DRAFT

Revised Sampling and Analysis Plan/Data Collection and Analysis Quality Assurance Plan

Volume II of II

General Electric Company
Pittsfield, Massachusetts

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BLASLAND, BOUCK & LEE, INC.
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Data Validation Procedures for Volatile and Semi-Volatile Compounds

Appendix Y

Data Validation Procedures for Volatile Organic Compounds and Semi-Volatile Organic Compounds

I. Introduction

This standard operating procedure (SOP) describes the data validation procedures for a USEPA Region I Tiered review of the data for volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs) conducted by USEPA methods 8260B and 8270C, respectively. Data review procedures presented in this SOP are from the applicable quality control criteria specified in the following documents:

- *Region I Tiered Organic and Inorganic Data Validation Guidelines*, USEPA Region I, July 1, 1993.
- *Region I Laboratory Data Validation Functional Guidelines for Evaluating Organics Analyses*, USEPA Region I, Draft, December 1996.
- *CLP Organics Data Review and Preliminary Review*, USEPA SOP HW-6, Revision 10, October 1995.
- *USEPA Contract Laboratory Program, Statement of Work for the Organics Analysis, Revision OLM0.1.9*, July 1993

II. Tier I Validation Procedures

Tier I validation of a data package consists of verifying that all raw data and forms are included and complete. All Form Is or laboratory equivalent (presented in Attachment Y-1) are copied and a data validation summary spreadsheet (presented in Attachment Y-2) is prepared to document the data review. The following steps are taken to complete a Tier I review:

Step 1 - The laboratory case narrative is reviewed. During review of the case narrative, if there are any deviations that warrant a more extensive validation procedure, a Tier II review would be initiated to evaluate potential data use limitations.

Step 2 - Compare the chain-of-custody and the sample traffic reports. If there are any inconsistencies or if they are incomplete, then contact laboratory for resolution.

Step 3 - Verify that all forms presented in Attachment Y-1 or laboratory equivalent forms are present and complete. If any of the forms are not in the data package contact the laboratory for a resubmission.

Note: If frequent or severe quality control deviations are present on the above-mentioned forms, this would warrant a more extensive validation procedure may be warranted. Based on the reviewer's judgement, Tier II or Tier III review may be warranted to fully evaluate the usability of the data.

Step 4 - Make a copy of the all sample data Form Is or laboratory equivalent for inclusion in the validation report.

Step 5 - Verify that the following raw data is provided for each sample and associated QA/QC samples in the data package. Contact the laboratory to obtain missing data:

- Case Narrative
- Chain-of-Custody Forms
- Traffic Reports
- QA Sample Summary Forms
- Instrument Calibration Summary Forms
- Instrument Run Logs
- Sample Preparation Logs
- Instrument/Method Detection Limits
- Standards Preparation Logs
- Supporting (raw) Data

Step 6 - With a blue ink pen record on the first page of the data package: the validation level, date, and reviewer's initials.

III. Tier II Validation Procedures

Tier II validation of a data package consists of the steps mentioned above for a Tier I review plus review of the data package for identification of QA/QC deviations. Tier II validation does not include review of the "raw data" or recalculation of sample results. Sample qualification is performed (if required) following USEPA Region I Guidelines.

A. Data Qualifiers

All data qualified due to QA/QC deviations will be clearly recorded on a copy of the Form Is or laboratory equivalent with a blue ink pen. The laboratory qualification is lined out and the reviewer's qualification placed next to it. The date and the initials of the reviewer will also be placed on the Form I. Below is a list of qualifiers to be used.

U The compound or analyte was analyzed for, but was not detected. The sample quantitation limit is presented and adjusted for dilution and (for solid samples only) percent moisture. For consistency with the database and summary tables prepared from the data, non-detected sample results are displayed as ND(CRQL) as presented in Attachment Y-2.

J The compound or analyte was positively identified, but the associated numerical value is an estimated concentration. This qualifier is used when the data evaluation procedure identifies a deficiency in the data generation process. This qualifier is also used when a compound or analyte is detected at estimated concentrations less than the contract-required detection limit (CRDL) for inorganic analyses or the contract-required quantitation limit (CRQL) for organic analyses.

UJ The compound or analyte was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual level of quantitation. For consistency

with the database and summary tables prepared from the data, Non-detected sample results are displayed as ND(CRQL) J as presented in Attachment Y-2.

R Indicates that the previously reported detection limit or sample result has been rejected due to a major deficiency in the data generation procedure. The data should not be used for any qualitative or quantitative purposes.

B. Holding Times

Criteria

1.0 Purgeables: Water samples are preserved to pH of less than two with HCl, H_2SO_4, or solid $NaHSO_4$ and stored at 4 degrees centigrade. Samples must be analyzed within 14 days. Soil are preserved per SW-846 method 5035 and must be analyzed within 14 days.

1.1 Extractables: (Includes Base/Neutrals and Acids): Samples (waters or soils) and extracts must be preserved at 4 degrees centigrade. Soil and water samples must be extracted within seven days and the extract must be analyzed within 40 days.

Action

Specific holding times for each analysis and sample type are presented in Table 1 of the SAP/DCAQAP. The following steps are performed for the validation of data due to holding times:

Step 1 - Establish the holding time by comparing the sampling date on the chain-of-custody with the dates of analysis and/or extraction on the Form Is or laboratory equivalent. The chain-of-custody is also reviewed to determine if the samples were properly preserved.

Step 2 - If the holding times are exceeded by less than 24 hours, then no qualification of data is needed.

Step 3 - If the holding times are exceeded by more than 24 hours, but less than 14 days then, all the positive results are qualified as estimated (J) and the non-detected compounds are qualified as estimated (UJ).

Step 4 - If the holding times are exceeded by more than twice the specified holding time, then all the results are qualified as unusable (R).

C. GC/MS Tuning

Criteria The following criteria must be met at all times:

1.0 Decafluorotriphenylphosphine (DFTPP)

m/z	Ion Abundance Criteria
51	30.0 - 60.0% of m/z 198
68	less than 2.0% of m/z 69
70	less than 2.0% of m/z 69
127	40.0 - 60.0% of m/z 198
197	less than 1.0% of m/z 198
198	base peak, 100% relative abundance
199	5.0 - 9.0% of m/z 198
275	10.0 - 30.0% of m/z 198
365	greater than 1.00% of m/z 198
441	present, but not less than m/z 443
442	greater than 40.0% of m/z 198
443	17.0 - 23.0% of m/Z 442

1.1 Bromofluorobenzene (BFB)

m/z	Ion Abundance Criteria
50	15.0 - 40.0% of the base peak
75	30.0 - 60.0% of the base peak
95	base peak, 100% relative abundance
96	5.0 - 9.0% of the base peak
173	less than 2.0% of m/z 174
174	greater than 50.0% of the base peak
175	5.0 - 9.0% of m/z 174
176	greater than 95.0%, but <101.0% of m/z 174
177	5.0 - 9.0% of m/z 176

Action

Review Form V or laboratory equivalent to determine if a mass calibration is in error. If an error is identified, then all data associated with the evaluated spectra are qualified as unusable (R).

D. Calibration

Criteria

1.0 Initial Calibration Volatile and Semi-Volatile

1.0.1 All average Relative Response Factors (RRFs) for TCL compounds must be greater than or equal to 0.05.

1.0.2 All Percent Relative Standard Deviation (%RSD) values must be less than or equal to 30 percent.

1.1 Continuing Calibration Volatile and Semi-Volatile

1.1.1 All daily RRFs for TCL compounds must be greater than or equal to 0.05.

1.1.2 All Percent Difference (%D) values must be less than or equal to 25 percent.

Action

The following steps are performed by reviewing Form VI and Form VII or laboratory equivalents during the validation of calibration data:

Step 1 - Verify that all the average RRFs for the TCL compounds in the initial calibration are greater than 0.05. If any average RRF is not in control then:

A. All positive sample results for that compound related to the initial and succeeding continuing calibrations are qualified as estimated (J).

B. All non-detected sample results for that compound related to the initial and succeeding continuing calibrations are qualified as unusable (R).

Step 2 - Verify that all the %RSD values for the TCL compounds in the initial calibration are greater than 30 percent. If any %RSD is not in control then:

A. All positive sample results for that compound related to the initial and succeeding continuing calibrations are qualified as estimated (J).

B. All non-detected sample results for that compound that have a %RSD value greater than 50 percent related to the initial and succeeding continuing calibrations are qualified as estimated (UJ).

Step 3 - Verify that all the RRF values for the TCL compounds in the continuing calibration are greater than 0.05. If any average RRF is not in control then:

A. All positive sample results for that compound related to that continuing calibrations are qualified as estimated (J).

B. All non-detected sample results for that compound related to that continuing calibrations are qualified as unusable (R).

Step 4 - Verify that all the %D values for the TCL compounds in the continuing calibration are greater than 25 percent. If any %D is not in control then:

A. All positive sample results for that compound related to that continuing calibrations are qualified as estimated (J).

B. All non-detected sample results for that compound that have a %D greater than 50 percent related to continuing calibrations are qualified as estimated (UJ).

E. Blanks

Criteria

1.0 No contaminants should be present in the blank(s).

1.1 For each matrix and for each twelve hour window a method blank must be analyzed for volatile analysis.

1.2 For each matrix and each extracted batch, a method blank must be analyzed for semi-volatile analysis.

Action

Qualification of sample results due to blank contamination is dependent on the conditions and the origin of the blank. No sample results are reported unless the concentration of the compound in the sample exceeds ten times the amount in the blank for the compounds listed below, or five times the blank amount for all other compounds. No sample results are corrected by subtracting blank values. Specific qualifications of sample data is as follows:

Step 1 - Review the Form IV or laboratory equivalent within the data package to ensure that criteria III.E.1.1 and III.E.1.2 are in compliance. If they are not, the laboratory will be contacted by the reviewer for a written explanation.

Step 2 - Review the Form I or laboratory equivalent of all the blanks within the data package.

Step 3 - If a compound is found in the blank but not in the sample then the data are not qualified.

Step 4 - When any compound (other than the five listed below) is detected in the sample and the sample concentration is less than five times the concentration detected in the associated blank, the data are qualified. For the following five compounds, the sample results are qualified if the sample concentration is less than ten times the concentration detected in the blank.

Common laboratory contaminants:

a. Methylene chloride
b. Acetone
c. Toluene
d. 2-Butanone
e. Common phthalate esters

Note: Any difference between the sample analyses and the related blank analyses which involve weights, volumes, or dilution factors are taken into account when the 5-times or 10-times criteria are used.

The following are examples of how qualifications apply to blank data:

A: When the sample result is greater than the Contract Required Quantitation Limit (CRQL), but less than the action level (5-times or 10-times) from the blank, the sample results are qualified as non-detects. As in the example below, the sample result for the 10-times rule is less than 70 (or 10 x 7) and for the 5-times rule the result is less than 35 (or 5 x 7), therefore they are qualified as described.

Factor	10-times	5-times
Blank Result	7	7
CRQL	5	5
Action Level	70	35
Sample Result	60	30
Qualified Sample Result	60 U	30 U

B: When the sample result is less than the CRQL and is also less than the action level (5-times or 10-times) from the blank result, the sample results are qualified as non-detected by using the CRQL as the detection limit. As in the example below, the sample result is less than the CRQL in both instances and the sample results are qualified as described.

Factor	10-times	5-times
Blank Result	6	6
CRQL	5	5
Action Level	60	25
Sample Result	4 J	4 J
Qualified Sample Result	5 U	5 U

C: When the sample result is greater than the blank action level (5-times or 10-times), the sample results are not qualified. As in the example below, the sample results are greater than the blank action level and the sample results are not qualified.

Factor	10-times	5-times
Blank Result	10	10
CRQL	5	5
Action Level	50	50
Sample Result	120	60
Qualified Sample Result	120	60

Step 5 - When excessive amounts of contamination exists (i.e., saturated peaks by GC/MS), all compounds affected are qualified as unusable (R).

Note: As mentioned above, similar consideration is given to Tentatively Identified Compounds (TIC) which are found in both the sample and the associated blank(s).

F. Surrogate Recovery

Criteria

Sample and blank surrogates recoveries for volatile and semi-volatile must be within control limits listed in Table 5 of the SAP/DCAQAP.

Action

Qualification of the data due to surrogate recoveries being out of control is based on the evaluation of all data provided in the data package, especially considering the complexity of the effect of sample matrices. These qualifications are completed in the following steps:

Step 1 - Surrogate recoveries tabulated on Form II or laboratory equivalent for each fraction are evaluated against the control limits provided in Table 5.

Step 2 - No qualification of the data is needed if less than two surrogates are out of control for the base/neutral or acid fraction, or one in the volatile fraction, or unless any surrogate has a recovery less than 10 percent.

Step 3 - If at least two surrogates in a base/neutral or acid fraction or one surrogate in the volatile fraction are out of control, but the surrogate recoveries are greater than 10 percent then:

A. All positive results for that fraction are qualified as estimated (J).

B. All non-detected results are qualified as estimated (UJ).

Step 4 - If any surrogate recoveries in a fraction are less than 10 percent then:

A. All positive results for that fraction are qualified as estimated (J).

B. All non-detected results for that fraction are qualified as unusable (R).

Step 5 - When the blank analysis involves surrogate recoveries out of control, the related sample data are reviewed and qualified in the following manner:

A. If the sample data does not contain any surrogate out of control, then the data are not qualified.

B. If the sample data does contain any surrogate out of control then the sample data are qualified as mentioned above in steps two through four.

Note: In this special circumstance the problem is considered to be within the laboratory control and is so noted in the validation report.

G. Matrix Spike/Matrix Spike Duplicate

Criteria

1.0 Spike recoveries must be within the control limits in Table 5 of the SAP/DCAQAP.

1.1 Relative Percent Difference (RPD) values between matrix spike and matrix spike duplicate recoveries must be within the control limits in Table 5.

Action

If recovery results are not within the control limits, the following steps are taken to qualify the data:

Step 1 - If the recovery results are not within the control limits presented in Table 5, the positive results for this compound in the unspiked sample are qualified as estimated (J).

Step 2 - If the recovery result is less than 10 percent, the non-detects for that compound in the unspiked sample are qualified as rejected (R). This is the only instance that a non-detect is qualified due to recovery result being out of control.

Step 3 - If any of the RPD values are greater than the limits presented in Table 5, then positive results for that compound are qualified as estimated (J) in the unspiked sample.

H. Field Duplicates

Criteria

1.0 For water matrices, each compound with a detectable concentration must have a RPD value that is less than 30 percent.

1.1 For soil matrices, each compound with a detectable concentration must have a RPD value that is less than 50 percent.

Action

Step 1 - Calculate all the RPD values for positive results between the sample and the field duplicate.

$$\text{Calculation: } RPD = \frac{\text{Sample Result - Field Duplicate}}{(\text{Sample Result + Field Duplicate})/2} \times 100$$

Step 2 - If the RPD value is greater than 30 percent in water matrix, the result for that compound in both samples are qualified as estimated (J).

Step 3 - If the RPD value is greater than 50 percent in soil matrix, the result for that compound in both samples are qualified as estimated (J).

I. Internal Standards Performance

Criteria

1.0 Internal standard area counts must not vary by more than a factor of two (-50 to 100 percent) from the associated continuing calibration standard.

1.1 The retention time of the internal standard must not vary by more than +/- 30 seconds from the associated continuing calibration standard.

Action

Step 1 - Review the tabulated results for the comparison of the internal standard (IS) areas of the samples and the related continuing calibration standard on Form VIII or laboratory equivalent. If an IS area is outside of the -50 to +100 percent criteria, the data are qualified in the following manner:

A. Positive sample results quantitated using that IS are qualified as estimated (J) for that sample fraction.

B. Non-detected samples results quantitated using that IS are qualified with the sample quantitation limit classified as estimated (UJ) for that sample fraction.

Step 2 - If there is a severe loss in sensitivity causing the IS area counts to be extremely low or if there is an immediate drop off in area counts, then non-detected sample results are qualified as unusable (R).

Step 3 - Review the tabulated results for comparison of the IS retention time (RT) of the samples and the related continuing calibration standard on Form VIII or laboratory equivalent. If an IS retention time varies by more than 30 seconds, the data are qualified as unusable (R).

IV. Tier III Validation Procedures

Tier III validation of a data package consists of the steps mentioned above for a Tier I and Tier II validation plus review of the "raw data" and recalculation of approximately ten percent of the sample results. The confirmation of TCL compounds and tentatively identified compounds is also reviewed.

A. Compound Quantitation and Reported Detection Limits

Criteria

1.0 The quantitation of the compounds and the adjustment of the CRDL, must be recalculated for 10 percent of the data.

1.2 The compound's RRF and sample result quantitation must be calculated based on the IS specified in Tables Y-1 and Y-2.

Action

If the criteria above has not been followed, then the laboratory will be contacted by the reviewer and the laboratory will be responsible for a correction of the quantitation and resubmission of the reported data.

B. TCL Compounds Identification

Criteria

1.0 Compounds must be within + or - 0.06 Relative Retention Time (RRT) units of the continuing calibration standard RRT.

1.1 Mass spectra of the sample compound and of the current reference spectra must match the following criteria:

1.1.1 All the ions present in the reference spectra must be at a relative intensity greater than 10 percent and must be present in the sample spectrum.

1.1.2 The relative intensities of the ions specified above must agree within +/- 20 percent (absolute) between the reference and sample spectrum (example: for an ion with an abundance of 50 percent in the reference spectrum, the corresponding sample ion abundance must be between 30 percent and 70 percent).

1.1.3 Ions greater than 10 percent in the sample spectrum, but not present in the reference spectrum must be considered and accounted for.

1.1.3 If a compound cannot be verified by all of the above criteria, but in the technical judgement of the mass spectral interpretation specialist the identification is correct, the laboratory will report the identification and continue with the quantitation.

Action

Professional judgment is used for the qualitative criteria for GC/MS analysis of TCL compounds. If it is determined that the wrong identification was made, all such data are qualified as not detected (U).

C. Tentatively Identified Compounds (TICs)

Criteria

1.0 For each sample, the laboratory may conduct a mass spectral search of the NBS library. Report the possible identity of the 10 largest VOA Fraction peaks and the 20 largest BNA fraction peaks which are not surrogate, internal standard, or TCL compounds, but which have an area/height that is greater than 10 percent of the size of the nearest internal standard. TIC results, if reported by the laboratory, will be reported for each sample on Organic Analyses Data Sheet (Form I, TIC) or laboratory equivalent.

1.1 Requirements for the tentative identification are as follows:

1.1.1 Major ions (greater than 10 percent relative intensity) in the reference spectrum should be present in the sample spectrum.

1.1.2 Relative intensities of the major ions should agree within +/- 20 percent between the sample and the reference spectra.

1.1.3 Molecular ions present in the reference spectrum should be present in the sample spectrum.

1.1.4 Ions present in the sample spectrum but not in the reference spectrum should be reviewed for possible background contamination, interference, or coelution of additional TIC or TCL compounds.

1.2 When the above criteria are not met, but in the technical judgement of the data reviewer or the mass spectral interpretation specialist the identification is correct, the data reviewer may report the identification.

Action

The following steps are taken in qualifying the TICs if they are reported by the laboratory:

Step 1 - Review the Form I or laboratory equivalent to verify that all TIC results are qualified as estimated concentrations (J).

Step 2 - If it is determined that the tentative identification of a compound is not acceptable, the tentative identification is changed to "unknown" or the correct compound identification.

Step 3 - If all of the required peaks are not searched, then the laboratory is contacted to complete the library search of that sample.

Step 4 - Any TIC results that are not sufficiently above the level in the blank are not reported.

Note: Dilutions and sample size must be taken into account when comparing the amounts present in the blanks and samples.

Step 5 - When a compound is not found in the blanks, but is a suspected artifact of a common laboratory contaminant, the sample result is qualified as unusable (R).

Step 6 - In the identification of TICs professional judgement is used. In the case that there is more than one reasonable match, the result will be reported as "either compound X or compound Y". If the results lack isomer specificity, the TIC result is changed to a nonspecific isomer result (e.g., 1,3,5-trimethyl benzene to trimethyl benzene isomer) or to the class of compound (e.g., 2-methyl-3-ethyl benzene to substituted aromatic).

Step 7 - If a sample's TIC match is poor, but other samples from the data package have the same TIC with an acceptable match, that identification information is used to identify the TIC result.

Table Y-1

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Volatile Internal Standards with Corresponding Target Compounds Assigned for Quantitation

TABLE Y-1

VOLATILE INTERNAL STANDARDS WITH CORRESPONDING TARGET COMPOUNDS ASSIGNED FOR QUANTITATION

Option 1: Four Internals

1) Pentafluorobenzene

Acetone
Acetonitrile
Acrolein
Acrylonitrile
Allyl Chloride
Carbon Disulfide
Chloroethane
Chloroform
Chloroprene
Dichlorodifluoromethane
1,1-Dichloroethane
1,1-Dichloroethene
trans-1,2-Dichloroethene
Isobutyl Alcohol
Methacrylonitrile
Methyl Bromide
Methyl Chloride
Methyl Ethyl Ketone
Methyl Iodide
Methylene Chloride
Propionitrile
1,1,1-Trichloroethane
Trichlorofluoromethane
Vinyl Acetate
Vinyl Chloride

2) 1,4-Difluorobenzene

Benzene
Bromodichloromethane
Carbon Tetrachloride
2-Chloroethylvinylether
1,2-Dibromoethane
1,2-Dichloroethane
1,2-Dichloropropane
cis-1,3-Dichloropropene
trans-1,3-Dichloropropene
1,4-Dioxane
Ethyl Methacrylate
Methyl Methacrylate
4-Methyl-2-pentanone
Methylene Bromide
Toluene
1,1,2-Trichloroethane
Trichloroethene

3) Chlorobenzene-d_5

Bromoform
Chlorobenzene
Dibromochloromethane
trans-1,4-Dichloro-2-butene
Ethylbenzene
2-Hexanone
Styrene
1,1,1,2-Tetrachloroethane
Tetrachloroethene
Xylene

4) 1,4-Dichlorobenzene-d_4

1,2-Dibromo-3-chloropropane
1,1,2,2-Tetrachloroethane
1,2,3-Trichloropropane

VOLATILE INTERNAL STANDARDS WITH CORRESPONDING TARGET COMPOUNDS ASSIGNED FOR QUANTITATION

Option 2: Three Internals

1) Fluorobenzene

Acetone
Acetonitrile
Acrolein
Acrylonitrile
Allyl Chloride
Benzene
Bromodichloromethane
Carbon Disulfide
Carbon Tetrachloride
Chloroethane
2-Chloroethylvinylether
Chloroform
Chloroprene
Dichlorodifluoromethane
1,1-Dichloroethane
1,2-Dichloroethane
1,1-Dichloroethene
trans-1,2-Dichloroethene
1,2-Dichloropropane
cis-1,3-Dichloropropene
Ethylbenzene
Isobutyl Alcohol
Methacrylonitrile
Methyl Bromide
Methyl Chloride
Methylene Bromide
Methylene Chloride
Methyl Ethyl Ketone
Methyl Iodide
Methyl Methacrylate
4-Methyl-2-pentanone
Propionitrile
1,1,1-Trichloroethane
Trichloroethene
Trichlorofluoromethane
Vinyl Acetate
Vinyl Chloride

2) Chlorobenzene-d_5

Bromoform
Chlorobenzene
1,4-Dioxane
Dibromochloromethane
1,2-Dibromoethane
trans-1,3-Dichloropropene
Ethyl Methacrylate
2-Hexanone
Styrene
1,1,1,2-Tetrachloroethane
Tetrachloroethene
Toluene
1,1,2-Trichloroethane
Xylene

3) 1,2-Dichlorobenzene-d4

trans-1,4-Dichloro-2-butene
1,1,2,2-Tetrachloroethane
1,2,3-Trichloropropane
1,2-Dibromo-3-chloropropane

Table Y-2

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Semi-Volatile Internal Standards with Corresponding Target Compounds Assigned for Quantitation

TABLE Y-2

SEMIVOLATILE INTERNAL STANDARDS WITH CORRESPONDING TARGET COMPOUNDS ASSIGNED FOR QUANTITATION

1) 1,4-Dichlorobenzene-d_4

Aniline
Benzyl Alcohol
bis(2-chloro-1-methylethyl)ether
bis(2-chloroethyl)ether
2-Chlorophenol
m-Cresol
o-Cresol
p-Cresol
m-Dichlorobenzene
o-Dichlorobenzene
p-Dichlorobenzene
Ethyl Methanesulfonate
Hexachloroethane
Methyl methanesulfonate
N-Nitrosodi-n-propylamine
N-Nitrosodiethylamine
N-Nitrosodimethylamine
N-Nitrosomethylethylamine
N-Nitrosomorpholine
N-Nitrosopyrrolidine
Pentachloroethane
Phenol
2-Picoline
Pyridine
o-Toluidine
o,o,o-Triethyl phosphorothioate

2) Naphthalene-d_8

Acetophenone
bis(2-chloroethoxy)methane
p-Chloro-m-cresol
p-Chloroaniline
2,4-Dichlorophenol
2,6-Dichlorophenol
a,a-Dimethylphenethylamine
2,4-Dimethylphenol
Hexachlorobutadiene
Hexachlorophene
Hexachloropropene
Isophorone
Isosafrole
2-Methylnaphthalene
Naphthalene
Nitrobenzene
o-Nitrophenol
N-Nitrosodi-n-butylamine
N-Nitrosopiperidine
p-Phenylenediamine
1,2,4-Trichlorobenzene

3) Acenaphthene-d_{10}

Acenaphthene
Acenaphthylene
2-Chloronaphthalene
4-Chlorophenyl-phenylether
Dibenzofuran
Diethyl phthalate
Dimethyl phthalate
m-Dinitrobenzene
2,4-Dinitrophenol
2,4-Dinitrotoluene
2,6-Dinitrotoluene
Fluorene
Hexachlorocyclopentadiene
1,4-Naphthoquinone
1-Naphthylamine
2-Naphthylamine
5-Nitro-o-toluidine
m-Nitroaniline
o-Nitroaniline
p-Nitroaniline
p-Nitrophenol
Pentachlorobenzene
Safrole
1,2,4,5-Tetrachlorobenzene
2,3,4,6-Tetrachlorophenol
2,4,5-Trichlorophenol
2,4,6-Trichlorophenol

4) Phenanthrene-d_{10}

4-Aminobiphenyl
Anthracene
4-Bromophenyl phenyl ether
Di-n-butylphthalate
Diallate
O,O-Diethyl-O-2-pyrazinyl phosphorothioate
4,6-Dinitro-o-cresol
Diphenylamine
1,2-Diphenylhydrazine
Fluoranthene
Hexachlorobenzene
4-Nitroquinoline-1-oxide
N-Nitrosodiphenylamine
Pentachloronitrobenzene
Pentachlorophenol
Phenacetin
Phenanthrene
Pronamide
sym-Trinitrobenzene

5) Chrysene-d_{12}

2-Acetylaminofluorene
Aramite
Benzidine
Benzo(a)anthracene
bis(2-ethylhexyl)phthalate
Butyl benzyl phthalate
Chlorobenzilate
Chrysene
3,3'-Dichlorobenzidine
p-(Dimethylamino)azobenzene
3,3'-Dimethylbenzidine
Isodrin
Methapyrilene
Pyrene

6) Perylene-d_{12}

Benzo(a)pyrene
Benzo(b)fluoranthene
Benzo(g,h,i)perylene
Benzo(k)fluoranthene
Di-n-octylphthalate
Dibenz(a,h)anthracene
7,12-Dimethylbenz(a)anthracene
Indeno(1,2,3-cd)pyrene
3-Methylcholanthrene

Attachment Y-1

BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Laboratory Reporting Forms for Volatile and Semi-Volatile Organic Compounds

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

Lab Name:_____ Contract:_____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

Matrix: (soil/water)_____ Lab Sample ID: _____

Sample wt/vol: _____(g/mL)____ Lab File ID: _____

Level: (low/med) _____ Date Received: _____

% Moisture: not dec._____ Date Analyzed: _____

GC Column: _____ ID: _____(mm) Dilution Factor: _____

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg)_____	Q
74-87-3	Chloromethane		
74-83-9	Bromomethane		
75-01-4	Vinyl Chloride		
75-00-3	Chloroethane		
75-09-2	Methylene Chloride		
67-64-1	Acetone		
75-15-0	Carbon Disulfide		
75-35-4	1,1-Dichloroethene		
75-34-3	1,1-Dichloroethane		
540-59-0	1,2-Dichloroethene (total)		
67-66-3	Chloroform		
107-06-2	1,2-Dichloroethane		
78-93-3	2-Butanone		
71-55-6	1,1,1-Trichloroethane		
56-23-5	Carbon Tetrachloride		
75-27-4	Bromodichloromethane		
78-87-5	1,2-Dichloropropane		
10061-01-5	cis-1,3-Dichloropropene		
79-01-6	Trichloroethene		
124-48-1	Dibromochloromethane		
79-00-5	1,1,2-Trichloroethane		
71-43-2	Benzene		
10061-02-6	trans-1,3-Dichloropropene		
75-25-2	Bromoform		
108-10-1	4-Methyl-2-Pentanone		
591-78-6	2-Hexanone		
127-18-4	Tetrachloroethene		
79-34-5	1,1,2,2-Tetrachloroethane		
108-88-3	Toluene		
108-90-7	Chlorobenzene		
100-41-4	Ethylbenzene		
100-42-5	Styrene		
1330-20-7	Xylene (total)		

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

Lab Name:_____ Contract:_____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

Matrix: (soil/water)_____ Lab Sample ID: _____

Sample wt/vol: _____(g/mL)____ Lab File ID: _____

Level: (low/med) _____ Date Received: _____

% Moisture: _____ decanted: (Y/N)___ Date Extracted:_____

Concentrated Extract Volume: _____(uL) Date Analyzed: _____

Injection Volume: _____(uL) Dilution Factor: _____

GPC Cleanup: (Y/N)___ pH:____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg)_____	Q
108-95-2	Phenol		
111-44-4	bis(2-Chloroethyl)ether		
95-57-8	2-Chlorophenol		
541-73-1	1,3-Dichlorobenzene		
106-46-7	1,4-Dichlorobenzene		
95-50-1	1,2-Dichlorobenzene		
95-48-7	2-Methylphenol		
108-60-1	2,2'-oxybis(1-Chloropropane)		
106-44-5	4-Methylphenol		
621-64-7	N-Nitroso-di-n-propylamine		
67-72-1	Hexachloroethane		
98-95-3	Nitrobenzene		
78-59-1	Isophorone		
88-75-5	2-Nitrophenol		
105-67-9	2,4-Dimethylphenol		
111-91-1	bis(2-Chloroethoxy)methane		
120-83-2	2,4-Dichlorophenol		
120-82-1	1,2,4-Trichlorobenzene		
91-20-3	Naphthalene		
106-47-8	4-Chloroaniline		
87-68-3	Hexachlorobutadiene		
59-50-7	4-Chloro-3-methylphenol		
91-57-6	2-Methylnaphthalene		
77-47-4	Hexachlorocyclopentadiene		
88-06-2	2,4,6-Trichlorophenol		
95-95-4	2,4,5-Trichlorophenol		
91-58-7	2-Chloronaphthalene		
88-74-4	2-Nitroaniline		
131-11-3	Dimethylphthalate		
208-96-8	Acenaphthylene		
606-20-2	2,6-Dinitrotoluene		
99-09-2	3-Nitroaniline		
83-32-9	Acenaphthene		

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

Lab Name:_____ Contract:_____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

Matrix: (soil/water)_____ Lab Sample ID: _____

Sample wt/vol: _____(g/mL)____ Lab File ID: _____

Level: (low/med) _____ Date Received: _____

% Moisture: _____ decanted: (Y/N)___ Date Extracted:_____

Concentrated Extract Volume: _____(uL) Date Analyzed: _____

Injection Volume: _____(uL) Dilution Factor: _____

GPC Cleanup: (Y/N)___ pH:____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg)_____	Q
51-28-5	2,4-Dinitrophenol		
100-02-7	4-Nitrophenol		
132-64-9	Dibenzofuran		
121-14-2	2,4-Dinitrotoluene		
84-66-2	Diethylphthalate		
7005-72-3	4-Chlorophenyl-phenylether		
86-73-7	Fluorene		
100-01-6	4-Nitroaniline		
534-52-1	4,6-Dinitro-2-methylphenol		
86-30-6	N-Nitrosodiphenylamine (1)		
101-55-3	4-Bromophenyl-phenylether		
118-74-1	Hexachlorobenzene		
87-86-5	Pentachlorophenol		
85-01-8	Phenanthrene		
120-12-7	Anthracene		
86-74-8	Carbazole		
84-74-2	Di-n-butylphthalate		
206-44-0	Fluoranthene		
129-00-0	Pyrene		
85-68-7	Butylbenzylphthalate		
91-94-1	3,3'-Dichlorobenzidine		
56-55-3	Benzo(a)anthracene		
218-01-9	Chrysene		
117-81-7	bis(2-Ethylhexyl)phthalate		
117-84-0	Di-n-octylphthalate		
205-99-2	Benzo(b)fluoranthene		
207-08-9	Benzo(k)fluoranthene		
50-32-8	Benzo(a)pyrene		
193-39-5	Indeno(1,2,3-cd)pyrene		
53-70-3	Dibenz(a,h)anthracene		
191-24-2	Benzo(g,h,i)perylene		

(1) - Cannot be separated from Diphenylamine

1E

EPA SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name:_____ Contract:_____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

Matrix: (soil/water)_____ Lab Sample ID: _____

Sample wt/vol: _____(g/mL)___ Lab File ID: _____

Level: (low/med) _____ Date Received: _____

% Moisture: not dec._____ Date Analyzed: _____

GC Column: _____ ID: _____(mm) Dilution Factor: _____

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL)

Number TICs found: _____ CONCENTRATION UNITS: (ug/L or ug/Kg)_____

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
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27.					
28.					
29.					
30.					

1F

EPA SAMPLE NO.

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name:_____ Contract:_____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

Matrix: (soil/water)_____ Lab Sample ID: _____

Sample wt/vol: _____(g/mL)____ Lab File ID: _____

Level: (low/med) _____ Date Received: _____

% Moisture: _____ decanted: (Y/N)___ Date Extracted:_____

Concentrated Extract Volume: _____(uL) Date Analyzed: _____

Injection Volume: _____(uL) Dilution Factor: _____

GPC Cleanup: (Y/N)___ pH:____

Number TICs found: _____ CONCENTRATION UNITS: (ug/L or ug/Kg)_____

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.					
2.					
3.					
4.					
5.					
6.					
7.					
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9.					
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27.					
28.					
29.					
30.					

2A

WATER VOLATILE SYSTEM MONITORING COMPOUND RECOVERY

Lab Name: _____ Contract: _____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

	EPA SAMPLE NO.	SMC1 (TOL) #	SMC2 (BFB) #	SMC3 (DCE) #	OTHER	TOT OUT
01						
02						
03						
04						
05						
06						
07						
08						
09						
10						
11						
12						
13						
14						
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27						
28						
29						
30						

	QC LIMITS
SMC1 (TOL) = Toluene-d8	(88-110)
SMC2 (BFB) = Bromofluorobenzene	(86-115)
SMC3 (DCE) = 1,2-Dichloroethane-d4	(76-114)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D System Monitoring Compound diluted out

2C
WATER SEMIVOLATILE SURROGATE RECOVERY

Lab Name:_____ Contract:_____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

	EPA SAMPLE NO.	S1 (NBZ) #	S2 (FBP) #	S3 (TPH) #	S4 (PHL) #	S5 (2FP) #	S6 (TBP) #	S7 (2CP) #	S8 (DCB) #	TOT OUT
01										
02										
03										
04										
05										
06										
07										
08										
09										
10										
11										
12										
13										
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25										
26										
27										
28										
29										
30										

		QC LIMITS	
S1 (NBZ)	= Nitrobenzene-d5	(35-114)	
S2 (FBP)	= 2-Fluorobiphenyl	(43-116)	
S3 (TPH)	= Terphenyl-d14	(33-141)	
S4 (PHL)	= Phenol-d5	(10-110)	
S5 (2FP)	= 2-Fluorophenol	(21-110)	
S6 (TBP)	= 2,4,6-Tribromophenol	(10-123)	
S7 (2CP)	= 2-Chlorophenol-d4	(33-110)	(advisory)
S8 (DCB)	= 1,2-Dichlorobenzene-d4	(16-110)	(advisory)

Column to be used to flag recovery values
* Values outside of contract required QC limits
D Surrogate diluted out

2B

SOIL VOLATILE SYSTEM MONITORING COMPOUND RECOVERY

Lab Name: _____ Contract: _____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

Level: (low/med) _____

	EPA SAMPLE NO.	SMC1 (TOL) #	SMC2 (BFB) #	SMC3 (DCE) #	OTHER	TOT OUT
01						
02						
03						
04						
05						
06						
07						
08						
09						
10						
11						
12						
13						
14						
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27						
28						
29						
30						

	QC LIMITS
SMC1 (TOL) = Toluene-d8	(84-138)
SMC2 (BFB) = Bromofluorobenzene	(59-113)
SMC3 (DCE) = 1,2-Dichloroethane-d4	(70-121)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D System Monitoring Compound diluted out

2C
WATER SEMIVOLATILE SURROGATE RECOVERY

Lab Name:_____ Contract:_____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

	EPA SAMPLE NO.	S1 (NBZ) #	S2 (FBP) #	S3 (TPH) #	S4 (PHL) #	S5 (2FP) #	S6 (TBP) #	S7 (2CP) #	S8 (DCB) #	TOT OUT
01										
02										
03										
04										
05										
06										
07										
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26										
27										
28										
29										
30										

		QC LIMITS	
S1 (NBZ)	= Nitrobenzene-d5	(35-114)	
S2 (FBP)	= 2-Fluorobiphenyl	(43-116)	
S3 (TPH)	= Terphenyl-d14	(33-141)	
S4 (PHL)	= Phenol-d5	(10-110)	
S5 (2FP)	= 2-Fluorophenol	(21-110)	
S6 (TBP)	= 2,4,6-Tribromophenol	(10-123)	
S7 (2CP)	= 2-Chlorophenol-d4	(33-110)	(advisory)
S8 (DCB)	= 1,2-Dichlorobenzene-d4	(16-110)	(advisory)

Column to be used to flag recovery values
* Values outside of contract required QC limits
D Surrogate diluted out

2D

SOIL SEMIVOLATILE SURROGATE RECOVERY

Lab Name:_____ Contract:_____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

Level: (low/med)_____

	EPA SAMPLE NO.	S1 (NBZ) #	S2 (FBP) #	S3 (TPH) #	S4 (PHL) #	S5 (2FP) #	S6 (TBP) #	S7 (2CP) #	S8 (DCB) #	TOT OUT
01										
02										
03										
04										
05										
06										
07										
08										
09										
10										
11										
12										
13										
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21										
22										
23										
24										
25										
26										
27										
28										
29										
30										

		QC LIMITS	
S1 (NBZ)	= Nitrobenzene-d5	(23-120)	
S2 (FBP)	= 2-Fluorobiphenyl	(30-115)	
S3 (TPH)	= Terphenyl-d14	(18-137)	
S4 (PHL)	= Phenol-d5	(24-113)	
S5 (2FP)	= 2-Fluorophenol	(25-121)	
S6 (TBP)	= 2,4,6-Tribromophenol	(19-122)	
S7 (2CP)	= 2-Chlorophenol-d4	(20-130)	(advisory)
S8 (DCB)	= 1,2-Dichlorobenzene-d4	(20-130)	(advisory)

Column to be used to flag recovery values
* Values outside of contract required QC limits
D Surrogate diluted out

3A

WATER VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name:_____ Contract:_____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

Matrix Spike - EPA Sample No.: _____

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS % REC #	QC. LIMITS REC.
1,1-Dichloroethene					61-145
Trichloroethene					71-120
Benzene					76-127
Toluene					76-125
Chlorobenzene					75-130

COMPOUND	SPIKE ADDED (ug/L)	MSD CONCENTRATION (ug/L)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
1,1-Dichloroethene					14	61-145
Trichloroethene					14	71-120
Benzene					11	76-127
Toluene					13	76-125
Chlorobenzene					13	75-130

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD:_____ out of _____ outside limits
Spike Recovery:_____ out of _____ outside limits

COMMENTS: _____

_____

3B

SOIL VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name:_____ Contract:_____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

Matrix Spike - EPA Sample No.: _____ Level:(low/med) _____

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC. LIMITS REC.
1,1-Dichloroethene					59-172
Trichloroethene					62-137
Benzene					66-142
Toluene					59-139
Chlorobenzene					60-133

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
1,1-Dichloroethene					22	59-172
Trichloroethene					24	62-137
Benzene					21	66-142
Toluene					21	59-139
Chlorobenzene					21	60-133

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD:_____ out of _____ outside limits
Spike Recovery:_____ out of _____ outside limits

COMMENTS: _____

_____

3C

WATER SEMIVOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name:_____ Contract:_____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

Matrix Spike - EPA Sample No.: _____

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS % REC #	QC. LIMITS REC.
Phenol					12-110
2-Chlorophenol					27-123
1,4-Dichlorobenzene					36- 97
N-Nitroso-di-n-prop.(1)					41-116
1,2,4-Trichlorobenzene					39- 98
4-Chloro-3-methylphenol					23- 97
Acenaphthene					46-118
4-Nitrophenol					10- 80
2,4-Dinitrotoluene					24- 96
Pentachlorophenol					9-103
Pyrene					26-127

COMPOUND	SPIKE ADDED (ug/L)	MSD CONCENTRATION (ug/L)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
Phenol					42	12-110
2-Chlorophenol					40	27-123
1,4-Dichlorobenzene					28	36- 97
N-Nitroso-di-n-prop.(1)					38	41-116
1,2,4-Trichlorobenzene					28	39- 98
4-Chloro-3-methylphenol					42	23- 97
Acenaphthene					31	46-118
4-Nitrophenol					50	10- 80
2,4-Dinitrotoluene					38	24- 96
Pentachlorophenol					50	9-103
Pyrene					31	26-127

(1) N-Nitroso-di-n-propylamine

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits

RPD: _____ out of _____ outside limits
Surrogate Recovery: _____ out of _____ outside limits

COMMENTS: _____

3D

SOIL SEMIVOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name:_____ Contract:_____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

Matrix Spike - EPA Sample No.: _____ Level:(low/med) _____

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC. LIMITS REC.
Phenol					26- 90
2-Chlorophenol					25-102
1,4-Dichlorobenzene					28-104
N-Nitroso-di-n-prop.(1)					41-126
1,2,4-Trichlorobenzene					38-107
4-Chloro-3-methylphenol					26-103
Acenaphthene					31-137
4-Nitrophenol					11-114
2,4-Dinitrotoluene					28- 89
Pentachlorophenol					17-109
Pyrene					35-142

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
Phenol					35	26- 90
2-Chlorophenol					50	25-102
1,4-Dichlorobenzene					27	28-104
N-Nitroso-di-n-prop.(1)					38	41-126
1,2,4-Trichlorobenzene					23	38-107
4-Chloro-3-methylphenol					33	26-103
Acenaphthene					19	31-137
4-Nitrophenol					50	11-114
2,4-Dinitrotoluene					47	28- 89
Pentachlorophenol					47	17-109
Pyrene					36	35-142

(1) N-Nitroso-di-n-propylamine

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits

RPD: _____ out of _____ outside limits
Spike Recovery: _____ out of _____ outside limits

COMMENTS: _____

4A

VOLATILE METHOD BLANK SUMMARY

EPA SAMPLE NO.

Lab Name: _____ Contract: _____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

Lab File ID: _____ Lab Sample ID: _____

Date Analyzed: _____ Time Analyzed: _____

GC Column: _____ ID: _____(mm) Heated Purge: (Y/N) ___

Instrument ID: _____

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01				
02				
03				
04				
05				
06				
07				
08				
09				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				

COMMENTS:

4B

SEMIVOLATILE METHOD BLANK SUMMARY

EPA SAMPLE NO.

Lab Name: _____ Contract: _____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

Lab File ID: _____ Lab Sample ID: _____

Instrument ID: _____ Date Extracted: _____

Matrix: (soil/water) _____ Date Analyzed: _____

Level: (low/med) _____ Time Analyzed: _____

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
01				
02				
03				
04				
05				
06				
07				
08				
09				
10				
11				
12				
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14				
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COMMENTS:

_____

_____

5A

VOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
BROMOFLUOROBENZENE (BFB)

Lab Name: _____ Contract: _____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

Lab File ID: _____ BFB Injection Date: _____

Instrument ID: _____ BFB Injection Time: _____

GC Column: _____ ID: _____(mm) Heated Purge: (Y/N) ___

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	8.0 - 40.0% of mass 95	
75	30.0 - 66.0% of mass 95	
95	Base peak, 100% relative abundance	
96	5.0 - 9.0% of mass 95	
173	Less than 2.0% of mass 174	( )1
174	50.0 - 120.0% of mass 95	
175	4.0 - 9.0 % of mass 174	( )1
176	93.0 - 101.0% of mass 174	( )1
177	5.0 - 9.0% of mass 176	( )2

1-Value is % mass 174 2-Value is % mass 176

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01					
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					

5B

SEMIVOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

Lab Name:_____ Contract:_____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

Lab File ID: _____ DFTPP Injection Date:_____

Instrument ID: _____ DFTPP Injection Time:_____

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
51	30.0 - 80.0% of mass 198	
68	Less than 2.0% of mass 69	( )1
69	Mass 69 relative abundance	
70	Less than 2.0% of mass 69	( )1
127	25.0 - 75.0% of mass 198	
197	Less than 1.0% of mass 198	
198	Base Peak, 100% relative abundance	
199	5.0 to 9.0% of mass 198	
275	10.0 - 30.0% of mass 198	
365	Greater than 0.75% of mass 198	
441	Present, but less than mass 443	
442	40.0 - 110.0% of mass 198	
443	15.0 - 24.0% of mass 442	( )2

1-Value is % mass 69 2-Value is % mass 442

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01					
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					

6A

VOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name:_____ Contract:_____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

Instrument ID: _____ Calibration Date(s):_____ _____

Heated Purge: (Y/N) ___ Calibration Times: _____ _____

GC Column: _____ ID: _____(mm)

LAB FILE ID: RRF10 =_____ RRF20 =_____
RRF50 =_____ RRF100=_____ RRF200=_____

COMPOUND	RRF10	RRF20	RRF50	RRF100	RRF200	$\overline{RRF}$	% RSD
Chloromethane							
Bromomethane *							*
Vinyl Chloride *							*
Chloroethane							
Methylene Chloride							
Acetone							
Carbon Disulfide							
1,1-Dichloroethene *							*
1,1-Dichloroethane *							*
1,2-Dichloroethene (total)							
Chloroform *							*
1,2-Dichloroethane *							*
2-Butanone							
1,1,1-Trichloroethane *							*
Carbon Tetrachloride *							*
Bromodichloromethane *							*
1,2-Dichloropropane							
cis-1,3-Dichloropropene *							*
Trichloroethene *							*
Dibromochloromethane *							*
1,1,2-Trichloroethane *							*
Benzene *							*
trans-1,3-Dichloropropene *							*
Bromoform *							*
4-Methyl-2-Pentanone							
2-Hexanone							
Tetrachloroethene *							*
1,1,2,2-Tetrachloroethane *							*
Toluene *							*
Chlorobenzene *							*
Ethylbenzene *							*
Styrene *							*
Xylene (total) *							*
Toluene-d8							
Bromofluorobenzene *							*
1,2-Dichloroethane-d4							

* Compounds with required minimum RRF and maximum %RSD values.
All other compounds must meet a minimum RRF of 0.010.

6B
SEMIVOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name:_____ Contract:_____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

Instrument ID: _____ Calibration Date(s):_____ _____

Calibration Times: _____ _____

LAB FILE ID: RRF20 =_____ RRF50 =_____
RRF80 =_____ RRF120=_____ RRF160=_____

COMPOUND	RRF20	RRF50	RRF80	RRF120	RRF160	$\overline{RRF}$	% RSD
Phenol	*						*
bis(2-Chloroethyl)ether	*						*
2-Chlorophenol	*						*
1,3-Dichlorobenzene	*						*
1,4-Dichlorobenzene	*						*
1,2-Dichlorobenzene	*						*
2-Methylphenol	*						*
2,2'-oxybis(1-Chloropropane)							
4-Methylphenol	*						*
N-Nitroso-di-n-propylamine	*						*
Hexachloroethane	*						*
Nitrobenzene	*						*
Isophorone	*						*
2-Nitrophenol	*						*
2,4-Dimethylphenol	*						*
bis(2-Chloroethoxy)methane	*						*
2,4-Dichlorophenol	*						*
1,2,4-Trichlorobenzene	*						*
Naphthalene	*						*
4-Chloroaniline							
Hexachlorobutadiene							
4-Chloro-3-methylphenol	*						*
2-Methylnaphthalene	*						*
Hexachlorocyclopentadiene							
2,4,6-Trichlorophenol	*						*
2,4,5-Trichlorophenol	*						*
2-Chloronaphthalene	*						*
2-Nitroaniline							
Dimethylphthalate							
Acenaphthylene	*						*
2,6-Dinitrotoluene	*						*
3-Nitroaniline							
Acenaphthene	*						*
2,4-Dinitrophenol							
4-Nitrophenol							
Dibenzofuran	*						*
2,4-Dinitrotoluene	*						*

* Compounds with required minimum RRF and maximum %RSD values.
All other compounds must meet a minimum RRF of 0.010.

6C

SEMIVOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name:_____ Contract:_____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

Instrument ID: _____ Calibration Date(s):_____ _____

Calibration Times: _____ _____

LAB FILE ID: RRF20 =_____ RRF50 =_____

RRF80 =_____ RRF120=_____ RRF160=_____

COMPOUND	RRF20	RRF50	RRF80	RRF120	RRF160	$\overline{RRF}$	% RSD
Diethylphthalate							
4-Chlorophenyl-phenylether	*						*
Fluorene	*						*
4-Nitroaniline							
4,6-Dinitro-2-methylphenol							
N-Nitrosodiphenylamine (1)							
4-Bromophenyl-phenylether	*						*
Hexachlorobenzene	*						*
Pentachlorophenol	*						*
Phenanthrene	*						*
Anthracene	*						*
Carbazole							
Di-n-butylphthalate							
Fluoranthene	*						*
Pyrene	*						*
Butylbenzylphthalate							
3,3'-Dichlorobenzidine							
Benzo(a)anthracene	*						*
Chrysene	*						*
bis(2-Ethylhexyl)phthalate							
Di-n-octylphthalate							
Benzo(b)fluoranthene	*						*
Benzo(k)fluoranthene	*						*
Benzo(a)pyrene	*						*
Indeno(1,2,3-cd)pyrene	*						*
Dibenz(a,h)anthracene	*						*
Benzo(g,h,i)perylene	*						*
Nitrobenzene-d5							*
2-Fluorobiphenyl	*						*
Terphenyl-d14	*						*
Phenol-d5	*						*
2-Fluorophenol	*						
2,4,6-Tribromophenol							
p-Chlorophenol-d4	*						
1,2-Dichlorobenzene-d4	*						*

(1) Cannot be separated from Diphenylamine

* Compounds with required minimum RRF and maximum %RSD values. All other compounds must meet a minimum RRF of 0.010.

7A

VOLATILE CONTINUING CALIBRATION CHECK

Lab Name:_____ Contract:_____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

Instrument ID: _____ Calibration Date:_____ Time:_____

Lab File ID: _____ Init. Calib. Date(s):_____ _____

Heated Purge: (Y/N) ___ Init. Calib. Times: _____ _____

GC Column: _____ ID: _____(mm)

COMPOUND	$\overline{RRF}$	RRF50	MIN RRF	%D	MAX %D
Chloromethane					
Bromomethane			0.100		25.0
Vinyl Chloride			0.100		25.0
Chloroethane					
Methylene Chloride					
Acetone					
Carbon Disulfide					
1,1-Dichloroethene			0.100		25.0
1,1-Dichloroethane			0.200		25.0
1,2-Dichloroethene (total)					
Chloroform			0.200		25.0
1,2-Dichloroethane			0.100		25.0
2-Butanone					
1,1,1-Trichloroethane			0.100		25.0
Carbon Tetrachloride			0.100		25.0
Bromodichloromethane			0.200		25.0
1,2-Dichloropropane					
cis-1,3-Dichloropropene			0.200		25.0
Trichloroethene			0.300		25.0
Dibromochloromethane			0.100		25.0
1,1,2-Trichloroethane			0.100		25.0
Benzene			0.500		25.0
trans-1,3-Dichloropropene			0.100		25.0
Bromoform			0.100		25.0
4-Methyl-2-Pentanone					
2-Hexanone					
Tetrachloroethene			0.200		25.0
1,1,2,2-Tetrachloroethane			0.500		25.0
Toluene			0.400		25.0
Chlorobenzene			0.500		25.0
Ethylbenzene			0.100		25.0
Styrene			0.300		25.0
Xylene (total)			0.300		25.0
Toluene-d8					
Bromofluorobenzene			0.200		25.0
1,2-Dichloroethane-d4					

All other compounds must meet a minimum RRF of 0.010.

7B

SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name:_____ Contract:_____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

Instrument ID: _____ Calibration Date:_____ Time:_____

Lab File ID: _____ Init. Calib. Date(s):_____ _____

Init. Calib. Times: _____ _____

COMPOUND	$\overline{RRF}$	RRF50	MIN RRF	%D	MAX %D
Phenol			0.800		25.0
bis(2-Chloroethyl)ether			0.700		25.0
2-Chlorophenol			0.800		25.0
1,3-Dichlorobenzene			0.600		25.0
1,4-Dichlorobenzene			0.500		25.0
1,2-Dichlorobenzene			0.400		25.0
2-Methylphenol			0.700		25.0
2,2'-oxybis(1-Chloropropane)					
4-Methylphenol			0.600		25.0
N-Nitroso-di-n-propylamine			0.500		25.0
Hexachloroethane			0.300		25.0
Nitrobenzene			0.200		25.0
Isophorone			0.400		25.0
2-Nitrophenol			0.100		25.0
2,4-Dimethylphenol			0.200		25.0
bis(2-Chloroethoxy)methane			0.300		25.0
2,4-Dichlorophenol			0.200		25.0
1,2,4-Trichlorobenzene			0.200		25.0
Naphthalene			0.700		25.0
4-Chloroaniline					
Hexachlorobutadiene					
4-Chloro-3-methylphenol			0.200		25.0
2-Methylnaphthalene			0.400		25.0
Hexachlorocyclopentadiene					
2,4,6-Trichlorophenol			0.200		25.0
2,4,5-Trichlorophenol			0.200		25.0
2-Chloronaphthalene			0.800		25.0
2-Nitroaniline					
Dimethylphthalate					
Acenaphthylene			1.300		25.0
2,6-Dinitrotoluene			0.200		25.0
3-Nitroaniline					
Acenaphthene			0.800		25.0
2,4-Dinitrophenol					
4-Nitrophenol					
Dibenzofuran			0.800		25.0
2,4-Dinitrotoluene			0.200		25.0

All other compounds must meet a minimum RRF of 0.010.

7C

SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name:_____ Contract:_____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

Instrument ID: _____ Calibration Date:_____ Time:_____

Lab File ID: _____ Init. Calib. Date(s):_____ _____

Init. Calib. Times: _____ _____

COMPOUND	$\overline{RRF}$	RRF50	MIN RRF	%D	MAX %D
Diethylphthalate					
4-Chlorophenyl-phenylether			0.400		25.0
Fluorene			0.900		25.0
4-Nitroaniline					
4,6-Dinitro-2-methylphenol					
N-Nitrosodiphenylamine (1)					
4-Bromophenyl-phenylether			0.100		25.0
Hexachlorobenzene			0.100		25.0
Pentachlorophenol			0.050		25.0
Phenanthrene			0.700		25.0
Anthracene			0.700		25.0
Carbazole					
Di-n-butylphthalate					
Fluoranthene			0.600		25.0
Pyrene			0.600		25.0
Butylbenzylphthalate					
3,3'-Dichlorobenzidine					
Benzo(a)anthracene			0.800		25.0
Chrysene			0.700		25.0
bis(2-Ethylhexyl)phthalate					
Di-n-octylphthalate					
Benzo(b)fluoranthene			0.700		25.0
Benzo(k)fluoranthene			0.700		25.0
Benzo(a)pyrene			0.700		25.0
Indeno(1,2,3-cd)pyrene			0.500		25.0
Dibenz(a,h)anthracene			0.400		25.0
Benzo(g,h,i)perylene			0.500		25.0
Nitrobenzene-d5			0.200		25.0
2-Fluorobiphenyl			0.700		25.0
Terphenyl-d14			0.500		25.0
Phenol-d5			0.800		25.0
2-Fluorophenol			0.600		25.0
2,4,6-Tribromophenol					
2-Chlorophenol-d4			0.800		25.0
1,2-Dichlorobenzene-d4			0.400		25.0

(1) Cannot be separated from Diphenylamine
All other compounds must meet a minimum RRF of 0.010.

8A

VOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name:_____ Contract:_____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

Lab File ID (Standard): _____ Date Analyzed:_____

Instrument ID: _____ Time Analyzed:_____

GC Column: _____ ID: _____(mm) Heated Purge: (Y/N) ___

	IS1(BCM) AREA #	RT #	IS2(DFB) AREA #	RT #	IS3(CBZ) AREA #	RT #
12 HOUR STD						
UPPER LIMIT						
LOWER LIMIT						
EPA SAMPLE NO.						
01						
02						
03						
04						
05						
06						
07						
08						
09						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						

IS1 (BCM) = Bromochloromethane
IS2 (DFB) = 1,4-Difluorobenzene
IS3 (CBZ) = Chlorobenzene-d5

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = - 50% of internal standard area
RT UPPER LIMIT = +0.50 minutes of internal standard RT
RT LOWER LIMIT = -0.50 minutes of internal standard RT

Column used to flag values outside QC limits with an asterisk.
* Values outside of QC limits:

8B

SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name:_____ Contract:_____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

Lab File ID (Standard): _____ Date Analyzed:_____

Instrument ID: _____ Time Analyzed:_____

	IS1(DCB) AREA #	RT #	IS2(NPT) AREA #	RT #	IS3(ANT) AREA #	RT #
12 HOUR STD						
UPPER LIMIT						
LOWER LIMIT						
EPA SAMPLE NO.						
01						
02						
03						
04						
05						
06						
07						
08						
09						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						

IS1 (DCB) = 1,4-Dichlorobenzene-d4
IS2 (NPT) = Naphthalene-d8
IS3 (ANT) = Acenaphthene-d10

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = - 50% of internal standard area
RT UPPER LIMIT = +0.50 minutes of internal standard RT
RT LOWER LIMIT = -0.50 minutes of internal standard RT

Column used to flag internal standard area values with an asterisk.
* Values outside of QC limits.

8C

SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: _____ Contract: _____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

Lab File ID (Standard): _____ Date Analyzed: _____

Instrument ID: _____ Time Analyzed: _____

	EPA SAMPLE NO.	IS4(PHN) AREA #	RT #	IS5(CRY) AREA #	RT #	IS6(PRY) AREA #	RT #
	12 HOUR STD						
	UPPER LIMIT						
	LOWER LIMIT						
01							
02							
03							
04							
05							
06							
07							
08							
09							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							

IS4 (PHN) = Phenanthrene-d10
IS5 (CRY) = Chrysene-d12
IS6 (PRY) = Perylene-d12

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = - 50% of internal standard area
RT UPPER LIMIT = +0.50 minutes of internal standard RT
RT LOWER LIMIT = -0.50 minutes of internal standard RT

Column used to flag internal standard area values with an asterisk.
* Values outside of QC limits.

Attachment Y-2

BLASLAND, BOUCK & LEE, INC.
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Analytical Data Validation Summary Table

TABLE 1

GENERAL ELECTRIC COMPANY - PITTSFIELD, MASSACHUSETTS

ANALYTICAL DATA VALIDATION SUMMARY
(Results are presented in parts per million, ppm)

Sample Delivery Group No.	Sample ID	Date Collected	Matrix	Validation Level	Qualification	Compound	QA/QC Parameter	Value	Control Limits	Qualified Result	Notes
PCBs											
9700001	EXAMPLE-SS-1 (0 - 0 5)	1/1/97	Soil	Tier II	No						
9700001	EXAMPLE-SS-1 (0 5 - 1)	1/1/97	Soil	Tier II	No						
9700001	EXAMPLE-SS-2 (0 - 0.5)	1/1/97	Soil	Tier II	No						
9700001	EXAMPLE-SS-2 (0 5 - 1)	1/1/97	Soil	Tier II	No						
9700001	EXAMPLE-SS-3 (0 - 0 5)	1/1/97	Soil	Tier II	No						
9700001	EXAMPLE-SS-3 (0 5 - 1)	1/1/97	Soil	Tier II	No						
9700002	EXAMPLE-SS-5 (0 5 - 1)	1/1/97	Soil	Tier I	No						
9700002	EXAMPLE-SS-5 (0 5 - 1)	1/1/97	Soil	Tier I	No						
9700002	EXAMPLE-SS-6 (0 5 - 1)	1/1/97	Soil	Tier I	No						
9700002	EXAMPLE-SS-6 (0 5 - 1)	1/1/97	Soil	Tier I	No						
9700002	EXAMPLE-SS-DUP-1	1/1/97	Soil	Tier I	No						Duplicate of EXAMPLE-SS-5 (0 5 - 1)
Metals											
9700001	EXAMPLE-SS-1 (0 - 0 5)	1/1/97	Soil	Tier II	Yes	Copper	Matrix Spike %R	54.0%	75% to 125%	ND(5 62) J	
9700001	EXAMPLE-SS-1 (0 5 - 1)	1/1/97	Soil	Tier II	Yes	Copper	Matrix Spike %R	54.0%	75% to 125%	ND(5.62) J	
VOCs											
9801047	EXAMPLE-SS-1 (0 - 0 5)	1/1/97	Soil	Tier II	No						
9801047	EXAMPLE-SS-1 (0 5 - 1)	1/1/97	Soil	Tier II	No						
SVOCs											
9700001	EXAMPLE-SS-1 (0 - 0 5)	1/1/97	Soil	Tier II	Yes	2,6-Dinitrophenol	CCAL %D	59.0%	<25%	ND(3 6) J	
9700001	EXAMPLE-SS-1 (0 5 - 1)	1/1/97	Soil	Tier II	Yes	2,6-Dinitrophenol	CCAL %D	85.3%	<25%	ND(3 6) J	
						Pentachrolophenol	CCAL %D	52.3%	<25%	ND(3.6) J	
PCDDs/PCDFs											
9700001	EXAMPLE-SS-1 (0 - 0 5)	1/1/97	Soil	Tier II	Yes	1,2,3,4,7,8-HxCDF	Internal Standard %R	188.0%	25% to 150%	0.00013 J	
						1,2,3,6,7,8-HxCDF	Internal Standard %R	186.7%	25% to 150%	0.000066 J	
						Total TCDF	Result exceeded calibration range			0.00058 J	
						Total HxCDF	Result exceeded calibration range			0.0021 J	
9700001	EXAMPLE-SS-1 (0 5 - 1)	1/1/97	Soil	Tier II	Yes	1,2,3,4,6,7,8-HpCDD	Internal Standard %R	221.1%	25% to 150%	0.000020 J	
						OCDD	Internal Standard %R	235.2%	25% to 150%	0.00022 J	
						1,2,3,4,7,8-HxCDF	Internal Standard %R	422.3%	25% to 150%	0.0000038 J	
						1,2,3,6,7,8-HxCDF	Internal Standard %R	365.2%	25% to 150%	0.0000020 J	
						2,3,4,6,7,8-HxCDF	Internal Standard %R	332.0%	25% to 150%	0.0000041 J	
						1,2,3,4,6,7,8-HpCDF	Internal Standard %R	222.6%	25% to 150%	0.000011 J	
Cyanide											
9801047	EXAMPLE-SS-1 (0 - 0 5)	1/1/97	Soil	Tier II	No						
9801047	EXAMPLE-SS-1 (0 5 - 1)	1/1/97	Soil	Tier II	No						
Sulfide											
9801047	EXAMPLE-SS-1 (0 - 0 5)	1/1/97	Soil	Tier II	No						
9801047	EXAMPLE-SS-1 (0 5 - 1)	1/1/97	Soil	Tier II	No						

Appendix Z

BLASLAND, BOUCK & LEE, INC.
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Data Validation Procedures for Polychlorinated Biphenyls/Pesticides

Appendix Z

Data Validation Procedures for Pesticides and Polychlorinated biphenyls (PCBs)

I. Introduction

This standard operating procedure (SOP) describes the data validation procedures for a USEPA Region I Tiered review of data for pesticides and polychlorinated biphenyls (PCBs) analyzed by USEPA methods 8081A and 8082, respectively. Data review procedures presented in this SOP were developed from the applicable quality control criteria specified in the following documents:

- *Region I Tiered Organic and Inorganic Data Validation Guidelines*, USEPA Region I, July 1, 1993.
- *Region I Laboratory Data Validation Functional Guidelines for Evaluating Organics Analyses*, USEPA Region I, Draft, December 1996.
- *CLP Organics Data Review and Preliminary Review*, USEPA SOP HW-6, Revision 10, October 1995.
- *USEPA Contract Laboratory Program, Statement of Work for the Organics Analysis, Revision OLM0.1.9*, July 1993

II. Tier I Validation Procedures

Tier I validation of a data package consists of verifying that all raw data and forms are included and complete. All Form Is or laboratory equivalent (presented in Attachment Z-1) are copied and a data validation summary spreadsheet presented in Attachment Z-2 is prepared to document the data review. The following steps are taken to complete a Tier I validation:

Step 1 - The laboratory case narrative is reviewed. During review of the case narrative, if there are any deviations that warrant a more extensive validation procedure, a Tier II review would be initiated to evaluate potential data use limitations.

Step 2 - Compare the chain-of-custody and the sample traffic reports. If there are any inconsistencies or if they are incomplete, then contact laboratory for an explanation.

Step 3 - Verify that all forms presented in Attachment Z-1 or laboratory equivalent forms are present and complete. If any of the forms are not in the data package, contact the laboratory for a resubmission.

Note: If frequent or severe quality control deviations are present on the above-mentioned forms, a more extensive validation procedure may be warranted. Based on the reviewer's judgement, Tier II or Tier III review may be warranted to fully evaluate the usability of the data.

Step 4 - Make a copy of the all sample data Form Is or laboratory equivalent for inclusion in the validation report.

Step 5 - Verify that the following raw data is provided for each sample and associated QA/QC samples in the data package. Contact the laboratory to obtain missing data:

- Case Narrative
- Chain-of-Custody Forms
- Traffic Reports
- QA Sample Summary Forms
- Instrument Calibration Summary Forms
- Instrument Run Logs
- Sample Preparation Logs
- Instrument/Method Detection Limits
- Standards Preparation Logs
- Supporting (raw) Data

Step 6 - With a blue ink pen, record on the first page of the data package: the validation level, date, and reviewer's initials.

III. Tier II Validation Procedures

Tier II validation of a data package consists of the steps mentioned above for a Tier I review plus review of the data package for identification of QA/QC deviations. Tier II validation does not include review of the "raw data" or recalculation of sample results. Sample qualification is performed (if required) following USEPA Region I Guidelines.

A. Data Qualifiers

All data qualified due to QA/QC deviations will be clearly marked on a copy of the Form Is or laboratory equivalent with a blue ink pen. The laboratory qualification is lined out and the reviewer's qualification placed next to it. The date and the initials of the reviewer will also be placed on the Form I. Below is a list of qualifiers to be used.

U The compound or analyte was analyzed for, but was not detected. The sample quantitation limit is presented and adjusted for dilution and (for solid samples only) percent moisture. For consistency with the database and summary tables prepared from the data, non-detected sample results are displayed as ND(CRQL) as presented in Attachment Z-2.

J The compound or analyte was positively identified, but the associated numerical value is an estimated concentration. This qualifier is used when the data evaluation procedure identifies a deficiency in the data generation process. This qualifier is also used when a compound or analyte is detected at estimated concentrations less than the contract-required detection limit (CRDL) for inorganic analyses or the contract-required quantitation limit (CRQL) for organic analyses.

UJ The compound or analyte was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual level of quantitation. For consistency with the database and summary tables prepared from the data, non-detected sample results are displayed as ND(CRQL) J as presented in Attachment Z-2.

R Indicates that the previously reported detection limit or sample result has been rejected due to a major deficiency in the data generation procedure. The data should not be used for any qualitative or quantitative purposes.

B. Holding Times

Criteria

Samples (waters or soils) and extracts must be preserved at 4 degrees centigrade. Soil and water samples must be extracted within seven days and extracts must be analyzed within 40 days.

Action

Specific holding times for each analysis and sample type are presented in Table 1 of the SAP/DCAQAP. The following steps are performed for the validation of data due to holding times:

Step 1 - Establish the holding time by comparing the sampling date on the chain-of-custody with the dates of analysis and/or extraction on the Form I. The chain-of-custody is also reviewed to determine if the samples were properly preserved.

Step 2 - If the holding times are exceeded by less than 24 hours, then no qualification of data is needed.

Step 3 - If the holding times are exceeded by more than 24 hours, but less than 14 days, then all the positive results are qualified as estimated (J) and the non-detected compounds are qualified as estimated (UJ).

Step 4 - If the holding times are exceeded by more than twice the specified holding time, then all the results are qualified as unusable (R).

C. Pesticides and PCBs Instrument Performance

Criteria

1.0 The laboratory must report retention time window data on the pesticide/PCBs Standards Summary (Form X Pest-1 or Form X Pest-2) or laboratory equivalent for each GC column used to analyze samples. Compounds must be within these retention time windows.

1.1 The total percent breakdown for neither DDT nor endrin may exceed 20 percent. The percent breakdown is the amount of decomposition that endrin and 4,4'-DDT undergo when analyzed by the chromatograph.

1.2 The retention time of DCB and TCMX in each analysis of PCBs must be compared to the retention time of the DCB and TCMX in Evaluation Standard Mix A. The percent difference (%D) must not exceed 0.3 percent for narrow-bore capillary columns, and 1.5 percent if wide-bore capillary columns are used.

Action

2.0 If any compound is outside the retention time window listed on Form X Pest-1, Form X Pest-2, or laboratory equivalent, a Tier III validation is warranted.

2.1 DDT and Endrin degradation deviations are qualified in the following manner:

Step 1 - Review DDT breakdown data presented on Form X Pest-1 or laboratory equivalent to determine if it is greater than 20 percent. Beginning with the sample following the last in-control standard qualify the data in the following manner:

A. All positive results for DDT are qualified as estimated (J).

B. If DDT was not detected, but DDD and DDE are positive, then the quantitation limit for DDT is qualified as unusable (R).

