TABLES

Table No.	Description	Page No.	Revision Date
5-1	Sample Preparation Methods	5.3	5/17/93
5-2	Summary of Precision and Accuracy Criteria for Inorganics Analysis, Metals Analysis, Oil and Grease, TRPH, and TOX	5.4	5/17/93
5-3	Reporting Limit Data for Metals, Inorganics, Oil and Grease, TRPH, TOX, and Radionuclide Analyses	5.14	5/17/93
5-4	Analytes, Precision, and Accuracy Data For Trihalomethanes, EPA 501.2	5.22	5/17/93
5-5	Reporting Limit Data for Trihalomethanes, EPA 501.2	5.23	5/17/93
5-6	Analytes, Precision, and Accuracy Data For EDB and DBCP, EPA 504 and Modified 504	5.24	5/17/93
5-7	Reporting Limit Data for EDB and DBCP, EPA 504 and Modified 504	5.25	5/17/93
5-8	Analytes, Precision, and Accuracy Data For Organohalide Pesticides and Arochlors in Drinking Water, EPA 505	5.26	5/17/93
5-9	Reporting Limits Data for Organohalide Pesticides and Arochlors in Drinking Water, EPA 505	5.28	5/17/93
5-10	Analytes, Precision, and Accuracy Data For Nitrogen and Phosphorous Containing Pesticides, EPA 507	5.29	5/17/93
5-11	Reporting Limit Data for Nitrogen and Phosphorus Containing Pesticides, EPA 507	5.32	5/17/93
5-12	Analytes, Precision, and Accuracy Data For Chlorinated Herbicides, EPA 515	5.35	5/17/93

TABLES

(Continued, Page 2 of 7)

Table No.	Description	Page No.	Revision Date
5-13	Reporting Limit Data for Chlorinated Herbicides, EPA 515.1	5.36	5/17/93
5-14	Analytes, Precision, and Accuracy Data for Volatile Organic Compounds, EPA 524.2	5.37	5/17/93
5-15	Reporting Limit Data for Volatile Organic Compounds, EPA 524.2	5.40	5/17/93
5-16	Analytes, Precision, and Accuracy Data For N-Methyl Carbamoxyloximes and N-Methyl Carbamates, EPA 531.1	5.43	5/17/93
5-17	Reporting Limit Data for N-Methyl Carbamoxyloximes and N-Methyl Carbamates, EPA 531.1	5.44	5/17/93
5-18	Analytes, Precision, and Accuracy Data for Purgeable Halocarbons, EPA 601 and SW 5030/8010	5.45	5/17/93
5-19	Reporting Limit Data for Purgeable Halocarbons, EPA 601 and SW 5030/8010	5.47	5/17/93
5-20	Analytes, Precision, and Accuracy Data for Purgeable Aromatics, EPA 602 and SW 5030/8020	5.49	5/17/93
5-21	Reporting Limit for Purgeable Aromatics, EPA 602 and SW 5030/8020	5.50	5/17/93
5-22	Analytes, Precision, and Accuracy Data for Phenols, EPA 604 and SW 3510/3520/3540/3550/8040	5.51	5/17/93
5-23	Reporting Limit Data for Phenols, EPA 604 and SW 3510/3520/3540/3550/8040	5.52	5/17/93
5-24	Analytes, Precision, and Accuracy Data for Benzidines, EPA 605	5.53	5/17/93

TABLES

(Continued, Page 3 of 7)

Table No.	Description	Page No.	Revision Date
5-25	Reporting Limit Data for Benzidines, EPA 605	5.54	5/17/93
5-26	Analytes, Precision, and Accuracy Data for Phthalate Esters, EPA 606 and SW 3510/3520/3540/3550/8060	5.55	5/17/93
5-27	Reporting Limit Data for Phthalate Esters, EPA 606 and SW 3510/3520/3540/3550/8060	5.56	5/17/93
5-28	Analytes, Precision, and Accuracy Data for Organochlorine Pesticides and PCBs, EPA 608/617 and SW 3510/3520/3540/3550/8080	5.58	5/17/93
5-29	Reporting Limit Data for Organochlorine Pesticides and PCBs, EPA 608/617 and SW 3510/3520/3540/3550/8080	5.60	5/17/93
5-30	Analytes, Precision, and Accuracy Data for Polynuclear Aromatic Hydrocarbons, EPA 610 and SW 3510/3520/3540/3550/8310	5.62	5/17/93
5-31	Reporting Limit Data for Polynuclear Aromatic Hydrocarbons, EPA 610 and SW 3510/3520/3540/3550/8310	5.64	5/17/93
5-32	Analytes, Precision, and Accuracy Data for Chlorinated Herbicides, EPA 615 and SW 8150	5.66	5/17/93
5-33	Reporting Limit Data for Chlorinated Herbicides, EPA 615 and SW 8150	5.67	5/17/93
5-34	Analytes, Precision, and Accuracy Data for Organophosphorus Pesticides, EPA 622/614 and SW 3510/3520/3540/3550/8140	5.68	5/17/93

TABLES

(Continued, Page 4 of 7)

Table No.	Description	Page No.	Revision Date
5-35	Reporting Limit Data for Organophosphorus Pesticides, EPA 614/622 and SW 3510/3520/3540/3550/8140	5.71	5/17/93
5-36	Analytes, Precision, and Accuracy Data for Volatile Organic Compounds, EPA 624 and SW 5030/8240/8260	5.73	5/17/93
5-37	Reporting Limit Data for Volatile Organic Compounds, EPA 624 and SW 5030/8240/8260	5.77	5/17/93
5-38	Analytes, Precision, and Accuracy Data for Semivolatile Organic Compounds, EPA 625 and SW 3510/3520/3540/3550/8270	5.80	5/17/93
5-39	Reporting Limit Data for Semivolatile Organic Compounds, EPA 625 and SW 3510/3520/3540/3550/8270	5.89	5/17/93
5-40	Analytes, Precision, and Accuracy Data For Carbamates and Urea Pesticides, EPA 632 and Modified 632	5.96	5/17/93
5-41	Reporting Limit Data for Carbamates and Urea Pesticides, EPA 632 and Modified 632	5.97	5/17/93
5-42	Analytes, Precision, and Accuracy Data for Chlorinated Hydrocarbons, EPA 612 and SW 3510/3520/3540/3550/8120	5.98	5/17/93
5-43	Reporting Limit Data for Chlorinated Hydrocarbons, EPA 612 and SW 3510/3520/3540/3550/8120	5.99	5/17/93
5-44	Analytes, Precision, and Accuracy Data for Triazines, EPA 619	5.100	5/17/93

TABLES

(Continued, Page 5 of 7)

Table No.	Description	Page No.	Revision Date
5-45	Reporting Limit Data for Triazines, EPA 619	5.101	5/17/93
5-46	Analytes, Precision, and Accuracy Data for Organonitrogen Pesticides, EPA 633	5.102	5/17/93
5-47	Reporting Limit Data for Organonitrogen Pesticides, EPA 633	5.103	5/17/93
5-48	Analytes, Precision, and Accuracy Data for Certain Amine Pesticides and Lethane, EPA 645	5.104	5/17/93
5-49	Reporting Limit Data for Certain Amine Pesticides and Lethane, EPA 645	5.105	5/17/93
5-50	Analytes, Precision, and Accuracy Data for Nitroaromatics and Nitramines by High Performance Liquid Chromatography (HPLC), SW 8330	5.106	5/17/93
5-51	Reporting Limit Data for Nitroaromatics and Nitroamines by High Performance Liquid Chromatography, SW 8330	5.107	5/17/93
5-52	Analytes, Precision, and Accuracy Data for Nitroaromatics and Nitramines by High Performance Liquid Chromatography (HPLC), UW32 and LW12	5.108	5/17/93
5-53	Reporting Limit Data for Nitroaromatics and Nitroamines by High Performance Liquid Chromatography, UW32, and LW12	5.109	5/17/93
5-54	Analyte, Precision, and Accuracy Data for Glyphosate, EPA 547 (Modified)	5.110	5/17/93
5-55	Reporting Limit Data for Glyphosate, EPA 547 (Modified)	5.111	5/17/93

TABLES

(Continued, Page 6 of 7)

Table No.	Description	Page No.	Revision Date
5-56	Analyte, Precision, and Accuracy Data for Ethylene-Bis-Dithiocarbamates (EBDC), EPA 630.1 (Modified)	5.112	5/17/93
5-57	Reporting Limit Data for Ethylene-Bis-Dithiocarbamates (EBDC), EPA 630.1 (Modified)	5.113	5/17/93
5-58	Analytes, Precision, and Accuracy Data for Organochlorine Pesticides and PCBs in Water, EPA 617	5.114	5/17/93
5-59	Reporting Limit Data for Organochlorine Pesticides and PCBs in Water, EPA 617	5.116	5/17/93
5-60	Analyte, Precision, and Accuracy Data for Tetrazene, EPA 8331	5.118	5/17/93
5-61	Reporting Limit Data for Tetrazene, EPA 8331	5.119	5/17/93
6-1	Sample Container Cleaning Procedures Within the Laboratory	6.2	5/17/93
6-2	Required Containers, Preservation Techniques, and Holding Times	6.6	5/17/93
6-3	Reagent Storage	6.12	5/17/93
8-1	Glassware Cleaning Procedures	8.6	5/17/93
8-2	Laboratory Method Modification Compounds	8.8	5/17/93
9-1	Standard Sources and Preparation	9.3	5/17/93
9-2	List of Laboratory Instruments	9.5	5/17/93
9-3	Mass Intensity Specifications for DFTPP and BFB	9.13	5/17/93

TABLES

(Continued. Page 7 of 7)

Table No.	Description	Page No.	Revision Date
9-4	Standardization of Titrating Solutions	9.25	5/17/93
11-1	Methods Used to Generate Precision and Accuracy Targets	11.11	5/17/93
13-1	Summary of Corrective Action Procedures for Metals Analyzed by Graphite Furnace and Cold Vapor Atomic Absorption Spectroscopy	13.4	5/17/93
13-2	Summary of Corrective Action Procedures for Metals Analyzed by Inductively Coupled Plasma Emission Spectroscopy	13.6	5/17/93
13-3	Summary of Corrective Action Procedures for Inorganics, Oil and Grease, Petroleum Hydrocarbons, and TOX	13.8	5/17/93
13-4	Summary of Corrective Action Procedures for Radionuclides	13.10	5/17/93
13-5	Summary of Corrective Action Procedures for Organics Analyzed by Gas Chromatography and High Pressure Liquid Chromatography	13.12	5/17/93
13-6	Summary of Corrective Action Procedures for Organics by Gas Chromatography/Mass Spectrometry	13.15	05/17/93

LIST OF ACRONYMS AND ABBREVIATIONS

AAS	atomic absorption spectrophotometry
AIHA	American Industrial Hygiene Association
ASTM	American Society for Testing and Materials
BFB	bromofluorobenzene
BOD	biochemical oxygen demand
°C	degrees Celsius
CCC	calibration check compounds
CCV	continuing calibration verification
CLASS	Chemical Laboratory Analysis and Scheduling System
COD	chemical oxygen demand
D	detection limit
DBCP	1,2-Dibromo-3-chloropropane
DFTPP	decafluorotriphenylphosphine
DHRS	Department of Health and Rehabilitative Services
DI	deionized
DO	dissolved oxygen
DOT	Department of Transportation
ECD	electron capture detector
EDB	1,2-Dibromoethane
ELAP	Environmental Laboratory Approval Program
EPA	U.S. Environmental Protection Agency
ESE	Environmental Science & Engineering, Inc.
eV	electronvolt
FDER	Florida Department of Environmental Regulation
FID	flame ionization detector
FPD	flame photometric detector
FR	fraction code

LIST OF ACRONYMS AND ABBREVIATIONS
(Continued, Page 2 of 5)

FRN	frame reference number
ft	foot
g	gram
g/kg	grams per kilogram
GC	gas chromatography
GC/FID	GC employing flame ionization detection
GC/FPD	GC employing flame photometric detection
GC/HPLC	gas chromatography/high performance liquid chromatography
GC/MS	gas chromatograph/mass spectrometer
GC/MS/DS	gas chromatography/mass spectrometry/data system
GC/NPD	GC employing nitrogen-phosphorus detection
GLP	Good Laboratory Practice
HCL	hydrochloric acid
HNO_3	nitric acid
HPLC	high performance liquid chromatography
H_2SO_4	sulfuric acid
ICAP	inductively coupled argon plasma
ICS	interference check solution
ICV	initial calibration verification
ID	identification
IR	infrared
KCl	potassium chloride
kg	kilogram
KOH	potassium hydroxide
L	liter

LIST OF ACRONYMS AND ABBREVIATIONS
(Continued, Page 3 of 5)

