CITY OF ELMIRA

DATA USABILITY SUMMARY REPORT

FOR THE
FORMER AMERICAN LAFRANCE SITE
100 LAFRANCE STREET
ELMIRA, NEW YORK

MUNICIPAL ASSISTANCE BROWNFIELD PROGRAM

N Y S D E C
1996 CLEAN WATER / CLEAN AIR BOND ACT
ENVIRONMENTAL RESTORATION PROJECTS

SUBMITTED TO:

NYS DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF ENVIRONMENTAL REMEDIATION
AND
NYS DEPARTMENT OF HEALTH

PREPARED BY:

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MAY, 2000
FE PROJECT NO. 97.150

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May 16, 2000

Steve Degerdon
Fagan Engineers
113 East Chemung Pl.
Elmira, NY 14904

RE: **D**ata **U**sability **S**ummary **R**eport (DUSR) for the American LaFrance Site Data Packages
Friends Laboratory, Inc. data package Nos. 35879, 36702, 37275, 388897, 38952, 39015, 39061, 39290, 39385, 39569, 39648, and 41196

Dear Mr. Fagan

Review has been completed for the data packages generated by Friends Laboratory, Inc., pertaining to samples collected 6/29/99 through 11/2/99 at the American La Franc site. Nine aqueous, one tar, and eighteen soil field samples were analyzed for the full TCL organics and TAL metals. Five more soil samples were analysed for the full TCL/TAL analyte list, with the exclusion of volatile parameters, two test pit samples were analyzed for metals only, and three soil samples were processed for PCBs only. Cyanide was processed for some, but not all, of the samples. An additional sample was collected and reported for TCLP parameters, but validation of it was not performed. Matrix spikes, trip blanks, and a field blank were processed. Methodologies utilized are those of the USEPA SW846.

The data packages submitted contained full deliverables for validation, but this usability report is generated from review of the summary form information, with review of sample raw data, and some review of associated QC raw data. Full validation has not been performed. However, the reported summary tables and sample data have been reviewed (using the project QAPP and USEPA National and Regional validation guidelines) for application of validation qualifiers, as affects the usability of the sample data. The following items were reviewed:

* Laboratory Narrative Discussion
* Custody Documentation
* Holding Times
* Surrogate and Internal Standard Recoveries
* Matrix Spike Recoveries/Duplicate Correlations
* Field Duplicate Correlations
* Preparation/Calibration Blanks
* Control Spike/Laboratory Control Samples
* Instrumental Tunes
* Calibration Standards
* Instrument IDLs
* Method Compliance

Those items listed above which show deficiency are discussed within the text of this narrative. Unless noted herein, all other items were determined to be acceptable for the DUSR level of review.

In summary, most sample reported values are usable as reported, or with minor qualification as estimated ("J" qualifier). In most cases, there expected variances in reported results from actual are not likely to exceed a factor of two. The exception is the detected metals results for one sample, most of which are not usable. Those items of most concern are:

1. One field blank was processed, and it was associated with a single aqueous sample. No equipment blanks were submitted. The field blank that was reported showed significant concentrations of several elements, up to 58,200 ug/l. Results for eight elements in the associated sample, which is a background sample, are therefore not usable.
2. Thallium produced large negative responses in most calibration and preparation blanks. Therefore all project sample thallium results are estimated ("J"), possibly biased low.
3. Although the laboratory reported a-chlordane and g-chlordane, the analysis was actually for technical chlordane, and the report forms should be edited accordingly.
4. Field duplicate evaluation showed several instances of poor correlation, including numerous metal parameters. There are also several instances of detection versus nondetection of organic components. These generally involve low level concentrations which do not affect the usability of the data at concentrations of concern for this project.
5. The laboratory report form for W-ALFGWDUP-100799 failed to include the analyte endrin ketone. The raw data shows that the result should be nondetection at 0.05 ug/L ("0.05 U").
6. Volatile and semivolatile Tentatively Identified Compounds (TICs) were reported, but poorly characterized; most were reported as "Unknown." Review of the associated raw data shows most sample TICs to be mixtures of aliphatic hydrocarbons and aromatic hydrocarbons.
7. Additional qualifications due to standard or blank responses, or to sample matrix effect, are discussed specifically below.

Copies of the laboratory case narratives and laboratory NYSDEC Sample Analytical Requirement Summary Forms are attached to this text, and should be reviewed in conjunction with this report. A summary of validation qualifier definitions is also attached.

The following text discusses quality issues of concern. Minor errors in summary form entries not affecting sample reported results are not noted within this report. Please see the last section of this narrative, discussing data package completeness.

Accuracy and Precision

Soil matrix spike/duplicate evaluations were performed on S-ALFH4-062999, S-ALFB1-100599, ALF-TPB-080399 (metals only), S-ALFTPJ-080999 (metals spike evaluation only), S-ALFG8B-092399 (organics only), and S-ALFG2A092399 (mercury only).

Aqueous matrix spike/duplicate evaluations were performed W-ALFMW3-110299, W-ALF-GW2092299 (selenium only), W-ALFGW1-092199 (mercury only), ALFGW3-092499 (BNA only), and W-ALFB1W-100499 (metals duplicate evaluation only).

Most accuracy and precision values were acceptable, or showed slightly outlying responses (i.e. elevated recoveries or duplicate correlations for components not detected in the samples), not indicating qualification of associated results. The exceptions, which include metals recoveries, are listed specifically in the sections below.

Field Duplicate Correlation

Soil field duplicate evaluation was performed on project samples S-ALFH1-062999 and S-ALF-G7-100599. Correlations for S-ALFG7-100599 were acceptable with the exception of those of trichloroethene (nondetection at 660 ug/kg versus detection at 910 ug/kg), antimony, and calcium. Results for trichloroethene are qualified estimated in the sample and its duplicate. Results for the two elements are qualified estimated in all soil samples of that matrix.

Correlations for S-ALFH1-062999 showed significant variances for PCB Aroclor 1260 (at 0.05 mg/kg versus detection at 0.65 mg/kg). This may result from sample nonhomogeneity, and other project results should be used with this consideration. The detected PAH analytes in the BNA fraction showed about a five fold variance between the sample and its duplicate, and both showed matrix effect on analytes recovery. Bis(2-ethylhexyl)phthalate also showed significant variance, with nondetection at 290 ug/kg versus detection at 2000 ug/kg. Results for those detected BNA analytes and Aroclor 1260 in the sample and its duplicate are to be qualified as estimated ("J"). Metals cadmium, chromium, mercury, sodium, and zinc also showed variances, and results for these five elements in the samples of that matrix are qualified as estimated.