C. All positive results for DDD and/or DDE are qualified as estimated (J).

Step 2 - Review endrin breakdown data presented on Form X Pest-1 or laboratory equivalent to determine if it is greater than 20 percent. Beginning with the sample following the last in-control standard and qualify the data in the following manner:

A. All positive results for endrin are qualified as estimated (J).

B. If endrin was not detected, but endrin aldehyde and endrin ketone are positive, then the quantitation limit for endrin is qualified as unusable (R).

C. All positive results for endrin ketone are qualified as estimated (J).

2.2 Review the retention time percent difference presented on Form X Pest-1 or laboratory equivalent. The following steps outline the qualification of data for retention time shifts of DCB and TCMX:

Step 1 - If the retention time shift for DCB and TCMX is greater than 0.3 percent for a narrow-bore capillary column, or 1.5 percent for a wide-bore capillary column, the data are qualified as unusable (R).

Step 2 - If DCB and TCMX are absent, then the retention time shift cannot be evaluated (i.e., if it is diluted out due to high concentration of a target compound or matrix interference.)

D . Calibration

Criteria

1.0 Initial Calibration Pesticides

The percent Relative Standard Deviation (%RSD) of calibration factors for aldrin, endrin, DDT, and dibutylchlorendate must not be greater than 10 percent. When toxaphene is identified, a three-point calibration is required for quantification. If the calibration factor %RSD for DDT or toxaphene is greater than 10 percent, calibration curves must be used for the quantitation of DDT, DDE, DDD, or toxaphene.

Note: The %RSD linearity check is required only for columns that are used for quantitation of sample and surrogate results. Columns used only to provide qualitative verification are not required to meet this criterion.

1.1 Initial Calibration PCBs

The %RSD for each PCB standard must not be greater than 20 percent.

1.2 Analytical Sequence

1.2.1 Primary Analysis

At the beginning of each 72-hour period all standards must be analyzed.

1.2.2 Confirmation Analysis

1.2.3 Evaluation Standard Mix A, B, and C are required for the curve.

1.2.4 Only the standards containing the compounds to be confirmed are required. These standards must be repeated after every five samples.

1.2.5 Evaluation Mix B is required after every ten samples.

1.3 Continuing Calibration

The calibration factor for each standard must be within 15 percent of the standard at the beginning of the analytical sequence on quantitation columns (20 percent on the confirmation columns).

Action

The following steps are performed during the validation of data due to calibration deviation:

Step 1 - Verify that the criterion for the initial calibration linearity has been met by reviewing Form VI Pest-2 and Form VI Pest-3 or laboratory equivalents. If the criteria in sections III.C.1.1 and III.C.1.2 are not met, then all associated positive results are qualified as estimated (J).

Step 2 - Verify by reviewing Form VII Pest-1 and Form VII Pest-2 or laboratory equivalents, that the percent difference (%D) between calibration factors is not greater than 15 percent for the compound(s) being quantitated (20 percent for compound(s) being confirmed). If the %D is greater than this criterion then all associated positive results are qualified as estimated (J).

E. Blanks

Criteria

1.0 No contaminants should be present in the blank(s).

1.1 For each matrix, and each extracted batch, a method blank must be analyzed.

Action

Qualification of sample results due to blank contamination is dependent on the conditions and the origin of the blank. No positive sample results are reported unless the concentration of the compound in the sample exceeds five times the amount in the blank. No sample results are corrected by subtracting blank values. Specific qualifications of sample data is as follows:

Step 1 - Review the Form IVS or laboratory equivalent within the data package to ensure that criteria III.D.1.2 is in compliance. If they are not, the laboratory will be contacted by the reviewer for a written explanation.

Step 2 - Review the Form I of all the blanks within the data package.

Step 3 - When any pesticide/PCB is detected in the sample and the sample concentration is less than five times the concentration detected in the associated blank, the data are qualified as a non-detect (U).

Step 4 - If a compound is found in the blank, but not in the sample, then the data are not qualified.

Note: Any difference between the sample analyses and the related blank analyses which involve weights, volumes or dilution factors are taken into account when the 5-times criteria is used.

The following are examples of how qualifications apply to blank data:

Example (Step 3): When the sample result is greater than the contract required quantitation limit (CRQL), but less than the blank action level, the sample results are qualified as non-detects. As in the example below, the result is less than the blank action level (or 5 x 1), therefore the sample result is qualified as non-detected.

Factor	5-times
Blank Result	1.0
CRQL	0.5
Action Level	5.0
Sample Result	4.0
Qualified Sample Result	4.0 U

Example (Step 4): When the sample result is greater than the blank action level the sample results are not qualified. As in the example below, the sample result is greater than the blank action level and the sample result is not qualified.

Factor	5-times
Blank Result	1.0
CRQL	0.5
Action Level	5.0
Sample Result	6.0
Qualified Sample Result	6.0

Step 5 - When excessive amounts of contamination exists (i.e., saturated peaks by ECD), all compounds affected are qualified as unusable (R).

F. Surrogate Recovery

Criteria

Sample and blank surrogates recoveries for TCMX and DCB must be within control limits listed in Table 5 of the SAP/DCAQAP.

Action

Qualification of the data because of surrogate recoveries being out of control is based on the evaluation of all data provided in the data package, especially considering the complexity of the effect of sample matrices. These qualifications are completed in the following steps:

Step 1 - Surrogate recoveries tabulated on Form II or laboratory equivalent of each fraction are evaluated against the control limits provided in Table 5 of the SAP/DCAQAP.

Step 2 - If both TCMX and DCB recoveries are low and are out of control:

A. All positive results for that fraction are qualified as estimated (J).

B. All non-detected results are qualified as estimated (UJ).

Step 3 - In the case where both TCMX and DCB recoveries are zero, the data are qualified as unusable (R).

Step 4 - When the blank analysis involves both surrogate recoveries out of control, the related sample data are reviewed and qualified in the following manner:

A. If the sample data does not contain any out of control surrogates, then the data are not qualified.

B. If the sample data does contain a surrogate that is out of control, then the sample data are qualified as mentioned above in steps 2A and 2B.

Note: In this special circumstance the problem is considered to be within the laboratory control and is so noted in the validation report.

G. Matrix Spike / Matrix Spike Duplicate

Criteria

1.0 Spike recoveries must be within the control limits in Table 5 of the SAP/DCAQAP.

1.1 The relative percent difference (RPD) between matrix spike and matrix spike duplicate recoveries must be within the control limits specified in Table 5.

Action

If recovery results are not within the control limits, the following steps are taken to qualify the data:

Step 1 - If the recovery results are not within the control limits presented in Table 5, the positive results for the compound in the unspiked sample are qualified as estimated (J).

Step 2 - If the recovery result is less than 10 percent, the non-detects for that compound in the unspiked sample are qualified as rejected (R). This is the only instance that a non-detect is qualified due to a recovery being out of control.

Step 3 - If any of the RPDs are greater than the limits presented in Table 5, then positive results for that compound are flagged as estimated (J) in the unspiked sample.

H. Field Duplicates

Criteria

1.0 For water matrices, each compound's RPD must be less than 30 percent.

1.1 For soil matrices, each compound's RPD must be less than 50 percent.

Action

Step 1 - Calculate all the RPD values for positive results between the sample and the field duplicate.

$$\text{Calculation: } RPD = \frac{\text{Sample Result - Field Duplicate}}{\text{(Sample Result + Field Duplicate)/2}} \times 100$$

Step 2 - If the RPD is greater than 30 percent in water matrix, the results for that compound in both samples are qualified as estimated (J).

Step 3 - If the RPD is greater than 50 percent in soil matrix, the results for that compound in both samples are qualified as estimated (J).

IV. Tier III Validation Procedures

Tier III validation of a data package consists of the steps mentioned above for a Tier I and Tier II validation plus review of the "raw data" and recalculation of approximately ten percent of the sample results. The compound identification, instrument performance, quantitation and detection limits are also evaluated.

A. Compound Quantitation and Reported Detection Limits

Criteria

The quantitation of detected compounds and the adjustment of the CRDL for dilutions and percent solids are recalculated for 10 percent of the data.

Action

Step 1 - If the criteria above have not been followed, then the laboratory will be contacted by the reviewer and the laboratory will be responsible for a correction of the quantitation and a resubmission of the reported data.

Step 2 - Quantitation limits affected by large, off-scale peaks are qualified as unusable (R).

Step 3 - If the interference is on-scale, the quantitation limit is qualified as estimated (J).

B. Instrument Performance

Criteria

The laboratory must report retention time window data on the pesticide/PCBs standards summary (Form X Pest-1 or Form X Pest-2) or laboratory equivalent for each GC column used to analyze samples. Compounds must be within these retention time windows.

Action

Retention time windows are used in qualitative identification. If the sample results are not within the retention time windows, the following steps are taken to evaluate the data:

Step 1 - The chromatogram is reviewed to see if there are any peaks within an expanded window surrounding the expected retention time window of the pesticide of interest.

Step 2 - If there are no peaks present either within or close to the retention time window of the out of control targeted pesticide, then there is no qualification of the data. Non-detected results are considered valid.

Step 3 - If there are peaks present above or close to the CRDL and either within or close to the retention time window of the out of control targeted pesticide, all positive data are qualified as unusable (R).

C. Compound Identification

Criteria

Reported compounds must be within calculated retention time windows for both chromatographic columns.

Action

The following steps are taken during the compound identification:

Step 1 - When the qualitative criteria for two-column confirmation are not met, all reported positive detects are reported as non-detects. The reviewer uses professional judgment and the following steps to report the appropriate quantitation limit:

A. If the misidentified peak was sufficiently outside the target pesticide retention time window, then the CRQL is reported.

B. If the misidentified peak poses an interference with potential detection of a target peak, the reported value is qualified as the estimated (J) quantitation limit.

Step 2 - When PCBs or multipeak pesticides exhibit marginal pattern-matching quality, the reviewer's professional judgment is used to confirm whether the differences are credited to environmental

"weathering". If the presence of a PCB/multipeak pesticide is strongly suggested, results are reported as being present.

Step 3 - When an observed pattern closely matches more than one Aroclor, professional judgement is used to decide whether the neighboring Aroclor is a better match, or if multiple Aroclors are present.

Attachment Z-1

BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Laboratory Reporting Forms for Pesticides and Polychlorinated Biphenyls

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

Lab Name:_____ Contract:_____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

Matrix: (soil/water)_____ Lab Sample ID: _____

Sample wt/vol: _____(g/mL)____ Lab File ID: _____

% Moisture: _____ decanted: (Y/N)___ Date Received: _____

Extraction: (SepF/Cont/Sonc) _____ Date Extracted:_____

Concentrated Extract Volume: _____(uL) Date Analyzed: _____

Injection Volume: _____(uL) Dilution Factor: _____

GPC Cleanup: (Y/N)___ pH:____ Sulfur Cleanup: (Y/N) ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg)_____	Q
319-84-6	alpha-BHC		
319-85-7	beta-BHC		
319-86-8	delta-BHC		
58-89-9	gamma-BHC (Lindane)		
76-44-8	Heptachlor		
309-00-2	Aldrin		
1024-57-3	Heptachlor epoxide		
959-98-8	Endosulfan I		
60-57-1	Dieldrin		
72-55-9	4,4'-DDE		
72-20-8	Endrin		
33213-65-9	Endosulfan II		
72-54-8	4,4'-DDD		
1031-07-8	Endosulfan sulfate		
50-29-3	4,4'-DDT		
72-43-5	Methoxychlor		
53494-70-5	Endrin ketone		
7421-36-3	Endrin aldehyde		
5103-71-9	alpha-Chlordane		
5103-74-2	gamma-Chlordane		
8001-35-2	Toxaphene		
12674-11-2	Aroclor-1016		
11104-28-2	Aroclor-1221		
11141-16-5	Aroclor-1232		
53469-21-9	Aroclor-1242		
12672-29-6	Aroclor-1248		
11097-69-1	Aroclor-1254		
11096-82-5	Aroclor-1260		

2E
WATER PESTICIDE SURROGATE RECOVERY

Lab Name:_____ Contract:_____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.:_____

GC Column(1): _____ ID: _____(mm) GC Column(2): _____ ID: _____(mm)

	EPA SAMPLE NO.	TCX 1 %REC #	TCX 2 %REC #	DCB 1 %REC #	DCB 2 %REC #	OTHER (1)	OTHER (2)	TOT OUT
01								
02								
03								
04								
05								
06								
07								
08								
09	-							
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

	ADVISORY QC LIMITS
TCX = Tetrachloro-m-xylene	**(60-150)**
DCB = Decachlorobiphenyl	**(60-150)**

Column to be used to flag recovery values
* Values outside of QC limits
D Surrogate diluted out

2F
SOIL PESTICIDE SURROGATE RECOVERY

Lab Name:_____ Contract:_____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.:_____

GC Column(1): _____ ID: _____(mm) GC Column(2): _____ ID: _____(mm)

	EPA SAMPLE NO.	TCX 1 %REC #	TCX 2 %REC #	DCB 1 %REC #	DCB 2 %REC #	OTHER (1)	OTHER (2)	TOT OUT
01								
02								
03								
04								
05								
06								
07								
08								
09								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

	ADVISORY QC LIMITS
TCX = Tetrachloro-m-xylene	**(60-150)**
DCB = Decachlorobiphenyl	**(60-150)**

Column to be used to flag recovery values
* Values outside of QC limits
D Surrogate diluted out

3E

WATER PESTICIDE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name:_____ Contract:_____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

Matrix Spike - EPA Sample No.: _____

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS % REC #	QC. LIMITS REC.
gamma-BHC (Lindane)					56-123
Heptachlor					40-131
Aldrin					40-120
Dieldrin					52-126
Endrin					56-121
4,4'-DDT					38-127

COMPOUND	SPIKE ADDED (ug/L)	MSD CONCENTRATION (ug/L)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
gamma-BHC (Lindane)					15	56-123
Heptachlor					20	40-131
Aldrin					22	40-120
Dieldrin					18	52-126
Endrin					21	56-121
4,4'-DDT					27	38-127

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD:_____ out of _____ outside limits
Spike Recovery:_____ out of _____ outside limits

COMMENTS: _____

3F

SOIL PESTICIDE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name:_____ Contract:_____

Lab Code: _____ Case No.:_____ SAS No.: _____ SDG No.: _____

Matrix Spike - EPA Sample No.: _____

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC. LIMITS REC.
gamma-BHC (Lindane)____					46-127
Heptachlor_____					35-130
Aldrin_____					34-132
Dieldrin_____					31-134
Endrin_____					42-139
4,4'-DDT_____					23-134

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
gamma-BHC (Lindane)____					50	46-127
Heptachlor_____					31	35-130
Aldrin_____					43	34-132
Dieldrin_____					38	31-134
Endrin_____					45	42-139
4,4'-DDT_____					50	23-134

 # Column to be used to flag recovery and RPD values with an asterisk

*** Values outside of QC limits**

RPD:_____ out of _____ outside limits
Spike Recovery:_____ out of _____ outside limits

COMMENTS: _____

_____

4C

PESTICIDE METHOD BLANK SUMMARY

EPA SAMPLE NO.

Lab Name:_____ Contract:_____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

Lab Sample ID: _____ Lab File ID: _____

Matrix:(soil/water) _____ Extraction:(SepF/Cont/Sonc)_____

Sulfur Cleanup: (Y/N) __ Date Extracted: _____

Date Analyzed (1): _____ Date Analyzed (2): _____

Time Analyzed (1): _____ Time Analyzed (2): _____

Instrument ID (1): _____ Instrument ID (2): _____

GC Column (1): _____ ID:_____(mm) GC Column (2): _____ ID:_____(mm)

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED 1	DATE ANALYZED 2
01				
02				
03				
04				
05				
06				
07				
08				
09				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				

COMMENTS: _____

_____

6D

PESTICIDE INITIAL CALIBRATION OF SINGLE COMPONENT ANALYTES

Lab Name:_____ Contract:_____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

Instrument ID: _____ Level (x low): low _____ mid _____ high _____

GC Column: _____ ID: _____(mm) Date(s) Analyzed: _____ _____

COMPOUND	RT OF STANDARDS LOW	MID	HIGH	MEAN RT	RT WINDOW FROM	TO
alpha-BHC						
beta-BHC						
delta-BHC						
gamma-BHC (Lindane)						
Heptachlor						
Aldrin						
Heptachlor epoxide						
Endosulfan I						
Dieldrin						
4,4'-DDE						
Endrin						
Endosulfan II						
4,4'-DDD						
Endosulfan sulfate						
4,4'-DDT						
Methoxychlor						
Endrin ketone						
Endrin aldehyde						
alpha-Chlordane						
gamma-Chlordane						
Tetrachloro-m-xylene						
Decachlorobiphenyl						

* Surrogate retention times are measured from Standard Mix A analyses.

Retention time windows are ± 0.05 minutes for all compounds that elute before Heptachlor epoxide, ±0.07 minutes for all other compounds, except ±0.10 minutes for Decachlorobiphenyl.

6E

PESTICIDE INITIAL CALIBRATION OF SINGLE COMPONENT ANALYTES

Lab Name:_____ Contract:_____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

Instrument ID: _____ Level (x low): low _____ mid _____ high _____

GC Column: _____ ID: _____(mm) Date(s) Analyzed: _____ _____

COMPOUND	CALIBRATION FACTORS LOW	MID	HIGH	MEAN	%RSD
alpha-BHC					
beta-BHC					
delta-BHC					
gamma-BHC (Lindane)					
Heptachlor					
Aldrin					
Heptachlor epoxide					
Endosulfan I					
Dieldrin					
4,4'-DDE					
Endrin					
Endosulfan II					
4,4'-DDD					
Endosulfan sulfate					
4,4'-DDT					
Methoxychlor					
Endrin ketone					
Endrin aldehyde					
alpha-Chlordane					
gamma-Chlordane					
Tetrachloro-m-xylene					
Decachlorobiphenyl					

* Surrogate calibration factors are measured from Standard Mix A analyses.

%RSD must be less than or equal 20.0 % for all compounds except the surrogates, where %RSD must be less than or equal to 30.0%. Up to two target compounds, but not surrogates, may have %RSD greater than 20.0% but less than or equal to 30.0%.

6F

PESTICIDE INITIAL CALIBRATION OF MULTICOMPONENT ANALYTES

Lab Name: _____ Contract: _____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

Instrument ID: _____ Date(s) Analyzed: _____ _____

GC Column: _____ ID: _____(mm)

COMPOUND	AMOUNT (ng)	PEAK	RT	RT WINDOW FROM	RT WINDOW TO	CALIBRATION FACTOR
Toxaphene		*1				
		*2				
		*3				
		4				
		5				
Aroclor 1016		*1				
		*2				
		*3				
		4				
		5				
Aroclor 1221		*1				
		*2				
		*3				
		4				
		5				
Aroclor 1232		*1				
		*2				
		*3				
		4				
		5				
Aroclor 1242		*1				
		*2				
		*3				
		4				
		5				
Aroclor 1248		*1				
		*2				
		*3				
		4				
		5				
Aroclor 1254		*1				
		*2				
		*3				
		4				
		5				
Aroclor 1260		*1				
		*2				
		*3				
		4				
		5				

* Denotes required peaks

6G

PESTICIDE ANALYTE RESOLUTION SUMMARY

Lab Name:_____ Contract:_____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

GC Column (1): _____ ID:_____(mm) Instrument ID (1): _____

EPA Sample No. (Standard 1): _____ Lab Sample ID (1): _____

Date Analyzed (1): _____ Time Analyzed (1): _____

	ANALYTE	RT	RESOLUTION (%)
01			
02			
03			
04			
05			
06			
07			
08			
09			

GC Column (2): _____ ID:_____(mm) Instrument ID (2): _____

EPA Sample No. (Standard 2): _____ Lab Sample ID (2): _____

Date Analyzed (2): _____ Time Analyzed (2): _____

	ANALYTE	RT	RESOLUTION (%)
01			
02			
03			
04			
05			
06			
07			
08			
09			

Resolution of two adjacent peaks must be calculated as a percentage of the height of the smaller peak, and must be greater than or equal to 60.0%.

7D

PESTICIDE CALIBRATION VERIFICATION SUMMARY

Lab Name:_____ Contract:_____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

GC Column: _____ ID: _____(mm) Init. Calib. Date(s):_____ _____

EPA Sample No.(PIBLK): _____ Date Analyzed :_____

Lab Sample ID (PIBLK):_____ Time Analyzed :_____

EPA Sample No.(PEM): _____ Date Analyzed :_____

Lab Sample ID (PEM):_____ Time Analyzed :_____

PEM COMPOUND	RT	RT WINDOW FROM	RT WINDOW TO	CALC AMOUNT (ng)	NOM AMOUNT (ng)	RPD
alpha-BHC						
beta-BHC						
gamma-BHC (Lindane)						
Endrin						
4,4'-DDT						
Methoxychlor						

4,4'-DDT % breakdown (1): _____ Endrin % breakdown (1): _____

Combined % breakdown (1): _____

QC LIMITS:

RPD of amounts in PEM must be less than or equal to 25.0%

4,4'-DDT breakdown must be less than or equal to 20.0%

Endrin breakdown must be less than or equal to 20.0%

Combined breakdown must be less than or equal to 30.0%

7E

PESTICIDE CALIBRATION VERIFICATION SUMMARY

Lab Name:_____ Contract:_____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

GC Column: _____ ID: _____(mm) Init. Calib. Date(s):_____ _____

EPA Sample No.(PIBLK): _____ Date Analyzed :_____

Lab Sample ID (PIBLK): _____ Time Analyzed :_____

EPA Sample No.(INDA): _____ Date Analyzed :_____

Lab Sample ID (INDA): _____ Time Analyzed :_____

INDIVIDUAL MIX A COMPOUND	RT	RT WINDOW FROM	RT WINDOW TO	CALC AMOUNT (ng)	NOM AMOUNT (ng)	RPD
alpha-BHC						
gamma-BHC (Lindane)						
Heptachlor						
Endosulfan I						
Dieldrin						
Endrin						
4,4'-DDD						
4,4'-DDT						
Methoxychlor						
Tetrachloro-m-xylene						
Decachlorobiphenyl						

EPA Sample No.(INDB): _____ Date Analyzed :_____

Lab Sample ID (INDB): _____ Time Analyzed :_____

INDIVIDUAL MIX B COMPOUND	RT	RT WINDOW FROM	RT WINDOW TO	CALC AMOUNT (ng)	NOM AMOUNT (ng)	RPD
beta-BHC						
delta-BHC						
Aldrin						
Heptachlor epoxide						
4,4'-DDE						
Endosulfan II						
Endosulfan sulfate						
Endrin ketone						
Endrin aldehyde						
alpha-Chlordane						
gamma-Chlordane						
Tetrachloro-m-xylene						
Decachlorobiphenyl						

QC LIMITS: RPD of amounts in the Individual Mixes must be less than or equal to 25.0%.

8D

PESTICIDE ANALYTICAL SEQUENCE

Lab Name: _____ Contract: _____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

GC Column: _____ ID: _____(mm) Init. Calib. Date(s): _____ _____

Instrument ID: _____

THE ANALYTICAL SEQUENCE OF PERFORMANCE EVALUATION MIXTURES, BLANKS, SAMPLES, AND STANDARDS IS GIVEN BELOW:

	MEAN SURROGATE RT FROM INITIAL CALIBRATION TCX: _____ DCB: _____					
	EPA SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED	TIME ANALYZED	TCX RT #	DCB RT #
01						
02						
03						
04						
05						
06						
07						
08						
09						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						
31						
32						

	QC LIMITS
TCX = Tetrachloro-m-xylene	(± 0.05 MINUTES)
DCB = Decachlorobiphenyl	(± 0.10 MINUTES)

Column used to flag retention time values with an asterisk.
* Values outside of QC limits.

9A

PESTICIDE FLORISIL CARTRIDGE CHECK

Lab Name:_____ Contract:_____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

Florisil Cartridge Lot Number: _____ Date of Analysis: _____

GC Column(1): _____ ID: _____(mm) GC Column(2): _____ ID: _____(mm)

COMPOUND	SPIKE ADDED (ng)	SPIKE RECOVERED (ng)	% REC #	QC LIMITS
alpha-BHC				80-120
gamma-BHC (Lindane)				80-120
Heptachlor				80-120
Endosulfan I				80-120
Dieldrin				80-120
Endrin				80-120
4,4'-DDD				80-120
4,4'-DDT				80-120
Methoxychlor				80-120
Tetrachloro-m-xylene				80-120
Decachlorobiphenyl				80-120

Column to be used to flag recovery with an asterisk.
* Values outside of QC limits.

THIS CARTRIDGE LOT APPLIES TO THE FOLLOWING SAMPLES, BLANKS, MS, AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED 1	DATE ANALYZED 2
01				
02				
03				
04				
05				
06				
07				
08				
09				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				

9B

PESTICIDE GPC CALIBRATION

Lab Name:_____ Contract:_____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

GPC Column: _____ Calibration Date: _____

GC Column(1): _____ ID: _____(mm) GC Column(2): _____ ID: _____(mm)

COMPOUND	SPIKE ADDED (ng)	SPIKE RECOVERED (ng)	% REC #	QC. LIMITS REC.
gamma-BHC (Lindane)				80-110
Heptachlor				80-110
Aldrin				80-110
Dieldrin				80-110
Endrin				80-110
4,4'-DDT				80-110

\# Column to be used to flag recovery values with an asterisk
* Values outside of QC limits

THIS GPC CALIBRATION APPLIES TO THE FOLLOWING SAMPLES, BLANKS, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED 1	DATE ANALYZED 2
01				
02				
03				
04				
05				
06				
07				
08				
09				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				

10A

PESTICIDE IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

EPA SAMPLE NO.

Lab Name: _____ Contract: _____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

Lab Sample ID : _____ Date(s) Analyzed: _____ _____

Instrument ID (1): _____ Instrument ID (2): _____

GC Column(1): _____ ID: _____(mm) GC Column(2): _____ ID: _____(mm)

ANALYTE	COL	RT	RT WINDOW FROM	RT WINDOW TO	CONCENTRATION	%D
	1					
	2					
	1					
	2					
	1					
	2					
	1					
	2					
	1					
	2					
	1					
	2					
	1					
	2					
	1					
	2					

10B

PESTICIDE IDENTIFICATION SUMMARY FOR MULTICOMPONENT ANALYTES

EPA SAMPLE NO.

Lab Name: _____ Contract: _____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

Lab Sample ID : _____ Date(s) Analyzed: _____ _____

Instrument ID (1): _____ Instrument ID (2): _____

GC Column(1): _____ ID: _____(mm) GC Column(2): _____ ID: _____(mm)

ANALYTE	PEAK	RT	RT WINDOW FROM	RT WINDOW TO	CONCENTRATION	MEAN CONCENTRATION	%D
	1						
_____	2						
	3						
COLUMN 1	4						
	5						
	-						
	1						
	2						
	3						
COLUMN 2	4						
	5						
	1						
	2						
_____	3						
COLUMN 1	4						
	5						
	1						
	2						
	3						
COLUMN 2	4						
	5						
	1						
	2						
_____	3						
COLUMN 1	4						
	5						
	1						
	2						
	3						
COLUMN 2	4						
	5						

At least 3 peaks are required for identification of multicomponent analytes

Attachment Z-2

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Analytical Data Validation Summary Table

TABLE 1

GENERAL ELECTRIC COMPANY - PITTSFIELD, MASSACHUSETTS

ANALYTICAL DATA VALIDATION SUMMARY
(Results are presented in parts per million, ppm)

Sample Delivery Group No.	Sample ID	Date Collected	Matrix	Validation Level	Qualification	Compound	QA/QC Parameter	Value	Control Limits	Qualified Result	Notes
PCBs											
9700001	EXAMPLE-SS-1 (0 - 0.5)	1/1/97	Soil	Tier II	No						
9700001	EXAMPLE-SS-1 (0.5 - 1)	1/1/97	Soil	Tier II	No						
9700001	EXAMPLE-SS-2 (0 - 0.5)	1/1/97	Soil	Tier II	No						
9700001	EXAMPLE-SS-2 (0.5 - 1)	1/1/97	Soil	Tier II	No						
9700001	EXAMPLE-SS-3 (0 - 0.5)	1/1/97	Soil	Tier II	No						
9700001	EXAMPLE-SS-3 (0.5 - 1)	1/1/97	Soil	Tier II	No						
9700002	EXAMPLE-SS-5 (0.5 - 1)	1/1/97	Soil	Tier I	No						
9700002	EXAMPLE-SS-5 (0.5 - 1)	1/1/97	Soil	Tier I	No						
9700002	EXAMPLE-SS-6 (0.5 - 1)	1/1/97	Soil	Tier I	No						
9700002	EXAMPLE-SS-6 (0.5 - 1)	1/1/97	Soil	Tier I	No						
9700002	EXAMPLE-SS-DUP-1	1/1/97	Soil	Tier I	No						Duplicate of EXAMPLE-SS-5 (0.5 - 1)
Metals											
9700001	EXAMPLE-SS-1 (0 - 0.5)	1/1/97	Soil	Tier II	Yes	Copper	Matrix Spike %R	54.0%	75% to 125%	ND(5.62) J	
9700001	EXAMPLE-SS-1 (0.5 - 1)	1/1/97	Soil	Tier II	Yes	Copper	Matrix Spike %R	54.0%	75% to 125%	ND(5.62) J	
VOCs											
9801047	EXAMPLE-SS-1 (0 - 0.5)	1/1/97	Soil	Tier II	No						
9801047	EXAMPLE-SS-1 (0.5 - 1)	1/1/97	Soil	Tier II	No						
SVOCs											
9700001	EXAMPLE-SS-1 (0 - 0.5)	1/1/97	Soil	Tier II	Yes	2,6-Dinitrophenol	CCAL %D	59.0%	<25%	ND(3.6) J	
9700001	EXAMPLE-SS-1 (0.5 - 1)	1/1/97	Soil	Tier II	Yes	2,6-Dinitrophenol	CCAL %D	85.3%	<25%	ND(3.6) J	
						Pentachrolophenol	CCAL %D	52.3%	<25%	ND(3.6) J	
PCDDs/PCDFs											
9700001	EXAMPLE-SS-1 (0 - 0.5)	1/1/97	Soil	Tier II	Yes	1,2,3,4,7,8-HxCDF	Internal Standard %R	188.0%	25% to 150%	0.00013 J	
						1,2,3,6,7,8-HxCDF	Internal Standard %R	186.7%	25% to 150%	0.000066 J	
						Total TCDF	Result exceeded calibration range			0.00058 J	
						Total HxCDF	Result exceeded calibration range			0.0021 J	
9700001	EXAMPLE-SS-1 (0.5 - 1)	1/1/97	Soil	Tier II	Yes	1,2,3,4,6,7,8-HpCDD	Internal Standard %R	221.1%	25% to 150%	*0.000020 J*	
						OCDD	Internal Standard %R	235.2%	25% to 150%	0.00022 J	
						1,2,3,4,7,8-HxCDF	Internal Standard %R	422.3%	25% to 150%	0.0000038 J	
						1,2,3,6,7,8-HxCDF	Internal Standard %R	365.2%	25% to 150%	0.0000020 J	
						2,3,4,6,7,8-HxCDF	Internal Standard %R	332.0%	25% to 150%	0.0000041 J	
						1,2,3,4,6,7,8-HpCDF	Internal Standard %R	222.6%	25% to 150%	*0.000011 J*	
Cyanide											
9801047	EXAMPLE-SS-1 (0 - 0.5)	1/1/97	Soil	Tier II	No						
9801047	EXAMPLE-SS-1 (0.5 - 1)	1/1/97	Soil	Tier II	No						
Sulfide											
9801047	EXAMPLE-SS-1 (0 - 0.5)	1/1/97	Soil	Tier II	No						
9801047	EXAMPLE-SS-1 (0.5 - 1)	1/1/97	Soil	Tier II	No						

Data packages validated under Tier III procedures consist of the steps mentioned above for a Tier I and Tier II validation. In addition to review of the "raw data", approximately ten percent of the data results are recalculated. Furnace atomic absorption analysis and calibration raw data are also reviewed.

A. Calibration

Criteria

1.0 The initial calibration for atomic absorption analysis must contain three standards, one of which must be at the CRDL.

1.1 The correlation coefficient must be greater than or equal to 0.995 for the calibration of atomic absorption, mercury, and cyanide or other photometric determinations.

Action

The following steps are taken when verifying inorganic calibration for Tier III validation:

Step 1 - Review the calibration raw data and Form XIII or laboratory equivalent to confirm that the curve for the analysis did include a standard at the CRDL. If there is not a standard at the CRDL, all positive sample results up to 2 times the CRDL and non-detected results are qualified as estimated (J) and (UJ), respectively.

Step 2 - Evaluate the raw data of atomic absorption, mercury, and cyanide or other photometric determination and calculate the correlation coefficient. If the correlation coefficient is less than 0.995, then all results greater than the IDL and non-detects are qualified estimated (J) and (UJ), respectively.

B Furnace Atomic Absorption

Criteria

1.0 For sample concentrations greater than the CRDL, duplicate injections must agree within +/- 20 percent RSD, or Coefficient of Variation (CV), otherwise the sample must be reanalyzed once (two additional injections).

1.1 Spike recoveries must be within the control limits of 85 to 115 percent.

1.2 If the post-digestion spike recovery is not within the control limits of 85 to 115 percent and the sample absorbance is greater than 50 percent of the spike absorbance, the Method of Standard Additions is required. The sample must be spiked at 50, 100, and 150 percent of the sample absorbance.

Action

The following steps are taken when reviewing the Furnace Atomic Absorption data:

Step 1 - Review the duplicate injection values for RSD or CV. If they are outside the required criteria specified in Section IV.A.1.0 and the sample was not reanalyzed once as required, all positive results are qualified as estimated (J).

Step 2 - Review the spike recoveries. If they are outside the required criteria mentioned in section IV.A.1.1, all positive results are qualified as estimated (J).

Step 3 - Review the sample absorbance of the post-digestion spike and if the spike absorbance is greater than 50 percent the data are qualified as follows:

A. If the furnace post-digestion spike recovery is not within 85 to 115 percent and the sample result is greater than the IDL, then the data are qualified as estimated (J).

B. If the sample result is non-detected and the furnace post-digestion spike recovery is greater than 10 percent but less than 85 percent, then the data are qualified as estimated (UJ).

C. If the furnace post-digestion spike recovery is less than 10 percent, then positive and non-detected results are qualified as unusable (R).

Step 4 - If the Method of Standard Additions (MSA) is required, but was not performed, then the positive sample results are qualified as estimated (J).

Step 5 - If any samples analyzed by MSA were not spiked at the correct levels, then the positive sample results are qualified as estimated (J).

Step 6 - If the MSA correlation coefficient is less than 0.995, then the positive sample results are qualified as estimated (J).

C. Sample Result Verification

Criteria

The quantitation of the analytes and the adjustment of the CRDL for dilution and percent solids, must be recalculated for 10 percent of the data.

Action

If the criteria above have not been followed, then the laboratory will be contacted by the reviewer and the laboratory will be responsible for resolving any discrepancies and resubmission of results, if needed.

Appendix AA

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Data Validation Procedures for Inorganics

Appendix AA

Data Validation Procedures for Inorganic Analytes

I. Introduction

This standard operating procedure (SOP) describes the data validation procedures for a USEPA Region I Tiered review of the data for inorganic analytes by USEPA methods 5000, 6000, and 9000 series. Data review procedures presented in this SOP were developed from the applicable quality control criteria specified in the following documents:

- *Region I Tiered Organic and Inorganic Data Validation Guidelines*, USEPA Region I, July 1, 1993.
- *Region I Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, USEPA Region I, June 13, 1988 (Modified February 1989).
- *Evaluation of Metals Data for the Contract Laboratory Program*, USEPA SOP HW-2, Revision 11, January 1992.
- *USEPA Contract Laboratory Program, Statement of Work for the Inorganics Analysis, Revision OLM0.1.9*, July 1993

II. Tier I Validation Procedures

Tier I validation of a data package consists of verifying that all raw data and forms are included and complete. All Form Is or laboratory equivalent (presented in Attachment AA-1) are copied and a data validation summary spreadsheet (presented in Attachment AA-2) is prepared to document the data review. The following steps are taken to complete a Tier I validation:

Step 1 - The laboratory case narrative is reviewed. During review of the case narrative, if there are any deviations that warrant a more extensive validation procedure, a Tier II review would be initiated to evaluate potential data use limitations.

Step 2 - Compare the chain-of-custody and the sample traffic reports. If there are any inconsistencies or if they are incomplete, then contact laboratory for resolution.

Step 3 - Verify that all forms presented in Attachment AA-1 or laboratory equivalent forms are present and complete. If any of the forms are not in the data package, contact the laboratory for a resubmission.

Note: If frequent or severe quality control deviations are present on the above-mentioned forms, a more extensive validation procedure may be warranted. Based on the reviewer's judgement, Tier II or Tier III review may be warranted to fully evaluate the usability of the data.

Step 4 - Make a copy of all sample data Form I's or laboratory equivalent for inclusion in the validation report.

Step 5 - Verify that the following raw data is provided for each sample and associated QA/QC samples in the data package. Contact the laboratory to obtain missing data:

- Case Narrative
- Chain-of-Custody Forms
- Traffic Reports
- QA Sample Summary Forms
- Instrument Calibration Summary Forms
- Instrument Run Logs
- Sample Preparation Logs
- Instrument/Method Detection Limits
- Standards Preparation Logs
- Supporting (raw) Data

Step 6 - With a blue ink pen, record on the first page of the data package: the validation level, date, and reviewer's initials.

III. Tier II Validation Procedures

Tier II validation of a data package consists of the steps mentioned above for a Tier I review plus review of the data package for identification of QA/QC deviations. Tier II validation does not include review of the "raw data" or recalculation of sample results. Sample qualification is performed (if required) following USEPA Region I Guidelines.

A. Data Qualifiers

All data qualified due to QA/QC deviations will be clearly marked on a copy of the Form Is or laboratory equivalent with a blue ink pen. The laboratory qualification is lined out and the reviewer's qualification placed next to it. The date and the initials of the reviewer will also be placed on the Form I. Below is a list of qualifiers to be used.

U The compound or analyte was analyzed for, but was not detected. The sample quantitation limit is presented and adjusted for dilution and (for solid samples only) percent moisture. For consistency with the database and summary tables prepared from the data, non-detected sample results are displayed as ND(CRQL) as presented in Attachment AA-2.

J The compound or analyte was positively identified, but the associated numerical value is an estimated concentration. This qualifier is used when the data evaluation procedure identifies a deficiency in the data generation process. This qualifier is also used when a compound or analyte is detected at estimated concentrations less than the contract-required detection limit (CRDL) for inorganic analyses or the contract-required quantitation limit (CRQL) for organic analyses.

UJ The compound or analyte was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual level of quantitation. For

consistency with the database and summary tables prepared from the data, non-detected sample results are displayed as ND(CRQL) J as presented in Attachment AA-2.

R Indicates that the previously reported detection limit or sample result has been rejected due to a major deficiency in the data generation procedure. The data should not be used for any qualitative or quantitative purposes.

B. Holding Times

Criteria

The holding times present in Table 1 of the SAP/DCAQAP for the inorganic analysis must be not exceeded.

Action

The following steps are performed to review holding times for Tier II validation:

Step 1 - Establish the holding time by comparing the sampling date on the chain-of-custody with the dates of analysis and/or digestion on the Form I. The chain-of-custody is also reviewed to decide if the samples were properly preserved.

Step 2 - If the holding times are exceeded by less than 24 hours, then no qualification of data is needed.

Step 3 - If the holding times are exceeded by more than 24 hours but less than 14 days, then all the positive results are flagged as estimated (J) and the non-detected compounds are flagged as estimated (UJ).

Step 4 - If the holding times are exceeded by more than twice the specified holding time, then all the results are flagged as unusable (R).

C. Calibration

Criteria

1.0 Instruments must be calibrated daily and each time the instrument is set up for analysis.

1.1 Initial Calibration ICP

A blank and at least one standard must be used in establishing the analytical curve.

1.2 Initial Calibration Atomic Absorption Analysis (AA)

A blank and at least three standards must be used in establishing the analytical curve.

1.3 Initial Calibration-Mercury

A blank and at least four standards must be used in establishing the analytical curve.

1.4 Initial Calibration-Cyanide

1.4.1 A blank and at least three standards must be used in establishing the analytical curve.

1.4.2 At least one mid-point standard must be distilled before analysis.

1.5 Initial and Continuing Calibration Verification (ICV and CCV)

1.5.1 A certified standard must be used for the initial Calibration Verification (ICV) and must be analyzed for each wavelength used for analysis.

1.5.2 All percent recoveries of the ICVs and CCVs for all the analytes must be within 90 to 110 percent except for mercury and cyanide.

1.5.3 All percent recoveries of all the ICVs and CCVs for mercury must be within 85 to 120 percent.

1.5.4 All percent recoveries of all the ICVs and CCVs for cyanide must be within 85 to 115 percent.

1.5.5 A CCV must be analyzed every ten samples or every 2 hours whichever is more frequent.

1.5.6 To verify linearity near the CRDL for ICP analysis, the standard at two times the CRDL or two times the IDL (whichever is greater) must be analyzed. The results for the analytes must be within +\- 20%.

Action

The following steps are performed to review inorganic calibration for Tier II validation:

Step 1 - Verify that the instrument was calibrated daily and every time it was set up by reviewing Form XIV or laboratory equivalent. Also, that the correct number of standards were used for the initial calibration for each analyte reported. If any of these are not completed by the laboratory, the data are qualified as unusable (R).

Step 2 - Verify that a mid range standard was distilled by reviewing Form XIII or laboratory equivalent. If a mid range standard for cyanide was not distilled or did not meet the 85 to 115 percent criteria, all positive and non-detected results are qualified as estimated (J) and (UJ), respectively.

Step 3 - Review Form II (Part 1) or laboratory equivalent for the identification of the source of the ICV and CCV. If they are not from different sources, all positive and non-detected results are qualified as estimated (J) and (UJ), respectively.

Step 4 - ICV and CCV percent recovery Form II (Part 1) or laboratory equivalent are reviewed against the above mentioned criteria. If the ICV or CCV percent recovery are outside the acceptance criteria, the following steps are taken to qualify the data:

A. If the ICV and CCV percent recovery are not within the control limits but are within the ranges of 75-89%, or 111-125% (CN, 70-84% or 116-130%; Hg, 65-79% or 121-135%), all results greater than the IDL are qualified as estimated (J).

B. If the ICV and CCV percent recovery are not within the control limits but are within the ranges of 111-125 % (CN, 116-130%; Hg, (121-135%), all non-detected results are not qualified.

C. If the ICV and CCV percent recovery are not within the control limits but are within the ranges of 75-89% (CN, 70-84%; Hg, 65-79%), all non-detected results are qualified as estimated (UJ).

D. If the ICV and CCV percent recovery are not within the control limits ranges of 75-89% (CN, 70-84%; Hg, 65 to 79%), all non-detected results are qualified as unusable (R).

Step 5 - Form XIV or laboratory equivalent is reviewed to verify that the CCVs were analyzed in the required intervals. If they were not analyzed at the required intervals, all positive and non-detected results are qualified as estimated (J) and (UJ), respectively.

Step 6 - Form II (Part 2) or laboratory equivalent is reviewed to verify that the CRDL standards are within the required control limits of +/-20% of the true value. If the CRDL standard for ICP is not within +/-20% of the true value, positive results less than 3 times the CRDL and non-detects are qualified as estimated (J) and (UJ), respectively.

D. Blanks

Criteria

1.0 No contaminants should be present in the blank(s).

1.1 For each matrix, for every 20 samples digested, or for each batch digested, a preparation blank must be analyzed.

1.2 A calibration blank (CCB) must be analyzed after every ten samples or every 2 hours, whichever is more frequent.

Action Qualification of sample results due to blank contamination is dependent on the conditions and the origin of the blank. No sample results are reported unless the concentration of the analyte in the sample exceeds five times the amount detected in any blank. No sample results are corrected by subtracting blank values. Specific qualifications of sample data are as follows:

Step 1 - Review the Form III or laboratory equivalent for all blanks within the data package.

Step 2 - If a blank result is greater than 2 times the negative IDL, all non-detects are qualified as estimated (UJ).

Step 3 - If an analyte is found in the blank but not in the sample, then the data are not qualified.

Step 4 - When an analyte is detected in the sample and the sample concentration is less than five times the concentration detected in the associated blank, the data are qualified as non-detected (U).

Step 5 - When a positive result is greater than the action level, the result is not qualified.

Note: Any difference between the sample analyses and the related blank analyses which involve weights, volumes or dilution factors must be taken into account when the 5-times criteria are used.

The following are examples of how qualifications apply to blank data:

Example 1(Step 4): When the sample result is less than the IDL but greater than the action level. Positive results less than 35 are qualified as non-detects.

Factor	5X
Blank Result	7
CRQL	5
Action level	35
Sample Result	22
Qualified Sample Result	22 U

Example 2 (Step 5): When the sample result is greater than the IDL and the action level, no qualification is used.

Factor	5X
Blank Result	10
CRQL	8
Action level	50
Sample Result	70
Qualified Sample Result	70

E. ICP Interference Check Sample (ICS)

Criteria

1.0 The ICS must be analyzed at the beginning and the end of each sample analysis run or a minimum of twice per 8 hour working shift, whichever is more frequent.

1.1 The percent recovery for the ICS solution AB must be within the control limits of +/- 20 percent of the true value.

Note: Interferant Element Concentration used for ICP Interference Check Sample

Element	Concentration (mg/L)
Al	500
Ca	500
Fe	200
Mg	500

Action

The following steps are performed to review the ICS for Tier II validation:

Step 1 - Review Form XIV or laboratory equivalent to ensure the ICS is analyzed at the proper frequency. If the ICS is not analyzed at the correct frequency, detect and non-detect sample results are qualified as estimated (J) or (UJ), respectively.

Step 2 - Verify on the ICS recovery Form IV or laboratory equivalent that the percent recovery results for the ICS solution AB are within the control limits of 80 to 120 percent. Also review Form Is for concentrations of As Ca, Mg, and Fe to confirm that they are 50 percent or more than their respective levels in the ICS. The following steps are taken in reviewing the data:

A. If the ICS recovery for an element is greater than 120 percent and the reported sample results are non-detect, then no qualification of the data is needed.

B. If the ICS recovery for an element is greater than 120 percent and the reported sample results are greater than the IDL, the affected data are qualified as an estimate (J).

C. If the ICS recovery for an element is between 50 and 79 percent and the reported results are greater than the IDL, the affected data are qualified as an estimated (J).

D. If the ICS recovery for an element is between 50 and 79 percent and the reported results are non-detected, the affected data are qualified as an estimated (UJ).

E. If the ICS recovery for an element is less than 50 percent, the sample results are qualified as unusable (R).

Step 3 - When sample results greater than the IDL are reported for elements which are not present in the ICS solution, there is the possibility of false positives. Sample results greater than 2 times the IDL with levels of interferents that are 50 percent or more of the levels found in the ICS solution, the results are qualified as estimated (J).

Step 4 - When negative sample results with an absolute value greater than 2 times the IDL are reported for elements which are not present in the ICS solution, there is the possibility of false negatives. In these instances when the levels of interferents that are 50 percent or more of the levels found in the ICS solution, the sample results are qualified as estimated (UJ).

F. Matrix Spike Sample Analysis

Criteria

1.0 Samples identified as field blanks cannot be used for spiked sample analysis.

1.1 Spike recoveries must be within the control limits of 75 to 125 percent. However, the control limits do not apply when the sample concentration surpasses the spike concentration by a factor of four or more.

1.2 If the matrix spike recovery does not meet criteria, a post-digestion spike is required and reported on Form 5B or laboratory equivalent for ICP, Flame, Mercury, and Cyanide. Post-digestion spikes are also required for all furnace analyses, but recoveries are reported on the raw data and are reviewed in a Tier III evaluation.

Action

The following steps are performed to review inorganic matrix spike analysis for Tier II validation:

Step 1 - Matrix spike recoveries are reviewed on Form V (Part 1) or laboratory equivalent. If they are out of the control limits of 75 to 125 percent the following steps are taken:

A. When the spike recovery is greater than 125 percent and the reported sample results are non-detected, no qualification of data is needed.

B. When the spike recovery is greater than 125 percent or less than 75 percent and the reported sample results are greater than the IDL, the data are qualified as estimated (J).

C. If the spike recovery is within the range of 30 to 74 percent and the sample results are non-detected, the data are qualified as estimated (UJ).

D. If the spike recovery is less than 30 percent and the sample results are non-detected, the data are qualified as unusable (R).

G. Duplicate Sample Analysis

Criteria

1.0 Samples identified as field blanks cannot be used for duplicate sample analysis.

1.1 A control limit of +/- 20 percent for waters and +/- 35 percent for soils for the Relative Percent Difference (RPD) are used for sample results greater than five times the CRDL as presented in Table 5 of the SAP/DCAQAP.

1.2 A control limit of +/- the CRDL for waters and +/- 2 times the CRDL for soils are used for sample values less than five times the CRDL, including when only one sample value is greater than 5 times the CRDL or when one sample is above the IDL and one is non-detected.

1.3 Duplicate sample analysis must be prepared and analyzed for every 20 samples, for every batch digested, or for every matrix, which ever is more frequent.

Action

Verify on the Duplicates Form V (Part 2) or laboratory equivalent that the RPD for the duplicate samples analysis is within the above mentioned criteria. If duplicate analysis results are outside the appropriate control windows, all sample results greater than the IDL for that analyte and the same matrix are qualified as estimated (J).

H. Field Duplicates

Criteria

1.0 For sample values greater than 5 times the CRDL, the control limit for the RPD for water matrices is +/- 30 percent and +/- 50 percent for soils matrices.

1.1 For sample values less than 5 times the CRDL, the control limit of +/-2 times the CRDL for waters and +/- 4 times the CRDL for soils will be used.

Action

Step 1 - Calculate all the RPD values for positive results between the sample and the field duplicate.

$$\text{Calculation: } RPD = \frac{\text{Sample Result - Field Duplicate}}{(\text{Sample Result + Field Duplicate})/2} \times 100$$

Step 2 - If duplicate analysis results are outside the appropriate control limits, all sample results greater than the IDL for that analyte and the same matrix are qualified as estimated (J).

I. Laboratory Control Limits Sample Analysis (LCS)

Criteria

1.0 Aqueous LCS results must fall within the control limits of 80 to 120 percent. For validation of the data the +/-20 percent limit will also apply to both antimony and silver.

1.1 Solid LCS results must fall within the control limits established by the laboratory as presented on Form VII or the laboratory equivalent.

1.2 LCS must be prepared and analyzed for every 20 samples, for every batch digested, or for every matrix, whichever is more frequent.

Action

2.0 The following steps are taken to evaluate the aqueous LCS:

Step 1 - Review the Form VII or the laboratory equivalent for any analyte that is outside the control limits of 80 to 120 percent.

Step 2 - If the LCS recovery for any analyte is within the control limit of 50 to 79 percent or greater than 120 percent, results greater than the IDL are qualified as estimated (J).

Step 3 - If the sample results are non-detects and the LCS recovery is greater than 120 percent, no qualification of the data is performed.

Step 4 - If the sample results are non-detects and the LCS recoveries are within the control limits of 50 to 79 percent, the data are qualified as estimated (UJ).

Step 5 - If the LCS recoveries for any analyte are less than 50 percent, the data for that analyte are qualified as unusable (R).

2.1 The following steps are taken to evaluate the soil LCS:

Step 1 - Review the Form VII or laboratory equivalent to identify any analyte that is outside the control limits established by the laboratory.

Step 2 - If any solid LCS recoveries for any analyte are outside the laboratory established control limits, all results greater than the IDL are qualified as estimated (J).

Step 3 - If the LCS results are greater than the control limits and the sample results are non-detected, no qualification of the data is needed.

Step 4 - If the LCS results are less than the control limits and the sample results are non-detected, the data are qualified as estimated (UJ).

J. ICP Serial Dilution Analysis

Criteria

1.0 If the analyte concentration is sufficiently high (concentration in the original sample is at a minimum a factor of 50 times the IDL) the laboratory is required to report the results of a five fold dilution. Results that do not agree within 10 percent of the original results are qualified with an "E" by the laboratory. For the purposes of validation the criterion is 15 percent.

1.1 A serial dilution is required for each matrix analyzed.

1.2 If the sample used for the serial dilution had to be diluted for any elements to bring the result within the linear range of the instrument, another five-fold dilution is required for the evaluation of matrix interferences for that specific element.

Action

The following steps are performed to review ICP serial dilution for Tier II validation:

Step 1 - Review the ICP serial dilution results on Form IX or the laboratory equivalent. If the percent difference between the results is greater than 15 percent and the serial dilution results are greater than the initial sample results the, data are qualified. The detected and non-detected results are qualified as estimated (J) and (UJ), respectively.

Step 2 - If there is evidence of a negative interference, all positive sample results are qualified as estimated (J).

K. Detection Limits

Criteria

1.1 IDLs must be less than the CRDL for all analytes.

1.2 ICP or other methods may be used that do not have IDLs that are less than the CRDLs only if all the sample results are greater than 5 times the IDL for that instrument.

1.3 IDLs must be multiplied by the dilution factors and prep factors before being reported on the Form Is or laboratory equivalent.

Action

The following steps are taken when verifying detection limits for Tier II validation:

Step 1 - On the Form I or laboratory equivalent, correct any sample results that are not reported to the IDL or do not use the correct dilution/preparation factors.

Step 2 - Any positive or non-detected results for As, Tl, Se, or Pb analyzed by ICP, but are not greater than 5 times the IDL are qualified as estimated (J).

IV. Tier III Validation Procedures

Tier III validation of a data package consists of the steps mentioned above for a Tier I and Tier II validation plus review of the "raw data"and recalculation of approximately ten percent of the data results. Furnace atomic absorption analysis and calibration raw data are also reviewed.

A. Calibration

Criteria

1.0 The initial calibration for atomic absorption analysis must contain three standards, one of which must be at the CRDL.

1.1 The correlation coefficient must be greater than or equal to 0.995 for the calibration of atomic absorption, mercury, and cyanide or other photometric determinations.

Action

The following steps are taken when verifying inorganic calibration for Tier III validation:

Step 1 - Review the calibration raw data and Form XIII or laboratory equivalent to confirm that the curve for the analysis did include a standard at the CRDL. If there is not a standard at the CRDL, all positive sample results up to 2 times the CRDL and non-detected results are qualified as estimated (J) and (UJ), respectively.

Step 2 - Evaluate the raw data of atomic absorption, mercury, and cyanide or other photometric determination and calculate the correlation coefficient. If the correlation coefficient is less than 0.995, then all results greater than the IDL and non-detects are qualified estimated (J) and (UJ), respectively.

B. Furnace Atomic Absorption

Criteria

1.0 For sample concentrations greater than the CRDL, duplicate injections must agree within +/- 20 percent RSD, or Coefficient of Variation (CV), otherwise the sample must be reanalyzed once (two additional injections).

1.1 Spike recoveries must be within the control limits of 85 to 115 percent.

1.2 If the post-digestion spike recovery is not within the control limits of 85 to 115 percent and the sample absorbance is greater than 50 percent of the spike absorbance, the Method of Standard Additions is required. The sample must be spiked at 50, 100, and 150 percent of the sample absorbance.

Action

The following steps are taken when reviewing the Furnace Atomic Absorption data:

Step 1 - Review the duplicate injection values for RSD or CV. If they are outside the required criteria specified in Section IV.A.1.0 and the sample was not reanalyzed once as required, all positive results are qualified as estimated (J).

Step 2 - Review the spike recoveries. If they are outside the required criteria mentioned in section IV.A.1.1, all positive results are qualified as estimated (J).

Step 3 - Review the sample absorbance of the post-digestion spike and if the spike absorbance is greater than 50 percent the data are qualified as follows:

A. If the furnace post-digestion spike recovery is not within 85 to 115 percent and the sample result is greater than the IDL, then the data are qualified as estimated (J).

B. If the sample result is non-detected and the furnace post-digestion spike recovery is greater than 10 percent but less than 85 percent, then the data are qualified as estimated (UJ).

C. If the furnace post-digestion spike recovery is less than 10 percent, then positive and non-detected results are qualified as unusable (R).

Step 4 - If the Method of Standard Additions (MSA) is required, but was not performed, then the positive sample results are qualified as estimated (J).

Step 5 - If any samples analyzed by MSA were not spiked at the correct levels, then the positive sample results are qualified as estimated (J).

Step 6 - If the MSA correlation coefficient is less than 0.995, then the positive sample results are qualified as estimated (J).

C. Sample Result Verification

Criteria

The quantitation of the analytes and the adjustment of the CRDL for dilution and percent solids, must be recalculated for 10 percent of the data.

Action

If the criteria above have not been followed, then the laboratory will be contacted by the reviewer and the laboratory will be responsible for resolving any discrepancies and resubmission of results, if needed.

Attachment AA-1

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Laboratory Reporting Forms for Inorganic Analytes

U.S. EPA - CLP

COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

Lab Name: _____ Contract: _____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

SOW No.: _____

EPA Sample No.	Lab Sample ID.

Were ICP interelement corrections applied? Yes/No ___

Were ICP background corrections applied? Yes/No ___

If yes-were raw data generated before application of background corrections? Yes/No ___

Comments:

_____

_____

_____

_____

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature: _____ Name: _____

Date: _____ Title: _____

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

Lab Name: _____ Contract: _____

Lab Code: ____ Case No.: _____ SAS No.: _____ SDG No.: _____

Matrix (soil/water): _____ Lab Sample ID: _____

Level (low/med): _____ Date Received: _____

% Solids: _____

Concentration Units (ug/L or mg/kg dry weight): _____

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				
7440-36-0	Antimony				
7440-38-2	Arsenic				
7440-39-3	Barium				
7440-41-7	Beryllium				
7440-43-9	Cadmium				
7440-70-2	Calcium				
7440-47-3	Chromium				
7440-48-4	Cobalt				
7440-50-8	Copper				
7439-89-6	Iron				
7439-92-1	Lead				
7439-95-4	Magnesium				
7439-96-5	Manganese				
7439-97-6	Mercury				
7440-02-0	Nickel				
7440-09-7	Potassium				
7782-49-2	Selenium				
7440-22-4	Silver				
7440-23-5	Sodium				
7440-28-0	Thallium				
7440-62-2	Vanadium				
7440-66-6	Zinc				
	Cyanide				

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

_____

_____

_____

_____

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2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: _____ Contract: _____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

Initial Calibration Source: _____

Continuing Calibration Source: _____

Concentration Units: ug/L

Analyte	Initial Calibration True	Found	%R(1)	Continuing Calibration True	Found	%R(1)	Found	%R(1)	M
Aluminum									
Antimony									
Arsenic									
Barium									
Beryllium									
Cadmium									
Calcium									
Chromium									
Cobalt									
Copper									
Iron									
Lead									
Magnesium									
Manganese									
Mercury									
Nickel									
Potassium									
Selenium									
Silver									
Sodium									
Thallium									
Vanadium									
Zinc									
Cyanide									

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

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2B
CRDL STANDARD FOR AA AND ICP

Lab Name: _____ Contract: _____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

AA CRDL Standard Source: _____

ICP CRDL Standard Source: _____

Concentration Units: ug/L

Analyte	CRDL Standard for AA			CRDL Standard for ICP				
				Initial			Final	
	True	Found	%R	True	Found	%R	Found	%R
Aluminum								
Antimony								
Arsenic								
Barium								
Beryllium								
Cadmium								
Calcium								
Chromium								
Cobalt								
Copper								
Iron								
Lead								
Magnesium								
Manganese								
Mercury								
Nickel								
Potassium								
Selenium								
Silver								
Sodium								
Thallium								
Vanadium								
Zinc								

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3

BLANKS

Lab Name: _____ Contract: _____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

Preparation Blank Matrix (soil/water): _____

Preparation Blank Concentration Units (ug/L or mg/kg): _____

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum											
Antimony											
Arsenic											
Barium											
Beryllium											
Cadmium											
Calcium											
Chromium											
Cobalt											
Copper											
Iron											
Lead											
Magnesium											
Manganese											
Mercury											
Nickel											
Potassium											
Selenium											
Silver											
Sodium											
Thallium											
Vanadium											
Zinc											
Cyanide											

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4

ICP INTERFERENCE CHECK SAMPLE

Lab Name: _____ Contract: _____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

ICP ID Number: _____ ICS Source: _____

Concentration Units: ug/L

Analyte	True Sol. A	True Sol. AB	Initial Found Sol. A	Initial Found Sol. AB	Initial Found %R	Final Found Sol. A	Final Found Sol. AB	Final Found %R
Aluminum								
Antimony								
Arsenic								
Barium								
Beryllium								
Cadmium								
Calcium								
Chromium								
Cobalt								
Copper								
Iron								
Lead								
Magnesium								
Manganese								
Mercury								
Nickel								
Potassium								
Selenium								
Silver								
Sodium								
Thallium								
Vanadium								
Zinc								

U.S. EPA - CLP

5A
SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

Lab Name: _____ Contract: _____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

Matrix (soil/water): _____ Level (low/med): _____

% Solids for Sample: _____

Concentration Units (ug/L or mg/kg dry weight): _____

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Aluminum									
Antimony									
Arsenic									
Barium									
Beryllium									
Cadmium									
Calcium									
Chromium									
Cobalt									
Copper									
Iron									
Lead									
Magnesium									
Manganese									
Mercury									
Nickel									
Potassium									
Selenium									
Silver									
Sodium									
Thallium									
Vanadium									
Zinc									
Cyanide									

Comments:

_____

_____

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_____

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5B

POST DIGEST SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

Lab Name: _____ Contract: _____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

Matrix (soil/water): _____ Level (low/med): _____

Concentration Units: ug/L

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Aluminum									
Antimony									
Arsenic									
Barium									
Beryllium									
Cadmium									
Calcium									
Chromium									
Cobalt									
Copper									
Iron									
Lead									
Magnesium									
Manganese									
Mercury									
Nickel									
Potassium									
Selenium									
Silver									
Sodium									
Thallium									
Vanadium									
Zinc									
Cyanide									

Comments:

_____

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6 DUPLICATES

EPA SAMPLE NO.

Lab Name: _____ Contract: _____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

Matrix (soil/water): _____ Level (low/med): _____

% Solids for Sample: _____ % Solids for Duplicate: _____

Concentration Units (ug/L or mg/kg dry weight): _____

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	M
Aluminum								
Antimony								
Arsenic								
Barium								
Beryllium								
Cadmium								
Calcium								
Chromium								
Cobalt								
Copper								
Iron								
Lead								
Magnesium								
Manganese								
Mercury								
Nickel								
Potassium								
Selenium								
Silver								
Sodium								
Thallium								
Vanadium								
Zinc								
Cyanide								

7

LABORATORY CONTROL SAMPLE

Lab Name: _____ Contract: _____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

Solid LCS Source: _____

Aqueous LCS Source: _____

Analyte	Aqueous (ug/L) True	Found	%R	Solid (mg/kg) True	Found	C	Limits		%R
Aluminum									
Antimony									
Arsenic									
Barium									
Beryllium									
Cadmium									
Calcium									
Chromium									
Cobalt									
Copper									
Iron									
Lead									
Magnesium									
Manganese									
Mercury									
Nickel									
Potassium									
Selenium									
Silver									
Sodium									
Thallium									
Vanadium									
Zinc									
Cyanide									

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8
STANDARD ADDITION RESULTS

Lab Name: _____ Contract: _____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

Concentration Units: ug/L

EPA Sample No.	An	0 ADD ABS	1 ADD CON	1 ADD ABS	2 ADD CON	2 ADD ABS	3 ADD CON	3 ADD ABS	Final Conc.	r	Q

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9

ICP SERIAL DILUTIONS

EPA SAMPLE NO.

Lab Name: _____ Contract: _____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

Matrix (soil/water): _____ Level (low/med): _____

Concentration Units: ug/L

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	M
Aluminum							
Antimony							
Arsenic							
Barium							
Beryllium							
Cadmium							
Calcium							
Chromium							
Cobalt							
Copper							
Iron							
Lead							
Magnesium							
Manganese							
Mercury							
Nickel							
Potassium							
Selenium							
Silver							
Sodium							
Thallium							
Vanadium							
Zinc							

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10
INSTRUMENT DETECTION LIMITS (QUARTERLY)

Lab Name: _____ Contract: _____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

ICP ID Number: _____ Date: _____

Flame AA ID Number: _____

Furnace AA ID Number: _____

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Aluminum			200		
Antimony			60		
Arsenic			10		
Barium			200		
Beryllium			5		
Cadmium			5		
Calcium			5000		
Chromium			10		
Cobalt			50		
Copper			25		
Iron			100		
Lead			3		
Magnesium			5000		
Manganese			15		
Mercury			0.2		
Nickel			40		
Potassium			5000		
Selenium			5		
Silver			10		
Sodium			5000		
Thallium			10		
Vanadium			50		
Zinc			20		

Comments:

_____
_____
_____
_____

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11A

ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: _____ Contract: _____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

ICP ID Number: _____ Date: _____

Analyte	Wavelength (nm)	Interelement Correction Factors for: Al	Ca	Fe	Mg	___
Aluminum						
Antimony						
Arsenic						
Barium						
Beryllium						
Cadmium						
Calcium						
Chromium						
Cobalt						
Copper						
Iron						
Lead						
Magnesium						
Manganese						
Mercury						
Nickel						
Potassium						
Selenium						
Silver						
Sodium						
Thallium						
Vanadium						
Zinc						

Comments:

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11B

ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: _____ Contract: _____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

ICP ID Number: _____ Date: _____

Analyte	Wavelength (nm)	Interelement Correction Factors for: ___	___	___	___	___
Aluminum						
Antimony						
Arsenic						
Barium						
Beryllium						
Cadmium						
Calcium						
Chromium						
Cobalt						
Copper						
Iron						
Lead						
Magnesium						
Manganese						
Mercury						
Nickel						
Potassium						
Selenium						
Silver						
Sodium						
Thallium						
Vanadium						
Zinc						

Comments:

_____

_____

_____

_____

12

ICP LINEAR RANGES (QUARTERLY)

Lab Name: _____ **Contract:** _____

Lab Code: _____ **Case No.:** _____ **SAS No.:** _____ **SDG No.:** _____

ICP ID Number: _____ **Date:** _____

Analyte	Integ. Time (Sec.)	Concentration (ug/L)	M
Aluminum			
Antimony			
Arsenic			
Barium			
Beryllium			
Cadmium			
Calcium			
Chromium			
Cobalt			
Copper			
Iron			
Lead			
Magnesium			
Manganese			
Mercury			
Nickel			
Potassium			
Selenium			
Silver			
Sodium			
Thallium			
Vanadium			
Zinc			

Comments:

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_____

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13

PREPARATION LOG

Lab Name: ______________________ Contract: __________

Lab Code: ________ **Case No.:** ______ **SAS No.:** _______ **SDG No.:** _______

Method: ____

EPA Sample No.	Preparation Date	Weight (gram)	Volume (mL)

14
ANALYSIS RUN LOG

Lab Name: ______________________ Contract: ________

Lab Code: ______ **Case No.:** ______ **SAS No.:** ______ **SDG No.:** ______

Instrument ID Number: ____________ **Method:** __

Start Date: ________ **End Date:** ________

EPA Sample No.	D/F	Time	% R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN

Attachment AA-2

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Analytical Data Validation Summary Table

TABLE 1

GENERAL ELECTRIC COMPANY - PITTSFIELD, MASSACHUSETTS

ANALYTICAL DATA VALIDATION SUMMARY
(Results are presented in parts per million, ppm)

Sample Delivery Group No.	Sample ID	Date Collected	Matrix	Validation Level	Qualification	Compound	QA/QC Parameter	Value	Control Limits	Qualified Result	Notes
PCBs											
9700001	EXAMPLE-SS-1 (0 - 0.5)	1/1/97	Soil	Tier II	No						
9700001	EXAMPLE-SS-1 (0.5 - 1)	1/1/97	Soil	Tier II	No						
9700001	EXAMPLE-SS-2 (0 - 0.5)	1/1/97	Soil	Tier II	No						
9700001	EXAMPLE-SS-2 (0.5 - 1)	1/1/97	Soil	Tier II	No						
9700001	EXAMPLE-SS-3 (0 - 0.5)	1/1/97	Soil	Tier II	No						
9700001	EXAMPLE-SS-3 (0.5 - 1)	1/1/97	Soil	Tier II	No						
9700002	EXAMPLE-SS-5 (0.5 - 1)	1/1/97	Soil	Tier I	No						
9700002	EXAMPLE-SS-5 (0.5 - 1)	1/1/97	Soil	Tier I	No						
9700002	EXAMPLE-SS-6 (0.5 - 1)	1/1/97	Soil	Tier I	No						
9700002	EXAMPLE-SS-6 (0.5 - 1)	1/1/97	Soil	Tier I	No						
9700002	EXAMPLE-SS-DUP-1	1/1/97	Soil	Tier I	No						Duplicate of EXAMPLE-SS-5 (0.5 - 1)
Metals											
9700001	EXAMPLE-SS-1 (0 - 0.5)	1/1/97	Soil	Tier II	Yes	Copper	Matrix Spike %R	54.0%	75% to 125%	ND(5.62) J	
9700001	EXAMPLE-SS-1 (0.5 - 1)	1/1/97	Soil	Tier II	Yes	Copper	Matrix Spike %R	54.0%	75% to 125%	ND(5.62) J	
VOCs											
9801047	EXAMPLE-SS-1 (0 - 0.5)	1/1/97	Soil	Tier II	No						
9801047	EXAMPLE-SS-1 (0.5 - 1)	1/1/97	Soil	Tier II	No						
SVOCs											
9700001	EXAMPLE-SS-1 (0 - 0.5)	1/1/97	Soil	Tier II	Yes	2,6-Dinitrophenol	CCAL %D	59.0%	<25%	ND(3.6) J	
9700001	EXAMPLE-SS-1 (0.5 - 1)	1/1/97	Soil	Tier II	Yes	2,6-Dinitrophenol	CCAL %D	85.3%	<25%	ND(3.6) J	
						Pentachrolophenol	CCAL %D	52.3%	<25%	ND(3.6) J	
PCDDs/PCDFs											
9700001	EXAMPLE-SS-1 (0 - 0.5)	1/1/97	Soil	Tier II	Yes	1,2,3,4,7,8-HxCDF	Internal Standard %R	188.0%	25% to 150%	0.00013 J	
						1,2,3,6,7,8-HxCDF	Internal Standard %R	186.7%	25% to 150%	0.000066 J	
						Total TCDF	Result exceeded calibration range			0.00058 J	
						Total HxCDF	Result exceeded calibration range			0.0021 J	
9700001	EXAMPLE-SS-1 (0.5 - 1)	1/1/97	Soil	Tier II	Yes	1,2,3,4,6,7,8-HpCDD	Internal Standard %R	221.1%	25% to 150%	0.000020 J	
						OCDD	Internal Standard %R	235.2%	25% to 150%	0.00022 J	
						1,2,3,4,7,8-HxCDF	Internal Standard %R	422.3%	25% to 150%	0.0000038 J	
						1,2,3,6,7,8-HxCDF	Internal Standard %R	365.2%	25% to 150%	0.0000020 J	
						2,3,4,6,7,8-HxCDF	Internal Standard %R	332.0%	25% to 150%	0.0000041 J	
						1,2,3,4,6,7,8-HpCDF	Internal Standard %R	222.6%	25% to 150%	0.000011 J	
Cyanide											
9801047	EXAMPLE-SS-1 (0 - 0.5)	1/1/97	Soil	Tier II	No						
9801047	EXAMPLE-SS-1 (0.5 - 1)	1/1/97	Soil	Tier II	No						
Sulfide											
9801047	EXAMPLE-SS-1 (0 - 0.5)	1/1/97	Soil	Tier II	No						
9801047	EXAMPLE-SS-1 (0.5 - 1)	1/1/97	Soil	Tier II	No						

Appendix BB

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Data Validation Procedures for Polychlorinated Dibenzo-p-Dioxins/Polychlorinated Dibenzofurans

Appendix BB

Data Validation Procedures for Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans

I. Introduction

This standard operating procedure (SOP) describes the data validation procedures for a USEPA Region I Tiered review of the data for Polychlorinated dibenzo-p-dioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) analyzed by USEPA method 8280 and 8290. Data review procedures presented in this SOP are from the applicable quality control criteria specified in the following documents:

- *Region I Tiered Organic and Inorganic Data Validation Guidelines*, USEPA Region I, July 1, 1993.
- *The Analysis of Polychlorinated Dibenzo-p-dioxins and Polychlorinated Dibenzofurans by High Resolution Gas Chromatography/High Resolution Mass Spectrometry (HRGC/HRMS),* USEPA Method 8290.
- *National Functional Guidelines for Dioxin/Furans Data Validation, Draft Revision DFLM01.1, January, 1996*
- *USEPA Contract Laboratory Program, Statement of Work for the Analysis of PCDDs/PCDFs, Revision DFLM01.1*, September 1991

II. Tier I Validation Procedures

Tier I validation of a data package consists of verifying that all raw data and forms are included and complete. All Form Is or laboratory equivalent (presented in Attachment BB-1) are copied and a data validation summary spreadsheet (presented in Attachment BB-2) is prepared to document the data review. The following steps are taken to complete a Tier I validation:

Step 1 - The laboratory case narrative is reviewed. During review of the case narrative, if any deviations warrant a more extensive validation procedure, a Tier II review would be initiated to evaluated potential data use limitations.