LC50	50 percent lethal concentration
MBAS	methylene blue active substances
MDL	method detection limits
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
mL	milliliter
mm	millimeter
mm^2	square millimeter
MSC	matrix spike compound
NaOH	sodium hydroxide
$Na_2S_2O_3$	sodium thiosulfate
ng	nanogram
NIOSH	National Institute of Occupational Safety and Health
NIST	National Institute of Standards and Technology
NTU	nephelometric turbidity unit
PAT	Proficiency Analytical Testing Program
PCB	polychlorinated biphenyl
PCP	pentachlorophenol
PCU	platinum-cobalt unit
% RSD	percent relative standard deviation
PFS	prefield setup
PID	photoionization device
PNA	polynuclear aromatic hydrocarbon
ppb	parts per billion

LIST OF ACRONYMS AND ABBREVIATIONS
(Continued, Page 4 of 5)

ppt	parts per thousand
psi	pounds per square inch
PVC	polyvinyl chloride
QA	quality assurance
QA/QC	quality assurance/quality control
QC	quality control
QCC	quality control check
RF	response factor
RPD	relative percent difference
S	surrogate
SCT	salinity, conductivity, and temperature
SDS	sodium dodecyl sulfate
SOP	standard operating procedure
STORET	storage and retrieval
THMS	trihalomethanes
TIC	tentatively identified compound
TOC	total organic carbon
TOX	total organic halides
TRPH	total recoverable petroleum hydrocarbons
µg/g	micrograms per gram
µg/L	micrograms per liter
µL	microliter
µmho/cm	micromhos per centimeter
UPS	United Parcel Service
USACE	U.S. Army Corps of Engineers
USGS	U.S. Geological Survey

LIST OF ACRONYMS AND ABBREVIATIONS
(Continued, Page 5 of 5)

UV	ultraviolet
VOC	volatile organic compound
YSI	Yellow Springs Instruments

3.0 STATEMENT OF POLICY

3.1 QUALITY ASSURANCE (QA) STATEMENT OF POLICY

It is the policy of Environmental Science & Engineering, Inc. (ESE), Gainesville Laboratory, to maintain an active quality assurance/quality control (QA/QC) program to provide the highest quality information and ensure the highest professional standards in deliverables for every project undertaken. An established QA/QC philosophy and program are essential for any organization to consistently produce valid laboratory data. To be valid, data must be generated under controlled conditions which do not adversely affect data quality. Data must also be interpreted by capable professionals who are trained in appropriate scientific disciplines, maintain a current knowledge of their field, and are experts in the applications for which the data will be used. The objectives of the QA/QC program are to estimate the quality of each analytical system including precision, accuracy, and sensitivity sufficient for each project. The QA/QC program also assists in the early recognition of deficiencies which might affect data quality, validate data, and define data usability.

ESE's commitment to the QA/QC process is evidenced by the establishment of a separate QA/Safety Division which is responsible for overseeing QA activities and an internal QA/QC department which is responsible for overseeing QA and QC activities within the Gainesville Laboratory. QA is a management system which ensures the completion of predetermined activities. All activities are recorded including traceability, completeness, and document security. QC refers to specific actions taken to ensure that system performance is consistent with established limits. These actions ensure precision, accuracy, comparability, and completeness of analytical data.

ESE supports a corporate-wide Quality Education System (QES). All employees are trained in the quality improvement process. This training is supplemented at the departmental level by instructing employees on the importance of QA/QC and the price of nonconformance.

3.2 SCOPE

All major environmental studies and analyses conducted by ESE Gainesville Laboratory for projects under the guidance of the Department of Energy (DOE), the Naval Energy And Environmental Support Activity (NEESA), the Hazardous Waste Remedial Actions Program (HAZWRAP), the Florida Department of Environmental Regulations (FDER) or any state and federal government agency must be performed in accordance with this Laboratory Comprehensive Quality Assurance Plan (LCQAP).

This LCQAP will be the basis for all project-specific QA plans except where alternate QA plans are required. When appropriate, this LCQAP will be filed with a client and/or regulatory agency and, once approved, may be referenced in lieu of repetitive submission of plans in which only a portion of the information is changed.

3.3 DOCUMENT CONTROL

This LCQAP will be revised periodically as procedural changes become necessary. Changes will be documented by the date and revision number of each section. ESE's QA/QC Department will keep a distribution list and assign a unique number to each copy of the LCQAP. When a section is revised, the revision date will replace the original date in the heading code, the revision number will be changed, and the table of contents will be updated. Copies of the revised sections will be provided to each individual on the distribution list.

These procedures will apply once the plan has been finalized and implemented; these procedures will not apply to draft documents.

4.0 ORGANIZATION AND RESPONSIBILITIES

4.1 LABORATORY OPERATIONS CAPABILITIES

ESE laboratory operations include the following capabilities:

1. Groundwater and surface water analysis,
2. Soil and sediment analysis,
3. Wastewater analysis,
4. Air monitoring screening,
5. Drum analysis, and
6. Underground storage tank analysis.

4.2 KEY PERSONNEL

This section includes ESE's Gainesville Laboratory key personnel identified by title and a brief summary of each individuals responsibilities. An organization chart of the Gainesville Laboratory is presented in Figure 4-1.

4.2.1 LABORATORY OPERATIONS PERSONNEL

4.2.1.1 Laboratory Director

The Laboratory Director is responsible for the overall management of the analytical laboratory, including the appointment and supervision of the Laboratory Information Services Manager, Laboratory Division Managers, Customer Service Manager, and Laboratory QA/QC Manager. He is responsible for approving all analytical procedures and associated QA/QC procedures.

4.2.1.2 Laboratory QA/QC Manager

The Laboratory QA/QC Manager is responsible for the overall management of the laboratory QA/QC operations, including the appointment and supervision of the Laboratory QA/QC Coordinators.

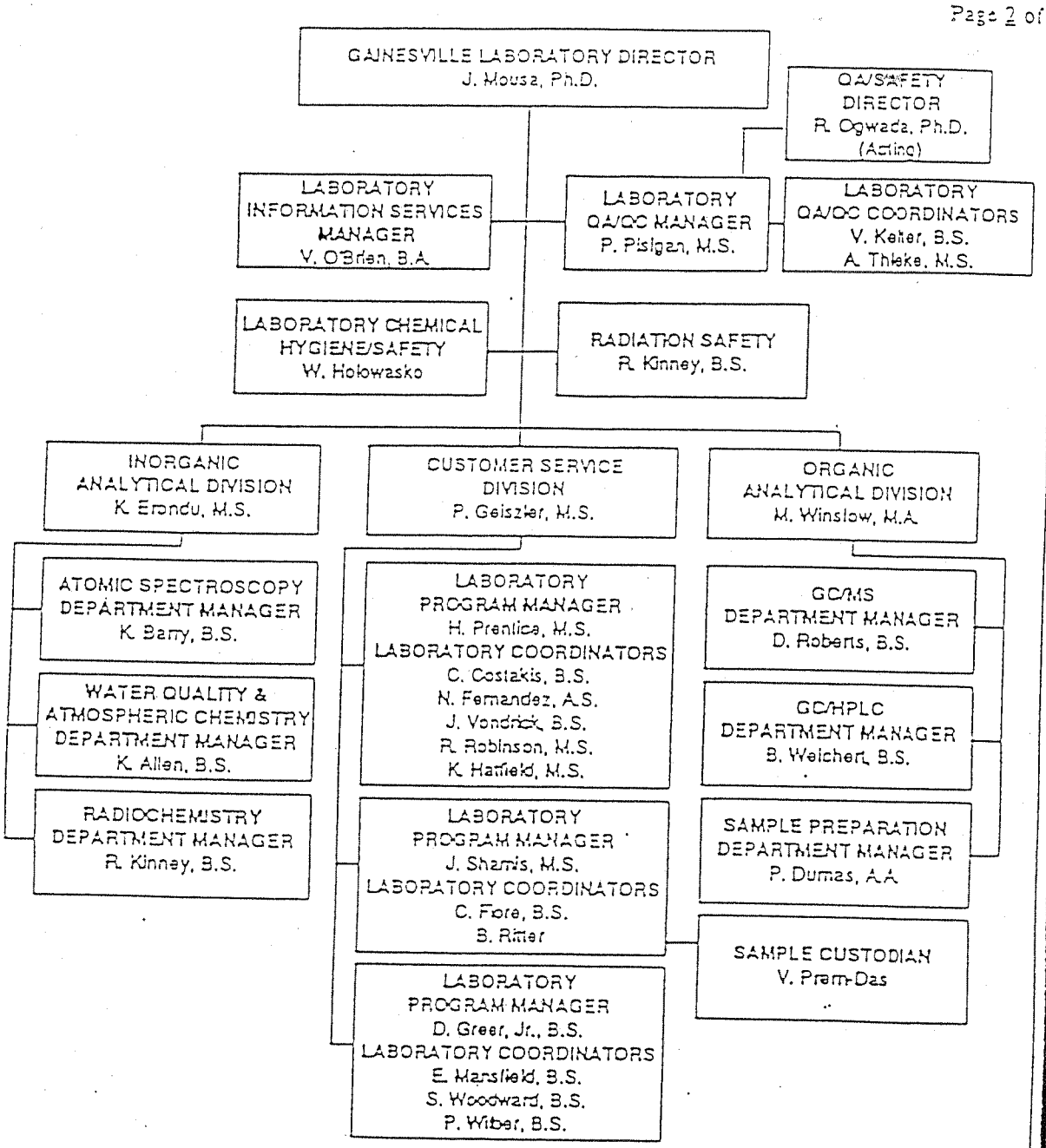

Figure 4-1
ESE GAINESVILLE LABORATORY
ORGANIZATION CHART

SOURCE: ESE

ENVIRONMENTAL SCIENCE & ENGINEERING, INC.

4.2.1.3 Laboratory QA/QC Coordinator

The Laboratory QA/QC Coordinator is responsible for coordinating the certification programs of the Gainesville Laboratory. The Laboratory QA/QC Coordinator also performs laboratory and data audits, and maintains QC records for inspection by ESE project management and the Project QA Coordinator. The Laboratory QA/QC Coordinator provides guidance and coordination to resolve any QA/QC deficiencies and reviews precision, accuracy, and blind samples for projects to ensure completeness of the QC data.

4.2.1.4 Laboratory Information Services Manager

The Laboratory Information Services Manager oversees ESE's computerized data management system and is responsible for the following:

1. Maintaining ESE's Chemical Laboratory Analysis Scheduling System (CLASS™) (refer to Section 10.1);
2. Approval of all changes made to CLASS™; and
3. Storage of chain-of-custody logsheets, analytical batch folders for all departments in one central location, and all other computerized data.

4.2.1.5 Laboratory Division Managers

The Analytical Laboratory Division Managers are responsible for the overall management of their respective analytical inorganic and organic sections or including the appointment and supervision of their Department Managers. The Customer Service Manager is responsible for the overall management of the project operations within the laboratory including the appointment and supervision of the Laboratory Program Manager.

4.2.1.6 Laboratory Program Manager

The Laboratory Program Manager is responsible for the overall management of the project operations within the Gainesville Laboratory, including the appointment and supervision of the Laboratory Coordinators and Sample Custodian.

4.2.1.7 Laboratory Coordinator

The Laboratory Coordinator acts as liaison between field and laboratory operations and is responsible for the following:

1. Coordination of sample analyses to meet project or client objectives;
2. Preparation of analytical reports, including coordination with the QA Division or Laboratory QA/QC Manager and laboratory management to ensure that the data are validated prior to release to the client;
3. Review of any QA/QC deficiencies reported by the Laboratory Department Manager; and
4. Coordination of any data changes resulting from review by the Laboratory QA/QC Coordinator, and/or Project Manager.

4.2.1.8 Sample Custodian

The Sample Custodian checks in the samples from the field upon receipt by the laboratory. The Sample Custodian compares all samples contained in the shipment to the logsheet(s) to ensure that all samples designated on the logsheet have been received. The Sample Custodian will note any special remarks concerning the shipment and deliver the logsheet to the Laboratory Information Services Manager. The Sample Custodian places samples in appropriate storage areas and notifies the appropriate Laboratory Coordinators and Laboratory Department Managers, or designee.

4.2.1.9 Laboratory Department Managers

The Laboratory Department Managers are responsible for providing consistent and accurate laboratory data and technical reports produced by their analysts. These individuals are responsible to the Project Manager to ensure that all personnel under their direction are knowledgeable of the QA/QC requirements of the project and that all QC and technical review procedures are followed and documentation is provided.

4.1.10 Laboratory Analyst

Laboratory Analysts must perform preliminary QC checks to ensure that each batch of data being generated passes all the required QC criteria.

