-1,2-DCE	<0.00041	0.05	1.00
							Acrolein	0.00078	N/A	N/A
							Acetone	0.0095	N/A	N/A
08/02/03	RSML06	Southwest	NA	NA	NA	NA	TCE	<0.00030	0.025	0.50
							cis-1,2-DCE	<0.00040	0.05	1.00
							Acrolein	0.00071	N/A	N/A
							Acetone	0.0089	N/A	N/A
							Carbon disulfide	0.012	N/A	N/A
08/03/03	RSML06	Southwest	NA	NA	NA	NA	TCE	<0.00024	0.025	0.50
							cis-1,2-DCE	<0.00032	0.05	1.00
							Acrolein	0.00055	N/A	N/A
							Acetone	0.0082	N/A	N/A
08/04/03	RSML06	Southwest	NA	NA	NA	NA	TCE	<0.00028	0.025	0.50
							cis-1,2-DCE	<0.00039	0.05	1.00
							Acrolein	0.0014	N/A	N/A
							Acetone	0.0098	N/A	N/A
08/05/03	RSML03	South	NA	NA	NA	NA	TCE	<0.00037	0.025	0.50
							cis-1,2-DCE	<0.00050	0.05	1.00
							Acetone	0.0061	N/A	N/A
08/07/03	RSML03	South	NA	NA	NA	NA	TCE	<0.00047	0.025	0.50
							cis-1,2-DCE	<0.00064	0.05	1.00
							Acetone	0.0075	N/A	N/A
08/08/03	RSML03	South	NA	NA	NA	NA	TCE	<0.00024	0.025	0.50
							cis-1,2-DCE	<0.00033	0.05	1.00
							Acrolein	0.00086	N/A	N/A
							Acetone	0.0089	N/A	N/A
08/09/03	RSML07	Northeast	NA	NA	NA	NA	TCE	<0.00029	0.025	0.50
							cis-1,2-DCE	<0.00039	0.05	1.00
							Acrolein	0.00078	N/A	N/A
							Acetone	0.0097	N/A	N/A

TABLE 5
Summary of Analytical Results
Residential Sampling

The Lockformer Company / Lisle, Illinois

SAMPLE DATE	LOCATION	Prevailing Wind Direction [1]	PID (PPM)	TOTAL HYDROCARBON ANALYZER (PPM)	FIRST ENVIRONMENTAL LABORATORIES		COLUMBIA ANALYTICAL			
					COMPOUND	RESULTS (PPM)	COMPOUND	RESULTS (PPM)	ACTION LEVEL (PPM)	24-HOUR STANDARD (PPM)
08/10/03	RSML03	South	NA	NA	NA	NA	TCE	<0.00027	0.025	0.50
							cis-1,2-DCE	<0.00037	0.05	1.00
							Acrolein	0.00097	N/A	N/A
							Acetone	0.011	N/A	N/A
08/11/03	RSML03	South	NA	NA	NA	NA	TCE	<0.00027	0.025	0.50
							cis-1,2-DCE	<0.00036	0.05	1.00
							Acetone	0.0059	N/A	N/A
08/12/03	RSML07	Northeast	NA	NA	NA	NA	TCE	<0.00030	0.025	0.50
							cis-1,2-DCE	<0.00041	0.05	1.00
							Acetone	0.0058	N/A	N/A
08/13/03	RSML07	Northeast	NA	NA	NA	NA	TCE	<0.00032	0.025	0.50
							cis-1,2-DCE	<0.00043	0.05	1.00
							Acetone	0.0053	N/A	N/A
08/14/03	RSML04	Southeast	NA	NA	NA	NA	TCE	<0.00030	0.025	0.50
							cis-1,2-DCE	<0.00041	0.05	1.00
							Acrolein	0.001	N/A	N/A
							Acetone	0.0087	N/A	N/A
							1,3,5-Trimethylbenzene	0.0004	N/A	N/A
							1,2,4-Trimethylbenezene	0.0013	N/A	N/A
08/14/03	RSML04 DUP	Southeast	NA	NA	NA	NA	TCE	<0.00030	0.025	0.50
							cis-1,2-DCE	<0.00041	0.05	1.00
							Acrolein	0.001	N/A	N/A
							Acetone	0.0088	N/A	N/A
							1,3,5-Trimethylbenzene	0.00038	N/A	N/A
							1,2,4-Trimethylbenezene	0.0013	N/A	N/A
08/15/03	RSML05	North	NA	NA	NA	NA	TCE	<0.00034	0.025	0.50
							cis-1,2-DCE	<0.00045	0.05	1.00
							Acrolein	0.00081	N/A	N/A
							Acetone	0.0095	N/A	N/A
							alpha-Pinene	0.00037	N/A	N/A
08/16/03	RSML01	West	NA	NA	NA	NA	TCE	<0.00028	0.025	0.50
							cis-1,2-DCE	<0.00038	0.05	1.00
							Acrolein	0.00067	N/A	N/A
							Acetone	0.010	N/A	N/A
							1,4-Dichlorobenzene	0.00030	N/A	N/A

TABLE 5
Summary of Analytical Results
Residential Sampling

The Lockformer Company / Lisle, Illinois

SAMPLE DATE	LOCATION	Prevailing Wind Direction [1]	PID (PPM)	TOTAL HYDROCARBON ANALYZER (PPM)	FIRST ENVIRONMENTAL LABORATORIES		COLUMBIA ANALYTICAL			
					COMPOUND	RESULTS (PPM)	COMPOUND	RESULTS (PPM)	ACTION LEVEL (PPM)	24-HOUR STANDARD (PPM)
08/17/03	RSML07	Northeast	NA	NA	NA	NA	TCE	<0.00029	0.025	0.50
							cis-1,2-DCE	<0.00039	0.05	1.00
							Acrolein	0.00093	N/A	N/A
							Acetone	0.012	N/A	N/A
08/18/03	RSML07	Northeast	NA	NA	NA	NA	TCE	<0.00036	0.025	0.50
							cis-1,2-DCE	<0.00048	0.05	1.00
							Acrolein	0.001	N/A	N/A
							Acetone	0.012	N/A	N/A
08/19/03	RSML06	Northeast	NA	NA	NA	NA	TCE	<0.00027	0.025	0.50
							cis-1,2-DCE	<0.00037	0.05	1.00
							Acetone	0.0065	N/A	N/A
08/20/03	RSML05	North	NA	NA	NA	NA	TCE	<0.00027	0.025	0.50
							cis-1,2-DCE	<0.00037	0.05	1.00
							Acrolein	0.00094	N/A	N/A
							Acetone	0.0087	N/A	N/A
08/21/03	RSML05	North	NA	NA	NA	NA	TCE	<0.00023	0.025	0.50
							cis-1,2-DCE	<0.00031	0.05	1.00
							Tetrachloroethene	0.00019	N/A	0.20
							Acrolein	0.0012	N/A	N/A
							Acetone	0.020 M	N/A	N/A
							Trichlorofluoromethane	0.00059	N/A	N/A
							Methyl tert-Butyl Ether	0.0018	N/A	N/A
							Toluene	0.040	N/A	N/A
							Ethylbenzene	0.0037	N/A	N/A
							m,p-Xylenes	0.013	N/A	N/A
							Styrene	0.00089	N/A	N/A
							o-Xylene	0.0039	N/A	N/A
							4-Ethyltoluene	0.00028	N/A	N/A
							1,3,5-Trimethylbenzene	0.00028	N/A	N/A
							d-Limonene	0.00055	N/A	N/A
08/22/03	RSML06	Southwest	NA	NA	NA	NA	TCE	<0.00027	0.025	0.50
							cis-1,2-DCE	<0.00036	0.05	1.00
							Acetone	0.0093 M	N/A	N/A