Step 2 - Compare the chain-of-custody and the sample traffic reports. If there are any inconsistencies or if they are incomplete, then contact the laboratory for resolution.

Step 3: Verify that all forms presented in Attachment BB-1 or laboratory equivalent forms are present and complete. If any of the forms are not in the data package contact the laboratory for a resubmission.

Note: If frequent or severe quality control deviations are present on the above-mentioned forms, a more extensive validation procedure may be warranted. Based on the reviewer's judgement, Tier II or Tier III review may be warranted to fully evaluate the usability of the data.

Step 4 - Make a copy of the all sample data Form Is or laboratory equivalent for inclusion in the validation report.

Step 5 - Verify that the following raw data is provided for each sample and associated QA/QC samples in the data package. Contact the laboratory to obtain missing data:

- Case Narrative
- Chain-of-Custody Forms
- Traffic Reports
- QA Sample Summary Forms
- Instrument Calibration Summary Forms
- Instrument Run Logs
- Sample Preparation Logs
- Instrument/Method Detection Limits
- Standards Preparation Logs
- Supporting (raw) Data

Step 6 - With a blue ink pen, record on the first page of the data package: the validation level, date, and reviewer's initials.

III. Tier II Validation Procedures

Tier II validation of a data package consists of the steps mentioned above for a Tier I review plus review of the data package for identification of QA/QC deviations. Tier II validation does not include review of the "raw data" or recalculation of sample results. Sample qualification is performed (if required) following USEPA Guidelines.

A. Data Qualifiers

All data qualified due to QA/QC deviations will be clearly marked on a copy of the Form Is or laboratory equivalent with a blue ink pen. The laboratory qualification is lined out and the reviewer's qualification placed next to it. The date and the initials of the reviewer will also be placed on the Form I. Below is a list of qualifiers to be used.

U The compound or analyte was analyzed for, but was not detected. The sample quantitation limit is presented and adjusted for dilution and (for solid samples only) percent moisture. For consistency with the database and summary tables prepared from the data, non-detected sample results are displayed as ND(CRQL) as presented in Attachment BB-2.

J The compound or analyte was positively identified, but the associated numerical value is an estimated concentration. This qualifier is used when the data evaluation procedure identifies a deficiency in the data generation process. This qualifier is also used when a compound or analyte is detected at estimated concentrations less than the contract-required detection limit (CRDL) for inorganic analyses or the contract-required quantitation limit (CRQL) for organic analyses.

UJ The compound or analyte was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual level of quantitation. For

consistency with the database and summary tables prepared from the data, non-detected sample results are displayed as ND(CRQL) J as presented in Attachment BB-2.

R Indicates that the previously reported detection limit or sample result has been rejected due to a major deficiency in the data generation procedure. The data should not be used for any qualitative or quantitative purposes.

B The compound or analyte was positively identified in the sample as well as in the associated blank sample. The detected sample concentration may be due in part or whole to contamination that occurred during sample handling and preparation.

B. Holding Times

Criteria

Samples (waters or soils) and extracts must be preserved at 4 degrees centigrade. Specific holding times for each analysis and sample type are presented in Table 1 of the SAP/DCAQAP.

Action

The following steps are performed for the validation of data due to holding times:

Step 1 - Establish the holding time by comparing the sampling date on the chain-of-custody with the dates of analysis and/or extraction on the Form I. The chain-of-custody is also reviewed to determine if the samples were properly preserved.

Step 2 - If the holding times are exceeded by less than 24 hours, then no qualification of data is needed.

Step 3 - If the holding times are exceeded more than 24 hours but less than 14 days then, all the positive results are qualified as estimated (J) and the non-detected compounds are qualified as estimated (UJ).

Step 4 - If the holding times are exceeded by more than twice the specified holding time, then all the results are qualified as unusable (R).

C. Window Defining Mix (WDM)

Criteria

The WDM must be analyzed at the following frequency:

1.0 Before an initial calibration on each instrument and GC column used for analysis.

1.1 Each time adjustments or instrument maintenance activities are performed that may affect retention times.

1.2 Any time retention times of either the $^{13}C_{12}$-1234-TCDD or $^{13}C_{12}$-123789-HxCDD recovery standards in any analysis vary by more than 10 seconds from its retention time in the most recent continuing calibration standard.

Action

The following steps are performed to review WDM for Tier II validation:

Step 1 - Review Form V PCDD-3 or laboratory equivalent and verify the WMD was analyzed at the correct frequency.

Step 2 - If the WMD was not analyzed at the mandated frequency, yet the calibration standards meet the specifications, the data are not qualified. If the initial and continuing calibration meet the specified criteria, it is assumed that this deviation has not affected the data.

D. Chromatographic Resolution

Criteria

The resolution criteria must be evaluated using measurements made on the Selected Ion Current Profile (SICP) for the appropriate ions for each isomers.

1.0 For analyses on a DB-5 (or equivalent) GC column, the chromatographic resolution is evaluated by the analysis of the CC3 standard during both the initial and the continuing calibration procedures.

1.1 The isomers $^{13}C_{12}$-2378-TCDD and $^{13}C_{12}$-1234-TCDD chromatographic peak separation must be resolved with a valley less than or equal to 25 percent.

1.2 The isomers 123478-HxCDD and 123678-HxCDD chromatographic peak separation must be resolved with a valley less than or equal to 50 percent.

1.3 For analyses on an SP-2331 (or equivalent) GC column, the chromatographic resolution is evaluated before the analysis of any calibration standards by the analysis of a commercially available standard.

1.4 The isomers 1478-TCDD and 2378-TCDD chromatographic peak separation must be resolved with a valley less than or equal to 25 percent.

1.5 The isomers 2378-TCDD and (1237/1238)-TCDD chromatographic peak separation must be resolved with a valley less than or equal to 25 percent.

Action

The following steps are performed in evaluating chromatographic resolution for Tier II validation:

Step 1 - Review Form V PCDD-2 or laboratory equivalent to verify that the percent valley criterion has been met.

Step 2 - If the resolution criteria for TCDD are not met, all positive results for Tetras, Pentas, and Hexas (both dioxin and furan) are qualified as estimated (J). No qualification is needed for non-detected results.

Step 3 - If the resolution criteria for HxCDD are not met, all positive results for Hexas (both dioxin and furan) are qualified as estimated (J). No qualification is needed for non-detected results.

E. GC/MS Initial Calibration

Criteria

1.0 Before any sample analysis is conducted, a five-point calibration must be performed.

1.1 All PCDD/PCDF peaks, including the labeled internal and recovery standards, in all solutions must meet the +/- 15 percent theoretical abundance ratio criteria, listed on Form VI PCDD-2 or laboratory equivalent.

1.2 The percent Relative Standard deviation (%RSD) calculated from the five relative response factors (RRFs) for the unlabeled and labeled PCDDs/PCDFs must not be greater than 15 percent.

Action

The following steps are performed in evaluating the initial calibration for Tier II validation:

Step 1 - Review Form VI PCDD-1 and Form VI PCDD-2 or laboratory equivalents to verify that the initial calibration criteria mentioned above as been satisfied.

Step 2 - If there was no five point calibration preceding sample analysis, then all the results are rejected (R).

Step 3 - Review Form VI PCDD-2 or laboratory equivalent to determine if any labeled or unlabeled isomer is outside the ion abundance ratio, theoretical window.

A. If the ion ratio falls between 16 and 20 percent, all non-detected results associated with that initial calibration are qualified as estimated (UJ).

B. If the ion ratio greater than +/- 20 percent, all non-detected results associated with that initial calibration are qualified as unusable (R).

Step 4 - Review Form VI PCDD-1 or laboratory equivalent to determine if the %RSD criterion has not been met:

A. If the %RSD is greater than 20 percent but less than 30 percent, positive and non-detected sample results are qualified as estimated (J) and (UJ), respectively.

B. If the %RSD is greater than 30 percent, positive and non-detected results are rejected (R).

F. GC/MS Continuing Calibration

Criteria

1.0 The continuing calibration standard should be analyzed at the beginning of each 12-hour period.

1.1 All PCDD/PCDF peaks, including the labeled internal and recovery standards, in all solutions must meet the +/- 15 percent theoretical abundance ratio criteria, listed on Form VII PCDD-1 or laboratory equivalent.

1.2 The measured RRF of each analyte and internal standard in the continuing calibration standard must be within +/- 30 percent of the mean RRF from the initial calibration.

Action

The following steps are performed in evaluating the initial calibration for Tier II validation:

Step 1 - Review Form VII PCDD-1 and Form VII PCDD-2 or laboratory equivalents to verify that the continuing calibration criteria mentioned above has been satisfied.

Step 2 - Verify that continuing calibrations were analyzed at the required frequency by reviewing Form V PCDD-3 or laboratory equivalent.

Step 3 - If any analyte(s) failed the ion abundance ratio for the continuing calibration standard, all non-detected results are qualified as rejected (R) and all positive results are qualified as estimated (J).

Step 4 - Review Form VII PCDD-1 or laboratory equivalent to determine if the percent difference (%D) criterion has not been met.

A. If the %D is between 30 and 50 percent, positive and non-detected sample results are qualified as estimated (J) and (UJ), respectively.

B. If the %D is greater than 50 percent, all positive and non-detected results are qualified as rejected (R).

G. Method Blank Analysis

Criteria

1.0 No contaminants should be present in the blank(s).

1.1 A method blank must be analyzed for each GC/MS system used to analyze that specific group or set of samples.

1.2 Internal standard recovery must be between 25 to 150 percent.

Action

The following steps are performed in evaluating the method blank analysis for Tier II validation:

Step 1 - Review Forms I and IV PCDD or laboratory equivalent and verify that blanks were analyzed at the appropriate frequency described above and that the blanks were free of contamination.

Step 2 - If a target compound is found in the blank, but not in the sample, no qualification of the data is performed.

Step 3 - Any compound that is detected in the sample (except OCDD and OCDF) and in the related method blank, is qualified with a "B" if the sample concentration is less than the five times the blank concentration. OCDD and OCDF are qualified with a "B" when the sample result is less than ten times the blank concentration.

Step 4 - When the blank analysis involves internal standards recoveries out of control, the related sample data is reviewed and qualified in the following manner:

A. If the sample data does not contain any internal standards out of control, then the data are not qualified.

B. If the sample data does contain internal standards out of control, then all sample data positive and non-detected sample results for compounds quantitated using that internal standard are qualified as estimated (J) and (UJ), respectively.

H. Matrix Spike Analysis

Criteria

1.0 For each SDG, the laboratory must prepare a spiked sample for each matrix and concentration level that occur in the SDG.

1.1 The recovery of each spiked analyte must be between 50-150 percent.

Action

The following steps are performed in evaluating the matrix spike analysis for Tier II validation:

Step 1 - Review the extraction log and the Form V PCDD-3 or laboratory equivalent, verify that matrix spike analysis was analyzed at the appropriate frequency described above. If the frequency was not in compliance, the laboratory will be contacted for a written explanation.

Step 2 - Evaluate the Form III PCDD-1 or laboratory equivalent if the recovery results are not within the control limits, the following steps are taken to qualify the data:

A. If the recovery results are not within the control limits, the positive results for that class of compounds in the unspiked sample are qualified as estimated (J).

B. If the recovery result is less than 10 percent, the non-detects for that class of compound in the unspiked sample are qualified as rejected (R).

I. Duplicate Analysis

Criteria

1.0 For each SDG, the laboratory must prepare a duplicate sample for each matrix in the SDG.

1.1 The Relative Percent Difference (RPD) of any detected analyte must be less than or equal to 50 percent.

Action

The following steps are performed in evaluating the duplicate analysis for Tier II validation:

Step 1 - Review the extraction log and the Form V PCDD-3 or laboratory equivalent, verify that duplicate analyses were extracted and analyzed at the appropriate frequency as described above. If the frequency was not in compliance, the laboratory will be for contacted a written explanation.

Step 2 - Evaluate the Form IV PCDD-1 or laboratory equivalent if RPD results are greater than 50 percent. Qualify all positive sample results for that compound in the SDG as estimated (J).

J. Internal Standard and Cleanup Standard Recoveries

Criteria

The percent recovery of any internal standard in the original sample, prior to any dilutions, must be within 25 to 150 percent. When the percent recovery is not within these control limits, reextraction and reanalysis of the affected sample is required.

Action

The following steps are performed in evaluating the internal standard and cleanup standard recoveries analysis for Tier II validation:

Step 1 - Review the extraction log and the Form I or laboratory equivalent, verify that the internal standard recoveries are within the control limits of 25 to 150 percent.

Step 2 - If internal standard and/or cleanup standard recoveries are outside the control limits and reanalysis was not completed, the laboratory will be contacted for a written explanation.

Step 3 - If an internal standard recovery is greater than 150 percent, then all positive results associated with that internal standard are qualified as estimated (J).

Step 4 - If an internal standard recovery is within the control limits of 10 to 25 percent, then all positive and non-detected sample results associated with that internal standard are qualified as estimated (J) and (UJ), respectively.

Step 5 - If an internal standard recovery is less than 10 percent, then the following qualification is performed:

A. All positive sample results associated with that internal standard are qualified as estimated (J).

B. All non-detected sample results associated with that internal standard are qualified as unusable (R).

K. Sample Dilutions

Criteria

A dilution is required when the concentration of any PCDD/PCDF is greater than the calibration range.

Action

Review the Form I PCDD-1 or laboratory equivalent to determine if any of the sample results are greater than the calibration range, the sample results are qualified as estimated (J).

IV Tier III Validation Procedures

Tier III validation of a data package consists of the steps mentioned above for a Tier I and Tier II validation plus review of the "raw data" and recalculation of approximately ten percent of the data results. The Instrument Sensitivity, Initial and Continuing Calibration, Compound identification, Toxicity Equivalency Factor, Column Confirmation, Sample Dilution, Sample Reanalysis, Estimated Detection Limits, Estimated Maximum Possible Concentration, are also reviewed.

A. Instrument Sensitivity

Criteria

The CC1 solution analyzed at the end of the twelve-hour period must meet the following criteria:

1.0 The absolute retention time of the recovery standards, $^{13}C_{12}$-1234-TCDD and $^{13}C_{12}$-123678-HxCDD, must not change more than 10 seconds between the initial CC3 analysis and the analysis of the CC1 at the end of the sequence.

1.1 All the analytes in the CC1 solution must meet the ion abundance ratio criteria listed below:

Table BB-1

Analyte	Selected Ions	Theoretical Ion Abundance	Control Limits
TCDD	320/322	0.77	0.65 - 0.89
PeCDD	356/358	1.55	1.24 -1.86
HxCDD	390/392	1.24	1.05 - 1.43
HpCDD	424/426	1.04	0.88 - 1.20
OCDD	458/460	0.89	0.76 - 1.02
TCDF	304/306	0.77	0.65 - 0.89
PeCDF	340/342	1.55	1.24 - 1.86
HxCDF	374/376	1.24	1.05 - 1.43
HpCDF	408/410	1.04	0.88 - 1.20
OCDF	442/444	0.89	0.76 - 1.02
Internal Standards			
$^{13}C_{12}$-1234-TCDD	332/334	0.77	0.65 - 0.89
$^{13}C_{12}$-123678-HxCDD	402/404	1.24	1.05 - 1.43
$^{13}C_{12}$-OCDD	470/472	0.89	0.76 - 1.01
$^{13}C_{12}$-2378-TCDF	316/318	0.77	0.65 - 0.89
$^{13}C_{12}$-1234678-HpCDF	420/422	1.04	0.88 - 1.20
Recovery Standard			
$^{13}C_{12}$-1234-TCDD	332/334	0.77	0.65 - 0.89
$^{13}C_{12}$-123789-HxCDD	402/404	1.24	1.05 - 1.43

1.2 The CC1 solution signal to noise (S/N) ratio of the chromatogram shall be greater than 2.5 for the unlabeled PCDD/PCDF and greater than 10.0 for the labeled internal and recovery standards. The percent recovery of the internal standards should be within the control limits of 25 to 150 percent.

Action

The following steps are performed in evaluating the instrument sensitivity for Tier III validation:

Step 1 - Compare the retention time (RT) of the recovery standards from the chromatographs and quantitation reports of CC3 and CC1. If the RT changes more than +/- 10 seconds, samples analyzed since the last acceptable CC3 standard will be reanalyzed, if the sample has not been destroyed. If the sample has been destroyed, the sample results are qualified as rejected (R).

Step 2 - If the standard's ion abundance ratios are not within the control limits in the Table BB-1, then all non-detected sample results since the last acceptable CC3 are qualified as rejected (R).

Step 3 - If the S/N is less than 2.5 for the two quantitation ions, then all non-detected sample results analyzed since the last acceptable CC1 are qualified as rejected (R).

B. GC/MS Initial Calibration

Criteria

1.0 All calibration solution retention times for each isomer must fall within the appropriate retention time windows established by the window defining mix. The absolute retention time of the recovery standards, $^{13}C_{12}$-1234-TCDD and $^{13}C_{12}$-123678-HxCDD, must not change more than 10 seconds between the initial CC3 analysis and the analysis of the CC1 at the end of the sequence.

1.1 All calibration solution S/N ratios must be greater than 2.5 for the unlabeled PCDD/PCDF ions, and greater than 10 for the internal standard and recovery standard ions.

Action

The following steps are completed when evaluating the initial calibration by reviewing the raw data for each standard for Tier III validation:

Step 1 - If the recovery standards drift more than +/-10 seconds from the initial CC3 analysis, all positive and non-detected sample results are qualified as rejected (R).

Step 2 - If the quantitation ions and the confirmation ion do not maximize within +/-2 seconds for the labeled and unlabeled standards, non-detected sample results are qualified as rejected (R).

Step 3 - For instrument sensitivity evaluation, follow the steps in Section IV.A.

C. GC/MS Continuing Calibration

Criteria

1.0 Retention times of each isomer must fall within the appropriate retention time windows established by the window defining mix. The absolute retention time of the recovery standards, $^{13}C_{12}$-1234-TCDD and

$^{13}C_{12}$-123678-HxCDD, must not change more than 10 seconds between the initial CC3 analysis and the analysis of the CC1 at the end of the sequence.

1.1 For the CC3 calibration solution the S/N ratio must be greater than 2.5 for the unlabeled PCDD/PCDF ions, and greater than 10 for the internal standard and recovery standard ions.

1.2 The percent recovery of the internal standards should be within 25 to 150 percent.

Action

The following steps are done in evaluating the continuing calibration by reviewing all the raw data of the CC3 standard for Tier III validation:

Step 1 - If the recovery standards drift more than +/-10 seconds from the CC3 analysis, all positive and non-detected sample results are qualified as rejected (R).

Step 2 - If the quantitation ions and the confirmation ion do not maximize within +/-2 seconds for the labeled and unlabeled standards, non-detected sample results are qualified as rejected (R).

Step 3 - For instrument sensitivity evaluation, follow the steps in Section IV.A.

Step 4 - If the percent recovery of the internal standards are not within the control limits of 25 to 150 percent, all positive and non-detected sample results are qualified as estimated (J) and (UJ), respectively.

D. Identification Criteria

Criteria

1.0 The absolute retention times (RTs)of the recovery standards must not shift more than +/- 10 seconds form their retention times in the continuing calibration standard.

1.1 The absolute RT at the maximum peak height of the 2378 substituted isomer must be within -1 to +3 seconds of the RT of the corresponding labeled internal or recovery standard.

1.2 The relative retention time (RRT) of the 2378 isomer must be within 0.005 RRT units of the RRT established during the continuing calibration.

1.3 The retention time of non-2378-substituted compounds (tetra - hepta), must be within the RT windows established by the window defining mix for the corresponding homologue, +/- 10 seconds.

1.4 The two quantitation ions and the conformation ion for the analytes detected must maximize concurrently (+/- 2 seconds). This also is a requirement for the internal standards and recovery standards.

1.5. The sample peak areas for quantitation ions must meet the +/- 15 percent theoretical abundance ratio criteria listed in Table BB-1.

1.6 The integrated ion current for each analyte must be at least 2.5 times background noise and the detector must not be saturated. The internal standard ions must be at least 10 times background noise and must not have saturated the detector. The percent recovery of the internal standards should be within 25 to 150 percent.

Action

The following steps are taken in evaluating the identification of the compounds by reviewing all the sample raw data for Tier III validation:

Step 1 - If the retention time criteria is not met and a positive result has been reported, then the result is lined out and a non-detected result will be recorded.

Step 2 - If the quantitation ions and confirmation ion do not maximize within +/- 2 seconds, then the result is lined out and a non-detected result will be recorded.

Step 3 - If the quantitation ions do not meet the signal-to-noise criteria, then the result is lined out and a non-detected result will be recorded.

Step 4 - If the ion abundance criteria are not met, but the abundances are within the +/- 15 percent to 25 percent ion ratio window, the sample results are qualified as estimated (J). Any sample result with an ion abundance greater than +/- 25 percent is qualified as rejected (R).

E. Toxicity Equivalency Factor and second Column Confirmation

Criteria

1.0 For each 2378-substituted isomer positively identified in the sample, the TEF from Form I PCDD-2 is multiplied by the concentration to give the TEF-adjusted concentration.

1.1 When the TEQ is greater than 0.7 ppb in soil/sediment or 7 ppt in water, secondary column confirmation is required.

Action

The following steps are taken in evaluating the Toxicity Equivalency Factor and second Column Confirmation by reviewing Form I PCDD-2, Form II PCDD-3, or laboratory equivalent, and sample raw data for Tier III validation:

Step 1 - Review approximately 10 percent of the TEF calculations. If any discrepancies in the calculations are found, then the laboratory will be contacted and the sample results will be resubmitted.

Step 2 - Verify that secondary column confirmation has been performed when needed. If it has not been done, the laboratory is contacted to conduct the secondary column confirmation if the sample has not been destroyed.

F. Sample Dilution

Criteria

1.0 When a sample is diluted, the sample results are quantified using the internal standard if the recovery is greater than or equal to 10 percent.

1.1 When a sample is diluted, the sample results are quantified using the recovery standards for target compounds associated with the internal standard, if the recovery is less than 10 percent.

Action

The following steps are taken in evaluating the sample dilution raw data for Tier III validation:

Step 1 - Review the diluted sample data. If the recovery of the internal standard is less than 10 percent yet all the other internal standard criteria is met, then the sample results are recalculated using the internal standards.

G. Sample Reanalysis

Criteria

1.0 If any internal standard or the cleanup standard is outside the control limits of 25 to 150 percent, then reextraction and reanalysis are required.

1.1 In the instance, were the internal standards and cleanup standard are not present with at least a 10:1 S/N ratio at their respective m/z, then reextraction and reanalysis are required.

1.2 Samples with positive results that are associated with a contaminated method blank and any samples that contain peaks that do not meet all qualitative identification criteria related to the method blank should be re-extracted and re-analyzed.

Action

The following steps are taken in evaluating the sample reanalysis raw data for Tier III validation:

Step 1 - If sample reanalysis is required by the criteria above, the original sample analysis and reanalysis will be compared and the best analysis will be reported.

H. Estimated Detection Limit (EDL) and Estimated Maximum Possible Concentration (EMPC)

Criteria

For each non-detected sample result, an EDL is calculated. The EMPC is a value applied to a sample when the S/N ratio is at least 2.5 for both quantitation ions, but the ion abundance is not met. Approximately 10 percent of these sample results are recalculated.

Action

If the EDL and EMPC are calculated incorrectly, the laboratory will be contacted and the laboratory will be responsible for resubmission of the reported sample results.

Attachment BB-1

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Laboratory Reporting Forms for Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans

1DFA

PCDD/PCDF SAMPLE DATA SUMMARY

EPA SAMPLE NO.

Lab Name: _____ Contract: _____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

Matrix: _____ (Soil/Water/Waste/Ash) Lab Sample ID: _____

Sample wt/vol: _____(g/mL)____ Lab File ID: _____

Water Sample Prep.: _____ (Sepf/Cont) Date Received: _____

Concentrated Extract Volume: ____ (uL) Date Extracted: _____

Injection Volume: ___ (uL) % Solids: _____ Date Analyzed: _____

GC Column: _____ ID: _____(mm) Dilution Factor: _____

CONCENTRATION UNITS: (ng/L or ug/Kg) _____

ANALYTE	SELECTED IONS	PEAK RT	ION RATIO	#	CONCENTRATION	Q	EMPC/EDL
2378-TCDD	320/322						
2378-TCDF	304/306						
12378-PeCDF	340/342						
12378-PeCDD	356/358						
23478-PeCDF	340/342						
123478-HxCDF	374/376						
123678-HxCDF	374/376						
123478-HxCDD	390/392						
123678-HxCDD	390/392						
123789-HxCDD	390/392						
234678-HxCDF	374/376						
123789-HxCDF	374/376						
1234678-HpCDF	408/410						
1234678-HpCDD	424/426						
1234789-HpCDF	408/410						
OCDD	458/460						
OCDF	442/444						

NOTE: Concentrations, EMPCs, and EDLs are calculated on a wet weight basis.

INTERNAL STANDARD	SELECTED IONS	PEAK RT	ION RATIO	#	ION RATIO LIMITS	% REC	#	RECOVERY LIMITS
13C-2378-TCDF	316/318				0.65-0.89			25-150
13C-2378-TCDD	332/334				0.65-0.89			25-150
13C-123678-HxCDD	402/404				1.05-1.43			25-150
13C-1234678-HpCDF	420/422				0.88-1.20			25-150
13C-OCDD	470/472				0.76-1.01			25-150
37Cl-2378-TCDD	328/NA		NA		NA			25-150

Column to be used to flag values outside QC limits

1DFB

PCDD/PCDF TOXICITY EQUIVALENCE SUMMARY

EPA SAMPLE NO.

Lab Name:_____ Contract:_____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

Matrix: _____ (Soil/Water/Waste/Ash) Lab Sample ID: _____

Sample wt/vol: _____(g/mL)____ Lab File ID: _____

Water Sample Prep.: _____ (Sepf/Cont) Date Received: _____

Concentrated Extract Volume: ____ (uL) Date Extracted:_____

Injection Volume: ___ (uL) % Solids: _____ Date Analyzed: _____

GC Column: _____ ID: _____(mm) Dilution Factor: _____

CONCENTRATION UNITS: (ng/L or ug/Kg) _____

ANALYTE	CONCENTRATION	TEF	TEF-ADJUSTED CONCENTRATION
2378-TCDD		x 1.0 =	
2378-TCDF		x 0.1 =	
12378-PeCDF		x 0.05 =	
12378-PeCDD		x 0.5 =	
23478-PeCDF		x 0.5 =	
123478-HxCDF		x 0.1 =	
123678-HxCDF		x 0.1 =	
123478-HxCDD		x 0.1 =	
123678-HxCDD		x 0.1 =	
123789-HxCDD		x 0.1 =	
234678-HxCDF		x 0.1 =	
123789-HxCDF		x 0.1 =	
1234678-HpCDF		x 0.01 =	
1234678-HpCDD		x 0.01 =	
1234789-HpCDF		x 0.01 =	
OCDD		x 0.001 =	
OCDF		x 0.001 =	
		Total =	

NOTE: Do <u>not</u> include EMPC or EDL values in the TEF-adjusted Concentration.

If the Total Toxic Equivalent Concentration of the sample is greater than 7 ng/L for an aqueous sample, greater than 0.7 ug/Kg for any solid matrix, or greater than 7 ug/Kg for a chemical waste sample, then second column confirmation of the results may be required.

1DFC

PCDD/PCDF SECOND COLUMN CONFIRMATION SUMMARY

EPA SAMPLE NO.

Lab Name: _____ Contract: _____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

Matrix: _____ (Soil/Water/Waste/Ash) Lab Sample ID: _____

Sample wt/vol: _____(g/mL)____ Lab File ID: _____

Water Sample Prep.: _____ (Sepf/Cont) Date Received: _____

Concentrated Extract Volume: ____ (uL) Date Extracted: _____

Injection Volume: ___ (uL) % Solids: _____ Date Analyzed: _____

GC Column: _____ ID: _____(mm) Dilution Factor: _____

CONCENTRATION UNITS: (ng/L or ug/Kg) _____

ANALYTE	SELECTED IONS	PEAK RT	ION RATIO	#	CONCENTRATION	Q	EMPC/EDL
2378-TCDD	320/322						
2378-TCDF	304/306						
12378-PeCDF	340/342						
12378-PeCDD	356/358						
23478-PeCDF	340/342						
123478-HxCDF	374/376						
123678-HxCDF	374/376						
123478-HxCDD	390/392						
123678-HxCDD	390/392						
123789-HxCDD	390/392						
234678-HxCDF	374/376						
123789-HxCDF	374/376						
1234678-HpCDF	408/410						
1234678-HpCDD	424/426						
1234789-HpCDF	408/410						
OCDD	458/460						
OCDF	442/444						

NOTE: Concentrations, EMPCs, and EDLs are calculated on a wet weight basis.

INTERNAL STANDARD	SELECTED IONS	PEAK RT	ION RATIO	#	ION RATIO LIMITS	% REC	#	RECOVERY LIMITS
13C-2378-TCDF	316/318				0.65-0.89			25-150
13C-2378-TCDD	332/334				0.65-0.89			25-150
13C-123678-HxCDD	402/404				1.05-1.43			25-150
13C-1234678-HpCDF	420/422				0.88-1.20			25-150
13C-OCDD	470/472				0.76-1.01			25-150
37Cl-2378-TCDD	328/NA		NA		NA			25-150

Column to be used to flag values outside QC limits

2DF

PCDD/PCDF TOTAL HOMOLOGUE CONCENTRATION SUMMARY

EPA SAMPLE NO.

Lab Name: _____ Contract: _____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

Matrix: _____ (Soil/Water/Waste/Ash) Lab Sample ID: _____

Sample wt/vol: _____(g/mL)____ Lab File ID: _____

Water Sample Prep.: _____ (Sepf/Cont) Date Received: _____

Concentrated Extract Volume: ____ (uL) Date Extracted: _____

Injection Volume: ___ (uL) % Solids: _____ Date Analyzed: _____

GC Column: _____ ID: _____(mm) Dilution Factor: _____

CONCENTRATION UNITS: (ng/L or ug/Kg) _____

HOMOLOGUE	PEAKS	CONCENTRATION	Q	EMPC/EDL
DIOXINS				
Total TCDD				
Total PeCDD				
Total HxCDD				
Total HpCDD				
FURANS				
Total TCDF				
Total PeCDF				
Total HxCDF				
Total HpCDF				

NOTE: Concentrations, EMPCs, and EDLs are calculated on a wet weight basis. The total congener concentrations do not affect the TEF calculations.

3DFA

PCDD/PCDF SPIKED SAMPLE SUMMARY

EPA SAMPLE NO.

Lab Name:_____ Contract:_____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

Matrix: _____ (Soil/Water/Waste/Ash)

CONCENTRATION UNITS: (ng/L or ug/Kg) _____

ANALYTE	SPIKE ADDED (PG)	SPIKED SAMPLE CONCENTRATION	SAMPLE CONCENTRATION	% REC #	QC LIMITS
2378-TCDD					50-150
2378-TCDF					50-150
12378-PeCDF					50-150
12378-PeCDD					50-150
123678-HxCDF					50-150
123678-HxCDD					50-150
1234678-HpCDF					50-150
1234678-HpCDD					50-150
OCDD					50-150
OCDF					50-150

If an analyte is not detected in the unspiked sample, enter 0 (zero) as th
"SAMPLE CONCENTRATION."

Column to be used to flag values outside QC limits.

QC limits are advisory.

3DFB

PCDD/PCDF DUPLICATE SAMPLE SUMMARY

EPA SAMPLE NO.

Lab Name:_____ Contract:_____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

Matrix: _____ (Soil/Water/Waste/Ash)

CONCENTRATION UNITS: (ng/L or ug/Kg) _____

ANALYTE	SAMPLE CONCENTRATION	DUPLICATE CONCENTRATION	RPD	# QC LIMITS
2378-TCDD				50
2378-TCDF				50
12378-PeCDF				50
12378-PeCDD				50
23478-PeCDF				50
123478-HxCDF				50
123678-HxCDF				50
123478-HxCDD				50
123678-HxCDD				50
123789-HxCDD				50
234678-HxCDF				50
123789-HxCDF				50
1234678-HpCDF				50
1234678-HpCDD				50
1234789-HpCDF				50
OCDD				50
OCDF				50

If an analyte is not detected in either analysis, enter 0 (zero) as the concentration.

Column to be used to flag values outside QC limits.

QC limits are advisory

4DF
PCDD/PCDF METHOD BLANK SUMMARY

EPA SAMPLE NO. ________

Lab Name: ____________________ Contract: ____________

Lab Code: ________ Case No.: ______ SAS No.: _______ SDG No.: _______

Matrix: ______ (Soil/Water/Waste/Ash) Lab Sample ID: ____________

Sample wt/vol: ______(g/mL)____ Lab File ID: ____________

Water Sample Prep.: _____ (Sepf/Cont) Date Extracted: __________

Date Analyzed: __________

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, SPIKES, AND DUPLICATES:

EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED

5DFA

PCDD/PCDF WINDOW DEFINING MIX SUMMARY

EPA SAMPLE NO.

Lab Name:_____ Contract:_____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

GC Column: _____ ID: _____(mm) Lab File ID: _____

Instrument ID: _____ Date Analyzed: _____

Time Analyzed: _____

CONGENER	RT FIRST ELUTING	RT LAST ELUTING
TCDD		
TCDF		
PeCDD		
PeCDF		
HxCDD		
HxCDF		
HpCDD		
HpCDF		

5DFB

PCDD/PCDF CHROMATOGRAPHIC RESOLUTION SUMMARY

EPA SAMPLE NO.

Lab Name:_____ Contract:_____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

GC Column: _____ ID: _____(mm) Lab File ID: _____

Instrument ID: _____ Date Analyzed: _____

Time Analyzed: _____

Percent Valley determination for DB-5 (or equivalent) column -
For the CC3 standard beginning the 12-hour period:

13C-2378-TCDD/13C-1234-TCDD: _____

123478-HxCDD/123678-HxCDD: _____

QC LIMITS:

Percent Valley between the TCDD isomers must be less than or equal to 25%

Percent Valley between the HxCDD isomers must be less than or equal to 50%

Percent Valley Determination for SP-2331 (or equivalent) Column -
For the Column Performance Solution beginning the 12-hour period:

1478-TCDD/2378-TCDD: _____

2378-TCDD/(1237/1238)-TCDD: _____

QC LIMITS:

Percent Valley between the TCDD isomers must be less than or equal to 25%.

5DFC
PCDD/PCDF ANALYTICAL SEQUENCE SUMMARY

Lab Name:_____ Contract:_____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

GC Column: _____ ID: _____(mm) Instrument ID: _____

Init. Calib. Date(s): _____ _____

Init. Calib. Times: _____ _____

THE ANALYTICAL SEQUENCE OF STANDARDS, SAMPLES, BLANKS, SPIKES, AND DUPLICATES IS AS FOLLOWS:

EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED

6DFA

PCDD/PCDF INITIAL CALIBRATION RESPONSE FACTOR SUMMARY

Lab Name:_____ Contract:_____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

GC Column: _____ ID: _____(mm) Instrument ID: _____

Init. Calib. Date(s): _____ _____

Init. Calib. Times: _____ _____

NATIVE ANALYTES VS. INTERNAL STDS.	RRF (N) CC1	CC2	CC3	CC4	CC5	MEAN RRF	%RSD
2378-TCDD							
• 2378-TCDF							
12378-PeCDF							
12378-PeCDD							
23478-PeCDF							
123478-HxCDF							
123678-HxCDF							
123478-HxCDD							
123678-HxCDD							
123789-HxCDD							
234678-HxCDF							
123789-HxCDF							
1234678-HpCDF							
1234678-HpCDD							
1234789-HpCDF							
OCDD							
OCDF							
INTERNAL STANDARDS VS. RECOVERY STDS.							
13C-2378-TCDD							
13C-2378-TCDF							
13C-123678-HxCDD							
13C-1234678-HpCDF							
13C-OCDD							
37Cl-2378-TCDD							

A single point calibration is performed for seven of the native analytes and the cleanup standard. Therefore, no %RSD is reported for these compounds.

QC Limits: %RSD must be less than or equal to 15.0%.

6DFB

PCDD/PCDF INITIAL CALIBRATION ION ABUNDANCE RATIO SUMMARY

Lab Name:_____ Contract:_____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

GC Column: _____ ID: _____(mm) Instrument ID: _____

Init. Calib. Date(s): _____ _____

Init. Calib. Times: _____ _____

NATIVE ANALYTES	SELECTED IONS	ION ABUNDANCE RATIO					FLAG	QC LIMITS
		CC1	CC2	CC3	CC4	CC5		
2378-TCDD	320/322							0.65-0.89
2378-TCDF	304/306							0.65-0.89
12378-PeCDF	340/342							1.24-1.86
12378-PeCDD	356/358							1.24-1.86
23478-PeCDF	340/342							1.24-1.86
123478-HxCDF	374/376							1.05-1.43
123678-HxCDF	374/376							1.05-1.43
123478-HxCDD	390/392							1.05-1.43
123678-HxCDD	390/392							1.05-1.43
123789-HxCDD	390/392							1.05-1.43
234678-HxCDF	374/376							1.05-1.43
123789-HxCDF	374/376							1.05-1.43
1234678-HpCDF	408/410							0.88-1.20
1234678-HpCDD	424/426							0.88-1.20
1234789-HpCDF	408/410							0.88-1.20
OCDD	458/460							0.76-1.02
OCDF	442/444							0.76-1.02
INTERNAL STANDARDS								
13C-2378-TCDD	332/334							0.65-0.89
13C-2378-TCDF	316/318							0.65-0.89
13C-123678-HxCDD	402/404							1.05-1.43
13C-1234678-HpCDF	420/422							0.88-1.20
13C-OCDD	470/472							0.76-1.02
RECOVERY STANDARDS								
13C-1234-TCDD	332/334							0.65-0.89
13C-123789-HxCDD	402/404							1.05-1.43

QC limits represent ± 15% window around the theoretical ion abundance ratio.

A single point calibration is performed for seven of the native analytes and the cleanup standard.

The laboratory must flag any analyte in any calibration solution which does not meet the ion abundance ratio QC limit by placing an asterisk in the fl column.

7DFA

PCDD/PCDF CONTINUING CALIBRATION SUMMARY

Lab Name:_____ Contract:_____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

GC Column: _____ ID: _____(mm) Instrument ID: _____

Date Analyzed: _____ Time Analyzed: _____

Lab File ID: _____ Init. Calib. Date(s): _____ _____

NATIVE ANALYTES	SELECTED IONS	RRF	MEAN RRF	%D	RRF FLAG	ION RATIO	ION FLAG	QC LIMITS
2378-TCDD	320/322							0.65-0.89
2378-TCDF	304/306							0.65-0.89
12378-PeCDF	340/342							1.24-1.86
12378-PeCDD	356/358							1.24-1.86
23478-PeCDF	340/342							1.24-1.86
123478-HxCDF	374/376							1.05-1.43
123678-HxCDF	374/376							1.05-1.43
123478-HxCDD	390/392							1.05-1.43
123678-HxCDD	390/392							1.05-1.43
123789-HxCDD	390/392							1.05-1.43
234678-HxCDF	374/376							1.05-1.43
123789-HxCDF	374/376							1.05-1.43
1234678-HpCDF	408/410							0.88-1.20
1234678-HpCDD	424/426							0.88-1.20
1234789-HpCDF	408/410							0.88-1.20
OCDD	458/460							0.76-1.02
OCDF	442/444							0.76-1.02
INTERNAL STANDARDS VS. RECOVERY STDS.								
13C-2378-TCDD	332/334							0.65-0.89
13C-2378-TCDF	316/318							0.65-0.89
13C-123678-HxCDD	402/404							1.05-1.43
13C-1234678-HpCDF	420/422							0.88-1.20
13C-OCDD	470/472							0.76-1.02
37Cl-2378-TCDD	328/NA					NA	NA	NA
RECOVERY STANDARDS								
13C-1234-TCDD	332/334	NA	NA	NA	NA			0.65-0.89
13C-123789-HxCDD	402/404	NA	NA	NA	NA			1.05-1.43

QC limits shown are for ion abundance ratios. Maximum %D for RRF is ± 30.0% The laboratory must flag any analyte which does not meet criteria for %D or ion abundance ratio by placing an asterisk in the appropriate flag column.

7DFB

PCDD/PCDF CONTINUING CALIBRATION RETENTION TIME SUMMARY

Lab Name:_____ Contract:_____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

GC Column: _____ ID: _____(mm) Instrument ID: _____

Date Analyzed: _____ Time Analyzed: _____

Lab File ID: _____ Init. Calib. Date(s): _____ _____

NATIVE ANALYTES	RRT	RT
2378-TCDD		
2378-TCDF		
12378-PeCDF		
12378-PeCDD		
23478-PeCDF		
123478-HxCDF		
123678-HxCDF		
123478-HxCDD		
123678-HxCDD		
123789-HxCDD		
234678-HxCDF		
123789-HxCDF		
1234678-HpCDF		
1234678-HpCDD		
1234789-HpCDF		
OCDD		
OCDF		
INTERNAL STANDARDS VS. RECOVERY STDS.		
13C-2378-TCDD	NA	
13C-2378-TCDF	NA	
13C-123678-HxCDD	NA	
13C-1234678-HpCDF	NA	
13C-OCDD	NA	
37Cl-2378-TCDD		
RECOVERY STANDARDS		
13C-1234-TCDD	NA	
13C-123789-HxCDD	NA	

RRT = (RT of analyte)/(RT of appropriate internal standard)

Attachment BB-2

BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Analytical Data Validation Summary Table

TABLE 1

GENERAL ELECTRIC COMPANY - PITTSFIELD, MASSACHUSETTS

ANALYTICAL DATA VALIDATION SUMMARY
(Results are presented in parts per million, ppm)

Sample Delivery Group No.	Sample ID	Date Collected	Matrix	Validation Level	Qualification	Compound	QA/QC Parameter	Value	Control Limits	Qualified Result	Notes
PCBs											
9700001	EXAMPLE-SS-1 (0 - 0.5)	1/1/97	Soil	Tier II	No						
9700001	EXAMPLE-SS-1 (0.5 - 1)	1/1/97	Soil	Tier II	No						
9700001	EXAMPLE-SS-2 (0 - 0.5)	1/1/97	Soil	Tier II	No						
9700001	EXAMPLE-SS-2 (0.5 - 1)	1/1/97	Soil	Tier II	No						
9700001	EXAMPLE-SS-3 (0 - 0.5)	1/1/97	Soil	Tier II	No						
9700001	EXAMPLE-SS-3 (0.5 - 1)	1/1/97	Soil	Tier II	No						
9700002	EXAMPLE-SS-5 (0.5 - 1)	1/1/97	Soil	Tier I	No						
9700002	EXAMPLE-SS-5 (0.5 - 1)	1/1/97	Soil	Tier I	No						
9700002	EXAMPLE-SS-6 (0.5 - 1)	1/1/97	Soil	Tier I	No						
9700002	EXAMPLE-SS-6 (0.5 - 1)	1/1/97	Soil	Tier I	No						
9700002	EXAMPLE-SS-DUP-1	1/1/97	Soil	Tier I	No						Duplicate of EXAMPLE-SS-5 (0.5 - 1)
Metals											
9700001	EXAMPLE-SS-1 (0 - 0.5)	1/1/97	Soil	Tier II	Yes	Copper	Matrix Spike %R	54.0%	75% to 125%	ND(5.62) J	
9700001	EXAMPLE-SS-1 (0.5 - 1)	1/1/97	Soil	Tier II	Yes	Copper	Matrix Spike %R	54.0%	75% to 125%	ND(5.62) J	
VOCs											
9801047	EXAMPLE-SS-1 (0 - 0.5)	1/1/97	Soil	Tier II	No						
9801047	EXAMPLE-SS-1 (0.5 - 1)	1/1/97	Soil	Tier II	No						
SVOCs											
9700001	EXAMPLE-SS-1 (0 - 0.5)	1/1/97	Soil	Tier II	Yes	2,6-Dinitrophenol	CCAL %D	59.0%	<25%	ND(3.6) J	
9700001	EXAMPLE-SS-1 (0.5 - 1)	1/1/97	Soil	Tier II	Yes	2,6-Dinitrophenol	CCAL %D	85.3%	<25%	ND(3.6) J	
						Pentachrolophenol	CCAL %D	52.3%	<25%	ND(3.6) J	
PCDDs/PCDFs											
9700001	EXAMPLE-SS-1 (0 - 0.5)	1/1/97	Soil	Tier II	Yes	1,2,3,4,7,8-HxCDF	Internal Standard %R	188.0%	25% to 150%	0.00013 J	
						1,2,3,6,7,8-HxCDF	Internal Standard %R	186.7%	25% to 150%	0.000066 J	
						Total TCDF	Result exceeded calibration range			0.00058 J	
						Total HxCDF	Result exceeded calibration range			0.0021 J	
9700001	EXAMPLE-SS-1 (0.5 - 1)	1/1/97	Soil	Tier II	Yes	1,2,3,4,6,7,8-HpCDD	Internal Standard %R	221.1%	25% to 150%	0.000020 J	
						OCDD	Internal Standard %R	235.2%	25% to 150%	0.00022 J	
						1,2,3,4,7,8-HxCDF	Internal Standard %R	422.3%	25% to 150%	0.0000038 J	
						1,2,3,6,7,8-HxCDF	Internal Standard %R	365.2%	25% to 150%	0.0000020 J	
						2,3,4,6,7,8-HxCDF	Internal Standard %R	332.0%	25% to 150%	0.0000041 J	
						1,2,3,4,6,7,8-HpCDF	Internal Standard %R	222.6%	25% to 150%	0.000011 J	
Cyanide											
9801047	EXAMPLE-SS-1 (0 - 0.5)	1/1/97	Soil	Tier II	No						
9801047	EXAMPLE-SS-1 (0.5 - 1)	1/1/97	Soil	Tier II	No						
Sulfide											
9801047	EXAMPLE-SS-1 (0 - 0.5)	1/1/97	Soil	Tier II	No						
9801047	EXAMPLE-SS-1 (0.5 - 1)	1/1/97	Soil	Tier II	No						

Attachment A

BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Laboratory Qualifications for Northeast Analytical Services, Inc.

NEW YORK STATE DEPARTMENT OF HEALTH

BARBARA A. DEBUONO, M.D., M.P.H. Commissioner

Expires 12:01 AM April 1, 1999
ISSUED April 1, 1998
REVISED August 6, 1998

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

Lab ID No.: 11078

Director: MR. ROBERT WAGNER
Lab Name: NORTHEAST ANALYTICAL INC
Address : 301 NOTT STREET
SCHENECTADY NY 12305

is hereby APPROVED as an Environmental Laboratory for the category

ENVIRONMENTAL ANALYSES/SOLID AND HAZARDOUS WASTE

All approved subcategories and/or analytes are listed below:

Characteristic Testing :
- Ignitability
- Reactivity
- TCLP
- E.P. Toxicity

Miscellaneous :
- Lead in Paint
- Hydrogen Ion (pH)

Polynuclear Aron. Hydrocarbon (ALL)
Priority Pollutant Phenols (ALL)

Chlor. Hydrocarbon Pesticides (ALL)
Haloethers (ALL)
Metals II (ALL)
Polychlorinated Biphenyls (ALL)
Purgeable Aromatics (ALL)

Chlorinated Hydrocarbons (ALL)
Metals I (ALL)
Nitroaromatics Isophorone (ALL)
Phthalate Esters (ALL)
Purgeable Halocarbons (ALL)

Serial No.: 103672

Wadsworth Center

Property of the New York State Department of Health. Valid only at the address shown.
Must be conspicuously posted. Valid certificate has a red serial number.

DOH-3317 (3/97)

NEW YORK STATE DEPARTMENT OF HEALTH

BARBARA A. DEBUONO, M.D., M.P.H. Commissioner

Expires 12:01 AM April 1, 1999
ISSUED April 1, 1998
REVISED June 26, 1998

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

Lab ID No.: 11078

Director: MR. ROBERT WAGNER
Lab Name: NORTHEAST ANALYTICAL INC
Address : 301 NOTT STREET
SCHENECTADY NY 12305

is hereby APPROVED as an Environmental Laboratory for the category

ENVIRONMENTAL ANALYSES/ POTABLE WATER

All approved subcategories and/or analytes are listed below:

Drinking Water Non-Metals : Hydrogen Ion (pH)
Drinking Water Trihalomethane (ALL) Volatile Aromatics (ALL)
Drinking Water Metals I (ALL) Volatile Halocarbons (ALL)
Drinking Water Metals II (ALL)

Serial No.: 102894

Wadsworth Center

Property of the New York State Department of Health. Valid only at the address shown.
Must be conspicuously posted. Valid certificate has a red serial number.

DOH-3317 (3/97)

NEW YORK STATE DEPARTMENT OF HEALTH

BARBARA A. DEBUONO, M.D., M.P.H. Commissioner

Expires 12:01 AM April 1, 1999
ISSUED April 1, 1998
REVISED June 26, 1998

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

Lab ID No.: 11078

Director: MR. ROBERT WAGNER
Lab Name: NORTHEAST ANALYTICAL INC
Address : 301 NOTT STREET
SCHENECTADY NY 12305

is hereby APPROVED as an Environmental Laboratory for the category

ENVIRONMENTAL ANALYSES NON POTABLE WATER

All approved subcategories and/or analytes are listed below:

Chlor. Hydrocarbon Pesticides :
- *4,4'-DDD*
- *4,4'-DDE*
- *4,4'-DDT*
- *alpha-BHC*
- *Aldrin*
- *beta-BHC*
- *Chlordane Total*
- *delta-BHC*
- *Dieldrin*
- *Endrin aldehyde*
- *Endrin*
- *Endosulfan I*
- *Endosulfan II*
- *Endosulfan sulfate*
- *Heptachlor*
- *Heptachlor epoxide*
- *Lindane*
- *Methoxychlor*
- *Toxaphene*

Wastewater Metals III :
- *Cobalt, Total*
- *Molybdenum, Total*
- *Tin, Total*
- *Titanium, Total*
- *Thallium, Total*

Chlorinated Hydrocarbons (ALL)
Wastewater Metals II (ALL)
Polynuclear Aromatics (ALL)
Priority Pollutant Phenols (ALL)
Residue (ALL)

Wastewater Miscellaneous :
- *Boron, Total*
- *Oil & Grease Total Recoverable*
- *Hydrogen Ion (pH)*
- *Organic Carbon, Total*

Benzidines (ALL)
Haloethers (ALL)
Nitroaromatics and Isophorone (ALL)
Polychlorinated Biphenyls (ALL)
Purgeable Aromatics (ALL)
TCLP Additional Compounds (ALL)

Chlorophenoxy Acid Pesticides :
- *2,4-D*
- *2,4,5-TP (Silvex)*

Mineral :
- *Calcium Hardness*
- *Hardness, Total*

Wastewater Metals I (ALL)
Nitrosoamines (ALL)
Phthalate Esters (ALL)
Purgeable Halocarbons (ALL)

Serial No.: 102893

Wadsworth Center

Property of the New York State Department of Health. Valid only at the address shown.
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DOH-3317 (3/97)

NEW YORK STATE DEPARTMENT OF HEALTH

BARBARA A. DEBUONO, M.D., M.P.H. Commissioner

Expires 12:01 AM April 1, 1999
ISSUED April 1, 1998
REVISED June 26, 1998

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

Lab ID No.: 11078

Director: MR. ROBERT WAGNER
Lab Name: NORTHEAST ANALYTICAL INC
Address : 301 NOTT STREET
SCHENECTADY NY 12305

is hereby APPROVED as an Environmental Laboratory for the category

ENVIRONMENTAL ANALYSES/AIR AND EMISSIONS

All approved subcategories and/or analytes are listed below:

Polychlorinated Biphenyls (ALL)

Serial No.: 102895

Wadsworth Center

Property of the New York State Department of Health. Valid only at the address shown.
Must be conspicuously posted. Valid certificate has a red serial number.

DOH-3317 (3/97)

South Carolina Department of Health and Environmental Control

Environmental Laboratory Certification Program

In accordance with the provisions of Regulation 61-81, entitled "State Environmental Laboratory Certification Regulation,"

NORTHEAST ANALYTICAL, INC. (91008)
301 NOTT STREET
SCHENECTADY, NY 12305-1039

is hereby certified to perform analyses as documented on the attached parameter list(s). This certification does not guarantee validity of data generated, but indicates the laboratory's adherence to prescribed methodology, quality control, records keeping, and reporting procedures. This certificate is the property of S.C. DHEC and must be surrendered upon demand. This certificate is non-transferable and is valid only for the parameters and methodology listed on the attached parameter lists(s).

Certifying Authority: NY
Date of Issue: 07/13/1998
Date of Expiration: 04/01/1999
Certificate Number: 91008001

R. Wayne Davis
Director
Office of Environmental Laboratory Certification

CR-000509 (03/1998)

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
ENVIRONMENTAL LABORATORY CERTIFICATION PROGRAM

NORTHEAST ANALYTICAL, INC. (Laboratory ID 91008)
Certifying Authority: NY
Certificate Number: 91008001

Date of Issue: 07/13/1998
Expiration Date: 04/01/1999

CLEAN WATER ACT

PCBS AND PESTICIDES

POLYCHLORINATED BIPHENYLS	EPA 608

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
ENVIRONMENTAL LABORATORY CERTIFICATION PROGRAM

NORTHEAST ANALYTICAL, INC. (Laboratory ID 91008)
Certifying Authority: NY
Certificate Number: 91008001

Date of Issue: 07/13/1998
Expiration Date: 04/01/1999

SOLID & HAZARDOUS WASTES

PCBS AND PESTICIDES

FLORISIL CLEANUP	EPA 3620B
POLYCHLORINATED BIPHENYLS	EPA 8082
PRES. FLUID EXTRACTION (PFE)	EPA 3545
SOXHLET EXTRACTION	EPA 3540C
SULFUR ACID/PERMANG. CLEANUP	EPA 3665A
SULFUR CLEANUP	EPA 3660B

I. WATER MATRIX
GENERAL CHEMICAL ANALYSIS

ANALYTE	METHOD
Total Suspended Solids (TSS)	EPA 160.2
Total Solids (TS)	EPA 160.3
Total Dissolved Solids (TDS)	EPA 160.1
Total Volatile Solids (TVS)	EPA 160.4
Hardness (Total as $CaCO_3$)	EPA 200.7 (ICP)
Total Organic Carbon (TOC)	EPA 415.1
pH (Laboratory)	EPA 150.1
Oil & Grease-Total Recoverable, Gravimetric	EPA 1664

I. WATER MATRIX
ELEMENTAL ANALYSIS - DRINKING WATER

ANALYTE	METHOD
ALUMINUM	EPA 1979 202.2, EPA 1979 202.1, EPA 200.7
ANTIMONY	EPA 1979 204.2, EPA 1979 204.1, EPA 200.7
ARSENIC	EPA 1979 206.2, EPA 200.7
BARIUM	EPA 1979 208.2, EPA 1979 208.1, EPA 200.7
BERYLLIUM	EPA 1979 210.2, EPA 1979 210.1, EPA 200.7
CADMIUM	EPA 1979 213.2, EPA 1979 213.1, EPA 200.7
CALCIUM	EPA 1979 215.1, EPA 200.7
CHROMIUM:TOTAL	EPA 1979 218.2, EPA 1979 218.1, EPA 200.7
COBALT	EPA 1979 219.2, EPA 1979 219.1, EPA 200.7
COPPER	EPA 1979 220.2, EPA 1979 220.1, EPA 200.7
GOLD	EPA 1979 231.2, EPA 1979 231.1
IRON	EPA 1979 236.2, EPA 1979 236.1, EPA 200.7
LEAD	EPA 1979 239.2, EPA 1979 239.1, EPA 200.7
MAGNESIUM	EPA 1979 242.1, EPA 200.7
MANGANESE	EPA 1979 243.2, EPA 1979 243.1, EPA 200.7
MERCURY	EPA 1979 245.2
MOLYBDENUM	EPA 1979 246.2, EPA 1979 246.1, EPA 200.7
NICKEL	EPA 1979 249.2, EPA 1979 249.1, EPA 200.7
PALLADIUM	EPA 1979 253.2, EPA 1979 253.1
PLATINUM	EPA 1979 255.2, EPA 1979 255.1,
SELENIUM	EPA 1979 270.2, 270.3, EPA 200.7
SILVER	EPA 1979 272.2, EPA 1979 272.1, EPA 200.7
THALLIUM	EPA 1979 279.2, EPA 1979 279.1, EPA 200.7
TIN	EPA 1979 282.2, EPA 1979 282.1, EPA 200.7
TITANIUM	EPA 1979 283.2, EPA 1979 283.1, EPA 200.7
VANADIUM	EPA 1979 286.2, EPA 1979 286.1, EPA 200.7
ZINC	EPA 1979 289.2, EPA 1979 289.1, EPA 200.7

ANALYTE	METHOD
VOLATILE HALOGENATED HYDROCARBONS/AROMATICS	EPA 601
VOLATILE HALOGENATED HYDROCARBONS/AROMATICS	EPA 502.1
VOLATILE HALOGENATED HYDROCARBONS/AROMATICS	EPA 502.2
VOLATILE AROMATIC HYDROCARBONS	EPA 503.1
VOLATILE AROMATIC HYDROCARBONS	EPA 602
VOLATILE HALOGENATED HYDROCARBONS/AROMATICS	SW846 8021
BETX	EPA 602
BETX	SW846 8021
TOTAL PETROLEUM HYDROCARBONS AS GASOLINE (GRO)	SW846 8015
TOTAL PETROLEUM HYDROCARBONS AS DIESEL (DRO)	SW846 8015
TRIHALOMETHANES	EPA 501.1
ORGANOCHLORINE PESTICIDES	EPA 608
HERBICIDES	SW846 8151
PCB	EPA 608
PCB	SW846 8081
PCB-CONGENER SPECIFIC	IN-HOUSE (GBMB)
PCB-CONGENER SPECIFIC	SW-846 8082
PETROLEUM HYDROCARBON IDENTIFICATION	NYS-DEC 310-14
POLYNUCLEAR AROMATIC HYDROCARBONS	EPA 610
POLYNUCLEAR AROMATIC HYDROCARBONS	SW846 8100

ANALYTE	METHOD
VOLATILE ORGANICS - PRIORITY POLLUTANTS	EPA 524.2
VOLATILE ORGANICS - PRIORITY POLLUTANTS	EPA 624
VOLATILE ORGANICS - PRIORITY POLLUTANTS	SW846 8260
SEMIVOLATILE ORGANIC COMPOUNDS	EPA 625
SEMIVOLATILE ORGANIC COMPOUNDS	SW846 8270
ACID EXTRACTABLE ORGANIC COMPOUNDS	EPA 625
ACID EXTRACTABLE ORGANIC COMPOUNDS	SW846-8270
BASE/NEUTRAL EXTRACTABLE ORGANIC COMPOUNDS	EPA 625
BASE/NEUTRAL EXTRACTABLE ORGANIC COMPOUNDS	SW846-8270
SEMIVOLATILE ORGANIC COMPOUNDS	EPA 525
ACID EXTRACTABLE ORGANIC COMPOUNDS	EPA 525
BASE/NEUTRAL EXTRACTABLE ORGANIC COMPOUNDS	EPA 525

II. SOIL/SOLID MATRIX
GENERAL CHEMICAL ANALYSIS

ANALYTE	METHOD
pH (LABORATORY)	SW846 9045
TOTAL ORGANIC CARBON (TOC)	EPA (LLOYD-KAHN)
OIL & GREASE-TOTAL RECOVERABLE, GRAVIMETRIC	SW846 9071
FLASH POINT	SW846 1010

ANALYTE	METHOD
ANTIMONY-GFAA	SW846 7041
ANTIMONY-FAA	SW846 7040
ARSENIC	SW846 7060
ARSENIC-GASEOUS HYDROXIDE AA	SW846 7061
BARIUM-FAA	SW846 7080
CADMIUM-FAA	SW846 7130
CADMIUM-GFAA	SW846 7131
CHROMIUM- GFAA	SW846 7191
CHROMIUM- FAA	SW846 7190
LEAD	SW846 7421
LEAD	SW846 7420
MERCURY-CVAA	SW846 7471
NICKEL-FAA	SW846 7520
SELENIUM-GFAA	SW846 7740
SELENUIM-GASEOUS HYDROXIDE AA	SW846 7741
SILVER-FAA	SW846 7760
ELEMENTS-SAMPLE PREPARATION	SW846 3050/3051

ANALYTE	METHOD
ANTIMONY	SW846 6010
ARSENIC	SW846 6010
BARIUM	SW846 6010
CADMIUM	SW846 6010
CHROMIUM	SW846 6010
LEAD	SW846 6010
NICKEL	SW846 6010
SELENIUM	SW846 6010
SILVER	SW846 6010
ELEMENTS-SAMPLE PREPARATION	SW846 3050/3051

II. SOIL/SOLID MATRIX
GC ORGANIC ANALYSIS

ANALYTE	METHOD
BETX	SW846 8021
VOLATILE HALOGENATED HYDROCARBONS/AROMATICS	SW846 8021
TOTAL PETROLEUM HYDROCARBONS AS GASOLINE (GRO)	SW846 8015
TOTAL PETROLEUM HYDROCARBONS AS DIESEL (DRO)	SW846 8015
ORGANOCHLORINE PESTICIDES	SW846 8081
PCB	SW846 8081
PCB-CONGENER SPECIFIC	IN-HOUSE
PCB-CONGENER SPECIFIC	SW846 8082
PETROLEUM HYDROCARBON IDENTIFICATION	NYSDOH 310-14
POLYNUCLEAR AROMATIC HYDROCARBONS	SW846 8100
HERBICIDES	SW846 8151

ANALYTE	METHOD
VOLATILE ORGANICS-PRIORITY POLLUTANTS	SW846 8260
SEMIVOLATILE ORGANIC COMPOUNDS	SW846 8270
ACID EXTRACTABLE ORGANIC COMPOUNDS	SW846 8270
BASE/NEUTRAL EXTRACTABLE ORGANIC COMPOUNDS	SW846 8270

II. SOIL/SOLID MATRIX
RCRA-HAZARDOUS WASTE CHARACTERIZATION

ANALYTE	METHOD
CORROSIVITY-pH	SW846 9045
IGNITABILITY-FLASH POINT	SW846 1010

ANALYTE	METHOD
VOLATILE ORGANICS-TCLP LIST	SW846 8260
SEMIVOLATILE ORGANIC COMPOUNDS-TCLP LIST	SW846-8270
ELEMENTS-TCLP LIST	
ARSENIC	SW846 7060/7061
BARIUM	SW846 7080
CADMIUM	SW846 7130/7131
CHROMIUM	SW846 7190/7191
LEAD	SW846 7420/7421
MERCURY	SW846 7421
SELENIUM	SW846 7740/7741
SILVER	SW846 7760
ELEMENTS-SAMPLE PREPARATION	SW846 3010/3015/3020
ELEMENTS-TCLP EXTRACTION	SW846 1311
VOLATILE ORGANICS-TCLP ZEROHEAD SPACE EXTRACTION	SW846 1311
SEMIVOLATILE ORGANICS-TCLP EXTRACTION	SW846 1311
TCLP EXTRACTION-GREASE/OILY WASTE	SW846 1311
TCLP EXTRACTION-ZERO HEADSPACE EXTRACTION FOR GREATER THAN 1% LIQUID	SW846 1311

Northeast Analytical, Inc.

Method Detection Limits

File Name: Q:\MDL PCB 121797A.WK4

Date: 17-Dec-98

Method Detection Limit (MDL) calculations as based on procedures outlined in 40 CFR, part 136, App B; 1-July-85.

Compound:	A1016	Analysis:	METHOD 8082
Matrix:	SOIL/SOLID	Instrument:	GC-5
Extraction:	ASE	Column:	DB5-MS
Spike conc:	69.9 ug/kg		

	NEA Samp ID	Extr Date	File Name	Analysis Date	Expt Conc (PPB)	Percent Recovery (%)
1	971201SS1	12/01/97	1201SS1	12/16/97	66.8	96%
2	971201SS2	12/01/97	1201SS2	12/16/97	66.4	95%
3	971201SS3	12/01/97	1201SS3	12/17/97	72.6	104%
4	971201SS4	12/01/97	1201SS4	12/17/97	67.5	97%
5	971201SS5	12/01/97	1201SS5	12/17/97	65.6	94%
6	971201SS6	12/01/97	1201SS6	12/17/97	66.0	94%
7	971201SS7	12/01/97	1201SS7	12/17/97	65.4	94%
8	971201SS8	12/01/97	1201SS8	12/17/97	61.9	89%

One sided Student's t values (t) at the 99% confidence level.

Number (n)	(t) value
7	3.143
8	2.998

Number (n):	8	
AVG:	66.53	ug/kg
STD (s):	2.97	ug/kg
%RSD:	4.5%	
MDL:	8.90	ug/kg
PQL:	44.52	PPB
VALID:	valid	

MDL calculations:

MDL = t * s

Where:

t = one sided Student's t value for the number of replicates at the 99% level

s = standard deviation of the population

PQL calculations:

PQL = MDL * 5

Sample Preparation Chemist:	Dean Hennessy	Date: 4/2/98
Gas Chromatography Analyst:	Kristen E. Vogt	Date: 4/2/98
QA/QC Officer:	Cynthia Wentz	Date: 4/1/98
Lab Director:	Robert E. Waytz	Date: 4/2/98

Comments:

Northeast Analytical, Inc.

Method Detection Limits

File Name: Q:\MDL\PCB\121797B.WK4

Date: 17-Dec-97

Method Detection Limit (MDL) calculations as based on procedures outlined in 40 CFR, part 136, App B; 1-July-85.

Compound:	A1221	Analysis:	METHOD 8082
Matrix:	SOIL/SOLID	Instrument:	GC-5
Extraction:	ASE	Column:	DB5-MS
Spike conc:	80.1 ug/kg		

	NEA Samp ID	Extr Date	File Name	Analysis Date	Expt Conc (PPB)	Percent Recovery (%)
1	971209SS1	12/09/97	1209SS1	12/17/97	64.1	80%
2	971209SS2	12/09/97	1209SS2	12/17/97	72.6	91%
3	971209SS3	12/09/97	1209SS3	12/17/97	71.0	89%
4	971209SS4	12/09/97	1209SS4	12/17/97	67.6	84%
5	971209SS5	12/09/97	1209SS5	12/17/97	71.5	89%
6	971209SS6	12/09/97	1209SS6	12/17/97	64.9	81%
7	971209SS7	12/09/97	1209SS7	12/17/97	70.2	88%
8	971209SS8	12/09/97	1209SS8	12/17/97	74.5	93%

Number (n):	8	
AVG:	69.55	ug/kg
STD (s):	3.69	ug/kg
%RSD:	5.3%	
MDL:	11.07	ug/kg
PQL:	55.34	PPB
VALID:	valid	

One sided Student's t values (t) at the 99% confidence level.

Number (n)	(t) value
7	3.143
8	2.998

MDL calculations:

MDL = t * s

Where:

t = one sided Student's t value for the number of replicates at the 99% level

s = standard deviation of the population

PQL calculations:

PQL = MDL * 5

Sample Preparation Chemist:	Dawn Hennessy	Date: 4/2/98
Gas Chromatography Analyst:	Kristen Sullivan	Date: 4/2/98
QA/QC Officer:	[illegible]	Date: 4/1/98
Lab Director:	Robert E. Waters	Date: 4/2/98

Comments:

Northeast Analytical, Inc.

Method Detection Limits

File Name: Q:\MDL PCB\012898C.WK4

Date: 29-Jan-98

Method Detection Limit (MDL) calculations as based on procedures outlined in 40 CFR, part 136, App B; 1-July-85.

Compound:	A1232	Analysis:	METHOD 8082
Matrix:	SOIL/SOLID	Instrument:	GC-5
Extraction:	ASE	Column:	DB-5 MS
Spike conc:	77.5 ug/kg		

	NEA Samp ID	Extr Date	File Name	Analysis Date	Expt Conc (PPB)	Percent Recovery (%)
1	980116SS9	01/16/98	0116SS9	01/23/98	67.0	86%
2	980116SS10	01/16/98	0116SS10	01/23/98	68.0	88%
3	980116SS11	01/16/98	0116SS11	01/23/98	65.0	84%
4	980116SS12	01/16/98	0116SS12	01/23/98	67.4	87%
5	980116SS13	01/16/98	0116SS13	01/23/98	70.1	90%
6	980116SS14	01/16/98	0116SS14	01/23/98	63.4	82%
7	980116SS15	01/16/98	0116SS15	01/23/98	68.2	88%
8	980116SS16	01/16/98	0116SS16	01/23/98	61.0	79%

Number (n):	8	
AVG:	66.26	ug/kg
STD (s):	2.95	ug/kg
%RSD:	4.4%	
MDL:	8.84	ug/kg
PQL:	44.18	PPB
VALID:	valid	

One sided Student's t values (t) at the 99% confidence level.