4.1.11 Radiation Safety Officer

The Radiation Safety Officer is responsible for enforcing company policy in handling radioactive materials in order to ensure protection of all ESE employees and facilities from exposure to radiation. He is responsible for evaluating new requirements by Florida DHRS and/or NRC to ensure that ESE's Radioactive Materials License is in compliance and reviewing and evaluating standard operating procedures and sections of the Laboratory Safety Manual involving the use of radioactive materials for appropriateness. He is also responsible for monitoring spills and leaks in areas where radioactive materials are used, leak testing and documenting all sealed and unsealed radiation sources, and issuing, collecting and shipping personal monitoring devices. He conducts radiation safety training of all personnel prior to their handling of radioactive materials, and maintains an inventory of all radioactive materials. He will remove and maintain documentation for the removal of radioactive samples as necessary to a temporary storage area within the company facility.

4.1.12 Laboratory Chemical Hygiene Officer

The Chemical Hygiene Officer (CHO) will assist laboratory supervisors in implementing the Chemical Hygiene Program. He will provide training (in accordance with Health and Safety (H&S) SOP 112- Chemical Hygiene Program Training), review laboratory safety manuals and SOPs, and perform safety audits of laboratory procedures and safety inspections of laboratory protective equipment to determine compliance. Areas of non-compliance will be reported to the appropriate supervisor or manager. The CHO will make this Program readily available to laboratory workers and supervisors. He will evaluate worker chemical exposure (in accordance with H&S SOP 140) and will provide a written report of each exposure assessment or determination to the Laboratory Director for action as necessary. Any over exposure shall be reported to the Regional Health and Safety Coordinator (RHSC).

4.2.2 QA PERSONNEL

4.2.2.1 ESE QA/Safety Director

The ESE QA/Safety Director maintains ESE's overall QA program and interacts with the Corporate Officers, Division Managers, and the Laboratory QA/QC manager to ensure compliance with approved QA/QC plans. He may review QA/QC reports to the Project Manager and the client, and may be responsible for approving QA/QC procedures. Formulation of QA policy and the formulation of the Quality Assurance Program is the responsibility of QA/Safety Director, who reports to ESE's NE Region Manager.

5.0 QA OBJECTIVES FOR MEASUREMENT DATA

5.1 LABORATORY ANALYSIS

Analyses are performed according to standard U.S. Environmental Protection Agency (EPA) analytical procedures for analysis of water and soil/sediment unless otherwise specified (Tables 5-1 through 5-61). EPA precision and accuracy data and historic ESE data were used as the basis for developing criteria to assess laboratory method performance and the precision and accuracy of sample data, as noted. These limits are subject to change based on actual historic and current performance; updates will be provided for insertion into all control copies of our site-specific QAPPs, as appropriate. Specific compounds are used for controlling purposes in multianalyte methods and are identified in Tables 5-2 through 5-61. Laboratory method performance is evaluated using calibration checks, blanks, and QC check samples; sample accuracy and precision are evaluated using matrix spike and matrix spike duplicate data.

The detection limits (DLs) achievable for all parameters are listed in Tables 5-3 through 5-61 (odd numbered tables). These DLs were developed in accordance with specific procedures referenced for each analytical method. The DLs for waters and calculated for solids are typically reported as DLs, if no matrix and/or other interferences (i.e., instrument noise) are found to be present (subject to adjustment for dilutions and/or moisture contents).

The following is a brief explanation of the terms that appear in Tables 5-2 through 5-61. Items that are not applicable are denoted by NA.

Reference: The reference of the standard analytical methodology used for each procedure.

Precision: Evaluated based on the relative percent difference (RPD) of duplicate spikes (see Section 11.0 for definitions).

Accuracy: Evaluated based on the percent recovery of each spike (see Section 11.0 for definition).

Units: Volume in liters (L) [e.g., micrograms per liter (μg/L)] indicates a water matrix; control spikes are added to either sample matrices or to organic-free laboratory water. Mass in grams (g) or kilograms (kg) [e.g., milligrams per kilogram (mg/kg)] indicates a soil/sediment matrix; control spikes are added to sample matrices, soil, or blank water, depending on the analytical procedure.

Table 5-1. Sample Preparation Methods

Sample Preparation Method Number	Description	Matrix	Sample Preparation for Methods
EPA 3005	Acid Digestion	Aqueous	EPA 6010, 7020, 7200, 7210, 7450, 7480, 7610, 7770
EPA 3010	Acid Digestion	Aqueous	EPA 6010, 7020, 7200, 7210, 7450, 7480, 7610, 7770
EPA 3020	Acid Digestion	Aqueous	EPA 7041, 7060, 7091, 7131, 7191, 7201, 7210, 7421, 7470, 7471, 7481, 7740, 7841, 7911
EPA 3050	Acid Digestion	Solid	EPA 6010, 7020, 7200, 7210, 7450, 7480, 7610, 7770, 7041, 7060, 7091, 7131, 7191, 7201, 7210, 7421, 7470, 7471, 7481, 7740, 7841, 7911
EPA 3510	Separator Funnel Liquid-Liquid Extraction	Aqueous	EPA 8040, 8060, 8080, 8120, 8140, 8270, 8310
EPA 3520	Continuous Liquid-Liquid Extraction	Aqueous	EPA 8040, 8060, 8080, 8120, 8140, 8270, 8310
EPA 3540	Soxhlet Extraction	Solid	EPA 8040, 8060, 8080, 8120, 8140, 8270, 8310
EPA 3550	Sonication Extraction	Solid	EPA 8040, 8060, 8080, 8120, 8140, 8270, 8310
EPA 5030	Purge-And-Trap	Aqueous, Solid	EPA 8010, 8020, 8240, 8260
EPA 3630	Silica Gel Cleanup	Aqueous, Solid	EPA 8080
EPA 3640	Gel-Permeation Cleanup	Aqueous, Solid	EPA 8080, 8140, 8270*
EPA 3660	Sulfur Cleanup	Aqueous, Solid	EPA 8080, 8120

*Only used for fish, oily, or highly contaminated samples.
Source: ESE.

Table 5-2. Summary of Precision and Accuracy Criteria for Inorganics Analysis, Metals Analysis, Oil and Grease, TRPH, TOX, and Radiochemical Analysis

Parameter	Units	Reference	Method Criterion[a,b] Precision (Max RPD)	Method Criterion[a,b] Accuracy (Percent Recovery)
Aluminum, Total	µg/L	EPA 200.7, 202.2, 3005, 3010, 6010	16	81-113
Aluminum, Solid	mg/kg	EPA 3050, 7020, 6010[c]	21[c]	75-117[c]
Antimony, Total[i]	µg/L	EPA 204.2, 3020, 7041	25[d]	75-125[d]
Antimony, Total[i]	µg/L	EPA 200.7, 3005, 3010, 6010	15	79-109
Antimony, Solid[i]	mg/kg	EPA 3050, 6010	15	79-109
Antimony, Solid[i]	mg/kg	EPA 3050, 7041	25[d]	75-125[d]
Arsenic, Total[i]	µg/L	EPA 206.2, 3005, 3010, 6010[c], 3020, 7060	24	72-120
Arsenic, Solid[i]	mg/kg	EPA 3050, 7060, 6010[c]	24	72-120
Barium, Total[i]	µg/L	EPA 208.2	25[d]	75-125[d]
Barium, Total[i]	µg/L	EPA 200.7, 3005, 3010, 6010	10	86-106
Barium, Solid[i]	mg/kg	EPA 3050, 6010	10	86-106
Beryllium, Total[i]	µg/L	EPA 210.2, 3020, 7091	25[d]	75-125[d]
Beryllium, Total[i]	µg/L	EPA 200.7, 3005, 3010, 6010	15	78-108
Beryllium, Solid[i]	mg/kg	EPA 3050, 6010	15	78-108
Beryllium, Solid[i]	mg/kg	EPA 3050, 7091	25[d]	75-125[d]
Cadmium, Total[i]	µg/L	EPA 213.2, 3020, 7131	25[d]	75-125[d]
Cadmium, Total[i]	µg/L	EPA 200.7, 3005, 3010, 6010	14	80-108
Cadmium, Solid[i]	mg/kg	EPA 3050, 6010	14	80-108
Cadmium, Solid[i]	mg/kg	EPA 3050, 7131	25[d]	75-125[d]
Calcium, Total[i]	mg/L	EPA 200.7[c], 3005, 3010, 6010[c]	19	78-116
Calcium, Solid[i]	mg/kg	EPA 3050, 6010[c]	28[c]	60-116[c]
Chromium, Total[i]	µg/L	EPA 218.1, 3020, 7191	16	80-112
Chromium, Total[i]	µg/L	EPA 200.7, 3005, 3010, 6010	15	79-109
Chromium, Solid[i]	mg/kg	EPA 3050, 6010	15	79-109
Chromium, Solid[i]	mg/kg	EPA 3050, 7191	16	80-112
Cobalt, Total[i]	µg/L	EPA 219.2, 3020, 7201	25[d]	75-125[d]
Cobalt, Total[i]	µg/L	EPA 200.7, 3005, 3010, 6010	10	85-105
Cobalt, Solid[i]	mg/kg	EPA 3050, 6010	10	85-105
Cobalt, Solid[i]	mg/kg	EPA 3050, 7200, 7201	25[d]	75-125[d]

Table 5-2. Summary of Precision and Accuracy Criteria for Inorganics Analysis, Metals Analysis, and Oil and Grease, TRPH, TOX, and Radiochemical Analysis (Continued, Page 2 of 11)

Parameter	Units	Reference	Method Criterion[b,j] Precision (Max RPD)	Accuracy (Percent Recovery)
Copper, Total[f]	µg/L	EPA 220.1, 220.2, 3020, 7210	25[d]	75-125[d]
Copper, Total[f]	µg/L	EPA 200.7, 3005, 3010, 6010	12	84-108
Copper, Solid[f]	mg/kg	EPA 3050, 6010	12	84-108
Copper, Solid[f]	mg/kg	EPA 3050, 7210	25	75-125
Iron, Total	µg/L	EPA 200.7, 3005, 3010, 6010	18	77-113
Iron, Solid	mg/kg	EPA 3050, 6010[c]	11[c]	86-108[c]
Lead, Total[f]	µg/L	EPA 239.2, 3020, 7421	27	71-125
Lead, Total[f]	µg/L	EPA 200.7, 3005, 3010, 6010	15	79-109
Lead, Solid[f]	mg/kg	EPA 3050, 6010,	15	79-109
Lead, Solid[f]	mg/kg	EPA 3050, 7421	27	71-125
Magnesium, Total	mg/L	EPA 200.7[c], 242.1, 3005, 3010, 6010[c]	10	86-106
Magnesium, Solid	mg/kg	EPA 3050, 7450, 6010[c]	53[c]	28-134[c]
Manganese, Total	µg/L	EPA 243.2	25[d]	75-125[d]
Manganese, Total	µg/L	EPA 200.7, 3005, 3010, 6010	12	83-107
Manganese, Solid	mg/kg	EPA 3050, 6010	12	83-107
Manganese, Solid	mg/kg	EPA 3050, 7460	25[d]	75-125[d]
Mercury, Total[f]	µg/L	EPA 245.1, 7470	21	83-125
Mercury, Solid[f]	mg/kg	EPA 7471	21	83-125
Molybdenum, Total	µg/L	EPA 200.7[c], 246.2, 3005, 3010, 6010[c]	25[d]	75-125[d]
Molybdenum, Solid	mg/kg	EPA 3050, 6010[c], 7480, 7481	25[d]	75-125[d]
Nickel, Total	µg/L	EPA 249.2	25[d]	75-125[d]
Nickel, Total[f]	µg/L	EPA 200.7, 3005, 3010, 6010	14	78-106
Nickel, Solid[f]	mg/kg	EPA 3050, 6010[c]	14	78-106
Potassium, Total	mg/L	EPA 258.1, 3010, 7610	14	81-109
Potassium, Total	mg/L	EPA 200.7[c], 3005, 3010, 6010[c]	19	75-113
Potassium, Solid	mg/kg	EPA 3050, 6010[c]	19	75-113
Potassium, Solid	mg/kg	EPA 3050, 7610	14	81-109

Table 5-2. Summary of Precision and Accuracy Criteria for Inorganics Analysis, Metals Analysis, and Oil and Grease, TRPH, TOX, and Radiochemical Analysis (Continued, Page 3 of 11)