TABLE 5
Summary of Analytical Results
Residential Sampling

The Lockformer Company / Lisle, Illinois

SAMPLE DATE	LOCATION	Prevailing Wind Direction [1]	PID (PPM)	TOTAL HYDROCARBON ANALYZER (PPM)	FIRST ENVIRONMENTAL LABORATORIES		COLUMBIA ANALYTICAL			
					COMPOUND	RESULTS (PPM)	COMPOUND	RESULTS (PPM)	ACTION LEVEL (PPM)	24-HOUR STANDARD (PPM)
08/23/03	RSML07	Northeast	NA	NA	NA	NA	TCE	<0.00027	0.025	0.50
							cis-1,2-DCE	<0.00036	0.05	1.00
							Acrolein	0.001	N/A	N/A
							Acetone	0.008 M	N/A	N/A
08/24/03	RSML07	Northeast	NA	NA	NA	NA	TCE	<0.00025	0.025	0.50
							cis-1,2-DCE	<0.00034	0.05	1.00
							Acetone	0.0046	N/A	N/A
08/25/03	RSML06	Southwest	NA	NA	NA	NA	TCE	<0.00028	0.025	0.50
							cis-1,2-DCE	<0.00038	0.05	1.00
							Acrolein	0.0013	N/A	N/A
							Acetone	0.011 M	N/A	N/A
08/26/03	RSML06	Southwest	NA	NA	NA	NA	TCE	<0.00027	0.025	0.50
							cis-1,2-DCE	<0.00037	0.05	1.00
							Tetrachloroethene	0.00071	N/A	0.20
							Acrolein	0.0009	N/A	N/A
							Acetone	0.011 M	N/A	N/A
08/28/03	RSML03	South	NA	NA	NA	NA	TCE	<0.00040	0.025	0.50
							cis-1,2-DCE	<0.00054	0.05	1.00
							Tetrachloroethene	0.003	N/A	0.20
							Acetone	0.0081 M	N/A	N/A
							d-Limonene	0.0004	N/A	N/A
08/29/03	RSML03	South	NA	NA	NA	NA	TCE	<0.00029	0.025	0.50
							cis-1,2-DCE	<0.00040	0.05	1.00
							Tetrachloroethene	0.0013	N/A	0.20
							Acrolein	0.0024	N/A	N/A
							Acetone	0.018	N/A	N/A
09/03/03	RSML04	Southeast	NA	NA	NA	NA	TCE	<0.00025	0.025	0.50
							cis-1,2-DCE	<0.00034	0.05	1.00
							Tetrachloroethene	0.00045	N/A	0.20
							Acetone	0.0067	N/A	N/A
09/05/03	RSML07	Northeast	NA	NA	NA	NA	TCE	<0.00026	0.025	0.50
							cis-1,2-DCE	<0.00035	0.05	1.00
							Tetrachloroethene	0.00021	N/A	0.20
							Acetone	0.0055	N/A	N/A

TABLE 5
Summary of Analytical Results
Residential Sampling

The Lockformer Company / Lisle, Illinois

SAMPLE DATE	LOCATION	Prevailing Wind Direction [1]	PID (PPM)	TOTAL HYDROCARBON ANALYZER (PPM)	FIRST ENVIRONMENTAL LABORATORIES		COLUMBIA ANALYTICAL			
					COMPOUND	RESULTS (PPM)	COMPOUND	RESULTS (PPM)	ACTION LEVEL (PPM)	24-HOUR STANDARD (PPM)
09/05/03	RSML07 DUP	Northeast	NA	NA	NA	NA	TCE	<0.00026	0.025	0.50
							cis-1,2-DCE	<0.00035	0.05	1.00
							Acetone	0.0054	N/A	N/A
09/11/03	RSML05	North	NA	NA	NA	NA	TCE	<0.00030	0.025	0.50
							cis-1,2-DCE	<0.00041	0.05	1.00
							Acetone	0.0065	N/A	N/A
09/19/03	RSML05	North	NA	NA	NA	NA	TCE	<<0.00023	0.025	0.50
							cis-1,2-DCE	<0.00031	0.05	1.00
							Acetone	0.0066	N/A	N/A
09/25/03	RSML02	Northwest	NA	NA	NA	NA	TCE	0.00042	0.025	0.50
							cis-1,2-DCE	<0.00050	0.05	1.00
							Acetone	0.0071	N/A	N/A
							Methylene chloride	0.0088	N/A	N/A
10/03/03	RSML05	North	NA	NA	NA	NA	TCE	0.00034	0.025	0.50
							cis-1,2-DCE	<0.00035	0.05	1.00
							Acetone	0.0039	N/A	N/A
	RSML05 DUP	North	NA	NA	NA	NA	TCE	0.00034	0.025	0.50
							cis-1,2-DCE	<0.00035	0.05	1.00
							Acetone	0.0038	N/A	N/A
10/09/03	RSML03	Southwest	NA	NA	NA	NA	TCE	0.00044	0.025	0.50
							cis-1,2-DCE	<0.00031	0.05	1.00
							Acetone	0.0055 M	N/A	N/A
10/17/03	RSML03	South	NA	NA	NA	NA				
10/22/03	RSML03	South	NA	NA	NA	NA				
10/23/03	RSML03	South	NA	NA	NA	NA				
10/30/03	RSML05	North	NA	NA	NA	NA				

NOTES: NA = Not Analyzed. Blank cells = Samples submitted. Results not yet received. M = Matrix interference

[1] = Based on meterological conditions determined by A. Bourlard.

TABLE 6
Summary of Analytical Results
Inside Building

The Lockformer Company / Lisle, Illinois

SAMPLE DATE	LOCATION	PID (PPM)	TOTAL HYDROCARBON ANALYZER (PPM)	FIRST ENVIRONMENTAL LABORATORIES		COLUMBIA ANALYTICAL	
				COMPOUND	RESULTS (PPM)	COMPOUND	RESULTS (PPM)
06/09/03	LB01	NA	NA	NA	NA	TCE	0.00096
						Cis-1,2-DCE	<.00049
						Acrolein	.0025
						Acetone	.036
						2-Butanone	.014
						2-Hexanone	.0012
						Ethylbenzene	.010
						m,p-xylene	.040
						o-xylene	.012
						n-nonane	.0031
						alpha-pinene	.00047
						4-ethyltoluene	.00042
						d-limone	.0022
06/10/03	LB01	1.8	1.9	TCE	<1	TCE	0.0018
				Cis-1,2-DCE	<1.3	Cis-1,2-DCE	0.00041
						1,1-DCE	0.00052
						1,1,1-TCA	0.00029
						PCE	0.00047
07/01/03	LB01	1.5	6.0	NA	NA	NA	NA
07/07/03	LB01	1.5	6.0	NA	NA	NA	NA
07/15/03	LB01	0.2	2.7	NA	NA	NA	NA
07/21/03	LB01	0.0	1.5	NA	NA	NA	NA
07/29/01	LB01	0.2	1.9	NA	NA	NA	NA
08/05/03	LB01	0.0	1.7	NA	NA	NA	NA
08/13/03	LB01	0.2	2.7	NA	NA	NA	NA
08/26/03	LB01	0.4	3.9	NA	NA	NA	NA
09/09/03	LB01	0.6	3.0	NA	NA	NA	NA

TABLE 6
Summary of Analytical Results
Inside Building

The Lockformer Company / Lisle, Illinois

SAMPLE DATE	LOCATION	PID (PPM)	TOTAL HYDROCARBON ANALYZER (PPM)	FIRST ENVIRONMENTAL LABORATORIES		COLUMBIA ANALYTICAL	
				COMPOUND	RESULTS (PPM)	COMPOUND	RESULTS (PPM)
09/12/03	LB01	0.0	3.0	NA	NA	NA	NA
09/15/03	LB01	0.0	1.1	NA	NA	NA	NA
09/17/03	LB01	0.0	1.2	NA	NA	NA	NA
09/23/03	LB01	0.0	1.6	NA	NA	NA	NA
09/30/03	LB01	0.3	2.5	NA	NA	NA	NA
10/01/03	LB01	0.0	2.3	NA	NA	NA	NA
10/03/03	LB01	0.0	3.2	NA	NA	NA	NA
10/07/03	LB01	0.0	7.1	NA	NA	NA	NA
10/09/03	LB01	0.0	2.4	NA	NA	NA	NA
10/14/03	LB01	0.4	2.6	NA	NA	NA	NA
10/21/03	LB01	0.0	1.9	NA	NA	NA	NA
10/28/03	LB01	0.1	1.9	NA	NA	NA	NA