Number (n)	(t) value
7	3.143
8	2.998

MDL calculations:

MDL = t * s

Where:

t = one sided Student's t value for the number of replicates at the 99% level

s = standard deviation of the population

PQL calculations:

PQL = MDL * 5

Sample Preparation Chemist:		Date: 4/2/98
Gas Chromatography Analyst:		Date: 4/2/98
QA/QC Officer:		Date: 4/1/98
Lab Director:		Date: 4/2/98

Comments:

Northeast Analytical, Inc.

Method Detection Limits

File Name: Q: MDL PCB 012898D.WK4

Date: 29-Jan-98

Method Detection Limit (MDL) calculations as based on procedures outlined in 40 CFR, part 136, App B; 1-July-85.

Compound:	A1242	Analysis:	METHOD 8082
Matrix:	SOIL/SOLID	Instrument:	GC-5
Extraction:	ASE	Column:	DB-5 MS
Spike conc:	74.2 ug/kg		

	NEA Samp ID	Extr Date	File Name	Analysis Date	Expt Conc (PPB)	Percent Recovery (%)
1	980116SS1	01/16/98	0116SS1	01/24/98	63.3	85%
2	980116SS2	01/16/98	0116SS2	01/24/98	61.9	83%
3	980116SS3	01/16/98	0116SS3	01/24/98	61.7	83%
4	980116SS4	01/16/98	0116SS4	01/24/98	64.3	87%
5	980116SS5	01/16/98	0116SS5	01/24/98	70.8	95%
6	980116SS6	01/16/98	0116SS6	01/24/98	66.5	90%
7	980116SS7	01/16/98	0116SS7	01/24/98	60.0	81%
8	980116SS8	01/16/98	0116SS8	01/24/98	60.3	81%

Number (n):	8	
AVG:	63.60	ug/kg
STD (s):	3.61	ug/kg
%RSD:	5.7%	
MDL:	10.82	ug/kg
PQL:	54.10	PPB
VALID:	valid	

One sided Student's t values (t) at the 99% confidence level.

Number (n)	(t) value
7	3.143
8	2.998

MDL calculations:

MDL = t * s

Where:

t = one sided Student's t value for the number of replicates at the 99% level

s = standard deviation of the population

PQL calculations:

PQL = MDL * 5

Sample Preparation Chemist:	Nicole J. LaMarque	Date: 4/2/98
Gas Chromatography Analyst:	Jonathan Marcello	Date: 4/2/98
QA/QC Officer:	[illegible]	Date: 4/1/98
Lab Director:	Robert E. Wagner	Date: 4/2/98

Comments:

Northeast Analytical, Inc.

Method Detection Limits

File Name: Q:\MDL PCB\021098B.WK4

Date: 10-Feb-98

Method Detection Limit (MDL) calculations as based on procedures outlined in 40 CFR, part 136, App B; 1-July-85.

Compound:	A1248	Analysis:	METHOD 8082
Matrix:	SOIL/SOLID	Instrument:	GC-7
Extraction:	ASE	Column:	MIXED PHASE PEST
Spike conc:	76.4 ug/kg		

	NEA Samp ID	Extr Date	File Name	Analysis Date	Expt Conc (PPB)	Percent Recovery (%)
1	980130SS1	01/30/98	0130SS1	02/03/98	85.7	112%
2	980130SS2	01/30/98	0130SS2	02/03/98	89.8	118%
3	980130SS3	01/30/98	0130SS3	02/03/98	88.4	116%
4	980130SS4	01/30/98	0130SS4	02/03/98	83.7	110%
5	980130SS5	01/30/98	0130SS5	02/03/98	81.4	107%
6	980130SS6	01/30/98	0130SS6	02/03/98	86.4	113%
7	980130SS7	01/30/98	0130SS7	02/04/98	82.5	108%
8	980130SS8	01/30/98	0130SS8	02/04/98	86.7	113%

One sided Student's t values (t) at the 99% confidence level.

Number (n)	(t) value
7	3.143
8	2.998

Number (n):	8	
AVG:	85.58	ug/kg
STD (s):	2.88	ug/kg
%RSD:	3.4%	
MDL:	8.64	ug/kg
PQL:	43.22	PPB
VALID:	valid	

MDL calculations:

MDL = t * s

Where:

t = one sided Student's t value for the number of replicates at the 99% level

s = standard deviation of the population

PQL calculations:

PQL = MDL * 5

Sample Preparation Chemist:	Dean Hennessy	Date:	4/2/98
Gas Chromatography Analyst:	Cynthia J. Murillo	Date:	4/2/98
QA/QC Officer:	[illegible]	Date:	4/1/98
Lab Director:	Robert E. Waters	Date:	4/2/98

Comments:

Northeast Analytical, Inc.

Method Detection Limits

File Name: Q_MDL PCB 050198B WK4

Date: 01-May-98

Method Detection Limit (MDL) calculations as based on procedures outlined in 40 CFR. part 136, App B; 1-July-85.

Compound:	A1254	Analysis:	METHOD 8082
Matrix:	SOIL/SOLID	Instrument:	GC-5
Extraction:	ASE	Column:	DB-5 MS
Spike conc:	74.7 ug/kg		

NEA Samp ID	Extr Date	File Name	Analysis Date	Expt Conc (PPB)	Percent Recovery (%)
980408SS1	04/08/98	0408SS1	04/20/98	67.6	90%
980408SS2	04/08/98	0408SS2	04/20/98	72.3	97%
980408SS3	04/08/98	0408SS3	04/20/98	67.1	90%
980408SS4	04/08/98	0408SS4	04/20/98	68.0	91%
980408SS5	04/08/98	0408SS5	04/20/98	67.1	90%
980408SS6	04/08/98	0408SS6	04/20/98	67.7	91%
980408SS7	04/08/98	0408SS7	04/20/98	62.2	83%

One sided Student's t values (t) at the 99% confidence level.

Number (n)	(t) value
7	3.143
8	2.998

Number (n):	7	
AVG:	67.42	ug/kg
STD (s):	2.94	ug/kg
%RSD:	4.4%	
MDL:	9.23	ug/kg
PQL:	46.14	PPB
VALID:	valid	

MDL calculations:

MDL = t * s

Where:

t = one sided Student's t value for the number of replicates at the 99% level

s = standard deviation of the population

PQL calculations:

PQL = MDL * 5

Sample Preparation Chemist:	Dean Hovissey	Date: 5/4/98
Gas Chromatography Analyst:	Cynthia Miller	Date: 5/4/98
QA/QC Officer:	Judith A Stitt	Date: 5/4/98
Lab Director:	Robert E. Waltz	Date: 5/4/98

Comments:

Northeast Analytical, Inc.

Method Detection Limits

File Name: Q:\MDL\PCB\050198A.WK4

Date: 01-May-98

Method Detection Limit (MDL) calculations as based on procedures outlined in 40 CFR, part 136, App B; 1-July-85.

Compound:	A1260	Analysis:	METHOD 8082
Matrix:	SOIL/SOLID	Instrument:	GC-5
Extraction:	ASE	Column:	DB-5 MS
Spike conc:	74.4 ug/kg		

NEA Samp ID	Extr Date	File Name	Analysis Date	Expt Conc (PPB)	Percent Recovery (%)
980408SS9	04/17/98	0408SS9	04/20/98	72.0	97%
980408SS1	04/17/98	0408SS10	04/20/98	68.9	93%
980408SS1	04/17/98	0408SS11	04/20/98	68.3	92%
980408SS1	04/17/98	0408SS12	04/21/98	71.3	96%
980408SS1	04/17/98	0408SS13	04/21/98	75.0	101%
980408SS1	04/17/98	0408SS14	04/21/98	76.0	102%
980408SS1	04/17/98	0408SS15	04/21/98	70.5	95%
980408SS1	04/17/98	0408SS16	04/21/98	64.9	87%

	Number (n):	8
One sided Student's t values (t)	AVG:	70.86 ug/kg
at the 99% confidence level.	STD (s):	3.60 ug/kg
	%RSD:	5.1%
	MDL:	10.80 ug/kg
	PQL:	54.02 PPB
	VALID:	valid

Number (n)	(t) value
7	3.143
8	2.998

MDL calculations:

MDL = t * s

Where:

t = one sided Student's t value for the number of replicates at the 99% level

s = standard deviation of the population

PQL calculations:

PQL = MDL * 5

Sample Preparation Chemist:	Dawn Hennessy	Date:	5/4/98
Gas Chromatography Analyst:	Anthony Marello	Date:	5/4/98
QA/QC Officer:		Date:	5/4/98
Lab Director:	Robert E. Waters	Date:	5/4/98

Comments:

Northeast Analytical, Inc.

Method Detection Limits
Multicomponent Liquid Table

File Name: Q:\MDL\PCB\040996B.WK4
Date: 09-Apr-96

Method Detection Limit (MDL) calculations as based on procedures outlined in 40 CFR, part 136, App B; 1-July-85.

Compound:	A1016	Analysis:	METHOD 8080
Matrix:	WATER	Instrument:	GC-2
Extraction:	SEP FUNNEL	Column:	DB-1 CAPILLARY
Spike conc:	46.6 PPT		

	NEA Samp ID	Extr Date	File Name	Analysis Date	Expt Conc (PPT)	Percent Recovery (%)
1	0402SW1	04/02/96	960402SW1	04/09/96	48.7	105%
2	0402SW2	04/02/96	960402SW2	04/09/96	46.4	100%
3	0402SW3	04/02/96	960402SW3	04/09/96	43.0	92%
4	0402SW4	04/02/96	960402SW4	04/09/96	44.6	96%
5	0402SW5	04/02/96	960402SW5	04/09/96	47.4	102%
6	0402SW6	04/02/96	960402SW6	04/09/96	47.5	102%
7	0402SW7	04/02/96	960402SW7	04/09/96	44.0	94%
8	0402SW8	04/02/96	960402SW8	04/09/96	45.6	98%

One sided Student's t values (t) at the 99% confidence level.

Number (n)	(t) value
7	3.143
8	2.998

Number (n):	8	
AVG:	45.90	PPT
STD (s):	1.95	PPT
%RSD:	4.3%	
MDL:	5.86	PPT
PQL:	29.28	PPT
VALID:	valid	

MDL calculations:

MDL = t * s

Where:

t = one sided Student's t value for the number of replicates at the 99% level

s = standard deviation of the population

PQL calculations:

PQL = MDL * 5

Sample Preparation Chemist:	(NEA STAFF)	Date:	4/9/96
Gas Chromatography Analyst:	Kristen E. Wright	Date:	4/9/96
QA/QC Officer:	[signature]	Date:	4/9/96
Lab Director:	R.E. Wagner	Date:	11/8/96

Comments:

Northeast Analytical, Inc.
Method Detection Limits
Multicomponent Liquid Table

File Name: Q: MDL PCB\010897A.WK4
Date: 15-Jan-97

Method Detection Limit (MDL) calculations as based on procedures outlined in 40 CFR, part 136, App B; 1-July-85.

Compound:	Aroclor 1221	Analysis:	SW-846 Method 8081
Matrix:	WATER	Instrument:	GC-2
Extraction:	CLLE	Column:	DB-1
Spike conc:	53.4 PPT		

	NEA Samp ID	Extr Date	File Name	Analysis Date	Expt Conc (PPT)	Percent Recovery (%)
1	970108SS1E	01/08/97	0108SS1E	01/15/97	56.1	105%
2	970108SS2E	01/08/97	0108SS2E	01/15/97	56.8	106%
3	970108SS3E	01/08/97	0108SS3E	01/15/97	56.9	106%
4	970108SS4E	01/08/97	0108SS4E	01/15/97	51.6	97%
5	970108SS5E	01/08/97	0108SS5E	01/15/97	54.8	103%
6	970108SS6E	01/08/97	0108SS6E	01/15/97	53.0	99%
7	970108SS7E	01/08/97	0108SS7E	01/15/97	50.3	94%
8	970108SS8E	01/08/97	0108SS8E	01/15/97	51.0	95%

Number (n):	8	
AVG:	53.82	PPT
STD (s):	2.68	PPT
%RSD:	5.0%	
MDL:	8.02	PPT
PQL:	40.12	PPT
VALID:	valid	

One sided Student's t values (t) at the 99% confidence level.

Number (n)	(t) value
7	3.143
8	2.998

MDL calculations:

MDL = t * s

Where:

t = one sided Student's t value for the number of replicates at the 99% level

s = standard deviation of the population

PQL calculations:

PQL = MDL * 5

Sample Preparation Chemist: _____ Date: _____
Gas Chromatography Analyst: _____ Date: _____
QA/QC Officer: _____ Date: _____
Lab Director: _____ Date: _____

Comments: _____

Northeast Analytical, Inc.

Method Detection Limits
Multicomponent Liquid Table

File Name: Q: MDL PCB\110896E.WK4
Date: 14-Nov-96

Method Detection Limit (MDL) calculations as based on procedures outlined in 40 CFR, part 136, App B; 1-July-85.

Compound:	Aroclor 1242	Analysis:	SW-846 Method 8081
Matrix:	WATER	Instrument:	GC-2
Extraction:	SEP FUNNEL	Column:	DB-1
Spike conc:	49.5 PPT		

	NEA Samp ID	Extr Date	File Name	Analysis Date	Expt Conc (PPT)	Percent Recovery (%)
1	961105SS9E	11/05/96	1105SS9E	11/07/96	50.8	103%
2	961105SS10E	11/05/96	1105SS10	11/07/96	46.1	93%
3	961105SS11E	11/05/96	1105SS11	11/07/96	47.6	96%
4	961105SS12E	11/05/96	1105SS12	11/07/96	45.2	91%
5	961105SS13E	11/05/96	1105SS13	11/08/96	47.7	96%
6	961105SS14E	11/05/96	1105SS14	11/08/96	49.9	101%
7	961105SS15E	11/05/96	1105SS15	11/08/96	48.4	98%
8	961105SS16E	11/05/96	1105SS16	11/08/96	46.4	94%

Number (n):	8	
AVG:	47.75	PPT
STD (s):	1.89	PPT
%RSD:	4.0%	
MDL:	5.67	PPT
PQL:	28.35	PPT
VALID:	valid	

One sided Student's t values (t) at the 99% confidence level.

Number (n)	(t) value
7	3.143
8	2.998

MDL calculations:

MDL = t * s

Where:

t = one sided Student's t value for the number of replicates at the 99% level

s = standard deviation of the population

PQL calculations:

PQL = MDL * 5

Sample Preparation Chemist: Dean Morrissey Date: 11/15/96
Gas Chromatography Analyst: Kristen E. Wood Date: 11/15/96
QA/QC Officer: [signature] Date: 11/15/96
Lab Director: R.E. Waters Date: 11/18/96

Comments:

Northeast Analytical, Inc.

Method Detection Limits
Multicomponent Liquid Table

File Name: Q:\MDL\PCB\110896D.WK4
Date: 13-Nov-96

Method Detection Limit (MDL) calculations as based on procedures outlined in 40 CFR, part 136, App B; 1-July-85.

Compound:	Aroclor 1254	Analysis:	SW-846 Method 8081
Matrix:	WATER	Instrument:	GC-2
Extraction:	SEP FUNNEL	Column:	DB-1
Spike conc:	49.8 PPT		

	NEA Samp ID	Extr Date	File Name	Analysis Date	Expt Conc (PPT)	Percent Recovery (%)
1	961105SS1E	11/05/96	1105SS1E	11/08/96	53.0	106%
2	961105SS2E	11/05/96	1105SS2E	11/08/96	53.2	107%
3	961105SS3E	11/05/96	1105SS3E	11/08/96	50.9	102%
4	961105SS4E	11/05/96	1105SS4E	11/08/96	49.7	100%
5	961105SS5E	11/05/96	1105SS5E	11/08/96	49.6	100%
6	961105SS6E	11/05/96	1105SS6E	11/08/96	54.8	110%
7	961105SS7E	11/05/96	1105SS7E	11/08/96	49.5	99%
8	961105SS8E	11/05/96	1105SS8E	11/08/96	50.3	101%

Number (n):	8	
AVG:	51.37	PPT
STD (s):	2.01	PPT
%RSD:	3.9%	
MDL:	6.03	PPT
PQL:	30.14	PPT
VALID:	valid	

One sided Student's t values (t) at the 99% confidence level.

Number (n)	(t) value
7	3.143
8	2.998

MDL calculations:

MDL = t * s

Where:

t = one sided Student's t value for the number of replicates at the 99% level

s = standard deviation of the population

PQL calculations:

PQL = MDL * 5

Sample Preparation Chemist:	Dean Hornung	Date: 11/15/96
Gas Chromatography Analyst:	Kristen Ellicott	Date: 11/15/96
QA/QC Officer:	[illegible]	Date: 11/15/96
Lab Director:	K.E. Wagner	Date: 11/18/96

Comments:

Northeast Analytical, Inc.

Method Detection Limits
Multicomponent Liquid Table

File Name: Q:\MDL\PCB\111396B.WK4
Date: 13-Nov-96

Method Detection Limit (MDL) calculations as based on procedures outlined in 40 CFR, part 136, App B; 1-July-85.

Compound:	Aroclor 1260	Analysis:	SW-846 Method 8081
Matrix:	WATER	Instrument:	GC-2
Extraction:	SEP FUNNEL	Column:	DB-1
Spike conc:	49.6 PPT		

	NEA Samp ID	Extr Date	File Name	Analysis Date	Expt Conc (PPT)	Percent Recovery (%)
1	961104SS1E	11/04/96	1104SS1E	11/13/96	59.3	120%
2	961104SS2E	11/04/96	1104SS2E	11/13/96	53.0	107%
3	961104SS3E	11/04/96	1104SS3E	11/13/96	52.4	106%
4	961104SS4E	11/04/96	1104SS4E	11/13/96	59.4	120%
5	961104SS5E	11/04/96	1104SS5E	11/13/96	54.4	110%
6	961104SS6E	11/04/96	1104SS6E	11/13/96	53.5	108%
7	961104SS7E	11/04/96	1104SS7E	11/13/96	55.6	112%
8	961104SS8E	11/04/96	1104SS8E	11/13/96	56.9	115%

One sided Student's t values (t) at the 99% confidence level.

Number (n)	(t) value
7	3.143
8	2.998

Number (n):	8	
AVG:	55.58	PPT
STD (s):	2.74	PPT
%RSD:	4.9%	
MDL:	8.21	PPT
PQL:	41.03	PPT
VALID:	valid	

MDL calculations:

MDL = t * s

Where:

t = one sided Student's t value for the number of replicates at the 99% level

s = standard deviation of the population

PQL calculations:

PQL = MDL * 5

Sample Preparation Chemist:	Jean Morrissey	Date: 11/15/96
Gas Chromatography Analyst:	Kimberly E. Wright	Date: 11/15/96
QA/QC Officer:	[illegible]	Date: 11/15/96
Lab Director:	R.E. Wagner	Date: 11/18/96

Comments:

Northeast Analytical, Inc.

Method Detection Limits
Multicomponent Liquid Table

File Name: Q:\MDL\PCB\121595A.WK4
Date: 15-Dec-95

Method Detection Limit (MDL) calculations as based on procedures outlined in 40 CFR, part 136, App B; 1-July-85.

Compound:	A1242	Analysis:	METHOD 8080 L.L.
Matrix:	WATER	Instrument:	GC-5
Extraction:	L/L EXTRACTION	Column:	MIXED PHS PEST
Spike conc:	50 PPT		

	NEA Samp ID	Extr Date	File Name	Analysis Date	Expt Conc (PPT)	Percent Recovery (%)
1	MDL-1 1242	09/20/95	MDL11242	12/14/95	48.4	97%
2	MDL-2 1242	09/20/95	MDL21242	12/14/95	47.9	96%
3	MDL-3 1242	09/20/95	MDL31242	12/14/95	50.5	101%
4	MDL-4 1242	09/20/95	MDL41242	12/14/95	45.4	91%
5	MDL-5 1242	09/20/95	MDL51242	12/15/95	47.6	95%
6	MDL-6 1242	09/20/95	MDL61242	12/15/95	50.4	101%
7	MDL-7 1242	09/20/95	MDL71242	12/15/95	49.4	99%
8	MDL-8 1242	09/20/95	MDL81242	12/15/95	51.2	102%

Number (n):	8	
AVG:	48.85	PPT
STD (s):	1.91	PPT
%RSD:	3.9%	
MDL:	5.72	PPT
PQL:	28.62	PPT
VALID:	valid	

One sided Student's t values (t) at the 99% confidence level.

Number (n)	(t) value
7	3.143
8	2.998

MDL calculations:

MDL = t * s

Where:

t = one sided Student's t value for the number of replicates at the 99% level

s = standard deviation of the population

PQL calculations:

PQL = MDL * 5

Sample Preparation Chemist:		Date: 01-24-96
Gas Chromatography Analyst:		Date: 1/24/96
QA/QC Officer:		Date: 1/24/96
Lab Director:		Date: 1/26/96

Comments:

Northeast Analytical, Inc.

Method Detection Limits
Multicomponent Liquid Table

File Name: Q:\MDL\PCB\110896A.WK4
Date: 14-Nov-96

Method Detection Limit (MDL) calculations as based on procedures outlined in 40 CFR, part 136, App B; 1-July-85.

Compound:	Aroclor 1242	Analysis:	SW-846 Method 8081
Matrix:	WATER	Instrument:	GC-2
Extraction:	SEP FUNNEL	Column:	DB-1
Spike conc:	49.5 PPT		

	NEA Samp ID	Extr Date	File Name	Analysis Date	Expt Conc (PPT)	Percent Recovery (%)
1	961105SS9E	11/05/96	1105SS9E	11/07/96	52.1	105%
2	961105SS10E	11/05/96	1105SS10	11/07/96	47.1	95%
3	961105SS11E	11/05/96	1105SS11	11/07/96	50.3	102%
4	961105SS12E	11/05/96	1105SS12	11/07/96	50.0	101%
5	961105SS13E	11/05/96	1105SS13	11/08/96	45.9	93%
6	961105SS14E	11/05/96	1105SS14	11/08/96	47.4	96%
7	961105SS15E	11/05/96	1105SS15	11/08/96	48.5	98%
8	961105SS16E	11/05/96	1105SS16	11/08/96	51.8	105%

		Number (n):	8	
One sided Student's t values (t)		AVG:	49.14	PPT
at the 99% confidence level.		STD (s):	2.29	PPT
Number (n)	(t) value	%RSD:	4.7%	
7	3.143	MDL:	6.85	PPT
8	2.998	PQL:	34.26	PPT
		VALID:	valid	

MDL calculations:

MDL = t * s

Where:

t = one sided Student's t value for the number of replicates at the 99% level

s = standard deviation of the population

PQL calculations:

PQL = MDL * 5

Sample Preparation Chemist:	Dean Harrissey	Date:	11/15/96
Gas Chromatography Analyst:	Krystle E. Wright	Date:	11/15/96
QA/QC Officer:	Keith A. Fitch	Date:	11/15/96
Lab Director:	R.E. Wagner	Date:	11/18/96

Comments:

Northeast Analytical, Inc.

Method Detection Limits
Multicomponent Liquid Table

File Name: Q:\MDL\PCB\040596A.WK4
Date: 05-Apr-96

Method Detection Limit (MDL) calculations as based on procedures outlined in 40 CFR, part 136, App B; 1-July-85.

Compound:	A1016	Analysis:	METHOD 8080
Matrix:	WATER	Instrument:	GC-5
Extraction:	SEP FUNNEL	Column:	MIXED PHASE PEST
Spike conc:	50 ng/L		

	NEA Samp ID	Extr Date	File Name	Analysis Date	Expt Conc (PPB)	Percent Recovery (%)
1	960402SW1	04/02/96	0402SW1	04/04/96	47.6	95%
2	960402SW2	04/02/96	0402SW2	04/04/96	44.8	90%
3	960402SW3	04/02/96	0402SW3	04/04/96	48.7	97%
4	960402SW4	04/02/96	0402SW4	04/04/96	53.4	107%
5	960402SW5	04/02/96	0402SW5	04/05/96	44.8	90%
6	960402SW6	04/02/96	0402SW6	04/05/96	46.8	94%
7	960402SW7	04/02/96	0402SW7	04/05/96	50.4	101%
8	960402SW8	04/02/96	0402SW8	04/05/96	45.5	91%

One sided Student's t values (t) at the 99% confidence level.

Number (n)	(t) value
7	3.143
8	2.998

Number (n):	8	
AVG:	47.75	ng/L
STD (s):	3.01	ng/L
%RSD:	6.3%	
MDL:	9.01	ng/L
PQL:	45.06	PPT
VALID:	valid	

MDL calculations:

MDL = t * s

Where:

t = one sided Student's t value for the number of replicates at the 99% level

s = standard deviation of the population

PQL calculations:

PQL = MDL * 5

Sample Preparation Chemist:	(NEA STAFF)	Date:	4/5/96
Gas Chromatography Analyst:	Kristine E. Wright	Date:	4/5/96
QA/QC Officer:		Date:	4/5/96
Lab Director:	R.E. Wagner	Date:	11/5/96

Comments: _____

Northeast Analytical, Inc.

Method Detection Limits
Multicomponent Liquid Table

File Name: Q:\MDL\PCB\110896B.WK4
Date: 13-Nov-96

Method Detection Limit (MDL) calculations as based on procedures outlined in 40 CFR, part 136, App B; 1-July-85.

Compound:	Aroclor 1254	Analysis:	SW-846 Method 8081
Matrix:	WATER	Instrument:	GC-2
Extraction:	SEP FUNNEL	Column:	DB-1
Spike conc:	49.8 PPT		

	NEA Samp ID	Extr Date	File Name	Analysis Date	Expt Conc (PPT)	Percent Recovery (%)
1	961105SS1E	11/05/96	1105SS1E	11/08/96	52.7	106%
2	961105SS2E	11/05/96	1105SS2E	11/08/96	56.3	113%
3	961105SS3E	11/05/96	1105SS3E	11/08/96	52.4	105%
4	961105SS4E	11/05/96	1105SS4E	11/08/96	50.5	101%
5	961105SS5E	11/05/96	1105SS5E	11/08/96	50.6	102%
6	961105SS6E	11/05/96	1105SS6E	11/08/96	55.3	111%
7	961105SS7E	11/05/96	1105SS7E	11/08/96	50.5	101%
8	961105SS8E	11/05/96	1105SS8E	11/08/96	51.2	103%

	Number (n):	8	
	AVG:	52.44	PPT
	STD (s):	2.26	PPT
	%RSD:	4.3%	
	MDL:	6.77	PPT
	PQL:	33.85	PPT
	VALID:	valid	

One sided Student's t values (t) at the 99% confidence level.

Number (n)	(t) value
7	3.143
8	2.998

MDL calculations:

MDL = t * s

Where:

t = one sided Student's t value for the number of replicates at the 99% level

s = standard deviation of the population

PQL calculations:

PQL = MDL * 5

Sample Preparation Chemist:	Dean Hornung	Date: 11/15/96
Gas Chromatography Analyst:	Jane Daley	Date: 11/15/96
QA/QC Officer:	Kathleen Mills	Date: 11/15/96
Lab Director:	R.E. Wagner	Date: 11/18/96

Comments:

Northeast Analytical, Inc.

Method Detection Limits

File Name: Q:\MDL\PCB\121697B.WK4

Date: 16-Dec-97

Method Detection Limit (MDL) calculations as based on procedures outlined in 40 CFR, part 136, App B; 1-July-85.

Compound:	A1016	Analysis:	METHOD 8082
Matrix:	SOIL/SOLID	Instrument:	GC-7
Extraction:	ASE	Column:	MIXED PHASE PEST
Spike conc:	69.9 ug/kg		

	NEA Samp ID	Extr Date	File Name	Analysis Date	Expt Conc (PPB)	Percent Recovery (%)
1	971201SS1	12/01/97	1201SS1	12/04/97	66.0	94%
2	971201SS2	12/01/97	1201SS2	12/04/97	64.4	92%
3	971201SS3	12/01/97	1201SS3	12/04/97	71.7	103%
4	971201SS4	12/01/97	1201SS4	12/04/97	60.1	86%
5	971201SS5	12/01/97	1201SS5	12/05/97	66.7	95%
6	971201SS6	12/01/97	1201SS6	12/05/97	69.8	100%
7	971201SS7	12/01/97	1201SS7	12/05/97	68.7	98%
8	971201SS8	12/01/97	1201SS8	12/05/97	68.1	97%

Number (n):	8	
AVG:	66.94	ug/kg
STD (s):	3.57	ug/kg
%RSD:	5.3%	
MDL:	10.72	ug/kg
PQL:	53.59	PPB
VALID:	valid	

One sided Student's t values (t) at the 99% confidence level.

Number (n)	(t) value
7	3.143
8	2.998

MDL calculations:

MDL = t * s

Where:

t = one sided Student's t value for the number of replicates at the 99% level

s = standard deviation of the population

PQL calculations:

PQL = MDL * 5

Sample Preparation Chemist:	Dawn Hennessy	Date: 4/2/98
Gas Chromatography Analyst:	Kristen E Voigt	Date: 4/2/98
QA/QC Officer:		Date: 4/1/98
Lab Director:	Richard E Wagner	Date: 4/2/98

Comments:

Northeast Analytical, Inc.

Method Detection Limits
Multicomponent Liquid Table

File Name: Q: MDL PCB\121395A.WK4
Date: 14-Dec-95

Method Detection Limit (MDL) calculations as based on procedures outlined in 40 CFR, part 136, App B; 1-July-85.

Compound:	A1016	Analysis:	METHOD 8080 L.L.
Matrix:	WATER	Instrument:	GC-5
Extraction:	L/L EXTRACTION	Column:	MIXED PHS PEST
Spike conc:	50 PPT		

	NEA Samp ID	Extr Date	File Name	Analysis Date	Expt Conc (PPT)	Percent Recovery (%)
1	MDL-1 1016	09/26/95	MDL11016	12/13/95	59.6	119%
2	MDL-2 1016	09/26/95	MDL21016	12/13/95	58.9	118%
3	MDL-3 1016	09/26/95	MDL31016	12/13/95	56.5	113%
4	MDL-4 1016	09/26/95	MDL41016	12/13/95	58.9	118%
5	MDL-5 1016	09/26/95	MDL51016	12/13/95	59.9	120%
6	MDL-6 1016	09/26/95	MDL61016	12/13/95	62.4	125%
7	MDL-7 1016	09/26/95	MDL71016	12/14/95	58.8	118%
8	MDL-8 1016	09/26/95	MDL81016	12/14/95	56.5	113%

One sided Student's t values (t) at the 99% confidence level.

Number (n)	(t) value
7	3.143
8	2.998

Number (n):	8	
AVG:	58.94	PPT
STD (s):	1.90	PPT
%RSD:	3.2%	
MDL:	5.69	PPT
PQL:	28.47	PPT
VALID:	valid	

MDL calculations:

MDL = t * s

Where:

t = one sided Student's t value for the number of replicates at the 99% level

s = standard deviation of the population

PQL calculations:

PQL = MDL * 5

Sample Preparation Chemist:	[signature]	Date: 01-24-96
Gas Chromatography Analyst:	[signature]	Date: 1/24/96
QA/QC Officer:	[signature]	Date: 1/24/96
Lab Director:	[signature]	Date: 1/26/96

Comments:

Northeast Analytical, Inc.

Method Detection Limits
Multicomponent Liquid Table

File Name: Q: MDL PCB 111296A.WK4
Date: 12-Nov-96

Method Detection Limit (MDL) calculations as based on procedures outlined in 40 CFR, part 136, App B; 1-July-85.

Compound:	Aroclor 1242	Analysis:	SW-846 Method 8080
Matrix:	WATER	Instrument:	GC-5
Extraction:	SEP FUNNEL	Column:	MIXED PHASE PEST
Spike conc:	49.5 PPT		

	NEA Samp ID	Extr Date	File Name	Analysis Date	Expt Conc (PPT)	Percent Recovery (%)
1	961105SS9E	11/05/96	1105SS9E	11/08/96	54.1	109%
2	961105SS10E	11/05/96	1105SS10	11/08/96	50.9	103%
3	961105SS11E	11/05/96	1105SS11	11/08/96	48.8	99%
4	961105SS12E	11/05/96	1105SS12	11/08/96	53.6	108%
5	961105SS13E	11/05/96	1105SS13	11/08/96	53.5	108%
6	961105SS14E	11/05/96	1105SS14	11/08/96	51.9	105%
7	961105SS15E	11/05/96	1105SS15	11/08/96	50.6	102%
8	961105SS16E	11/05/96	1105SS16	11/08/96	50.8	103%

One sided Student's t values (t) at the 99% confidence level.

Number (n)	(t) value
7	3.143
8	2.998

Number (n):	8	
AVG:	51.79	PPT
STD (s):	1.86	PPT
%RSD:	3.6%	
MDL:	5.56	PPT
PQL:	27.81	PPT
VALID:	valid	

MDL calculations:

MDL = t * s

Where:

t = one sided Student's t value for the number of replicates at the 99% level

s = standard deviation of the population

PQL calculations:

PQL = MDL * 5

Sample Preparation Chemist:	Dean Morrissey	Date:	11/15/96
Gas Chromatography Analyst:	Kristen E Wright	Date:	11/12/96
QA/QC Officer:		Date:	11/12/96
Lab Director:	R.E. Wagner	Date:	11/18/96

Comments:

Northeast Analytical, Inc.

Method Detection Limits
Multicomponent Liquid Table

File Name: Q:\MDL\PCB\111296B.WK4
Date: 12-Nov-96

Method Detection Limit (MDL) calculations as based on procedures outlined in 40 CFR, part 136, App B; 1-July-85.

Compound:	Aroclor 1254	Analysis:	SW-846 Method 8081
Matrix:	WATER	Instrument:	GC-6
Extraction:	SEP FUNNEL	Column:	DB-1
Spike conc:	49.8 PPT		

	NEA Samp ID	Extr Date	File Name	Analysis Date	Expt Conc (PPT)	Percent Recovery (%)
1	961105SS1E	11/05/96	1105SS1E	11/08/96	54.4	109%
2	961105SS2E	11/05/96	1105SS2E	11/08/96	48.9	98%
3	961105SS3E	11/05/96	1105SS3E	11/08/96	52.5	105%
4	961105SS4E	11/05/96	1105SS4E	11/08/96	48.6	98%
5	961105SS5E	11/05/96	1105SS5E	11/08/96	54.3	109%
6	961105SS6E	11/05/96	1105SS6E	11/09/96	53.8	108%
7	961105SS7E	11/05/96	1105SS7E	11/09/96	48.2	97%
8	961105SS8E	11/05/96	1105SS8E	11/09/96	52.2	105%

Number (n):	8	
AVG:	51.63	PPT
STD (s):	2.65	PPT
%RSD:	5.1%	
MDL:	7.96	PPT
PQL:	39.78	PPT
VALID:	valid	

One sided Student's t values (t) at the 99% confidence level.

Number (n)	(t) value
7	3.143
8	2.998

MDL calculations:

MDL = t * s

Where:

t = one sided Student's t value for the number of replicates at the 99% level

s = standard deviation of the population

PQL calculations:

PQL = MDL * 5

Sample Preparation Chemist:	Dawn Mowinsky	Date: 11/15/96
Gas Chromatography Analyst:	Kristin E. Wright	Date: 11/12/96
QA/QC Officer:	[signature]	Date: 11/12/96
Lab Director:	E.E. Wagner	Date: 11/18/96

Comments:

Northeast Analytical, Inc.

Method Detection Limits
Multicomponent Liquid Table

File Name: Q:\MDL\PCB\111396A.WK4
Date: 13-Nov-96

Method Detection Limit (MDL) calculations as based on procedures outlined in 40 CFR, part 136, App B; 1-July-85.

Compound:	Aroclor 1260	Analysis:	SW-846 Method 8081
Matrix:	WATER	Instrument:	GC-2
Extraction:	SEP FUNNEL	Column:	DB-1
Spike conc:	49.6 PPT		

	NEA Samp ID	Extr Date	File Name	Analysis Date	Expt Conc (PPT)	Percent Recovery (%)
1	961104SS1E	11/04/96	1104SS1E	11/13/96	58.9	119%
2	961104SS2E	11/04/96	1104SS2E	11/13/96	53.1	107%
3	961104SS3E	11/04/96	1104SS3E	11/13/96	51.5	104%
4	961104SS4E	11/04/96	1104SS4E	11/13/96	57.6	116%
5	961104SS5E	11/04/96	1104SS5E	11/13/96	51.9	105%
6	961104SS6E	11/04/96	1104SS6E	11/13/96	54.9	111%
7	961104SS7E	11/04/96	1104SS7E	11/13/96	56.1	113%
8	961104SS8E	11/04/96	1104SS8E	11/13/96	55.9	113%

One sided Student's t values (t) at the 99% confidence level.

Number (n)	(t) value
7	3.143
8	2.998

Number (n):	8	
AVG:	54.96	PPT
STD (s):	2.67	PPT
%RSD:	4.9%	
MDL:	7.99	PPT
PQL:	39.96	PPT
VALID:	valid	

MDL calculations:

MDL = t * s

Where:

t = one sided Student's t value for the number of replicates at the 99% level

s = standard deviation of the population

PQL calculations:

PQL = MDL * 5

Sample Preparation Chemist:	Dean Hennessy	Date: 11/15/96
Gas Chromatography Analyst:	Kristen E. Wolfe	Date: 11/15/96
QA/QC Officer:	Keith A. Hale	Date: 11/15/96
Lab Director:	R.E. Wagner	Date: 11/18/96

Comments:

Northeast Analytical Inc.

Quality Assurance/Quality Control

Date: 07/30/97

Method Detection Limit Study Oil and Grease by Method 1664

Method:	EPA METHOD 1664
Compound:	N-HEXANE EXTRACTABLE MATERIAL
Matrix:	WATER
Extraction:	SOLID PHASE EXTRACTION
Spike conc:	mg/L
Date Extracted:	07/28/97
Date Analyzed:	07/30/97

NEA Sample ID	MDL#1 Conc.	MDL#2 Conc.	MDL#3 Conc.	MDL#4 Conc.	MDL#5 Conc.	MDL#6 Conc.	MDL#7 Conc.	Average Conc	Expected Conc	Average Conc	STD. Dev. Conc	%RSD	MDL Conc	PQL Conc	
Compound	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	%Rec	mg/L		mg/L	mg/L	Valid
Stearic Acid/Hexadecane	1.50	1.50	1.30	1.20	1.40	1.50	1.40	1.4	1.0	146%	0.115	8%	0.346	1.385	Y

Preparation Chemist: Nicole A. LaMarque

Analyst: Nicole A. Lightenger

QA/QC Officer

Lab Director FOR IREW

Q:\QC\MDL\8270\O&G.WK7

Attachment B

BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Laboratory Qualifications for CT & E Environmental Services, Inc.

Colorado Department of Public Health and Environment

under Primacy Agreement with the
United States Environmental Protection Agency
Pursuant to the Safe Drinking Water Regulations, 40CFR, Part 141

Certifies

CT&E ENVIRONMENTAL SERVICES, INC.
1258 Greenbrier Street
Charleston, WV 25311

is in compliance with the criteria and procedures of the EPA, Manual for the Certification of Laboratories Analyzing Drinking Water.
The laboratory may perform **Chemistry Analysis** on public drinking water for the following analyte groups:

Trace Metals(TM1,TM2), Nitrate, Nitrite
Pesticides(P1,P2), Herbicides(H1,H2),
Carbamates, PAH, Cyanide
Trihalomethanes(THM), Volatile Organic Chemicals(V1-V2-V3)

Approved analytes and methods are delineated on certification list of June 24, 1998

EFFECTIVE: June 24, 1998 through June 30, 1999

Robert M. Quillin, Director
Laboratory and Radiation Services Division

CERTIFICATION STATUS (CHEMISTRY) SAFE DRINKING WATER ACT

Name: CT&E Environmental Services, Inc.
1258 Greenbrier Street
Charleston, WV 25311

Date: June 24, 1998

TRACE METALS	METHOD
TM1	
(A)Arsenic	EPA200.7
(A)Barium	EPA200.7
(A)Cadmium	EPA200.7
(A)Chromium	EPA200.7
(A)Lead	EPA200.9
(A)Mercury	EPA245.2
(A)Selenium	EPA200.9
TM2	
(A)Antimony	EPA200.9
(A)Beryllium	EPA200.7
(A)Copper	EPA200.7
(A)Nickel	EPA200.7
(P)Thallium	EPA200.9

NITRATE/NITRITE/FLUORIDE	
N/N/F	
(A)Nitrate-N	EPA353.2
(A)Nitrite-N	EPA353.2
(N)Fluoride-F	

PESTICIDES	
P1	
(A)Endrin	EPA508
(A)Lindane	EPA508
(A)Methoxychlor	EPA508
(A)Toxaphene	EPA508
P2	
(A)Alachlor	EPA505
(A)Atrazine	EPA505
(A)Chlordane	EPA508
(A)Heptachlor	EPA508
(A)Heptachlor Epoxide	EPA508
(A)Hexachlorobenzene	EPA508
(A)Hexachloro-cyclopentadiene	EPA508
(A)Simazine	EPA505

CARBAMATES/VYDATE	METHOD
C/V	
(A)Carbofuran	EPA531.1
(A)Oxamyl(Vydate)	EPA531.1

HERBICIDES	
H1	
(A)2,4-D	EPA515.1
(A)2,4,5-TP	EPA515.1
H2	
(A)Dalapon	EPA515.1
(A)Dinoseb	EPA515.1
(A)Pentachlorophenol	EPA515.1
(A)Picloram	EPA515.1, 515.2

PCB	
(N)Decachlorobiphenyl	

PAH	
(A)Benzo(a)pyrene	EPA550

ADIPATES/PHTHALATES
A/P
(N)Bis-(2-ethylhexyl) Adipate
(N)Bis-(2-ethylhexyl) Phthalate

(A) = Approved / Certified
(N) = Not Certified
(P) = Provisionally Certified

Name: CT&E Environmental Services, Inc.
1258 Greenbrier Street
Charleston, WV 25311

Date: June 24, 1998

THM	METHOD
(A)Bromodichloromethane	EPA524.2
(A)Bromoform	EPA524.2
(A)Chlorodibromomethane	EPA524.2
(A)Chloroform	EPA524.2

REGULATED VOC

V1	
(A)Benzene	EPA524.2
(A)Carbon Tetrachloride	EPA524.2
(A)1,2-Dichlorobenzene	EPA524.2
(A)1,2-Dichloroethane	EPA524.2
(A)1,1-Dichloroethylene	EPA524.2
(A)Trichloroethylene	EPA524.2
(A)Vinyl Chloride	EPA524.2

V2	
(A)Chlorobenzene	EPA524.2
(A)1,4-Dichlorobenzene	EPA524.2
(A)c-1,2-Dichloroethylene	EPA524.2
(A)t-1,2-Dichloroethylene	EPA524.2
(A)1,2-Dichloropropane	EPA524.2
(A)Ethylbenzene	EPA524.2
(A)Styrene	EPA524.2
(A)Tetrachloroethylene	EPA524.2
(A)Toluene	EPA524.2
(A)1,1,1-Trichloroethane	EPA524.2
(A)Xylenes (Total)	EPA524.2
(A)Dichloromethane	EPA524.2
(A)1,2,4-Trichlorobenzene	EPA524.2
(A)1,1,2-Trichloroethane	EPA524.2

V3	
(A)1,2-Dibromo3-chloropropane	EPA504.1
(A)Ethylene Dibromide	EPA504.1

MISCELLANEOUS	METHOD
(N)Diquat	
(N)Endothall	
(N)Glyphosate	
(N)Asbestos	
(N)Dioxin	
(A)Cyanide	EPA335.4

(A) = Approved / Certified
(N) = Not Certified
(P) = Provisionally Certified

Commonwealth of Kentucky

Department for Environmental Protection

Division of Environmental Services

Certificate of Laboratory Certification for the Chemical Analysis of Drinking Water

in accordance with 401 KAR Chapter 8, issued to:

CT&E Environmental Services
1258 Greenbrier Street
Charleston, West Virginia 25311

for the analytes listed on the most current certified parameter list.

Scott Bays

Gleason L. Wheatley

Certification Officers

Laboratory ID # 90032

Expires December 31, 1998

№ 087

STATE OF MARYLAND

DEPARTMENT OF HEALTH AND MENTAL HYGIENE
LABORATORIES ADMINISTRATION

Certifies That

CT&E ENVIRONMENTAL SERVICES, INC.
1258 Greenbrier Street, Charleston, West Virginia 25311

having duly met the requirements of the

Regulations Governing Laboratory Certification
And Standards Of Performance In Accordance With
The Annotated Code of Maryland,
is hereby approved as a

State Certified Water Quality Laboratory

To perform the analyses indicated on the Annual Certified Parameter List,
which must accompany this certificate.

Approved Analyses: **Trace Metals 1,2; Inorganics 1,2,3,5; Pesticides 1,2,3; Herbicides; THM; VOCs 1,2; Benzo(a)pyrene.**

Certification # 211

Date Issued June 30, 1998

Expiration Date June 30, 1999
(Not Transferable)

J. Melissen Joseph
Director, Laboratories Administration

This certification is subject to unannounced laboratory inspections

CONSPICUOUSLY DISPLAY IN THE LABORATORY WITH THE ANNUAL CERTIFIED PARAMETER LIST.

The Commonwealth of Massachusetts

Department of Environmental Protection

Division of Environmental Analysis
Senator William X. Wall Experiment Station

certifies

M-WV032 CT & E Environmental Services, Inc.
1258 Greenbrier St.
Charleston, WV 25311-1002

Laboratory Director: **Dr. James Smith**

for the ***Chemical Analysis of Potable and Non-Potable Water***

pursuant to 310 CMR 42.00

This certificate supersedes all previous Massachusetts certificates issued to this laboratory. The laboratory is regulated by and shall be responsible for being in compliance with Massachusetts regulations at 310 CMR 42.00.

This certificate is valid only when accompanied by the latest dated Certified Parameter List as issued by the Massachusetts D.E.P.

Certification is no guarantee of the validity of the data. This certification is subject to unannounced laboratory inspections.

Director, Division of Environmental Analysis

Issued: **08/03/98**

Expires: **06/30/99**

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Certified Parameter List

EFFECTIVE DATE: 08/03/98

EXPIRATION DATE: 06/30/99

M-WV032 CT & E Environmental Services, Inc.
Charleston, WV

POTABLE WATER

101 Antimony
102 Arsenic
103 Barium
* 104 Beryllium
105 Cadmium
106 Chromium
107 Copper
108 Lead
109 Mercury
111 Selenium
* 114 Nitrate-N
115 Nitrite-N
116 Fluoride
119 Cyanide
128 2,4-D
129 2,4,5-TP
130 Dalapon
131 Dinoseb
132 Pentachlorophenol
133 Picloram
134 Alachlor
135 Atrazine
136 Chlordane
137 Endrin
138 Heptachlor
139 Heptachlor Epoxide
140 Hexachlorobenzene
141 Hexachlorocyclopentadiene
142 Lindane
143 Methoxychlor
144 Simazine
145 Toxaphene
* 146 Aldicarb
147 Aldicarb sulfone
148 Aldicarb sulfoxide
149 Carbofuran
150 Vydate
151 Polynuclear Aromatic Hydrocarbons
153 Trihalomethanes
154 Volatile Organic Compounds

* **Provisional Certification**

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Certified Parameter List

EFFECTIVE DATE: 08/03/98

EXPIRATION DATE: 06/30/99

M-WV032 CT & E Environmental Services, Inc.
Charleston, WV

NON-POTABLE WATER

202 Antimony
203 Arsenic
204 Beryllium
205 Cadmium
206 Chromium
208 Copper
210 Lead
212 Mercury
215 Selenium
218 Thallium
232 Fluoride
235 Nitrate-N
247 Volatile Halocarbons
248 Volatile Aromatics
249 Chlordane
255 Heptachlor
256 Heptachlor Epoxide

Pennsylvania Department of Environmental Protection

P.O. Box 1467
Harrisburg, PA 17105-1467
November 14, 1997

Bureau of Laboratories

717-783-7150
Fax: 717-783-1502

CERTIFIED MAIL NO. P 282 636 781

Mr. Paul P. Painter
Commercial Testing & Engineering Co.
1258 Greenbrier Street
Charleston, West Virginia 25311

Re: Laboratory Certification Status, WS039
DEP 68-512, EPA WV00032

Dear Mr. Painter:

Recently, a set of Chemical Performance Evaluation Samples was sent to you for analysis through EPA's Quality Assurance Program. The results of your analysis, the true values, and acceptance limits are provided on the enclosed data report. Your current status in the Laboratory Certification Program in Pennsylvania is as shown below:

Category of Analysis	Certification Status
TM1,TM2,F,CN,C P1,P3,H1,H2,SOC1,SOC3 TTHM,VOC1,VOC2,VOC3	Classified as "Certified"
TM3*,N/N,P2	Classified as "Provisionally Certified" You must follow the procedures in Appendix A of the "Critical Elements of Chemistry" and/or correct the deviations listed on your laboratory's on-site report in order to be upgraded to "Certified". Classified as "Not Certified" No drinking water analysis data will be accepted by the Department or its Designee in the category listed until satisfactory Performance Evaluation results have been achieved.

COMMENTS: * Lab did not use an approved method for Thallium.

Any person aggrieved by this Action may appeal, pursuant to Section 4 of the Environmental Hearing Board Act, 35 P.S. Section 7514, and the Administrative Agency Law, 2 Pa. C.S. Chapter 5A, to the Environmental Hearing Board, Second Floor, Rachel Carson State Office Building, P.O. Box 8457, Harrisburg, PA 17105-8457, 717-787-3483. TDD users may contact the Board through the Pennsylvania Relay Service 800-654-5984. Appeals must be filed with the Environmental Hearing Board within 30 days of receipt of written notice of this action unless the appropriate statute provides a different time period. Copies of the appeal form and the Board's rules of practice and procedures may be obtained from the Board. The appeal form and the Board's rules of practice and procedure are also available in braille or on audiotape from the Section to the Board at 717-787-3483. This paragraph does not, in and of itself, create any right of appeal beyond that permitted by applicable statutes and decisional law.

If you have any questions regarding your laboratory certification status, please contact James Yoder at 717-783-7150.

Sincerely,

Richard Sheibley
Chief
Quality Assurance and
Laboratory Certification Section

Enclosures

bcc: File

State of Tennessee

Department of Health

Division of Laboratory Services

Certifies That

CT&E Environmental Services, Inc.

Having Met the Requirements of the Regulations for the Certification of Laboratories Analyzing Drinking Water is hereby Approved as a

State Certified Laboratory

To perform the Analyses as Indicated on the Certified Parameter List For the Public Water Systems of Tennessee

Laboratory ID Number 02848 Effective Through April 15, 2001

04/15/98

Laboratory Certification Officer
Laboratory Services

This certification is subject to performance on E.P.A. Performance Evaluation Samples, laboratory inspections and payment of annual fees.

TENNESSEE CERTIFIED PARAMETER LIST

DATE: April 15, 1998 LAB NAME: CT&E Environmental Services
1258 Greenbrier St.
Charleston WV, 25311
LAB NO 02848 EXPIRATION DATE: April 15, 2001

C/D			C/D			C/D		
		INORGANIC CHEMICALS						
C	1005	ARSENIC	C	1010	BARIUM	C	1015	CADMIUM
C	1020	CHROMIUM	C	1024	CYANIDE	C	1025	FLUORIDE
C	1035	MERCURY		1036	NICKEL	C	1038	NITROGEN/NITRATE (TOTAL)
	1040	NITROGEN (as N)	C	1041	NITRITE	C	1045	SELENIUM
C	1074	ANTIMONY (TOTAL)	C	1075	BERYLLIUM (TOTAL)	C	1085	THALLIUM (TOTAL)
	1094	ASBESTOS	C	5000	LEAD			
		SECONDARY STANDARDS						
	1002	ALUMINUM		1017	CHLORIDE	C	1022	COPPER
	1025	FLUORIDE		1028	IRON		1032	MANGANESE
	1050	SILVER		1055	SULFATE		1089	MBAS
	1095	ZINC		1905	COLOR		1920	ODOR
	1925	PH		1930	TOTAL DISSOLVED SOLIDS			
		CORROSIVITY						
	1052	SODIUM		1919	HARDNESS-CALCIUM		1925	PH
	1927	TOTAL ALKALINITY		1930	TOTAL DISSOLVED SOLIDS		1993	AGRESSIVE INDEX
	1996	TEMPERATURE (%)		1997	LANGLIER INDEX			
	0100	**TURBIDITY**						
		ORGANIC CHEMICALS						
C	2005	ENDRIN	C	2010	LINDANE	C	2015	METHOXYCHLOR
C	2020	TOXAPHENE	C	2031	DALAPON		2032	DIQUAT
	2033	ENDOTHALL		2034	GLYPHOSATE		2035	ADIPATES
C	2036	OXOMYL (VYDATE)	C	2037	SIMAZINE		2039	PHTHALATES
C	2040	PICLORAM	C	2041	DINOSEB	C	2042	HEXACHLOROCYCLOPENTADIENE
C	2046	CARBOFURAN	C	2050	ATRAZINE	C	2051	ALACHLOR (LASSO)
	2063	DIOXIN	C	2065	HEPTACHLOR	C	2067	HEPTACHLOR EPOXIDE
C	2105	2,4 - D	C	2110	2,4,5 - TP SILVEX	C	2274	HEXACHLOROBENZENE
C	2306	BENZO(A)PYRENE	C	2326	PENTACHLOROPHENOL	C	2383	POLYCHLORINATED BIPHENYLS (PCB'S)
C	2959	CHLORDANE (TOTAL)						
C	2931	1,2 DIBROMO-3 CHLOROPROPANE (DBCP)	C	2936	ETHYLENE DIBROMIDE (EDB)			
C	2950	**TOTAL TRIHALOMETHANES**						
C	####	**VOLATILE ORGANIC CHEMICALS (ALL)**	C	2976	VINYL CHLORIDE			
		UNREGULATED CHEMICALS						
	1005	SULFATE		2021	CARBARYL		2022	METHOMYL
	2030	p-ISOPROPYLTOLUENE	C	2043	ALDICARB SULFOXIDE	C	2044	ALDICARB SULFONE
	2045	METOLACHLOR	C	2047	ALDICARB		2066	3-HYDROXYCARBOFURAN
	2076	BUTACHLOR		2077	PROPACHLOR		2210	CHLOROMETHANE
	2212	DICHLORODIFLUOROMETHANE		2214	BROMOMETHANE		2216	CHLOROETHANE
	2218	TRICHLOROFLUOROMETHANE		2246	HEXACHLOROBUTADIENE		2248	NAPHTHALENE
	2356	ALDRIN		2364	DIELDRIN		2408	DIBROMOMETHANE
	2410	1,1-DICHLOROPROPENE		2412	1,3-DICHLOROPROPANE		2413	1,3-DICHLOROPROPENE
	2414	1,2,3-TRICHLOROPROPANE		2416	2,2-DICHHLOROPROPANE		2418	1,2,4-TRIMETHYLBENZENE
	2420	1,2,3-TRICHLOROBENZENE		2422	n-BUTYLBENZENE		2424	1,3,5-TRIMETHYLBENZENE
	2426	TERT-BUTYL BENZENE		2428	sec-BUTYLBENZENE		2430	BROMOCHLOROMETHANE
	2440	DICAMBA		2595	METRIBUZIN		2941	CHLOROFORM
	2942	BROMOFORM		2943	BROMODICHLORORMETHANE		2944	DIBROMOCHLOROMETHANE
	2965	o - CHLOROTOLUENE		2966	p-CHLOROTOLUENE		2967	m-DICHLOROBENZENE
	2978	1,1 - DICHLOROETHANE		2986	1,1,1,2-TETRACHLORORETHANE		2988	1,1,2,2-TETRACHLOROETHANE
	2993	BROMOBENZENE		2994	ISOPROPYLBENZENE		2998	n-PROPLYBENZENE
		RADIONUCLIDES						
	4000	GROSS ALPHA (EX: RADON,UR)			RADIUM 228		4020	RADIUM 226
				4100	GROSS BETA PARTICLE ACTIVITY		4102	TRITIUM
		STRONTIUM 89 AND 90		4264	53- IODINE- 131		4270	55- CESIUM -134
	4400	URANIUM			COBALT 60		4270	CESIUM -137
					RUTHENIUM 106			
		MICROBIOLOGY						
	303	MEMBRANE FILTER (TOTAL COLIFORM)			PRESENCE/ABSENCE			HPC
	313	FECAL COLIFORM		305	MTF			

LEGEND: C = "CERTIFIED"
D= DOWNGRADED TO "NOT CERTIFIED"

Commonwealth of Virginia
Department of General Services
Division of Consolidated Laboratory Services

Certifies That

CT & E ENVIRONMENTAL SERVICES, INC.

Having Duly Met the Requirements of the
Regulations for the Certification of Laboratories Analyzing Drinking Water
Is hereby Approved as a

Certified Drinking Water Laboratory

To Perform the Analyses as indicated on the Annual Certified Parameter List
Which must accompany this to be valid.

Laboratory ID Number 00336 Effective July 1998 Through June 1999

Virginia Laboratory Officer
Safe Drinking Water Program

This certification is subject to unannounced laboratory inspections.
Conspicuously display in the laboratory with the annual certified parameter list.

This laboratory has met the minimum requirements for certification to analyze drinking water.
THIS CERTIFICATION DOES NOT GUARANTEE ACCURATE RESULTS.

Certificate Not Transferable

Surrender upon Revocation

Commonwealth of Virginia
Department of General Services
Division of Consolidated Laboratory Services

Annual Certified Parameter List
July 1, 1998 - June 30, 1999

CT & E Environmental Services, Inc.
1258 Greenbrier Street
Charleston, WV 25311

ID Number 00336

Inorganic Chemical:

Trace Metal 1:	Lead, Copper
Trace Metal 2:	Arsenic, Barium, Cadmium, Chromium, Mercury, Selenium
Trace Metal 3:	Antimony, Beryllium, Thallium
F:	Fluoride
NO_3/NO_2:	Nitrate, Nitrite
Inorganic 2:	Cyanide

Organic Chemical:

Pesticides 1:	Alachlor, Atrazine, Chlordane, Heptachlor, Heptachlor Epoxide, Lindane, Methoxychlor, Toxaphene
Pesticides 2:	Endrin, Hexachlorobenzene, Hexachlorocyclopentadiene, Simazine
Herbicides 1:	2,4-D, 2,4,5-TP (Silvex), Pentachlorophenol
Herbicides 2:	Dalapon, Dinoseb, Picloram
Trihalomethanes	
VOCs 2:	Vinyl Chloride
VOCs 3:	Phase I, Phase II
VOCs 4:	Phase V
SOCs 1:	Ethylene dibromide (EDB), Dibromochloropropane (DBCP)
SOCs 2:	Benzo(A)pyrene

James L. Pearson, Dr. P.H., BCLD
Virginia Laboratory Officer
Safe Drinking Water Program

*** Denotes Provisional Certification**

State of West Virginia

Department of Health and Human Resources
Bureau For Public Health
Office of Laboratory Services

certifies that

CT&E Environmental Services, Inc.
1258 Greenbrier Street
Charleston, WV 25311

having duly met the requirements of the
Certification of Laboratories to Conduct Drinking Water Tests
(§64CSR 3-13)
is hereby approved as a

State Certified Drinking Water Laboratory

to perform the analyses indicated on the
Certified Parameter List
which must accompany this certificate

00202-C
Certificate Number

Frank W. Lamb, D.A.B.
Laboratory Director

January 1, 1998
Date of Issue

Brenda J. Barnett
Certification Officer(s)

Certificate Expires December 31, 1998

State of West Virginia
Bureau of Public Health
Office of Environmental Health Services
Radiation, Toxics and Indoor Air Division

This is to certify that
CT&E Environmental Services, Inc.
1258 Greenbrier Street
Charleston, WV 25311

has complied with Chapter 16, Article 32, of the
Asbestos Abatement Licensing Rules and Regulations
of the State cf West Virginia
and is hereby licensed as an
Asbestos Bulk Sample Analytical Laboratory.

Asbestos Laboratory License Number: LB000004

Issued: October 03, 1997

Expires: October 31, 1998

Randy C. Curtis, Director
Radiation, Toxics and Indoor Air Division

West Virginia Division of Environmental Protection
Office of Water Resources

COMMERCIAL TESTING & ENGINEERING - ENVIRONMENTAL LABORATORY SERVICES

Is hereby certified to perform wastewater analyses (as listed on Attachment I) for the purpose of determining compliance with the requirements of the State's natural resources and environmental programs or when required by an order issued by the Division.

This certificate does not guarantee validity of data generated, but indicates the methodology, equipment, quality control procedures, records, and proficiency of the laboratory have been examined and found to be acceptable.

020	02-25-94
Certificate Number	Date Issued
Dan E Caldwell	Marla A. Scott
Quality Assurance Officer	Chief

This certificate is the property of the Division of Environmental Protection

Attachment I

WEST VIRGINIA
DIVISION OF ENVIRONMENTAL PROTECTION
OFFICE OF WATER RESOURCES

ANNUAL CERTIFIED PARAMETER LIST

for

C T & E, Environmental Services, Inc - Charleston
Charleston, West Virginia

BIOASSAY
PARAMETERS CERTIFIED

AQUATIC TOXICITY (Bioassay): Acute EPA/600/4-90/027F [*Vertebrate, Invertebrate*], Chronic EPA/600/4-91/002 [*Vertebrate*].***

This laboratory may test ONLY for those environmental parameters listed above for compliance monitoring purposes. All analyses must be performed by the methods cited in the current **APPLICATION FOR CERTIFICATION**.

This Certification Expires On May 31, 1999.

Certificate No. **020** .

David F. Wolfe, PhD
Quality Assurance Officer

4/5/98

Attachment I

WEST VIRGINIA
DIVISION OF ENVIRONMENTAL PROTECTION
OFFICE OF WATER RESOURCES

ANNUAL CERTIFIED PARAMETER LIST

for

Commercial Testing and Engineering Company - Charleston
Charleston, West Virginia

PARAMETERS CERTIFIED

ORGANICS: Oil & Grease [O&G-5520 B], Total Organic Halides [TOX-9020A], Total Petroleum Hydrocarbon [TPH-EPA-418.1 IR].***

FUELS: Gasoline Range Organics [GRO-*modified* 8015B GC/FID-P&T], Diesel Range Organics [DRO-*modified* 8015B GC/FID-Ext], BTEX [BTEX-*modified* 8020 GC/PID-P&T], Polynuclear Aromatic Hydrocarbons [PAH-8100 GC/FID, 8270A GC/MS, & 8310 HLPC/UV&fluorescence].***

GAS CHROMATOGRAPHY(GC): Purgeable &/or Volatile Halocarbons 601 - 8010A GC, Purgeable &/or Volatile Aromatics 602 - 8020A GC, Organochlorine Pesticides & Polychlorinated Biphenyls [PCBs] 608 - 8080A GC, Chlorinated Herbicides 615 - 8150A - 8151 GC, 1,2-Dibromoethane & 1,2-Dibromo-3-Chloropropane 504 - 8011 GC, Nonhalogenated Volatile Organics 8015A GC, Halogenated & Aromatic Volatiles 8021 GC.***

GAS CHROMATOGRAPHY(GC)/MASS SPECTROMETRY(MS): Purgeables &/or Volatiles 624 - 8240B GC/MS, Base/Neutrals & Acids &/or Semivolatiles 625 - 8270A GC/MS.***

HIGH PERFORMANCE LIQUID CHROMATOGRAPHY(HPLC): Benzidines 605 HPLC.***

CHARACTERISTICS: Corrosivity [steel-1110A, pH-9045], Toxicity [EP Tox-1310A(*metals* & *pesticides*), TCLP-1311(*metals* & *organics*)], Ignitability [Pensky-Martins(*closed*)-1010], Reactivity [7.3.3.2(*cyanide*-CN 9012A), 7.3.4.2(*sulfide*-S 9030A)], Paint Filter [9095].***

EXTRACTIONS: Separatory Funnel 3510A, Soxhlet 3541, Ultrasonic 3550A, Waste Dilution 3580A, Purge & Trap 5030A.***

AQUATIC TOXICITY (Bioassay): Acute EPA/600/4-90/027F [*Vertebrate, Invertebrate*], Chronic EPA/600/4-91/002 [*Vertebrate, Invertebrate*].***

This laboratory may test ONLY for those environmental parameters listed above for compliance monitoring purposes. All analyses must be performed by the methods cited in the current **APPLICATION FOR CERTIFICATION**.

This Certification Expires on May 31, 1999.

Certificate No. **020** .

David F. Wolfe, PhD 4/5/98
Quality Assurance Officer

Attachment I

WEST VIRGINIA
DIVISION OF ENVIRONMENTAL PROTECTION
OFFICE OF WATER RESOURCES

ANNUAL CERTIFIED PARAMETER LIST

for

Commercial Testing and Engineering Company - Charleston
Charleston, West Virginia

PARAMETERS CERTIFIED

WET CHEMISTRY: Acidity [*hot peroxide*-2310 B(4.a.), *total*-(4.c.), *mineral*-(4.d.)], Alkalinity 2320 B, Chloride 4500-Cl^- B, Color [*APHA*], Cyanide [CN^- (*amenable, total*)], Hardness [EDTA-*titrn*-2340 C], Phenols [*total*], Solids [*dissolved*-TDS-2540 C, *suspended*-TSS-2540 D, *total*-2540 B, *settleable*-Imhoff-2540 F, *volatile*-EPA-160.4, *volatile-sludges*-2540 G], Specific Conductance 2510 B, Sulfate [SO_4^{2-}-EPA-375.4], Sulfide [S^{2-}], Surfactants [MBAS], Temperature [*laboratory*-2550 B], Turbidity.***

FIELD PARAMETERS: Chlorine [Cl_2-*total* residual-Hach DR-100], Hydrogen Ion [pH-4500-H^+ B], Oxygen [*dissolved*-DO-4500-O G], Specific Conductance 2510 B, Sulfite [SO_3^{2-}], Temperature [*field*-2550 B].***

SPECIFIC ION ELECTRODE: Fluoride [*total*-4500-F^- B & C], Hydrogen Ion [pH-4500-H^+ B], Oxygen [*dissolved*-DO-4500-O G].***

NUTRIENTS: Ammonia [NH_3 as N-4500-NH_3 B & E], Nitrogen [Kjeldahl-TKN-N_{org} as N-4500-N_{org} B & 4500-NH_3 E], Nitrate-Nitrite [NO_3^--NO_2^- as N-353.2 LaChat], Phosphate [*ortho*-PO_4^{3-} as P-4500-P E, *total*-PO_4^{3-} as P-4500-P B.5. & E].***

METALS-COLORIMETRIC 3500: Chromium [Cr^{6+}-*hexavalent*-3500-Cr D].***

METALS-FLAME/AA 3111: Mercury [*cold vapor*-3112 B].***

METALS-FURNACE/AA 3113: Antimony, Arsenic, Cadmium, Chromium, Copper, Lead, Nickel, Selenium, Silver, Thallium.***

METALS-ICP/AES-ATOMIC EMISSION SPECTROMETRY 200.7 - 6010: Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Hardness [Mg+Ca], Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silicon, Silver, Sodium, Thallium, Tin, Titanium, Vanadium, Zinc.***

MICROBIOLOGY: Coliform [*fecal*-MF-9222 D & MPN-9221 C , *total*-MF-9222 B & MPN-9221], Heterotrophic Plate Count [*HPC*-9215 B].***

DEMANDS: Biochemical Oxygen Demand [BOD_5 & $CBOD_5$-5 day-5210 B], Chemical Oxygen Demand [COD-410.4-5220 D], Total Organic Carbon [TOC-415.1-9060].***

This Certification Expires on May 31, 1999.

David F. Wolfe

David F. Wolfe, PhD
Quality Assurance Officer

4/5/98

Certificate No. **020** .

State of West Virginia

Department of Health and Human Resources
Bureau For Public Health

Office of Laboratory Services

This is to certify that the following laboratory has been approved to perform the indicated procedures on drinking water in accordance with West Virginia §64CSR 13-3:

CT&E Environmental Services, Inc.
1258 Greenbrier Street
Charleston, WV 25311

Certified Parameter List

METALS I, II
INORGANICS I, II, III, V
PESTICIDES I, II, III
HERBICIDES
THM
VOC I, II
SOC I

*Indicates Provisional Certification for Parameter or Group

Certificate expires December 31, 1998 unless sooner withdrawn.