Parameter	Units	Reference	Method Criterion[b] Precision (Max RPD)	Method Criterion[b] Accuracy (Percent Recovery)
Selenium, Total[f]	µg/L	EPA 200.7[c], 3005, 3010, 6010[c]	12	85-109
Selenium, Total[f]	µg/L	EPA 270.2, 3020, 7740	29	71-129
Selenium, Solid[f]	mg/kg	EPA 3050, 7740	29	71-129
Selenium, Solid[f]	mg/kg	EPA 3050, 6010[c]	12	85-109
Silicon, Total	µg/L	EPA 200.7[c], 3005, 3010, 6010[c]	25	75-125
Silicon, Solid	mg/kg	EPA 3050, 6010[c]	25	75-125
Silver, Total	µg/L	EPA 272.2	24	68-116
Silver, Total[f]	µg/L	EPA 200.7, 3005, 3010, 6010	17	73-107
Silver, Solid[f]	mg/kg	EPA 3050, 6010	17	73-107
Sodium, Total	mg/L	EPA 273.1	25[d]	75-125[d]
Sodium, Total	mg/L	EPA 200.7[c], 3005, 3010, 6010[c]	15	82-112
Sodium, Solid	mg/kg	EPA 3050, 6010[c], 7770	51[e]	29-131[e]
Strontium, Total	µg/L	EPA 200.7[c], 3005, 3010, 6010[c,d]	12[f]	95-115[f]
Strontium, Solid	mg/kg	EPA 3050, 6010[c]	N/A	N/A
Thallium, Total[f]	µg/L	EPA 279.2, 3020, 7841	27	74-128
Thallium, Total[f]	µg/L	EPA 200.7[c], 3005, 3010, 6010[c]	18	75-111
Thallium, Solid[f]	mg/kg	EPA 3050, 6010[c]	18	75-111
Thallium, Solid[f]	mg/kg	EPA 3050, 7841	27	74-128
Titanium, Total	µg/L	EPA 200.7[c], 283.2[c], 3005, 3010, 6010[c,d]	24	68-116
Titanium, Solid	mg/kg	EPA 3050, 6010[c]	24	68-116
Tin, Total[f]	µg/L	EPA 200.7[c], 3005, 3010, 6010[c]	25	75-125
Tin, Solid[f]	mg/kg	EPA 3050, 6010[c]	25	75-125
Vanadium, Total[f]	µg/L	EPA 286.2, 3020, 7911	25[d]	75-125[d]
Vanadium, Total[f]	µg/L	EPA 200.7, 3005, 3010, 6010	9	87-105
Vanadium, Solid[f]	mg/kg	EPA 3050, 6010	9	87-105
Vanadium, Solid[f]	mg/kg	EPA 3050, 7911	25[d]	75-125[d]
Zinc, Total	µg/L	EPA 289.2	25[d]	75-125[d]
Zinc, Total	µg/L	EPA 200.7, 3005, 3010, 6010	18	76-112
Zinc, Solid	mg/kg	EPA 3050, 6010	18	76-112

Table 5-2. Summary of Precision and Accuracy Criteria for Inorganics Analysis, Metals Analysis, and Oil and Grease, TRPH, TOX, and Radiochemical Analysis (Continued, Page 4 of 11)

Parameter	Units	Reference	Method Criterion[a] Precision (Max RPD)	Method Criterion[a] Accuracy (Percent Recovery)
Alkalinity, Total	mg/L-$CaCO_3$	EPA 310.1	11	88-110
COD, high-level	mg/L	HACH 8000	10	93-113
COD, low-level	mg/L	HACH 8000	10	93-113
Cyanide[c]	mg/L	EPA 335.3, 9010	18	81-117
Cyanide, Solid[d]	µg/g	EPA 9010 (Mod)	18	81-117
Moisture	% Wet Weight	ASTMD 2216-71	23	NA
Bromide	mg/L	EPA 300, 9056	6	95-107
Chloride	mg/L	EPA 325.3	8	92-108
Chloride	mg/L	EPA 300, 9056	6	95-107
Nitrogen, NO_2 + NO_3	mg/L-as N	EPA 353.2	7	90-104
Nitrogen, NO_2 + NO_3	mg/L-as N	EPA 353.2	7	90-104
Nitrogen, NO_3[b]	mg/L-as N	EPA 300, 353.2, 9200	5	95-105
Nitrogen, NO_2	mg/L-as N	EPA 300, 353.2, 9056	6	94-106
Nitrogen, NH_3 + NH_4	mg/L-as N	EPA 350.1	6	94-106
Nitrogen, TKN	mg/L-as N	EPA 351.2	23	78-124
Nitrogen, TKN, Solid	mg/kg	CE-81-1, p. 3-201, Method 1	40	57-137

Table 5-2. Summary of Precision and Accuracy Criteria for Inorganics Analysis, Metals Analysis, and Oil and Grease, TRPH, TOX, and Radiochemical Analysis (Continued, Page 5 of 11)

Parameter	Units	Reference	Method Criterion[b] Precision (Max RPD)	Accuracy (Percent Recovery)
Phosphorus, T	mg/L-as P	EPA 365.1	12	88-112
Phosphorus, Ortho	mg/L-as P	EPA 300, 9056	13	86-112
Phosphorus, Ortho	mg/L-as P	EPA 365.1	10	90-110
Silica	mg/L	EPA 370.1	5	92-105
Sulfate	mg/L	EPA 300, 9056	6	95-107
Sulfate	mg/L	EPA 375.4	9	89-107
Sulfide[f]	mg/L	EPA 376.2, 9030	33	60-126
Sulfide, Solid[f]	mg/kg	EPA 9030	33	60-126
Acidity, Total	mg/L-$CaCO_3$	EPA 305.1	8	92-108
BOD, 5-day	mg/L	EPA 405.1	38	60-136
BOD, 14-day	mg/L	EPA 405.1	38	60-136
Carbon, Total	mg/L	EPA 415.1, 9060	13	87-113
Carbon, TOC	mg/L	EPA 415.1, 9060	13	87-113
Carbon, TOC, Solid	g/kg	EPA 9060 (mod)	17	82-116
Carbon, TOC, Solid	% Organic Content	ASTM-D 2974[g]	20	NA
Chlorine, Free A,	mg/L	EPA 330.1	15	85-115
Chlorine, Total Residual	mg/L	EPA 330.1	15	85-115
Chromium (+6)	µg/L	EPA 7196	15	83-113
Chromium (+6), Solid	mg/kg	EPA 3060, 7196 (Mod)	15	83-113
Color, True	PCU	EPA 110.2	NA	NA
Corrosivity	mm/yr	EPA 1110, SM 2330	NA	NA

Table 5-2. Summary of Precision and Accuracy Criteria for Inorganics Analysis, Metals Analysis, and Oil and Grease, TRPH, TOX, and Radiochemical Analysis (Continued, Page 6 of 11)

Parameter	Units	Reference	Method Criterion[b] Precision (Max RPD)	Method Criterion[b] Accuracy (Percent Recovery)
Dissolved Oxygen (DO)	mg/L	EPA 360.1	20	NA
Fluoride	mg/L	EPA 340.2	14	85-112
Fluoride	mg/L	EPA 9056	6	95-107
Hardness	mg/L-$CaCO_3$	EPA 130.2	25	85-115
Ignitability	°C	EPA 1010	NA	NA
Odor, 25°C	Thrsh No	EPA 140.1	NA	NA
Oil and Grease, Grav	mg/L	EPA 413.1	20	79-119
Oil and Grease, IR	mg/L	EPA 9073[c]	23	79-116
Oil and Grease, IR, Solid	µg/g	EPA 9071, 9073[c]	22	78-122
pH	Std Units	EPA 150.1, 9040	4	NA
pH, Solid	Std Units	EPA 9045	8	NA
Phenols	µg/L	EPA 420.2, 9066	20	73-112
Phenols, Solid	µg/g	CE-S1-1, p. 3-555	25	72-122
Residue, Susp. (TSS)	mg/L	EPA 160.2	34	NA
Residue, Diss., Total (TDS) 105 Deg	mg/L	EPA 160.1	19	NA
Residue, Total (TS)	mg/L	EPA 160.3	19	NA
MBAS (foaming agents)	mg/L	EPA 425.1	17	78-112
Petroleum hydrocarbons (TRPH)	mg/L	EPA 418.1	23	76-122

Table 5-2. Summary of Precision and Accuracy Criteria for Inorganics Analysis, Metals Analysis, and Oil and Grease, TRPH, TOX, and Radiochemical Analysis (Continued, Page 7 of 11)

Parameter	Units	Reference	Method Criterion[b] Precision (Max RPD)	Method Criterion[b] Accuracy (Percent Recovery)
Petroleum hydrocarbons, Solid	µg/g	EPA 9071, 9073[f]	23	76-122
Petroleum hydrocarbons, Solid	µg/g	EPA 3550, 418.1 (Mod)	34	67-135
Specific Cond.	µmhos/cm	EPA 120.1, 9050	15	NA
Temperature	°C	EPA 170.1	NA	NA
TOX	µg/L-Cl	EPA 9020A	26	73-125
TOX, Solid	µg/kg	EPA 9020A (Mod)	31	66-125
Turbidity	NTU	EPA 180.1	16	NA
TCLP	--	EPA 1311	NA	NA
Americium-241	pCi/L	ER 120, HASL G-03	25	85-115
Americium-241, Solid	pCi/g	ER 120, HASL G-03	25	85-115
Lead-210	pCi/L	EPA-EERF	25	80-120
Lead-210, Solid	pCi/g	EPA-EERF	25	80-120
Gamma, gross	pCi/L	ER 150	25	80-120
Gamma, gross, Solid	pCi/g	ER 150	25	80-120
Plutonium-238	pCi/L	ER 160, HASL G-03	25	85-115
Plutonium-238, Solid	pCi/g	ER 160, HASL G-03	25	85-115
Plutonium-239	pCi/L	ER 160, HASL G-03	25	85-115
Plutonium-239, Solid	pCi/g	ER 160, HASL G-03	25	85-115
Plutonium-240	pCi/L	ER 160, HASL G-03	25	85-115
Plutonium-240, Solid	pCi/g	ER 160, HASL G-03	25	85-115
Plutonium-241	pCi/L	ER 160, HASL G-03	25	75-125
Plutonium-241, Solid	pCi/g	ER 160, HASL G-03	25	75-125
Thorium-234	pCi/L	ER 130	25	85-115
Thorium-234, Solid	pCi/g	ER 130	25	85-115
Thorium-227	pCi/L	EPA-EERF	25	85-115
Thorium-227, Solid	pCi/g	EPA-EERF	25	85-115

Table 5-2. Summary of Precision and Accuracy Criteria for Inorganics Analysis, Metals Analysis, and Oil and Grease, TRPH, TOX, and Radiochemical Analysis (Continued, Page 8 of 11)

Parameter	Units	Reference	Method Criterion[b] Precision (Max RPD)	Method Criterion[b] Accuracy (Percent Recovery)
Thorium-228	pCi/L	EPA-EERF	25	85-115
Thorium-228, Solid	pCi/g	EPA-EERF	25	85-115
Thorium-230	pCi/L	EPA-EERF	25	85-115
Thorium-230, Solid	pCi/g	EPA-EERF	25	85-115
Thorium-232	pCi/L	EPA-EERF	25	85-115
Thorium-232, Solid	pCi/g	EPA-EERF	25	85-115
Strontium-90	pCi/L	EML Sr-01	25	80-120
Strontium-90, Solid	pCi/g	EML Sr-01	25	80-120
Strontium 90	pCi/L	EPA 905.0	16	81-113
Strontium 89	pCi/L	EPA 905.0	14	83-111
Uranium-233	pCi/L	ER 310, HASL G-03	25	85-115
Uranium-233, Solid	pCi/g	ER 310, HASL G-03	25	85-115
Uranium-234	pCi/L	ER 310, HASL G-03	25	85-115
Uranium-234, Solid	pCi/g	ER 310, HASL G-03	25	85-115
Uranium-235	pCi/L	ER 310, HASL G-03	25	85-115
Uranium-235, Solid	pCi/g	ER 310, HASL G-03	25	85-115
Uranium-236	pCi/L	ER 310, HASL G-03	25	85-115
Uranium-236, Solid	pCi/g	ER 310, HASL G-03	25	85-115
Uranium-238	pCi/L	ER 310, HASL G-03	25	85-115
Uranium-238, Solid	pCi/g	ER 310, HASL G-03	25	85-115
Uranium, Natural	pCi/L	EPA 908.0	15	85-115
Uranium, Total	pCi/L	EPA 908.0	25	75-125
Uranium, Total, Solid	pCi/g	EPA 3050/908.0	25	75-125
Tritium	pCi/L	ER 210	25	80-120
Tritium, Solid	pCi/g	ER 210	25	80-120
Tritium	pCi/L	EPA 906.0	29	71-129
Cadmium-109	pCi/L	ER 130	25	80-120
Cadmium-109, Solid	pCi/g	ER 130	25	80-120
Cobalt-57	pCi/L	ER 130	25	80-120
Cobalt-57, Solid	pCi/g	ER 130	25	80-120

Table 5-2. Summary of Precision and Accuracy Criteria for Inorganics Analysis, Metals Analysis, Oil and Grease, TRPH, TOX, and Radiochemical Analysis (Continued, Page 9 of 11)