Aqueous field duplicate evaluation for all TCL/TAL analytes was performed on W-ALFGW1-092199 (volatile collected and reported separately). However, the sample and its duplicate were collected 16 days apart from one another. All organic parameters showed acceptable correlation except bis(2-ethylhexyl)phthalate (nondetection at 5 ug/L versus detection at 47 ug/L). That compound is qualified and considered estimated in the groundwater samples. Metals chromium, copper, cobalt, iron, manganese, nickel, sodium, zinc, and vanadium showed significant variance to indicate qualification of reported results as estimated in all groundwater samples.

Other QC issues of note are discussed in the sections below:

AQUEOUS SAMPLES

TCL Volatile Analyses by EPA8260

Due to copresence in the associated field blank, the detection of acetone in W-ALFGW1B-100499 is considered contamination, and results should be edited to nondetection ("U").

Calibration standard responses were reviewed for impact on sample reported results, and none of significance were noted.

TCL Semivolatile Analyses by EPA8270

Although not detected in all associated method blanks, and therefore not edited as such, low level detections of phthalates are suspect as contamination, and should be regarded with caution. This is further indicated by the poor field duplicate correlation of bis(2-ethylhexyl)phthalate, and the presence in a field blank.

Due to low responses in the continuing calibration standard, results for benzo(g,h,i)perylene in S-ALFH4-062999 is considered estimated, possibly biased low.

All Tentatively Identified Compounds (TICs) reported in the samples which are flagged as "A" or "B" are rejected, as they were detected in the associated method blanks or are extraction artifacts.

TCL Pesticide/PCB Analyses by EPA8081/8082

The raw data submitted in the data packages includes only edited integration reports, generated following the analyst review. Without the initial software evaluation, with the scaling of the provided chromatograms, and with data from only one analysis column (for those samples not reporting detection), it is not possible during validation to verify that no pesticide false negatives have been reported for those samples showing significant amounts of instrument response. Therefore the integrity of the reported results for many of the samples is dependent on the analyst review. Full validation could involve significant laboratory resubmittals.

Calibration standard responses were reviewed for impact on sample reported results, and none of significance were noted.

TAL Metals/Cyanide by 6000/7000

The field blank associated with aqueous sample W-ALFB1W-100499 showed elevated concentrations of nine elements. Those with concentrations below 5 times the blank level in the sample are considered possible external contamination, and results are not usable, except for consideration as elevated reporting limits. Those affected are: barium, calcium, iron, magnesium, mercury, potassium, sodium, and zinc.

Due to low matrix spike recovery of antimony in W-ALFMW3-110299 (60%), reported results for antimony in the groundwater samples should be considered estimated ("J" qualifier).

Cadmium also showed outlying laboratory duplicate correlation for W-ALFB1W-100499, and results for that element in the sample should therefore be qualified as estimated.

Arsenic produced elevated noncompliant calibration standard responses in analyses associated with samples W-ALFMW2-110299 and W-ALFMW3-110299. Results for that element in those two samples are therefore considered estimated. The associated arsenic LCS was also slightly above allowable limits, at 121%.

Low level standards (CRI/CRAs) recoveries and ICP serial dilution evaluations are reported in some instances for some of the elements. These QC evaluations are not required by SW846, although they are for CLP or ASP processing. Those reported for this project have been evaluated for effect on associated sample results. Outlying CRI/CRA values indicate poor instrument sensitivity at low concentrations. Outlying serial dilution evaluations indicate possible matrix effect.

The CRA standard associated with samples collected 11/02/99 produced a low CRA recovery (56%), and results for mercury in the samples should therefore be qualified as estimated, with a possible low bias.

Due to noncompliant negative response for silver in an initial calibration blank and low recoveries in the CRI standards, the results for that analyte in W-ALFB1W-100499 and the associated field blank are to be qualified as estimated.

The ICP serial dilutions of W-ALFGW4-092499 and W-ALFGW2A-092499 were acceptable.

SOIL SAMPLES

TCL Volatile Analyses by EPA8260

Sample S-ALFG8A-092399 showed slightly outlying recoveries of internal and surrogate standards, possibly indicating a matrix effect on target analyte recovery. All reported results for that sample should be considered estimated ("J" and "UJ"), with a possible small bias.

Carbon tetrachloride was erroneously reported as a detection for a method blank and set of matrix spikes in the data package pertaining to samples collected 9/21/99 to 9/24/99. These are apparent transcription errors to the Form 1's for those analyses. Sample reported results are unaffected.

Calibration standard responses were reviewed for impact on sample reported results, and none of significance were noted.

TCL Semivolatile Analyses by EPA8270

Sample S-ALFH1-062999 showed low response for internal standard d12-perylene, indicating matrix effect. Results for seven associated analytes (the last seven on the report form) are to be qualified as estimated ("J"). The laboratory applied this qualifier to all applicable except di-n-octylphthalate, the result for which should also be qualified as "J".

Samples S-ALFG4A-100599 and S-ALFTPH1-081099 showed low responses for internal standard d12-perylene due to matrix effect. Results for seven associated analytes (the last seven on the report form) are to be qualified as estimated ("J").

Sample S-ALFHDUP-062999 showed a slightly low response for one internal standard (49.55%, below the 50% limit). The laboratory reported some of the associated analytes as estimated ("J" flag). However, due to acceptance by round off, those qualifiers can be removed from the last six compounds reported on that analyte list.

Di-n-butylphthalate and bis(2-ethylhexyl)phthalate detections in S-ALFTH1-081099, and all phthalate detections in samples collected 10/05/99, should have been flagged as "B" by the laboratory, to indicate copresence in the associated blank. The detections are considered contamination, and should be edited to nondetection at the CRDLs, or originally reported values, whichever are greater.

Although not detected in all associated method blanks, and therefore not edited as such, low level detections of phthalates are suspect as contamination, and should be regarded with caution. This is further indicated by the poor field duplicate correlation of bis(2-ethylhexyl)phthalate, and the presence in a field blank.

Calibration standard responses were reviewed for impact on sample reported results, and none of significance were noted.