NOTES: NA = Not Analyzed

TABLE 7
Summary of Analytical Results
Vapor Extraction Wells

The Lockformer Company / Lisle, Illinois

WELL ID	6/6/03	6/11/03	6/12/03	6/20/03	6/27/03	7/2/03	7/10/03	7/18/03	7/24/03
VE-1	70.2	1.1		0.7	2.8	1.9	5.0	2.0	4.3
VE-2	20.1	2.2		2.9	4.1	3.3	1.7	0.8	2.9
VE-3	68.1	2.2		2.5	3.9	4.7	1.3	1.4	10.2
VE-4	22.6	2.7		4.1	1.1	4.4	2.6	0.3	1.0
VE-5	94.8	5.0		3.6	7.9	10.2	3.4	1.4	3.6
VE-6	89.3	13.8		8.6	7.5	9.3	5.3	3.6	11.0
VE-7	88.5	11.0		10.1	10.2	7.8	2.3	1.9	3.2
VE-8	81.2	4.2		10.1	8.5	9.1	7.4	7.8	7.1
VE-9	79.1	1.6		3.6	3.1	3.1	1.4	2.3	2.3
VE-10	77.9	36.2		32.1	25.1	25.9	22.9	19.1	21.8
VE-11	73.2	4.9		10.7	2.9	5.6	1.4	1.8	1.5
VE-12	86.1	10.7		5.0	6.3	7.5	1.3	0.1	0.7
VE-13	78.5	23.2		14.5	14.3	11.5	6.2	3.2	8.4
VE-14	27.0	20.6		32.2	31.6	27.7	18.6	12.7	2.5
VE-15	20.4	16.5		49.3	45.1	43.2	32.6	22.4	2.2
VE-16	98.0	170.0	205.8	145.8	102.8	95.3	81.5	63.3	66.8
VE-17	18.3	2.9		0.6	2.0	4.0	2.0	0.3	5.1
VE-18	22.9	11.6		4.3	7.9	6.5	1.7	1.2	2.1
VE-19	36.4	59.9		26.5	16.4	17.4	9.7	6.7	1.8
VE-20	29.9	70.4		67.1	39.9	29.8	23.5	16.5	15.3
VE-21	30.1	116.8		54.2	32.9	27.4	14.5	10.7	10.4
VE-22	45.2	2.0		3.0	2.9	4.2	1.3	1.8	1.6
VE-23	54.9	4.0		1.7	2.4	2.7	1.4	2.7	2.2
VE-24	53.1	5.9		3.6	3.1	3.1	2.9	1.5	2.5
VE-25	91.4	11.8		5.9	5.0	5.5	2.7	4.3	6.0
VE-26	36.8	28.9		11.7	12.9	10.6	7.4	4.4	2.8
VE-27	88.8	51.6		17.8	7.7	8.1	4.6	2.8	3.3
VE-28	17.4	5.7		1.3	1.9	3.0	3.9	1.8	1.2
VE-29	62.4	20.7		12.0	4.0	3.1	7.2	3.7	2.5
VE-30	21.0	3.1		0.9	3.4	1.4	2.5	1.5	1.2
VE-31	60.6	7.1		2.5	3.5	2.5	2.1	0.9	1.6
VE-32	15.4	5.6		2.0	6.1	4.2	2.2	0.5	2.0
VE-33	11.5	0.9		3.0	0.9	2.2	1.1	0.7	0.7
VE-34	46.0	118.9	97.7	36.0	28.6	22.9	16.7	14.8	7.9
VE-35	13.4	14.4		4.1	4.2	6.6	4.0	2.2	3.2
VE-36	30.0	2.1		0.9	3.4	3.8	1.2	1.9	1.0
VE-37	50.4	19.7		13.5	10.9	10.3	6.1	3.1	2.1
VE-38	13.9	2.9		5.5	4.3	2.8	1.6	1.6	3.0
VE-39	96.6	7.3		27.0	29.6	21.8	13.6	9.8	16.4
VE-40	75.0	0.8	1.6	2.1	2.9	3.5	0.7	3.0	4.8
VE-41	29.8	1.4		0.5	0.7	1.6	1.1	0.3	0.5
VE-42	54.0	19.4		14.6	7.7	7.3	9.3	9.2	6.8
VE-43	40.9	1.0	1.5	3.6	3.1	2.7	3.5	2.6	1.2
VE-44	20.0	1.8		5.1	2.0	2.6	0.9	2.0	1.4
VE-45	24.6	37.0		7.2	5.4	3.9	3.2	3.3	2.0
VE-46	19.4	4.4		3.7	4.0	3.0	1.9	0.8	1.6
VE-47	14.6	2.0		8.5	2.3	4.0	2.3	1.1	1.0
VE-48	52.8	4.5		1.5	3.4	3.7	1.3	2.9	2.9

NOTES: All values reported in parts per million (PPM).

TABLE 7
Summary of Analytical Results
Vapor Extraction Wells

The Lockformer Company / Lisle, Illinois

WELL ID	7/30/03	8/7/03	8/14/03	8/21/03	8/28/03	9/4/03	9/11/03	9/17/03	9/22/03
VE-1	0.9	1.4	2.3	1.6	0.2	0.4	29.3	0.9	1.0
VE-2	3.1	1.2	3.5	2.5	2.1	2.1	7.2	2.4	1.5
VE-3	1.7	3.4	3.9	4.8	0.7	2.4	5.3	1.6	1.7
VE-4	5.6	1.6	5.9	2.4	3.0	3.4	5.4	3.0	1.8
VE-5	2.6	2.2	5.2	5.4	0.4	3.1	14.8	2.8	1.9
VE-6	3.9	3.0	9.1	1.1	7.2	4.4	10.7	4.8	4.6
VE-7	2.9	2.9	6.5	5.7	0.0	2.8	36.8	2.8	2.1
VE-8	4.9	5.2	8.7	6.1	3.2	5.1	33.5	3.2	3.6
VE-9	1.1	1.1	4.0	3.6	0.9	2.4	30.2	0.8	2.2
VE-10	19.6	15.6	20.2	18.9	36.6	13.7	24.4	11.8	16.5
VE-11	2.0	0.8	3.5	2.2	0.4	1.1	29.3	1.0	4.5
VE-12	2.0	1.0	4.8	5.8	0.2	2.0	16.1	2.7	1.2
VE-13	3.9	2.9	8.7	5.5	4.3	2.6	33.2	1.2	2.8
VE-14	12.1	10.2	9.8	5.8	6.8	9.4	11.8	1.3	5.2
VE-15	22.4	17.5	15.5	17.7	14.1	22.3	19.5	1.1	13.4
VE-16	53.8	45.3	41.4	21.1	28.2	17.8	38.5	9.2	28.3
VE-17	4.0	1.4	4.4	1.4	2.1	3.3	23.4	2.5	1.2
VE-18	4.1	3.5	3.7	3.7	1.0	2.6	5.7	3.5	2.4
VE-19	7.3	4.0	9.6	6.0	5.6	6.6	20.7	6.1	3.6
VE-20	14.2	9.5	11.6	10.6	6.7	10.3	18.4	9.7	8.0
VE-21	11.6	8.3	11.2	6.3	5.8	7.3	8.9	7.1	7.3
VE-22	1.1	1.4	3.5	1.0	0.6	1.9	19.2	1.2	1.3
VE-23	1.3	1.0	2.7	1.5	0.3	1.4	28.0	1.4	1.6
VE-24	2.0	1.5	4.2	2.1	0.2	1.9	11.2	1.5	1.7
VE-25	2.0	2.1	4.9	3.6	0.5	1.8	6.2	1.8	1.4
VE-26	2.4	3.0	5.2	1.9	2.8	4.6	2.5	4.5	2.7
VE-27	3.4	3.1	6.0	5.7	2.0	3.3	20.7	3.4	2.0
VE-28	2.0	0.9	3.9	0.8	1.1	2.1	10.5	1.5	1.6
VE-29	1.1	1.1	2.2	2.0	0.4	1.9	26.3	0.8	1.1
VE-30	2.0	1.7	1.9	2.1	1.1	2.3	5.6	1.1	3.1
VE-31	1.0	1.0	2.5	0.9	0.5	1.6	16.7	0.6	1.5
VE-32	3.7	1.3	5.1	2.5	1.2	4.2	10.4	2.6	2.2
VE-33	1.4	1.7	2.9	1.2	0.8	1.6	3.8	1.1	2.8
VE-34	16.1	16.0	20.1	15.2	9.5	13.9	12.5	9.0	7.9
VE-35	3.2	4.7	5.8	2.6	2.7	4.3	2.4	3.4	2.0
VE-36	0.8	0.8	2.9	2.1	1.3	3.6	9.9	1.7	2.2
VE-37	4.7	2.8	8.3	7.2	3.7	3.5	3.0	3.4	2.9
VE-38	1.1	1.0	2.0	2.4	1.3	2.1	1.0	2.1	3.9
VE-39	8.6	6.3	10.5	7.7	9.5	4.7	11.6	3.6	4.1
VE-40	1.7	0.9	3.7	1.6	1.0	1.6	33.7	1.3	1.4
VE-41	1.3	1.8	2.6	0.2	1.1	2.4	1.5	1.4	3.3
VE-42	4.1	1.6	6.0	1.7	1.3	2.5	28.1	1.5	2.2
VE-43	0.9	0.9	2.7	2.6	0.9	3.6	28.3	1.4	5.1
VE-44	0.4	0.7	2.7	2.4	0.3	2.1	3.8	1.1	1.6
VE-45	1.4	1.4	3.6	3.1	1.9	2.3	2.4	1.8	7.3
VE-46	0.8	0.5	2.6	2.0	0.7	2.2	9.7	1.7	1.3
VE-47	1.9	1.0	2.4	2.6	1.2	2.1	0.5	1.6	2.1
VE-48	1.1	2.2	1.8	0.9	0.6	1.7	18.8	1.0	1.3

NOTES: All values reported in parts per million (PPM).