Parameter	Units	Reference	Method Criterion[b,d] Precision (Max RPD)	Method Criterion[b,d] Accuracy (Percent Recovery)
Cerium-139	pCi/L	ER 130	25	80-120
Cerium-139, Solid	pCi/g	ER 130	25	80-120
Yttrium-88	pCi/L	ER 130	25	80-120
Yttrium-88, Solid	pCi/g	ER 130	25	80-120
Cobalt-60	pCi/L	ER 130	25	80-120
Cobalt-60, Solid	pCi/g	ER 130	25	80-120
Cesium-137	pCi/L	ER 130	25	85-115
Cesium-137, Solid	pCi/g	ER 130	25	80-120
Neptunium-237	pCi/L	EPA 907.0	25	85-115
Neptunium-237	pCi/g	EPA 907.0	25	85-115
Polonium-210	pCi/L	HASL Po-01	25	85-115
Polonium-210	pCi/g	HASL Po-01	25	85-115
Technetium-99	pCi/L	HASL Tc-01	25	70-130
Technetium-99	pCi/g	HASL Tc-01	25	70-130
Alpha, Gross	pCi/L	EPA 900.0, 9310	24	74-122
Alpha, Gross, Solid	pCi/g	EPA 3050 (Mod), 9310	24	74-122
Beta, Gross	pCi/L	EPA 900.0, 9310	36	58-130
Beta, Gross, Solid	pCi/g	EPA 3050 (Mod), 9310	36	58-130
Radium Alpha, Gross	pCi/L	EPA 900.1	25	75-125
Radium, 226	pCi/L	EPA 903.1, 9320	17	83-117
Radium, 226, Alpha emit	pCi/L	EPA 903.0, 9315	17	83-117
Radium, 226, Solid	pCi/g	EPA 3050 (Mod), 9320	17	83-117
Radium, 226, Alpha emit, Solid	pCi/g	EPA 3050 (Mod), 9315	17	83-117
Radium 228	pCi/L	Brooks and Blanchard	25	75-125
Radium 228	pCi/L	EPA 903.0, 9320	15	84-114
Radium 228, Solid	pCi/g	EPA 3050 (Mod), 9320	15	84-114
Radium, Total	pCi/L	EPA 903.0, 9315	45	55-145

Table 5-2. Summary of Precision and Accuracy Criteria for Inorganics Analysis, Metals Analysis, Oil and Grease, TRPH, TOX, and Radiochemical Analysis (Continued, Page 10 of 11)

Parameter	Units	Reference	Method Criterion[b,c] Precision (Max RPD)	Accuracy (Percent Recovery)
Gamma Emitters*	pCi/L	ER-130, EPA 901.1	25	NA
Gamma Emitters*	pCi/g	ER-130,	25	NA

*The gamma emitters are Beryllium -7 (Be-7), Potassium-40 (K-40), Cesium-137 (Cs-137), Lead-212 (Pb-212), Lead-214 (Pb-214), Bismuth-214 (Bi-214), Actinium-227 (Ac-227), Actinium-228 (Ac-228), Paladium-234 (Pa-234), and Thorium-234 (Th-234).

Note:
CLP = EPA Contract Laboratory Program.
MAS = million asbestos structures.
NA = not applicable.
N/A = spiking and recovery information are not available.
SOW = statement of work.
TCLP = toxicity characteristics leaching procedure.
TOX = total organic halides.
TRPH = total recoverable petroleum hydrocarbons.

Table 5-2. Summary of Precision and Accuracy Criteria for Inorganics Analysis, Metals Analysis, and Oil and Grease, TRPH, TOX, and Radiochemical Analysis (Continued, Page 11 of 11)

References:

ASTM D2974--American Society for Testing and Materials Designation: D2974-87, July 1987.
EPA 100-400--Methods for Chemical Analyses of Water and Waste. EPA 600/4-79-20--Revised March 1983.
EPA 900--Prescribed Procedures for Measurement of Radioactivity in Drinking Water. EPA 600/4-80-032. August 1980.
EPA 1310-9073--Test Methods for Evaluating Solid Waste, SW-846. 3rd Edition (Method 9073, draft 1989: oil and grease methods exclude 7.8 and 7.10).
CE-81-1--Procedures for Handling and Chemical Analysis of Sediment and Water Samples. EPA/USACE. May 1981.
EPA CLM--Chemistry Laboratory Manual of Bottom Sediments. PB-215192, Federal Water Quality Administration. December 1969.
Hach 8000--Hach Handbook of Water Analysis, 1979. Hach Chemical Company. P.O. Box 389. Loveland. Colorado 80537.
EPA 600 M4-82-020--Interim Method for Determination of Asbestos in Bulk Insulation Samples.
NIOSH--National Institute of Occupational Safety and Health (NIOSH) Manual of Analytical Methods, 3rd Edition. Volume 1. 1984.
SM 4500-N--Standard Methods for the Examination of Water and Wastewater. 17th Edition. 1989.
EML Sr-01 = Environmental Measurements Laboratory- Health and Safety Laboratory - 300 (HASL-300). 27th Edition.
EPA-EERF = Eastern Environmental Radiation Facility Radiochemistry Procedures Manual (EPA 520/5-84-006).
ER 100-310 = Environmental Analytical Procedures- Radiochemical (ER). Los Alamos-10300-Manual. Health and Environmental Chemistry; Analytical Techniques. Data Management. and Quality Assurance.
HASL G-03 = Health and Safety Laboratory Manual. Environmental Measurements Laboratory. Department of Energy. New York. New York.

[a]The parameter may be analyzed by the referenced methodology, but it is not a control parameter for this referenced method.
[b]ESE historical data.
[c]SOP derived from referenced method is used for this unlisted analyte.
[d]Criteria from EPA CLP SOW 3/90.
[e]Data from ESE method certification.
[f]ESE performance evaluation data for EPA's Water Supply Studies.
[g]EPA Method 9073. draft method. EPA 1989. for oil and grease exclude steps 7.8 and 7.10.
[h]NO_x (as N) by EPA 353.2 is calculation of $(NO_2 + NO_3) - (NO_2)$: also. method criteria do not apply.
[i]Percent organic carbon is calculated from the percent organic content data obtained from the ASTMD method using the equation: $\% \text{ Organic Carbon} = \frac{\% \text{ Total Organic Content}}{1.724}$
[j]Appendix IX compounds.
[k]Criteria from EPA Method 903.0--Prescribed Procedures for Measurement of Radioactivity in Drinking Water. EPA 600/4-80-032. August 1980.
[l]CLP precision and accuracy acceptance criteria for metals will be used for Los Alamos projects.

Source: ESE.

Table 5-3. Reporting Limit Data for Metals, Inorganics, Oil and Grease, TRPH, TOX, and Radiochemical Analyses

Parameter	Reference	Reporting Limit Aqueous* (ug/L)	Reporting Limit Solid* (mg/kg)
Aluminum	EPA 200.7, 3010, 3050, 6010	73	7.3
Aluminum	EPA 202.2, 3050, 7020	5.0**	0.5**
Antimony	EPA 200.7, 3010, 3050, 6010	46	4.6
Antimony	EPA 204.2, 3050, 7041	5.0**	0.5**
Arsenic	EPA 200.7, 3010, 3050, 6010	70	7.0
Arsenic	EPA 206.2, 3020, 3050, 7060	2.3	0.23
Barium	EPA 200.7, 3010, 3050, 6010	1.4	0.14
Beryllium	EPA 200.7, 3010, 3050, 6010	2.5	0.25
Cadmium	EPA 200.7, 3010, 3050, 6010	3.9	0.39
Cadmium	EPA 213.2, 3050, 7131	0.5**	0.05**
Calcium	EPA 200.7, 3010, 3050, 6010	48	4.8
Chromium	EPA 200.7, 3010, 3050, 6010	6.3	0.63
Chromium	EPA 218.2	2.3	NA
Cobalt	EPA 200.7, 3010, 3050, 6010	17	1.7
Copper	EPA 200.7, 3010, 3050, 6010	11	1.1
Iron	EPA 200.7, 3010, 3050, 6010	28	2.8
Lead	EPA 200.7, 3010, 3050, 6010	53	5.3
Lead	EPA 239.2, 3020, 3050, 7421	1.4	0.14
Magnesium	EPA 200.7, 3010, 3050, 6010	36	3.6
Manganese	EPA 200.7, 3010, 3050, 6010	1.6	0.16
Mercury	EPA 245.1, 7470, 7471	0.2	0.02
Mercury, Low Level	EPA 245.1, 7471	0.01	0.001
Molybdenum	EPA 200.7, 3010, 3050, 6010	40	4.0
Molybdenum	EPA 3050, 7480, 7481	5.0**	0.5**

Table 5-3. Reporting Limit Data for Metals, Inorganics, Oil and Grease, TRPH, TOX, and Radiochemical Analyses (Continued, Page 2 of 8)

Parameter	Reference	Reporting Limit Aqueous* (µg/L)	Reporting Limit Solid* (mg/kg)
Nickel	EPA 200.7, 3010, 3050, 6010	13	1.3
Nickel	EPA 3050, 3010, 6010	5.0**	0.5**
Potassium	EPA 200.7, 3010, 3050, 6010	535	53.5
Potassium	EPA 3010, 3050, 7610	5.0**	0.5**
Selenium	EPA 270.2, 6010, 200.7, 3010, 3050	101	10.1
Selenium	EPA 200.7, 3050, 7740	1.8	0.18
Silicon	EPA 200.7, 3010, 3050, 6010	50	5.0
Silver	EPA 200.7, 3010, 3050, 6010	5.8	0.58
Silver	EPA 272.2	0.16	0.016
Sodium	EPA 200.7, 3010, 3050, 6010	70	7.0
Sodium	EPA 273.1, 3050, 7770	100**	10.0**
Strontium	EPA 200.7, 6010, 3010, 3050	7.0	0.70
Thallium	EPA 200.7, 3010, 3050, 6010	110	11.0
Thallium	EPA 279.2, 3050, 7841	5.0	0.5
Tin	EPA 200.7, 3010, 3050, 6010	77	7.7
Titanium	EPA 200.7, 3005, 3010, 6010	11.4	1.14
Vanadium	EPA 200.7, 3010, 3050, 6010	7.4	0.74
Vanadium	EPA 286.2, 3050, 7911	5.0**	0.5**
Zinc	EPA 200.7, 3010, 3050, 6010	5.6	0.56
Alkalinity, Total	mg/L-$CACO_3$	EPA 310.1	5.0***
COD, high-level	mg/L	HACH 8000	50
COD, low-level	mg/L	HACH 8000	5.0**
Cyanide	mg/L	EPA 335.3	0.005**
Cyanide, Solid	mg/g	EPA 335.3, 9010	0.25**
Moisture	% Wet Wt	ASTM-D 2216-71	0.5**
Bromide	mg/L	EPA 300, 9056	0.2**

Table 5-3. Reporting Limit Data for Metals, Inorganics, Oil and Grease, TRPH, TOX, and Radiochemical Analyses (Continued, Page 3 of 8)

Parameter	Units	Reference	Reporting Limit
Chloride	mg/L	EPA 325.3	1.0***
Chloride	mg/L	EPA 300, 9056	0.5**
Nitrogen, NO_2 + NO_3	mg/L-as N	EPA 353.2	0.010**
Nitrogen, NO_3	mg/L-as N	EPA 300, 353.2, 9056	0.010**
Nitrogen, NO_2	mg/L-as N	EPA 300, 353.2, 9056	0.010**
Nitrogen, NH_3 + NH_4	mg/L-as N	EPA 350.1	0.05**
Nitrogen, TKN	mg/L-as N	EPA 351.2	0.10**
Nitrogen, TKN, Solid	mg/kg	CE-81-1, p. 3-201, Method 1	10**
Phosphorus, T	mg/L-as P	EPA 300, 9056	0.01**
Phosphorus, T	mg/L-as P	EPA 365.1	0.01**
Phosphorus, T Solid	mg/kg-as P	EPA 365.1	2.5**
Phosphorus, Ortho, D	mg/L-as P	EPA 365.1	0.01**
Total O-PO_4	mg/L-as P	EPA 365.1	0.01**
Silica, Diss	mg/L	EPA 370.1	2.0**
Sulfate	mg/L	EPA 375.4	5.0**
		EPA 300, 9056	0.50**
Sulfide	mg/L	EPA 376.2	0.05**
Sulfide, Solid	mg/kg	EPA 9030	0.25**
Acidity, Total	mg/L-$CaCO_3$	EPA 305.1	5**
BOD, 5-day	mg/L	EPA 405.1	1.0***
BOD, 14-day	mg/L	EPA 405.1	1.0***
Carbon, Total	mg/L	EPA 415.1, 9060	1.0**
Carbon, TOC	mg/L	EPA 415.1, 9060	1.0**
Carbon, TOC, Solid	g/kg	EPA 9060 (Mod)	360*****
Carbon, TOC, Solid	% Organic Content	ASTM- D 2974	0.1**