All Tentatively Identified Compounds (TICs) reported in the samples which are flagged as "A" or "B" are rejected, as they were detected in the associated method blanks or are extraction artifacts. TICs reported with CAS numbers should also have been flagged as "N" by the laboratory to indicate tentative identification.

TCL Pesticide/PCBs by EPA8081/8082

Due to low surrogate recoveries (10% to 23%), the reported results for S-ALFG9-092999, S-ALFGS1-100599, and S-ALFB2A-100599 are considered estimated ("UJ"), with a low bias. The fist of those samples was included in a failed extraction batch, and was not reextracted due to having already discarded the sample.

Samples S-ALFPCBA-100599, S-ALFPCBB-100599, and S-ALFPCBC-100599 were processed in a batch with failed surrogate and spike recoveries for associated QC. Although the surrogate recoveries of the samples themselves were acceptable, evaluation of associated control spike recovery is not possible, and the samples results are therefore recommended for qualification as estimated.

The Aroclor 1260 result for S-ALFHDUP-062999 should be considered estimated ("J") due to outlying dual column quantitative correlation (38%D).

The raw data submitted in the data packages includes only edited integration reports, generated following the analyst review. Without the initial software evaluation, with the scaling of the provided chromatograms, and with data from only one analysis column (for those samples not reporting detection), it is not possible during validation to verify that no pesticide false negatives have been reported for those samples showing significant amounts of instrument response. Therefore the integrity of the reported results for many of the samples is dependent on the analyst review. Full validation would involve significant laboratory resubmittals.

Calibration standard responses were reviewed for impact on sample reported results, and none of significance were noted.

TAL Metals/CN by 6000/7000

Due to low matrix spike recoveries (47% to 61%) in S-ALFTPB-080399, reported results for antimony, barium, and cadmium in the test pit samples should be considered estimated ("J" qualifier).

Due to low matrix spike recoveries (32% and 40%) in S-ALFH4-062999, reported results for antimony and lead in the soils collected in June 1999 should be considered estimated ("J" qualifier). Antimony produced a noncompliant elevated recovery in the associated Laboratory Control Sample (LCS).

Due to outlying matrix spike recoveries in S-ALFB1-100599, reported results for barium (218%), antimony (73%), and mercury (74%) in the soil samples in SDG 39659 should be considered estimated ("J" qualifier). The expected bias for the latter two elements is not likely significant (lower acceptance limit is 75%).

Due to outlying matrix spike recoveries in S-ALFTPJ-080999, reported results for manganese (138%), zinc (133%), antimony (74%), and mercury (127%) in S-ALFTPJ-080999 and S-ALFTPH1-081099 should be considered estimated ("J" qualifier). The expected bias for the latter two elements is not likely significant (acceptance limits are 75%-125%).

Low level standards (CRI/CRAs) recoveries and ICP serial dilution evaluations are reported in some instances for some of the elements. These QC evaluations are not required by SW846, although they are for CLP or ASP processing. Those reported for this project have been evaluated for effect on associated sample results. Outlying CRI/CRA values indicate poor instrument sensitivity at low concentrations. Outlying serial dilution evaluations indicate possible matrix effect.

Cadmium results for the samples collected 6/29/99, 8/09/99, 8/10/99 and should be qualified estimated due to low CRI recovery (45% to 69%).

Silver results reporting detection in the samples collected 10/05/99 should be qualified estimated due to elevated CRI recovery (135% to 140%).

In addition to the qualification of thallium in all samples, noted above, the silver results for samples collected 09/21/99 through 09/24/99 are also to be qualified as estimated due to low negative response in the associated preparation blank.

Antimony was reported at elevated detection limits in S-ALFG1A-092399 and S-ALFG13A-092499 due to analysis at dilution because of apparent matrix effect.

The ICP serial dilution of S-ALFHDUP-062999 was acceptable.

GENERAL

Custody Documentation

Chain of custody forms consistently involve omission of a final relinquish signature. A memorandum to the file should be made to clarify the custody transfers.

One of the custodies (9/24/99) showed an apparent transcription error in receipt time. Some of the custodies did not designate the number of containers provided. Uninitialed strikeovers were present. All edits should be initialed and dated. Preservations should be noted.

Some of the coolers were received at elevated temperatures (all below 20 degrees C), but they involved samples collected that same day, and that were in the process of cooling down. No qualification is recommended.

Data Package Completness

Although all information required for the DUSR level of validation was present in the data packages, the packages were not compiled in sufficient accordance with NYSDEC ASP Category B (QAPP requirement) as to readily allow the DUSR review. Specifically, some of the summary forms contained insufficient information (ex. metals spike and duplicate summary forms do not reference the identification of the sample spiked; sample weights, final volumes, dilution factors, and extraction dates are not on the organic result report forms, etc). Other summary forms contain information indicating serious quality issues not discussed in the narratives, but potentially effecting sample reported results (ex. outlying blank or calibration standard responses in metals analysis). Consequently, in order to evaluate the validity and usability of the sample results, review of much of the raw data and preparation logs was required to verify compliance of the sample and associated QC. In most cases, it was determined that outlying responses were in metals controls not associated with the project samples.

No summaries of breakdown and resolution were provided for the pesticide analyses. Random review of raw data showed acceptable responses.

Pesticide report forms show only one surrogate standard recovery. Both were available in, and reviewed from, the raw data.

Two compliant volatile pesticide standard responses were erroneously reported as noncompliant recoveries.

The laboratory reported %RPD values on the pesticide Form 10's, not the required %D values.

Organic data package Form 1's (including those for blanks) all report soil sample pHs as 14. The actual sample pH should be reflected on the form.

Some of the volatile data package Form 1's report analytes not requested or processed, reported as nondetection at 0 ppb. These should have been removed from those report forms.

Some of the semivolatile data package Form 1's do not include certain analytes. Results report forms in the data package do report them.

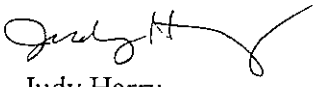
Although soil volatile and semivolatile target analytes are reported as ppb, the associated TICs are reported as ppm. Many of the volatile TICs are reported beyond the elution range of the target analytes, and therefore may also be reported as semivolatile TICs.