TABLE 7
Summary of Analytical Results
Vapor Extraction Wells

The Lockformer Company / Lisle, Illinois

WELL ID	10/2/03	10/7/03	10/16/03	10/17/03	10/22/03	10/30/03
VE-1	1.3	1.9		1.1	1.9	0.2
VE-2	1.0	3.1	1.0		2.3	0.5
VE-3	1.4	1.4		1.2	2.6	0.3
VE-4	1.5	1.6	0.8		2.1	0.4
VE-5	1.9	1.7		1.5	4.0	0.7
VE-6	4.1	2.9		3.8	7.2	3.8
VE-7	1.6	1.4		1.4	3.2	0.6
VE-8	5.1	2.6		4.8	5.5	2.6
VE-9	3.2	2.3		4.1	3.0	1.0
VE-10	14.7	12.5		12.2	18.8	12.4
VE-11	2.5	1.9		1.0	2.2	0.3
VE-12	1.9	1.6		1.2	2.7	0.3
VE-13	2.0	1.8		1.1	3.5	0.8
VE-14	6.1	6.4	5.5		7.2	4.8
VE-15	14.5	16.8	17.7		21.2	18.2
VE-16	32.5	23.4		18.2	40.7	25.6
VE-17	0.7	2.6	0.7		2.2	0.1
VE-18	1.3	2.2	0.7		2.5	0.8
VE-19	5.0	5.3	6.8		6.6	2.7
VE-20	8.4	6.8	9.9		9.3	6.0
VE-21	8.2	4.7	7.2		6.4	4.2
VE-22	1.9	2.4		2.3	2.4	0.6
VE-23	1.4	2.1		1.5	2.1	0.3
VE-24	2.7	2.0		1.9	3.0	0.9
VE-25	2.1	1.9		2.4	2.8	0.8
VE-26	2.5	3.8	3.7		4.6	3.2
VE-27	2.3	1.7		2.3	3.7	0.5
VE-28	1.7	1.4	1.0		2.0	0.2
VE-29	1.7	1.9		2.0	2.2	0.5
VE-30	1.6	1.4	0.6		1.8	0.3
VE-31	1.4	2.1		1.8	2.2	0.1
VE-32	1.6	1.9	1.1		2.9	0.1
VE-33	1.4	1.2	0.2		1.7	0.2
VE-34	9.5	6.4	15.0		20.4	16.0
VE-35	1.0	1.5	1.5		2.3	0.5
VE-36	1.5	2.1	0.3		1.8	0.2
VE-37	1.8	2.2	1.9		3.8	1.2
VE-38	1.9	3.4	0.5		1.8	0.2
VE-39	4.0	2.8		2.2	5.7	3.2
VE-40	1.7	2.6		1.7	2.1	0.2
VE-41	1.0	1.1	0.3		2.0	0.2
VE-42	2.6	2.8		2.0	2.8	0.9
VE-43	1.6	2.2		1.9	1.8	0.4
VE-44	1.2	1.0	0.3		1.9	0.1
VE-45	2.2	1.9	0.6		2.1	0.2
VE-46	1.4	3.4	0.5		2.3	0.7
VE-47	1.3	2.3	1.0		2.2	0.6
VE-48	1.6	1.7	1.5		2.0	0.2

NOTES:

ERH Subarea	Electrode Location	Vapor Extraction Screen Location	10/10/03 to 10/13/03		10/27/03	
			Vacuum (inches of water)	PID Reading (PPM)	Vacuum (inches of water)	PID Reading (PPM)
2-A	C1	S	0.8	2.9	0.3	3.3
	D1	S	2.5	7.5	0.8	10.1
	E1	S	1.8	11.7	0.1	61.0
	F2	S	1.3	6.4	0.1	5.0
	E2	S	1.7	4.1	0.6	6.8
	D2	S	1.3	5.2	0.5	12.0
	C2	S	0.6	1.5	0.3	2.8
	C3	S	0.5	1.5	0.4	2.5
	D3	S	1	**37.3**	0.2	47.6
	E3	S	2.8	7	0.5	3.1
	F3	S	6	3.3	0.7	11.3
	G3	S	0.5	[1]NS	[1]NS	[1]NS
	G4	S	<1	3.9	0.3	2.8
	F4	S	<1	10.6	0.2 Pressure	138.0
	E4	S	<1	3.2	1.3 Pressure	58.0
	D4	S	<1	8.7	0.1	60.8
	C4	S	<1	1.8	0.1	8.7
	D5	S	[1]NS	[1]NS	[1]NS	[1]NS
	E5	S	<1	[1]NS	0.1	41.0
	F5	S	4	3	15.0	6.2
	F6	S	1	8.6	1.8	63.3
	E6	S	<1	2.3	0.7	5.5
	D6	S	<1	**14.8**	0.3	22.6
2-B	C7	S	1	1.6	NM	2.8
	D7	S	<1	1.5	0.6	2.8
	E7	S	<1	27.6	0.7	NM
	F7	S	<1	**62.8**	0.1	90.9
	G8	S	4	7.4	2.3	3.8
	F8	S	1	2.8	0.4	1.7
	E8	S	1	7.2	0.4	11.4
	D8	S	<1	2.9	0.5	1.5
	C8	S	17	1.5	9.0	1.4
	D9	S	2.2	5.9	0.7	3.0
	E9	S	1	1.2	0.9	1.0
	F9	S	<1	1.6	0.4	8.4
	G9	S	1	7.1	0.8	2.9
	H9	S	8	1.3	8.0	1.4
	H10	S	1.8	1.6	0.7	4.5
	G10	S	1.6	1.1	2.0	0.8
	F10	S	2	2.6	0.8	7.9
	E10	S	1	**17.6**	1.0	4.2
	D10	S	6	1	9.0	1.2
2-C	B11	S	<1	**6.4**	3.0	1.4
	C11	S	1	1.2	2.5	6.8
	D11	S	<1	2	1.1	0.9
	E11	S	20	1	44.0	1.0
	F11	S	1.5	0.6	2.5	0.7
	F12	**S**	**2**	**3.4**	**1.5**	**1.4**
	E12	S	[1]NS	6.8	15.0	0.4
	D12	S	2	3.6	1.5	1.9
	C12	S	1.4	3.4	12.7	14.9
	B12	S	2.4	2.3	4.5	0.9
	A12	S	5	5.1	2.8	1.9
	A13	S	4.5	1.9	5.0	1.4
	B13	S	1.8	2.8	3.0	1.6
	C13	S	2	5.8	3.8	5.6
	D13	S	4.5	2.8	4.6	3.5
	E13	S	5	**24.5**	2.0	41.4
	F13	S	2	5.8	10.0	3.4
	G13	S	1.5	2.1	15.0	1.5
2-D	F14	S	<1	3.6	3.8	2.1
	E14	S	<1	57.2	1.4	6.2
	D14	S	<1	7.6	1.7	16.2
	C14	S	<1	2.9	8.0	2.4
	B14	S	<1	4.6	4.3	4.0
	C15	S	<1	2.2	1.8	1.8
	D15	S	<1	9.5	3.5	3.7
	E15	S	<1	3.4	0.6	2.1
	F15	D	2	**311**	8.0	26.1
	F15	S	<1	5.5	2.2	1.6
	G16	D	1	18.9	8.0	7.8
	G16	S	<1	5.9	3.0	10.2
	F16	D	<1	4.8	0.5	12.5
	F16	S	<1	9	1.0	8.8
	E16	D	1	**708**	3.0	178.0
	E16	S	<1	50.4	4.0	2.8
	D16	D	1	33.8	6.0	7.0
	D16	S	<1	21	4.0	7.0
	E17	D	<1	[2]NS	4.5	NM
	E17	S	<1	1.1	3.0	4.1
	F17	D	1	11.4	5.0	7.6
	F17	S	<1	4.6	3.8	10.0
	G17	D	1	[2]NS	4.8	115.0
	G17	S	<1	4.1	3.4	2.8
	G18	D	1	**137**	4.6	8.0
	G18	S	<1	3.9	3.5	9.8
	F18	D	<1	22.5	3.5	7.9
	F18	S	<1	4.5	3.0	1.1
	G19	D	1.5	4.1	5.0	2.0
	G19	S	1	10.1	5.0	4.0

Vacuum Shut Down

Vacuum Shut Down (Concentration ↓)

Notes: Refer to Figure 1 for ERH Subarea Layout and Electrode Locations
"S" refers to shallow vapor extraction well screens completed above the subsurface heated zone.
"D" refers to deep vapor extraction well screens completed below the subsurface heated zone.
[1]NS = no sample due to missing or damaged sampling ports.
[2]NS = no sample due to water condensation from steam.
NM = No measurement
Bold identifies locations selected for laboratory VOC analysis via Tedlar bags.