Table 5-3. Reporting Limit Data for Metals, Inorganics, Oil and Grease, TRPH, TOX, and Radiochemical Analyses (Continued, Page 4 of 8)

Parameter	Units	Reference	Reporting Limit
Chlorine, Free	mg/L	EPA 330.1	0.025****
Chlorine, Total Residual	mg/L	EPA 330.1	0.025****
Chromium (+6)	µg/L	EPA 7196	2.0**
Chromium (+6), Solid	mg/kg	EPA 3060, 7196 (Mod)	0.2**
Color, true	PCU	EPA 110.2	5.0**
Fluoride	mg/L	EPA 340.2	0.10**
Fluoride	mg/L	EPA 300, 9056	0.50**
Hardness	mg/L-$CaCO_3$	EPA 130.2	1.0**
Odor, 25C	Thresh No.	EPA 140.1	1.0**
Turbidity	NTU	EPA 180.1	0.4**
MBAS (foaming agents, surfactants)	mg/L	EPA 425.1	0.1**
Oil and Grease, IR	mg/L	EPA 413.2	0.17**
Oil and Grease, Gravimetric	mg/L	EPA 413.1	1.0**
Oil and Grease, IR, Solid	µg/g	EPA 9071, 9073	21**
Phenols	µg/L	EPA 420.2	5.0**
Phenols, Solid	µg/g	CE-81-1, p. 3-555	100**
Residue, Diss., Total (TDS) 105 Deg	mg/L	EPA 160.1	10****
Residue, Susp. (TSS)	mg/L	EPA 160.2	4****
Residue, Total (TS)	mg/L	EPA 160.3	10**
Petroleum Hydrocarbons (TRPH)	mg/L	EPA 418.1	0.17**

Table 5-3. Reporting Limit Data for Metals, Inorganics, Oil and Grease, TRPH, TOX, and Radiochemical Analyses (Continued, Page 5 of 8)

Parameter	Units	Reference	Reporting Limit
Petroleum Hydrocarbons, Solid	µg/g	EPA 9071, 9073	21**
Petroleum Hydrocarbons, Solid	µg/g	EPA 3550, 418.1	21**
Specific Cond.	µmhos/cm	EPA 120.1	10**
TOX	µg/L-Cl	EPA 9020	10**
TOX, Solid	µg/kg	EPA 9020 (Mod)	30**
Americium-241	pCi/L	EPA 120, AM-03	0.1
Americium-241, Solid	pCi/g	EPA 120, AM-03	0.01
Lead-210	pCi/L	EPA-EERF	1.0
Lead-210, Solid	pCi/g	EPA-EERF	1.0
Gamma, gross	pCi/L	EPA 150	100
Gamma, gross, Solid	pCi/g	EPA 150	2
Plutonium-238	pCi/L	ER 160	0.1
Plutonium-238, Solid	pCi/g	ER 160	0.01
Plutonium-239	pCi/L	ER 160	0.1
Plutonium-239, Solid	pCi/g	ER 160	0.01
Plutonium-240	pCi/L	ER 160	0.1
Plutonium-240, Solid	pCi/g	ER 160	0.01
Plutonium-241	pCi/L	ER 160	2.0
Plutonium-241 Solid	pCi/g	ER 160	1.0
Thorium-234	pCi/L	ER 130	20
Thorium-234, Solid	pCi/g	ER 130	1.0
Thorium-227	pCi/L	EPA-EERF	0.1
Thorium-227, Solid	pCi/g	EPA-EERF	0.1
Thorium-228	pCi/L	EPA-EERF	0.1
Thorium-228, Solid	pCi/g	EPA-EERF	0.1

Table 5-3. Reporting Limit Data for Metals, Inorganics, Oil and Grease, TRPH, TOX, and Radiochemical Analyses (Continued, Page 6 of 8)

Parameter	Units	Reference	Reporting Limit
Thorium-230	pCi/L	EPA-EERF	0.1
Thorium-230, Solid	pCi/g	EPA-EERF	0.1
Thorium-232	pCi/L	EPA-EERF	0.1
Thorium-232, Solid	pCi/g	EPA-EERF	0.1
Strontium-90	pCi/L	EML Sr-01	1.0
Strontium-90, Solid	pCi/g	EML Sr-01	0.5
Strontium 90	pCi/L	EPA 905.0	2.0****
Strontium 89	pCi/L	EPA 905.0	2.0****
Uranium-233	pCi/L	ER 310	0.1
Uranium-233, Solid	pCi/g	ER 310	0.1
Uranium-234	pCi/L	ER 310	0.1
Uranium-234, Solid	pCi/g	ER 310	0.1
Uranium-235	pCi/L	ER 310	0.1
Uranium-235, Solid	pCi/g	ER 310	0.1
Uranium-236	pCi/L	ER 310	0.1
Uranium-236, Solid	pCi/g	ER 310	0.1
Uranium-238	pCi/L	ER 310	0.1
Uranium-238, Solid	pCi/g	ER 310	0.1
Uranium, Natural	pCi/L	EPA 908.0	1.0
Uranium, Total	pCi/L	EPA 908.0	1.0
Uranium, Total, Solid	pCi/g	EPA 3050/908.0	0.3
Tritium	pCi/L	ER 210	300
Tritium, Solid	pCi/g	ER 210	300
Tritium	pCi/L	EPA 906.0	600
Cadmium-109	pCi/L	ER 130	421
Cadmium-109, Solid	pCi/g	ER 130	14
Cobalt-57	pCi/L	ER 130	12
Cobalt-57, Solid	pCi/g	ER 130	0.5
Cerium-139	pCi/L	ER 130	10
Cerium-139, Solid	pCi/g	ER 130	0.4
Yttrium-88	pCi/L	ER 130	21
Yttrium-88, Solid	pCi/g	ER 130	0.9

Table 5-3. Reporting Limit Data for Metals, Inorganics, Oil and Grease, TRPH, TOX, and Radiochemical Analyses (Continued, Page 7 of 8)

Parameter	Units	Reference	Reporting Limit
Cobalt-60	pCi/L	ER 130	22
Cobalt-60, Solid	pCi/g	ER 130	0.9
Cesium-137	pCi/l	ER 130	4.0
Cesium-137, Solid	pCi/g	ER 130	0.2
Neptunium-237	pCi/L	EPA 907.0	0.5
Neptunium-237	pCi/g	EPA 3050(Mod), 907.0	0.2
Polonium-210	pCi/L	HASL Po-01	1.0
Polonium-210	pCi/g	HASL Po-02	0.5
Technetium-99	pCi/L	HASL Tc-01	2.0
Technetium-99	pCi/g	HASL Tc-01	1.0
Alpha, Gross	pCi/L	EPA 900.0	1.0****
Alpha, Gross, Solid	pCi/g	EPA 3050, 9310 (Mod)	1.0****
Beta, Gross	pCi/L	EPA 900.0, 9310	3.0****
Beta, Gross, Solid	pCi/g	EPA 3050, 9310 (Mod)	3.0****
Radium Alpha, Gross	pCi/L	EPA 900.1	1.0****
Radium 226	pCi/L	EPA 903.1, 903.0, 9315, 9320	0.1****
Radium 226, Solid	pCi/g	EPA 3050, 9315, 9320 (Mod)	0.1****
Radium 226, Alpha emit	pCi/L	EPA 903.0, 9315	1.0****
Radium 226, Alpha emit, Solid	pCi/g	EPA 3050, 9315 (Mod)	1.0****
Radium 228	pCi/L	EPA 904.0, 9320	2.0****
Radium 228, Solid	pCi/g	EPA 3050, 9320 (Mod)	2.0****
Radium, Total	pCi/L	EPA 903.0, 9315	1.0****
Uranium, Natural	pCi/L	EPA 905.0	0.3****
Gamma Emitters			
Beryllium-7	pCi/L	ER 130, EPA 901.1	20
Beryllium-7	pCi/g	ER 130	140
Potassium-40	pCi/L	ER 130, EPA 901.1	45
Potassium-40	pCi/g	ER 130	300
Lead-212	pCi/L	ER 130, EPA 901.1	7.0
Lead-212	pCi/g	ER-130	50
Lead-214	pCi/L	ER-130, EPA 901.1	7.0
Lead 214	pCi/g	ER-130	50

Table 5-3. Reporting Limit Data for Metals, Inorganics, Oil and Grease, TRPH, TOX, and Radiochemical Analyses (Continued, Page 8 of 8)

Parameter	Units	Reference	Reporting Limit
Cesium-137	pCi/L	ER 130, EPA 901.1	3.0
Cesium-137	pCi/g	ER 130	20
Bismuth-214	pCi/L	ER 130, EPA 901.1	8.0
Bismuth-214	pCi/g	ER 130	55
Actinium-227	pCi/L	ER 130, EPA 901.1	25
Actinium-227	pCi/g	ER 130	175
Actinium-228	pCi/L	ER 130, EPA 901.1	10
Actinium-228	pCi/g	ER 130	70
Paladium-234	pCi/L	ER 130, EPA 901.1	600
Paladium-234	pCi/g	ER 130	4200
Thorium-234	pCi/L	ER 130, EPA 901.1	100
Thorium-234	pCi/g	ER 130	700

Note:
µg/L = micrograms per liter.
mg/kg = milligrams per kilogram.
mg/L = milligrams per liter.
pCi/L = picocuries per liter.
pCi/g = picocuries per gram.
g/kg = grams per kilogram.
NTU = nephelometric turbidity unit.
PCU = platinum-cobalt unit.
µg/g = micrograms per gram.
µmho/cm = micromhos per centimeter.

[1]Based on ESE's instrument detection limit (IDL) studies unless indicated differently. The EPA Contract Laboratory Program (CLP) SOW 3/90 requirements are followed when the IDL studies are conducted.
[2]Based on aqueous IDL studies times a factor of 0.1 to take into account sample weight and final volume of digestate, unless indicated differently.

* Based on the lowest standard that ESE routinely uses. For solids, the reporting limits are adjusted for sample weight and final volume.
** HACH instrument recommended detection limit. HACH Co., Box 389, Loveland, CO 80537.
*** Methods for Chemical Analyses of Water and Waste, EPA 600/4-79-020, Revised, March 1983.
**** Obtained from Standard Methods for the Examination of Water and Wastewater, 17th Edition, 1989. The reporting limits for petroleum hydrocarbon and oil and grease already take into account sample volume or sample weight and final extract volume.
***** Based on one-half of the major increments of the titration.
****** Based on EPA's detection limits calculation procedure recommended for radiochemical analyses. (Reference: Carbon-14 in Aqueous Samples, Environmental Measurements Laboratory Manual, 1981.)
******* Based on MDL Study.

Source: ESE.

Table 5-4. Analytes, Precision, and Accuracy Data For Trihalomethanes, EPA 501.2

Parameter	Aqueous	
	Precision (RPD)	Accuracy (% Recovery)
Chloroform	33	77-143
Bromodichloromethane	33	79-137
Dibromochloromethane	33	23-125
Bromoform	33	43-106
THMs, total[a]	33[b]	62-125[b]

Reference: Accuracy: EPA Method 501.2--The Analysis of Trihalomethanes in Drinking Water by Liquid/Liquid Extraction. EPA, Environmental Monitoring and Support Laboratory, Cincinnati, OH. May 15, 1979.

Precision: ESE, meets or exceeds the RPD criteria that can be calculated from the spiking and recovery information presented in the method EPA 501.2.

[a]Matrix spike and QC check sample compound.
[b]Accuracy and precision criteria are based on ESE historical data.

Source: ESE.

Table 5-7. Reporting Limit Data for EDB and DBCP, EPA 504 and Modified 504

Parameter	Reporting Limits* Aqueous (µg/L)	Solid (µg/kg)
1,2-Dibromoethane (EDB)†	0.02	30
DBCP (nemagon)†	0.02	30

*Based on the lowest standard that ESE routinely uses.
The solid detection limits are expressed on a wet weight basis.
†Appendix IX compounds.

Source: ESE.