Numerous edits were made 11 days after analysis to raw pesticide/PCB data sample laboratory ID numbers for samples collected 10/05/99. The edits involved correction of apparent transcription errors, but should have been reviewed and performed at the time of analysis. This is particularly important when client IDs are not present in the raw data.

There are no client IDs present anywhere in the data provided for the metals analyses, and rarely reference in the organic sections. The only place they are cross referenced to laboratory IDs are on the final report forms which are generated for the final data package reporting. Category B deliverables requires that the client ID be present on raw data.

Please do not hesitate to contact me if questions or comments arise during your review of this report.

Very truly yours,



Judy Harry

Att.

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SAMPLE IDENTIFICATION AND
ANALYTICAL REQUIREMENT SUMMARY

Customer Sample Code	Laboratory Sample Code	ANALYTICAL REQUIREMENTS					
		VOA GC/MS	BNA GC/MS	VOA GC	PCB PEST	METALS	OTHER
S-ALFH1-062999	L35879-1		*		*	*	*
S-ALFH2-062999	L35879-2		*		*	*	*
S-ALFH3-062999	L35879-3		*		*	*	*
S-ALFH4-062999	L35879-4		*		*	*	*
S-ALFH4-062999, L35879-4MS	L35879-5		*		*	*	*
S-ALFH4-062999, L35879-4MSD/DUP	L35879-6		*		*	*	*
S-ALFHDUP-062999	L35879-7		*		*	*	*

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NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SAMPLE IDENTIFICATION AND
ANALYTICAL SUMMARY REQUIREMENT

Customer Sample Code	Laboratory Sample Code	ANALYTICAL REQUIREMENTS					
		VOA GC/MS	BNA GC/MS	VOA GC	PCB PEST	METALS	OTHER
S-ALFTPB-080399	L36702-1					*	

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SAMPLE IDENTIFICATION AND
ANALYTICAL SUMMARY REQUIREMENT

Customer Sample Code	Laboratory Sample Code	ANALYTICAL REQUIREMENTS					
		VOA GC/MS	BNA GC/MS	VOA GC	PCB PEST	METALS	OTHER
S-ALFTPJ-080999	L37275-1					*	
TARS-ALFTPH1-081099	L37275-2	*	*		*	*	

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10/13/99

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SAMPLE IDENTIFICATION AND
ANALYTICAL SUMMARY REQUIREMENT

Customer Sample Code	Laboratory Sample Code	ANALYTICAL REQUIREMENTS					
		VOA GC/MS	BNA GC/MS	VOA GC	PCB PEST	METALS	OTHER
W-ALFGW1092199	L38897-1		*		*	*	
W-ALFGW2092299	L38952-1	*	*		*	*	
S-ALFGW1A092399	L39061-1	*	*		*	*	
S-ALFG1A092399	L39061-2	*	*		*	*	
S-ALFG2A092399	L39061-3	*	*		*	*	
S-ALFG3A092399	L39061-4	*	*		*	*	
S-ALFG8A092399	L39061-5	*	*		*	*	
S-ALFG8B092399	L39061-6	*	*		*	*	
S-ALFGW2A092499	L39061-7	*	*		*	*	
S-ALFG13A092499	L39061-8	*	*		*	*	
S-ALFGW4092499	L39061-9	*	*		*	*	
ALFGW3092499	L39061-10	*	*		*	*	
WALFGW44092399	L39015-1	*	*		*	*	
TRIP BLANK 09/24/99	L39015-2	*					

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NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SAMPLE IDENTIFICATION AND ANALYTICAL REQUIREMENT SUMMARY

Customer Sample Code	Laboratory Sample Code	ANALYTICAL REQUIREMENTS					
		VOA GC/MS	SV GC/MS	VOA GC	PCB PEST	METALS	OTHER
S-ALFG9092999	L39290-1	*	*		*	*	
W-ALFB1W100499	L39385-1	*	*		*	*	
W-ALFGW1B100499	L39385-2	*					
W-ALFFB100499	L39385-3	*	*		*	*	
TRIP BLANK	L39385-4	*					

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SAMPLE IDENTIFICATION AND
ANALYTICAL SUMMARY REQUIREMENT

Customer Sample Code	Laboratory Sample Code	ANALYTICAL REQUIREMENTS					
		VOA GC/MS	BNA GC/MS	VOA GC	PCB PEST	METALS	OTHER
S-ALFG7100599	L39569-1	*	*		*	*	
S-ALFGS100599	L39569-2	*	*		*	*	
S-ALFDUP100599	L39569-3	*	*		*	*	
S-ALFG4A100599	L39569-4	*	*		*	*	
S-ALFGW3A100599	L39569-5	*	*		*	*	
S-ALFB1100599	L39569-6	*	*		*	*	
S-ALFB1100599, L39569-6MS	L39569-7	*	*		*	*	
S-ALFB1100599, L39569-6MSD/DUP	L39569-8	*	*		*	*	
S-ALFB2A100599	L39569-9	*	*		*	*	
S-ALFPCBA100599	L39569-10				*		
S-ALFPCBB100599	L39569-11				*		
S-ALFPCBC100599	L39569-12				*		
S-ALFB2B100599	L39569-13	*	*		*	*	
W-ALFGWDUP100799	L39648-1	*	*		*	*	
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NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SAMPLE IDENTIFICATION AND
ANALYTICAL REQUIREMENT SUMMARY

Customer Sample Code	Laboratory Sample Code	ANALYTICAL REQUIREMENTS					
		VOA GC/MS	BNA GC/MS	VOA GC	PCB PEST	METALS	OTHER
W-ALF-MW1-110299	L41196-1	*	*		*	*	
W-ALF-MW3-110299	L41196-2	*	*		*	*	
W-ALF-MW3, L41196-2MS	L41196-3	*	*		*	*	
W-ALF-MW3, L41196-2MSD/DUP	L41196-4	*	*		*	*	
W-ALF-MW2-110299	L41196-5	*	*		*	*	
TRIP BLANK	L41196-6	*					

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Friend
Laboratory
I.N.C.

Laboratory Validation and Usability Assessment

Project: American LaFrance
Project # 97-150 NYS ID# B00011-8
Sampled June 29, 1999

The data reported in this package have been reviewed for compliance with QC acceptance limits as specified in the method cited for each analysis.

These statistical limits are typically based on historical laboratory data for a given sample matrix, and will not exceed any default limits specified by the method. CLP acceptance limits are also considered.