Certificate Number: 00202 C Date of Issue: January 1, 1998

Laboratory Director: Paul P. Painter

Precision and Accuracy Statement Method SW8081
for Polychlorinated Biphenyls (PCB's)
Soil Matrix
30 grams initial weight conc. to aprox. 5 mL

Instrument: GC7 **Analyst: RRR/KPP**

Channel: A

Parameter	Date of Analysis	Extraction Technician	Number of Replicates	Spike Level (ug/kg)	LOD * (ug/kg)	LOQ (ug/kg)	Accuracy % Mean Recovery	Precision (% RSD)
Aroclor 1016	11/15/96	DAM	7	100	18	33	78	7.3
Aroclor 1221	11/13/96	DAM	6	100	64	33	108	17.5
Aroclor 1232	11/15/96	CMM	6	100	24	33	100	7.1
Aroclor 1242	11/14/96	DAM	7	100	21	33	87	7.9
Aroclor 1248	11/18/96	CMM	6	100	14	33	77	5.6
Aroclor 1254	7/9/96	DAM	7	170	18	33	84	3.9
Aroclor 1260	11/15/96	CMM	7	100	32	33	76	13.1

Channel: B

Parameter	Date of Analysis	Extraction Technician	Number of Replicates	Spike Level (ug/kg)	LOD * (ug/kg)	LOQ (ug/kg)	Accuracy % Mean Recovery	Precision (% RSD)
Aroclor 1016	11/15/96	DAM	7	100	19	33	84	7.0
Aroclor 1221	11/13/96	DAM	7	100	24	33	62	11.7
Aroclor 1232	11/15/96	CMM	7	100	31	33	72	13.6
Aroclor 1242	11/14/96	DAM	7	100	24	33	80	9.5
Aroclor 1248	11/18/96	CMM	6	100	31	33	54	16.9
Aroclor 1254	7/9/96	DAM	7	170	20	33	74	5.0
Aroclor 1260	11/15/96	CMM	7	100	18	33	92	6.4

* calculated by 40CFR, part 136, apdx B

revised 11/21/96

Precision and Accuracy Statement
Volatile Organic Method SW8260, 5ml purge
for Analytes of Interest
Study Date: 01-06-97

Instrument #: MSD#6 **Analyst: GA**

Parameter	Spike Level (ug/l)	Number of Replcates	LOD * (ug/l)	Software cut-off value (ug/l)	LOQ (ug/l)	Accuracy % Mean Recovery	Precision (% RSD)
Acetone	5	7	2.1	2	10	154	8.7
Acetonitrile**	50	7	19.4	20	100	56	22.1
Acrolein**	50	7	14.4	20	100	53	17.2
Acrylonitrile	5	7	2.1	2	10	58	23.5
Allyl Chloride	5	7	1.2	1	5	94	7.9
Benzene	5	7	1.1	1	5	96	7.5
Bromochloromethane	5	7	1.2	1	5	94	8.3
Bromobenzene	5	7	1.0	1	5	94	6.4
Bromodichloromethane	5	7	1.0	1	5	89	6.7
Bromoform	5	7	1.2	1	5	87	8.5
Bromomethane	5	7	1.1	1	5	115	6.2
2-Butanone (MEK)	5	7	1.9	2	10	113	10.6
n-Butylbenzene	5	7	1.0	1	5	98	6.3
sec-Butylbenzene	5	7	1.0	1	5	94	6.4
tert-Butylbenzene	5	7	1.2	1	5	95	8.0
Carbon Disulfide	5	7	0.9	1	5	94	6.4
Carbon Tetrachloride	5	7	1.3	1	5	94	8.8
Chlorobenzene	5	7	1.1	1	5	101	6.5
Chloroethane	5	7	1.4	1	5	117	7.5
2-Chloroethyl vinyl ether	5	7	1.2	1	5	66	11.4
Chloroform	5	7	1.2	1	5	94	8.1
Chloromethane	5	7	1.5	1	5	96	10.0
Chloroprene**	5	7	0.5	1	5	81	4.2
2-Chlorotoluene	5	7	1.1	1	5	101	6.6
4-Chlorotoluene	5	7	1.0	1	5	97	6.2
Cumene	5	7	1.0	1	5	92	6.7
1,2-Dibromo-3-Chloropropane	5	7	1.0	1	5	89	7.4
Dibromochloromethane	5	7	0.9	1	5	90	6.5
Dibromomethane	5	7	0.9	1	5	98	6.1
1,2-Dibromoethane	5	7	0.8	1	5	97	5.4
1,2-Dichlorobenzene	5	7	1.0	1	5	103	6.2
1,3-Dichlorobenzene	5	7	1.1	1	5	98	6.7
1,4-Dichlorobenzene	5	7	1.0	1	5	101	6.6

Precision and Accuracy Statement
Volatile Organic Method SW8260, 5ml purge
for Analytes of Interest
Study Date: 01-06-97

Instrument #: MSD#6 **Analyst: GA**

Parameter	Spike Level (ug/l)	Number of Replcates	LOD * (ug/l)	Software cut-off value (ug/l)	LOQ (ug/l)	Accuracy % Mean Recovery	Precision (% RSD)
trans-1,4-Dichloro-2-butene	5	7	0.9	2	10	78	7.4
Dichlorodifluoromethane	5	7	1.1	1	5	104	6.7
1,1-Dichloroethane	5	7	1.0	1	5	96	6.5
1,2-Dichloroethane	5	7	1.0	1	5	98	6.7
1,1-Dichloroethene	5	7	1.0	1	5	94	6.4
cis-1,2-Dichloroethene	5	7	0.9	1	5	95	5.9
trans-1,2-Dichloroethene	5	7	0.8	1	5	95	5.7
1,2-Dichloropropane	5	7	1.1	1	5	94	7.7
1,3-Dichloropropane	5	7	0.9	1	5	94	6.4
2,2-Dichloropropane	5	7	1.4	1	5	101	8.7
1,1-Dichloropropene	5	7	1.1	1	5	95	7.2
cis-1,3-Dichloropropene	5	7	0.9	1	5	78	7.7
trans-1,3-Dichloropropene	5	7	1.2	1	5	68	10.9
Ethylbenzene	5	7	1.0	1	5	94	6.8
Ethyl Methacrylate	5	7	1.4	2	10	74	12.1
Hexachlorobutadiene	5	7	1.0	1	5	103	6.2
2-Hexanone	5	7	1.8	2	10	63	18.6
Iodomethane	5	7	0.9	1	5	97	6.0
Isobutyl Alcohol***	100	7	20.0	40	200	35	17.9
p-Isopropyltoluene	5	7	1.0	1	5	95	6.9
Methacrylonitrile	5	7	1.5	1	5	95	9.6
Methyl Methacrylate	5	7	1.8	1	10	87	13.3
Methylene Chloride	5	7	1.0	1	5	96	6.9
4-Methyl-2-Pentanone	5	7	2.2	2	10	83	16.8
Naphthalene	5	7	0.9	1	5	104	5.6
2-Nitropropane	5	7	1.6	2	10	54	19.0
Propionitrile**	50	7	13.7	20	100	43	20.3
n-Propylbenzene	5	7	1.0	1	5	93	6.9
Styrene	5	7	1.0	1	5	88	7.3
1,1,1,2-Tetrachloroethane	5	7	1.1	1	5	95	7.2
1,1,2,2-Tetrachloroethane	5	7	1.2	1	5	102	7.2
Tetrachloroethene	5	7	0.9	1	5	96	6.3
Toluene	5	7	1.0	1	5	94	6.8

Precision and Accuracy Statement
Volatile Organic Method SW8260, 5ml purge
for Analytes of Interest
Study Date: 01-06-97

Instrument #: MSD#6 **Analyst: GA**

Parameter	Spike Level (ug/l)	Number of Replcates	LOD * (ug/l)	Software cut-off value (ug/l)	LOQ (ug/l)	Accuracy % Mean Recovery	Precision (% RSD)
1,2,3-Trichlorobenzene	5	7	0.9	1	5	101	5.3
1,2,4-Trichlorobenzene	5	7	1.1	1	5	98	7.1
1,1,1-Trichloroethane	5	7	1.1	1	5	92	7.9
1,1,2-Trichloroethane	5	7	1.2	1	5	96	7.7
Trichloroethene	5	7	0.8	1	5	102	5.3
Trichlorofluoromethane	5	7	1.2	1	5	112	6.8
1,2,3-Trichloropropane	5	7	1.0	1	5	96	6.8
1,2,4-Trimethylbenzene	5	7	1.1	1	5	94	7.2
1,3,5-Trimethylbenzene	5	7	0.9	1	5	95	6.1
m/p-Xylene	10	7	2.4	2	10	97	7.8
o-Xylene	5	7	1.2	1	5	94	7.9
Vinyl Acetate	5	7	1.5	2	10	96	10.0
Vinyl Chloride	5	7	0.9	1	5	101	5.8

* calculated by 40CFR, part 136, apdx B

revised 01/22/97

** analyzed on Jan. 17, 1997

*** analyzed on Jan. 21, 1997

CT&E-Environmental Services Inc.
40 CFR Method Detection Limit Study

Study Date :	01/06/98
Method :	EPA 160.3
Analyte :	Total Solids
Test Matrix :	Water
Instrument Used:	0

MDL Study Statistics

Spike Concentration utilized:	10	mg/L
Total Number of Measurements (N) :	7	
Degrees of Freedom (N-1) :	6	
Student t at the 99% Confidence Interval:	3.143	
(t value table, 40CFR, Part 136 App.B) :		

Result (x)	Analyst	Spike Level	% Rec.	x^2	Rec^2
12	MHS	10.00	120.0	144.0000000	14400
10	MHS	10.00	100.0	100.0000000	10000
10	MHS	10.00	100.0	100.0000000	10000
8	MHS	10.00	80.0	64.0000000	6400
12	MHS	10.00	120.0	144.0000000	14400
8	MHS	10.00	80.0	64.0000000	6400
10	MHS	10.00	100.0	100.0000000	10000

Sum of Results (x):	70	squared =	4900
Sum of % Recovery	700.000	squared =	490000
Sum of x^2	716		
Sum of Rec^2	71600.000		

Standard Deviation (x) =	1.6330
Standard Deviation (Recovery) =	16.3299

Accuracy (Mean % Rec.) =	100.00	%
Precision (%RSD) =	16.33	
99% Confidence Interval =	19.40	

40 CFR MDL is: 5.1325 mg/L

Precision and Accuracy Statement: Using the specified Spike Concentration, the Mean Recovery at the 99% Confidence Interval is:

100.0 % (+/-) 19.40 %

CT&E Environmental Services Inc.
40 CFR Method Detection Limit Study

Study Date :	Jan. 28, 1998
Method :	SW 9060
Analyte :	TOC
Test Matrix :	Water

MDL Study Statistics

Spike Concentration utilized:	2.5	mg/L
Total Number of Measurements (N) :	7	
Degrees of Freedom (N-1) :	6	
Student t at the 99% Confidence Interval: (t value	3.143	

Result (x)	Analyst	Spike Level	% Rec.	x^2	Rec^2
2.567	CBS	2.5	102.7	6.5895	10543
2.68	CBS	2.5	107.2	7.1824	11492
2.679	CBS	2.5	107.2	7.1770	11483
2.716	CBS	2.5	108.6	7.3767	11803
2.649	CBS	2.5	106.0	7.0172	11228
2.66	CBS	2.5	106.4	7.0756	11321
2.651	CBS	2.5	106.0	7.0278	11244

Sum of Results (x):	18.602	squared =	346.034404
Sum of % Recovery	744.08	squared =	553655.0464
Sum of x^2	49.446188		
Sum of Rec^2	79113.9008		

Standard Deviation (x) =	0.0460
Standard Deviation (Recovery) =	1.8404

Accuracy (Mean % Rec.) =	106.30	%
Precision (%RSD) =	1.73	
99% Confidence Interval =	2.19	

40 CFR MDL is: 0.1 mg/L

Precision and Accuracy Statement: Using the specified Spike Concentration, the Mean Recovery at the 99% Confidence Interval is:

106.3 % (+/-) 2.19 %

Precision and Accuracy Statement
Herbicides by SW8151
Sudy Date: 02/27/97

Instrument: GC6 **Analyst:** ATL
Channel: B **Extraction Technician:** DM

Parameters	Spike Level (ug/L)	Number of Replicates	LOD * (ug/L)	LOQ (ug/L)	Accuracy %Recovery	Precision %RSD
Acifluorfen	0.05	7	0.01	0.05	80.0	0.0
Bentazon	0.05	7	0.02	0.05	100.0	20.0
Chloramben	0.05	7	0.01	0.05	20.0	0.0
2,4-D	0.05	6	0.04	0.05	60.0	33.3
Dacthal	0.05	7	0.01	0.05	80.0	0.0
Dalapon	0.05	7	0.03	0.05	100.0	20.0
Dicamba	0.05	7	0.02	0.05	80.0	25.0
3,5-Dichlorobenzoic aci	0.05	7	0.01	0.05	100.0	0.0
Dichloroprop	0.05	7	0.02	0.05	100.0	20.0
Dinoseb	0.05	7	0.01	0.05	80.0	0.0
4-Nitrophenol	0.05	7	0.04	0.05	160.0	12.5
Pentachlorophenol	0.05	7	0.01	0.05	120.0	0.0
Picloram	0.05	7	0.05	0.05	40.0	50.0
2,4,5-T	0.05	7	0.02	0.05	80.0	25.0
2,4,5-TP (Silvex)	0.05	7	0.01	0.05	100.0	0.0

Precision and Accuracy Statement SW6010B
Metals By Trace ICP
50 mL volume
Study Date: 02/23/98

Instrument: TJA61E

Analyst: MDA/JWJ

Parameter	Number of Replicates	Spike Level (mg/L)	LOD * (mg/L)	LOQ (mg/L)	Accuracy % Mean Recovery	Precision (% RSD)
Aluminum	7	0.100	0.048	0.050	119.2	18.13
Antimony	7	0.025	0.004	0.005	118.9	5.8
Arsenic	7	0.010	0.004	0.005	97.5	14.2
Barium	7	0.005	0.001	0.001	106.9	6.3
Beryllium	7	0.005	0.0005	0.001	102.5	3.6
Boron	7	0.200	0.003	0.100	98.7	0.48
Cadmium	7	0.005	0.001	0.001	103.0	3.9
Calcium	7	0.200	0.019	0.050	103.8	3.6
Chromium	7	0.010	0.001	0.005	107.7	5.6
Cobalt	7	0.010	0.002	0.005	100.7	7.6
Copper	7	0.010	0.003	0.005	117.3	12.3
Iron	7	0.200	0.013	0.050	101.1	2.6
Lead	7	0.010	0.005	0.005	105.9	17.2
Magnesium	7	0.100	0.007	0.050	101.9	2.6
Manganese	7	0.050	0.002	0.010	101.5	1.6
Molybdenum	7	0.010	0.004	0.005	105.5	16.6
Nickel	7	0.010	0.002	0.005	113.4	7.8
Potassium	7	0.250	0.042	0.100	93.5	6.3
Selenium	7	0.010	0.003	0.005	87.1	12.7
Silicon	7	0.250	0.006	0.100	79.2	1.1
Silver	7	0.010	0.002	0.005	109.1	6.9
Sodium	7	2.000	0.25	1.000	130.4	4.8
Thallium	7	0.010	0.004	0.005	98.5	14.8
Titanium	7	0.005	0.0003	0.001	93.5	2.37
Vanadium	7	0.050	0.002	0.005	100.0	1.5
Zinc	7	0.050	0.017	0.020	98.7	13.1

* calculated by 40CFR, part 136, apdx B

revised 04/29/98

Precision and Accuracy Statement SW7471A
Mercury by Cold Vapor
Study Date: 01/20/97

Instrument: PS200 **Analyst: JAM**

Parameter	Number of Replicates	Spike Level (mg/Kg)	LOD * (mg/Kg)	PQL (mg/Kg)	Accuracy % Mean Recovery	Precision (% RSD)
Mercury	7	0.08	0.020	0.1	98	5.2

* calculated by 40CFR, part 136, apdx B

revised 05/05/97

Precision and Accuracy Statement SW7470A
Mercury by Cold Vapor
10 mL volume
Study Date: 01/20/97

Instrument: PS200 **Analyst: JAM**

Parameter	Number of Replicates	Spike Level (mg/L)	LOD * (mg/L)	LOQ (mg/L)	Accuracy % Mean Recovery	Precision (% RSD)
Mercury	7	0.0005	0.0001	0.0002	98	5.2

* calculated by 40CFR, part 136, apdx B

revised 03/31/97

Precision and Accuracy Statement
Pesticides/PCB's Method SW8081/8082
for Pesticides
Study Date: 11/07/96

Instrument: GC#8 **Analyst:** TEP
Matrix: Water **Extraction Technician:** CMM
Channel: A

Parameter	Number of Replicates	Spike Level (ug/L)	LOD * (ug/L)	Software cut-off value (ug/L)	LOQ (ug/L)	Accuracy % Mean Recovery	Precision (% RSD)
Alachlor %	7	0.500	0.170	0.100	0.500	102.0	9.8
Aldrin	7	0.050	0.020	0.025	0.050	73.3	13.5
Atrazine %	7	5.000	1.400	1.000	5.000	99.0	8.7
alpha-BHC	7	0.050	0.018	0.025	0.050	96.0	11.8
beta-BHC	7	0.050	0.017	0.025	0.050	108.4	10.2
delta-BHC	7	0.050	0.016	0.025	0.050	103.6	10.1
gamma-BHC(Lindane)	7	0.050	0.017	0.025	0.050	99.5	10.8
alpha-Chlordane	7	0.050	0.021	0.025	0.050	97.8	14.0
gamma-Chlordane	7	0.050	0.021	0.025	0.050	87.1	15.3
Technical Chlordane**	7	0.500	0.060	0.250	0.50	100.0	4.0
4,4'-DDD	7	0.100	0.050	0.050	0.10	101.0	15.6
4,4'-DDE	7	0.100	0.045	0.050	0.10	91.0	15.4
4,4'-DDT	7	0.100	0.058	0.050	0.10	115.0	15.7
Dieldrin	7	0.100	0.045	0.050	0.10	97.6	14.3
Endosulfan I	7	0.050	0.019	0.025	0.050	94.4	13.0
Endosulfan II	7	0.100	0.047	0.050	0.10	100.0	14.9
Endosulfan Sulfate	7	0.100	0.048	0.050	0.10	100.8	14.9
Endrin	7	0.100	0.056	0.050	0.10	115.7	15.5
Endrin Aldehyde	7	0.100	0.051	0.050	0.10	94.9	16.9
Endrin Ketone	7	0.100	0.057	0.050	0.10	106.8	16.9
Heptachlor	7	0.050	0.023	0.025	0.050	102.6	14.5
Heptachlor Epoxide	7	0.050	0.018	0.025	0.050	92.7	12.2
Hexachlorobenzene	7	0.050	0.022	0.025	0.050	89.6	15.6
Hexachloropentadiene #	7	0.005	0.002	0.025	0.050	62.0	18.4
Methoxychlor	7	0.500	0.312	0.250	0.50	130.1	15.2
Simazine %	7	5.000	1.300	1.000	5.000	104.4	8.0
Toxaphene**	7	0.500	0.080	0.250	0.50	98.0	4.1
Aroclor 1016 #	7	0.050	0.008	0.250	0.50	93.1	5.2
Aroclor 1221 #	7	0.050	0.008	0.250	0.50	93.1	5.2
Aroclor 1232 #	7	0.050	0.008	0.250	0.50	93.1	5.2
Aroclor 1242 #	7	0.050	0.008	0.250	0.50	93.1	5.2
Aroclor 1248 #	7	0.050	0.018	0.250	0.50	101.4	11.0
Aroclor 1254 #	7	0.050	0.018	0.250	0.50	101.4	11.0
Aroclor 1260 #	7	0.050	0.018	0.250	0.50	101.4	11.0

* calculated by 40CFR, part 136, apdx B revised 03/03/98

** analyzed on 03/01/97

analyzed on 01/01/96, Aroclors 1221, 1232, 1242, 1248, 1254 based upon common congeners shared with 1016/1260

% analyzed on 8/6/97

Precision and Accuracy Statement
Semi-Volatile Organics Method SW8270C
800 mL initial volume conc. to aprox. 1 mL
Study Date: 1-21-97

Instrument #: MSD#5 **Analyst: RA**

Extraction Technician: DAM

Parameter	Spike Level (ug/L)	Number of Replcates	LOD * (ug/L)	Software cut-off value (ug/L)	LOQ (ug/L)	Accuracy % Mean Recovery	Precision (% RSD)
Acenaphthene	10	7	2.08	2	10	123	5.4
Acenaphthylene	10	7	1.62	2	10	109	4.8
Acetophenone	10	7	1.75	2	10	103	5.4
2-Acetylaminofluorene	10	7	1.53	10	50	40	12.2
4-Aminobiphenyl	10	7	4.16	4	20	147	9.0
Aniline	10	7	3.39	2	10	89	12.1
Anthracene	10	7	0.94	2	10	115	2.6
Aramite	10	7	0.94	2	10	86	22.1
Benzo [a] anthracene	10	7	0.68	2	10	111	2.0
Benzo [b] fluoranthene	10	7	2.11	2	10	91	7.4
Benzo [k] fluoranthene	10	7	2.15	2	10	107	7.4
Benzo [ghi] perylene	10	7	5.16	2	10	131	12.5
Benzo [a] pyrene	10	7	1.56	2	10	98	5.1
Benzyl alcohol	10	7	1.97	2	10	45	14.1
Bis (2-chloroethoxy) methane	10	7	1.26	2	10	88	4.5
Bis (2-chloroethyl) ether	10	7	2.31	2	10	108	6.8
Bis (2-chloroisopropyl) ether	10	7	1.37	2	10	95	4.6
Bis (2-ethylhexyl) phthalate #	5	7	0.74	2	5.0	51	9.5
4-Bromophenyl phenylether	10	7	2.22	2	10	126	5.6
Butylbenzyl phthalate	10	7	0.87	4	20	34	8.3
4-Chloroaniline	10	7	2.80	2	10	63	14.2
Chlorobenzilate	10	7	3.67	10	50	95	12.3
4-Chloro-3-methylphenol	10	7	1.12	4	20	36	10.0
2-Chloronaphthalene	10	7	2.00	2	10	139	4.6
2-Chlorophenol	10	7	0.54	2	10	81	2.1
4-Chlorophenyl phenyl ether	10	7	1.54	2	10	123	4.0
Chrysene	10	7	1.48	2	10	133	3.5
2-Methylphenol	10	7	1.79	2	10	65	8.8
3/4-Methylphenol	20	7	3.33	4	20	60	8.9
cis-Diallate	10	7	2.56	4	20	89	9.1
trans-Diallate	10	7	3.22	4	20	91	11.2
Dibenzo [a,h] anthracene	10	7	3.78	2	20	101	11.9
Dibenzofuran	10	7	2.03	2	10	117	5.5
Di-n-butylphthalate	10	7	0.47	2	10	53	2.8
1,2-Dichlorobenzene	10	7	1.80	2	10	136	4.2
1,3-Dichorobenzene	10	7	2.40	2	10	136	5.6

Precision and Accuracy Statement
Semi-Volatile Organics Method SW8270C
800 mL initial volume conc. to aprox. 1 mL
Study Date: 1-21-97

Instrument #: MSD#5 **Analyst: RA**

Extraction Technician: DAM

Parameter	Spike Level (ug/L)	Number of Replcates	LOD * (ug/L)	Software cut-off value (ug/L)	LOQ (ug/L)	Accuracy % Mean Recovery	Precision (% RSD)
1,4-Dichlorobenzene	10	7	1.96	2	10	140	4.4
3,3-Dichlorobenzidine	10	7	3.16	10	50	69	14.5
2,4-Dichlorophenol	10	7	0.77	4	20	56	4.3
2,6-Dichlorophenol	10	7	1.55	2	10	62	7.9
Diethyl phthalate	10	7	1.63	2	10	85	6.1
Thionazin(O,O-Diethyl-O-2-pyrazinyl)	10	7	1.95	10	50	59	10.6
Dimethoate	10	7	2.00	10	50	46	13.8
p-(Dimethylamino)azobenzene	10	7	1.03	10	50	29	11.4
7,12-Dimethylbenz[a]anthracene	10	7	3.89	4	20	67	18.4
3,3'-Dimethylbenzidine	10	7	1.93	10	50	86	7.2
2,4-Dimethylphenol	10	7	1.16	2	10	68	5.4
Dimethyl phthalate	10	7	1.98	2	10	95	6.6
1,3-Dinitrobenzene	10	7	2.27	10	50	34	20.9
4,6-Dinitro-o-cresol	10	7	2.15	10	50	51	13.2
2,4-Dinitrophenol %	50	7	18.90	10	50	80	15.0
2,4-Dinitrotoluene	10	7	2.14	10	50	46	14.7
2,6-Dinitrotoluene	10	7	1.84	10	50	59	9.8
Dinoseb	10	7	2.74	10	50	57	15.3
Di-n-octyl phthalate	10	7	0.87	4	20	37	7.5
Diphenylamine **	10	7	1.35	2	10	91	4.7
Disulfoton	10	7	1.42	10	50	57	7.9
Ethyl methanesulfonate	10	7	2.13	2	10	94	7.2
Famphur	10	7	1.84	10	50	88	6.6
Fluoranthene	10	7	1.01	2	10	130	2.5
Fluorene	10	7	1.49	2	10	115	4.1
Hexachlorobenzene	10	7	2.60	4	20	176	4.7
Hexachlorobutadiene	10	7	2.38	4	20	156	4.9
Hexachlorocyclopentadiene	10	7	1.92	10	50	119	5.1
Hexachloroethane	10	7	2.62	10	50	135	6.2
Hexachloropropene	10	7	2.20	10	50	119	5.9
Indeno[1,2,3-cd]pyrene	10	7	5.67	4	20	110	16.4
Isodrin	10	7	1.70	4	20	172	3.1
Isophorone	10	7	1.56	2	10	89	5.6
cis-Isosafrole %	50	7	20.50	4	50	130	10.0
trans-Isosafrole	10	7	2.29	2	50	64	11.4
Kepone	10	7	4.14	10	50	108	12.2

Precision and Accuracy Statement
Semi-Volatile Organics Method SW8270C
800 mL initial volume conc. to aprox. 1 mL
Study Date: 1-21-97

Instrument #: MSD#5 **Analyst: RA**

Extraction Technician: DAM

Parameter	Spike Level (ug/L)	Number of Replcates	LOD * (ug/L)	Software cut-off value (ug/L)	LOQ (ug/L)	Accuracy % Mean Recovery	Precision (% RSD)
Methapyrilene HCL	10	7	1.04	10	50	16	20.6
3-Methylcholanthrene	10	7	2.8	4	20	95	9.4
Methylmethanesulfonate	10	7	2.57	2	10	91	9.0
2-Methylnaphthalene	10	7	1.20	2	10	97	3.9
Methyl parathion	10	7	3.97	10	50	101	12.5
Naphthalene	10	7	0.80	2	10	107	2.4
1,4-Naphthoquinone %	50	7	6.33	10	50	28	14.3
1-Naphthylamine	10	7	4.07	4	20	91	14.3
2-Naphthylamine	10	7	2.38	4	20	78	9.7
2-Nitroaniline	10	7	1.23	10	50	30	12.9
3-Nitroaniline	10	7	1.45	4	20	37	12.3
4-Nitroaniline	50	7	8.13	10	50	76	6.8
Nitrobenzene	10	7	3.70	2	10	111	10.6
Nitrophenol	10	7	2.16	4	20	49	14.0
4-Nitrophenol %	50	7	11.30	10	50	50	14.3
N-Nitrosodi-n-butylamine	10	7	3.76	4	20	85	14.1
N-Nitrosodiethylamine	10	7	4.23	2	10	108	12.5
N-Nitrosodimethylamine	10	7	3.69	4	20	113	10.4
N-Nitrosodiphenylamine **	10	7	3.37	2	10	127	8.4
N-Nitrosodi-n-propylamine	10	7	3.65	2	10	115	10.1
N-Nitrosomethylethylamine	10	7	5.85	10	50	92	18.0
N-Nitrosopiperidine	10	7	3.19	2	10	113	8.9
N-Nitrosopyrrolidine	10	7	3.12	10	50	76	13.0
5-Nitro-o-toluidine	10	7	2.18	10	50	51	13.6
Parathion	10	7	3.62	10	50	100	11.5
Pentachlorobenzene	10	7	2.34	2	10	164	4.5
Pentachloroethane	10	7	1.84	2	10	68	8.7
Pentachloronitrobenzene %	50	7	7.60	10	50	107	4.5
Pentachlorophenol	10	7	4.38	10	50	37	37.7
Phenacetin	10	7	1.14	10	50	17	21.3
Phenanthrene	10	7	0.74	2	10	132	1.8
Phenol	10	7	1.25	4	20	45	8.8
para-Phenylenediamine %	50	7	5.47	10	50	45	7.8
Phorate	10	7	0.89	10	50	61	4.6
Pronamide	10	7	2.09	10	50	76	8.9
Pyrene	10	7	1.26	2	10	90	4.5

Precision and Accuracy Statement
Semi-Volatile Organics Method SW8270C
800 mL initial volume conc. to aprox. 1 mL
Study Date: 1-21-97

Instrument #: MSD#5 **Analyst: RA**

Extraction Technician: DAM

Parameter	Spike Level (ug/L)	Number of Replcates	LOD * (ug/L)	Software cut-off value (ug/L)	LOQ (ug/L)	Accuracy % Mean Recovery	Precision (% RSD)
Safrole	10	7	1.43	2	10	90	5.1
Sulfotepp	10	7	1.43	2	10	85	14.0
1,2,4,5-Tetrachlorobenzene	10	7	2.21	2	10	147	4.8
2,3,4,6-Tetrachlorophenol	10	7	1.79	2	10	55	10.4
ortho-Toluidine	10	7	2.72	4	20	125	6.9
1,2,4-Trichlorobenzene	10	7	1.13	2	10	149	2.4
2,4,5-Trichlorophenol	10	7	1.21	2	10	55	7.1
2,4,6-Trichlorophenol	10	7	2.09	2	10	56	11.8
O,O,O-Triethyl phosphorothioate	10	7	1.80	4	20	108	5.3
1,3,5-Trinitrobenzene	10	7	3.96	4	20	101	12.4

* calculated by 40CFR, part 136, apdx B

** N-Nitrosodiphenylamine converts to Diphenylamine

analyzed 2/25/97

% analyzed 2/26/97

revised 03/07/97

Precision and Accuracy Statement
Cyanide by Method SW9010A
Study Date September 18, 1996

Parameter	Analyst	Spike Level (mg/L)	LOD* (mg/L)	PRRL (mg/L)	Accuracy % Recovery	Precision (% RSD)
Cyanide	CF	0.10	0.010	0.01	95.9	3.5

* calculated by 40CFR, part 136, apdx B

revised 11/14/96

Attachment C

BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Laboratory Qualifications for Columbia Analytical Services, Inc.

State of Connecticut, Department of Public Health

Approved Environmental Laboratory

THIS IS TO CERTIFY THAT THE LABORATORY DESCRIBED BELOW HAS BEEN APPROVED BY THE STATE DEPARTMENT OF PUBLIC HEALTH PURSUANT TO APPLICABLE PROVISIONS OF THE PUBLIC HEALTH CODE AND GENERAL STATUTES OF CONNECTICUT, FOR MAKING THE EXAMINATIONS, DETERMINATIONS OR TESTS SPECIFIED BELOW WHICH HAVE BEEN AUTHORIZED IN WRITING BY THAT DEPARTMENT.

COLUMBIA ANALYTICAL SERVICES, INC.

LOCATED AT 1 MUSTARD STREET, SUITE 250 IN ROCHESTER, NEW YORK 14609
AND REGISTERED IN THE NAME OF MICHAEL K. PERRY
THIS CERTIFICATE IS ISSUED IN THE NAME OF MICHAEL K. PERRY WHO HAS BEEN DESIGNATED

BY THE REGISTRANT TO BE IN CHARGE OF THE LABORATORY WORK COVERED BY THIS CERTIFICATE OF APPROVAL AS FOLLOWS:

POTABLE WATER, WASTEWATER AND/OR TRADE WASTE, SEWAGE AND/OR EFFLUENT, SOIL

Examination for:
INORGANIC CHEMICALS
ORGANIC CHEMICALS

SEE COMPUTER PRINT-OUT FOR SPECIFIC TESTS APPROVED

THIS CERTIFICATE EXPIRES JUNE 30, 2000 AND IS REVOCABLE FOR CAUSE BY THE STATE DEPARTMENT OF PUBLIC HEALTH
DATED AT HARTFORD, CONNECTICUT, THIS 21st DAY OF JULY 1998

PH-0556

Thomas K. Sturgeon

DIRECTOR, DIVISION OF ENVIRONMENTAL HEALTH

CONNECTICUT STATE DEPARTMENT OF HEALTH

LABORATORY DIVISION

TUESDAY JULY 21, 1998 2:46 PM

REGISTRATION DATE 07/01

PH0556 COLUMBIA ANALYTICAL SERVICES, INC. 1 MUSTARD ST.SUT 250 ROCHESTER NY 14609
REGISTRANT MICHAEL K. PERRY DIRECTOR MICHAEL K. PERRY
CO-DIRECTOR
MEDICARE NUMBER- INTERSTATE NUMBER-

TEST 200 POTABLE WATER
TEST 201 WASTEWATER AND/OR TRADE WASTE
TEST 202 SEWAGE AND/OR EFFLUENT
TEST 203 SOIL
TEST 230 CHEMISTRY
TEST 231 INORGANIC CHEMICALS
TEST 232 PHYSICAL EXAMS
TEST 233 COLOR
TEST 234 ODOR
TEST 235 TURBIDITY
TEST 236 PH
TEST 237 CONDUCTIVITY
TEST 238 TEMPERATURE
TEST 239 MINERALS
TEST 241 ALKALINITY
TEST 242 HARDNESS
TEST 243 SULFATE
TEST 244 SULFIDE
TEST 246 BROMIDE
TEST 247 CHLORIDE
TEST 248 FLUORIDE
TEST 249 CHLORINE
TEST 250 NUTRIENTS
TEST 251 AMMONIA
TEST 252 KJELDAHL NITROGEN
TEST 253 ORGANIC NITROGEN
TEST 254 NITRATE
TEST 255 NITRITE
TEST 256 ORTHO-PHOSPHATE
TEST 257 TOTAL PHOSPHORUS
TEST 258 MISCELLANEOUS
TEST 259 TOTAL SOLIDS
TEST 260 TOTAL DISSOLVED SOLIDS
TEST 261 TOTAL VOLATILE SOLIDS
TEST 262 TOTAL SUSPENDED SOLIDS
TEST 263 CYANIDE
TEST 264 IGNITABILITY
TEST 265 SURFACTANTS
TEST 266 DEMAND
TEST 267 BOD

TEST 268	COD
TEST 269	TOC
TEST 270	METALS
TEST 271	ALUMINUM
TEST 272	ANTIMONY
TEST 273	ARSENIC
TEST 274	BARIUM
TEST 275	BERYLLIUM
TEST 276	BORON
TEST 277	CADMIUM
TEST 278	CHROMIUM TOTAL
TEST 279	CHROMIUM VI
TEST 280	COBALT
TEST 281	COPPER
TEST 282	IRON
TEST 283	LEAD
TEST 285	MAGNESIUM
TEST 286	MANGANESE
TEST 287	MERCURY
TEST 288	MOLYBEDNUM
TEST 289	NICKEL
TEST 290	POTASSIUM
TEST 291	SELENIUM
TEST 292	SILVER
TEST 293	SODIUM
TEST 294	THALLIUM
TEST 295	TIN
TEST 296	TITANIUM
TEST 297	VANADIUM
TEST 298	ZINC
TEST 311	ORGANIC CHEMICALS
TEST 312	PURGEABLE HALOCARBONS
TEST 313	PURGEABLE AROMATICS
TEST 314	PESTICIDES
TEST 315	HERBICIDES
TEST 316	PCB
TEST 317	PCB IN OIL
TEST 318	ETHYLENE DIBROMIDE
TEST 319	ACROLEIN AND ACRYLONITRILE
TEST 320	PHENOLS
TEST 321	BENZIDINES
TEST 322	PHTHALATE ESTERS
TEST 323	NITROSAMINES
TEST 324	NITROAROMATICS AND ISOPHORONE
TEST 325	POLYNUCLEAR AROMATIC HYDROCARBONS
TEST 326	HALOETHERS
TEST 327	CHLORINATED HYDROCARBONS
TEST 329	BASE/NEUTRALS AND ACIDS
TEST 331	OIL AND GREASE
TEST 332	GROSS HYDROCARBONS

The American Industrial Hygiene Association

is proud to acknowledge that

Columbia Analytical Services, Inc.

Rochester, NY
Laboratory ID# 7889

has fulfilled the requirements for Industrial Hygiene Laboratory Accreditation and has earned distinguished recognition as an

AIHA IH Accredited Laboratory

Originally Accredited July 1, 1997, current certificate effective July 1, 1997 until July 1, 2000, subject to continued compliance with AIHA accreditation criteria.

D. Jeff Burton, CIH, PE, CSP
President, American Industrial Hygiene Association

July 3, 1997
Preparation Date

Mark A. Puskar, Ph.D.
Chair, Analytical Accreditation Board

566
Certificate Number

William M. Walsh, CIH
Chair, IH Laboratory Accreditation Committee

The Commonwealth of Massachusetts

Department of Environmental Protection

Division of Environmental Analysis
Senator William X. Wall Experiment Station

certifies

M- NY032 Columbia Analytical Services
1 Mustard Street, Suite 250
Rochester, NY 14609

Laboratory Director: **Michael K. Perry**

for the ***Chemical Analysis of Potable and Non-Potable Water***

pursuant to 310 CMR 42.00

This certificate supersedes all previous Massachusetts certificates issued to this laboratory. The laboratory is regulated by and shall be responsible for being in compliance with Massachusetts regulations at 310 CMR 42.00.

This certificate is valid only when accompanied by the latest dated Certified Parameter List as issued by the Massachusetts D.E.P.

Certification is no guarantee of the validity of the data. This certification is subject to unannounced laboratory inspections.

Director, Division of Environmental Analysis

Issued: **07/01/98**

Expires: **06/30/99**

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Certified Parameter List

EFFECTIVE DATE: 07/01/98

EXPIRATION DATE: 06/30/99

M-NY032 Columbia Analytical Services
Rochester, NY

POTABLE WATER

* 101 Antimony
102 Arsenic
103 Barium
104 Beryllium
105 Cadmium
106 Chromium
107 Copper
* 108 Lead
109 Mercury
110 Nickel
* 111 Selenium

* **Provisional Certification**

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Certified Parameter List

EFFECTIVE DATE: 07/01/98

EXPIRATION DATE: 06/30/99

M-NY032 Columbia Analytical Services
Rochester, NY

NON-POTABLE WATER

201 Aluminum
202 Antimony
203 Arsenic
204 Beryllium
205 Cadmium
206 Chromium
207 Cobalt
208 Copper
209 Iron
210 Lead
211 Manganese
212 Mercury
213 Molybdenum
214 Nickel
215 Selenium
216 Silver
218 Thallium
220 Vanadium
221 Zinc
241 Total Organic Carbon
242 Total Cyanide
247 Volatile Halocarbons
248 Volatile Aromatics
249 Chlordane
250 Aldrin
251 Dieldrin
252 DDD
253 DDE
254 DDT
255 Heptachlor
256 Heptachlor Epoxide
257 Polychlorinated Biphenyls (water)
258 Polychlorinated Biphenyls (oil)

The State of New Hampshire
Department of Environmental Services

CERTIFICATE OF APPROVAL
Wastewater Analysis

Issued to
Columbia Analytical Services

Located at

1 Mustard Street, Rochester, NY

Under the provisions of the Regulations in Env-C300 for the following analyses:

FULL CERTIFICATION: Metals by Flame AA, Metals by Graphite Furnace, Metals by ICP, Mercury, pH, Specific Conductivity, Calcium, Magnesium, Sodium, Potassium, Total Alkalinity, Chloride, Sulfate, Ammonia, Nitrate-N, Orthophosphate, TKN, Total Phosphorus, COD, TOC, BOD, Total Cyanide, Non-Filterable Residue, Oil & Grease, Total Phenolics, Total Residual Chlorine, PCBs in Water, PCBs in Oil, Pesticides, Volatile Organics.

PROVISIONAL CERTIFICATION:Total Hardness.

CERTIFICATE NUMBER: 294297-A

DATE OF ISSUE: October 15, 1997

Charles H. Dyer
Certifying Officer

EXPIRATION DATE: October 14, 1998

STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Certifies That

Columbia Analytical Services, Inc.
710 Exchange Street
Rochester, New York 14608

having duly met the requirements of the

Regulations Governing Laboratory Certification
And Standards Of Performance N.J.A.C. 7:18 et. seq.

is hereby approved as a

State Certified Environmental Laboratory

To perform the analyses as indicated on the Annual Certified Parameter List
which must accompany this certificate to be valid

73004
PERMANENT CERTIFICATION NUMBER

May 21, 1996
DATE

COMMISSIONER
DEPARTMENT OF ENVIRONMENTAL PROTECTION

This certification is subject to unannounced laboratory inspections as specified by N.J.A.C. 7:18-2.11(d) and agreed to by the Laboratory Manager on filing the application

TO BE CONSPICUOUSLY DISPLAYED AT THE LABORATORY WITH THE ANNUAL CERTIFIED PARAMETER LIST.

State of New Jersey
Department of Environmental Protection
Office of Quality Assurance
9 Ewing Street, P.O. Box 424
Trenton, New Jersey 08625
Tel. (609) 633-3840
Fax. (609) 777-1774

Christine Todd Whitman
Governor

Robert C. Shinn, Jr.
Commissioner

COLUMBIA ANALYTICAL SERV., INC
700 EXCHANGE ST.
ROCHESTER, NY 14608
Lab ID # 73004
Attn: MICHAEL K. PERRY

July 21, 1997

Dear Laboratory Manager:

The Office of Quality Assurance (OQA) will not be issuing a Certificate or an Annual Certified Parameter List at this time. New Certificates will be issued as soon as they become available. Annual Certified Parameter Lists will be generated and forwarded once our Environmental Laboratory Certification Program completes the development of its computerized data base.

Effective with the receipt of this letter your laboratory's certification status is temporarily extended until December 31, 1997 or until new Certificates and Annual Certified Parameter Lists become available, whichever is earlier. To determine your laboratory's current certification status please use the temporary Annual Certified Parameter List issued August 1, 1996, and all written notices of certifications and suspensions received by your laboratory since that time.

Additionally, laboratories that have submitted an administratively complete application to the OQA by July 1, 1997 for certification in categories SHW1 through SHW12 and CLP1 through CLP7, are given temporary approval. Part III of your Fiscal/Certification Year 1997 Renewal Application should be used to determine your approval status. For those laboratories submitting a completed Fiscal/Certification Year 1998 Renewal Application, Part III of that application should be used in place of the 1997 Renewal Application.

As always, we are available to discuss any comments or questions. Please do not hesitate to contact me or one of the laboratory certification officers.

Sincerely,

Joseph F. Aiello, Chief

STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION
OFFICE OF QUALITY ASSURANCE
ANNUAL CERTIFIED PARAMETER LIST FOR 1995-1996

COLUMBIA ANALYTICAL SERVICES (73004) IS CERTIFIED TO PERFORM THE ANALYSES BELOW UNTIL JUNE 30 1996.

DRINKING WATER LABORATORY CERTIFICATION

LIMITED CHEMISTRY

001 ALKALINITY, TITRIMETRIC

004 CONDUCTIVITY

006 ORTHOPHOSPHATE, AUTO COLO

007 SILICA

008 TEMPERATURE

020 NITRITE, AUTO CD REDUCTIO

034 CYANIDE, SPECTROPHOTO

934 NITRATE, AUTO CD REDUC

944 TURBIDITY

947 CHLORIDE, HG OR AG NITRAT

951 PH, GLASS ELECTRODE

952 TOT DISS SOLIDS, TOT RES

956 SULFATE, GRAVIM OR TURBID

METALS

010 CALCIUM, ICAP

013 PB, AA/PLATFORM FURNACE

DRINKING WATER LABORATORY CERTIFICATION

METALS

017 ALUMINUM, ICAP

025 ANTIMONY, GRAPH FURNACE

030 NICKEL, ICAP

031 THALLIUM, GRAPH FURNACE

036 BERYLLIUM, ICAP

912 HG,MANUAL COLD VAPOR

914 AS, GRAPHITE FURNACE

916 CD, GRAPHITE FURNACE

917 CR, GRAPHITE FURNACE

918 PB, GRAPHITE FURNACE

920 SE, GRAPHITE FURNACE

921 AG, GRAPHITE FURNACE

922 CU, GRAPHITE FURNACE

923 FE, GRAPHITE FURNACE

924 MN, GRAPHITE FURNACE

925 ZN, GRAPHITE FURNACE

960 ARSENIC, ICAP

961 BARIUM, ICAP

962 CADMIUM, ICAP

963 CHROMIUM, ICAP

965 SILVER, ICAP

966 COPPER, ICAP

DRINKING WATER LABORATORY CERTIFICATION

METALS

967 IRON, ICAP

968 MANGANESE, ICAP

969 ZINC, ICAP

ORGANICS

504 EDP & DBCP (GC)

501.1 TOTAL TRIHALOMETHANES

502.1 VHOC (PT/GC)

524.2 VOC (PT/GC-MS)

525.1 PESTICIDES/PAH (GC/MS)

WATER POLLUTION LABORATORY CERTIFICATION

LIMITED CHEMISTRY

00010 TEMPERATURE

00076 TURBIDITY

00080 COLOR

00095 SPECIFIC CONDUCTANCE

00299 DISS OXYGEN-ELECTRODE

00300 DISS OXYGEN-WINKLER

00310 BOD(5/20 DAY)

00320 CARBONACEOUS BOD(5/20DAY)

00340 COD

00400 HYDROGEN ION-PH

Christine Todd Whitman
Governor

State of New Jersey
Department of Environmental Protection

Robert C. Shinn, Jr.
Commissioner

June 27, 1996

Columbia Analytical Services, Inc.
710 Exchange Street
Rochester, N.Y. 14608

Lab Manager: Michael K. Perry

Lab ID# 73004

Dear Mr. Perry:

Enclosed is your permanent Laboratory Certificate, along with your 1995-96 Annual Certified Parameter list. Both documents must be conspicuously displayed at the laboratory at all times.

Your cooperation in this matter is appreciated.

Sincerely,

Dottie Correnti

Dottie Correnti
Administrative Analyst I
Bureau of Revenue

DCP:ch-209
Enclosures(2)
cc: Jerry Bundy

NYAAEL CERTIFICATE OF MEMBERSHIP

Columbia Analytical Services

is hereby recognized a member of NYAAEL for the year 1997-98

OUR MISSION:

The New York Association of Approved Environmental Laboratories (NYAAEL) is a non-profit organization of NYS DOH approved laboratories and related industry representatives which takes a leadership role in promoting the advancement of environmental laboratories through:

- Providing educational opportunities, professional development, and dissemination of information to our members;
- Providing a forum for communication among environmental laboratories, regulatory agencies, professional organizations, and related businesses;
- Encouraging quality performance and ethical practices of its members;
- Championing the interests of the environmental laboratory community.

CHAIR

EXECUTIVE DIRECTOR

NEW YORK STATE DEPARTMENT OF HEALTH

BARBARA A. DEBUONO, M.D., M.P.H. Commissioner

Expires 12:01 AM April 1, 1999
ISSUED April 1, 1998
REVISED June 29, 1998

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

Lab ID No.: 10145

Director: MR. MICHAEL PERRY
Lab Name: COLUMBIA ANALYTICAL SERVICES
Address : 1 MUSTARD ST - STE 250
ROCHESTER NY 14609-0859

is hereby APPROVED as an Environmental Laboratory for the category

ENVIRONMENTAL ANALYSES NON POTABLE WATER

All approved subcategories and/or analytes are listed below:

lor. Hydrocarbon Pesticides :
4,4'-DDD
4,4'-DDE
4,4'-DDT
alpha-BHC
A[illegible]
[illegible]C
Chlordane Total
delta-BHC
Dichloran
Dieldrin
Endrin aldehyde
Endrin
Endosulfan I
Endosulfan II
Endosulfan sulfate
Heptachlor
Heptachlor epoxide
Lindane
Mirex
Methoxychlor
PCNB
Strobane
Toxaphene

Wastewater Miscellaneous :
Boron, Total
Cyanide, Total
Color
Phenols
Oil & Grease Total Recoverable
Hydrogen Ion (pH)
Specific Conductance
Silica, Dissolved
Sulfide (as S)
Surfactant (MBAS)
Temperature
Organic Carbon, Total
TCLP Additional Compounds (ALL)

Wastewater Metals III :
Cobalt, Total
Molybdenum, Total
Tin, Total
Titanium, Total
Thallium, Total
Wastewater Metals I (ALL)
Mineral (ALL)
Nitrosoamines (ALL)
Organophosphate Pesticides (ALL)
Polychlorinated Biphenyls (ALL)
Priority Pollutant Phenols (ALL)
Purgeable Halocarbons (ALL)

Acrolein and Acrylonitrile (ALL)
Benzidines (ALL)
Chlorophenoxy Acid Pesticides (ALL)
Chlorinated Hydrocarbons (ALL)
Demand (ALL)
Haloethers (ALL)
Wastewater Metals II (ALL)
Nitroaromatics and Isophorone (ALL)
Nutrient (ALL)
Polynuclear Aromatics (ALL)
Phthalate Esters (ALL)
Purgeable Aromatics (ALL)
Residue (ALL)

Serial No.: 102920

Wadsworth Center

Property of the New York State Department of Health. Valid only at the address shown.
Must be conspicuously posted. Valid certificate has a red serial number.

DOH-3317 (3/97)

NEW YORK STATE DEPARTMENT OF HEALTH

BARBARA A. DEBUONO, M.D., M.P.H. Commissioner

Expires 12:01 AM April 1, 1999
ISSUED April 1, 1998
REVISED June 29, 1998

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

Lab ID No.: 10145

Director: MR. MICHAEL PERRY
Lab Name: COLUMBIA ANALYTICAL SERVICES
Address : 1 MUSTARD ST - STE 250
ROCHESTER NY 14609-0859

is hereby APPROVED as an Environmental Laboratory for the category

ENVIRONMENTAL ANALYSES/ POTABLE WATER

All approved subcategories and/or analytes are listed below:

Drinking Water Non-Metals :
- Alkalinity
- Calcium Hardness
- Chloride
- Cyanide
- Color
- Conductivity
- Fluoride, Total
- Nitrite (as N)
- Nitrate (as N)
- Hydrogen Ion (pH)
- Solids, Total Dissolved
- Sulfate (as SO4)

Drinking Water Bacteriology :
- Coliform, Total

Drinking Water Metals II (ALL)
Volatile Halocarbons (ALL)

D.W. Miscellaneous :
- Benzo(a)pyrene

Microextractables (ALL)

Drinking Water Trihalomethane (ALL)
Drinking Water Metals I (ALL)
Volatile Aromatics (ALL)

Serial No.: 102921

Wadsworth Center

Property of the New York State Department of Health. Valid only at the address shown.
Must be conspicuously posted. Valid certificate has a red serial number.

DOH-3317 (3/97)

NEW YORK STATE DEPARTMENT OF HEALTH

BARBARA A. DEBUONO, M.D., M.P.H. Commissioner

Expires 12:01 AM April 1, 1999
ISSUED April 1, 1998
REVISED June 29, 1998

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

Lab ID No.: 10145

Director: MR. MICHAEL PERRY
Lab Name: COLUMBIA ANALYTICAL SERVICES
Address : 1 MUSTARD ST - STE 250
ROCHESTER NY 14609-0859

is hereby APPROVED as an Environmental Laboratory for the category

ENVIRONMENTAL ANALYSES/AIR AND EMISSIONS

All approved subcategories and/or analytes are listed below:

lorophenoxy Acid Pesticides (ALL)
tals II (ALL)
iority Pollutant Phenols (ALL)
Chlor. Hydrocarbon Pesticides (ALL)
Mineral (ALL)
Purgeable Aromatics (ALL)
Chlorinated Hydrocarbons (ALL)
Polynuclear Aromatics (ALL)
Purgeable Halocarbons (ALL)
Metals I (ALL)
Polychlorinated Biphenyls (ALL)

Serial No.: 102922

Wadsworth Center

Property of the New York State Department of Health. Valid only at the address shown. Must be conspicuously posted. Valid certificate has a red serial number.

DOH-3317 (3/97)

NEW YORK STATE DEPARTMENT OF HEALTH

BARBARA A. DEBUONO, M.D., M.P.H. Commissioner

Expires 12:01 AM April 1, 1999
ISSUED April 1, 1998
REVISED June 29, 1998

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

Lab ID No.: 10145

Director: MR. MICHAEL PERRY
Lab Name: COLUMBIA ANALYTICAL SERVICES
Address : 1 MUSTARD ST - STE 250
ROCHESTER NY 14609-0859

is hereby APPROVED as an Environmental Laboratory for the category

ENVIRONMENTAL ANALYSES/SOLID AND HAZARDOUS WASTE

All approved subcategories and/or analytes are listed below:

racteristic Testing :
Corrosivity
Ignitability
Reactivity
TCLP
E.P. Toxicity
ge alocarbons (ALL)

Miscellaneous :
Cyanide, Total
Hydrogen Ion (pH)
Sulfide (as S)
Organophosphate Pesticides (ALL)
Phthalate Esters (ALL)

Acrolein and Acrylonitrile (ALL)
Chlor. Hydrocarbon Pesticides (ALL)
Haloethers (ALL)
Metals II (ALL)
Polynuclear Arom. Hydrocarbon (ALL)
Priority Pollutant Phenols (ALL)

Chlorophenoxy Acid Pesticides (ALL)
Chlorinated Hydrocarbons (ALL)
Metals I (ALL)
Nitroaromatics Isophorone (ALL)
Polychlorinated Biphenyls (ALL)
Purgeable Aromatics (ALL)

Serial No.: 102923

Wadsworth Center

Property of the New York State Department of Health. Valid only at the address shown.
Must be conspicuously posted. Valid certificate has a red serial number.

DOH-3317 (3/97)

NEW YORK STATE DEPARTMENT OF HEALTH

BARBARA A. DEBUONO, M.D., M.P.H. Commissioner

Expires 12:01 AM April 1, 1999
ISSUED April 1, 1998
REVISED June 29, 1998

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

Lab ID No.: 10145

Director: MR. MICHAEL PERRY
Lab Name: COLUMBIA ANALYTICAL SERVICES
Address : 1 MUSTARD ST - STE 250
ROCHESTER NY 14609-0859

is hereby APPROVED as an Environmental Laboratory for the category

CONTRACT LABORATORY PROTOCOL (CLP)

All approved subcategories and/or analytes are listed below:

Inorganics | CLP PCB/Pesticides | CLP Semi-Volatile Organics | CLP Volatile Organics

Serial No.: 102924

Wadsworth Center

Property of the New York State Department of Health. Valid only at the address shown. Must be conspicuously posted. Valid certificate has a red serial number.

DOH-3317 (3/97)

NORTH DAKOTA STATE DEPARTMENT OF HEALTH
AND CONSOLIDATED LABORATORIES

RECIPROCAL CERTIFICATION

Columbia Analytical Services, Inc. - Rochester, New York

meets acceptable standards for the performance of the following procedures:

All potable water, non potable water, and solid and hazardous waste chemistry subcategories and/or analytes for which they retain approval from the New York State Department of Health

Myra Kossack

Director, Division of Chemistry

Certification Officer

This certificate remains the property of the North Dakota State Department of Health and Consolidated Laboratories, and may be removed for cause, at any time by the department.

Certificate Number: R-162

Expiration Date: March 31, 1999

Date of Issue: July 24, 1998

OhioEPA

Ohio Environmental Protection Agency
Division of Emergency and Remedial Response
Voluntary Action Program

Under the authority of Ohio Revised Code Section 3746.04(B)(6) and Ohio Administrative Code Rule 3745-300-04

Certifies

COLUMBIA ANALYTICAL SERVICES, INC.

1 MUSTARD STREET, SUITE 250
ROCHESTER, NY 14609-0859

as a

Certified Laboratory

(Number CL0035)

for the following analytes, parameter groups, and methods:

Antimony/6010A	Cyanide/9010A	Thallium/6010A	Semi-Volatile Organic Compounds/8270B
Arsenic/6010A	Lead/6010A	Zinc/6010A	Organochlorine Pesticides/8081A
Beryllium/6010A	Mercury/7470A,7471A	Barium/6010A	Polychlorinated Biphenyls/8081A
Cadmium/6010A	Nickel/6010A	Cobalt/6010A	Aromatic and Halogenated Volatiles/8021B
Chromium,Total/6010A	Selenium/6010A	Iron/6010A	Total Petroleum Hydrocarbons/Diesel Range Organics,418.1, Modified 8015A
Copper/6010A	Silver/6010A	Manganese/6010A	Total Petroleum Hydrocarbons/Gasoline Range Organics, Modified 8015A
Aluminum/6010A		Vanadium/6010A	Volatile Organic Compounds/8260A

OHIO E.P.A.
MAY 28 98
ENTERED DIRECTOR'S JOURNAL

MAY 28 1998
Date of Certification

OCT 14 1999
Date of Expiration

Donald R. Schregardus
Director, Ohio Environmental Protection Agency

Manager, Voluntary Action Program

SCOPE, LIMITATION, OBLIGATIONS AND RESPONSIBILITIES OF CERTIFICATION ON REVERSE SIDE

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS

D E P A R T M E N T O F H E A L T H

Safe and Healthy Lives in Safe and Healthy Communities

24 June 1998

Mr. Michael Perry
Columbia Analytical Services Inc.
1 Mustard St., Suite 250
Rochester, NY 14609

RE: **License Number 158**

Dear Mr. Perry:

This is to acknowledge acceptance of the Analytical Laboratory License Renewal Application for the period of July 1, 1998 until June 30, 2000.

In accordance with the provisions of Chapter 23-16.2-A/LAB of the Rhode Island General Laws 1956, as amended, the Rhode Island Department of Health hereby issues this license renewal for the period as specified above, authorizing the operation and maintenance of this facility known as **Columbia Analytical Services Inc.**

This license covers the premise located at:

1 Mustard St., Suite 250
Rochester, New York 14609

Sincerely,

Wayne I. Farrington
Chief
Division of Facilities Regulation
(401) 222-2566

lg
Enclosure
wp.ltr/anl.lic.renew

State of Rhode Island and Providence Plantations

DEPARTMENT OF HEALTH

Audit № 232

License No. 158

This is to certify that COLUMBIA ANALYTICAL SERVICES, Inc.
710 Exchange Street
Rochester, New York 14608
is licensed to operate a

Analytical Laboratory

Columbia Analytical Services, Inc.

in conformity with Chapter 39 of Title 23 of the General Laws of Rhode Island, as amended.

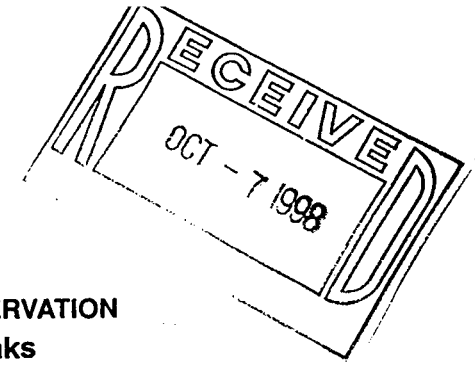
It has demonstrated its proficiency in the performance of the following One categories of laboratory tests:

Chemistry
- Surface Water
- Wastewater
- Sewage

Patricia A. Nolan, MD, MPH

Director of Health

ISSUED 31 May 1996



STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
Division of Underground Storage Tanks
4th Floor L&C Tower, 401 Church Street
Nashville, TN 37243-1541

October 1, 1998

Ms. Lisa Reyes
Columbia Analytical Services
1 Mustard Street, Suite 250
PO Box 90859
Rochester, NY. 14609-0859

RE: **UST LABORATORY APPROVAL**
Columbia Analytical Services
Rochester, NY Laboratory

Dear Ms. Reyes:

The Tennessee Division of Underground Storage Tanks (the "Division") has received your updated New York Laboratory Certification (July 24, 1998 letter). Your **Rochester, NY** laboratory will remain on our list of Tennessee UST Approved Laboratories for BTX and TPH analyses.

You must submit proper documentation of your laboratory's ability to perform BTX and TPH analyses at least thirty (30) days before your current approval expires. Failure to maintain laboratory approval will result in the REJECTION of sample analyses from your laboratory by the Division. Your laboratory's approval for BTX analysis expires on July 1, 1999 and your laboratory's approval for TPH analysis expires on July 1, 1999.

If you have any questions or comments please call me at (615) 532-0945.

Sincerely,

Michael Langreck/dsp

Michael F. Langreck
EPS 7
TN Division of Underground Storage Tanks

MFL/sjp

CC: All UST Field Offices

Attachment I

WEST VIRGINIA DIVISION OF ENVIRONMENTAL PROTECTION
OFFICE OF WATER RESOURCES

ANNUAL CERTIFIED PARAMETER LIST

for

COLUMBIA ANALYTICAL SERVICES
Rochester, New York

PARAMETERS CERTIFIED

LIMITED CHEMISTRY: Cyanide(Total)[EPA 335.3/SW-9010], Oil & Grease[EPA 413.1], pH(lab analyte only)[EPA 150.1]***

Demand: Total Organic Carbon(TOC)[EPA 415.1]***

METALS(CVAA/FAA/GFAA/ICP): Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Calcium, Chromium, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Nickel, Potassium, Selenium, Silver, Sodium, Thallium, Vanadium, Zinc***

and GC/MS: Organochlorine Pesticides and PCB's[8080A\8081], Volatile Organic Compounds[8260A], Semivolatile Organic Compounds[8270B], Total Petroleum Hydrocarbons[8015B]***

MISCELLANEOUS: Total Petroleum Hydrocarbons[EPA 418.1]***

This laboratory may test ONLY for those environmental parameters listed above for compliance reporting purposes. All testing must be by the test method cited in the current application for certification.

This Certification Expires: **January 31, 1999** Certificate No. 292

Daniel T. Arnold 11/15/97
Daniel T. Arnold
Quality Assurance Officer

1/21/97

MS#1																
			MDL 8260 WATER OCTOBER 1997													
		AMT	ZD642	ZD643	ZD644	ZD645	ZD646	ZD647	ZD648	ZD649	ZD650	ZD651	AVG	%REC	STDEVP	MDL
SURR4,DIBROMOFLUOROMET		50.00	47.69	45.20	45.48	49.73	52.94	50.89	47.56	52.92	47.24	53.75	49.34	98.68	3.00	8.47
SURR3,TOLUENE-D8		50.00	50.21	51.74	52.63	51.74	51.56	51.70	50.30	51.74	51.88	51.68	51.52	103.04	0.69	1.95
SURR2,BFB		50.00	52.51	53.74	54.15	52.80	51.81	53.32	52.40	51.65	57.13	54.29	53.38	106.76	1.52	4.29
			TRIAL1	TRIAL2	TRIAL3	TRIAL4	TRIAL5	TRIAL6	TRIAL7	TRIAL8	TRIAL9	TRIAL10				
Dichlorodifluoromethane		10.00	11.90	11.64	11.55	11.30	10.41	10.91	10.69	10.26	10.62	9.71	10.90	108.99	0.66	1.85
Chloromethane		10.00	13.61	14.39	14.14	13.66	13.00	13.57	12.86	12.65	12.68	12.62	13.32	133.18	0.61	1.73
Vinyl Chloride		10.00	14.76	13.97	13.70	13.85	12.87	12.84	13.05	12.30	12.99	12.34	13.25	132.47	0.76	2.13
Bromomethane		10.00	14.12	13.61	14.27	14.83	13.97	12.97	11.99	10.70	10.95	11.34	12.88	128.75	1.44	4.05
Chloroethane		10.00	13.26	13.25	13.10	12.75	12.25	12.61	12.27	12.36	12.64	12.15	12.67	126.66	0.40	1.13
Trichlorofluoromethane		10.00	11.24	10.93	11.01	11.07	10.40	10.55	10.25	10.34	9.98	10.04	10.58	105.81	0.43	1.21
Acetone		20.00	22.00	24.55	23.38	23.17	17.68	24.06	24.52	15.31	23.92	26.68	22.53	112.64	3.26	9.21
1,1-Dichloroethene		10.00	10.35	9.92	10.10	10.89	10.72	10.37	10.05	10.63	9.88	10.25	10.32	103.16	0.33	0.92
tert-Butyl Alcohol		200.00	155.38	183.02	186.87	203.78	170.54	216.12	206.51	193.90	203.18	218.11	193.74	96.87	19.03	53.65
Iodomethane		10.00	6.77	6.81	7.82	8.75	9.65	6.56	5.87	5.03	4.61	5.71	6.76	67.58	1.52	4.28
Methylene Chloride		10.00	11.53	11.42	11.30	11.51	12.00	12.03	12.03	12.16	12.32	12.48	11.88	118.78	0.39	1.09
Carbon Disulfide		20.00	17.28	16.50	16.48	17.48	17.64	16.92	16.54	17.20	15.75	16.94	16.87	84.37	0.54	1.52
Methyl-t-Butyl Ether		10.00	10.04	9.58	9.31	10.20	10.13	10.76	10.66	11.07	10.36	12.01	10.41	104.12	0.73	2.06
trans-1,2-Dichloroethene		10.00	10.18	9.53	9.37	10.32	10.89	10.00	9.68	10.91	9.01	10.87	10.08	100.76	0.64	1.82
1,1-Dichloroethane		10.00	11.63	10.91	10.19	11.11	11.89	11.91	10.61	12.11	10.01	12.53	11.29	112.90	0.81	2.28
2,2-Dichloropropane		10.00	8.87	8.15	7.72	8.57	8.66	8.34	7.93	8.36	7.59	8.19	8.24	82.38	0.39	1.09
2-Butanone		20.00	17.49	16.72	16.77		16.16	14.65	10.45			10.17	14.92	74.58	3.13	9.83
cis-1,2-Dichloroethene		10.00	10.75	10.11	9.94	11.18	11.65	10.79	10.64	11.79	10.24	12.12	10.92	109.21	0.71	1.99
Chloroform		10.00	10.86	10.38	10.24	11.20	11.80	11.39	11.15	12.13	10.76	12.63	11.25	112.54	0.72	2.03
Bromochloromethane		10.00	10.36	10.28	9.86	10.63	10.56	11.05	10.97	11.48	11.29	11.86	10.83	108.34	0.58	1.63
Vinyl Acetate		20.00	18.16	17.53	11.20	17.80	6.21	5.80	0.00	2.21	1.01	1.17	8.11	40.55	7.08	19.97
1,1,1-Trichloroethane		10.00	9.94	9.27	9.43	10.03	9.95	10.13	9.62	10.20	9.55	10.29	9.84	98.41	0.33	0.94
1,1-Dichloropropene		10.00	10.83	10.98	10.79	11.08	10.98	11.44	10.80	10.82	10.67	10.83	10.92	109.22	0.21	0.58
Carbontetrachloride		10.00	9.50	8.87	9.05	9.46	9.49	9.38	9.26	9.59	8.83	9.18	9.26	92.61	0.26	0.73
Benzene		10.00	11.82	11.88	12.05	11.87	11.81	12.16	12.03	12.19	12.24	12.15	12.02	120.20	0.16	0.44
1,2-Dichloroethane		10.00	11.02	10.65	10.55	11.36	11.78	11.91	11.58	12.42	11.49	13.07	11.58	115.83	0.73	2.07
Trichloroethene		10.00	10.80	10.87	10.98	11.12	11.03	11.31	11.69	11.04	10.98	11.19	11.10	111.01	0.24	0.68
1,2-Dichloropropane		10.00	11.99	11.68	12.13	12.60	12.32	12.68	12.72	13.29	12.86	12.89	12.52	125.16	0.46	1.29
Bromodichloromethane		10.00	10.07	9.87	9.80	10.58	10.74	10.60	10.53	11.12	10.29	11.29	10.49	104.89	0.47	1.32
Dibromomethane		10.00	10.53	10.27	10.51	10.90	10.91	11.58	11.24	12.05	10.84	12.67	11.15	111.50	0.71	2.01
2-Chloroethylvinyl Ether		10.00	8.16	8.74				10.00	16.04	14.65	12.49	10.98	11.58	115.80	2.75	8.62
4-methyl-2-Pentanone		20.00	19.28	21.36	20.23	20.98	15.75	16.88	15.52				18.57	92.86	2.30	7.22
trans-1,3-Dichloropropene		10.00	8.87	9.05	8.74	8.89	8.22	8.90	8.58	8.35	9.15	9.34	8.81	88.09	0.33	0.93
Toluene		10.00	11.33	11.79	11.84	11.54	11.29	11.45	11.34	11.52	11.50	11.49	11.51	115.09	0.17	0.49
cis-1,3-Dichloropropene		10.00	10.00	9.55	9.59	10.01	9.94	9.68	9.50	9.97	9.92	10.21	9.84	98.37	0.23	0.64
1,1,2-Trichloroethane		10.00	11.09	11.55	11.79	10.98	11.06	12.61	12.07	12.19	12.59	12.67	11.86	118.60	0.63	1.79
1,2-Dibromoethane		10.00	10.10	10.52	10.44	10.19	9.51	11.39	11.15	10.60	11.72	11.72	10.73	107.34	0.70	1.97
2-Hexanone		20.00	19.87	22.17	21.38	20.86	15.71	15.30	14.05				18.48	92.39	3.09	9.72
1,3-Dichloropropane		10.00	10.46	10.28	10.46	10.35	10.12	11.19	11.29	11.06	11.19	11.44	10.78	107.84	0.47	1.32
Tetrachloroethene		10.00	9.01	8.83	8.84	8.71	8.72	8.69	8.81	8.73	8.06	8.23	8.66	86.63	0.28	0.78
Dibromrchloromethane		10.00	8.54	7.96	8.11	8.27	8.23	8.71	8.72	8.50	8.40	9.05	8.45	84.49	0.31	0.87

Chlorobenzene		10.00	10.27	10.44	10.30	10.17	10.24	10.23	10.34	10.35	10.42	10.39	10.32	103.15	0.08	0.24
1,1,1,2-Tetrachloroethane		10.00	8.96	8.74	8.71	8.85	9.10	8.87	8.79	9.14	8.55	9.10	8.88	88.81	0.18	0.52
Ethylbenzene		10.00	10.11	10.28	10.06	10.11	9.38	10.03	9.63	9.51	9.51	9.71	9.83	98.33	0.30	0.85
(m+p) Xylene		20.00	20.63	20.86	20.99	20.01	20.19	20.76	19.92	19.97	20.56	19.11	20.30	101.50	0.54	1.53
o-Xylene		20.00	20.63	20.47	20.59	20.19	20.03	20.04	20.18	19.89	20.53	19.99	20.25	101.27	0.26	0.74
Styrene		20.00	20.49	20.74	20.43	20.20	19.56	20.48	20.40	19.78	20.48	19.90	20.25	101.23	0.36	1.01
Bromoform		10.00	6.83	6.93	6.81	6.62	6.29	7.66	7.35	6.72	7.19	7.50	6.99	69.90	0.40	1.14
Isopropylbenzene		10.00	10.99	11.02	10.65	11.04	11.13	10.63	10.67	10.58	10.49	10.43	10.76	107.63	0.24	0.68
1,1,2,2-Tetrachloroethane		10.00	10.41	11.19	10.81	10.86	10.28	12.58	11.23	11.39	11.86	12.41	11.30	113.02	0.74	2.09
1,2,3-Trichloropropane		10.00	9.71	10.24	10.55	9.88	9.29	11.59	11.07	10.53	11.26	11.65	10.58	105.77	0.77	2.17
n-Propylbenzene		10.00	11.26	11.08	11.13	11.49	11.54	11.09	10.38	10.96	10.79	10.80	11.05	110.52	0.33	0.92
Bromobenzene		10.00	10.67	10.53	10.47	10.53	10.84	10.99	10.49	10.78	10.98	10.83	10.71	107.11	0.19	0.53
1,3,5-Trimethylbenzene		10.00	11.45	11.31	11.06	11.20	11.13	10.59	10.07	10.40	10.16	10.52	10.79	107.89	0.47	1.34
2-Chlorotoluene		10.00	11.13	10.04	10.47	10.60	11.39	11.39	10.52	10.93	11.25	10.46	10.82	108.18	0.44	1.24
4-Chlorotoluene		10.00	11.56	10.51	10.91	11.08	11.65	11.48	11.08	11.44	10.66	10.92	11.13	111.29	0.37	1.05
tert-Butylbenzene		10.00	10.90	10.99	10.81	10.88	10.72	10.52	10.25	10.18	10.23	10.18	10.57	105.66	0.31	0.89
1,2,4-Trimethylbenzene		10.00	11.90	12.43	12.19	12.25	10.90	10.88	10.39	10.89	11.07	10.59	11.35	113.49	0.72	2.03
sec-Butylbenzene		10.00	11.12	10.81	10.70	10.78	10.80	10.41	10.00	10.04	9.98	9.91	10.46	104.55	0.42	1.18
p-Isopropyltoluene		10.00	11.19	11.28	11.35	10.96	10.28	10.70	10.03	10.15	9.61	9.65	10.52	105.20	0.63	1.77
1,3-Dichlorobenzene		10.00	10.65	10.60	10.56	10.48	10.59	10.84	10.57	10.48	10.53	10.57	10.59	105.87	0.10	0.28
1,4-Dichlorobenzene		10.00	10.15	10.78	10.05	10.86	10.37	11.02	10.75	10.19	10.32	10.19	10.47	104.68	0.33	0.93
n-Butylbenzene		10.00	12.41	12.59	12.20	12.71	10.86	10.46	9.75	10.03	10.02	9.46	11.05	110.49	1.22	3.45
1,2-Dichlorobenzene		10.00	10.94	10.72	10.87	10.69	10.65	11.15	10.94	10.90	11.23	10.78	10.89	108.87	0.18	0.51
1,2-Dibromo-3-chloropropane		10.00	7.63	7.90	7.95	7.77	8.35	8.97	7.76	8.07	8.28	8.80	7.95	79.48	0.68	1.92
1,2,4-Trichlorobenzene		10.00	11.27	12.31	11.89	12.34	9.38	10.32	8.44	9.47	9.17	9.09	10.37	103.68	1.39	3.92
Hexachlorobutadiene		10.00	9.13	8.73	8.29	8.55	8.78	8.30	7.49	7.81	7.98	7.19	8.23	82.25	0.58	1.63
Naphthalene		10.00	10.69			12.67	8.83	10.61	8.50	8.91		8.90	9.87	98.73	1.41	4.42
1,2,3-Trichlorobenzene		10.00	10.99			11.63	9.65	9.80		8.37	7.80	7.57	9.40	94.01	1.45	4.55