Table 5-8. Analytes, Precision, and Accuracy Data For Organohalide Pesticides and Arochlors in Drinking Water, EPA 505

Parameter	Aqueous Precision (RPD)	Aqueous Accuracy (% Recovery)
BHC.G(lindane)*	20	71-111
Endrin*	20	79-119
Methoxychlor	63	37-163
Toxaphene	29	81-139
Alachlor	40	62-142
Heptachlor*	31	46-108
Aldrin*	29	57-115
Dieldrin*	51	36-138
Chlordane	37	68-142
PCB-1016	23	74-120
PCB-1221	29	63-121
PCB-1232	22	64-108
PCB-1242	22	74-118
PCB 1248	30	54-114
PCB-1254	35	50-120
PCB-1260	59	29-147
Atrazine	49	36-134

Table 5-8. Analytes, Precision, and Accuracy Data For Organohalide Pesticides and Arochlors in Drinking Water, EPA 505 (Continued, Page 2 of 2)

Parameter	Aqueous Precision (RPD)	Aqueous Accuracy (%Recovery)
Chlordane, alpha	51	35-137
Chlordane, gamma	56	30-142
Chlordane	37	68-142
Heptachlor Epoxide	47	53-147
Hexachlorobenzene	41	63-145
Hexachlorocyclopentadiene	35	38-108
Simazine	25	74-125
Toxaphene	41	73-155

Reference: Accuracy: EPA Method 505--Supplement to "Methods for the Determination of Organic Compounds in Finished Drinking Water and Raw Source Water," EPA, Cincinnati, OH, September 1986. Precision: ESE, meets or exceeds the RPD criteria that can be calculated from the spiking and recovery information presented in the method (EPA 505).

*Matrix spike and QC check sample compound.

Source: ESE.

Table 5-9. Reporting Limits Data for Organohalide Pesticides and Arochlors in Drinking Water, EPA 505

Parameter	Reporting Limit* Aqueous (µg/L)
BHC,G(lindane)	0.10
Endrin	0.10
Methoxychlor	0.20
Toxaphene	10
Alachlor	2.0†
Heptachlor	0.10
Aldrin	0.10
Dieldrin	0.10
Chlordane	0.50
Atrazine	0.6
Chlordane, alpha	0.5
Chlordane, gamma	0.5
Chlordane	0.5
Heptachlor Epoxide	0.1
Hexachlorobenzene	0.5
Hexachlorocyclopentadiene	0.5
Simazine	1.0
Toxaphene	10.0
PCB-1016	2.0
PCB-1221	2.0
PCB-1232	2.0
PCB-1242	2.0
PCB 1248.	2.0
PCB-1254	2.0
PCB-1260	2.0

*Based on the lowest standard that ESE routinely uses, taking into account the sample volume and final extract volume. The lowest standard is chosen to be within the range of 5 to 10 times the background noise of the instrument.

†Method detection limits listed in EPA Method 505, Analysis of Organohalide Compounds in Drinking Water (supplement to "Methods for the Determination of Organic Compounds in Drinking Water," EPA/600/4-88/039, December 1988) times ten.

Source: ESE.

Table 5-10. Analytes, Precision, and Accuracy Data For Nitrogen and Phosphorous Containing Pesticides, EPA 507

Parameter	Aqueous Precision (RPD)	Aqueous Accuracy (% Recovery)
Alachlor	33	62-128
Ametryn	30	61-121
Atraton	33	58-124
Atrazine*	24	68-116
Bromacil	27	64-118
Butachlor	12	84-108
Butylate	63	34-160
Carboxin	12	90-114
Chlorpropham	33	60-126
Cycloate	27	62-116
Diazinon*	21	94-136
Dichlorvos	18	79-115
Diphenamid	24	69-117
Disulfoton	30	59-119
Disulfoton Sulfone	30	68-128
Disulfoton Sulfoxide	33	54-120
EPTC	27	58-112

Table 5-10. Analytes, Precision, and Accuracy Data For Nitrogen and Phosphorous Containing Pesticides, EPA 507.
(Continued, Page 2 of 3)

Parameter	Aqueous Precision (RPD)	Aqueous Accuracy (% Recovery)
Ethoprop	15	85-115
Fenamiphos	24	66-114
Fenarimol	15	84-114
Fluridone	27	60-114
Hexazinone	21	69-111
Merphos	24	72-120
Methyl Parathion	30	65-128
Metolachlor	12	81-105
Metribuzin	15	86-116
Mevinphos	33	62-125
Molinate	54	44-152
Napropamide	15	83-119
Norflurazon	15	79-109
Pebulate	27	67-121
Prometon	27	51-105
Prometryn	24	69-117
Pronamide	30	61-121

Table 5-10. Analytes, Precision, and Accuracy Data For Nitrogen and Phosphorous Containing Pesticides, EPA 507.
(Continued, Page 3 of 3)

Parameter	Aqueous Precision (RPD)	Aqueous Accuracy (% Recovery)
Propazine	24	68-116
Simazine*	21	79-121
Simetryn	15	84-114
Stirofos	18	80-116
Tebuthiuron	27	57-111
Terbacil	15	79-115
Terbufos	12	85-109
Terbutryn	27	67-121
Triadimefon	24	69-117
Tricyclazole	21	65-107
Vernolate	18	75-111

Reference: Accuracy: EPA Method 507--Methods for the Determination of Organic Compounds in Drinking Water. EPA 600/4-88/039. December 1988.
Precision: ESE. meets or exceeds the RPD criteria that can be calculated from the spiking and recovery information presented in the method (EPA 507).

*Matrix spike and QC check sample compound.

Source: ESE.

Table 5-11. Reporting Limit Data for Nitrogen and Phosphorus Containing Pesticides, EPA 507

Parameter	Reporting Limit* Aqueous (µg/L)
Alachlor	3.8
Ametryn	20
Ametraton	6.0
Atrazine	0.6*
Bromacil	25
Butachlor	3.8
Butylate	0.3*
Carboxin	6.0
Chlorpropham	5.0
Cycloate	2.5
Diazinon	0.3*
Dichlorvos	0.3*
Diphenamid	6
Disulfoton	0.3*
Disulfoton Sulfone	38
Disulfoton Sulfoxide	3.8
EPTC	0.3
Ethoprop	1.9
Fenamiphos	10
Fenarimol	3.8

Table 5-11. Reporting Limit Data for Nitrogen and Phosphorus Containing Pesticides, EPA 507 (Continued, Page 2 of 3)

Parameter	Reporting Limit[a] Aqueous (µg/L)
Fluridone	38
Hexazinone	1.2[c]
Merphos	0.3[c]
Methyl Parathion	25
Metolachlor	7.5
Metribuzin	1.5
Mevinphos	2.9
Molinate	1.5
Napropamide	2.5
Norflurazon	5
Pebulate	0.3[c]
Prometon	3
Prometryn	1.9
Pronamide	7.6
Propazine	1.3
Simazine	0.75
Simetryn	2.5
Stirofos	0.6[c]
Tebuthiuron	13
Terbacil	45

Table 5-11. Reporting Limit Data for Nitrogen and Phosphorus Containing Pesticides, EPA 507 (Continued, Page 3 of 3)

Parameter	Reporting Limit[a] Aqueous (µg/L)
Terbufos	0.3[b]
Terbutryn	2.5
Triademefon	6.5
Tricyclazole	10
Vernolate	0.3

[a]Estimated detection limits listed in EPA Method 507, (Methods for the Determination of Organic Compounds in Drinking Water, EPA 600/4-88/039, December 1988) times ten.
[b]Based on the lowest standard that ESE routinely uses, taking into account sample volume and final extract volume. The lowest standard is chosen to be 5 to 10 times the background noise of the instrument.

Source: ESE.

Table 5-12. Analytes, Precision, and Accuracy Data For Chlorinated Herbicides, EPA 515

Parameter	Aqueous Precision (RPD)	Aqueous Accuracy (%Recovery)
2,4-D*	30	54-120
2,4,5-TP/Silvex + der.*	30	48-126
Dalapon	30	64-118
Picloram	30	20-104
Dinoseb	30	0-113
Dicamba (banvel)*	30	54-120
Pentachlorophenol	30	30-96
2,4-DB	30	0-159
2,4,5-T	30	46-124

Reference: Accuracy: EPA Method 515--Supplement to "Methods for the Determination of Organic Compounds in Finished Drinking Water and Raw Source Water," EPA, Cincinnati, OH, September 1986.
Precision: ESE, meets or exceeds the RPD criteria that can be calculated from the spiking and recovery information presented in the EPA 515 method.

*Matrix spike and QC check sample compound.

Source: ESE.

Table 5-13. Reporting Limit Data for Chlorinated Herbicides, EPA 515.1

Parameter	Reporting Limit* Aqueous (µg/L)
2,4-D	0.029
2,4,5-TP/Silvex + der.	0.029
Dalapon	0.029
Picloram	0.029
Dinoseb	0.029
Dicamba (banvel)	0.029
Pentachlorophenol	0.029
2,4-DB	0.029
2,4,5-T	0.029

*Based on the lowest standard that ESE routinely uses, taking into account the sample volume and final extract volume. The lowest standard is chosen to be 5 to 10 times the background noise of the instrument.

Source: ESE.

Table 5-14. Analytes, Precision, and Accuracy Data for Volatile Organic Compounds, EPA 524.2

Parameter	Aqueous Precision (RPD% Recovery)	Aqueous Accuracy
Dichlorobenzene, total	21	82-124
1,1-Dichloroethane	16	80-112
1,2-Dichloroethane	16	79-111
1,1-Dichloroethylene*	14	61-145
cis-1,2-Dichloroethene	20	81-121
trans-1,2-Dichloroethene	17	76-110
1,2-Dichloropropane	18	79-115
1,3-Dichloropropane	18	78-114
2,2-Dichloropropane	51	35-107
1,1-Dichloropropene	27	71-125
Ethylbenzene	26	73-125
Hexachlorobutadiene	20	80-120
Isopropylbenzene	23	78-124
cis-1,3-Dichloropropene	20	0-227
trans-1,3-Dichloropropene	20	17-183
p-Cymene	N/A	N/A
Naphthalene	25	79-129
Methylene chloride	16	79-111
Pentachloroethane	N/A	N/A
Styrene	21	81-123
1,1,1,2-Tetrachloroethane	20	70-110
1,1,2,2-Tetrachloroethane	19	72-110
Tetrachloroethene	20	69-109
Toluene*	13	76-125
1,2,3-Trichlorobenzene	26	83-135
1,2,4-Trichlorobenzene	25	83-135
Benzene*	11	76-127
Bromobenzene	17	83-117
Bromochloromethane	19	71-109

Table 5-14. Analytes, Precision, and Accuracy Data for Volatile Organic Compounds, EPA 524.2 (Continued, Page 2 of 3)

Parameter	Aqueous Precision (RPD)	Aqueous Accuracy (% Recovery)
Bromodichloromethane	18	77-113
Bromoform	19	82-120
Bromomethane	25	70-120
n-Butylbenzene	23	77-123
sec-Butylbenzene	23	77-123
tert-Butylbenzene	22	80-124
Carbon tetrachloride	26	58-110
Chlorobenzene*	13	75-130
Chloroform	18	72-108
bis-2-Chloroisopropyl ether	N/A	N/A
Chloromethane	27	66-120
Chloroethane	27	62-116
2-Chlorotoluene	19	71-109
4-Chlorotoluene	25	74-124
Dibromochloromethane	21	71-113
1,2-Dibromo-3-chloropropane	60	23-143
1,2-Dibromoethane	12	90-102
Dibromomethane	17	83-117
1,2-Dichlorobenzene	19	74-112
1,3-Dichlorobenzene	21	78-120
1,4-Dichlorobenzene	19	84-122
Dichlorodifluoromethane	23	67-113
1,1,1-Trichloroethane	24	74-122
1,1,2-Trichloroethane	22	82-126
Trichloroethene*	14	71-120
Trichlorofluoromethane	24	65-113
1,2,3-Trichloropropane	43	65-151
1,2,4-Trimethylbenzene	24	75-123
1,3,5-Trimethylbenzene	22	70-114

Table 5-14. Analytes, Precision, and Accuracy Data for Volatile Organic Compounds, EPA 524.2 (Continued, Page 3 of 3)

Parameter	Aqueous Precision (RPD)	Aqueous Accuracy (% Recovery)
Vinyl chloride	20	78-118
Xylene, total	23	81-127
Dichlorobenzene-D4†	NA	87-107
4-Bromofluorobenzene†	NA	86-115

Reference: Accuracy: EPA Method 524.2--Methods for the Determination of Organic Compounds in Drinking Water, EPA 600/4-88/039, December 1988 and CLP SOW 7/87 for the controlling analytes.
Precision: ESE (meets or exceeds the RPD criteria that can be calculated from the spiking and recovery information presented in the EPA method 524.2) and CLP SOW 7/87 for controlling analytes.

Note: N/A = spiking and recovery information is not available.
NA = not applicable.

*Matrix spike and QC check sample compound.
†Surrogate: the surrogate is added to all environmental samples and quality control samples.

Source: ESE.