ERH SYSTEM VACUUM PIEZOMETER MONITORING DATA - Pressure

Lockformer - Lisle, IL

Date	Probe Identification																												
	VPZ-1	VPZ-2	VPZ-3	VPZ-4	VPZ-5	VPZ-6	VPZ-7	VPZ-8	VPZ-9	VPZ-10	VPZ-11	VPZ-12	VPZ-13	VPZ-14	VPZ-15	VPZ-16	VPZ-17	VPZ-18	VPZ-19	VPZ-20	VPZ-21	VPZ-22	VPZ-23	VPZ-24	VPZ-25	VPZ-26	VPZ-27	VPZ-28	VPZ-29
05-Jun-03	1.10	3.40	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	3.80	0.00	0.00	(0.64)	0.08	(0.08)	(0.02)	0.01	0.00	0.00	(0.01)	0.00	0.00	0.00	0.24				
16-Jun-03	1.90	7.50	0.00	0.00	(0.22)	0.00	0.14	0.00	0.00	3.60	4.00	0.00	0.00	0.68	0.18	(0.38)	(0.58)	(0.57)	(0.30)	0.14	(0.36)	0.00	0.00	0.00	0.26				
17-Jun-03	1.90	7.50					0.14			3.60	4.00			0.68	0.18					0.14					0.26				
18-Jun-03	2.50	4.50	0.00	0.00	0.00	0.00	(0.25)	0.00	0.00	4.10	3.80	0.00	0.00	0.00	0.12	(0.22)	(0.48)	(0.43)	(0.08)	0.10	(0.10)	0.00	0.00	0.00	0.10				
16-Jul-03												0.00	0.00					(0.17)		0.00	(0.54)	0.00	(0.21)	0.00	0.00				
25-Jul-03			0.00	0.16	(0.04)	0.60	1.75					0.00	0.00	1.90	1.05	2.40	(0.49)	(0.94)	0.30	0.00	1.30	0.42	(1.10)	0.00	0.00				
31-Jul-03		3.60	0.00	2.10	(0.30)	0.00	>5					0.00	0.00	0.00	>5	4.60	(0.45)	(0.80)	(0.22)	>5	2.00	0.10	0.00	0.00	0.00				
07-Aug-03		>5	0.03	(0.53)	(0.74)	0.14	>5					1.35	0.00	(0.06)	>5	>5	(1.40)	2.00	(0.60)	>5	4.20	(0.15)	0.00	(0.20)					
13-Aug-03		>5	(0.90)	0.00	(0.06)	0.00	2.40					0.00	0.00	1.10	>5	>5	(0.45)	(1.20)	(0.23)	>5	>5	0.05	0.00	0.00	0.00				
14-Aug-03		0.10												(2.20)	(3.50)	26.50				6.00	9.50	0.06							
15-Aug-03														(3.90)	(3.50)	25.00				7.00	10.00	0.08							
20-Aug-03	3.35		0.00	2.35	(1.80)	0.00		0.27	1.30	0.33		0.00	0.00				(3.50)	(3.00)	(0.09)		9.00	0.00	0.00	0.12	0.00				
21-Aug-03	0.00	1.05	0.00	0.00	0.00	0.07	0.00	0.00	1.60	0.00	0.00	0.00	0.00	0.00	0.00	16.50	0.00	0.00	(0.01)	(0.02)	8.00	0.04	0.00	0.10	0.00				
22-Aug-03	0.00	0.00	0.00	0.00	(1.20)	0.08	0.02	(0.36)	1.80	(0.01)	(0.07)	0.00	0.00	0.00	0.01	26.00	(4.60)	(4.00)	(0.42)	0.02	11.00	0.00	(0.02)	0.01	(0.02)				
25-Aug-03	0.00	>(40.0)	0.00	0.00	(1.30)	0.00	0.00	0.00	0.00	0.00	0.00	>(40.0)	0.00	0.00	0.00	2.10	(4.00)	(3.40)	(0.10)	(23.00)	6.00	(5.50)	0.00	0.00					
26-Aug-03	0.00	(31.00)	0.00	0.00	(1.20)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(0.10)	(4.20)	(3.45)	0.00	(20.00)	6.00	0.00	0.00	0.00	0.00				
27-Aug-03	0.00	0.00	0.00	0.00	(2.10)	0.00	0.00	(1.35)	1.20	0.23	0.00	0.00	0.00	0.00	0.00	0.00	(0.18)	(0.23)	0.00	0.00	2.20	0.00	0.00	0.00	0.00				
28-Aug-03	0.00	0.00	0.20	0.00	(0.31)	0.00	0.00	(0.31)	2.00	0.44	0.68	0.00	0.00	0.00	0.00	1.60	(0.18)	(0.19)	0.00	0.00	3.00	0.00	0.00	0.00	0.00				
29-Aug-03	0.00	0.00	0.22	0.00	(1.00)	0.28	2.10	2.25	5.00	2.50	2.40	(0.30)	0.00	(1.00)	0.00	(0.10)	(4.70)	(2.90)	(0.57)	0.00	(4.50)	(4.50)	(0.06)	0.00	0.00				
02-Sep-03	0.00	0.42	1.45	0.00	(3.10)	1.95	(4.50)	0.00	0.00	2.10	4.20	(0.10)	0.00	(4.50)	(0.10)	(0.10)	(5.00)	(0.73)	(0.11)	(0.10)	0.30	(0.24)	0.00	0.00	0.00				
03-Sep-03	0.00	(0.06)	0.58	0.00	(2.00)	0.00	(0.22)	0.00	1.80	5.00	1.10	(0.06)	0.00	(0.10)	(0.04)	(0.10)	(3.80)	(0.55)	(0.30)	0.00	0.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
04-Sep-03	0.00	0.00	0.00	0.00	(0.19)	0.06	0.00	0.00	0.24	(0.67)	0.00	(0.03)	0.00	0.00	0.00	0.00	(0.74)	(0.16)	(0.12)	0.00	(0.30)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
05-Sep-03	0.00	0.00	0.00	0.00	(0.14)	0.00	0.00	(1.30)	0.06	(0.53)	0.00	(0.20)	0.00	(0.49)	0.00	0.00	(0.69)	(0.40)	(0.10)	0.00	0.36	0.00	(0.04)	0.00	0.00	0.00	0.00	0.00	0.00
08-Sep-03	0.00	0.00	0.00	0.00	(0.68)	0.00	0.00	(1.00)	0.00	(0.50)	0.00	(0.15)	0.00	(0.30)	0.00	0.00	(3.20)	(1.00)	(0.04)	0.00	(1.40)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
09-Sep-03	0.00	0.00	0.00	0.00	(0.56)	0.16	(1.20)	(3.00)	2.90	4.10	0.00	(0.10)	0.00	(1.30)	0.00	(1.40)	(2.80)	(0.83)	(0.08)	0.00	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10-Sep-03	0.00	0.00	0.00	0.00	(0.50)	0.14	(1.10)	(2.50)	2.00	4.00	0.00	0.00	0.00	(1.20)	0.00	(1.00)	(1.40)	(0.80)	0.00	0.00	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11-Sep-03	0.90	0.00	0.44	0.00	0.00	0.00	0.04	(0.52)	0.00	2.20	0.00	0.00	0.00	0.00	0.00	4.90	0.00	0.04	0.00	0.00	7.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12-Sep-03	1.30	0.00	(0.35)	0.00	0.00	0.00	0.00	0.00	1.90	6.00	0.00	0.00	0.00	0.00	0.00	4.00	(0.05)	0.00	0.00	0.00	6.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15-Sep-03	1.00	0.00	(0.25)	0.00	(0.28)	0.00	0.00	0.00	1.70	5.00	0.00	0.00	0.00	0.00	0.00	3.50	(0.80)	(0.06)	0.00	0.00	6.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16-Sep-03	0.00	0.00	0.68	0.00	(0.34)	0.00	0.00	0.52	1.20	0.55	0.00	0.00	0.00	0.00	0.00	5.00	(0.88)	(0.36)	(0.42)	0.00	10.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17-Sep-03	0.00	0.00	0.65	0.00	(0.36)	0.00	0.00	0.48	1.16	0.49	0.00	0.00	0.00	0.00	0.00	4.52	(0.89)	(0.32)	(0.38)	0.00	10.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18-Sep-03	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.24	0.00	0.00	0.00	0.00	0.00	0.00	5.50	0.00	0.05	0.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19-Sep-03	0.00	0.00	(0.80)	0.00	(0.30)	0.10	(0.22)	(1.40)	0.60	1.70	0.04	0.00	0.00	0.00	0.00	3.90	(1.00)	(0.40)	0.00	0.00	8.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22-Sep-03	0.00	0.00	2.50	0.00	(0.04)	0.00	(1.20)	1.20	2.70	6.00	0.00	(0.08)	0.00	(0.40)	0.00	5.00	(0.22)	(0.20)	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23-Sep-03	0.00	0.00	0.00	0.00	(0.10)	0.00	0.00	(0.34)	1.90	(0.72)	0.00	0.00	0.00	0.00	0.00	5.00	(0.07)	0.00	0.00	(0.07)	1.00	0.00	0.00	(0.27)	0.00	0.00	0.00	0.00	0.00
24-Sep-03	0.22	0.00	0.35	0.00	0.00	0.00	0.00	0.00	0.76	0.51	0.06	0.00	0.00	0.00	0.00	2.50	0.00	0.00	0.00	5.00	9.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25-Sep-03	0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.80	0.50	0.10	0.00	0.00	0.00	0.00	2.00	0.00	0.00	0.00	4.80	8.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29-Sep-03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.70	0.00	0.00	0.22	0.00	0.00	0.00	8.00	(0.14)	(0.09)	0.00	0.00	7.00	0.00	0.00	0.00	0.00	0.90	0.00	0.00	0.00
30-Sep-03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.00	0.00	0.00	0.00	0.23	8.00	0.00	0.00	0.00	0.00	0.46	0.00	0.00	0.00
01-Oct-03	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.08	0.00	0.00	0.00	0.00	5.00	(0.18)	(0.12)	0.00	0.00	6.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
02-Oct-03	0.08	0.00	0.00	0.00	0.00	0.00	0.00	(0.08)	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	(0.09)	(0.13)	0.00	0.00	3.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
06-Oct-03	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	9.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
07-Oct-03	0.00	0.00	(0.02)	0.00	(0.10)	0.00	0.00	(2.40)	(0.26)	1.30	0.00	0.00	0.00	0.00	0.00	1.50	(0.13)	(0.24)	0.00	0.00	N/M	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
08-Oct-03	(0.92)	0.00	0.00	0.00	(0.12)	0.00	(0.04)	(2.40)	(0.60)	0.72	0.04	0.00	0.00	0.00	(0.04)	(1.10)	(0.47)	(0.54)	0.00	0.00	N/M	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
09-Oct-03	0.00	0.00	0.00	0.00	(0.08)	0.00	0.00	(2.90)	(0.41)	2.00	0.07	0.00	0.00	0.00	0.00	(0.23)	(0.72)	(0.66)	(0.09)	0.00	N/M	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