Method Detection Limit Study

General Testing Corporation

EPA Method #: 8270 1625

Date: 09/22/97

Analyst: T. Brown

Instrument: GC/MS #2

Analyte	Conc. Inj (ul/L)	Trial #1	Trial #2	Trial #3	Trial #4	Trial #5	Trial #6	Trial #7	Trial #8	Trial #9	Mean (ul/L)	S	N # of reps	MDL (ul/L)
Diethylphthalate	10	8.33	8.56	8.37	8.32	8.11	7.13	6.58	6.42	6.51	7.59	0.9683	9	2.804
4-Nitroaniline	10	7.81	8.69	8.24	8.93	8.45	8.12	8.42	7.98	7.64	8.25	0.4406	9	1.276
4,6-Dinitro-2-methylphenol	10	3.99	4.56	2.85	2.55	1.84	1.59	2.09	1.68	1.80	2.55	1.1350	9	3.287
1,2-Diphenylhydrazine	10	8.57	9.49	9.29	10.08	9.60	9.63	9.21	8.69	9.15	9.30	0.5002	9	1.449
N-Nitrosodiphenylamine	10	9.51	10.13	10.04	10.63	10.19	10.22	10.54	9.52	9.27	10.01	0.5024	9	1.455
4-Bromophenyl-phenylether	10	8.39	8.93	8.90	9.25	8.69	8.55	8.71	8.48	8.77	8.74	0.2787	9	0.807
Hexachlorobenzene	10	8.29	8.67	8.77	9.48	8.79	8.74	8.53	8.07	8.17	8.61	0.4483	9	1.298
Pentachlorophenol	10	4.14	5.86	3.72	4.57	3.48	3.42	3.80	3.67	3.30	4.00	0.8492	9	2.459
Phenanthrene	10	10.53	10.92	11.14	11.67	11.14	11.09	11.23	10.49	10.66	10.99	0.4022	9	1.165
Anthracene	10	10.19	10.72	10.79	11.37	10.88	10.66	10.53	10.01	10.01	10.57	0.4726	9	1.369
Carbazole	10	10.89	11.44	11.44	12.24	11.67	11.52	11.59	10.75	10.91	11.38	0.4964	9	1.438
Di-n-Butylphthalate	10	10.83	11.15	10.83	11.51	10.90	10.20	9.55	9.36	9.41	10.42	0.8581	9	2.485
Fluoranthene	10	10.94	11.55	11.16	11.79	11.35	11.27	11.28	10.38	10.61	11.15	0.4696	9	1.360
Benzidine	10	1.10	1.18	1.24	1.69	1.33	1.15	1.92	1.45	1.08	1.35	0.3063	9	0.887
Pyrene	10	9.63	10.42	10.35	11.04	10.49	10.96	10.33	9.98	10.08	10.36	0.4743	9	1.373
I zylphthalate	10	8.09	8.21	7.52	7.32	7.32	5.90	4.79	5.03	5.48	6.63	1.4118	9	4.089
3, lorobenzidine	10	10.31	9.24	10.51	11.22	10.63	10.67	10.80	10.07	9.53	10.33	0.6653	9	1.927
B)Anthracene	10	9.83	10.00	10.04	10.68	10.24	10.60	10.18	9.82	9.75	10.13	0.3544	9	1.026
Chrysene	10	10.55	10.98	10.85	11.72	11.17	11.35	10.96	10.32	10.07	10.89	0.5436	9	1.574
bis (2-ethylhexyl) phthalate,	10	14.27	15.26	15.07	16.01	15.68	15.88	15.24	14.04	14.31	15.08	0.7734	9	2.240
Di-n-octyl phthalate	10	12.22	13.70	13.41	14.42	14.00	14.17	13.55	12.72	12.53	13.41	0.8144	9	2.358
Benzo(b)fluoranthene	10	10.23	10.74	10.34	11.39	10.57	10.80	10.58	10.03	9.88	10.51	0.4823	9	1.397
Benzo(k)Fluoranthene	10	12.06	12.10	11.48	11.95	12.08	12.16	11.40	10.83	10.96	11.67	0.5489	9	1.590
Benzo(a)Pyrene	10	10.12	10.37	9.98	10.47	10.17	10.49	9.84	9.45	9.23	10.01	0.4685	9	1.357
Indeno(1,2,3-cd)Pyrene	10	10.27	9.48	9.90	10.22	9.98	10.09	10.36	9.45	9.48	9.91	0.3837	9	1.111
Dibenzo(a,h)Anthracene	10	10.36	9.58	10.03	10.35	10.04	10.60	10.48	9.97	9.41	10.09	0.4269	9	1.236
Benzo(g,h,i)Perylene	10	9.42	8.53	8.78	9.14	8.96	8.84	8.94	8.35	8.49	8.83	0.3581	9	1.037

Method Detection Limit Study

Columbia Analytical Services

EPA Method #: 8270/625

Date: 06/17/97

Analyst: T. Brown

Instrument: GC/MS #2

Analyte	Amount Inj (ng)	Nanograms Recovered Trial #1	Trial #2	Trial #3	Trial #4	Trial #5	Trial #6	Trial #7	Mean (ng)	S (ng)	N # of reps	MDL (ng)
Pyridine	20	6.00	6.40	8.72	12.34	12.20	9.47	5.81	8.71	2.7995	7	8.791
N-Nitrosodimethylamine	20	10.94	11.87	10.04	12.80	12.93	13.17	11.22	11.85	1.1771	7	3.696
Aniline	20	15.12	16.42	12.90	17.03	17.00	17.01	15.18	15.91	1.6490	7	5.178
Phenol	20	7.28	8.03	7.18	8.60	8.60	8.57	8.21	8.07	0.6123	7	1.922
bis(2-Chloroethyl)Ether	20	16.68	17.19	13.31	17.38	18.72	17.97	16.94	16.88	1.7180	7	5.394
2-Chlorophenol	20	14.69	15.55	14.28	16.55	16.48	16.65	15.40	15.66	0.9460	7	2.970
1,3-Dichlorobenzene	20	11.01	11.56	8.84	11.60	12.01	12.72	13.76	11.64	1.5298	7	4.804
1,4-Dichlorobenzene	20	10.96	11.65	9.10	11.82	11.83	13.02	13.03	11.63	1.3428	7	4.216
1,2-Dichlorobenzene	20	11.75	12.16	9.36	12.17	12.93	13.59	13.33	12.18	1.4148	7	4.443
Benzyl Alcohol	20	15.46	15.79	13.15	17.09	17.00	17.31	17.44	16.18	1.5393	7	4.833
2,2'-oxybis-(1-Chloropropn	20	25.00	25.18	20.44	26.33	26.75	26.83	25.05	25.08	2.1970	7	6.899
2-Methylphenol	20	14.47	15.43	14.44	15.65	15.15	14.70	14.61	14.92	0.4870	7	1.529
N-Nitroso-Di-n-propylamine	20	18.28	17.97	14.79	19.72	18.94	18.69	18.37	18.11	1.5682	7	4.924
Hexachloroethane	20	10.53	11.28	8.51	10.88	10.51	11.99	12.57	10.90	1.2989	7	4.079
4-Methylphenol	20	13.86	13.91	12.98	14.71	14.53	13.78	13.51	13.90	0.5870	7	1.843
Nitrobenzene	20	13.59	15.59	12.57	17.35	18.37	18.31	15.55	15.90	2.2603	7	7.097
Isophorone	20	13.39	15.14	12.35	15.73	16.62	17.04	14.51	14.97	1.6924	7	5.314
2-Nitrophenol	20	12.29	13.38	13.49	15.17	16.85	16.31	13.02	14.36	1.7539	7	5.507
Benzoic acid	100	92.85	100.8	107.9	94.6	94.0	96.7	102.2	98.44	5.4449	7	17.097
2,4-Dimethylphenol	20	13.04	14.46	12.06	13.34	14.51	14.30	13.29	13.57	0.9038	7	2.838
bis(2-Chloroethoxy)Methane	20	15.43	16.68	13.96	18.04	19.32	18.78	16.82	17.00	1.8918	7	5.940
2,4-Dichlorophenol	20	14.45	15.37	15.00	16.47	17.94	17.68	14.92	15.98	1.4005	7	4.398
1,2,4-Trichlorobenzene	20	11.55	11.38	9.89	12.82	13.34	13.77	12.75	12.21	1.3463	7	4.227
Naphthalene	20	14.76	15.07	12.65	16.23	17.31	16.94	15.86	15.55	1.5733	7	4.940
4-Chloroaniline	20	15.86	15.25	12.70	16.56	17.45	17.07	14.91	15.69	1.6088	7	5.052
Hexachlorobutadiene	20	10.30	9.43	8.16	9.68	10.30	11.32	12.76	10.28	1.4611	7	4.588
4-Chloro-3-methylphenol	20	17.24	17.07	17.90	18.55	19.17	19.40	16.93	18.04	1.0181	7	3.197
2-Methylnaphthalene	20	15.01	13.74	12.26	15.01	16.72	16.80	15.31	14.98	1.6014	7	5.028
Hexachlorocyclopentadiene	20	4.68	4.75	3.55	4.50	4.62	5.83	6.55	4.93	0.9759	7	3.064
2,4,6-Trichlorophenol	20	13.20	15.20	15.52	14.78	16.89	16.45	13.14	15.03	1.4565	7	4.573
2,4,5-Trichlorophenol	20	14.22	14.78	15.58	15.50	17.96	17.50	14.20	15.68	1.5103	7	4.742
2-Chloronaphthalene	20	15.06	15.22	13.43	17.38	17.54	17.88	17.44	16.28	1.7048	7	5.353
2-Nitroaniline	20	15.56	17.73	14.33	18.71	18.94	19.86	18.45	17.65	1.9878	7	6.242
Dimethyl Phthalate	20	8.45	8.59	7.35	11.88	11.59	12.40	6.11	9.48	2.4659	7	7.743
Acenaphthylene	20	17.16	17.55	14.90	18.81	19.32	19.54	18.31	17.94	1.6000	7	5.024
3-Nitroaniline	20	15.56	16.24	13.19	17.64	17.27	18.05	16.95	16.41	1.6509	7	5.184
Acenaphthene	20	17.64	18.37	14.57	18.91	20.00	20.17	18.45	18.30	1.8768	7	5.893
2,4-Dinitrophenol	100	097.0	100.7	107.8	97.8	107.0	101.3	103.3	102.1	4.1772	7	13.116
Dibenzofuran	20	16.82	17.80	13.37	17.98	18.87	19.02	17.36	17.32	1.9067	7	5.987
4-Nitrophenol	20	5.26	5.46	6.15	5.65	6.55	9.15	4.74	6.14	1.4529	7	4.562
2,4-Dinitrotoluene	20	18.24	18.62	14.72	19.71	19.55	20.85	18.80	18.64	1.9326	7	6.068
2,6-Dinitrotoluene	20	16.68	17.52	13.20	18.85	19.33	19.49	17.70	17.54	2.1727	7	6.822
Diethylphthalate	20	16.21	17.08	13.68	18.68	19.39	20.44	14.67	17.16	2.4920	7	7.825
4-Chlorophenyl-phenylethr	20	16.72	17.80	14.37	18.32	18.32	18.88	16.86	17.32	1.5241	7	4.786
Fluorene	20	19.22	19.72	15.04	19.73	21.14	20.76	19.56	19.31	2.0041	7	6.293

Method Detection Limit Study

Columbia Analytical Services

EPA Method #: 8270/625

Date: 06/17/97

Analyst: T. Brown

Instrument: GC/MS #2

Analyte	Amount Inj (ng)	Nanograms Recovered Trial #1	Trial #2	Trial #3	Trial #4	Trial #5	Trial #6	Trial #7	Mean (ng)	S (ng)	N # of reps	MDL (ng)
4-Nitroaniline	20	16.94	17.77	14.71	17.92	18.34	19.00	17.37	17.44	1.3718	7	4.307
4,6-Dinitro-2-methylphenol	20	12.38	11.91	14.13	12.29	14.92	15.21	9.02	12.84	2.1439	7	6.732
1,2-Diphenylhydrazine	20	17.08	16.98	15.94	19.31	20.15	20.17	19.05	18.38	1.6958	7	5.325
N-Nitrosodiphenylamine	20	15.66	14.02	13.6	16.23	16.59	17.33	16.75	15.74	1.4175	7	4.451
4-Bromophenyl-phenylether	20	18.34	17.07	15.90	19.16	19.78	20.01	17.72	18.28	1.4979	7	4.704
Hexachlorobenzene	20	17.97	17.78	15.67	19.27	19.39	20.29	18.23	18.37	1.4919	7	4.685
Pentachlorophenol	20	13.86	14.48	16.10	14.32	17.22	16.70	10.28	14.71	2.3361	7	7.335
Phenanthrene	20	20.06	19.56	16.67	20.13	20.84	21.20	20.08	19.79	1.4805	7	4.649
Anthracene	20	19.64	19.29	16.66	19.80	20.82	20.77	20.00	19.57	1.4019	7	4.402
Carbazole	20	9.48	9.81	9.38	9.66	9.07	10.07	9.96	9.63	0.3498	7	1.099
Di-n-Butylphthalate	20	19.59	20.52	16.47	20.79	21.63	22.05	19.57	20.09	1.8490	7	5.806
Fluoranthene	20	21.38	23.42	17.86	21.32	22.03	22.27	21.55	21.40	1.7222	7	5.408
Benzidine	100	96.82	104.20	107	96.02	114.6	94.5	77.07	98.63	11.9235	7	37.440
Pyrene	20	18.04	17.51	13.51	18.77	20.17	19.43	19.57	18.14	2.2387	7	7.030
Butylbenzylphthalate	20	13.24	12.98	9.99	15.33	15.57	16.11	10.68	13.41	2.4154	7	7.584
3,3'-Dichlorobenzidine	20	17.88	18.76	14.46	19.97	20.83	20.45	19.02	18.77	2.1578	7	6.776
Benzo(a)Anthracene	20	19.45	19.94	15.66	21.46	21.01	21.21	21.48	20.03	2.0793	7	6.529
Bis(2-Ethylhexyl)Phthalate	100	88.41	96.53	97.26	91.43	99.51	93.78	95.82	94.68	3.7725	7	11.846
Chrysene	20	19.80	19.83	16.78	21.54	22.02	21.96	20.43	20.34	1.8312	7	5.750
Di-n-octyl phthalate	20	20.73	20.82	16.54	22.78	23.49	22.88	23.48	21.53	2.4857	7	7.805
Benzo(b)fluoranthene	20	19.07	19.30	14.77	19.90	21.01	23.15	21.53	19.82	2.6385	7	8.285
Benzo(k)Fluoranthene	20	21.71	21.70	17.71	22.42	24.81	21.85	22.31	21.79	2.0997	7	6.593
Benzo(a)Pyrene	20	19.24	19.54	16.42	20.80	21.13	21.68	20.78	19.94	1.7762	7	5.577
Indeno(1,2,3-cd)Pyrene	20	20.07	21.18	18.63	22.16	22.26	22.94	22.60	21.41	1.5609	7	4.901
Dibenzo(a,h)Anthracene	20	21.80	23.27	20.52	23.68	24.22	24.29	24.37	23.16	1.4700	7	4.616
Benzo(g,h,i)Perylene	20	19.19	20.63	17.81	20.65	21.92	21.68	21.58	20.49	1.5037	7	4.722

Method Detection Limit Study

Columbia Analytical Services

EPA Method #: 8270

Date: 10/16/97

Analyst: Todd Brown

Instrument: GC/MS #2

Appendix IX Compounds

Analyte	Conc. (ug/L)	Trial #1	Trial #2	Trial #3	Trial #4	Trial #5	Trial #6	Trial #7	Trial #8	Trial #9	Mean (ug/L)	S	N # of reps	MDL (ug/L)
2-Picoline	10	5.61	5.33	5.40	5.50	6.22	6.31	6.11	5.97	6.05	5.83	0.3970	9	1.150
N-Nitrosomethylethylamine	10	5.14	5.55	4.85	5.76	5.73	6.48	6.24	6.30	6.27	5.81	0.5968	9	1.728
Methyl methanesulfonate	10	4.63	5.07	4.60	4.91	5.22	5.73	5.59	5.87	5.63	5.25	0.5074	9	1.469
N-Nitrosodiethylamine	10	5.85	5.87	5.72	6.34	6.39	6.72	6.84	6.47	6.89	6.34	0.4686	9	1.357
Ethyl methanesulfonate	10	6.04	6.50	6.19	6.77	7.12	7.22	7.32	7.44	7.52	6.90	0.5838	9	1.691
N-Nitrosopyrrolidine	10	5.88	6.42	6.32	6.94	7.11	7.17	7.29	7.80	7.54	6.94	0.6584	9	1.907
N-Nitrosomorpholine	10	5.49	5.81	5.25	5.93	6.14	6.86	6.02	6.10	6.56	6.02	0.5228	9	1.514
o-Toluidine	10	6.85	7.02	7.14	7.64	7.97	8.41	8.20	7.59	8.62	7.72	0.6693	9	1.938
o,o,o-Triethylphosphorothioate	10	6.87	7.23	7.36	7.24	8.47	9.22	8.48	8.97	9.25	8.12	1.0040	9	2.908
Acetophenone	10	9.92	10.18	9.95	9.87	10.31	11.37	10.84	9.99	11.21	10.40	0.6195	9	1.794
N-Nitrosopiperidine	10	6.09	6.86	5.98	6.55	6.58	6.61	6.80	6.57	6.99	6.56	0.3543	9	1.026
a,a-Dimethylphenethylamine	10	3.89	3.33	2.98	2.29	2.82	3.67	4.24	3.88	3.28	3.38	0.6504	9	1.883
2,6-Dichlorophenol	10	8.47	8.52	7.02	8.52	9.07	9.47	8.67	8.39	9.31	8.60	0.7553	9	2.187
Hexachloropropene	10	2.24	2.68	2.46	2.41	2.89	3.01	2.87	2.89	3.27	2.75	0.3470	9	1.005
N-N-di-n-butylamine	10	7.05	7.38	6.47	7.21	7.19	7.92	8.45	7.55	7.67	7.43	0.5961	9	1.726
Isosafrole	10	6.83	7.05	6.92	7.17	7.76	8.22	7.86	7.04	8.26	7.46	0.6029	9	1.746
1,2,4,5-Tetrachlorobenzene	10	5.86	5.43	5.59	5.87	6.34	6.91	6.84	7.12	7.10	6.34	0.7118	9	2.061
Safrole	10	6.97	7.20	6.84	7.69	7.98	8.49	7.99	7.77	8.28	7.69	0.6106	9	1.768
m-Dinitrobenzene	10	5.94	6.52	5.41	6.72	6.61	6.41	6.74	6.03	5.70	6.23	0.5085	9	1.473
[illegible]nochlorobenzene	10	6.77	6.87	6.83	7.25	7.88	8.40	7.94	8.03	8.46	7.60	0.7209	9	2.088
1-Naphthylamine	10	7.46	7.08	6.13	7.37	7.27	7.63	7.42	7.34	7.39	7.23	0.4654	9	1.348
2-Naphthylamine	10	8.08	7.88	7.70	7.26	8.19	8.72	8.77	7.84	8.31	8.08	0.5121	9	1.483
2,3,4,6-Tetrachlorophenol	10	8.58	8.12	8.46	8.36	7.58	7.47	8.58	8.71	8.18	8.23	0.4683	9	1.356
5-Nitro-o-toluidine	10	8.30	7.97	7.74	8.35	8.34	8.43	8.72	8.16	8.49	8.28	0.3072	9	0.890
Tetraethyl dithiopyrophosphate	10	9.30	9.57	9.32	9.26	10.10	9.31	9.65	9.75	8.78	9.45	0.3952	9	1.145
Thionazin	10	8.51	9.13	8.96	9.54	8.68	9.59	9.88	8.70	9.45	9.16	0.5083	9	1.472
Diphenylamine	10	11.92	12.76	11.93	12.58	12.05	13.10	13.80	12.96	12.91	12.67	0.6618	9	1.916
1,3,5-Trinitrobenzene	10	3.71	4.07	4.44	4.32	3.99	4.43	4.64	4.40	3.87	4.21	0.3286	9	0.952
Phorate	10	8.78	9.37	8.46	9.90	8.63	9.04	9.93	9.54	9.51	9.24	0.5716	9	1.655
Diallate	10	8.88	9.43	8.96	9.50	9.31	9.28	10.55	9.55	10.11	9.51	0.5615	9	1.626
Phenacetin	10	8.87	9.07	8.94	9.63	9.14	9.12	9.74	9.58	9.45	9.28	0.3408	9	0.987
Dimethoate	10	2.74	3.11	2.51	3.24	2.06	2.07	2.09	2.32	2.48	2.51	0.4677	9	1.354
4-Aminobiphenyl	10	9.67	9.81	9.59	10.90	10.31	10.42	11.69	10.65	10.38	10.38	0.7035	9	2.037
Pronamide	10	9.17	9.54	8.82	9.98	9.29	9.67	10.64	9.47	9.37	9.55	0.5526	9	1.600
Disulfoton	10	7.63	7.60	6.68	7.53	7.00	6.91	7.08	7.13	7.32	7.21	0.3520	9	1.020
Pentachloronitrobenzene	10	8.48	9.56	9.57	10.01	9.67	9.64	10.35	10.24	10.04	9.73	0.5867	9	1.699
4-Nitroquinoline-1-oxide	10	5.31	4.65	4.68	5.30	5.39	4.82	5.99	5.50	5.87	5.28	0.5145	9	1.490
Methyl parathion	10	9.80	10.04	9.45	10.29	9.78	9.30	10.56	9.93	10.22	9.93	0.4258	9	1.233
Ethyl parathion	10	9.07	8.73	8.63	9.66	9.15	8.90	9.86	9.91	9.91	9.31	0.5556	9	1.609
Isodrin	10	8.39	9.53	8.89	9.39	9.69	9.49	10.57	9.71	10.95	9.62	0.8223	9	2.381
Methapyrilene	10	13.00	13.04	11.40	12.32	12.44	11.82	13.63	13.25	14.21	12.79	0.9380	9	2.716
Dimethylaminoazobenzene	10	10.52	9.51	9.70	10.66	10.32	9.98	10.56	10.78	10.53	10.28	0.4764	9	1.380
Chlorobenzilate	10	4.65	4.35	3.70	4.51	3.27	2.74	2.94	3.09	3.87	3.68	0.7558	9	2.189
3,3'-Dimethylbenzidine	10	6.74	7.74	7.53	8.90	7.47	9.70	10.92	8.98	8.25	8.47	1.3737	9	3.978
2-Acetylaminofluorene	10	10.50	10.12	10.29	11.40	11.51	10.87	11.17	11.18	11.64	10.96	0.5840	9	1.691
7,12-Dimethylbenz(a)anthracene	10	9.55	8.51	6.55	8.43	7.56	8.16	7.98	8.61	8.56	8.21	0.8754	9	2.535
3-Methylcholanthrene	10	10.43	10.25	9.84	10.77	10.55	10.24	10.52	10.98	10.81	10.49	0.3696	9	1.070

Method Detection Limit Study

Columbia Analytical Services

Method: 8081/8082

Extraction: Water 1000 mL / 10 mL

Date: 7/98

Analyst: M. Langdon

Instrument: HP5890-L DB-1701

Analyte	True Conc. (ug/L)	Final Concentration (ug/L) Trial #1	Trial #2	Trial #3	Trial #4	Trial #5	Trial #6	Trial #7	Mean (ug/L)	S	N # of reps	MDL (ug/L)
alpha-BHC	0.050	0.044	0.044	0.043	0.046	0.048	0.043	0.054	0.046	0.004	7	0.013
gamma-BHC	0.050	0.043	0.043	0.045	0.045	0.046	0.041	0.047	0.044	0.002	7	0.007
Heptachlor	0.050	0.050	0.049	0.049	0.047	0.050	0.045	0.052	0.049	0.003	7	0.008
Aldrin	0.050	0.046	0.043	0.042	0.043	0.046	0.040	0.048	0.044	0.003	7	0.009
beta-BHC	0.050	0.048	0.047	0.050	0.050	0.051	0.045	0.052	0.049	0.003	7	0.008
delta-BHC	0.050	0.042	0.041	0.046	0.043	0.046	0.039	0.047	0.043	0.003	7	0.010
Heptachlor Epoxide	0.050	0.046	0.046	0.053	0.047	0.049	0.043	0.053	0.048	0.004	7	0.013
alpha-Endosulfan	0.050	0.048	0.047	0.047	0.048	0.051	0.044	0.051	0.048	0.003	7	0.008
4,4'-DDE	0.050	0.045	0.045	0.048	0.048	0.047	0.044	0.050	0.047	0.002	7	0.008
Dieldrin	0.050	0.049	0.049	0.048	0.049	0.051	0.048	0.052	0.049	0.002	7	0.005
Endrin	0.050	0.054	0.056	0.041	0.055	0.041	0.051	0.056	0.051	0.007	7	0.023
beta-Endosulfan	0.050	0.048	0.050	0.056	0.062	0.054	0.053	0.054	0.054	0.005	7	0.015
4,4'-DDD	0.050	0.045	0.044	0.043	0.046	0.047	0.042	0.046	0.045	0.002	7	0.007
4,4'-DDT	0.050	0.054	0.055	0.040	0.063	0.058	0.057	0.055	0.055	0.008	7	0.024
Endrin Aldehyde	0.050	0.059	0.054	0.056	0.057	0.070	0.066	0.067	0.061	0.007	7	0.021
Endosulfan Sulfate	0.050	0.041	0.045	0.044	0.050	0.055	0.039	0.047	0.046	0.006	7	0.018
Methoxychlor	0.050	0.049	0.049	0.058	0.061	0.059	0.051	0.061	0.055	0.006	7	0.018
Endrin Ketone	0.050	0.048	0.048	0.062	0.051	0.065	0.046	0.052	0.053	0.008	7	0.025
Chlordane	0.400	0.303	0.327	0.334	0.315	0.315	0.326	0.282	0.315	0.019	7	0.060
Toxaphene	1.000	1.030	0.953	1.024	1.033	1.075	1.041	0.990	1.021	0.042	7	0.132
AR 1016	1.000	0.906	0.878	0.871	0.973	1.003	0.938	1.042	0.944	0.070	7	0.219
AR 1221	1.000	0.942	0.900	0.849	0.859	0.876	1.012	1.023	0.923	0.077	7	0.242
AR 1232	1.000	0.930	0.933	0.950	0.927	0.943	0.977	0.944	0.943	0.018	7	0.058
AR 1242	1.000	0.842	0.795	0.899	0.775	0.891	0.988	0.975	0.881	0.089	7	0.280
AR 1248	1.000	0.869	0.947	0.961	1.020	0.971	1.022	0.906	0.957	0.061	7	0.190
AR 1254	1.000	0.882	0.855	0.853	0.878	0.929	0.968	1.079	0.921	0.088	7	0.275
AR 1260	1.000	0.879	0.891	0.873	0.928	0.994	0.872	0.989	0.918	0.058	7	0.182

S = Standard Deviation using n-1 method.

N = number of replicates.

MDL = t x S where t = 3.14 for 7 replicates.

Method Detection Limit Study

Columbia Analytical Services

Method: 8081/8082

Extraction: Water 1000 mL / 10 mL

Date: 7/98

Analyst: M. Langdon

Instrument: HP5890-L DB-17

Analyte	True Conc. (ug/L)	Final Concentration (ug/L) Trial #1	Trial #2	Trial #3	Trial #4	Trial #5	Trial #6	Trial #7	Mean (ug/L)	S	N # of reps	MDL (ug/L)
alpha-BHC	0.050	0.039	0.039	0.040	0.040	0.042	0.036	0.042	0.040	0.002	7	0.007
gamma-BHC	0.050	0.040	0.040	0.042	0.041	0.043	0.037	0.044	0.041	0.002	7	0.007
Heptachlor	0.050	0.044	0.044	0.045	0.042	0.047	0.039	0.046	0.044	0.003	7	0.009
Aldrin	0.050	0.038	0.038	0.037	0.036	0.037	0.033	0.039	0.037	0.002	7	0.007
beta-BHC	0.050	0.048	0.047	0.048	0.049	0.049	0.044	0.052	0.048	0.003	7	0.008
delta-BHC	0.050	0.039	0.038	0.042	0.040	0.042	0.038	0.042	0.040	0.002	7	0.006
Heptachlor Epoxide	0.050	0.043	0.043	0.044	0.044	0.044	0.040	0.046	0.043	0.002	7	0.006
alpha-Endosulfan	0.050	0.045	0.045	0.046	0.046	0.047	0.041	0.048	0.046	0.002	7	0.008
4,4'-DDE	0.050	0.034	0.033	0.034	0.034	0.035	0.031	0.037	0.034	0.002	7	0.006
Dieldrin	0.050	0.042	0.042	0.046	0.044	0.043	0.040	0.046	0.043	0.002	7	0.008
Endrin	0.050	0.053	0.054	0.041	0.034	0.039	0.053	0.051	0.046	0.009	7	0.028
beta-Endosulfan	0.050	0.044	0.044	0.060	0.048	0.047	0.043	0.046	0.047	0.006	7	0.019
4,4'-DDD	0.050	0.040	0.040	0.038	0.040	0.042	0.036	0.043	0.040	0.003	7	0.008
4,4'-DDT	0.050	0.045	0.049	0.062	0.068	0.050	0.056	0.054	0.055	0.008	7	0.026
Endrin Aldehyde	0.050	0.052	0.045	0.058	0.056	0.053	0.052	0.069	0.055	0.008	7	0.025
Endosulfan Sulfate	0.050	0.041	0.041	0.038	0.042	0.045	0.039	0.043	0.041	0.003	7	0.008
Methoxychlor	0.050	0.059	0.058	0.062	0.052	0.061	0.053	0.062	0.060	0.004	7	0.011
Endrin Ketone	0.050	0.045	0.047	0.058	0.045	0.059	0.041	0.050	0.049	0.007	7	0.023
Chlordane	0.400	0.265	0.293	0.289	0.284	0.267	0.288	0.255	0.277	0.016	7	0.050
Toxaphene	1.000	0.977	0.922	0.951	0.973	1.022	0.910	0.971	0.961	0.041	7	0.127
AR 1016	1.000	0.955	0.913	0.905	1.011	1.040	0.958	1.029	0.973	0.059	7	0.185
AR 1221	1.000	0.841	0.866	0.815	0.814	0.824	0.911	0.924	0.856	0.049	7	0.154
AR 1232	1.000	1.009	1.016	1.030	1.034	1.024	1.037	1.023	1.025	0.011	7	0.034
AR 1242	1.000	0.913	0.920	0.922	0.895	1.019	1.029	1.012	0.959	0.063	7	0.198
AR 1248	1.000	0.920	1.055	1.087	1.033	1.023	1.105	1.009	1.033	0.065	7	0.206
AR 1254	1.000	0.868	0.869	0.831	0.878	0.916	1.017	1.066	0.921	0.094	7	0.296
AR 1260	1.000	0.990	0.997	0.978	1.049	1.104	0.984	1.102	1.029	0.060	7	0.188

S = Standard Deviation using n-1 method.

N = number of replicates.

MDL = t x S where t = 3.14 for 7 replicates.

METALS INSTUMENT DETECTION LIMITS

The IDL (ppb) is determined by multiplying the t(n-1) by the standard deviation obtained on three days from the analysis of seven consecutive measurements of a standard solution at a concentration of 3-5 times the IDL on each day.

IDL = t(n-1) X SDev.
When n = 21, t(n-1) = 2.528

Analytical Met ICP
Digest Method NONE
Matrix: WATER
Units: ppb
Analyst(s): CKutzer
Instrument: Leeman
Date Analyzed 6/24/98 6/29/98 7/2/98 7/6/98

Replicate		Ag	Al	As	Ba	Be	Ca	Cd	Co
1		17.4	221	892	179	4.6	2198	4.7	47.7
2		17.3	210	873	180	5.3	2045	5.4	59.5
3		20.9	249	919	179	4.7	2127	4.4	52.9
4		20	213	900	179	4.6	2044	4.1	53
5		18.1	201	909	180	4.8	2262	4.8	48.6
6		23.6	207	993	180	4.9	2519	4.3	60.2
7		20.5	206	1003	179	5.1	2578	4.4	51.6
8		21.6	204	1031	182	6	2387	6.4	49.9
9		18.3	178	982	182	6.2	2388	6.5	50.9
10		20.2	197	972	184	5.2	2331	6.5	48.5
11		16.5	185	971	184	5.1	2311	6	46.3
12		16.2	215	1002	184	5.8	2318	6.4	48.9
13		19.2	194	978	182	5.7	2316	6.6	49.6
14		18.2	250	1000	184	6	2333	6.2	44.7
15		22.7	206	998	181	4.9	2362	5.3	55.3
16		21.2	332	955	181	5.1	2339	5.7	51.5
17		20.8	176	1017	180	5.3	2333	5.1	50.3
18		18.3	200	993	179	5.4	2307	4.9	47.1
19		20.4	171	966	180	4.8	2292	6.2	55.3
20		18.8	186	969	178	4.8	2294	4.7	50.9
21		19.3	193	966	180	4.3	2301	5.2	45.7
Mean		19.5	209.2381	966.1429	180.8095	5.171429	2304.048	5.419048	50.87619
Std. Dev.		1.960102	34.65675	43.39272	1.91361	0.519753	126.8674	0.842982	4.109976
t (n-1)		2.528	2.528	2.528	2.528	2.528	2.528	2.528	2.528
IDL		4.955138	87.61227	109.6968	4.837607	1.313935	320.7209	2.131059	10.39002
Max IDL		10	100	500	20	5	500	5	50

Leeman

6/24/98

METALS INSTUMENT DETECTION LIMITS

The IDL (ppb) is determined by multiplying the t(n-1) by the dtandard deviation obtained on three days from the analysis of seven consecutive measurements of a standard solutin at a concentration of 3-5 times the IDL on each day.

IDL = t(n-1) X SDev.
When n = 21, t(n-1) = 2.528

Replicate	Cr	Cu	Fe	K	Mg	Mn	Na	Ni
1	18.3	24.6	97.4	9098	2411	30.5	2286	85.1
2	21.2	21.7	93.3	9049	2351	30.6	2222	81.1
3	21	22.5	93.1	9012	2355	29.3	2240	86.3
4	20.5	22	92.4	8920	2355	29.3	2249	85.4
5	24.1	19.8	92.7	8869	2393	29.7	2247	83.4
6	20.3	22.1	90.7	9128	2355	30.1	2222	89.7
7	20.1	24	88.8	9158	2419	30.6	2240	82.9
8	21.3	25.4	99.5	9321	2342	30	2489	84.9
9	20.1	27.5	98.9	9309	2311	30	2519	82
10	18.1	24.7	100	9539	2249	30	2549	87.9
11	17.7	25.2	94.1	9407	2243	30.3	2501	82.4
12	18.5	25.1	92.9	9371	2253	30.3	2565	79.2
13	18.2	26.6	99	9376	2236	31.1	2478	75
14	18.7	25.6	96.6	9402	2245	28.4	2506	78.8
15	19.3	26.6	102	9281	2272	29	2470	80.1
16	19.5	26.1	98	9233	2252	29.7	2505	75.8
17	17.9	24.8	96.9	9152	2242	29.4	2464	79.3
18	19.2	25.2	95.6	9086	2232	28.9	2415	76.9
19	17.4	25.5	92.4	9292	2205	29.3	2444	71
20	18.3	25.4	94.2	9152	2187	29	2381	70.8
21	17.6	23.8	95.9	9040	2199	28.9	2448	77.6
11	19.39524	24.48571	95.44762	9199.762	2290.81	29.73333	2401.905	80.74286
Std. Dev.	1.639962	1.902179	3.401855	174.3685	72.51525	0.702377	121.9782	5.103682
t (n-1)	2.528	2.528	2.528	2.528	2.528	2.528	2.528	2.528
IDL	4.145825	4.808709	8.59989	440.8037	183.3186	1.775609	308.361	12.90211
	10	20	100	5000	500	10	500	40

METALS INSTUMENT DETECTION LIMITS

The IDL (ppb) is determined by multiplying the t(n-1) by the dtandard deviation obtained on three days from the analysis of seven consecutive measurements of a standard solutin at a concentration of 3-5 times the IDL on each day.

Leeman
6/24/98

IDL = t(n-1) X SDev.
When n = 21, t(n-1) = 2.528

Replicate	*Pb*	*Sb*	*Se*	*Tl*	*V*	*Zn*
1	204	252	902	1004	62.8	36.5
2	196	223	991	1038	61.8	33.7
3	186	232	922	1052	56.4	35.5
4	186	231	931	1002	49.6	33.4
5	189	230	986	980	55.8	38.1
6	208	256	969	1013	63.6	45.8
7	210	248	1051	1021	58.3	45.4
8	205	254	1110	1101	42.6	41
9	206	258	1031	1082	46.1	39.3
10	194	237	1016	1059	44.2	39.9
11	188	242	1042	1032	40	36.7
12	183	229	1074	1039	42.9	37.8
13	191	234	990	1041	52.3	37.2
14	185	233	1075	1071	44.3	37.7
15	184	253	983	1033	55.1	37.2
16	179	240	954	1014	50.2	37.7
17	163	254	1003	1000	53.2	38
18	177	273	964	990	57.2	36.4
19	190	236	961	998	46.4	36.4
20	180	233	995	1006	46.9	37.3
21	165	273	986	1013	49.9	37.5
11	189	243.8571	996.9524	1028.048	51.40952	38.02381
Std. Dev.	12.89186	14.1996	52.83321	31.56339	7.044424	3.058579
t (n-1)	2.528	2.528	2.528	2.528	2.528	2.528
IDL	32.59062	35.89658	133.5623	79.79225	17.8083	7.732087
	50	60	500	300	50	10

METALS INSTUMENT DETECTION LIMITS

The IDL (ppb) is determined by multiplying the t(n-1) by the standard deviation obtained on three days from the analysis of seven consecutive measurements of a standard solution at a concentration of 3-5 times the IDL on each day.

IDL = t(n-1) X SDev.
When n = 21, t(n-1) = 2.528

Analytical Met ICP
Digest Method NONE
Matrix: WATER
Units: PPB
Analyst(s): CKUTZER
Instrument: OPTIMA
Date Analyzed 6/25/98 6/29/98 7/2/98 7/6/98

Replicate		Ag	Al	As	Ba	Be	Ca	Cd	Co
1		9.7	182	20.6	218	4.8	489	9.7	52.8
2		9.7	183	19.9	219	4.8	474	9.5	52.9
3		9.7	185	19.6	220	4.8	455	9.6	53
4		9.9	184	18.9	219	4.8	433	9.8	52.9
5		9.6	183	20.1	218	4.8	432	9.8	53.1
6		9.7	182	20.4	217	4.8	397	9.8	52.7
7		9.7	182	20.1	216	4.8	398	9.7	52.4
8		9.9	193	20.8	219	4.9	373	10.2	53.1
9		9.9	191	21.2	218	5	358	10.3	52.9
10		9.7	196	21.1	222	5	505	10.3	53.6
11		9.9	195	21.6	222	5	457	10.3	53.6
12		10	196	20.7	221	5	392	10.3	53.2
13		9.8	199	22	224	5	465	10.2	53.6
14		9.8	198	21.4	224	5	493	10.2	53.4
15		9.8	200	19.4	229	5	863	10.3	53.4
16		9.8	199	19.2	228	5	818	10.4	53.2
17		9.7	197	19.2	227	4.9	766	10.2	52.7
18		9.6	200	19.7	229	5	804	10.3	53.2
19		9.8	198	19	228	5	766	10.3	53
20		9.9	200	20.3	229	5	756	10.4	53.2
21		9.8	198	20.5	226	4.9	729	10.3	53
Mean		9.780952	192.4286	20.27143	222.5238	4.919048	553.4762	10.09048	53.09048
Std. Dev.		0.107792	7.20119	0.887211	4.490201	0.092839	174.4702	0.294796	0.317655
t (n-1)		2.528	2.528	2.528	2.528	2.528	2.528	2.528	2.528
IDL		0.272497	18.20461	2.242869	11.35123	0.234697	441.0607	0.745245	0.803032
Max IDL		10	100	10	20	5	500	5	50

METALS INSTUMENT DETECTION LIMITS

The IDL (ppb) is determined by multiplying the t(n-1) by the dtandard deviation obtained on three days from the analysis of seven consecutive measurements of a standard solutin at a concentration of 3-5 times the IDL on each day.

OPTIMA

6/25/98

IDL = t(n-1) X SDev.
When n = 21, t(n-1) = 2.528

Replicate	Cr	Cu	Fe	K	Mg	Mn	Na	Ni
1	10.3	27.3	93.6	6083	496	15.5	742	41.3
2	10.2	27.1	93.3	6088	500	15.5	686	41.2
3	10.2	27.2	93.8	6137	505	15.6	816	41.4
4	10.2	27	91.8	6266	503	15.5	904	41.2
5	10.2	27	91.6	6255	505	15.4	934	41.2
6	10.1	26.6	91.1	6239	503	15.4	904	40.9
7	10	26.6	90.7	6232	503	15.3	898	40.6
8	10	26.2	142	6947	573	15.5	801	41.6
9	9.9	25.4	117	6947	540	15.4	790	41.4
10	10.1	26	104	6929	538	15.7	815	41.7
11	10.1	26	102	6969	533	15.6	880	41.9
12	10	25.8	102	6977	525	15.6	818	41.6
13	10.1	26.3	99.6	6952	531	15.7	892	42
14	10.2	26.2	97.5	6960	531	15.7	899	42
15	10.6	28.4	108	6977	518	16.4	840	43.7
16	10.5	27.3	105	6996	516	16.2	946	43.7
17	10.4	26.8	102	6977	515	16.1	893	43.4
18	10.5	26.7	103	6952	524	16.2	873	43.7
19	10.5	26.5	102	7010	521	16.1	871	43.5
20	10.5	26.7	99.3	7005	528	16.2	899	43.8
21	10.5	26.1	97.6	6994	523	16	887	43.3
11	10.24286	26.62857	101.281	6709.143	520.5238	15.74286	856.5714	42.14762
Std. Dev.	0.208738	0.658136	11.37759	382.3065	17.87629	0.334023	64.50626	1.097096
t (n-1)	2.528	2.528	2.528	2.528	2.528	2.528	2.528	2.528
IDL	0.527689	1.663768	28.76255	966.4707	45.19127	0.84441	163.0718	2.773458
MAX IDL	10	20	100	5000	500	10	500	40

METALS INSTUMENT DETECTION LIMITS

The IDL (ppb) is determined by multiplying the t(n-1) by the dtandard deviation obtained on three days from the analysis of seven consecutive measurements of a standard solutin at a concentration of 3-5 times the IDL on each day.

OPTIMA
6/25/98

IDL = t(n-1) X SDev.
When n = 21, t(n-1) = 2.528

Replicate	Pb	Sb	Se	Tl	V	Zn
1	9.6	31.3	9.5	22.2	49.8	20.7
2	9.5	29.9	9.6	21	50.1	20.6
3	9.4	30.1	10.9	22.1	50.3	21.1
4	9.4	29.8	9.9	21.8	50	20.6
5	9.1	29.8	11.2	21.1	50	20.7
6	9.3	29.2	10.8	20.4	49.7	21.2
7	9	29	10.7	21.7	49.4	21.3
8	10.5	31.4	8.6	19.1	50.8	20.4
9	10.1	30.2	9.5	20.3	50.5	20.2
10	10.7	31.1	12.2	20.3	51.2	20.7
11	10.4	30.4	8	20	51.2	20.8
12	10.3	30.5	9.5	19.8	51.2	20.6
13	10.3	31	8	20.3	51.7	20.9
14	10.6	30.7	9	19.5	51.9	20.7
15	11	33.8	6.5	21.8	52.1	22.4
16	11	32.6	7.8	22.7	51.9	22
17	10.8	32.1	8.1	22.5	51.6	21.7
18	10.8	33	7.3	22	52.2	21.8
19	10.8	32.2	4.7	20.7	51.7	21.8
20	11.1	32	6.7	21.8	52	21.9
21	10.7	32.3	6.3	21.3	51.6	21.5
11	10.20952	31.06667	8.8	21.06667	50.99524	21.12381
Std. Dev.	0.692029	1.292027	1.877765	1.035052	0.904697	0.612295
t (n-1)	2.528	2.528	2.528	2.528	2.528	2.528
IDL	1.74945	3.266244	4.746989	2.616612	2.287073	1.547881
MAX IDL	3	10	5	10	50	10

METALS INSTUMENT DETECTION LIMITS

The IDL (ppb) is determined by multiplying the t(n-1) by the standard deviation obtained on three days from the analysis of seven consecutive measurements of a standard solution at a concentration of 3-5 times the IDL on each day.

IDL = t(n-1) X SDev.
When n = 21, t(n-1) = 2.528

Analytical Met ICP
Digest Method NONE
Matrix: WATER
Units: PPB
Analyst(s): CKUTZER
Instrument: OPTIMA
Date Analyzed: 6/29/98 7/2/98 7/6/98

Replicate		*B*	*Mo*	*Ti*					
1		290	102	92.4					
2		287	101	91.8					
3		290	103	93.1					
4		290	103	93.1					
5		288	102	92.8					
6		293	103	94.1					
7		293	103	94.3					
8		312	103	102					
9		309	103	101					
10		306	102	101					
11		309	103	101					
12		307	102	101					
13		310	103	102					
14		306	102	101					
15		268	99.9	98.5					
16		262	100	99.2					
17		269	100	99.6					
18		266	100	99.3					
19		264	100	99.3					
20		262	99.5	98.8					
21		260	98.9	98.1					
Mean		287.6667	101.5857	97.78095					
Std. Dev.		18.66637	1.443359	3.591882					
t (n-1)		2.528	2.528	2.528					
IDL		47.18858	3.648812	9.080279					
Max IDL		200	25	50					

Analyte	3100 (ppb)	4100ZL (ppb)	FIMS (ppb)
Pb/PbW	0.557 7/30/98		
As		2.54 12/22/97	
Tl		1.98 1/02/98	
Se		1.47 7/30/98	
Cu		0.542 12/04/97	
Hg IDL			0.0294 7/09/98
Sb		3.08 12/12/97	
Sn		4.53 12/12/97	

Hg Water MDL: 0.0363ppb (09/30/97)
Hg Soil MDL: 0.0217mg/kg (10/02/97)

Method Detection Limit Study
Columbia Analytical Services / Rochester

Analyte: Total Cyanide by MIDI Distillation Date: 11/14/1997
EPA Method #: 335.2/9010 Analyst: B. Bowe

Instrument: Technicon CN AA

Amount Added (mg/L): 0.0196

Repetitions:

MIDI Dist. Still #1:

#1	#2	#3	#4	#5	#6	#7	Mean	S	MDL
0.0170	0.0108	0.0123	0.0123	0.0116	0.0131	0.0131	0.0129	0.0018	0.0058

MIDI Dist. Still #2:

#1	#2	#3	#4	#5	#6	#7	Mean	S	MDL
0139	0.0131	0.0123	0.0139	0.0146	0.0162	0.0139	0.0140	0.0011	0.0035

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Method Detection Limit Study
COLUMBIA ANALYTICAL SERVICES

HERBICIDES

Instrument: HP5890II-F
Capillary Column: DB-1701
Carrier Gas: Helium
Detector: ECD

Date: 7/97
Analyst: Mike Langdon

Analyte	Amount Added (ug/L)	Trial #1	Trial #2	Trial #3	Trial #4	Trial #5	Trial #6	Trial #7	Trial #8	Mean (ug/L)	S (ug/L)	MDL (ug/L)
2,4-D	0.20	0.140	0.140	0.138	0.138	0.139	0.081	0.084	0.083	0.118	0.0273	0.0819
2,4,5-TP (Silvex)	0.20	0.152	0.153	0.148	0.149	0.149	0.073	0.074	0.075	0.122	0.0369	0.1108
2,4,5-T	0.20	0.098	0.098	0.113	0.097	0.114	0.048	0.048	0.048	0.083	0.0278	0.0834
Dinoseb	0.20	0.070	0.070	0.071	0.068	0.068	0.034	0.036	0.036	0.057	0.0165	0.0496

Method Detection Limit Study
COLUMBIA ANALYTICAL SERVICES

HERBICIDES

Instrument: HP5890II-F
Capillary Column: DB-17
Carrier Gas: Helium
Detector: ECD

Date: 7/97
Analyst: Mike Langdon

Analyte	Amount Added (ug/L)	Trial #1	Trial #2	Trial #3	Trial #4	Trial #5	Trial #6	Trial #7	Trial #8	Mean (ug/L)	S (ug/L)	MDL (ug/L)
2,4-D	0.20	0.137	0.134	0.119	0.135	0.137	0.067	0.063	0.063	0.107	0.0334	0.1002
2,4,5-TP (Silvex)	0.20	0.146	0.146	0.143	0.145	0.145	0.072	0.073	0.074	0.118	0.0349	0.1046
2,4,5-T	0.20	0.150	0.151	0.147	0.146	0.146	0.064	0.065	0.065	0.117	0.0404	0.1211
Dinoseb	0.20	0.097	0.098	0.098	0.096	0.097	0.041	0.042	0.043	0.077	0.0267	0.0802

Method Detection Limit Study
Columbia Analytical Services
1 Mustard St., Rochester, NY

Analyte: Total Sulfide, soils
EPA Method # : SW846, Method 9030b

Date: 10/01/98
Analyst: V. Collom

Instrument: Titration

Amount Added (mg/Kg) : 63.05

Repetitons:

1	2	3	4	5	6	7	Mean	S	MDL(mg/Kg)
56.65	59.40	58.61	57.04	59.40	56.65	55.47	57.6029	1.42205	**4.469**

WATER POLLUTION LABORATORY CERTIFICATION

LIMITED CHEMISTRY

00410 ALKALINITY

00436 ACIDITY

00500 TOT SOLIDS

00505 TOT VOLATILE SOLIDS

00530 SUSP SOLIDS

00545 SETT SOLIDS-VOLUMETRIC

00556 OIL AND GREASE

00605 ORGANIC NITROGEN

00610 AMMONIA NITROGEN

00615 NITRITE

00625 TOT KJELDAHL NITROGEN

00630 NITRATE

00650 PHOSPHORUS, TOT AS PO4

00660 ORTHOPHOSPHATE AS PO4

00665 PHOSPHORUS, TOT AS P

00671 ORTHOPHOSPHATE AS P

00680 ORGANIC CARBON, TOTAL

00681 ORGANIC CARBON, DISSOLVED

00720 CYANIDE, TOTAL

00722 CYANIDE, AMEN TO CHLOR

00740 SULFITE

00745 SULFIDE

WATER POLLUTION LABORATORY CERTIFICATION

LIMITED CHEMISTRY

00900 HARDNESS

00940 CHLORIDE

00945 SULFATE

00951 FLUORIDE, TOTAL

00955 SILICA

01032 CR HEX

32730 PHENOLS

38260 SURFACTANTS

70300 TOT DISS SOLIDS

METALS

00915 CALCIUM (ICAP)

00916 CALCIUM (AA)

00925 MAGNESIUM (ICAP)

00927 MAGNESIUM (AA)

00929 SODIUM (ICAP)

00930 SODIUM (AA)

00935 POTASSIUM (ICAP)

00937 POTASSIUM (AA)

00956 SILICA (ICAP)

01000 ARSENIC (ICAP)

01002 ARSENIC (AA/GF)

WATER POLLUTION LABORATORY CERTIFICATION

METALS

01005	BARIUM (ICAP)
01007	BARIUM (AA/GF)
01010	BERYLLIUM (ICAP)
01012	BERYLLIUM (AA/GF)
01020	BORON (ICAP)
01025	CADMIUM (ICAP)
01027	CADMIUM (AA/GF)
01030	CHROMIUM (ICAP)
01032	CHROMIUM VI (AA)
01034	CHROMIUM (AA/GF)
01035	COBALT (ICAP)
01037	COBALT (AA/GF)
01040	COPPER (ICAP)
01042	COPPER (AA/GF)
01045	IRON (ICAP)
01046	IRON (AA/GF)
01049	LEAD (ICAP)
01051	LEAD (AA/GF)
01055	MANGANESE (ICAP)
01056	MANGANESE (AA/GF)
01057	THALLIUM (ICAP)
01059	THALLIUM (AA/GF)

Quanterra Incorporated, Pittsburgh
METHOD DETECTION LIMIT STUDY

DATE LAST REVISED:		PROG/PROJECT:	MATRIX: soil
METHOD:	8260B Soil	PROJECT NUMBER:	
METHOD DESCRIPTION:	8260B Methanol Extraction	ANALYST: KLG	
PREP METHOD:	PURGE AND TRAP	QUALITY ASSURANCE:	

ANALYSIS DATE	ANALYSIS METHOD	ANALYTE	SPIKE CONC ug/L	REPLICATE MEASUREMENT 1	2	3	4	5	6	7	AVG ug/L	SPIKE REC. %	S ug/L	MDL ug/L	Report Limit ug/L	NOTES	
01/16/96	8260B	CHLOROMETHANE	250	191.9	203.4	187.05	167.45	253.05	244.5	285.6	218.99	87.60%	42.6246938	133.969413	250		
01/16/96	8260B	VINYL CHLORIDE	250	173.1	236.6	205.25	170.3	256.25	269.4	291.1	228.86	91.54%	47.2992462	148.661531	250		
01/16/96	8260B	BROMOMETHANE	250	159.9	197.25	261.05	173.75	329.8	324.65	309.2	250.8	100.32%	73.3457111	230.52557	250		
01/16/96	8260B	CHLOROETHANE	250	152.6	203.3	197.1	186.05	243.55	226.05	256	209.52	83.81%	35.8965581	112.194273	250		
01/16/96	8260B	1,1DICHLOROETHENE	250	220.25	219.45	202.75	190.4	259.45	268.1	279.35	234.26	93.70%	34.5064166	108.459954	250		
01/16/96	8260B	TRANS1,2DICHLOROETHENE	250	202.65	216.7	205	205.35	276.35	266.25	284.6	236.7	94.68%	37.1637144	116.806554	250		
01/16/96	8260B	CIS1,2DICHLOROETHENE	250	202.7	220.3	213.1	200.75	265.75	261.45	284.25	238.33	95.33%	37.334578	117.342579	250		
01/16/96	8260B	METHYLENE CHLORIDE	250	205.5	211.05	227.35	199.95	282.75	280.65	281.95	241.31	96.53%	38.7730009	121.863542	250		
01/16/96	8260B	CARBON DISULFIDE	250	202.35	213.75	198.75	214.6	246.35	239.4	258.05	224.75	89.90%	23.0646013	72.4920419	250		
01/16/96	8260B	1,1DICHLOROETHANE	250	202.6	216.6	218.35	214.2	263.45	260.35	281.65	239.6	95.84%	34.1377357	107.294903	250		
01/16/96	8260B	CHLOROFORM	250	212	227.45	217.4	215.15	268.5	262.5	280.3	243.33	97.33%	32.235641	101.31662	250		
01/16/96	8260B	1,1,1TRICHLOROETHANE	250	219.4	236.6	210.05	210.65	272.5	261.6	274.7	243.64	97.46%	31.8652166	100.152376	500		
01/16/96	8260B	ACETONE	500	346.65	292.8	314.95	303.9	372	346.65	327.6	329.22	65.84%	27.7233785	87.1346796	250		
01/16/96	8260B	VINYL ACETATE	250	138.8	133.6	147.15	139.95	185.2	198.45	198.35	163.07	65.23%	29.5286706	92.8066114	500		
01/16/96	8260B	2BUTANONE	500	333.6	277.8	316.35	330.35	384	363.4	320.1	332.23	66.45%	34.2029466	107.499661	250		
01/16/96	8260B	CARBON TETRACHLORIDE	250	223.3	234.95	198	197.45	252.3	255.15	257.9	231.29	92.52%	25.9788926	81.6516592	250		
01/16/96	8260B	1,2DICHLOROETHANE	250	184.7	194.05	201.3	198.85	255.4	270.35	265.85	224.36	89.74%	37.5812833	118.117974	250		
01/16/96	8260B	BENZENE	250	220.75	229.7	218.25	219.75	281.25	279.95	279.7	247.06	98.82%	31.3196291	98.4376842	250		
01/16/96	8260B	TRICHLOROETHENE	250	224.95	236.15	222.7	218.15	284.8	293.55	296.7	253.86	101.54%	35.9706844	113.05649	250		
01/16/96	8260B	1,2DICHLOROPROPANE	250	197.7	199.15	210.1	203.7	266.6	267	278.85	231.87	92.75%	36.8625358	115.85895	250		
01/16/96	8260B	BROMODICHLOROMETHANE	250	188.4	188.35	192.9	198.05	248.25	252.85	256.75	217.94	87.17%	32.6966195	102.768475	250		
01/16/96	8260B	CIS1,3DICHLOROPROPENE	250	162.75	166.8	182.3	169.9	232.25	225.6	242.55	197.45	78.98%	34.5678906	108.646838	250		
01/16/96	8260B	TOLUENE	250	230.8	236.5	223.05	227	274.3	288.5	282.85	251.86	100.74%	28.6780996	90.1269812	250		
01/16/96	8260B	TRANS1,3DICHLOROPROPENE	250	156.95	152.6	162.25	151.85	202.65	207.25	209.2	177.54	71.01%	27.2496592	85.645679	250		
											#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!		#####	#DIV/0!
											#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!		#####	#DIV/0!
											#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!		#####	#DIV/0!

Footnote 1 = If this footnote appears next to the MDL, the calculated MDL was more than 10 times less than the spiking level, therefore the MDL shown is set at exactly 10 times less than the spiking level.

	GCMS#1	Apr-98										
	8260		1	2	3	4	5	6	7			
			ZG414	ZG415	ZG418	ZG419	ZG479	ZG478	ZG481	stdev	MDL	PQL
Acrolein			76.73	56.61	44.20	30.14	60.80	52.57	29.17	17.05	53.58	100
Acetonitrile			43.62	51.73	38.34	37.70	69.27	29.80	39.10	12.88	40.48	100
Allyl Chloride			10.54	11.09	9.81	9.54	11.85	10.33	12.04	0.96	3.02	5.0
Acrylonitrile			69.06	70.93	62.50	67.53	84.56	71.37	60.92	7.74	24.31	100
2-Chloro-1,3-Butadiene			11.15	10.91	10.19	9.96	11.81	10.71	12.32	0.84	2.65	5.0
Propionitrile			49.18	47.94	44.18	42.81	58.88	44.72	40.82	5.99	18.84	100
Methacrylonitrile			13.08	12.70	10.43	10.11	14.59	11.93	10.83	1.62	5.09	100
Isobutyl Alcohol			271.32	285.22	198.42	172.10	306.83	228.28	184.50	53.06	166.76	200
Methyl Methacrylate			11.08	12.70	10.25	12.03	11.66	10.82	10.16	0.94	2.95	10
1,4-Dioxane			821.97	811.64	729.71	704.46	794.39	644.87	532.37	104.49	328.43	1000
Ethyl Methacrylate			10.61	8.92	6.74	4.72	10.40	9.61	6.68	2.22	6.99	10
Trans-1,4-Dichloro-2-Butene			9.35	9.59	8.43	8.90	10.26	10.08	7.53	0.96	3.02	5.0
				H:\GROUP\EXCEL\MSVOA\MS1GEMDL								

GF Appendix IX

Method Detection Limit Study

General Testing Corporation

EPA Method #: 8270 1625

Date: 09/22/97

Analyst: T. Brown

Instrument: GC/MS #2

Analyte	Conc. Inj (ul/L)	Trial #1	Trial #2	Trial #3	Trial #4	Trial #5	Trial #6	Trial #7	Trial #8	Trial #9	Mean (ul/L)	S	N # of reps	MDL (ul/L)
Pyridine	10	3.54	3.98	3.73	3.81	3.88	3.97	4.47	3.56	3.37	3.81	0.3417	9	0.990
N-Nitrosodimethylamine	10	3.63	4.22	4.22	3.97	4.08	4.00	4.41	3.93	3.94	4.04	0.2371	9	0.687
Aniline	10	5.72	6.44	6.09	6.55	6.09	6.35	6.62	5.88	6.11	6.21	0.3234	9	0.937
Phenol	10	3.31	3.85	3.54	3.83	3.81	3.76	3.72	3.46	3.53	3.65	0.2030	9	0.588
bis(2-Chloroethyl)Ether	10	6.65	7.15	7.04	7.29	6.90	7.13	7.88	6.72	7.13	7.10	0.3823	9	1.107
2-Chlorophenol	10	6.91	7.59	7.01	7.55	7.43	7.45	7.74	6.65	6.97	7.26	0.3985	9	1.154
1,3-Dichlorobenzene	10	4.44	5.08	5.03	4.58	4.43	4.55	4.98	4.90	4.97	4.77	0.2840	9	0.822
1,4-Dichlorobenzene	10	4.81	5.21	5.38	4.69	4.66	4.82	5.36	5.26	5.28	5.05	0.3181	9	0.921
1,2-Dichlorobenzene	10	4.94	5.65	5.63	5.09	5.01	4.87	5.76	5.24	5.76	5.33	0.3922	9	1.136
Benzyl Alcohol	10	5.54	6.91	6.77	7.73	5.85	6.37	7.67	7.00	6.63	6.72	0.7794	9	2.257
2,2' -oxybis-(1-Chloropropane)	10	5.54	6.22	5.69	6.28	5.92	5.95	6.30	5.59	6.18	5.96	0.3186	9	0.923
2-Methylphenol	10	6.58	7.19	6.97	7.48	6.94	6.77	7.76	5.71	6.98	6.93	0.6162	9	1.784
N-Nitroso-Di-n-propylamine	10	6.64	7.02	6.59	7.43	6.97	6.87	7.49	6.33	6.97	6.92	0.4000	9	1.158
Hexachloroethane	10	3.80	4.14	4.24	3.96	3.64	3.95	4.39	3.94	4.26	4.04	0.2551	9	0.739
4-Methylphenol	10	6.36	7.19	6.53	7.32	7.03	7.19	7.01	6.22	6.44	6.81	0.4442	9	1.286
N tene	10	6.13	6.94	6.92	7.29	7.06	6.70	7.28	6.28	6.57	6.80	0.4364	9	1.264
Is ve	10	7.33	7.78	7.80	8.38	8.18	8.00	8.19	7.23	7.44	7.81	0.4352	9	1.260
2- henol	10	6.52	7.16	6.66	7.33	6.94	7.00	7.24	6.03	6.34	6.80	0.4693	9	1.359
Benzoic acid	10										0.00	0.0000	9	0.000
2,4-Dimethylphenol	10	5.86	8.18	5.88	8.29	6.74	6.71	6.64	5.73	6.02	6.67	1.0269	9	2.974
bis(2-Chloroethoxy)Methane	10	7.00	7.81	7.74	8.45	8.63	8.58	8.41	7.48	7.52	7.96	0.6153	9	1.782
2,4-Dichlorophenol	10	5.86	8.35	7.94	9.12	8.55	8.63	8.39	7.29	7.67	7.98	1.0215	9	2.958
1,2,4-Trichlorobenzene	10	5.22	5.68	5.87	5.52	5.64	5.10	5.84	5.61	5.53	5.56	0.2723	9	0.789
Naphthalene	10	7.01	7.52	7.73	7.65	7.27	7.42	7.68	7.37	7.60	7.47	0.2452	9	0.710
4-Chloroaniline	10	7.49	8.11	7.92	8.55	8.57	8.26	8.35	7.45	7.64	8.04	0.4616	9	1.337
Hexachlorobutadiene	10	4.22	4.82	4.97	4.85	4.29	3.98	4.86	4.16	4.40	4.51	0.3922	9	1.136
2-Methylnaphthalene	10	7.41	8.08	7.75	7.98	7.98	7.78	7.91	7.66	7.80	7.82	0.2146	9	0.621
4-Chloro-3-methylphenol	10	8.52	9.03	8.74	9.88	9.56	9.18	9.20	8.15	8.32	8.95	0.6075	9	1.759
Hexachlorocyclopentadiene	10										0.00	0.0000	9	0.000
2,4,6-Trichlorophenol	10	8.32	8.40	8.58	9.05	9.01	8.29	8.73	8.01	8.48	8.54	0.3624	9	1.049
2,4,5-Trichlorophenol	10	8.74	8.92	9.16	9.73	8.75	8.69	8.91	7.90	8.58	8.82	0.5161	9	1.495
2-Chloronaphthalene	10	7.26	8.05	8.18	8.43	8.07	7.75	8.33	7.82	8.00	7.99	0.3702	9	1.072
2-Nitroaniline	10	7.94	8.46	8.17	9.02	8.76	8.34	8.36	7.55	7.72	8.26	0.5017	9	1.453
Acenaphthylene	10	8.21	8.95	9.20	9.58	9.04	8.98	9.25	8.58	8.87	8.96	0.4189	9	1.213
Dimethyl Phthalate	10	5.28	5.55	5.26	3.95	4.34	2.90	2.22	2.27	2.69	3.83	1.4314	9	4.145
2,6-Dinitrotoluene	10	7.46	7.29	7.64	8.66	7.91	8.00	7.86	7.21	7.48	7.72	0.4735	9	1.371
Acenaphthene	10	8.55	9.30	9.36	9.62	9.07	9.21	9.86	9.12	9.00	9.23	0.3976	9	1.151
3-Nitroaniline	10	8.00	8.41	8.61	8.91	8.45	8.11	8.06	7.81	8.17	8.28	0.3636	9	1.053
2,4-Dinitrophenol	10										0.00	0.0000	9	0.000
D furan	10	8.57	8.81	9.41	9.66	9.22	9.10	9.53	8.89	8.81	9.11	0.3935	9	1.140
2 trotoluene	10	7.34	7.67	7.57	8.28	8.03	7.97	7.45	7.08	7.54	7.66	0.3974	9	1.151
4-Nitrophenol	10	2.41	3.35	2.74	2.80	2.67	2.78	2.35	2.44	2.26	2.64	0.3521	9	1.020
Fluorene	10	10.01	10.47	10.54	11.18	10.84	10.63	11.15	10.10	10.39	10.59	0.4372	9	1.266
4-Chlorophenyl-phenylether	10	9.12	9.36	9.69	9.82	9.40	9.35	9.68	9.17	8.96	9.39	0.3064	9	0.887

WATER POLLUTION LABORATORY CERTIFICATION

METALS

01060	MOLYBDENUM (ICAP)
01062	MOLYBDENUM (AA/GF)
01065	NICKEL (ICAP)
01067	NICKEL (AA/GF)
01075	SILVER (ICAP)
01077	SILVER (AA/GF)
01085	VANADIUM (ICAP)
01087	VANADIUM (AA/GF)
01090	ZINC (ICAP)
01092	ZINC (AA/GF)
01095	ANTIMONY (ICAP)
01097	ANTIMONY (AA/GF)
01102	TIN (AA/GF)
01105	ALUMINUM (ICAP)
01106	ALUMINUM (AA/GF)
01147	SELENIUM (AA/GF)
01152	TITANIUM (AA/GF)
71900	MERCURY (COLD VAPOR)

ORGANICS

601	PURGEABLE HALOCARBONS(GC)
602	PURGEABLE AROMATICS (GC)

WATER POLLUTION LABORATORY CERTIFICATION

ORGANICS

608 PESTICIDES & PCBS (GC)

610 PAH

624 PURGEABLES (GC/MS)

625 B/N, ACIDS & PEST (GC/MS)

THIS LIST MUST BE CONSPICUOUSLY DISPLAYED WITH THE PERMANENT CERTIFICATE AT THE LABORATORY

Attachment D

BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Laboratory Qualifications for Quanterra Environmental Services, Inc.

The Commonwealth of Massachusetts

Department of Environmental Protection

Division of Environmental Analysis
Senator William X. Wall Experiment Station

certifies

M- PA164 Quanterra Environmental Services
Pittsburgh Laboratory
450 William Pitt Way
Pittsburgh, PA 15238

Laboratory Director: **Albert Vicinie**

for the ***Chemical Analysis of Potable and Non-Potable Water***

pursuant to 310 CMR 42.00

This certificate supersedes all previous Massachusetts certificates issued to this laboratory. The laboratory is regulated by and shall be responsible for being in compliance with Massachusetts regulations at 310 CMR 42.00.

This certificate is valid only when accompanied by the latest dated Certified Parameter List as issued by the Massachusetts D.E.P.

Certification is no guarantee of the validity of the data. This certification is subject to unannounced laboratory inspections.