The following Quality Control operations are considered in the validation of reported results:

Holding times, surrogate recovery, spiked sample recovery, duplicates/spiked duplicate precision, tuning criteria, internal standard variation, continuing calibration variation, reference (check) sample recovery, and instrument, method, trip and field blanks. The appropriate frequency for each operation is also considered.

Every effort has been made to report data that is compliant with the EPA methodology cited for each analysis. In cases where the laboratory was unable to meet all method requirements prior to sample expiry, either due to the nature of the sample or other technical difficulty, results are reported with qualification with the understanding that qualified results may not be suitable for compliance purposes. The internal technical review is based on the USEPA Contract Laboratory Program *National Functional Guidelines for Organic Review* (EPA 540/R-94/012, February 1994) and *National Functional Guidelines for Inorganic Review* (EPA 540/R-94/013, February 1994).

Validation

Semivolatiles

Seven site samples were analyzed for the Target Compound List by EPA method 8270.

Surrogate recoveries were within acceptance limits for all the site samples, with one exception. The recovery of one Base Neutral surrogate was above the limit for one site sample. No qualification was made.

Internal standard recoveries were out of limits for two site samples: S-ALFH1 and DUP. The MS and MSD of H4 were also out of limits, but since the original sample IS were within limits, no qualification was made. Re-analyses were performed for the site samples with similar results. Matrix interference is suspected.

One site sample, S-ALF-H4-06/29/99, was spiked in duplicate. Recoveries were within acceptance limits, with one exception. The recovery of 2,4-Dinitrotoluene was above the limit of 89% at 93%. Since no 2,4-Dinitrotoluene was found in the site sample, no qualification was made.

One blank spike was associated with the site samples. Recoveries were within acceptance limits.

Pesticides/PCB

Seven site samples were analyzed for Pesticides/PCB by EPA methods 8081/8082.

Surrogate recoveries were within limits for all undiluted site samples. PCB's were discovered in three site samples. Each of these sample results was confirmed by a second column confirmation after a one point calibration, to confirm the fingerprint pattern only, as stated in EPA method 8082.

Site sample H4 was spiked in duplicate for both pesticides and PCB, separately. Recoveries were within acceptance limits, with one exception. The recovery for 4,4'-DDT was above the limit of 160% at 217%. It is suspected that there is an interfering peak form the PCB 1260 present in the sample.

Precision as indicated by RPD was within acceptance limits, with one exception. The RPD for PCB 1260 exceeded the limit of 20% at 24%. Since there was PCB 1260 in the sample, sample inhomogeneity is suspected.

One blank spike for Pesticide and one for PCB were associated with the site samples. Blank spike recoveries were within acceptance limits.

Metals

Samples were analyzed for the Target Analyte list by Inductively Coupled Plasma Spectrometry, Cold Vapor AA, and Automated Spectroscopy.

Site samples were spiked and duplicated for all metals by all methods reported. Spike recoveries were within limits, with two exceptions. The recovery of Antimony and Lead for H4 was below the limit of 75%. Post spike recoveries were reported for both metals.

Precision as indicated by RPD was within limits for all metals. If the sample or duplicate level was less than five times the CRDL, then the absolute difference between the sample and duplicate should be less than the CRDL. If the sample or the duplicate was below the CRDL, then no limit was applied.

Laboratory Control Sample recoveries were within acceptance limits for all metals by all methods reported.

No other analytical difficulties were encountered.

Usability Assessment

All reported data were found to be valid and usable within the EPA National Functional Validation guidelines except those that were qualified in this Laboratory Validation.

Laboratory validation and
Usability assessment conducted by: Teresa B. Bishop

Date: September 14, 1999

Teresa B. Bishop
Quality Assurance

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Laboratory Validation and Usability Assessment

Project: American LaFrance
Project # 97-150 NYS ID# B00011-8
Sampled August 3, 1999

The data reported in this package have been reviewed for compliance with QC acceptance limits as specified in the method cited for each analysis.

These statistical limits are typically based on historical laboratory data for a given sample matrix, and will not exceed any default limits specified by the method. CLP acceptance limits are also considered.

The following Quality Control operations are considered in the validation of reported results:

Holding times, surrogate recovery, spiked sample recovery, duplicates/spiked duplicate precision, tuning criteria, internal standard variation, continuing calibration variation, reference (check) sample recovery, and instrument, method, trip and field blanks. The appropriate frequency for each operation is also considered.

Every effort has been made to report data that is compliant with the EPA methodology cited for each analysis. In cases where the laboratory was unable to meet all method requirements prior to sample expiry, either due to the nature of the sample or other technical difficulty, results are reported with qualification with the understanding that qualified results may not be suitable for compliance purposes. The internal technical review is based on the USEPA Contract Laboratory Program *National Functional Guidelines for Organic Review* (EPA 540/R-94/012, February 1994) and *National Functional Guidelines for Inorganic Review* (EPA 540/R-94/013, February 1994).

Validation

Metals

One sample was analyzed for the Target Analyte List by Inductively Coupled Plasma Spectrometry, and Cold Vapor AA.

The site sample was spiked for all metals, except Silver, by all methods reported. Spike recoveries were within limits, with three exceptions. If the level of any metal in the sample was more than four times the spiking level, no limit was applied. The recoveries of Antimony, Barium and Nickel for S-ALFTPB-080399 were below the limit of 75%. Post spike recoveries were reported for these metals.

The sample was re-digested for Silver due to low recovery of the Silver LCSS, but no spike was performed. The recovery for the Silver LCSS on the second digestion was within limits.

Laboratory Control Sample recoveries were within acceptance limits for all metals by all methods reported.

No other analytical difficulties were encountered.

Usability Assessment

All reported data were found to be valid and usable within the EPA National Functional Validation guidelines except those that were qualified in this Laboratory Validation.

Laboratory validation and
Usability assessment conducted by: Teresa B Bishop

Date: October 1, 1999

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Laboratory Validation and Usability Assessment

Project: American LaFrance
Project # 97-150 NYS ID# B00011-8
Sampled August 10, 1999

The data reported in this package have been reviewed for compliance with QC acceptance limits as specified in the method cited for each analysis.

These statistical limits are typically based on historical laboratory data for a given sample matrix, and will not exceed any default limits specified by the method. CLP acceptance limits are also considered.