ERH SYSTEM VACUUM PIEZOMETER MONITORING DATA - Pressure

Lockformer - Lisle, IL

Date	Probe Identification																												
	VPZ-1	VPZ-2	VPZ-3	VPZ-4	VPZ-5	VPZ-6	VPZ-7	VPZ-8	VPZ-9	VPZ-10	VPZ-11	VPZ-12	VPZ-13	VPZ-14	VPZ-15	VPZ-16	VPZ-17	VPZ-18	VPZ-19	VPZ-20	VPZ-21	VPZ-22	VPZ-23	VPZ-24	VPZ-25	VPZ-26	VPZ-27	VPZ-28	VPZ-29
10-Oct-03	(0.62)	**0.00**	(0.50)	0.00	(0.10)	0.00	**(0.20)**	(3.10)	(0.23)	2.40	0.00	**(0.12)**	0.00	**0.00**	**0.00**	**(1.50)**	(1.50)	(0.92)	(0.13)	**0.00**	N/M	**0.00**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13-Oct-03	0.00	**2.30**	0.00	(0.77)	0.00	0.00	**0.00**	(0.96	**0.64**	**4.00**	0.00	**0.00**	0.00	**0.00**	**0.00**	**1.30**	(1.25)	0.00	0.00	**0.00**	N/M	**0.00**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15-Oct-03	0.00	**0.50**	0.00	0.00	0.00	0.00	**0.00**	0.00	0.00	0.00	0.00	**0.00**	0.00	**0.00**	**0.00**	**(0.10)**	(0.08)	0.00	0.00	**0.00**	N/M	**0.00**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16-Oct-03	0.00	**0.00**	0.00	0.00	0.00	0.00	**0.00**	0.00	0.00	0.00	0.05	**0.00**	0.00	**0.00**	**0.00**	**(0.16)**	(0.12)	(0.06)	0.00	**0.00**	N/M	**0.00**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17-Oct-03	0.00	**0.00**	0.00	0.00	0.00	0.00	**0.00**	0.00	0.00	0.00	0.00	**0.00**	0.00	**0.00**	**0.00**	**(0.06)**	(1.00)	(0.10)	0.00	**0.00**	N/M	**0.00**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20-Oct-03	0.00	**0.00**	0.00	0.00	0.00	0.00	**0.00**	0.00	**1.20**	**5.00**	0.00	**0.00**	0.00	**0.00**	**0.00**	**0.00**	0.00	0.00	0.00	**0.00**	N/M	**0.00**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21-Oct-03	0.00	**0.00**	0.00	0.00	0.00	0.00	**0.00**	0.00	0.00	0.00	0.00	**0.00**	0.00	**0.00**	**0.00**	**0.00**	0.00	0.00	0.00	**0.00**	N/M	**0.00**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22-Oct-03	0.00	**0.00**	0.00	0.00	0.00	0.00	**0.00**	0.00	0.00	0.00	0.00	**0.00**	0.00	**0.00**	**0.00**	**0.00**	0.00	0.00	0.00	**0.00**	N/M	**0.00**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23-Oct-03	0.00	**0.00**	0.00	0.00	0.00	0.00	**0.00**	0.00	0.00	0.00	0.00	**0.00**	0.00	**0.00**	**0.00**	**0.00**	0.00	0.00	0.00	**0.00**	N/M	**0.00**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24-Oct-03	0.00	**0.00**	0.00	0.00	0.00	0.00	**0.00**	0.00	0.00	0.00	0.00	**0.00**	0.00	**0.00**	**0.00**	**(0.23)**	(0.22)	(0.10)	0.00	**0.00**	N/M	**0.00**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27-Oct-03	0.00	**(0.20)**	0.00	0.00	(0.75)	0.00	**(0.08)**	(0.64)	**0.42**	2.85	0.00	**(0.10)**	0.00	**(1.00)**	**(0.09)**	**(5.00)**	(2.40)	(1.50)	0.00	**0.00**	N/M	**0.00**	0.00	0.00	0.00	**0.49**	0.00	0.00	**0.70**
28-Oct-03	0.00	**(1.20)**	0.00	**3.20**	(0.76)	0.00	**0.00**	**1.30**	**1.80**	**6.00**	0.00	**(0.07)**	**0.78**	**0.00**	**(0.80)**	**(5.00)**	(2.50)	(1.40)	0.00	**(0.55)**	N/M	**0.00**	0.00	0.00	0.00	**1.45**	0.00	0.00	0.00
29-Oct-03	(1.65)	**(0.20)**	0.00	(5.00)	(0.76)	0.00	**(1.05)**	(5.50)	(1.15)	(6.00)	0.00	**0.00**	(3.70)	**(0.08)**	**0.00**	**(4.00)**	(2.00)	(1.25)	**0.00**	**(0.08)**	N/M	**(0.34)**	0.00	0.00	(0.26)	(4.00)	0.00	0.00	0.00
30-Oct-03	0.00	**(1.00)**	0.00	(3.20)	(0.75)	0.00	**(0.80)**	(3.70)	(0.30)	(2.75)	0.00	**(0.25)**	(3.50)	**(0.60)**	**(0.30)**	**(5.00)**	**2.00**	(1.30)	0.00	**(0.70)**	N/M	**(0.20)**	(0.04)	(0.05)	0.00	0.00	0.00	0.00	0.00
31-Oct-03	(1.50)	**(0.90)**	0.00	(6.00)	(0.86)	0.00	**(0.50)**	(5.00)	(2.00)	(3.00)	0.00	**(0.50)**	0.00	**(0.30)**	**0.00**	**(7.00)**	(2.00)	(1.30)	**0.00**	**(0.70)**	N/M	**(0.40)**	0.00	0.00	0.00	0.00	0.00	0.00	0.00

NOTES: Blank space indicates no reading taken
Blue reading indicate a Tedlar bag sample for PID analysis was obtained
identifies locations currently connected to the vapor extraction system.