Director, Division of Environmental Analysis

Issued: **07/01/98**

Expires: **06/30/99**

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Certified Parameter List

EFFECTIVE DATE: 07/01/98

EXPIRATION DATE: 06/30/99

M-PA164 Quanterra Environmental Services
Pittsburgh, PA

NON-POTABLE WATER

202 Antimony
203 Arsenic
204 Beryllium
205 Cadmium
206 Chromium
208 Copper
209 Iron
210 Lead
211 Manganese
212 Mercury
214 Nickel
215 Selenium
216 Silver
218 Thallium
222 pH
* 223 Specific Conductivity
* 224 Total Dissolved Solids
225 Total Hardness (CaCO3)
226 Calcium
227 Magnesium
228 Sodium
229 Potassium
230 Total Alkalinity
231 Chloride
232 Fluoride
233 Sulfate
235 Nitrate-N
242 Total Cyanide
247 Volatile Halocarbons
248 Volatile Aromatics
249 Chlordane
250 Aldrin
251 Dieldrin
255 Heptachlor
256 Heptachlor Epoxide

* **Provisional Certification**

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Certified Parameter List

EFFECTIVE DATE: 07/15/98

EXPIRATION DATE: 06/30/99

M-PA164 Quanterra Environmental Services
Pittsburgh, PA

NON-POTABLE WATER

202 Antimony
203 Arsenic
204 Beryllium
205 Cadmium
206 Chromium
208 Copper
209 Iron
210 Lead
211 Manganese
212 Mercury
214 Nickel
215 Selenium
216 Silver
218 Thallium
222 pH
225 Total Hardness (CaCO3)
226 Calcium
227 Magnesium
228 Sodium
229 Potassium
230 Total Alkalinity
231 Chloride
* 232 Fluoride
233 Sulfate
235 Nitrate-N
242 Total Cyanide
247 Volatile Halocarbons
248 Volatile Aromatics
249 Chlordane
250 Aldrin
251 Dieldrin
255 Heptachlor
256 Heptachlor Epoxide

* **Provisional Certification**

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Certified Parameter List

EFFECTIVE DATE: 07/01/98

EXPIRATION DATE: 06/30/99

M-PA164 Quanterra Environmental Services
Pittsburgh, PA

POTABLE WATER

101 Antimony
102 Arsenic
103 Barium
104 Beryllium
105 Cadmium
106 Chromium
107 Copper
108 Lead
109 Mercury
110 Nickel
111 Selenium
113 Thallium
114 Nitrate-N
115 Nitrite-N
116 Fluoride
117 Sodium
118 Sulfate
119 Cyanide
122 Calcium
123 Total Alkalinity
124 Total Dissolved Solids
* 125 pH
128 2,4-D
129 2,4,5-TP
136 Chlordane
137 Endrin
138 Heptachlor
139 Heptachlor Epoxide
140 Hexachlorobenzene
* 141 Hexachlorocyclopentadiene
142 Lindane
143 Methoxychlor
144 Simazine
145 Toxaphene
153 Trihalomethanes
154 Volatile Organic Compounds

* **Provisional Certification**

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Certified Parameter List

EFFECTIVE DATE: 07/15/98

EXPIRATION DATE: 06/30/99

M-PA164 Quanterra Environmental Services
Pittsburgh, PA

POTABLE WATER

101 Antimony
102 Arsenic
103 Barium
104 Beryllium
105 Cadmium
106 Chromium
107 Copper
108 Lead
109 Mercury
110 Nickel
111 Selenium
113 Thallium
114 Nitrate-N
115 Nitrite-N
116 Fluoride
117 Sodium
119 Cyanide
122 Calcium
123 Total Alkalinity
124 Total Dissolved Solids
* 125 pH
128 2,4-D
129 2,4,5-TP
136 Chlordane
137 Endrin
138 Heptachlor
139 Heptachlor Epoxide
140 Hexachlorobenzene
* 141 Hexachlorocyclopentadiene
142 Lindane
143 Methoxychlor
144 Simazine
145 Toxaphene
153 Trihalomethanes
154 Volatile Organic Compounds

*** Provisional Certification**

The State of New Hampshire
Department of Environmental Services

CERTIFICATE OF APPROVAL
Drinking Water Analysis

Issued to
Quanterra Environmental Services

Located at
450 William Pitt Way, Pittsburgh, PA

Under the provisions of the Regulations in Env-C300
for the following analyses:

FULL CERTIFICATION: Metals by Graphite Furnace, Metals by ICP, Nitrate-N, Nitrite-N, Fluoride, Orthophosphate, Residual Free Chlorine, Turbidity, Total Filterable Residue, Calcium, pH, Alkalinity, Corrosivity, Sodium, Sulfate, Total Cyanide, TOC, Insecticides (Compliance List), Trihalomethanes, Volatile Organics, and Vinyl Chloride.

PROVISIONAL CERTIFICATION: Herbicides (Compliance List).

CERTIFICATE NUMBER: 203098-A

DATE OF ISSUE: April 5, 1998

EXPIRATION DATE: April 4, 1999

Charles M. Boyce
Certifying Officer

NEW YORK STATE DEPARTMENT OF HEALTH

BARBARA A. DEBUONO, M.D., M.P.H. Commissioner

Expires 12:01 AM April 1, 1999
ISSUED April 1, 1998
REVISED June 17, 1998

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

Lab ID No.: 11182

Director: MR. ALBERT VICINIE
Lab Name: QUANTERRA INC
Address : 450 WILLIAM PITT WAY - BLDG 6
PITTSBURGH PA 15238

is hereby APPROVED as an Environmental Laboratory for the category

ENVIRONMENTAL ANALYSES/SOLID AND HAZARDOUS WASTE

All approved subcategories and/or analytes are listed below:

Characteristic Testing :
- Corrosivity
- Ignitability
- Reactivity
- TCLP
- E.P. Toxicity

Volatile Chlorinate Organics (ALL)

Miscellaneous :
- Cyanide, Total
- Hydrogen Ion (pH)
- Sulfide (as S)

Organophosphate Pesticides (ALL)
Phthalate Esters (ALL)

Acrolein and Acrylonitrile (ALL)
Chlor. Hydrocarbon Pesticides (ALL)
Haloethers (ALL)
Metals II (ALL)
Polynuclear Arom. Hydrocarbon (ALL)
Priority Pollutant Phenols (ALL)

Chlorophenoxy Acid Pesticides (ALL)
Chlorinated Hydrocarbons (ALL)
Metals I (ALL)
Nitroaromatics Isophorone (ALL)
Polychlorinated Biphenyls (ALL)
Purgeable Aromatics (ALL)

Serial No.: 102540

Wadsworth Center

Property of the New York State Department of Health. Valid only at the address shown.
Must be conspicuously posted. Valid certificate has a red serial number.

DOH-3317 (3/97)

NEW YORK STATE DEPARTMENT OF HEALTH

BARBARA A. DEBUONO, M.D., M.P.H. Commissioner

Expires 12:01 AM April 1, 1999
ISSUED April 1, 1998
REVISED July 15, 1998

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

Lab ID No.: 11182

Director: MR. ALBERT VICINIE
Lab Name: QUANTERRA INC
Address : 450 WILLIAM PITT WAY - BLDG 6
PITTSBURGH PA 15238

is hereby APPROVED as an Environmental Laboratory for the category

CONTRACT LABORATORY PROTOCOL (CLP)

All approved subcategories and/or analytes are listed below:

CLP Inorganics | CLP PCB/Pesticides | CLP Semi-Volatile Organics | CLP Volatile Organics

Serial No.: 103392

Wadsworth Center

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DOH-3317 (3/97)

NEW YORK STATE DEPARTMENT OF HEALTH

BARBARA A. DEBUONO, M.D., M.P.H. Commissioner

Expires 12:01 AM April 1, 1999
ISSUED April 1, 1998
REVISED July 15, 1998

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

Lab ID No.: 11182

Director: MR. ALBERT VICINIE
Lab Name: QUANTERRA INC
Address : 450 WILLIAM PITT WAY - BLDG 6
PITTSBURGH PA 15238

is hereby APPROVED as an Environmental Laboratory for the category

ENVIRONMENTAL ANALYSES NON POTABLE WATER

All approved subcategories and/or analytes are listed below:

Wastewater Miscellaneous :
- Bromide
- Boron, Total
- Cyanide, Total
- Color
- Corrosivity
- Phenols
- & Grease Total Recoverable
- Hydrogen Ion (pH)
- Specific Conductance
- Silica, Dissolved
- Sulfide (as S)
- Surfactant (MBAS)
- Organic Carbon, Total

Mineral :
- Acidity
- Alkalinity
- Calcium Hardness
- Chloride
- Sulfate (as SO4)
- Hardness, Total

Polynuclear Aromatics (ALL)
Priority Pollutant Phenols (ALL)
Residue (ALL)

Acrolein and Acrylonitrile (ALL)
Chlorophenoxy Acid Pesticides (ALL)
Chlorinated Hydrocarbons (ALL)
Haloethers (ALL)
Wastewater Metals I (ALL)
Nitroaromatics and Isophorone (ALL)
Nutrient (ALL)
Polychlorinated Biphenyls (ALL)
Purgeable Aromatics (ALL)
TCLP Additional Compounds (ALL)

Benzidines (ALL)
Chlor. Hydrocarbon Pesticides (ALL)
Demand (ALL)
Wastewater Metals III (ALL)
Wastewater Metals II (ALL)
Nitrosoamines (ALL)
Organophosphate Pesticides (ALL)
Phthalate Esters (ALL)
Purgeable Halocarbons (ALL)
Volatile Chlorinated Organics (ALL)

Serial No.: 103391

Wadsworth Center

Property of the New York State Department of Health. Valid only at the address shown.
Must be conspicuously posted. Valid certificate has a red serial number.

DOH-3317 (3/97)

Quanterra Incorporated, Pittsburgh
METHOD DETECTION LIMIT STUDY

DATE LAST REVISED:	02/16/98	**PROG/PROJECT:**	**MATRIX:** WATER
METHOD;	SW-846 8260B P&T	**PROJECT NUMBER:**	
METHOD DESCRIPTION:	GCMS Volatiles, HP4	**ANALYST:** KWD	
PREP METHOD:	Purge & Trap 5 mL	**QUALITY ASSURANCE:** PAC 5	

ANALYSIS DATE	ANALYSIS METHOD	ANALYTE	SPIKE CONC ug/L	REPLICATE MEASUREMENT 1	2	3	4	5	6	7	AVG ug/L	SPIKE REC. %	S ug/L	MDL ug/L	Report Limit ug/L	NOTES	
02/12/98	8260B	Dichlorodifluoromethane	2.5	2.18	1.45	2	2.76	2.42	2.48	2.34	2.2329	89.31%	0.41939299	1.31818215	5		
02/12/98	8260B	Chloromethane	2.5	2.66	1.92	1.81	2.76	2.65	2.56	2.44	2.3843	95.37%	0.36936238	1.16090698	5		
02/12/98	8260B	Bromomethane	2.5	3.14	2.34	2.37	3.16	2.22	2.64	2.76	2.69	107.60%	0.38656606	1.21497719	5		
02/12/98	8260B	Vinyl Chloride	2.5	2.34	1.67	1.8	2.7	2.46	2.47	2.26	2.2429	89.71%	0.3746537	1.17722229	5		
02/12/98	8260B	Chloroethane	2.5	4.11	3.22	3.99	4.63	3.88	3.96	4.01	3.9286	157.14%	0.43048146	1.35300322	5		REC
02/12/98	8260B	Methylene Chloride	2.5	3.36	2.1	2.31	2.97	2.86	2.41	2.02	2.5757	103.03%	0.49742192	1.56339711	5		
02/12/98	8260B	Acetone	5	5.81	4.36	4.78	5.29	5.41	5.38	4.36	5.0557	101.11%	0.56251984	1.76799986	5		
02/12/98	8260B	Trichlorotrifluoroethane	2.5	2.87	1.64	1.94	2.17	2.05	1.88	1.46	2.0271	81.09%	0.43273218	1.36007725	5		
02/12/98	8260B	Ethanol	250	283.9	473.3	401.29	466.6	461.36	445.32	354.25	412.29	164.92%	70.8928128	222.784681	250		REC
02/12/98	8260B	Iodomethane	2.5	2.95	1.86	2.1	2.13	2.18	2.04	1.54	2.1143	84.57%	0.42879121	1.34769078	5		
02/12/98	8260B	Carbon Disulfide	2.5	2.65	1.62	1.8	1.97	1.77	1.55	1.24	1.8	72.00%	0.43984846	1.38244371	5		
02/12/98	8260B	Tert butyl Alcohol	50	59.29	40.77	20.05	57.22	52.47	44.32	40.54	44.951	89.90%	13.354564	41.9733948	50		
02/12/98	8260B	1,1 Dichloroethene	2.5	2.9	2.01	2.29	2.53	2.06	1.94	1.59	2.1686	87.54%	0.42846348	1.34668071	5		
02/12/98	8260B	1,1 Dichloroethane	2.5	3.06	1.95	2.19	2.49	2.36	2.03	1.69	2.2529	90.11%	0.44372342	1.39462272	5		
02/12/98	8260B	Trichlorofluoromethane	2.5	2.67	2.03	2.35	3.15	2.92	2.95	2.85	2.7029	108.11%	0.38904645	1.222773	5		
02/12/98	8260B	Trans 1,2 Dichloroethene	2.5	3.24	2	2.27	2.61	2.42	2.19	1.74	2.3529	94.11%	0.48161646	1.51340311	5		
02/12/98	8260B	Cis 1,2 Dichloroethene	2.5	3.11	2.1	2.42	2.54	2.5	2.26	1.75	2.3843	95.37%	0.42003401	1.3201669	5		
02/12/98	8260B	Methyl Tert Butyl Ether	2.5	3.03	2.08	2.29	2.48	2.46	2.15	1.72	2.3157	92.63%	0.40764784	1.28092285	5		
02/12/98	8260B	Hexane	2.5	2.86	1.76	1.88	2.17	1.99	1.77	1.37	1.9714	78.86%	0.46272485	1.4543442	5		
02/12/98	8260B	Tetrahydrofuran	2.5	4.27	2.56	2.67	3.2	3.04	3.73	2.67	3.1629	126.51%	0.53418489	1.99324311	5		
02/12/98	8260B	Chloroform	2.5	3.12	2.03	2.36	2.56	2.41	2.21	1.84	2.3614	94.46%	0.41269151	1.29708943	5		
02/12/98	8260B	1,2 Dichloroethane	2.5	3.27	2.14	2.4	2.63	2.6	2.23	1.9	2.4529	98.11%	0.44285868	1.39190483	5		
02/12/98	8260B	Dibromomethane	2.5	3.14	1.92	2.44	2.62	2.47	2.22	1.66	2.3557	94.23%	0.47783739	1.50184292	5		
02/12/98	8260B	2 Butanone	5	4.43	3.66	3.89	4.33	4.64	4.35	3.2	4.0571	81.14%	0.49206078	1.54654703	5		
02/12/98	8260B	1,4 Dioxane	125	115.98	201.12	194.25	202.75	206.23	199.67	152.05	181.72	145.38%	34.4011165	108.122709	125		
02/12/98	8260B	1,1,1 Trichloroethane	2.5	3.01	1.99	2.33	2.48	2.33	2.1	1.65	2.27	90.80%	0.42634102	1.33998983	5		
02/12/98	8260B	Carbon Tetrachloride	2.5	2.69	1.73	1.99	2.28	1.94	1.86	1.41	1.9857	79.43%	0.40771138	1.28143688	5		

Footnote 1 = If this footnote appears next to the MDL, the calculated MDL was more than 10 times less than the spiking level, therefore the MDL shown is set at exactly 10 times less than the spiking level.

Quanterra Incorporated, Pittsburgh
METHOD DETECTION LIMIT STUDY

DATE LAST REVISED:	02/16/98	PROG/PROJECT:	MATRIX: WATER
METHOD:	SW-846 8260B P&T	PROJECT NUMBER:	
METHOD DESCRIPTION:	GCMS Volatiles, HP4	ANALYST: KWD	
PREP METHOD:	Purge & Trap 5 mL	QUALITY ASSURANCE: PAC	

ANALYSIS DATE	ANALYSIS METHOD	ANALYTE	SPIKE CONC ug/L	REPLICATE MEASUREMENT 1	2	3	4	5	6	7	AVG ug/L	SPIKE REC. %	S ug/L	MDL ug/L	Report Limit ug/L	NOTES	
02/12/98	8260B	Bromodichloromethane	2.5	2.96	1.89	2.28	2.5	2.28	1.95	1.57	2.2043	88.17%	0.45393026	1.42638851	5		
02/12/98	8260B	1,2 Dichloropropane	2.5	3.06	1.95	2.19	2.49	2.36	2.03	1.69	2.2529	90.11%	0.44372342	1.39462272	5		
02/12/98	8260B	Cis 1,3 Dichloropropene	2.5	3.03	1.86	2.34	2.36	2.33	2.01	1.69	2.2314	89.26%	0.43891641	1.37951429	5		
02/12/98	8260B	Trichloroethene	2.5	3.04	1.87	2.39	2.41	2.16	2.1	1.68	2.2357	89.43%	0.44116728	1.38658877	5		
02/12/98	8260B	Dibromochloromethane	2.5	3.12	1.88	2.45	2.44	2.24	2.09	1.65	2.2671	90.69%	0.47496366	1.49281078	5		
02/12/98	8260B	1,2 Dibromoethane	2.5	3.09	1.96	2.43	2.52	2.35	2.14	1.61	2.3286	93.14%	0.42179887	1.32571384	5		
02/12/98	8260B	1,2,3 Trichloropropane	2.5	2.95	1.91	2.37	2.19	2.45	2.05	1.74	2.2371	89.48%	0.40052941	1.25886394	5		
02/12/98	8260B	1,1,2 Trichloroethane	2.5	3.01	1.99	2.33	2.48	2.33	2.1	1.65	2.27	90.80%	0.42634102	1.33998983	5		
02/12/98	8260B	Benzene	2.5	3.19	2.04	2.33	2.56	2.4	2.17	1.77	2.3514	94.06%	0.45046008	1.41579604	5		
02/12/98	8260B	Ethyl Methacrylate	2.5	3.17	2.12	2.44	2.23	2.48	2.17	1.91	2.36	94.40%	0.40620192	1.27669264	5		
02/12/98	8260B	Trans 1,3 Dichloropropene	2.5	3.08	1.85	2.3	2.44	2.34	2.05	1.71	2.2529	90.11%	0.45224309	1.42140002	5		
02/12/98	8260B	Bromoform	2.5	2.84	1.75	2.17	2.15	2.32	1.93	1.56	2.1029	84.11%	0.41760086	1.3126195	5		
02/12/98	8260B	4Methyl 2Pentanone	5	5.35	4.1	5.02	4.69	5.41	4.72	4.48	4.8243	96.49%	0.47077444	1.47964406	5		
02/12/98	8260B	2Hexanone	5	3.87	2.93	3.75	3.39	3.91	3.69	2.92	3.4943	69.89%	0.42362944	1.33146734	5		
02/12/98	8260B	Tetrachloroethene	2.5	3.14	2.08	2.43	2.47	2.24	2.31	1.72	2.3414	93.66%	0.4336677	1.36270329	5		
02/12/98	8260B	1,1,2,2 Tetrachloroethane	2.5	2.99	2.14	2.66	2.41	2.76	2.31	1.89	2.4614	98.06%	0.37918469	1.19177716	5		
02/12/98	8260B	Toluene	2.5	3.39	2.08	2.52	2.62	2.51	2.36	1.89	2.4814	99.26%	0.47831052	1.50332996	5		
02/12/98	8260B	Chlorobenzene	2.5	3.33	2.03	2.54	2.55	2.55	2.35	1.94	2.47	98.80%	0.45574115	1.43239445	5		
02/12/98	8260B	Ethyl Benzene	2.5	3	2.04	2.41	2.47	2.38	2.25	1.77	2.3314	93.26%	0.38329399	1.20469302	5		
02/12/98	8260B	Styrene	2.5	2.82	1.85	2.31	2.28	2.27	2.04	1.67	2.1771	87.09%	0.3726354	1.17119307	5		
01/15/98	8260B	Trans1,4Dichloro2Butene	2.5	3.06	2.08	2.66	2.56	2.64	2.26	1.77	2.4186	96.74%	0.42128488	1.32409839	5		
01/15/98	8260B	O-Xylene	2.5	2.87	1.84	2.27	2.33	2.27	2.13	1.64	2.1929	87.71%	0.39228877	1.23296359	5		
01/15/98	8260B	M,P Xylene	5	6.04	3.82	4.83	4.82	4.71	4.31	3.37	4.5571	91.14%	0.85435579	2.68524024	5		
01/15/98	8260B	1,3 Dichlorobenzene	2.5	3.07	2.05	2.6	2.61	2.39	2.19	1.77	2.3829	95.31%	0.427111	1.34240988	5		
01/15/98	8260B	1,4 Dichlorobenzene	2.5	3.2	2.12	2.73	2.65	2.5	2.28	1.88	2.48	99.20%	0.43585166	1.36988176	5		
01/15/98	8260B	1,2 Dichlorobenzene	2.5	3.11	2.01	2.72	2.63	2.41	2.19	1.82	2.4129	96.51%	0.4456227	1.40027785	5		
01/15/98	8260B		5								#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0! ****	5	#####	#DIV/0!

Footnote 1 = If this footnote appears next to the MDL, the calculated MDL was more than 10 times less than the spiking level, therefore the MDL shown is set at exactly 10 times less than the spiking level.

Quanterra Incorporated, Pittsburgh
METHOD DETECTION LIMIT STUDY

DATE LAST REVISED:		PROG/PROJECT:	MATRIX: SOIL
METHOD:	8260B Low Level Soil	PROJECT NUMBER:	
METHOD DESCRIPTION:	SW-846 GCMS Volatiles HP4	ANALYST: KWD	
PREP METHOD:	PURGE AND TRAP 5 gm	QUALITY ASSURANCE: 5	

ANALYSIS DATE	ANALYSIS METHOD	ANALYTE	SPIKE CONC ug/kg	REPLICATE MEASUREMENT 1	2	3	4	5	6	7	AVG ug/kg	SPIKE REC. %	S ug/kg	MDL ug/kg	Report Limit ug/kg	NOTES	
02/16/96	8260B	Dichlorodifluoromethane	2.5	2.25	2.67	2.58	2.72	2.38	2.47	2.39	2.4943	99.77%	0.16998599	0.53426598	5		
02/16/96	8260B	Chloromethane	2.5	2.7	2.66	2.69	2.87	2.74	2.76	2.61	2.7186	108.74%	0.08316218	0.26134731	5		
02/16/96	8260B	Bromomethane	2.5	4.13	4.06	3.72	3.97	3.99	3.87	3.71	3.8929	155.71%	0.18621214	0.59155076	5		REC
02/16/96	8260B	Vinyl Chloride	2.5	2.2	2.52	2.38	2.6	2.31	2.39	2.42	2.4029	96.11%	0.13123951	0.41248579	5		
02/16/96	8260B	Chloroethane	2.5	4.9	4.48	3.78	4.58	3.91	4.3	3.79	4.2486	169.94%	0.43491105	1.36692542	5		REC
02/16/96	8260B	Methylene Chloride	4	4.34	4.31	3.4	4.21	4.09	4.48	3.55	4.0543	101.36%	0.41556617	1.30612446	5		
02/16/96	8260B	Acetone	4	7.13	6.5	5.72	6.75	5.59	6.77	7.11	6.51	162.75%	0.62452649	1.96288675	5		REC
02/16/96	8260B	Trichlorotrifluoroethane	4	3.12	3.74	2.96	3.84	3.54	4.09	3.33	3.5171	87.93%	0.40532762	1.2739447	5		
02/16/96	8260B	Ethanol	200	494.83	432.98	343.12	451.83	390.52	470	422.27	429.36	214.68%	50.747885	159.500602	250		REC
02/16/96	8260B	Iodomethane	4	2.31	2.51	2.14	2.45	2.34	2.47	1.74	2.28	57.00%	0.2688246	0.84491572	5		
02/16/96	8260B	Carbon Disulfide	4	3.31	3.69	2.99	3.81	3.51	3.97	3.22	3.5	87.50%	0.3482815	1.09464874	5		
02/16/96	8260B	Tert butyl Alcohol	40	67.66	61.5	46.64	75.71	64.99	67.94	58.09	67.507	168.77%	12.7083601	39.9424385	50		REC
02/16/96	8260B	1,1 Dichloroethene	4	3.39	3.82	3.09	3.91	3.57	4.08	3.44	3.6143	90.36%	0.34258124	1.07673283	5		
02/16/96	8260B	1,1 Dichloroethane	4	3.47	3.77	3.1	3.83	3.71	4.05	3.37	3.6143	90.36%	0.32009671	1.00606396	5		
02/16/96	8260B	Trichlorofluoromethane	2.5	1.29	1.5	1.6	1.53	1.46	1.49	3.28	1.7357	69.43%	0.68752835	2.16090182	5		
02/16/96	8260B	Trans 1,2 Dichloroethene	4	3.54	3.76	2.99	3.79	3.61	4.15	3.26	3.5857	89.64%	0.37730877	1.18588145	5		
02/16/96	8260B	Cis 1,2 Dichloroethene	4	3.44	3.74	3.13	3.76	3.75	3.99	3.23	3.5771	89.43%	0.31610728	0.99352517	5		
02/16/96	8260B	Methyl Tert Butyl Ether	4	3.59	3.5	2.87	3.76	3.41	3.85	3.29	3.4671	86.68%	0.32653301	1.02629326	5		
02/16/96	8260B	Hexane	4	6.03	4.98	3.19	3.96	3.8	4.71	3.13	4.2571	106.43%	1.04699115	3.2906932	5		
02/16/96	8260B	Tetrahydrofuran	4	5.23	4.5	4.05	4.87	4.29	5.02	5	4.7086	117.71%	0.43441258	1.36535872	5		
02/16/96	8260B	Chloroform	4	3.63	3.91	3.04	3.7	3.77	4.04	3.49	3.6543	91.36%	0.32621055	1.02213677	5		
02/16/96	8260B	1,2 Dichloroethane	4	3.74	3.77	3.05	3.96	3.7	4.09	3.61	3.7029	92.57%	0.33084308	1.0398398	5		
02/16/96	8260B	Dibromomethane	4	3.76	3.59	2.82	3.77	3.35	3.84	3.55	3.5257	88.14%	0.35283883	1.10897243	5		
02/16/96	8260B	2 Butanone	4	6.38	5.82	5.1	5.99	5.27	6.08	5.4	5.72	143.00%	0.47212287	1.48388217	5		
02/16/96	8260B	1,4 Dioxane	100	196.32	182.71	130.1	190.98	156.23	178.83	160.56	170.82	170.82%	23.2323836	73.0193816	125		REC
02/16/96	8260B	1,1,1 Trichloroethane	4	3.32	3.74	3.06	3.81	3.56	4.04	3.28	3.5471	88.68%	0.33924987	1.06626235	5		
02/16/96	8260B	Carbon Tetrachloride	4	2.9	3.31	2.69	3.25	3.09	3.26	3.11	3.0871	77.18%	0.22336176	0.70202601	5		

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Quanterra Incorporated, Pittsburgh
METHOD DETECTION LIMIT STUDY

DATE LAST REVISED:		PROG/PROJECT:	MATRIX: SOIL
METHOD:	8260B Low Level Soil	PROJECT NUMBER:	
METHOD DESCRIPTION:	SW-846 GCMS Volatiles HP4	ANALYST: KWD	
PREP METHOD:	PURGE AND TRAP 5 gm	QUALITY ASSURANCE:	

ANALYSIS DATE	ANALYSIS METHOD	ANALYTE	SPIKE CONC ug/kg	REPLICATE MEASUREMENT 1	2	3	4	5	6	7	AVG ug/kg	SPIKE REC. %	S ug/kg	MDL ug/kg	Report Limit ug/kg	NOTES	
02/16/96	8260B	Bromodichloromethane	4	3.43	3.44	2.73	3.59	3.24	3.69	3.16	3.3257	83.14%	0.32046098	1.00720885	5		
02/16/96	8260B	1,2 Dichloropropane	4	3.47	3.77	3.1	3.83	3.71	4.05	3.37	3.6143	90.36%	0.32009671	1.00606396	5		
02/16/96	8260B	Cis 1,3 Dichloropropene	4	3.47	3.34	2.82	3.61	3.32	3.58	3.05	3.3129	82.82%	0.28784917	0.90470993	5		
02/16/96	8260B	Trichloroethene	4	3.41	3.56	2.84	3.73	3.35	3.92	3.24	3.4357	85.89%	0.35065924	1.102122	5		
02/16/96	8260B	Dibromochloromethane	4	3.13	3.06	2.58	3.21	3.06	3.3	2.85	3.0271	75.68%	0.24219237	0.76121061	5		
02/16/96	8260B	1,2 Dibromoethane	4	3.54	3.4	2.86	3.71	3.31	3.68	3.28	3.3957	84.89%	0.29410073	0.92435859	5		
02/16/96	8260B	1,2,3 Trichloropropane	4	3.74	3.36	2.75	3.55	3.17	3.59	3.34	3.3571	83.93%	0.32709399	1.0280564	5		
02/16/96	8260B	1,1,2 Trichloroethane	4	3.32	3.74	3.08	3.81	3.56	4.04	3.26	3.5471	88.68%	0.33924987	1.06626235	5		
02/16/96	8260B	Benzene	4	3.5	3.69	3.03	3.66	3.6	3.98	3.0	3.58	89.50%	0.28524843	0.89653581	5		
02/16/96	8260B	Ethyl Methacrylate	4	3.22	2.98	2.57	3.44	3.01	3.46	3.12	3.1143	77.86%	0.30604233	0.96189103	5		
02/16/96	8260B	Trans 1,3 Dichloropropene	4	3.25	3.32	2.66	3.35	3.3	3.49	3.03	3.2	80.00%	0.27507675	0.86456307	5		
02/16/96	8260B	Bromoform	4	3.14	3.04	2.32	3.04	2.89	3.21	2.79	2.9186	72.96%	0.29974592	0.94210144	5		
02/16/96	8260B	4Methyl 2Pentanone	4	4.76	4.5	3.55	4.66	4.21	4.66	4.72	4.4371	110.93%	0.43323259	1.36165003	5		
02/16/96	8260B	2Hexanone	4	3.52	3.58	2.71	3.82	3.12	3.76	3.69	3.4571	86.43%	0.40177582	1.2627814	5		
02/16/96	8260B	Tetrachloroethene	4	3.27	3.6	2.98	3.66	3.56	3.87	3.15	3.4414	86.04%	0.31567011	0.99215116	5		
02/16/96	8260B	1,1,2,2 Tetrachloroethane	4	3.8	3.74	2.9	3.89	3.52	3.86	3.65	3.6229	90.57%	0.34315761	1.07854436	5		
02/16/96	8260B	Toluene	4	4.06	4.13	3.23	3.94	3.89	4.18	3.63	3.8657	96.64%	0.33470669	1.05198314	5		
02/16/96	8260B	Chlorobenzene	4	3.63	3.72	3.11	3.83	3.63	3.9	3.44	3.6086	90.21%	0.26592158	0.83579152	5		
02/16/96	8260B	Ethyl Benzene	4	3.51	3.61	2.95	3.65	3.54	3.92	2.89	3.4386	85.96%	0.3787888	1.19053319	5		
02/16/96	8260B	Styrene	4	3.22	3.28	2.65	3.37	3.18	3.46	2.71	3.1214	78.04%	0.31735514	0.99744721	5		
02/16/96	8260B	Trans1,4Dichloro2Butene	4	2.79	3.02	2.47	3.14	3.07	3.26	2.63	2.8971	72.43%	0.30668737	0.9639184	5		
02/16/96	8260B	O-Xylene	4	3.18	3.28	2.67	3.3	3.19	3.45	2.65	3.1029	77.57%	0.31536827	0.99120246	5		
02/16/96	8260B	M,P Xylene	8	6.81	6.81	5.51	6.87	6.8	7.35	5.63	6.5543	81.93%	0.70023465	2.20083752	5		
02/16/96	8260B	1,3 Dichlorobenzene	4	3.6	3.65	3.09	3.79	3.58	3.93	3.12	3.5371	88.43%	0.3190462	1.0027622	5		
02/16/96	8260B	1,4 Dichlorobenzene	4	3.92	3.88	3.26	4.01	3.82	4.09	3.35	3.7614	94.04%	0.32482963	1.02093951	5		
02/16/96	8260B	1,2 Dichlorobenzene	4	3.66	3.5	3.02	3.72	3.5	3.81	3.14	3.4786	86.96%	0.29633475	0.93138013	5		
02/16/96	8260B		4								#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0! note 1	5	#####	#DIV/0!

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Quanterra Incorporated, Pittsburgh
METHOD DETECTION LIMIT STUDY

DATE LAST REVISED:		PROG/PROJECT:	MATRIX: soil
METHOD:	8260B Soil	PROJECT NUMBER:	
METHOD DESCRIPTION:	8260B Methanol Extraction	ANALYST: KLG	
PREP METHOD:	PURGE AND TRAP	QUALITY ASSURANCE:	

ANALYSIS DATE	ANALYSIS METHOD	ANALYTE	SPIKE CONC ug/L	REPLICATE MEASUREMENT 1	2	3	4	5	6	7	AVG ug/L	SPIKE REC. %	S ug/L	MDL ug/L	Report Limit ug/L	NOTES	
01/16/96	8260B	1,1,2TRICHLOROETHANE	250	188.1	185	197.05	204.1	249.55	250.75	260.75	219.33	87.73%	32.9097105	103.43622	250		
01/16/96	8260B	4METHYL2PENTANONE	500	400.25	358.45	431.35	476.3	507.65	471.5	418	437.64	87.53%	51.0503953	160.451392	250		
01/16/96	8260B	TETRACHLOROETHENE	250	243.95	250.05	230.1	222.4	304.35	295.05	310.6	265.21	106.09%	37.0356553	116.403065	250		
01/16/96	8260B	DIBROMOCHLOROMETHANE	250	176.65	170.4	185.6	181.35	233.3	234.5	227.6	201.34	80.54%	28.9391377	90.9557098	250		
01/16/96	8260B	CHLOROBENZENE	250	224.65	229.35	223.6	224.75	281.05	290.6	291.6	252.26	100.90%	33.4186264	105.03474	250		
01/16/96	8260B	ETHYL BENZENE	250	227.8	232.45	233.2	231.5	283.75	300.45	307.55	259.53	103.81%	36.0232432	113.221063	250		
01/16/96	8260B	0 XYLENE	250	234.95	233.85	223.4	228.9	276.3	287.65	294.4	254.21	101.68%	30.541685	95.992618	250		
01/16/96	8260B	STYRENE	250	209.95	218.3	224.35	217.25	260.15	270.8	273.35	239.16	95.67%	27.6838506	87.0103431	250		
01/16/96	8260B	BROMOFORM	250	134.9	142.9	155.2	156.4	197.65	201.2	206.15	170.63	68.25%	30.0345337	94.3985394	250		
01/16/96	8260B	2HEXANONE	500	398.7	353.05	387.9	427.4	474.15	429.8	392.7	409.1	81.82%	38.6502372	121.477695	500		
01/16/96	8260B	ISOBUTYL ALCOHOL	25000	14818.1	11167.7	23192.7	20456.8	23797.9	27723.1	22556.3	20530	82.12%	5684.76754	17867.2244	25000		
01/16/96	8260B	1,1,2,2TETRACHLOROETHANE	250	177.8	188	191.5	199.85	256	258.95	252	217.73	87.09%	36.1111693	113.497405	250		
01/16/96	8260B	M,P XYLENE	500	475.85	496.75	469.4	468.95	568.65	588.4	623.5	527.21	105.44%	64.6749031	203.273221	250		
01/16/96	8260B	Dichlorodifluoromethane	250	397.05	373.5	512.65	436.95	451.65	454.2	408.85	433.55	173.42%	45.7726263	143.86305	250		REC
01/16/96	8260B	Trichlorofluoromethane	250	248.95	228.3	340.85	284.95	286.1	368.05	309.1	295.19	118.07%	48.9673336	153.90433	250		
01/16/96	8260B	2,2 Dichloropropane	250	205.8	191.75	279.4	253	268.05	294.8	197.55	241.48	96.59%	42.417772	133.319057	250		
01/16/96	8260B	Bromochloromethane	250	263.8	211.95	315.05	268.7	262.4	304.1	197.37	260.48	104.19%	43.3991157	136.403421	250		
01/16/96	8260B	Iodomethane	250	260.65	225	300.3	275.55	289.65	321.65	239.5	273.19	109.27%	34.0939109	107.157162	250		
01/16/96	8260B	Acrolein	5000	4874.3	4306	5433.55	3760.5	2792.35	3011.85	4213.25	4056	81.12%	951.215647	2989.67078	5000		
01/16/96	8260B	Arcylonitrile	5000	5406.05	4987.05	6075.5	4937.45	4167	4803.25	6465.25	5263.4	105.27%	787.540174	2475.23877	5000		
01/16/96	8260B	1,1 Dichloropropene	250	232.85	194.75	299.2	258.45	262.55	298.2	218.7	252.1	100.84%	39.3028626	123.528897	250		
01/16/96	8260B	Dibromomethane	250	295.75	196.65	334.05	278.7	270.4	293.6	213.7	268.98	107.59%	48.202497	151.500448	250		
01/16/96	8260B	Propionitrile	5000	7544.55	6472.95	6285.6	4916.7	3671.05	4715.45	7339.25	5849.4	116.99%	1447.59871	4549.80275	5000		
01/16/96	8260B	1,2 Dibromoethane	250	253.65	170.9	283.2	234.5	221.35	230.6	186.1	226.76	90.30%	38.2513663	120.224044	250		
											#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!		#####	#DIV/0!
											#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!		#####	#DIV/0!
											#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!		#####	#DIV/0!

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Quanterra Incorporated, Pittsburgh
METHOD DETECTION LIMIT STUDY

DATE LAST REVISED:	04/04/97	PROG/PROJECT: NYS ASP	MATRIX: water
METHOD:	SW-846 8270B	PROJECT NUMBER:	
METHOD DESCRIPTION:	GCMS Semivolatiles with Appdx IX Compounds	ANALYST: RLT	
PREP METHOD:		QUALITY ASSURANCE: PAC	

ANALYSIS DATE	ANALYSIS METHOD	ANALYTE	SPIKE CONC ug/L	REPLICATE MEASUREMENT 1	2	3	4	5	6	7	AVG ug/L	SPIKE REC. %	S ug/L	MDL ug/L	Report Limit ug/L	NOTES	
04/02/97	8270B	N-Nitrosodimethylamine	5.00	3.42	3.52	3.28	3.43	3.36	3.29	3.78	3.44	68.80%	0.17175564	0.53982798	10		
04/02/97	8270B	Pyridine	5.00	2.08	2.55	2.67	2.65	2.82	2.42	3.07	2.6086	52.17%	0.31131069	0.9784492	20		
04/02/97	8270B	2-Picoline	5.00	2.64	2.81	2.77	2.93	3.14	2.78	3.20	2.8957	57.91%	0.20630537	0.64841777	10		
04/02/97	8270B	Aniline	5.00	1.77	1.40	1.25	1.11	0.99	1.45	1.16	1.3043	26.09%	0.2606311	0.81916355	10		REC
04/02/97	8270B	bis(2-Chloroethyl)ether	5.00	4.38	4.21	4.09	4.17	4.28	4.25	4.67	4.2929	85.86%	0.18927179	0.59488123	10		
04/02/97	8270B	Phenol	5.00	3.80	3.81	3.56	3.62	3.64	3.69	4.13	3.75	75.00%	0.19113695	0.60074343	10		
04/02/97	8270B	2-Chlorophenol	5.00	4.02	4.13	3.92	3.99	4.10	3.89	4.55	4.0857	81.71%	0.22247526	0.69923972	10		
04/02/97	8270B	1,3-Dichlorobenzene	5.00	3.75	4.09	3.86	4.04	4.05	3.83	4.42	4.0057	80.11%	0.22337242	0.70206962	10		
04/02/97	8270B	1,4-Dichlorobenzene	5.00	3.90	4.08	4.00	4.05	4.21	3.90	4.65	4.1129	82.26%	0.26023799	0.81792799	10		
04/02/97	8270B	1,2-Dichlorobenzene	5.00	4.02	4.21	4.04	4.07	4.25	4.00	4.56	4.1643	83.29%	0.19923664	0.62620075	10		
04/02/97	8270B	Ethyl methanesulfonate	5.00	3.94	3.91	3.59	3.77	3.65	3.68	4.20	3.82	76.40%	0.21244607	0.667718	10		
04/02/97	8270B	Acetophenone	5.00	3.99	4.08	3.89	4.00	3.99	3.94	4.45	4.0486	80.97%	0.1863177	0.58559653	10		
04/02/97	8270B	Benzyl alcohol	5.00	3.97	4.17	3.74	3.97	4.02	3.93	4.40	4.0286	80.57%	0.20731648	0.65160196	10		
04/02/97	8270B	bis(2-chloroisopropyl)ether	5.00	3.96	3.90	3.65	3.61	3.73	3.62	4.20	3.81	76.20%	0.22016146	0.69193605	10		
04/02/97	8270B	2-Methylphenol	5.00	4.40	4.48	4.10	4.33	4.30	4.23	4.72	4.3657	87.31%	0.19764065	0.62118518	10		
04/02/97	8270B	N-Nitrosomorpholine	5.00	3.90	3.87	3.69	3.96	3.80	3.77	4.25	3.8943	77.89%	0.18263482	0.57464984	10		
04/02/97	8270B	N-Nitrosopyrrolidine	5.00	4.42	4.54	3.93	4.21	4.33	4.14	4.64	4.3157	86.31%	0.24405306	0.76705882	10		
04/02/97	8270B	Hexachloroethane	5.00	3.96	3.96	3.61	3.95	3.95	3.82	4.25	3.9629	79.26%	0.14556949	0.5 [1]	10		
04/02/97	8270B	Methyl methansulfonate	5.00	3.35	3.45	3.16	3.47	3.44	3.40	3.99	3.4657	69.31%	0.25395913	0.79819354	10		
04/02/97	8270B	N-Nitrosomethylethylamine	5.00	3.76	4.12	3.96	3.96	4.09	3.92	4.55	4.0514	81.03%	0.24956152	0.78437196	10		
04/02/97	8270B	N-Nitrosodiethylamine	5.00	3.75	3.71	3.57	3.63	3.55	3.27	3.90	3.6257	72.51%	0.19713423	0.61959289	10		
04/02/97	8270B	N-Nitroso-di-n-propylamine	5.00	3.91	3.92	3.64	3.71	3.73	3.62	4.31	3.8343	76.69%	0.24130597	0.75842467	10		
04/02/97	8270B	Pentachloroethane	5.00	4.17	4.23	4.10	4.11	4.32	4.03	4.77	4.2471	84.94%	0.24917961	0.7831715	10		
04/02/97	8270B	P-Phenylene diamine	25.00	3.99	3.51	3.55	4.01	3.95	3.82	4.38	3.8871	15.55%	0.29803324	2.5 [1]	10		REC
04/02/97	8270B	O-Toluidine	5.00	2.14	1.83	1.80	1.91	1.63	2.09	1.77	1.8814	37.63%	0.18077874	0.56818758	10		REC
04/02/97	8270B	3&4-Methylphenol (T)	10.00	8.48	8.38	8.00	8.14	8.19	8.31	9.32	8.4029	84.03%	0.43453862	1.36576487	10		
04/02/97	8270B	0,0,0-Triethylphosphorothioate	5.00	4.11	4.12	3.91	4.06	4.13	4.02	4.45	4.1143	82.29%	0.16661904	0.52368365	10		

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Quanterra Incorporated, Pittsburgh
METHOD DETECTION LIMIT STUDY

DATE LAST REVISED:	04/04/97	**PROG/PROJECT:** NYS ASP	**MATRIX:** water
METHOD:	SW-846 8270B	**PROJECT NUMBER:**	
METHOD DESCRIPTION:	GCMS Semivolatiles with Appdx IX Compounds	**ANALYST:** RLT	
PREP METHOD:		**QUALITY ASSURANCE:** PAC	

ANALYSIS DATE	ANALYSIS METHOD	ANALYTE	SPIKE CONC ug/L	REPLICATE MEASUREMENT 1	2	3	4	5	6	7	AVG ug/L	SPIKE REC. %	S ug/L	MDL ug/L	Report Limit ug/L	NOTES	
04/02/97	8270B	Nitrobenzene	5.00	3.76	3.67	3.56	3.47	3.70	3.48	4.20	3.6914	73.83%	0.2499619	0.78563026	10		
04/02/97	8270B	Isophorone	5.00	3.69	3.70	3.59	3.59	3.67	3.52	4.18	3.7057	74.11%	0.21900207	0.68832349	10		
04/02/97	8270B	2-Nitrophenol	5.00	3.63	3.63	3.45	3.59	3.62	3.45	4.07	3.6343	72.69%	0.20615516	0.65423167	10		
04/02/97	8270B	N-Nitrosodi-n-butylamine	5.00	3.81	3.93	3.55	3.67	3.54	3.65	4.12	3.7529	75.06%	0.21344119	0.67084567	10		
04/02/97	8270B	N-Nitrosopiperdine	5.00	3.70	3.75	3.56	3.64	3.64	3.51	4.13	3.7043	74.09%	0.20419412	0.64178211	10		
04/02/97	8270B	2,4-Dimethylphenol	5.00	3.74	3.65	3.46	3.57	3.59	3.48	4.09	3.6543	73.09%	0.21469802	0.67479586	10		
04/02/97	8270B	bis(2-Chloroethoxy)methane	5.00	3.79	3.96	3.68	3.70	3.84	3.74	4.36	3.87	77.40%	0.23853721	0.74972245	10		
04/02/97	8270B	2,4-Dichlorophenol	5.00	3.76	3.90	3.76	3.67	3.75	3.66	4.40	3.8429	76.86%	0.25799671	0.81066223	10		
04/02/97	8270B	2,6-Dichlorophenol	5.00	4.23	4.26	3.90	3.92	4.11	4.03	4.56	4.1443	82.89%	0.23013454	0.72331286	10		
04/02/97	8270B	a,a-Dimethyl-phenethylamine	5.00	1.97	2.16	2.05	1.64	1.77	1.59	1.89	1.8671	37.34%	0.21140122	0.66443404	10		REC
04/02/97	8270B	1,2,4-Trichlorobenzene	5.00	3.94	4.19	3.96	3.95	4.14	3.87	4.58	4.0929	81.86%	0.24329093	0.76466339	10		
04/02/97	8270B	Naphthalene	5.00	4.06	4.13	3.89	3.99	4.17	3.92	4.54	4.1029	82.06%	0.21921939	0.68900686	10		
04/02/97	8270B	4-Chloroaniline	5.00	2.05	1.86	1.76	1.71	1.58	1.87	1.72	1.7929	35.86%	0.15007934	0.5 [1]	10		REC
04/02/97	8270B	Hexachlorobutadiene	5.00	4.11	4.15	4.03	4.04	4.23	4.02	4.66	4.1771	83.54%	0.22585828	0.71018686	10		
04/02/97	8270B	Safrole	5.00	3.81	3.85	3.74	3.78	3.89	3.85	4.26	3.8829	77.66%	0.17356212	0.54550574	10		
04/02/97	8270B	4-Chloro-3-methylphenol	5.00	3.59	3.61	3.42	3.44	3.54	3.38	4.07	3.5786	71.57%	0.2337683	0.73473377	10		
04/02/97	8270B	Hexachloropropene	5.00	3.84	3.90	3.77	3.76	4.01	3.69	4.27	3.8914	77.83%	0.1969288	0.61894722	10		
04/02/97	8270B	2-Methylnaphthalene	5.00	4.04	4.13	3.92	3.98	4.14	3.95	4.52	4.0971	81.94%	0.20483443	0.64379461	10		
04/02/97	8270B	Hexachlorocyclopentadiene	5.00	1.74	1.73	1.55	1.59	1.66	1.51	1.76	1.6486	32.97%	0.09990472	0.5 [1]	10		REC
04/02/97	8270B	1-Naphthylamine	5.00	1.25	1.06	1.06	1.13	0.87	1.14	0.92	1.0671	21.34%	0.13136644	0.5 [1]	10		REC
04/02/97	8270B	2-Naphthylamine	5.00	1.45	1.34	1.29	1.30	1.18	1.29	1.24	1.2986	25.97%	0.0839501	0.5 [1]	10		REC
04/02/97	8270B	2,4,6-Trichlorophenol	5.00	3.19	3.17	3.03	3.13	3.13	2.90	3.45	3.1429	62.86%	0.16799943	0.52802222	10		
04/02/97	8270B	2,4,5-Trichlorophenol	5.00	4.31	4.45	4.10	4.24	4.33	3.90	4.58	4.2729	85.46%	0.22373454	0.70319765	10		
04/02/97	8270B	2-Chloronaphthalene	5.00	3.84	3.72	3.60	3.71	3.64	3.54	4.16	3.7443	74.89%	0.20703117	0.65069896	10		
04/02/97	8270B	2-Nitroaniline	5.00	3.29	3.13	2.97	3.09	3.09	2.94	3.58	3.1557	63.11%	0.21923026	0.68904069	50		
04/02/97	8270B	Acenaphthylene	5.00	3.67	3.74	3.55	3.65	3.66	3.51	4.10	3.6971	73.94%	0.19371063	0.60883262	10		
04/02/97	8270B	Dimethylphthalate	5.00	4.53	4.43	4.18	4.28	4.39	4.13	4.85	4.3986	87.97%	0.24361367	0.76567776	10		

Footnote 1 = If this footnote appears next to the MDL, the calculated MDL was more than 10 times less than the spiking level, therefore the MDL shown is set at exactly 10 times less than the spiking level.

Quanterra Incorporated, Pittsburgh
METHOD DETECTION LIMIT STUDY

DATE LAST REVISED:	04/04/97	**PROG/PROJECT:** NYS ASP	**MATRIX:** water
METHOD:	SW-846 8270B	**PROJECT NUMBER:**	
METHOD DESCRIPTION:	GCMS Semivolatles with Appdx IX Compounds	**ANALYST:** RLT	
PREP METHOD:		**QUALITY ASSURANCE:** PAC	

ANALYSIS DATE	ANALYSIS METHOD	ANALYTE	SPIKE CONC ug/L	REPLICATE MEASUREMENT 1	2	3	4	5	6	7	AVG ug/L	SPIKE REC. %	S ug/L	MDL ug/L	Report Limit ug/L	NOTES	
04/02/97	8270B	2,6-Dinitrotoluene	5.00	4.44	4.28	3.87	4.02	4.14	4.04	4.45	4.1771	83.54%	0.22111191	0.69495473	10		
04/02/97	8270B	Acenaphthene	5.00	3.93	4.00	3.73	3.95	3.89	3.77	4.38	3.95	79.00%	0.21299452	0.66944176	10		
04/02/97	8270B	3-Nitroaniline	5.00	2.44	2.40	2.20	2.36	2.23	2.29	2.45	2.3386	46.77%	0.10023781	0.5 [1]	50		REC
04/02/97	8270B	2,4-Dinitrophenol	25.00	16.26	15.90	14.41	16.33	16.55	15.61	17.99	16.436	65.74%	1.36139489	4.27896321	50		
04/02/97	8270B	Dibenzofuran	5.00	3.97	4.04	3.78	3.93	4.01	3.81	4.43	3.9957	79.91%	0.21477563	0.67503981	10		
04/02/97	8270B	2,4-Dinitrotoluene	5.00	3.91	3.84	3.61	3.85	3.69	3.63	4.18	3.7871	75.74%	0.206776	0.64990327	10		
04/02/97	8270B	4-Nitrophenol	5.00	2.73	3.31	2.55	2.47	2.52	2.59	3.16	2.7614	55.23%	0.33617597	1.06660109	50		
04/02/97	8270B	Pentachlorobenzene	5.00	4.27	4.36	4.00	4.10	4.26	4.02	4.70	4.2443	84.89%	0.24247729	0.76210613	10		
04/02/97	8270B	1,2,4,5-Tetrachlorobenzene	5.00	3.79	3.75	3.64	3.67	3.76	3.69	4.11	3.7729	75.46%	0.1579783	0.5 [1]	10		
04/02/97	8270B	Fluorene	5.00	6.01	5.94	5.67	5.76	5.75	5.59	6.54	5.8943	117.89%	0.31994047	1.0055729	10		
04/02/97	8270B	4-Chlorophenyl-phenylether	5.00	7.33	7.44	6.92	7.24	7.29	7.01	8.14	7.3386	146.77%	0.39746818	1.24924248	10		
04/02/97	8270B	2,3,4,6-Tetrachlorophenol	5.00	2.95	2.96	2.69	2.83	2.68	2.68	3.10	2.8414	56.83%	0.16727506	0.52574568	10		
04/02/97	8270B	Diethylphthalate	5.00	4.55	4.49	4.17	4.33	4.47	4.25	4.90	4.4614	89.03%	0.24068461	0.75615741	10		
04/02/97	8270B	4-Nitroaniline	5.00	2.93	2.93	2.67	2.85	3.04	2.85	3.27	2.9057	58.11%	0.214465	0.67406351	50		
04/02/97	8270B	Isosafrole	5.00	5.11	5.05	4.76	4.96	5.08	4.97	5.60	5.0786	101.57%	0.25712698	0.80815011	10		
04/02/97	8270B	1,4-Naphthoquinone	5.00	2.25	2.16	1.84	1.92	2.04	2.00	2.47	2.0971	41.94%	0.21468693	0.67476101	10		REC
04/02/97	8270B	1,3-Dinitrobenzene	5.00	3.33	3.24	3.05	3.18	3.22	3.09	3.49	3.2286	64.57%	0.14848441	0.5 [1]	10		
04/02/97	8270B	4,6-Dinitro-2-methylphenol	5.00	4.03	4.13	3.45	3.77	3.99	3.43	4.17	3.8529	77.06%	0.30971569	0.97343642	50		
04/02/97	8270B	N-Nitrosodiphenylamine&Diphenylamine(T)	10.00	8.07	8.07	7.55	7.70	8.04	7.70	8.82	7.9929	79.93%	0.42149394	1.32476546	10		
04/02/97	8270B	4-Aminobiphenyl	5.00	1.23	1.19	1.06	1.16	1.05	1.15	1.15	1.1414	22.83%	0.06542899	0.5 [1]	10		REC
04/02/97	8270B	Pentachloronitrobenzene	5.00	3.70	3.92	3.54	3.67	3.74	3.84	4.21	3.8029	76.06%	0.21684974	0.68155873	10		
04/02/97	8270B	Phenacetin	5.00	3.56	3.58	3.31	3.46	3.41	3.43	3.91	3.5229	70.46%	0.19371063	0.60883262	10		
04/02/97	8270B	Pronamide	5.00	3.91	4.11	3.92	3.94	4.04	3.87	4.45	4.0343	80.69%	0.20123429	0.63247936	10		
04/02/97	8270B	Phorate	5.00	3.92	3.89	3.60	3.69	3.76	3.70	4.41	3.8814	77.63%	0.24895974	0.78248046	10		
04/02/97	8270B	5-Nitro-O-Toluidine	5.00	2.50	2.68	2.40	2.57	2.55	2.56	2.58	2.5486	50.97%	0.06493695	0.5 [1]	10		
04/02/97	8270B	Dialate	5.00	3.59	3.60	3.26	3.45	3.53	3.53	4.09	3.6786	73.57%	0.2532738	0.79603956	10		
04/02/97	8270B	Dimethoate	5.00	4.05	4.22	3.81	4.06	4.02	3.86	4.52	4.08	81.60%	0.23769729	0.74709257	10		

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Quanterra Incorporated, Pittsburgh
METHOD DETECTION LIMIT STUDY

DATE LAST REVISED:	04/04/97	**PROG/PROJECT:**	NYS ASP
METHOD:	SW-846 8270B	**PROJECT NUMBER:**	
METHOD DESCRIPTION:	GCMS Semivolaties with Appdx IX Compounds	**ANALYST:**	RLT
PREP METHOD:		**QUALITY ASSURANCE:**	PAC

MATRIX: water

ANALYSIS DATE	ANALYSIS METHOD	ANALYTE	SPIKE CONC	REPLICATE MEASUREMENT							AVG	SPIKE REC.	S	MDL	Report Limit	NOTES	
				1	2	3	4	5	6	7							
			ug/L								ug/L	%	ug/L	ug/L	ug/L		
04/02/97	8270B	1,2-Diphenylhydrazine	5.00	3.14	3.22	3.01	2.93	3.16	3.07	3.51	3.1486	62.97%	0.19667517	0.68672006	10		
04/02/97	8270B	4-Bromophenyl-phenylether	5.00	4.13	4.14	3.94	3.94	4.14	3.91	4.60	4.1143	82.29%	0.23803761	0.74816221	10		
04/02/97	8270B	Hexachlorobenzene	5.00	4.00	3.96	3.87	3.84	4.05	3.90	4.48	4.0171	80.34%	0.21746374	0.68348852	10		
04/02/97	8270B	1,3,5-Trinitrobenzene	5.00	2.04	2.18	1.92	2.00	2.01	1.89	2.26	2.0429	40.86%	0.13375528	0.5 [1]	10		REC
04/02/97	8270B	Pentachlorophenol	5.00	1.73	1.52	1.48	1.43	1.46	1.71	2.14	1.6386	32.77%	0.25149079	0.79043556	10		REC
04/02/97	8270B	Phenanthrene	5.00	4.14	4.01	3.86	3.92	4.03	3.89	4.47	4.0486	80.97%	0.20731848	0.65160196	10		
04/02/97	8270B	Thionazin	5.00	3.99	4.22	3.91	3.97	4.13	3.86	4.58	4.0943	81.89%	0.24771335	0.77856307	10		
04/02/97	8270B	Dinoseb	5.00	2.53	2.54	2.41	2.50	2.56	2.40	2.71	2.5214	50.43%	0.1041819	0.5 [1]	10		
04/02/97	8270B	Anthracene	5.00	4.36	4.54	4.09	4.35	4.39	4.27	4.79	4.4014	88.03%	0.21896945	0.68822097	10		
04/02/97	8270B	Carbazole	5.00	4.07	3.91	3.68	3.73	3.89	3.70	4.20	3.8829	77.66%	0.1976288	0.62114732	10		
04/02/97	8270B	Sulfotepp	5.00	3.40	3.59	3.36	3.36	3.56	3.31	3.87	3.4929	69.86%	0.19729118	0.62008618	10		
04/02/97	8270B	Di-n-butylphthalate	5.00	4.12	4.25	4.03	4.09	4.26	4.02	4.61	4.1971	83.94%	0.20572781	0.64660157	10		
04/02/97	8270B	Disulfoton	5.00	4.71	5.00	4.81	4.84	5.02	4.87	5.20	4.9214	98.43%	0.16324096	0.51306841	10		
04/02/97	8270B	Fluoranthene	5.00	4.32	4.37	4.13	4.25	4.34	4.17	4.72	4.3286	86.57%	0.19402994	0.60963611	10		
04/02/97	8270B	4-Nitroquinoline-n-Oxide	5.00	1.19	1.17	0.98	0.98	0.97	0.93	1.23	1.0843	21.29%	0.12820844	0.5 [1]	10		REC
04/02/97	8270B	Methapyrilene	5.00	4.30	4.19	3.96	4.17	4.20	3.94	4.53	4.1843	83.69%	0.20139986	0.63299977	10		
04/02/97	8270B	Benzidine	25.00	3.17	2.71	2.56	3.20	2.12	3.06	2.85	2.81	11.24%	0.38609153	2.5 [1]	100		REC
04/02/97	8270B	Pyrene	5.00	4.55	4.52	4.28	4.23	4.22	4.35	4.77	4.4171	88.34%	0.20410082	0.64148886	10		
04/02/97	8270B	Butylbenzylphthalate	5.00	4.20	4.08	3.90	3.99	4.10	4.13	4.63	4.1471	82.94%	0.23407366	0.7356935	10		
04/02/97	8270B	3,3'-Dichlorobenzidine	5.00	2.29	2.26	1.96	2.05	2.02	2.09	2.15	2.1171	42.34%	0.1229789	0.5 [1]	50		REC
04/02/97	8270B	p-Dimethylaminoazobenzene	5.00	3.79	3.69	3.44	3.67	3.58	3.87	4.15	3.7129	74.26%	0.22111191	0.69496473	10		
04/02/97	8270B	Chlorobenzilate	5.00	3.97	3.92	3.63	3.82	3.79	3.84	4.31	3.8971	77.94%	0.21148006	0.66468178	10		
04/02/97	8270B	3,3-Dimethylbenzidine	25.00	4.27	3.66	3.01	4.30	3.24	4.32	4.30	3.8714	15.49%	0.56463642	2.5 [1]	10		REC
04/02/97	8270B	2-Acetylaminofluorene	5.00	3.35	3.34	2.92	2.90	3.06	2.93	3.46	3.1371	62.74%	0.2390756	0.75141461	10		
04/02/97	8270B	Aramite	5.00	3.89	3.96	3.31	3.50	3.60	3.63	4.08	3.71	74.20%	0.2751969	0.86494385	10		
04/02/97	8270B	Benzo(a)anthracene	5.00	4.47	4.29	4.05	4.32	4.38	4.31	4.79	4.3729	87.46%	0.22410669	0.70436733	10		
04/02/97	8270B	Chrysene	5.00	4.64	4.43	4.33	4.30	4.47	4.40	5.03	4.6143	90.29%	0.25290691	0.79488642	10		

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Quanterra Incorporated, Pittsburgh
METHOD DETECTION LIMIT STUDY

DATE LAST REVISED:	04/04/97	PROG/PROJECT:	NYS ASP	MATRIX:	water
METHOD:	SW-846 8270B	PROJECT NUMBER:			
METHOD DESCRIPTION:	GCMS Semivolatles with Appdx IX Compounds	ANALYST:	RLT		
PREP METHOD:		QUALITY ASSURANCE:	PAC		

ANALYSIS DATE	ANALYSIS METHOD	ANALYTE	SPIKE CONC ug/L	REPLICATE MEASUREMENT 1	2	3	4	5	6	7	AVG ug/L	SPIKE REC. %	S ug/L	MDL ug/L	Report Limit ug/L	NOTES	
04/02/97	8270B	bis(2-Ethylhexyl)phthalate	5.00	4.15	3.96	3.85	3.83	3.98	4.00	4.43	4.0286	80.57%	0.20618993	0.64805494	10		
04/02/97	8270B	Di-n-octylphthalate	5.00	3.56	3.54	3.27	3.35	3.37	3.23	3.74	3.4371	68.74%	0.18273061	0.57432231	10		
04/02/97	8270B	7,12-Dimethylbenz-(a)anthracene	5.00	3.56	3.59	3.40	3.51	3.52	3.45	3.87	3.5571	71.14%	0.15206515	0.5[1]	10		
04/02/97	8270B	3-Methylcholanthrene	5.00	3.30	3.28	3.13	3.20	3.27	3.13	3.52	3.2614	65.23%	0.13359498	0.5[1]	10		
04/02/97	8270B	Benzo[b]fluoranthene	5.00	4.83	4.43	4.31	4.68	4.80	4.24	4.85	4.5914	91.83%	0.25944997	0.81545126	10		
04/02/97	8270B	Benzo[k]fluoranthene	5.00	4.34	4.56	4.16	4.07	4.10	4.14	4.68	4.2929	85.86%	0.24198583	0.76056147	10		
04/02/97	8270B	Benzo[a]pyrene	5.00	3.82	3.48	3.59	3.65	3.76	3.20	4.05	3.65	73.00%	0.26956756	0.84725083	10		
04/02/97	8270B	Indeno[1,2,3-cd]pyrene	5.00	3.33	3.19	2.90	3.11	3.11	3.04	3.45	3.1614	63.23%	0.18297801	0.57509989	10		
04/02/97	8270B	Dibenz[a,h]anthracene	5.00	3.22	3.09	2.90	2.93	3.06	2.93	3.34	3.0671	61.34%	0.16529915	0.51953523	10		
04/02/97	8270B	Benzo[g,h,i]perylene	5.00	3.53	3.24	3.19	3.29	3.34	3.12	3.67	3.34	66.80%	0.19510681	0.6132207	10		
04/02/97	8270B										#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0! [illegible]	10	#####	#DIV/0!
04/02/97	8270B										#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0! [illegible]	10	#####	#DIV/0!
04/02/97	8270B										#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0! [illegible]	10	#####	#DIV/0!
04/02/97	8270B										#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0! [illegible]	10	#####	#DIV/0!
04/02/97	8270B										#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0! [illegible]	10	#####	#DIV/0!
04/02/97	8270B										#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0! [illegible]	10	#####	#DIV/0!
04/02/97	8270B										#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0! [illegible]	10	#####	#DIV/0!
04/02/97	8270B										#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0! [illegible]	10	#####	#DIV/0!
04/02/97	8270B										#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0! [illegible]	10	#####	#DIV/0!
04/02/97	8270B										#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0! [illegible]	10	#####	#DIV/0!
04/02/97	8270B										#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0! [illegible]	10	#####	#DIV/0!
04/02/97	8270B										#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0! [illegible]	10	#####	#DIV/0!
04/02/97	8270B										#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0! [illegible]	10	#####	#DIV/0!
04/02/97	8270B										#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0! [illegible]	10	#####	#DIV/0!
04/02/97	8270B										#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0! [illegible]	10	#####	#DIV/0!
04/02/97	8270B										#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0! [illegible]	10	#####	#DIV/0!
04/02/97	8270B										#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0! [illegible]	10	#####	#DIV/0!

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Quanterra Incorporated, Pittsburgh
METHOD DETECTION LIMIT STUDY

DATE LAST REVISED:		PROG/PROJECT:	MATRIX: Soil
METHOD:	SW-846 8270C	PROJECT NUMBER:	
METHOD DESCRIPTION:	GCMS BNAs in Soil	ANALYST: FB	
PREP METHOD:	Sonication	QUALITY ASSURANCE: PAC	

ANALYSIS DATE	ANALYSIS METHOD	ANALYTE	SPIKE CONC	REPLICATE MEASUREMENT							AVG	SPIKE REC.	S	MDL	Report Limit	NOTES	
			ug/kg	1	2	3	4	5	6	7	ug/kg	%	ug/kg	ug/kg	ug/kg		
01/13/98	SW-8270C	N-Nitrosodimethylamine	166.665	89.6658	82.6658	87.3325	94.6657	82.6658	170.332	74.9993	97.475	58.49%	32.7200692	102.839177	330		
01/13/98	SW-8270C	Pyridine	333.33	284.95	333.36	373.48	258.73	330.06	370.86	383.03	333.5	100.05%	47.2729561	148.578901	330		
01/13/98	SW-8270C	2-Picoline	166.665	135.999	108.332	130.999	145.665	131.999	242.998	117.665	144.81	86.89%	44.9842624	141.385537	330		
01/13/98	SW-8270C	Aniline	333.33	294.43	330.08	282.77	310.77	286.87	329.04	336.47	310.06	93.02%	22.3078838	70.1136789	330		
01/13/98	SW-8270C	bis(2-Chloroethyl)ether	333.33	443.64	526.51	537.79	426.62	450.22	504.16	558.06	493	147.90%	51.6974787	162.485175	330		
01/13/98	SW-8270C	Phenol	166.665	134.332	124.999	126.999	136.665	127.665	195.331	128.665	139.24	83.54%	25.0845788	78.8408311	330		
01/13/98	SW-8270C	2-Chlorophenol	166.665	115.666	105.666	109.999	119.665	108.332	175.332	109.332	120.57	72.34%	24.6090824	77.3463459	330		
01/13/98	SW-8270C	1,3-Dichlorobenzene	166.665	126.332	115.999	122.332	133.999	120.665	219.998	116.332	136.52	81.91%	37.3274324	117.32012	330		
01/13/98	SW-8270C	1,4-Dichlorobenzene	166.665	140.665	128.332	125.665	140.665	123.665	224.998	124.665	144.09	86.46%	36.4046185	114.419716	330		
01/13/98	SW-8270C	1,2-Dichlorobenzene	166.665	96.6657	92.6657	95.999	102.666	93.6657	150.998	92.6657	103.9	62.34%	21.0822677	66.2615673	330		
01/13/98	SW-8270C	Ethyl methanesulfonate	166.665	128.999	115.332	117.665	126.332	120.332	231.998	113.666	136.62	81.97%	42.4820023	133.520933	330		
01/13/98	SW-8270C	Acetophenone	166.665	159.998	145.332	151.332	162.998	142.665	282.664	141.332	169.47	101.69%	50.6068632	159.057371	330		
01/13/98	SW-8270C	Benzyl alcohol	166.665	61.6661	56.3328	60.9994	67.3327	60.6661	120.665	66.666	70.618	42.37%	22.3864691	70.3606723	330		REC
01/13/98	SW-8270C	bis(2-chloroisopropyl)ether	333.33	443.64	526.51	537.79	426.62	450.6	524.16	558.06	495.91	148.77%	52.9000197	166.264762	330		
01/13/98	SW-8270C	2-Methylphenol	166.665	144.999	130.999	134.332	147.332	134.665	269.997	137.332	157.09	94.26%	50.1355041	157.57589	330		
01/13/98	SW-8270C	N-Nitrosomorpholine	166.665	156.332	144.665	151.998	162.998	151.332	257.664	145.332	167.19	100.31%	40.3906737	126.947886	330		
01/13/98	SW-8270C	N-Nitrosopyrrolidine	166.665	160.998	149.999	151.998	164.665	151.998	269.664	148.999	171.19	102.71%	43.8211095	137.729747	330		
01/13/98	SW-8270C	Hexachloroethane	166.665	107.999	95.6657	99.6657	109.999	100.666	197.665	93.3324	115	69.00%	36.9490454	116.13085	330		
01/13/98	SW-8270C	Methyl methanesulfonate	166.665	82.3325	75.6659	76.6659	81.6659	74.9993	141.999	74.3326	86.809	52.09%	24.5443905	77.1430193	330		
01/13/98	SW-8270C	N-Nitrosomethylethylamine	333.333	410.89	492.86	510.77	390.01	454.7	484.35	509.83	464.77	139.43%	48.1531324	151.345295	330		
01/13/98	SW-8270C	N-Nitrosodiethylamine	166.665	163.998	119.665	120.332	136.999	118.999	230.664	118.332	144.14	86.49%	41.624833	130.82685	330		
01/13/98	SW-8270C	N-Nitroso-di-n-propylamine	166.665	180.998	161.998	165.665	184.331	164.665	302.664	162.332	188.95	113.37%	50.9611421	160.17087	330		
01/13/98	SW-8270C	Pentachloroethane	166.665	128.332	114.999	118.332	131.332	113.999	255.664	117.999	140.09	84.06%	51.3875213	161.510979	330		
01/13/98	SW-8270C	P-Phenylene diamine									#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0! *****	660	#####	#DIV/0!
01/13/98	SW-8270C	O-Toluidine	166.665	60.9994	55.3328	52.6661	64.3327	60.9994	120.332	71.666	69.475	41.69%	23.2518937	73.080702	330		REC
											#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0! *****	330	#####	#DIV/0!
											#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0! *****		#####	#DIV/0!