The following Quality Control operations are considered in the validation of reported results:

Holding times, surrogate recovery, spiked sample recovery, duplicates/spiked duplicate precision, tuning criteria, internal standard variation, continuing calibration variation, reference (check) sample recovery, and instrument, method, trip and field blanks. The appropriate frequency for each operation is also considered.

Every effort has been made to report data that is compliant with the EPA methodology cited for each analysis. In cases where the laboratory was unable to meet all method requirements prior to sample expiry, either due to the nature of the sample or other technical difficulty, results are reported with qualification with the understanding that qualified results may not be suitable for compliance purposes. The internal technical review is based on the USEPA Contract Laboratory Program *National Functional Guidelines for Organic Review* (EPA 540/R-94/012, February 1994) and *National Functional Guidelines for Inorganic Review* (EPA 540/R-94/013, February 1994).

Validation

Volatiles

One soil sample was received and analyzed for the Target Compound List by the Medium level method for EPA method 8260 using a five milliliter purge volume.

Surrogate recoveries were within limits.

One blank spike was analyzed with the site sample. Recoveries were within acceptance limits.

Semivolatiles

One soil site sample was analyzed for the Target Compound list by EPA method 8270 after soxhlet extraction.

Surrogate recoveries were within limits. Internal standard recoveries were within limits, except for the last internal standard. A huge hump in the chromatogram is most likely responsible for the low recovery. The sample was not re-analyzed, since no more data could be obtained from a sample with this kind of matrix interference.

One blank spike was associated with the site sample. Blank spike recoveries were within acceptance limits.

Pesticides/PCB

One site sample was analyzed for the Target Compound List by EPA method 8081/8082.

Surrogate recoveries were within acceptance limits.

One pesticide blank spike was associated with the sample. Blank spike recoveries were within acceptance limits.

Metals

Two samples were analyzed for the Target Analyte List by Inductively Coupled Plasma Spectrometry, and Cold Vapor AA. One sample was also analyzed for Cyanide by Automated Spectroscopy.

The site sample was spiked for all metals, except the minerals and Aluminum and Iron, by all methods reported. Spike recoveries were within limits, with four exceptions. If the level of any metal in the sample was more than four times the spiking level, no limit was applied. The recoveries of Antimony, Manganese, Mercury and Zinc for S-ALFTPJ-080999 were outside the limit. Post spike recoveries were reported for the three ICP metals. inhomogeneity is the suspected cause of the recoveries that were out of limits.

Laboratory Control Sample recoveries were within acceptance limits for all metals by all methods reported.

No other analytical difficulties were encountered.

Usability Assessment

All reported data were found to be valid and usable within the EPA National Functional Validation guidelines except those that were qualified in this Laboratory Validation.

Laboratory validation and
Usability assessment conducted by: Teresa B. Bishop

Date: October 7, 1999

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Laboratory Validation and Usability Assessment

Project: American LaFrance
Project # 97-150 NYS ID# B00011-8
Sampled September 22-24, 1999

The data reported in this package have been reviewed for compliance with QC acceptance limits as specified in the method cited for each analysis.

These statistical limits are typically based on historical laboratory data for a given sample matrix, and will not exceed any default limits specified by the method. CLP acceptance limits are also considered.

The following Quality Control operations are considered in the validation of reported results:

Holding times, surrogate recovery, spiked sample recovery, duplicates/spiked duplicate precision, tuning criteria, internal standard variation, continuing calibration variation, reference (check) sample recovery, and instrument, method, trip and field blanks. The appropriate frequency for each operation is also considered.

Every effort has been made to report data that is compliant with the EPA methodology cited for each analysis. In cases where the laboratory was unable to meet all method requirements prior to sample expiry, either due to the nature of the sample or other technical difficulty, results are reported with qualification with the understanding that qualified results may not be suitable for compliance purposes. The internal technical review is based on the USEPA Contract Laboratory Program *National Functional Guidelines for Organic Review* (EPA 540/R-94/012, February 1994) and *National Functional Guidelines for Inorganic Review* (EPA 540/R-94/013, February 1994).

Validation

Volatiles

Nine soil samples, three water samples plus one trip blank were received and analyzed for the Target Compound List for EPA method 8260 using a five milliliter purge volume.

Surrogate recoveries were within limits for the water samples and the medium level soil samples.

Surrogate recoveries for the low level, heated purge, soil samples were out of limits for one sample, S-ALFG8A092399. Internal standard recoveries were also out of limits. The sample was re-analyzed with similar results. Matrix interference is suspected.

One medium level soil site sample, S-ALFG8B0923999, was spiked in duplicate. Recoveries were within acceptance limits. Precision as indicated by RPD was within acceptance limits.

Four blank spikes were analyzed with the site samples. Recoveries were within acceptance limits.

Semivolatiles

Nine soil site samples and four water samples were analyzed for the Target Compound list by EPA method 8270.

Surrogate recoveries were within limits for all the soil samples and all but one water sample. The surrogate recoveries for site sample W-ALFGW2092299 were above limit for three of the six surrogates. Considering the appearance of the chromatogram, it's a wonder any compounds could be identified. Results for the water sample should be examined carefully before use.

One water site sample, ALFGW3092499, was spiked in duplicate. Recoveries were within acceptance limits. Precision as indicated by RPD was within limits, with one exception. The RPD for Pentachlorophenol exceeded the limit of 50% at 63%. Since there were no target compounds detected in the site sample, no qualification was made.

Three blank spikes were associated with the site samples. Blank spike recoveries were within acceptance limits.

Pesticides/PCB

Nine soil and four water site samples were analyzed for the Target Compound List by EPA method 8081/8082.

Surrogate recoveries were within acceptance limits.

Five pesticide and five PCB blank spikes were associated with the samples. Blank spike recoveries were within acceptance limits.

Metals

Nine soil samples and four water samples were analyzed for the Target Analyte List by Inductively Coupled Plasma Spectrometry, Hydride AA, Furnace AA and Cold Vapor AA.

One water and one soil site sample were spiked for Mercury. One water sample was spiked for Selenium. Spike recoveries were within limits.

One water and one soil site sample were duplicated for Mercury. One water sample was duplicated for Selenium. If the sample or duplicate was less than five times the CRDL, the absolute difference between the sample and duplicate should be less than the CRDL. If either the sample or duplicate was less than the CRDL, no limit was applied. Precision was within limits, with one exception. The RPD for Mercury for site sample S-ALFG3A092399 exceeded the limit of 20% at 28%. Sample inhomogeneity is suspected.