ERH SYSTEM VACUUM PIEZOMETER MONITORING DATA - PID

Lockformer - Lisle, IL

Date	Average Soil Temperature (degrees C)		Probe Identification																								
	Area 2	Area 1	VPZ-1	VPZ-2	VPZ-3	VPZ-4	VPZ-5	VPZ-6	VPZ-7	VPZ-8	VPZ-9	VPZ-10	VPZ-11	VPZ-12	VPZ-13	VPZ-14	VPZ-15	VPZ-16	VPZ-17	VPZ-18	VPZ-19	VPZ-20	VPZ-21	VPZ-22	VPZ-23	VPZ-24	VPZ-25
05-Jun-03			12.8	5.8	3.4	8.9	0.4	2.3	0.3	0.1	0.0	0.7	0.2	2.1	0.0	0.0	0.1	0.2	0.3	0.0	0.0	0.0	0.0	0.4	3.9	0.8	2.6
16-Jun-03																											
17-Jun-03																											
18-Jun-03																											
16-Jul-03	30	15																									
25-Jul-03	41	20				0.7		0.1	1.8							1.3	0.8	0.4			3.2		4.8	1.5			
31-Jul-03	44	23				6.7			4.8								4.2	7.6				0.5	5.8	2.4			
07-Aug-03	50	28		6.9	3.3			0.0	3.4					0.8			1.3	11.0				0.0	49.1				
13-Aug-03	55	33		4.1												2.0	2.2	13.0				0.0	112.0	3.8			
14-Aug-03	57	35		6.5												3.2	5.0	10.2				0.0	128.0	2.2			
20-Aug-03	60	41	3.8			3.6				8.7	0.9												119.0			1.2	
21-Aug-03	62	45		5.6				9.1	1.3		0.0					2.5	3.3					0.0	168.0	2.7			
22-Aug-03	62	45		2.2				0.0	1.8		0.0			0.0		0.4	1.5	15.2				0.4	216.0	2.3			
25-Aug-03	64	49																23.2					270.0				
26-Aug-03	64	49		29.8					20.1					7.3		11.3	8.6	21.0				93.5	332.0	0.8			
27-Aug-03	65	51		7.2					25.8		3.7			3.2		18.4	10.7	32.2				52.5	343.1	4.7			
28-Aug-03	65	51		8.2	8.8				16.3		0.1			7.7		12.2	10.5	9.4				25.1	136.0	3.1			
29-Aug-03	67	52		6.2	5.1			0.0	5.9	4.8	0.0			4.1		5.8	3.9	3.9				6.5	58.7	4.8			
02-Sep-03	69	54		1.0	2.9			0.4	5.0				1.6	4.0		3.3	2.0	8.4				0.5	37.4	2.8			
03-Sep-03				1.9	2.7				9.3		2.0	2.4		2.4		3.8	6.4	18.8				0.6	65.4	1.9			
04-Sep-03				2.5				1.1	4.9		2.8			1.2		5.7	6.1	8.3				11.3	60.2	2.0			
05-Sep-03				2.9					8.3		1.4			3.3		4.4	5.5	16.4				4.8	38.1	4.9			
08-Sep-03				1.4					4.4					2.6		1.8	2.2	11.3				3.2	7.3	2.1			
09-Sep-03				5.6				1.2	13.3		0.3	5.3		12.8		13.9	10.1	13.1				38.5	289.0	1.6			
10-Sep-03				6.0				0.8	8.0		0.0	4.0		14.0		9.2	12.0	10.0				26.2	250.0	1.0			
11-Sep-03					30.8				35.6					27.9		26.1	37.3	30.3		14.1		17.3	90.7	22.2			
12-Sep-03				93.3					40.2		32.8	30.2		33.5		33.9	33.9	53.1				17.7	120.2	47.1			
15-Sep-03				80.0					36.1					20.7		27.9	29.4	45.2				15.0	86.2	40.0			
16-Sep-03				37.7	44.4				24.4	8.0	1.2	12.3		25.3		18.7	17.6	28.5				51.8	300.0	3.9			
17-Sep-03				39.9	41.1				25.5	10.0	2.8	8.9		27.1		20.4	16.2	29.2				47.2	298.5	2.8			
18-Sep-03				*					*		*			*		*	*	*		*		*	*	*			
19-Sep-03				28.7				3.1	19.0		2.6			12.4		11.3	14.6	18.2				11.0	393.0	5.7			
22-Sep-03				10.9	12.8				9.7	13.3	1.3	6.3		15.1		10.7	12.9	32.2				7.0	146.2	5.6			
23-Sep-03				149.0					20.3		5.1			15.6		22.0	21.9	35.4				16.4	277.0	2.7			
24-Sep-03				28.5	34.2				16.2		9.2			7.4		15.3	14.5	21.0				15.3	345.0	6.1			
25-Sep-03				32.1					14.4		10.6			6.2		20.1	17.9	19.5				18.1	406.0	10.2			
29-Sep-03				7.6					23.0		3.1			6.0		4.0	8.8	9.6				30.3	583.0	3.3			
30-Sep-03				32.3					16.0					6.3		2.5	3.0	8.6				5.1	298.0	286.0			
01-Oct-03				44.7					45.3					8.6		6.4	7.2	6.3				12.1	275.0	15.5			
02-Oct-03				38.6					33.7					14.0		19.9	15.9	22.0				13.5	483.0	11.5			
06-Oct-03				10.0					13.0					9.1		9.5	5.7	38.3				8.9	634.0	4.3			
07-Oct-03				51.8					13.0					21.2		53.2	31.0	49.2				11.8		8.6			
08-Oct-03				8.6					7.4					8.9		6.4	6.5	9.2				3.6		9.6			
09-Oct-03				6.3					7.1					5.8		17.6	6.9	27.5				4.8		6.9			
10-Oct-03				4.8					4.4					2.2		3.9	3.7	5.3				3.1		4.1			

ERH SYSTEM VACUUM PIEZOMETER MONITORING DATA - PID

Lockformer - Lisle, IL

Date	Average Soil Temperature (degrees C)		Probe Identification																								
	Area 2	Area 1	VPZ-1	VPZ-2	VPZ-3	VPZ-4	VPZ-5	VPZ-6	VPZ-7	VPZ-8	VPZ-9	VPZ-10	VPZ-11	VPZ-12	VPZ-13	VPZ-14	VPZ-15	VPZ-16	VPZ-17	VPZ-18	VPZ-19	VPZ-20	VPZ-21	VPZ-22	VPZ-23	VPZ-24	VPZ-25
13-Oct-03					2.5				11.9		0.0	8.6		5.0		3.0	2.4	60.5				2.4		4.1			
15-Oct-03				3.3					1.9					2.8		1.5	2.3	2.8				0.0		2.5			
16-Oct-03				4.5					3.2					3.5		2.6	3.0	6.0				1.6		3.5			
17-Oct-03				4.0					3.7					2.6		3.2	3.5	5.8				2.1		3.9			
20-Oct-03				22.7					4.9		0.0	5.4		4.4		5.4	3.8	32.0				4.2		3.6			
21-Oct-03				14.7					5.8					2.7		3.9	6.2	21.9				3.9		2.4			
22-Oct-03				15.2					6.3					3.8		4.1	5.4	25.5				4.6		3.6			
23-Oct-03				18.3					6.2					5.1		5.6	4.0	38.0				5.0		2.9			
24-Oct-03				4.0					2.3					1.8		1.6	2.0	2.7				2.5		2.1			
27-Oct-03				0.9					0.8		0.0			0.7		0.6	0.7	1.8				0.8		1.3			
28-Oct-03				2.2		1.1			1.0	1.4	0.0	5.8		0.4	0.6	1.9	0.6	1.8				0.9		1.1			
29-Oct-03				6.6					1.0					0.4		0.6	0.7	4.0			1.1	0.7		1.1			
30-Oct-03				5.6					1.1					1.1		1.1	1.4	4.5	1.1			1.1		1.0			
31-Oct-03				2.2					1.0					0.8		0.6	1.1	3.6			1.6	0.7					