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Quanterra Incorporated, Pittsburgh
METHOD DETECTION LIMIT STUDY

DATE LAST REVISED:		PROG/PROJECT:	MATRIX: Soil
METHOD:	SW-846 8270C	PROJECT NUMBER:	
METHOD DESCRIPTION:	GCMS BNAs in Soil	ANALYST: FB	
PREP METHOD:	Sonication	QUALITY ASSURANCE: PAC	

ANALYSIS DATE	ANALYSIS METHOD	ANALYTE	SPIKE CONC ug/kg	REPLICATE MEASUREMENT 1	2	3	4	5	6	7	AVG ug/kg	SPIKE REC. %	S ug/kg	MDL ug/kg	Report Limit ug/kg	NOTES	
01/13/98	SW-8270C	3&4-Methylphenol (T)	166.665	159.665	143.665	147.332	158.665	145.332	267.997	151.998	167.81	100.69%	44.6188725	140.237116	330		
01/13/98	SW-8270C	0,0,0-Triethylphosphorothioate	166.665	145.999	132.332	135.332	149.665	136.665	263.664	130.999	156.36	93.83%	47.8137567	150.278637	660		
01/13/98	SW-8270C	Nitrobenzene	166.665	143.665	131.665	132.665	148.332	129.665	234.331	135.332	150.81	90.49%	37.4507577	117.707731	330		
01/13/98	SW-8270C	Isophorone	166.665	146.999	129.332	143.999	148.665	137.665	270.331	138.999	159.43	95.66%	49.3364883	155.064577	330		
01/13/98	SW-8270C	2-Nitrophenol	166.665	141.665	126.332	128.665	144.332	126.999	259.331	127.332	150.67	90.40%	48.4938828	152.416274	330		
01/13/98	SW-8270C	N-Nitroso-di-n-butylamine	166.665	154.998	142.332	141.332	158.665	135.999	270.664	136.999	163	97.80%	48.2634522	151.69203	330		
01/13/98	SW-8270C	N-Nitrosopiperidine	166.665	176.665	161.332	151.332	168.665	151.332	287.997	145.332	177.52	106.51%	49.9234641	156.909448	330		
01/13/98	SW-8270C	2,4-Dimethylphenol	333.33	623.47	739.73	725.33	615.11	686.96	670.78	715.32	682.67	204.80%	48.9756257	153.930392	330		REC
01/13/98	SW-8270C	bis(2-Chloroethoxy)methane	166.665	164.332	146.332	150.998	165.998	144.999	278.997	150.665	171.76	103.06%	48.0051964	150.880332	330		
01/13/98	SW-8270C	2,4-Dichlorophenol	166.665	152.665	135.665	139.665	153.332	133.999	278.331	138.665	161.76	97.06%	51.9865563	163.393746	330		
01/13/98	SW-8270C	2,6-Dichlorophenol	333.33	472.51	556.74	541.9	455.36	498	491.8	537.69	507.71	152.32%	38.2941944	120.358653	330		REC
01/13/98	SW-8270C	a,a-Dimethyl-phenethylamine	333.33	429.72	578.33	585.4	448.02	584.82	537.26	605.02	538.37	161.51%	71.1543212	223.638031	330		REC
01/13/98	SW-8270C	1,2,4-Trichlorobenzene	166.665	149.332	131.999	137.665	150.998	130.999	263.997	134.665	157.09	94.26%	47.8138674	150.278985	330		
01/13/98	SW-8270C	Naphthalene	166.665	158.998	144.665	148.332	163.665	139.665	276.664	146.332	168.33	101.00%	48.4950284	152.419874	330		
01/13/98	SW-8270C	4-Chloroaniline	166.665	49.3328	42.6662	42.3329	53.9995	60.6661	82.9992	64.3327	56.818	33.97%	14.3208186	45.0103329	330		REC
01/13/98	SW-8270C	Hexachlorobutadiene	166.665	150.332	133.332	138.999	149.665	130.665	265.997	133.332	157.47	94.49%	48.5028104	152.443704	330		
01/13/98	SW-8270C	Safrole	166.665	150.998	128.665	138.999	153.665	133.332	269.331	131.999	158.14	94.89%	49.947198	156.984043	330		
01/13/98	SW-8270C	4-Chloro-3-methylphenol	166.665	159.332	139.999	145.999	160.665	142.665	286.664	145.332	168.66	101.20%	52.8478529	166.472202	330		
01/13/98	SW-8270C	Hexachloropropene	166.665	139.665	122.332	126.999	140.665	120.332	259.664	123.999	147.67	88.60%	50.0546542	157.321778	330		
01/13/98	SW-8270C	2-Methylnaphthalene	166.665	167.665	148.665	152.665	169.998	141.332	277.664	148.332	172.33	103.40%	47.6199365	149.66946	330		
01/13/98	SW-8270C	Hexachlorocyclopentadiene	333.33	318.34	370.36	366.34	309.2	305.05	317.46	341.65	332.63	99.79%	27.0351999	84.9716333	1665		
01/13/98	SW-8270C	1-Naphthylamine	333.33	212.98	197.47	161.19	327.95	158.3	235.73	199.22	213.26	63.98%	57.4994312	180.720712	330		
01/13/98	SW-8270C	2-Naphthylamine	333.33	295.14	296.25	260.63	375.45	257.15	328.79	300.98	302.06	90.62%	40.6545339	127.7772	330		
01/13/98	SW-8270C	2,4,6-Trichlorophenol	166.665	136.999	119.332	125.999	134.665	115.666	250.997	129.665	144.76	86.86%	47.471823	149.20394	330		
01/13/98	SW-8270C	2,4,5-Trichlorophenol	166.665	130.999	115.999	102.666	108.999	96.999	209.665	138.999	129.19	77.51%	38.5078426	121.030149	1665		
											#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0! [1]	330	#####	#DIV/0!
											#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0! [1]		#####	#DIV/0!

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Quanterra Incorporated, Pittsburgh
METHOD DETECTION LIMIT STUDY

DATE LAST REVISED:		PROG/PROJECT:	MATRIX: Soil
METHOD:	SW-846 8270C	PROJECT NUMBER:	
METHOD DESCRIPTION:	GCMS BNAs in Soil	ANALYST: FB	
PREP METHOD:	Sonication	QUALITY ASSURANCE: PAC	

ANALYSIS DATE	ANALYSIS METHOD	ANALYTE	SPIKE CONC	REPLICATE MEASUREMENT							AVG	SPIKE REC.	S	MDL	Report Limit	NOTES	
			ug/kg	1	2	3	4	5	6	7	ug/kg	%	ug/kg	ug/kg	ug/kg		
01/13/98	SW-8270C	2-Chloronaphthalene	333.33	395.37	466.17	434.92	387.34	420.3	443.098	455.02	428.89	128.67%	29.6369386	92.834598	330		
01/13/98	SW-8270C	2-Nitroaniline	166.665	142.999	127.999	130.999	145.332	121.665	255.997	137.332	151.76	91.06%	46.713681	146.8211	1666		
01/13/98	SW-8270C	Acenaphthylene	166.665	145.999	131.999	134.332	151.332	127.665	256.997	136.999	155.05	93.03%	45.6898973	143.603347	330		
01/13/98	SW-8270C	Dimethylphthalate	166.665	146.665	130.665	134.999	146.332	125.999	258.331	137.665	154.38	92.63%	46.4631626	146.033689	330		
01/13/98	SW-8270C	2,6-Dinitrotoluene	166.665	143.999	130.665	134.332	143.999	126.665	260.331	136.332	153.76	92.26%	47.4281131	149.066559	330		
01/13/98	SW-8270C	Acenaphthene	166.665	152.665	135.332	139.665	152.332	131.332	263.997	138.999	159.19	95.51%	46.9190273	147.466503	330		
01/13/98	SW-8270C	3-Nitroaniline	166.665	76.9992	66.666	72.6659	81.9992	77.9992	142.332	87.6658	86.904	52.14%	25.1980095	79.1973438	1666		
01/13/98	SW-8270C	2,4-Dinitrophenol	333.33	392.93	466.58	447.55	387.87	435.97	430.01	463.57	434.93	130.48%	35.7098679	112.236115	1666		
01/13/98	SW-8270C	Dibenzofuran	166.665	151.998	133.999	138.332	151.998	132.332	262.331	140.332	158.76	95.26%	46.344345	145.660276	330		
01/13/98	SW-8270C	2,4-Dinitrotoluene	166.665	139.999	127.332	130.332	140.332	123.665	253.997	131.999	149.67	89.80%	46.4155293	145.884008	330		
01/13/98	SW-8270C	4-Nitrophenol	333.33	263.79	314.06	292.09	251.64	280.29	280.61	275.2	276.81	83.05%	21.2238976	66.7067101	1666		
01/13/98	SW-8270C	Pentachlorobenzene	166.665	147.999	133.332	137.332	151.998	127.665	260.664	136.665	156.52	93.91%	46.6756861	146.701618	330		
01/13/98	SW-8270C	1,2,4,5-Tetrachlorobenzene	166.665	143.999	129.665	134.665	148.332	124.332	258.331	134.999	153.47	92.09%	46.9438858	147.544633	330		
01/13/98	SW-8270C	Fluorene	166.665	120.665	109.666	111.999	121.999	105.332	206.331	112.332	127.19	76.31%	36.2624931	113.973016	330		
01/13/98	SW-8270C	4-Chlorophenyl-phenylether	166.665	158.998	143.665	146.665	159.665	135.999	275.997	146.665	166.81	100.09%	48.8715502	153.603282	330		
01/13/98	SW-8270C	2,3,4,6-Tetrachlorophenol	166.665	125.665	110.666	118.332	122.332	106.666	249.664	122.332	136.81	82.09%	50.1606672	157.654977	330		
01/13/98	SW-8270C	Diethylphthalate	166.665	157.665	143.665	144.999	162.332	140.665	272.331	151.332	167.57	100.54%	46.8486646	147.245353	330		
01/13/98	SW-8270C	4-Nitroaniline	166.665	106.999	104.332	101.999	109.999	96.999	204.665	105.666	118.67	71.20%	38.1416533	119.879216	330		
01/13/98	SW-8270C	Isosafrole	166.665	133.999	119.999	121.665	134.332	117.665	233.998	127.665	141.33	84.80%	41.3893326	130.088672	330		
01/13/98	SW-8270C	1,4-Naphthoquinone	166.665	55.6661	56.9994	71.666	85.9991	66.666	119.332	67.9993	74.904	44.94%	22.0365454	69.2608623	330		REC
01/13/98	SW-8270C	1,3-Dinitrobenzene	166.665	132.665	115.332	120.332	133.999	116.999	247.331	122.665	141.33	84.80%	47.2972445	148.655239	330		
01/13/98	SW-8270C	4,6-Dinitro-2-methylphenol	166.665	104.666	85.6658	83.3325	97.3324	78.6659	213.331	84.6658	106.81	64.09%	47.8224428	150.305937	1666		
01/13/98	SW-8270C	N-Nitrosodiphenylamine&Diphenylamine(T)	333.33	464.625	567.59	581.52	475.24	517.71	531.435	577.575	530.81	159.25%	47.8743449	150.469066	330		REC
01/13/98	SW-8270C	4-Aminobiphenyl	333.33	263.73	288.15	245.57	323.51	250.06	290.42	281.87	277.62	83.29%	27.0100651	84.8926345	660		
01/13/98	SW-8270C	Pentachloronitrobenzene	166.665	144.999	124.332	125.999	140.665	121.332	251.997	131.999	148.76	89.26%	46.3423471	145.653997	330		
											#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	330	#####	#DIV/0!
											#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!		#####	#DIV/0!

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Quanterra Incorporated, Pittsburgh
METHOD DETECTION LIMIT STUDY

DATE LAST REVISED:		PROG/PROJECT:	MATRIX: Soil
METHOD:	SW-846 8270C	PROJECT NUMBER:	
METHOD DESCRIPTION:	GCMS BNAs in Soil	ANALYST: FB	
PREP METHOD:	Sonication	QUALITY ASSURANCE: PAC	

ANALYSIS DATE	ANALYSIS METHOD	ANALYTE	SPIKE CONC ug/kg	REPLICATE MEASUREMENT 1	2	3	4	5	6	7	AVG ug/kg	SPIKE REC. %	S ug/kg	MDL ug/kg	Report Limit ug/kg	NOTES	
01/13/98	SW-8270C	Phenacetin	166.665	139.665	122.665	125.332	139.999	120.665	255.331	140.332	149.14	89.49%	47.6198809	149.659286	660		
01/13/98	SW-8270C	Pronamide	166.665	89.9991	83.3325	89.9991	104.999	91.3324	194.998	118.999	110.52	66.31%	39.1332181	122.995695	330		
01/13/98	SW-8270C	Phorate	166.665	101.999	89.9991	98.999	110.666	92.9991	180.665	96.3324	110.24	66.14%	31.766025	99.8406167	330		
01/13/98	SW-8270C	5-Nitro-O-Toluidine	166.665	84.3325	80.3325	79.3325	90.9991	82.6658	150.998	95.6657	94.904	56.94%	25.4255378	79.9124852	330		
01/13/98	SW-8270C	Dialate	166.665	130.665	114.332	116.332	129.665	111.332	222.664	126.332	135.9	81.54%	39.0246322	122.654419	330		
01/13/98	SW-8270C	Dimethoate	166.665	136.332	119.332	123.332	134.665	117.999	253.664	136.665	146	87.60%	48.1485926	151.331026	660		
01/13/98	SW-8270C	1,2-Diphenylhydrazine	166.665	131.665	116.666	116.666	136.999	119.332	260.664	123.665	143.67	86.20%	52.1651688	163.955125	330		
01/13/98	SW-8270C	4-Bromophenyl-phenylether	166.665	123.999	111.999	112.332	123.999	108.666	216.331	118.332	130.81	78.49%	38.1838	120.011684	330		
01/13/98	SW-8270C	Hexachlorobenzene	166.665	136.665	120.665	121.332	133.332	115.999	234.998	126.999	141.43	84.86%	41.899247	131.689333	330		
01/13/98	SW-8270C	1,3,5-Trinitrobenzene	166.665	83.9992	73.6659	76.9992	90.6658	74.3326	183.332	82.9992	95.142	57.09%	39.3540533	123.68979	330		
01/13/98	SW-8270C	Pentachlorophenol	166.665	81.6659	62.3327	65.9993	71.666	60.6661	182.665	83.6658	86.952	52.17%	43.1459295	135.607856	1665		
01/13/98	SW-8270C	Phenanthrene	166.665	141.665	126.999	128.332	141.999	124.665	244.998	134.999	149.09	89.46%	42.8519081	134.683547	330		
01/13/98	SW-8270C	Thionazin	166.665	145.665	130.665	131.665	146.665	128.332	262.997	137.665	154.81	92.89%	48.2495826	151.648438	330		
01/13/98	SW-8270C	Dinoseb	166.665	91.9991	77.9992	79.3325	88.9991	70.9993	194.331	75.6659	97.047	58.23%	43.5253587	136.800297	330		
01/13/98	SW-8270C	Anthracene	166.665	137.999	124.332	125.999	140.665	122.665	242.331	135.999	147.14	88.29%	42.577545	133.821224	330		
01/13/98	SW-8270C	Carbazole	166.665	137.332	121.332	126.665	138.332	118.665	240.331	130.999	144.81	86.89%	42.7723817	134.433596	330		
01/13/98	SW-8270C	Sulfotepp	166.665	156.665	144.665	145.999	160.998	142.665	285.664	151.665	169.76	101.86%	51.53937	161.98824	330		
01/13/98	SW-8270C	Di-n-butylphthalate	166.665	154.665	141.665	141.332	156.665	137.332	270.331	153.665	165.09	99.06%	47.0273837	147.807067	330		
01/13/98	SW-8270C	Disulfoton	166.665	101.332	88.3325	87.3325	97.3324	89.3324	173.665	92.6657	104.28	62.57%	31.0136823	97.4760034	330		
01/13/98	SW-8270C	Fluoranthene	166.665	144.665	128.332	127.665	141.999	122.332	251.664	137.332	150.57	90.34%	45.3139687	142.421804	330		
01/13/98	SW-8270C	4-Nitroquinoline-n-Oxide	333.33	505.26	618.13	595.11	514.49	540.68	564.19	569.51	558.2	167.46%	41.1010748	129.180678	330		REC
01/13/98	SW-8270C	Methapyrilene	166.665	97.999	93.3324	106.999	132.332	119.332	235.331	139.665	132.14	79.29%	48.6017762	152.755383	330		
01/13/98	SW-8270C	Benzidine	333.33	267.38	283.81	250.67	316.56	235.96	284.45	277.5	273.76	82.13%	26.0249838	81.796524	660		
01/13/98	SW-8270C	Pyrene	166.665	142.665	129.332	133.332	146.665	126.665	262.997	144.999	155.24	93.14%	48.1592504	151.364524	330		
01/13/98	SW-8270C	Butylbenzylphthalate	166.665	132.999	118.999	122.332	132.332	116.666	240.998	132.999	142.47	85.49%	43.9927654	138.269262	330		
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Quanterra Incorporated, Pittsburgh
METHOD DETECTION LIMIT STUDY

DATE LAST REVISED:		PROG/PROJECT:		MATRIX: Soil
METHOD:	SW-846 8270C	PROJECT NUMBER:		
METHOD DESCRIPTION:	GCMS BNAs in Soil	ANALYST:	FB	
PREP METHOD:	Sonication	QUALITY ASSURANCE:	PAC	

ANALYSIS DATE	ANALYSIS METHOD	ANALYTE	SPIKE CONC ug/kg	REPLICATE MEASUREMENT 1	2	3	4	5	6	7	AVG ug/kg	SPIKE REC. %	S ug/kg	MDL ug/kg		Report Limit ug/kg	NOTES	
01/13/98	SW-8270C	3,3'-Dichlorobenzidine	166.665	49.9995	42.9996	46.9995	54.9995	53.6661	105.332	74.3326	61.19	36.71%	21.8848827	68.7841865		660		REC
01/13/98	SW-8270C	p-Dimethylaminoazobenzene	166.665	123.999	110.666	116.666	129.332	112.332	232.998	130.332	136.62	81.97%	43.2094041	135.807157		330		
01/13/98	SW-8270C	Chlorobenzilate	166.665	137.665	120.999	126.332	138.999	120.999	256.331	140.665	148.86	89.31%	48.1312273	151.276447		660		
01/13/98	SW-8270C	3,3-Dimethylbenzidine	333.33	169.23	167.35	138.58	259.91	143.36	191.77	175.41	177.94	53.38%	40.5169692	127.344834		660		
01/13/98	SW-8270C	2-Acetylaminofluorene	333.33	469.52	567.43	518.04	464.25	471.53	502.24	539.63	504.66	151.40%	39.3980523	123.828078		660		REC
01/13/98	SW-8270C	Aramite	166.665	82.3325	70.666	74.3326	79.6659	70.9993	156.998	81.6659	88.094	52.86%	30.7642963	96.6921834		330		
01/13/98	SW-8270C	Benzo(a)anthracene	166.665	109.999	97.6657	100.999	111.666	96.999	194.331	107.666	117.05	70.23%	34.5799036	108.684637		330		
01/13/98	SW-8270C	Chrysene	166.665	127.999	115.999	118.999	129.332	111.999	226.998	128.999	137.19	82.31%	40.1939671	126.329639		330		
01/13/98	SW-8270C	bis(2-Ethylhexyl)phthalate	333.33	462.77	542.65	498.88	451.52	471.05	484.32	519.15	490.05	147.02%	32.4400244	101.958997		330		
01/13/98	SW-8270C	Di-n-octylphthalate	333.33	501.32	605.26	552.98	491.49	535.46	529.28	572.56	541.19	162.36%	39.7123695	124.815977		330		REC
01/13/98	SW-8270C	7,12-Dimethylbenz-(a)anthracene	166.665	116.999	97.999	104.999	114.332	100.332	186.998	100.999	117.52	70.51%	31.4744589	98.9242243		330		
01/13/98	SW-8270C	3-Methylcholanthrene	166.665	127.999	105.999	114.332	124.665	110.666	231.998	131.999	135.38	81.23%	43.6515663	137.196873		660		
01/13/98	SW-8270C	Benzo(b)fluoranthene	166.665	91.9991	77.9992	78.3326	88.6658	77.3326	167.998	82.3325	94.951	56.97%	32.7039759	102.788596		330		
01/13/98	SW-8270C	Benzo(k)fluoranthene	166.665	164.332	136.665	148.665	166.665	142.999	268.331	157.332	169.28	101.57%	45.0266783	141.519478		330		
01/13/98	SW-8270C	Benzo(a)pyrene	166.665	105.666	87.9991	93.9991	104.666	89.3324	207.998	105.999	113.67	68.20%	42.3084062	132.975321		330		
01/13/98	SW-8270C	Indeno(1,2,3-cd)pyrene	166.665	163.665	148.332	153.665	171.332	145.332	164.332	164.665	158.76	95.26%	9.6870735	30.446472		330		
01/13/98	SW-8270C	Dibenz(a,h)anthracene	166.665	166.998	142.332	150.665	150.665	140.332	167.998	159.998	154.14	92.49%	11.150137	35.0448807		330		
01/13/98	SW-8270C	Benzo(g,h,i)perylene	166.665	107.666	103.666	119.332	121.999	98.6657	93.3324	108.666	107.62	64.57%	10.3679894	32.5865907		330		
01/13/98	SW-8270C	Benzoic Acid	333.33	420.54	478.55	503.13	383.83	407.66	413.71	440.91	435.48	130.64%	42.0314239	132.104765		330		
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Quanterra Incorporated, Pittsburgh
METHOD DETECTION LIMIT STUDY

DATE LAST REVISED:	03/17/98	PROG/PROJECT:	MATRIX: H2O
METHOD:	8081A/8082 (58903E DB608)	PROJECT NUMBER:	
METHOD DESCRIPTION:	SW-846 Pesticides/PCBs in water	ANALYST: DE	
PREP METHOD:	L-L Extraction	QUALITY ASSURANCE:	

ANALYSIS DATE	ANALYSIS METHOD	ANALYTE	SPIKE CONC UG/L	REPLICATE MEASUREMENT 1	2	3	4	5	6	7	AVG UG/KG	SPIKE REC. %	S UG/KG	MDL UG/KG	Report Limit UG/KG	NOTES	
03/14/98	8081	ALPHA-BHC	0.0125	0.01297	0.01331	0.01303	0.01413	0.01348	0.01322	0.01373	0.0134	107.28%	0.00041024	0.0012894	0.05		
03/14/98	8081	GAMMA-BHC	0.0125	0.01338	0.01338	0.01325	0.01422	0.01356	0.01347	0.01376	0.0136	108.59%	0.00032741	0.00125 [1]	0.05		
03/14/98	8081	HEPTACHLOR	0.0125	0.01611	0.01588	0.01588	0.01785	0.0161	0.0166	0.01672	0.0164	131.59%	0.00070039	0.00220133	0.05		
03/14/98	8081	ENDOSULFAN I	0.0125	0.01594	0.01788	0.01716	0.01793	0.0173	0.01737	0.01724	0.0173	138.08%	0.00065826	0.0020689	0.05		
03/14/98	8081	DIELDRIN	0.0125	0.01772	0.01769	0.01731	0.01925	0.01929	0.02131	0.01867	0.0187	149.99%	0.00137597	0.00432466	0.05		
03/14/98	8081	ENDRIN	0.0125	0.0316	0.0362	0.03352	0.0374	0.03898	0.0406	0.03622	0.0364	290.88%	0.00307387	0.00966117	0.05		REC
03/14/98	8081	4,4'-DDD	0.0125	0.01317	0.01357	0.01455	0.01583	0.01523	0.01555	0.01605	0.0149	118.80%	0.0011244	0.00353398	0.05		
03/14/98	8081	4,4'-DDT	0.0125	0.01281	0.01281	0.01255	0.0136	0.01386	0.01368	0.01414	0.0134	106.80%	0.00061628	0.00193697	0.05		
03/14/98	8081	METHOXYCHLOR	0.025	0.04286	0.05306	0.05111	0.04824	0.04864	0.0551	0.05459	0.0505	202.06%	0.00431565	0.0135641	0.5		REC
03/14/98	8081	ALDRIN	0.0125	0.01117	0.01057	0.01104	0.00996	0.01105	0.0117	0.0138	0.0113	90.61%	0.00121695	0.00382488	0.05		
03/14/98	8081	BETA-BHC	0.0125	0.01476	0.01507	0.01537	0.01534	0.01458	0.01445	0.01579	0.0151	120.41%	0.00048296	0.00151793	0.05		
03/14/98	8081	DELTA-BHC	0.0125	0.01769	0.01684	0.01607	0.01695	0.01672	0.01635	0.01673	0.0168	134.11%	0.00050892	0.00159952	0.05		
03/14/98	8081	HEPT. EPOXIDE	0.0125	0.01575	0.01513	0.01604	0.01528	0.01468	0.01472	0.01626	0.0154	123.27%	0.0006244	0.0019625	0.05		
03/14/98	8081	G.CHLORDANE	0.0125	0.01576	0.01549	0.01623	0.01543	0.01302	0.01341	0.01561	0.015	119.94%	0.00124738	0.00392052	0.05		
03/14/98	8081	A. CHLORDANE	0.0125	0.01989	0.01802	0.01989	0.0192	0.01999	0.01902	0.01946	0.0192	153.68%	0.00076898	0.00241691	0.05		REC
03/14/98	8081	4,4'-DDE	0.0125	0.01338	0.01355	0.01392	0.01373	0.01354	0.01332	0.01486	0.0138	110.06%	0.00052709	0.00165664	0.05		
03/14/98	8081	ENDOSULFAN II	0.0125	0.02022	0.02834	0.01954	0.03154	0.02115	0.0283	0.02001	0.0242	193.26%	0.00503698	0.01583122	0.05	FAIL	REC
03/14/98	8081	ENDRIN ALDEHYDE	0.0125	0.01632	0.01661	0.01595	0.01536	0.01756	0.01676	0.01693	0.0165	132.22%	0.00071897	0.00225974	0.05		
03/14/98	8081	ENDO. SULFATE	0.0125	0.02236	0.02269	0.02222	0.02353	0.02236	0.02231	0.02477	0.0229	183.38%	0.00093655	0.00294357	0.05		REC
03/14/98	8081	ENDRIN KETONE	0.0125	0.02856	0.02593	0.02252	0.02569	0.02736	0.02556	0.02103	0.0252	201.89%	0.00262742	0.008258	0.05		REC
03/14/98	8082	AROCLOR 1016	0.25	0.3205	0.3239	0.3331	0.3276	0.321	0.3273	0.3132	0.3238	129.52%	0.0063807	0.025 [1]	1		
03/14/98	8082	AROCLOR 1260	0.25	0.4542	0.4939	0.4898	0.518	0.4779	0.4778	0.4701	0.4831	193.24%	0.02016135	0.06336712	1		REC
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Quanterra Incorporated, Pittsburgh
METHOD DETECTION LIMIT STUDY

DATE LAST REVISED: 01/19/98	**PROG/PROJECT:**	**MATRIX:** H2O
METHOD: 8082	**PROJECT NUMBER:**	
METHOD DESCRIPTION: 8082 H2O	**ANALYST:** LM	
PREP METHOD: S-FUNNEL	**QUALITY ASSURANCE:**	

ANALYSIS DATE	ANALYSIS METHOD	ANALYTE	SPIKE CONC UG/L	REPLICATE MEASUREMENT 1	2	3	4	5	6	7	AVG UG/L	SPIKE REC. %	S UG/L	MDL UG/L	Report Limit UG/L	NOTES	
01/13/98	8082	1221	0.5	0.2688	0.2466	0.2859	0.2796	0.3194	0.3551	0.2346	0.2843	56.86%	0.04163518	0.13085937	1		
01/13/98	8082	1254	0.5	0.6265	0.6258	0.6298	0.6162	0.6768	0.668	0.6907	0.6477	129.54%	0.0298597	0.09384902	1		
01/13/98	8082	1232	0.5	0.718	0.683	0.739	0.719	0.715	0.685	0.743	0.7153	143.06%	0.02454054	0.07713092	1		
01/13/98	8082	1248	0.5	0.651	0.617	0.623	0.586	0.615	0.571	0.532	0.5993	119.86%	0.03937306	0.12374954	1		
01/13/98	8082	1016	0.5	0.654	0.698	0.72	0.752	0.7	0.707	0.697	0.704	140.80%	0.02935416	0.09226012	1		
01/13/98	8082	1260	0.5	0.641	0.679	0.71	0.719	0.663	0.674	0.654	0.6771	135.43%	0.02853903	0.08969817	1		
01/13/98	8082	1242	0.5	0.69	0.584	0.629	0.65	0.564	0.606	0.671	0.6277	125.54%	0.04599534	0.14456336	1		
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Quanterra Incorporated, Pittsburgh
METHOD DETECTION LIMIT STUDY

DATE LAST REVISED:		**PROG/PROJECT:**		**MATRIX:**	H2O
METHOD:	8081 TOX/CHLOR	**PROJECT NUMBER:**			
METHOD DESCRIPTION:	SW-846 Pesticides in Water	**ANALYST:**	DE		
PREP METHOD:	SEPFUNNEL	**QUALITY ASSURANCE:**			

ANALYSIS DATE	ANALYSIS METHOD	ANALYTE	SPIKE CONC UG/KG	REPLICATE MEASUREMENT							AVG UG/KG	SPIKE REC. %	S UG/KG	MDL UG/KG	Report Limit UG/KG	STATUS	FLAG
				1	2	3	4	5	6	7							
12/09/97	8081	TOXAPHENE	0.2	0.327	0.316	0.223	0.211	0.259	0.223	0.188	0.2496	124.79%	0.05352214	0.16822007	1	pass	0
12/09/97	8081	CHLORDANE	0.05	0.058	0.055	0.059	0.06	0.054	0.051	0.054	0.0559	111.71%	0.00323669	0.01017293	0.05	pass	0
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fail => MDL Value is above RL. Accuracy is < 50% or > 150%, or MDL <10% or > spike level

Quanterra Incorporated, Pittsburgh

METHOD DETECTION LIMIT STUDY

DATE LAST REVISED: 03/15/98	PROG/PROJECT:	MATRIX: SOIL
METHOD: 8081	PROJECT NUMBER:	
METHOD DESCRIPTION: 5890 2A DB608	ANALYST: DE	
PREP METHOD: SONICATION	QUALITY ASSURANCE:	

ANALYSIS DATE	ANALYSIS METHOD	ANALYTE	SPIKE CONC UG/KG	REPLICATE MEASUREMENT							AVG UG/KG	SPIKE REC. %	S UG/KG	MDL UG/KG	Report Limit UG/KG	NOTES	
				1	2	3	4	5	6	7							
03/15/98	8081	ALPHA-BHC	0.417	0.423	0.456	0.497	0.488	0.432	0.46	0.413	0.4527	108.56%	0.03204015	0.1007022	1.7		
03/15/98	8081	GAMMA-BHC	0.417	0.491	0.389	0.428	0.399	0.41	0.423	0.477	0.431	103.36%	0.03876854	0.12184953	1.7		
03/15/98	8081	HEPTACHLOR	0.417	0.733	0.685	0.692	0.673	0.708	0.544	0.745	0.6829	163.75%	0.06642647	0.2087784	1.7		REC
03/15/98	8081	ENDOSULFAN I	0.417	0.874	0.841	1.064	0.779	0.833	0.892	0.772	0.865	207.43%	0.09836666	0.30916642	1.7		REC
03/15/98	8081	DIELDRIN	0.417	0.168	0.144	0.144	0.192	0.135	0.149	0.123	0.1507	36.14%	0.02277216	0.07157291	1.7		REC
03/15/98	8081	ENDRIN	0.417	0.582	0.606	0.641	0.588	0.606	0.577	0.563	0.5947	142.62%	0.02557156	0.08037142	1.7		
03/15/98	8081	4,4'-DDD	0.417	0.583	0.577	0.602	0.392	0.602	0.591	0.59	0.5624	134.87%	0.07570746	0.23794854	1.7		
03/15/98	8081	4,4'-DDT	0.417	0.366	0.321	0.347	0.35	0.348	0.346	0.317	0.3421	82.05%	0.01723783	0.05417851	1.7		
03/15/98	8081	METHOXYCHLOR	0.833	1.029	1.018	1.065	0.939	1.038	1.02	0.992	1.0144	121.78%	0.03992016	0.12546906	3.4		
03/15/98	8081	ALDRIN	0.417	0.535	0.547	0.667	0.557	0.591	0.56	0.574	0.5759	138.10%	0.04406219	0.13848745	1.7		
03/15/98	8081	BETA-BHC	0.417	0.453	0.444	0.784	0.483	0.521	0.495	0.679	0.5513	132.20%	0.129348	0.40654076	1.7		
03/15/98	8081	DELTA-BHC	0.417	0.585	0.592	0.794	0.658	0.664	0.631	0.682	0.658	157.79%	0.07014509	0.22046601	1.7		REC
03/15/98	8081	HEPT. EPOXIDE	0.417	0.407	0.412	0.41	0.388	0.395	0.432	0.383	0.4039	96.85%	0.01668761	0.05244915	1.7		
03/15/98	8081	G.CHLORDANE	0.417	0.21	0.197	0.153	0.18	0.17	0.214	0.17	0.1849	44.33%	0.02276275	0.07154333	1.7		REC
03/15/98	8081	A. CHLORDANE	0.417	0.831	0.74	0.85	0.861	1.02	1.128	1.395	0.975	233.81%	0.22598525	0.71027164	1.7	FAIL	REC
03/15/98	8081	4,4'-DDE	0.417	0.511	0.491	0.562	0.5	0.518	0.501	0.494	0.511	122.54%	0.02435843	0.07655856	1.7		
03/15/98	8081	ENDOSULFAN II	0.417	0.738	0.723	0.764	0.737	0.728	0.739	0.726	0.7364	176.60%	0.01372172	0.04312738	1.7		REC
03/15/98	8081	ENDRIN ALDEHYDE	0.417	0.58	0.51	0.536	0.506	0.617	0.623	0.506	0.554	132.85%	0.05208007	0.16368765	1.7		
03/15/98	8081	ENDO. SULFATE	0.417	0.616	0.524	0.58	0.52	0.702	0.718	0.61	0.61	146.28%	0.07805981	0.24534197	1.7		
03/15/98	8081	ENDRIN KETONE	0.417	0.491	0.474	0.581	0.493	0.516	0.543	0.523	0.5176	124.12%	0.03636783	0.11430409	1.7		
03/15/98	8082	AROCLOR 1016	8.33	14.35	14.46	13.56	12.91	14.89	13.26	13.49	13.846	166.22%	0.72445053	2.27694802	33		REC
03/15/98	8082	AROCLOR 1260	8.33	17.39	21.05	20.42	16.92	17.09	21.43	13.87	18.31	219.81%	2.75906385	8.67173768	33	FAIL	REC
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Footnote 1 = If this footnote appears next to the MDL, the calculated MDL was more than 10 times less than the spiking level, therefore the MDL shown is set at exactly 10 times less than the spiking level.

Quanterra Incorporated, Pittsburgh

METHOD DETECTION LIMIT STUDY

DATE LAST REVISED: 01/19/98

METHOD: 8082

METHOD DESCRIPTION: 8082 SOIL

PREP METHOD: SONICATION

PROG/PROJECT:

PROJECT NUMBER:

ANALYST: LM

QUALITY ASSURANCE:

MATRIX: SOIL

ANALYSIS DATE	ANALYSIS METHOD	ANALYTE	SPIKE CONC UG/KG	REPLICATE MEASUREMENT 1	2	3	4	5	6	7	AVG UG/KG	SPIKE REC. %	S UG/KG	MDL UG/KG	Report Limit UG/KG	NOTES	
01/13/98	8082	1221	16.7	14.7	13.9	14.8	15.4	14.7	14.6	16.6	14.957	89.56%	0.84628038	2.65985922	33		
01/13/98	8082	1254	16.7	19.06	20.08	18.9	19.58	19.27	20.43	20.6	19.703	117.98%	0.67529535	2.12245328	33		
01/13/98	8082	1232	16.7	18.78	17.77	15.83	17.52	16.5	17.12	18.9	17.489	104.72%	1.12576535	3.53828049	33		
01/13/98	8082	1248	16.7	18.52	18.9	22.17	18.31	18.28	20.69	26.37	20.463	122.53%	2.98544086	9.38324063	33		
01/13/98	8082	1016	16.7	18.68	20.47	19.03	20.39	19.51	20.28	20.3	19.809	118.61%	0.73124161	2.29829237	33		
01/13/98	8082	1260	16.7	20.1	20.23	19.28	22.14	20.04	23.28	21.17	20.891	125.10%	1.39805136	4.39407544	33		
01/13/98	8082	1242	16.7	19.05	21.23	18.94	20.4	22.04	18.83	18.76	19.893	119.12%	1.33458751	4.19460853	33		
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Quanterra Incorporated, Pittsburgh
METHOD DETECTION LIMIT STUDY

DATE LAST REVISED:	02/18/98	PROG/PROJECT:	MATRIX: WATER
METHOD:	SW-846 6010A/6010B	PROJECT NUMBER:	
METHOD DESCRIPTION:	ICP JA61E Metals	ANALYST: RJG	
PREP METHOD:		QUALITY ASSURANCE: PAC	

ANALYSIS DATE	ANALYSIS METHOD	ANALYTE	SPIKE CONC	REPLICATE MEASUREMENT							AVG	SPIKE REC.	S	MDL	Report Limit	NOTES	
				1	2	3	4	5	6	7							
			ug/L								ug/L	%	ug/L	ug/L	ug/L		
02/11/98	6010A	Aluminum	60	48.75	56.98	60.45	62.15	43.13	54.4	54.41	54.324	90.54%	6.61080897	20.7777726	200		
02/11/98	6010A	Antimony	50	36.88	56.3	52.45	56.29	50.47	46.57	34.93	47.699	95.40%	8.75029224	27.5021685	60		
03/18/98	6010	Arsenic	100	75.44	46.92	83.17	74.45	74.73	65.88	57.13	68.246	68.25%	12.509816	39.3183515	300		
02/11/98	6010A	Barium	5	4.4	4.26	4.18	4.26	4.26	4.18	4.26	4.2571	85.14%	0.07341986	0.5 [1]	200		
02/11/98	6010A	Beryllium	1	0.92	0.92	0.91	0.95	0.95	0.94	0.96	0.9386	93.86%	0.02410295	0.1 [1]	5		
02/11/98	6010A	Boron	30	32.5	26.84	27.67	27.24	24.11	27.91	27.7	27.71	92.37%	2.48071226	7.79667864	200		
02/11/98	6010A	Cadmium	10	7.09	6.77	7.26	7.1	7.63	5.47	9.31	7.2329	72.33%	1.14258062	3.59113089	5		
02/11/98	6010A	Calcium	50	41.07	47.71	48.91	46.45	45.45	50.95	57.34	48.269	96.54%	5.05429332	15.8856439	5000		
02/11/98	6010A	Chromium	10	7.04	6.45	7.77	7.18	5.72	7.91	9.09	7.3086	73.09%	1.08761863	3.41838536	10		
02/11/98	6010A	Cobalt	10	6.53	5.84	7.56	6.53	7.22	8.95	9.28	7.4157	74.16%	1.28715263	4.04552073	50		
02/11/98	6010A	Copper	2.5	2.26	1.85	1.85	1.64	2.26	2.06	2.88	2.1143	84.57%	0.40750694	1.28079431	25		
03/18/98	6010	Iron	20	24.62	23.46	29.58	25.78	28.42	28.26	29.91	27.147	135.74%	2.52525058	7.93686256	100		
02/11/98	6010A	Lead	50	34.83	14.06	27.95	21	43.54	40.1	38.35	31.404	62.81%	10.8310893	34.0421136	100		
02/11/98	6010A	Lithium	1	0.79	0.29	0.66	0	0.24	0.57	0.31	0.4086	40.86%	0.27504112	0.86445425	50		REC
02/11/98	6010A	Magnesium	50	45.34	37.98	44.21	44.21	34.57	43.64	44.78	42.104	84.21%	4.13583872	12.9989411	5000		
02/11/98	6010A	Manganese	2	1.82	2.59	2.59	2.34	2.08	2.34	2.35	2.3014	115.07%	0.2746773	0.86331075	15		
02/11/98	6010A	Molybdenum	10	12.55	10.26	10.26	13.69	12.55	10.27	11.41	11.57	115.70%	1.38822429	4.36318893	40		
02/11/98	6010A	Nickel	10	11.74	10.22	14.18	11.75	12.13	9.02	13.31	11.764	117.64%	1.74524933	5.48531866	40		
02/11/98	6010A	Potassium	1000	595.83	557.59	706.55	619.99	559.6	754.86	557.59	621.72	62.17%	79.2463265	249.071204	5000		
02/11/98	6010A	Selenium	100	69.8	108.26	71.75	83.94	88.7	67.2	80.32	78.567	78.57%	15.5666018	48.9258293	250		
03/18/98	6010	Silicon	500	542.52	489.08	569.24	716.97	546.74	667.67	643.85	596.58	119.32%	81.1297601	254.990836	500		
02/11/98	6010A	Silver	10	6.96	7.37	6.96	6.55	5.33	5.74	6.16	6.4386	64.39%	0.73238033	2.30187139	10		
02/11/98	6010A	Sodium	200	214.34	213.82	221.21	214.69	208.25	232.08	246	221.48	110.74%	13.1937824	41.4680582	5000		
02/11/98	6010A	Strontium	1	0.74	0.8	0.74	0.74	0.63	0.91	0.77	0.7614	76.14%	0.0839501	0.26385516	50		
03/18/98	6010	Thallium	250	199.03	194.51	226.12	226.14	248.77	217.1	198.94	215.8	86.32%	19.6675938	61.8152475	2000		
02/11/98	6010A	Vanadium	10	7.31	7.62	8.64	7.33	7.65	9.32	8.32	8.0271	80.27%	0.75731355	2.38023648	50		
02/11/98	6010A	Zinc	20	18.13	21.38	23.08	20.7	20.72	22.5	22.39	21.271	106.36%	1.66044601	5.21878181	20		

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Quanterra Incorporated, Pittsburgh
METHOD DETECTION LIMIT STUDY

DATE LAST REVISED: 02/18/98

METHOD: SW-846 6010A/6010B

METHOD DESCRIPTION: ICP JA61E Metals

PREP METHOD:

PROG/PROJECT:

PROJECT NUMBER:

ANALYST: RJG

QUALITY ASSURANCE:

MATRIX: WATER

ANALYSIS DATE	ANALYSIS METHOD	ANALYTE	SPIKE CONC ug/L	REPLICATE MEASUREMENT							AVG	SPIKE REC.	S	MDL		Report Limit	NOTES	
				1	2	3	4	5	6	7	ug/L	%	ug/L	ug/L		ug/L		
02/11/98	6010A	Tin	40	29.99	31.77	34.74	32.63	44.96	38.12	47.45	37.094	92.74%	6.76330505	21.2570678		100		
02/11/98	6010A	Titanium	2	0.54	0.81	1.26	1.26	0.54	0.9	1.08	0.9129	45.64%	0.30488874	0.95826531		50		REC
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Quanterra Incorporated, Pittsburgh
METHOD DETECTION LIMIT STUDY

DATE LAST REVISED:	02/18/98	PROG/PROJECT:	MATRIX: Soil
METHOD:	SW-846 6010A/6010B	PROJECT NUMBER:	
METHOD DESCRIPTION:	ICP JA61E Metals	ANALYST: RJG	
PREP METHOD:		QUALITY ASSURANCE: PAC	

ANALYSIS DATE	ANALYSIS METHOD	ANALYTE	SPIKE CONC	REPLICATE MEASUREMENT							AVG	SPIKE REC.	S	MDL	Report Limit	NOTES	
			mg/kg	1	2	3	4	5	6	7	mg/kg	%	mg/kg	mg/kg	mg/kg		
02/11/98	6010A	Aluminum	6	4.875	5.698	6.045	6.215	4.313	5.44	5.441	5.4324	90.54%	0.6610809	2.07777726	20		
02/11/98	6010A	Antimony	5	3.688	5.63	5.245	5.629	5.047	4.657	3.493	4.7699	95.40%	0.87502922	2.75021685	6		
03/18/98	6010A	Arsenic	10	7.544	4.692	8.317	7.445	7.473	6.588	5.713	6.8246	68.25%	1.2509816	3.93183516	30		
02/11/98	6010A	Barium	0.5	0.44	0.426	0.418	0.426	0.426	0.418	0.426	0.4257	85.14%	0.00734199	0.05 [1]	20		
02/11/98	6010A	Beryllium	0.1	0.092	0.092	0.091	0.095	0.095	0.094	0.098	0.0939	93.86%	0.0024103	0.01 [1]	0.5		
02/11/98	6010A	Boron	3	3.25	2.684	2.767	2.724	2.411	2.791	2.77	2.771	92.37%	0.24807123	0.77968786	20		
02/11/98	6010A	Cadmium	1	0.709	0.677	0.726	0.71	0.763	0.547	0.931	0.7233	72.33%	0.11425806	0.35911309	0.5		
02/11/98	6010A	Calcium	5	4.107	4.771	4.891	4.645	4.545	5.095	5.734	4.8269	96.54%	0.50542933	1.58856439	500		
02/11/98	6010A	Chromium	1	0.704	0.645	0.777	0.718	0.572	0.791	0.909	0.7309	73.09%	0.10876186	0.34183854	1		
02/11/98	6010A	Cobalt	1	0.653	0.584	0.756	0.653	0.722	0.695	0.928	0.7416	74.16%	0.12871526	0.40455207	5		
02/11/98	6010A	Copper	0.25	0.226	0.185	0.185	0.164	0.226	0.206	0.288	0.2114	84.57%	0.04075069	0.12807943	2.5		
03/18/98	6010A	Iron	2	2.462	2.346	2.958	2.578	2.842	2.826	2.991	2.7147	135.74%	0.25252506	0.79368626	10		
02/11/98	6010A	Lead	5	3.483	1.406	2.795	2.1	4.354	4.01	3.835	3.1404	62.81%	1.08310893	3.40421136	10		
02/11/98	6010A	Lithium	0.1	0.079	0.029	0.066	0	0.024	0.057	0.031	0.0409	40.86%	0.02750411	0.08644542	5		REC
02/11/98	6010A	Magnesium	5	4.534	3.798	4.421	4.421	3.457	4.364	4.478	4.2104	84.21%	0.41358387	1.29989411	500		
02/11/98	6010A	Manganese	0.2	0.182	0.259	0.259	0.234	0.208	0.234	0.235	0.2301	115.07%	0.02746773	0.08633108	1.5		
02/11/98	6010A	Molybdenum	1	1.255	1.026	1.026	1.369	1.255	1.027	1.141	1.157	115.70%	0.13882243	0.43631889	4		
02/11/98	6010A	Nickel	1	1.174	1.022	1.418	1.175	1.213	0.902	1.331	1.1764	117.64%	0.17452493	0.54853187	4		
02/11/98	6010A	Potassium	100	59.583	55.759	70.655	61.999	55.96	75.486	55.759	62.172	62.17%	7.92463265	24.9071204	500		
02/11/98	6010A	Selenium	10	6.98	10.826	7.175	6.394	8.87	6.72	8.032	7.8567	78.57%	1.55666018	4.89258293	25		
02/11/98	6010A	Silicon	50	54.252	48.908	56.924	71.697	54.674	66.767	64.385	59.658	119.32%	8.11297601	25.4990836	50		
02/11/98	6010A	Silver	1	0.696	0.737	0.696	0.655	0.533	0.574	0.616	0.6439	64.39%	0.07323803	0.23018714	1		
02/11/98	6010A	Sodium	20	21.434	21.382	22.121	21.469	20.825	23.208	24.6	22.148	110.74%	1.31937824	4.14680582	500		
02/11/98	6010A	Strontium	0.1	0.074	0.08	0.074	0.074	0.063	0.091	0.077	0.0761	76.14%	0.00839501	0.02638552	5		
03/18/98	6010A	Thallium	25	19.903	19.451	22.612	22.614	24.877	21.71	19.894	21.58	86.32%	1.96675938	6.18152475	200		
02/11/98	6010A	Vanadium	1	0.731	0.762	0.864	0.733	0.765	0.932	0.832	0.8027	80.27%	0.07573135	0.23802365	5		
03/18/98	6010B	Zinc	2	1.813	2.138	2.308	2.07	2.072	2.25	2.239	2.1271	106.36%	0.1660446	0.52187818	2		

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Quanterra Incorporated, Pittsburgh
METHOD DETECTION LIMIT STUDY

DATE LAST REVISED:	02/18/98	**PROG/PROJECT:**		**MATRIX:**	Soil
METHOD:	SW-846 6010A/6010B	**PROJECT NUMBER:**			
METHOD DESCRIPTION:	ICP JA61E Metals	**ANALYST:**	RJG		
PREP METHOD:		**QUALITY ASSURANCE:**			

ANALYSIS DATE	ANALYSIS METHOD	ANALYTE	SPIKE CONC mg/kg	REPLICATE MEASUREMENT 1	2	3	4	5	6	7	AVG mg/kg	SPIKE REC. %	S mg/kg	MDL mg/kg		Report Limit mg/kg	NOTES	
02/11/98	6010A	Tin	4	2.999	3.177	3.474	3.263	4.496	3.812	4.745	3.7094	92.74%	0.67633051	2.12570678		10		
02/11/98	6010A	Titanium	0.2	0.054	0.081	0.126	0.126	0.054	0.09	0.108	0.0913	45.64%	0.03048887	0.09582653		5		REC
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Quanterra Incorporated, Pittsburgh
METHOD DETECTION LIMIT STUDY

DATE LAST REVISED:	02/18/98	**PROG/PROJECT:**		**MATRIX:**	WATER
METHOD:	METHOD 6010A/6010B	**PROJECT NUMBER:**			
METHOD DESCRIPTION:	TRACE ICP MDLS	**ANALYST:**	RJG		
PREP METHOD:		**QUALITY ASSURANCE:**	PAC		

ANALYSIS DATE	ANALYSIS METHOD	ANALYTE	SPIKE CONC ug/L	REPLICATE MEASUREMENT							AVG ug/L	SPIKE REC. %	S ug/L	MDL ug/L	Report Limit ug/L	NOTES	
				1	2	3	4	5	6	7							
02/10/98	6010B	Aluminum	30	35.03	28.69	30.25	33.71	36.3	39.36	36.5	34.2629	114.21%	3.72356332	11.7031595	200		
02/10/98	6010B	Antimony	5	5.42	4.93	5.2	5.79	4.81	5.02	4.89	5.15143	103.03%	0.34963927	1.09891623	10		
02/10/98	6010B	Arsenic	10	9.52	9.91	7.44	8.74	8.57	8.87	9.13	8.88286	88.83%	0.7876487	2.47557987	10		
02/10/98	6010B	Barium	0.35	0.45	0.42	0.43	0.57	0.42	0.41	0.44	0.44857	128.16%	0.05520524	0.17351008	200		
03/12/98	6010B	Beryllium	2	1.64	1.64	1.69	1.61	1.6	1.68	1.66	1.64571	82.29%	0.03359422	0.2 [1]	5		
04/03/98	6010B	Cadmium	0.5	0.41	0.44	0.54	0.49	0.43	0.51	0.43	0.46429	92.86%	0.04894117	0.1538221	5		
02/10/98	6010B	Calcium	100	116.68	115.08	108.95	115.26	130.77	111.03	109.58	115.336	115.34%	7.44468682	23.3986507	5000		
02/10/98	6010B	Cobalt	3	2.24	2.31	1.68	2.24	2.52	2.24	2.26	2.21286	73.76%	0.25565043	0.8035093	50		
02/10/98	6010B	Chromium	5	3.71	3.68	3.6	3.88	3.63	3.75	3.7	3.70714	74.14%	0.09123491	0.5 [1]	10		
02/10/98	6010B	Copper	5	4.9	4.34	4.54	5	4.94	4.12	4.18	4.57429	91.49%	0.37393659	1.17528269	25		
04/03/98	6010B	Iron	100	111.87	116.97	111.36	111.74	113.83	110.07	113	112.691	112.69%	2.23316986	10 [1]	100		
02/10/98	6010B	Lead	5	5.94	5.21	5.43	5.53	5.25	4.88	5.53	5.39571	107.91%	0.33044703	1.03859501	3		
02/10/98	6010B	Magnesium	25	27.46	24.77	24.51	25.09	25.54	22.94	26.85	25.3086	101.23%	1.50797248	4.73955745	5000		
02/10/98	6010B	Manganese	0.6	0.96	0.95	1.03	1.16	1.07	0.87	1.21	1.03571	172.62%	0.12081075	0.3797082	15		REC
02/10/98	6010B	Molybdnum	10	11.29	10.21	9.75	10.28	10.12	9.3	9.51	10.0657	100.66%	0.65362724	2.05435042	40		
02/10/98	6010B	Nickel	5	5.37	4.24	4.17	5.78	4.83	4.3	4.32	4.71571	94.31%	0.63605181	1.99911084	40		
02/10/98	6010B	Selenium	15	17.34	15.21	16.53	16.81	16.56	16.24	16.61	16.4714	109.81%	0.65118939	2.04668825	5		
02/10/98	6010B	Silver	1	0.96	0.8	0.71	0.9	0.8	0.66	1.06	0.84	84.00%	0.13820275	0.43437124	10		
02/10/98	6010B	Thallium	40	38.68	37.24	37.35	38.35	37.27	36.04	37.33	37.4657	93.66%	0.85733807	4 [1]	10		
02/10/98	6010B	Vanadium	5	3.92	3.57	4.49	2.8	4.48	4.57	4.02	3.97857	79.57%	0.63559496	1.99767496	50		
02/10/98	6010B	Zinc	15	21.52	21.47	16.6	18.07	18.25	16.93	22.54	19.34	128.93%	2.43741667	7.66080058	20		
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Quanterra Incorporated, Pittsburgh
METHOD DETECTION LIMIT STUDY

DATE LAST REVISED:	02/18/98	PROG/PROJECT:		MATRIX:	Soil
METHOD:	METHOD 6010A/6010B	PROJECT NUMBER:			
METHOD DESCRIPTION:	TRACE ICP MDLs	ANALYST:	RJG		
PREP METHOD:		QUALITY ASSURANCE:	PAC		

ANALYSIS DATE	ANALYSIS METHOD	ANALYTE	SPIKE CONC mg/kg	REPLICATE MEASUREMENT							AVG mg/kg	SPIKE REC. %	S mg/kg	MDL mg/kg		Report Limit mg/kg	NOTES	
				1	2	3	4	5	6	7								
02/10/98	6010B	Aluminum	3	3.503	2.869	3.025	3.371	3.63	3.936	3.66	3.42629	114.21%	0.37235633	1.17031595		20		
02/10/98	6010B	Antimony	0.5	0.542	0.493	0.52	0.579	0.481	0.502	0.489	0.51514	103.03%	0.03496393	0.10989162		1		
02/10/98	6010B	Arsenic	1	0.952	0.991	0.744	0.874	0.857	0.887	0.913	0.88829	88.83%	0.07876487	0.24756799		1		
02/10/98	6010B	Barium	0.035	0.045	0.042	0.043	0.057	0.042	0.041	0.044	0.04486	128.16%	0.00552052	0.01735101		20		
03/12/98	6010B	Beryllium	0.2	0.164	0.164	0.169	0.161	0.16	0.168	0.166	0.16457	82.29%	0.00336942	0.02 [1]		0.5		
04/03/98	6010B	Cadmium	0.05	0.041	0.044	0.054	0.049	0.043	0.051	0.043	0.04643	92.86%	0.00489412	0.01538221		0.2		
02/10/98	6010B	Calcium	10	11.668	11.506	10.895	11.526	13.077	11.103	10.958	11.5336	115.34%	0.74446868	2.33986507		500		
02/10/98	6010B	Chromium	0.5	0.371	0.368	0.36	0.388	0.363	0.375	0.37	0.37071	74.14%	0.00912349	0.05 [1]		0.5		
02/10/98	6010B	Cobalt	0.3	0.224	0.231	0.168	0.224	0.252	0.224	0.226	0.22129	73.76%	0.02556504	0.08035093		1		
02/10/98	6010B	Copper	0.5	0.49	0.434	0.454	0.5	0.494	0.412	0.418	0.45743	91.49%	0.03739366	0.11752827		2.5		
04/03/98	6010B	Iron	10	11.187	11.697	11.136	11.174	11.383	11.007	11.3	11.2691	112.69%	0.22331699	1 [1]		10		
02/10/98	6010B	Lead	0.5	0.594	0.521	0.543	0.553	0.525	0.488	0.553	0.53957	107.91%	0.0330447	0.1038595		0.3		
02/10/98	6010B	Magnesium	2.5	2.746	2.477	2.451	2.509	2.554	2.294	2.685	2.53086	101.23%	0.15079725	0.47395575		500		
02/10/98	6010B	Manganese	0.06	0.096	0.095	0.103	0.116	0.107	0.087	0.121	0.10357	172.62%	0.01208108	0.03797082		1.5		REC
02/10/98	6010B	Molybdnum	1	1.129	1.021	0.975	1.028	1.012	0.93	0.951	1.00657	100.66%	0.06536272	0.20543504		4		
02/10/98	6010B	Nickel	0.5	0.537	0.424	0.417	0.578	0.483	0.43	0.432	0.47157	94.31%	0.06360518	0.19991108		4		
02/10/98	6010B	Selenium	1.5	1.734	1.521	1.653	1.681	1.656	1.624	1.661	1.64714	109.81%	0.06511894	0.20466882		0.5		
02/10/98	6010B	Silver	0.1	0.096	0.08	0.071	0.09	0.08	0.066	0.105	0.084	84.00%	0.01382027	0.04343712		0.5		
02/10/98	6010B	Thallium	4	3.868	3.724	3.735	3.835	3.727	3.604	3.733	3.74657	93.66%	0.08573381	0.4 [1]		1		
02/10/98	6010B	Vanadium	0.5	0.392	0.357	0.449	0.28	0.448	0.457	0.402	0.39786	79.57%	0.0635595	0.1997675		5		
02/10/98	6010B	Zinc	1.5	2.152	2.147	1.66	1.807	1.825	1.693	2.254	1.934	128.93%	0.24374167	0.78608006		2		
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Quanterra Incorporated, Pittsburgh
METHOD DETECTION LIMIT STUDY

DATE LAST REVISED:		**PROG/PROJECT:**	**MATRIX:** Water
METHOD: 7470A		**PROJECT NUMBER:**	**WATER**
METHOD DESCRIPTION: HG-WATERS NONCLP		**ANALYST:** WAH	
PREP METHOD: 7470A		**QUALITY ASSURANCE:**	

ANALYSIS DATE	ANALYSIS METHOD	ANALYTE	SPIKE CONC ug/L	REPLICATE MEASUREMENT 1	2	3	4	5	6	7	AVG ug/L	SPIKE REC. %	S ug/L	MDL ug/L	Report Limit ug/L	NOTES	
01/16/98	7470A	Hg	0.2	0.1685	0.2071	0.2091	0.1982	0.2248	0.198	0.2166	0.2032	101.59%	0.01803824	0.05669419	0.2		
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Quanterra Incorporated, Pittsburgh
METHOD DETECTION LIMIT STUDY

DATE LAST REVISED:		**PROG/PROJECT:**		**MATRIX:** Soils
METHOD:	7471A	**PROJECT NUMBER:**		
METHOD DESCRIPTION:	HG-Soils NONCLP	**ANALYST:**	WAH	
PREP METHOD:	7471A	**QUALITY ASSURANCE:**	PAC	

ANALYSIS DATE	ANALYSIS METHOD	ANALYTE	SPIKE CONC mg/kg	REPLICATE MEASUREMENT 1	2	3	4	5	6	7	AVG mg/kg	SPIKE REC. %	S mg/kg	MDL mg/kg		Report Limit mg/kg	NOTES	
01/16/96	7471A	Hg	0.033	0.028083	0.034617	0.03485	0.033033	0.037487	0.033	0.0361	0.0339	102.66%	0.00301025	0.0094612		0.1		
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Quanterra Incorporated, Pittsburgh
METHOD DETECTION LIMIT STUDY

DATE LAST REVISED: 03/22/98	**PROG/PROJECT:**	**MATRIX:** Water
METHOD: Wet Chemistry	**PROJECT NUMBER:**	
METHOD DESCRIPTION:	**ANALYST:** RSR,PJ.CLL	
PREP METHOD:	**QUALITY ASSURANCE:** PAC	

ANALYSIS DATE	ANALYSIS METHOD	ANALYTE	SPIKE CONC mg/L	REPLICATE MEASUREMENT 1	2	3	4	5	6	7	AVG mg/L	SPIKE REC. %	S mg/L	MDL mg/L	Report Limit mg/L	NOTES	
01/13/98	310.1	Alkalinity	3	3.27	3.16	4.22	3.27	3.27	4.22	3.27	3.5257	117.52%	0.47598519	1.49602146	1	FAIL	
02/09/98	325.2	Chloride	3	3.374	3.439	3.382	3.374	3.494	3.423	3.426	3.416	113.87%	0.04367884	0.3[1]	1		
01/23/98	35.2/CLP/901	Cyanide (water)	0.03	0.0298	0.0292	0.0287	0.0296	0.0294	0.0289	0.0286	0.0292	97.24%	0.00045722	0.003[1]	0.01		
01/23/98	CLP/9012	Cyanide (soil)	7.5	7.1509	7.6849	7.1727	7.2858	7.2596	7.3838	7.413	7.3358	97.81%	0.18222272	0.75[1]	2.5		
03/21/98	9012/CLP	Cyanide Soil (5 gram)	1.5	1.4597	1.4665	1.4248	1.4967	1.4605	1.4457	1.443	1.4596	97.30%	0.02510192	0.15[1]	0.5		
01/13/98	130.2	Hardness, Total	3	2.08	3.07	2.97	2.97	2.97	2.97	2.97	2.8571	95.24%	0.3447083	1.08341818	3		
01/26/98	353.2	Nitrate/Nitrite	0.06	0.064	0.06	0.062	0.064	0.063	0.066	0.064	0.0633	105.48%	0.00188982	0.006[1]	0.02		
01/12/98	365.1	Phosphate, Ortho	0.03	0.028	0.033	0.031	0.033	0.03	0.03	0.028	0.0304	101.43%	0.0020702	0.00650663	0.01		
03/20/98	160	Solids, TS	41.55	42.6	41	42	43.4	41.8	43.5	43.7	42.571	102.46%	1.01770049	4.155[1]	10		
03/20/98	160	Solids, TSS	11.4	26	19	20	24	19	23	18	21.286	186.72%	3.0394235	9.55290807	4	FAIL	REC
01/12/98	418.1/413.2	TPHIR/O&GIR (AUTO SHAKER)	3	2.28	2.36	2.36	2.12	2.2	2.03	2.12	2.21	73.67%	0.12819256	0.40290923	1		
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Attachment E

BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Laboratory Qualifications for CompuChem

NEW YORK STATE DEPARTMENT OF HEALTH

BARBARA A. DEBUONO, M.D., M.P.H. Commissioner

Expires 12:01 AM April 1, 1999
ISSUED April 1, 1998
REVISED August 11, 1998

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

Lab ID No.: 10065

Director: MR. ROBERT METERER
Lab Name: COMPUCHEM
Address : 501 MADISON AVENUE
CARY NC 27513

is hereby APPROVED as an Environmental Laboratory for the category

ENVIRONMENTAL ANALYSES/SOLID AND HAZARDOUS WASTE

All approved subcategories and/or analytes are listed below:

haracteristic Testing :
Corrosivity
Ignitability
Reactivity
E.P. Toxicity
geable Halocarbons (ALL)

Miscellaneous :
Cyanide, Total
Haloethers (ALL)
Nitroaromatics Isophorone (ALL)
Phthalate Esters (ALL)

Acrolein and Acrylonitrile (ALL)
Chlor. Hydrocarbon Pesticides (ALL)
Metals I (ALL)
Polynuclear Arom. Hydrocarbon (ALL)
Priority Pollutant Phenols (ALL)

Chlorophenoxy Acid Pesticides (ALL)
Chlorinated Hydrocarbons (ALL)
Metals II (ALL)
Polychlorinated Biphenyls (ALL)
Purgeable Aromatics (ALL)

Serial No.: 103698

Wadsworth Center

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DOH-3317 (3/97)

NEW YORK STATE DEPARTMENT OF HEALTH

BARBARA A. DEBUONO, M.D., M.P.H. Commissioner

Expires 12:01 AM April 1, 1999
ISSUED April 1, 1998
REVISED August 11, 1998

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

Lab ID No.: 10065

Director: MR. ROBERT MEIERER
Lab Name: COMPUCHEM
Address : 501 MADISON AVENUE
CARY NC 27513

is hereby APPROVED as an Environmental Laboratory for the category

CONTRACT LABORATORY PROTOCOL (CLP)

All approved subcategories and/or analytes are listed below:

CLP Inorganics | CLP PCB/Pesticides | CLP Semi-Volatile Organics | CLP Volatile Organics

Serial No.: 103699

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Lab ID No.: 10065

Director: MR. ROBERT MEIERER
Lab Name: COMPUCHEM
Address : 501 MADISON AVENUE
CARY NC 27513

is hereby APPROVED as an Environmental Laboratory for the category

ENVIRONMENTAL ANALYSES NON POTABLE WATER

All approved subcategories and/or analytes are listed below:

Chlor. Hydrocarbon Pesticides :
- 4,4'-DDD
- 4,4'-DDE
- 4,4'-DDT
- alpha-BHC
- Aldrin
- beta-BHC
- Chlordane Total
- delta-BHC
- Dieldrin
- Endrin aldehyde
- Endrin
- Endosulfan I
- Endosulfan II
- Endosulfan sulfate
- Heptachlor
- Heptachlor epoxide
- Lindane
- Methoxychlor
- PCNB
- Toxaphene

Wastewater Metals III :
- Cobalt, Total
- Molybdenum, Total
- Tin, Total
- Titanium, Total
- Thallium, Total

Mineral :
- Alkalinity
- Calcium Hardness
- Chloride
- Fluoride, Total

Wastewater Metals I (ALL)
Nitrosoamines (ALL)
Phthalate Esters (ALL)
Purgeable Halocarbons (ALL)

Wastewater Miscellaneous :
- Boron, Total
- Cyanide, Total
- Oil & Grease Total Recoverable
- Hydrogen Ion (pH)
- Organic Carbon, Total

Residue :
- Solids, Total Dissolved
- Solids, Total

Benzidines (ALL)
Chlorinated Hydrocarbons (ALL)
Wastewater Metals II (ALL)
Polynuclear Aromatics (ALL)
Priority Pollutant Phenols (ALL)

Nutrient :
- Kjeldahl Nitrogen, Total
- Ammonia (as N)
- Nitrate (as N)
- Orthophosphate (as P)
- Phosphorus, Total

TCLP Additional Compounds :
- Methylethyl ketone (2-butanone)

Acrolein and Acrylonitrile (ALL)
Chlorophenoxy Acid Pesticides (ALL)
Haloethers (ALL)
Nitroaromatics and Isophorone (ALL)
Polychlorinated Biphenyls (ALL)
Purgeable Aromatics (ALL)

Serial No.: 103697

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DOH-3317 (3/97)

Attachment F

BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Laboratory Qualifications for Maxymillian Technologies

The Commonwealth of Massachusetts

Department of Environmental Protection

Division of Environmental Analysis
Senator William X. Wall Experiment Station

certifies

M-MA146 Maxymillian Technologies, Inc.
86 South Main St.
Lanesboro, MA 01237

Laboratory Director: **John M. Massimiano**

for the ***Chemical Analysis of Non-Potable Water***

pursuant to 310 CMR 42.00

This certificate supersedes all previous Massachusetts certificates issued to this laboratory. The laboratory is regulated by and shall be responsible for being in compliance with Massachusetts regulations at 310 CMR 42.00.

This certificate is valid only when accompanied by the latest dated Certified Parameter List as issued by the Massachusetts D.E.P.

Certification is no guarantee of the validity of the data. This certification is subject to unannounced laboratory inspections.

Director, Division of Environmental Analysis

Issued: **07/01/98**

Expires: **06/30/99**

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Certified Parameter List

EFFECTIVE DATE: 07/01/98

EXPIRATION DATE: 06/30/99

M-MA146 Maxymillian Technologies, Inc.
Lanesboro, MA

NON-POTABLE WATER

257 Polychlorinated Biphenyls (water)
258 Polychlorinated Biphenyls (oil)

NEW YORK STATE DEPARTMENT OF HEALTH

BARBARA A. DEBUONO, M.D., M.P.H. Commissioner

Expires 12:01 AM April 1, 1999
ISSUED April 1, 1998
REVISED July 14, 1998

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

Lab ID No.: 11477

Director: MR. JOHN MASSIMIANO
Lab Name: MAXYMILLIAN TECHNOLOGIES INC
Address : 86 SOUTH MAIN STREET
LANESBORO MA 01237

is hereby APPROVED as an Environmental Laboratory for the category

ENVIRONMENTAL ANALYSES NON POTABLE WATER

All approved subcategories and/or analytes are listed below:

Wastewater Metals I :
- Silver, Total
- Barium, Total
- Calcium, Total
- Cadmium, Total
- Chromium, Total
- Copper, Total
- Magnesium, Total
- Nickel, Total
- Lead, Total

Polychlorinated Biphenyls (ALL)
Purgeable Halocarbons (ALL)

Chlor. Hydrocarbon Pesticides :
- Captan
- Dichloran
- Mirex
- Methoxychlor
- PCNB
- Strobane
- Trifluralin
- Toxaphene

Nitroaromatics and Isophorone (ALL)
Phthalate Esters (ALL)
TCLP Additional Compounds (ALL)

Wastewater Metals II :
- Arsenic, Total
- Beryllium, Total
- Chromium VI
- Mercury, Total
- Selenium, Total
- Zinc, Total

Benzidines (ALL)
Chlorinated Hydrocarbons (ALL)
Nitrosoamines (ALL)
Priority Pollutant Phenols (ALL)

Wastewater Miscellaneous :
- Hydrogen Ion (pH)
- Sulfide (as S)

Organophosphate Pesticides :
- Parathion ethyl
- Parathion methyl

Wastewater Metals III :
- Thallium, Total

Haloethers (ALL)
Polynuclear Aromatics (ALL)
Purgeable Aromatics (ALL)

Serial No.: 103289

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DOH-3317 (3/97)

NEW YORK STATE DEPARTMENT OF HEALTH

BARBARA A. DEBUONO, M.D., M.P.H. Commissioner

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REVISED July 14, 1998

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Lab Name: MAXYMILLIAN TECHNOLOGIES INC
Address : 86 SOUTH MAIN STREET
LANESBORO MA 01237

is hereby APPROVED as an Environmental Laboratory for the category

ENVIRONMENTAL ANALYSES/SOLID AND HAZARDOUS WASTE

All approved subcategories and/or analytes are listed below:

Characteristic Testing :
- Corrosivity
- Ignitability
- Reactivity

Purgeable Halocarbons (ALL)

Miscellaneous :
- Hydrogen Ion (pH)
- Sulfide (as S)

Phthalate Esters (ALL)

Chlorinated Hydrocarbons (ALL)
Metals I (ALL)
Polynuclear Arom. Hydrocarbon (ALL)
Priority Pollutant Phenols (ALL)

Haloethers (ALL)
Nitroaromatics Isophorone (ALL)
Polychlorinated Biphenyls (ALL)
Purgeable Aromatics (ALL)

Serial No.: 103290

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