Laboratory Control Sample recoveries were within acceptance limits for all metals by all methods reported.

No other analytical difficulties were encountered.

Usability Assessment

All reported data were found to be valid and usable within the EPA National Functional Validation guidelines except those that were qualified in this Laboratory Validation.

Laboratory validation and
Usability assessment conducted by: Teresa B. Bishop

Date: November 12, 1999

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Laboratory Validation and Usability Assessment

Project: American LaFrance
Project # 97-150 NYS ID# B00011-8
Sampled September 29 & October 4, 1999

The data reported in this package have been reviewed for compliance with QC acceptance limits as specified in the method cited for each analysis.

These statistical limits are typically based on historical laboratory data for a given sample matrix, and will not exceed any default limits specified by the method. CLP acceptance limits are also considered.

The following Quality Control operations are considered in the validation of reported results:

Holding times, surrogate recovery, spiked sample recovery, duplicates/spiked duplicate precision, tuning criteria, internal standard variation, continuing calibration variation, reference (check) sample recovery, and instrument, method, trip and field blanks. The appropriate frequency for each operation is also considered.

Every effort has been made to report data that is compliant with the EPA methodology cited for each analysis. In cases where the laboratory was unable to meet all method requirements prior to sample expiry, either due to the nature of the sample or other technical difficulty, results are reported with qualification with the understanding that qualified results may not be suitable for compliance purposes. The internal technical review is based on the USEPA Contract Laboratory Program *National Functional Guidelines for Organic Review* (EPA 540/R-94/012, February 1994) and *National Functional Guidelines for Inorganic Review* (EPA 540/R-94/013, February 1994).

Validation

Volatiles

One soil sample, three water samples plus one trip blank were received and analyzed for the Target Compound List for EPA method 8260 using a five milliliter purge volume.

Surrogate recoveries were within limits for all site samples.

No site sample was spiked or duplicated.

One soil blank spike and one water blank spike were analyzed with the site samples. Recoveries were within acceptance limits.

Semivolatiles

One soil site sample and two water samples were analyzed for the Target Compound list by EPA method 8270.

Surrogate recoveries were within limits for all site samples.

No site sample was spiked or duplicated.

One water and one soil blank spike was associated with the site samples. Blank spike recoveries were within acceptance limits.

Pesticides/PCB

One soil and two water site samples were analyzed for the Target Compound List by EPA method 8081/8082.

The soil site sample has not been reported yet. An extraction problem with the soxhlet was found for one batch of Pest/PCB with very low recoveries reported for the surrogates for each sample and the PCB and Pesticide Blank Spikes. The soxhlet extractors were not functioning properly. The lab is unable to re-extract the sample that was associated with this batch, S-ALFG9092999, due to no more sample.

Surrogate recoveries for the water samples were within acceptance limits.

One pesticide and one PCB blank spike was associated with the sample. Blank spike recoveries were within acceptance limits.

Metals

Two water and one soil sample were analyzed for the Metals Target Analyte List by Inductively Coupled Plasma Spectrometry, and Cold Vapor AA.

The soil site sample was spiked for Mercury. Spike recovery was slightly above the limit of 125% at 125.8%. Since this is less than 1%, no qualification was made.

Water site samples were duplicated for ICP, Arsenic, and Mercury. If the sample or duplicate was less than the CRDL, no limit was applied. If the sample or duplicate was less than five times the CRDL, then the absolute difference between the sample and duplicate should be less than the CRDL. Precision as indicated by RPD was within limits, with one exception.

Laboratory Control Sample recoveries were within acceptance limits for all metals by all methods reported.

No other analytical difficulties were encountered.

Usability Assessment

All reported data were found to be valid and usable within the EPA National Functional Validation guidelines except those that were qualified in this Laboratory Validation.

Laboratory validation and
Usability assessment conducted by: Teresa B. Bishop

Date: November 18, 1999

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Laboratory Validation and Usability Assessment

Project: American LaFrance
Project # 97-150 NYS ID# B00011-8
Sampled October 5 & 7, 1999

The data reported in this package have been reviewed for compliance with QC acceptance limits as specified in the method cited for each analysis.

These statistical limits are typically based on historical laboratory data for a given sample matrix, and will not exceed any default limits specified by the method. CLP acceptance limits are also considered.

The following Quality Control operations are considered in the validation of reported results:

Holding times, surrogate recovery, spiked sample recovery, duplicates/spiked duplicate precision, tuning criteria, internal standard variation, continuing calibration variation, reference (check) sample recovery, and instrument, method, trip and field blanks. The appropriate frequency for each operation is also considered.

Every effort has been made to report data that is compliant with the EPA methodology cited for each analysis. In cases where the laboratory was unable to meet all method requirements prior to sample expiry, either due to the nature of the sample or other technical difficulty, results are reported with qualification with the understanding that qualified results may not be suitable for compliance purposes. The internal technical review is based on the USEPA Contract Laboratory Program *National Functional Guidelines for Organic Review* (EPA 540/R-94/012, February 1994) and *National Functional Guidelines for Inorganic Review* (EPA 540/R-94/013, February 1994).

Validation

Volatiles

Ten soil samples, one water samples plus one trip blank were received and analyzed for the Target Compound List for EPA method 8260 using a five milliliter purge volume.

Surrogate recoveries were within limits for all site samples.

Site sample S-ALFB1100599 was spiked in duplicate. Spike recoveries were within acceptance limits. Precision as indicated by RPD was within acceptance limits.

One soil blank spike and one water blank spike were analyzed with the site samples. Recoveries were within acceptance limits, with one exception. The recovery of Carbon disulfide was above the limit for the water blank spike. Since there was no Carbon disulfide in the water sample, no qualification was made.

Semivolatiles

Nine soil site samples and one water sample was analyzed for the Target Compound list by EPA method 8270 using a one microliter injection.

Surrogate recoveries were within limits for all site samples. Internal standard recoveries were above the limits for two samples and were below the limits for one sample.

S-ALFG7100599 and S-ALFGS100599 had at least one internal standard recovery above the limits. Since there were no positive results above the reporting level, no further action was taken. The recovery of IS6 for S-ALFG4A100599 was below the limit and confirmed in a reanalysis. The results for the compounds associated with IS6 should be considered usable estimates due to matrix interference.