NOTES: Blank space indicates no reading taken.
Samples collected in Tedlar bag and analyzed with PID.
[ ] identifies locations currently connected to the vapor extraction system.
* identifies suspect PID results associated with faulty PID calibration.
PID readings are in ppmv

TABLE 8
Summary of Analytical Results
Liquid Phase Remediation System Granulated Activated Carbon Units

The Lockformer Company / Lisle, Illinois

SAMPLE DATE	LOCATION	FIRST ENVIRONMENTAL LABORATORIES		COLUMBIA ANALYTICAL	
		COMPOUND	RESULTS (ug/L)	COMPOUND	RESULTS (ug/L)
07/08/03	LPGAC01 (Liquid Phase Inlet)	TCE	<1.0	NA	NA
		cis-1,2-DCE	<1.0		
		Carbon Disulfide	3.2		
		Ethyl benzene	5.1		
		Xylenes (total)	49.8		
		Tetrahydrofuran (TIC)	45		
	LPGAC02 (Liquid Phase Intermediate)	TCE	<1.0	NA	NA
		cis-1,2-DCE	<1.0		
		Ethyl benzene	34.1		
		4-Methyl-2-pentanone	19.6		
		Xylenes (total)	191		
		Tetrahydrofuran (TIC)	16		
	LPGAC03 (Liquid Pase Effluent)	TCE	<1.0	NA	NA
		cis-1,2-DCE	<1.0		
		2-Butanone	182		
		Carbon disulfide	14.7		
		Tetrahydofuran (TIC)	328		
07/17/03	LPGAC01	TCE	<1.0	NA	NA
		cis-1,2-DCE	1.0		
		Acetone	35.2		
		2-Butanone	8.7		
	LPGAC02	TCE	<1.0	NA	NA
		cis-1,2-DCE	<1.0		
	LPGAC03	TCE	<1.0	NA	NA
		cis-1,2-DCE	<1.0		
07/29/03	LPGAC01	TCE	6.3	NA	NA
		cis-1,2-DCE	11.1		
		Acetone	127		
		2-Butanone	29.9		
	LPGAC02	TCE	<1.0	NA	NA
		cis-1,2-DCE	<1.0		
	LPGAC03	TCE	<1.0	NA	NA
		cis-1,2-DCE	<1.0		
08/07/03	LPGAC01	TCE	0.0109	NA	NA
		cis-1,2-DCE	0.0098		
		Acetone	0.109		
		Carbon disulfide	0.0337		
	LPGAC02	TCE	<0.0001	NA	NA
		cis-1,2-DCE	<0.0001		

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SAMPLE DATE	LOCATION	FIRST ENVIRONMENTAL LABORATORIES		COLUMBIA ANALYTICAL	
		COMPOUND	RESULTS (ug/L)	COMPOUND	RESULTS (ug/L)
08/07/03	LPGAC03	TCE	<0.0001	NA	NA
		cis-1,2-DCE	<0.0001		
08/12/03	LPGAC01	TCE	13.9	NA	NA
		cis-1,2-DCE	<1.0		
		Acetone	135		
		2-Butanone	42.1		
		trans-1,2-DCE	16.5		
		Toluene	1.2		
	LPGAC02	TCE	<1.0	NA	NA
		cis-1,2-DCE	<1.0		
		Acetone	20.6		
	LPGAC03	TCE	<1.0	NA	NA
		cis-1,2-DCE	<1.0		
08/22/03	LPGAC01	TCE	45.9	NA	NA
		cis-1,2-DCE	44.0		
		Acetone	244		
		2-Butanone	85.2		
		Toluene	6.4		
	LPGAC02	TCE	<1.0	NA	NA
		cis-1,2-DCE	<1.0		
		Acetone	104		
	LPGAC03	TCE	<1.0	NA	NA
		cis-1,2-DCE	<1.0		
		Acetone	18.5		
08/29/03	LPGAC01	TCE	42.3	NA	NA
		cis-1,2-DCE	49.1		
		Acetone	744		
		2-Butanone	177		
		trans-1,2-DCE	1.6		
		Toluene	7.3		
	LPGAC02	TCE	<1.0	NA	NA
		cis-1,2-DCE	<1.0		
		Acetone	184		
		2-Butanone	8.4		
	LPGAC03	TCE	<1.0	NA	NA
		cis-1,2-DCE	<1.0		
		Acetone	41.5		

TABLE 8
Summary of Analytical Results
Liquid Phase Remediation System Granulated Activated Carbon Units

The Lockformer Company / Lisle, Illinois

SAMPLE DATE	LOCATION	FIRST ENVIRONMENTAL LABORATORIES		COLUMBIA ANALYTICAL	
		COMPOUND	RESULTS (ug/L)	COMPOUND	RESULTS (ug/L)
09/03/03	LPGAC01	TCE	60	NA	NA
		cis-1,2-DCE	74.8		
		Acetone	805		
		2-Butanone	154		
		Toluene	12.8		
	LPGAC02	TCE	<1.0	NA	NA
		cis-1,2-DCE	<1.0		
		Acetone	538		
		2-Butanone	26.2		
	LPGAC03	TCE	<1.0	NA	NA
		cis-1,2-DCE	<1.0		
		Acetone	154		
09/09/03	LPGAC01	TCE	78.6	NA	NA
		cis-1,2-DCE	75.4		
		Acetone	1,180		
		2-Butanone	173		
		trans-1,2-DCE	2.3		
		Toluene	15.9		
	LPGAC02	TCE	<1.0	NA	NA
		cis-1,2-DCE	2.1		
		Acetone	961		
		2-Butanone	33		
	LPGAC03	TCE	<1.0	NA	NA
		cis-1,2-DCE	<1.0		
		Acetone	447		
09/15/03	LPGAC01			NA	NA
	LPGAC02			NA	NA
	LPGAC03			NA	NA
09/18/03	LPGAC01	TCE	78.7	NA	NA
		cis-1,2-DCE	66.2		
		Acetone	1,330		
		2-Butanone	239		
	LPGAC02	TCE	<1.0	NA	NA
		cis-1,2-DCE	<1.0		
		Acetone	672		
		2-Butanone	11.5		

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Liquid Phase Remediation System Granulated Activated Carbon Units

The Lockformer Company / Lisle, Illinois

SAMPLE DATE	LOCATION	FIRST ENVIRONMENTAL LABORATORIES		COLUMBIA ANALYTICAL	
		COMPOUND	RESULTS (ug/L)	COMPOUND	RESULTS (ug/L)
09/18/03	LPGAC03	TCE	<1.0	NA	NA
		cis-1,2-DCE	<1.0		
		Acetone	11.3		
09/23/03	LPGAC01	TCE	148	NA	NA
		cis-1,2-DCE	195		
		trans-1,2-DCE	5.1		
		Acetone	1,490		
		2-Butanone	264		
		4-Methyl-2-pentanone	9.0		
		Toluene	45.3		
	LPGAC02	TCE	<1.0	NA	NA
		cis-1,2-DCE	<1.0		
		Acetone	810		
		2-Butanone	18.9		
	LPGAC03	TCE	<1.0	NA	NA
		cis-1,2-DCE	<1.0		
		Acetone	145		
09/30/03	LPGAC01	TCE	280	NA	NA
		cis-1,2-DCE	399		
		trans-1,2-DCE	15.9		
		Acetone	3,820		
		2-Butanone	57.9		
		4-Methyl-2-pentanone	26.8		
		Toluene	108		
	LPGAC02	TCE	<1.0	NA	NA
		cis-1,2-DCE	<1.0		
		Acetone	1,370		
		2-Butanone	38.8		
	LPGAC03	TCE	<1.0	NA	NA
		cis-1,2-DCE	<1.0		
		Acetone	843		
10/27/03	LPGAC01				
	LPGAC02				
	LPGAC03				

NOTES: NA = Not Analyzed
TIC = Tentatively Identified Compound
Blank cells = Samples submitted. Results not yet received.