Site sample S-ALFB1100599 was spiked in duplicate. Recoveries were within acceptance limits. Precision as indicated by RPD was within limits.

One water and two soil blank spikes were associated with the site samples. Blank spike recoveries were within acceptance limits, with one exception. The recovery of 4-Nitrophenol for soil blank spike SBLKS65MS (QC65) was slightly above the limits. Since the matrix spike set was within limits, no action was taken.

Small positive results for the water method blank showed some laboratory contribution of phenols. The water sample that was associated with this method blank did not show the same pattern, therefore no qualification was made.

Pesticides/PCB

Thirteen soil samples and one water site sample were analyzed for the Target Compound List by EPA method 8081/8082 using a one microliter injection.

Surrogate recoveries for the site samples were within acceptance limits with two exceptions.

Surrogate recoveries for site samples S-ALFGS100599 and S-ALFB2A100599 were below the limits, but above ten percent. Results for these two site samples should be considered estimated, due to poor extraction efficiency.

The method blank (MB63) and blank spike (QC63) associated with three site samples, PCB-A, B, and C, had less than 10% recovery on the surrogates and about 10% recovery on the PCB blank spike recoveries. There was most likely a malfunction in the soxhlet apparatus during extraction for MB 63 and QC 63. Since each of the samples in question had acceptable surrogate recoveries. no further action was taken.

Site sample S-ALFB11005699 was spike in duplicate with Pesticide. Recoveries were within or slightly above acceptance limits. Since there were no positive results for pesticides, no qualification was made.

One pesticide and one PCB blank spike was associated with the water sample. Two PCB and two pesticide blank spikes (not counting QC 63 addressed above) were associated with the soil site samples. Blank spike recoveries were within acceptance limits, except as addressed above.

Metals

Ten soil samples and one water sample were analyzed for the Metals Target Analyte List by Inductively Coupled Plasma Spectrometry, and Cold Vapor AA. The water sample was also analyzed by Hydride AA and Furnace AA.

One soil site sample, S-ALFB1100599, was selected as a site specific matrix spike and duplicate. Spike recoveries were within limits with three exceptions. If the sample level was more than four times the spiking level, no limit applied.

The recoveries for Antimony, Barium, and Mercury were out of limits. Since there was no Antimony or Mercury found in the sample, matrix interference is suspected for these two metals. Post spike recoveries are provided for the ICP metals. The results for Antimony and Mercury should be considered usable estimates. The result for Barium should be considered an estimate due to sample inhomogeneity.

Precision as indicated by RPD was within limit for the soil site sample with four exceptions. The water site sample was duplicated for Furnace and was within limits. If the sample or duplicate was less than the CRDL, no limit was applied. If the sample or duplicate was less than five times the CRDL, then the absolute difference between the sample and duplicate should be less than the CRDL.

The RPD limit was exceeded for Calcium, Lead and Manganese. The results for these three metals for site sample S-ALFB1100599 should be considered a usable estimate. The CRDL limit was exceeded for Thallium. Since Thallium was run by ICP with elevated detection limits, no qualification was made. The result for Thallium should be considered usable.

Laboratory Control Sample recoveries were within acceptance limits for all metals by all methods reported.

No other analytical difficulties were encountered.

Usability Assessment

All reported data were found to be valid and usable within the EPA National Functional Validation guidelines except those that were qualified in this Laboratory Validation.

Laboratory validation and
Usability assessment conducted by: Teresa B. Bishop

Date: November 22, 1999

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Laboratory Validation and Usability Assessment

Project: **American LaFrance**
Project # 97-150 NYS ID# B00011-8
Sampled November 2, 1999

The data reported in this package have been reviewed for compliance with QC acceptance limits as specified in the method cited for each analysis.

These statistical limits are typically based on historical laboratory data for a given sample matrix, and will not exceed any default limits specified by the method. CLP acceptance limits are also considered.

The following Quality Control operations are considered in the validation of reported results:

Holding times, surrogate recovery, spiked sample recovery, duplicates/spiked duplicate precision, tuning criteria, internal standard variation, continuing calibration variation, reference (check) sample recovery, and instrument, method, trip and field blanks. The appropriate frequency for each operation is also considered.

Every effort has been made to report data that is compliant with the EPA methodology cited for each analysis. In cases where the laboratory was unable to meet all method requirements prior to sample expiry, either due to the nature of the sample or other technical difficulty, results are reported with qualification with the understanding that qualified results may not be suitable for compliance purposes. The internal technical review is based on the USEPA Contract Laboratory Program *National Functional Guidelines for Organic Review* (EPA 540/R-94/012, February 1994) and *National Functional Guidelines for Inorganic Review* (EPA 540/R-94/013, February 1994).

Validation

Volatiles

Three water samples, and MS/MSD set, plus one trip blank were received and analyzed for the Target Compound List for EPA method 8260 using a five milliliter purge volume.

Site sample W-ALF-GW3-110299 was spiked in duplicate with Pesticide. Recoveries were within acceptance limits.

Precision as indicated by RPD was within limits for 2 of the six spiking compounds. Since there were no positive results for pesticides, no qualification was made.

One pesticide and one PCB blank spike were associated with the water samples. Blank spike recoveries were within acceptance limits.

Metals

Three water samples were analyzed for the Metals Target Analyte List by Inductively Coupled Plasma Spectrometry, Hydride AA, Furnace AA and Cold Vapor AA.

Site sample W-ALF-MW3-110299 was spiked for all metals, except minerals, by all methods reported. Recoveries were within limits with one exception. The recovery of Antimony was below the limit. Post spike recoveries were reported for this metal.

Precision as indicated by RPD was within limits. If the sample or duplicate was less than the CRDL, no limit was applied. If the sample or duplicate was less than five times the CRDL, then the absolute difference between the sample and duplicate should be less than the CRDL.

Laboratory Control Sample recoveries were within acceptance limits for all metals by all methods reported.

No other analytical difficulties were encountered.

Usability Assessment

All reported data were found to be valid and usable within the EPA National Functional Validation guidelines except those that were qualified in this Laboratory Validation.

Laboratory validation and
Usability assessment conducted by: Teresa B. Bishop

Date: December 14, 1999

Teresa B. Bishop
Quality Assurance