Table 5-15. Reporting Limit Data for Volatile Organic Compounds, EPA 524.2

Parameter	Reporting Limit* Aqueous (µg/L)
Dichlorobenzene, total	1.0
1,1-Dichloroethane	1.0
1,2-Dichloroethane	1.0
1,1-Dichloroethylene	1.0
cis-1,2-Dichloroethene	1.0
trans-1,2-Dichloroethene	1.0
1,2-Dichloropropane	1.0
1,3-Dichloropropane	1.0
2,2-Dichloropropane	1.0
1,1-Dichloropropene	1.0
Ethylbenzene	1.0
Hexachlorobutadiene	1.0
Isopropylbenzene	1.0
cis-1,3-Dichloropropene	1.0
trans-1,3-Dichloropropene	1.0
p-Cymene	1.0
Naphthalene	1.0
Methylene chloride	1.0
Pentachloroethane	1.0
Styrene	1.0
1,1,1,2-Tetrachloroethane	1.0
1,1,2,2-Tetrachloroethane	1.0
Tetrachloroethene	1.0
Toluene	1.0
1,2,3-Trichlorobenzene	1.0
1,2,4-Trichlorobenzene	1.0
Benzene	1.0
Bromobenzene	1.0
Bromochloromethane	1.0
Bromodichloromethane	1.0
Bromoform	1.0

Table 5-15. Reporting Limit Data for Volatile Organic Compounds, EPA 524.2 (Continued, Page 2 of 3)

Parameter	Reporting Limit* Aqueous (µg/L)
Bromomethane	1.0
n-Butylbenzene	1.0
sec-Butylbenzene	1.0
tert-Butylbenzene	1.0
Carbon tetrachloride	1.0
Chlorobenzene	1.0
Chloroform	1.0
bis-2-Chloroisopropyl ether	1.0
Chloromethane	1.0
Chloroethane	1.0
2-Chlorotoluene	1.0
4-Chlorotoluene	1.0
Dibromochloromethane	1.0
1,2-Dibromo-3-chloropropane	3.0
1,2-Dibromoethane	3.0
Dibromomethane	1.0
1,2-Dichlorobenzene	1.0
1,3-Dichlorobenzene	1.0
1,4-Dichlorobenzene	1.0
Dichlorodifluoromethane	1.0
1,1,1-Trichloroethane	1.0
1,1,2-Trichloroethane	1.0
Trichloroethene	1.0
Trichlorofluoromethane	1.0
1,2,3-Trichloropropane	1.0
1,2,4-Trimethylbenzene	1.0
1,3,5-Trimethylbenzene	1.0
Vinyl chloride	1.0
Xylene, total	1.0

Table 5-15. Reporting Limit Data for Volatile Organic Compounds. EPA 524.2 (Continued. Page 3 of 3)

The reporting limits are based on the concentration that can be detected reliably according to ESE's past database and analytical experience performing volatile organic analyses by gas chromatography/mass spectrometry.

Source: ESE.

Table 5-16. Analytes, Precision, and Accuracy Data For N-Methyl Carbamoxyloximes and N-Methyl Carbamates, EPA 531.1

Parameter	Aqueous Precision (RPD)	Aqueous Accuracy (%Recovery)
Aldicarb*	17[1]	83-117[1]
Aldicarb sulfone	20	84-120
Aldicarb sulfoxide	20	72-128
Carbaryl*	26[1]	63-115[1]
Carbofuran*	15[1]	81-117[1]
3-Hydroxycarbofuran	20	36-162
Methomyl	20	64-115
Oxamyl	20	34-148

Reference: Accuracy: EPA Method 531.1--Supplement to "Methods for the Determination of Organic Compounds in Finished Drinking Water and Raw Source Water." EPA, Cincinnati, OH, September 1986.
Precision: ESE, meets or exceeds the RPD criteria that can be calculated from the spiking and recovery information presented in the method (EPA 531.1).

*Matrix spike and QC check sample compound.
[1]Accuracy and precision criteria are based on ESE historical data.

Source: ESE.

Table 5-17. Reporting Limit Data for N-Methyl Carbamoxyloximes and N-Methyl Carbamates, EPA 531.1

Parameter	Reporting Limit* Aqueous (µg/L)
Aldicarb	2.0
Aldicarb sulfone	2.0
Aldicarb sulfoxide	2.0
Carbaryl	2.0
Carbofuran	2.0
3-Hydroxycarbofuran	2.0
Methomyl	2.0
Oxamyl	2.0

*Based on the lowest standard that ESE routinely uses. The lowest standard is chosen to be within the range of 5 to 10 times the background noise of the instrument.

Source: ESE.

Table 5-18. Analytes, Precision, and Accuracy Data for Purgeable Halocarbons, EPA 601 and SW 5030/8010

Parameter	Aqueous Precision (RPD	Aqueous Accuracy (% Recovery)	Solid Precision (RPD)	Solid Accuracy (% Recovery)
Bromodichloromethane	20	42-172	30	42-172
Bromoform	20	13-159	30	13-159
Bromomethane	20	0-144	30	0-144
Carbon tetrachloride	20	43-143	30	43-143
Chlorobenzene*	43'	51-137'	50	38-150
Chloroethane	20	46-137	30	46-137
2-Chloroethylvinylether	20	14-186	30	14-186
Chloroform	20	49-133	30	49-133
Chloromethane	20	0-193	30	0-193
Dibromochloromethane	20	24-191	30	24-191
Dichlorobenzene,tot.	20	42-143	30	42-143
1,1-Dichloroethane	20	47-132	30	47-132
1,2-Dichloroethane	20	51-147	30	51-147
1,1-Dichloroethylene*	38'	51-127'	30	28-167
Trans-1,2-dichloroethene	20	38-155	30	38-155
1,2-Dichloropropane	20	44-156	30	44-156
cis-1,3-Dichloropropene	20	22-178	30	22-178

Table 5-18. Analytes, Precision, and Accuracy Data for Purgeable Halocarbons, EPA 601 and SW 5030/8010 (Continued, Page 2 of 2)

Parameter	Aqueous Precision (RPD	Aqueous Accuracy (% Recovery)	Solid Precision (RPD)	Solid Accuracy (% Recovery)
Trans-1,3-dichloropropene	20	22-178	30	22-178
Methylene chloride	20	25-162	30	25-162
1,1,2,2-Tetrachloroethane	20	8-184	30	8-184
Tetrachloroethene	20	26-162	30	26-162
1,1,1-Trichloroethane	20	41-138	30	41-138
1,1,2-Trichloroethane	20	39-136	30	39-136
Trichloroethene*	40†	54-134††	30	35-146
Trichlorofluoromethane	20	21-156	30	21-156
Vinyl chloride	20	28-163	30	28-163
Freon 113**	33	73-139	N/A	N/A

Reference: Accuracy: EPA Method SW 8010--Test Methods for Evaluating Solid Wastes, EPA-SW-846 3rd Edition, September 1986. Precision: ESE, meets or exceeds the RPD criteria that can be calculated from the spiking and recovery information presented in the method (SW 8010).

Note: N/A - spiking and recovery information are not available.

*Matrix spike and QC check sample compound.
†Accuracy and precision criteria are based on ESE historical data.
**Accuracy and precision criteria are based on ESE validation study (see Appendix U).
Source: ESE.

Table 5-19. Reporting Limit Data for Purgeable Halocarbons, EPA 601 and SW 5030/5010

Parameter	Reporting Limits Aqueous* (µg/L)	Reporting Limits Solid* (µg/kg)
Bromodichloromethane**	1.0	100
Bromoform**	1.0	100
Bromomethane**	1.0	100
Carbon tetrachloride**	1.0	100
Chlorobenzene**	1.0	100
Chloroethane**	1.0	100
2-Chloroethylvinylether**	1.0	100
Chloroform**	1.0	100
Chloromethane**	1.0	100
Dibromochloromethane**	1.0	100
Dichlorobenzene,tot.**	1.0	100
1,1-Dichloroethane**	1.0	100
1,2-Dichloroethane**	1.0	100
1,1-Dichloroethylene**	1.0	100
Trans-1,2-dichloroethene**	1.0	100
1,2-Dichloropropane**	1.0	100
cis-1,3-Dichloropropene	1.0	100
Trans-1,3-dichloropropene	1.0	100
Methylene chloride**	1.0	100
1,1,2,2-Tetrachloroethane**	1.0	100
Dichlorodifluoromethane	1.0	100

Table 5-19. Reporting Limit Data for Purgeable Halocarbons, EPA 601 and SW 5030/8010 (Continued, Page 2 of 2)

Parameter	Reporting Limits Aqueous* (µg/L)	Solid† (µg/kg)
Tetrachloroethene**	1.0	100
1,1,1-Trichloroethane**	1.0	100
1,1,2-Trichloroethane**	1.0	100
Trichloroethene**	1.0	100
Trichlorofluoromethane**	1.0	100
Vinyl chloride**	1.0	100
Freon 113	1.0	N/A

Note: N/A = Reporting limit information not available.

*Based on the lowest standard that ESE routinely uses.
†Based on the lowest standard that ESE routinely uses times a factor of 100. The solid reporting limits are expressed on a wet weight basis.
**Appendix IX compounds.

Source: ESE.

Table 5-20. Analytes, Precision, and Accuracy Data for Purgeable Aromatics, EPA 602 and SW 5030/8020

Parameter	Aqueous Precision (RPD	Aqueous Accuracy (% Recovery)	Solid Precision (RPD)	Solid Accuracy (% Recovery)
Benzene*,**	44†	44-132†	28†	74-130†
Chlorobenzene**	20	55-135	30	55-135
Dichlorobenzene,total**	20	42-143	30	42-143
Ethylbenzene**	20	32-160	30	32-160
Toluene*,**	40†	47-127†	26†	75-127†
Xylenes, total**	23†	80-126†	27†	74-128†
MTBE	N/A	N/A	N/A	N/A
Total VOA (BTEX)	42†	46-130†	27†	75-129†

Reference: Accuracy: EPA Method SW 8020--Test Methods for Evaluating Solid Wastes, EPA-SW-846 3rd Edition, September 1986.
Precision: ESE, meets or exceeds the RPD criteria that can be calculated from the spiking and recovery information presented in the method (SW 8020).

Note: Total VOA (BTEX) is calculated and defined as the arithmetic sum of the concentrations of benzene, toluene, ethylbenzene, and total xylenes.
MTBE = methyl tert-butyl ether.
N/A = spiking and recovery information are not available.

* Matrix spike and QC check sample compound.
† Accuracy and precision criteria are based on ESE historical data.
** Appendix IX compounds.

Source: ESE.

Table 5-21. Reporting Limit for Purgeable Aromatics, EPA 602 and SW 5030/8020

Parameter	Reporting Limits Aqueous* (µg/L)	Solid† (µg/kg)
Benzene	1.0	100
Chlorobenzene	1.0	100
Dichlorobenzene, total	1.0	100
Ethylbenzene	1.0	100
Toluene	1.0	100
Xylenes, total	1.0	100
MTBE	N/A	N/A
Total VOA (BTEX)	5.0	500

Note: N/A = Reporting limit information not available.

*Based on the lowest standard that ESE routinely uses.
†Based on the lowest standard that ESE routinely uses times a factor of 100. The solid reporting limits are expressed on a wet weight basis.

Source: ESE.

Table 5-22. Analytes, Precision, and Accuracy Data for Phenols, EPA 604 and SW 3510/3520/3540/3550/8040

Parameter	Aqueous Precision (RPD	Aqueous Accuracy (% Recovery)	Solid Precision (RPD)	Solid Accuracy (% Recovery)
4-Chloro-3-methylphenol[a,1]	30	39-130	50	39-130
2-Chlorophenol[a,1]	30	38-126	50	38-126
2,4-Dichlorophenol[1]	30	44-119	50	44-119
2,4-Dimethylphenol[1]	30	24-118	50	24-118
2,4-Dinitrophenol[1]	30	12-145	50	12-145
2-Methyl-4,6-dinitrophenol[1]	30	30-136	50	30-136
2-Nitrophenol[1]	30	43-117	50	43-117
4-Nitrophenol[1]	30	13-110	50	13-110
Pentachlorophenol[a,1]	30	36-134	50	36-134
Phenol[a,1]	30	23-105	50	23-105
2,4,6-Trichlorophenol[1]	30	53-119	50	53-119

Reference: Accuracy: EPA Method SW 8040--Test Methods for Evaluating Solid Wastes, EPA-SW-846 3rd Edition, September 1986.
Precision: ESE; meets or exceeds the RPD criteria that can be calculated from the spiking and recovery information presented in the method (SW 8040).

[a]Matrix spike and QC check sample compound.
[1]Appendix IX compounds.

Source: ESE.

Table 5-23. Reporting Limit Data for Phenols, EPA 604 and SW 3510/3520/3540/3550/8040

Parameter	Reporting Limits Aqueous* (µg/L)	Solid† (µg/kg)
4-Chloro-3-methylphenol	5.0	500
2-Chlorophenol	5.0	500
2,4-Dichlorophenol	5.0	500
2,4-Dimethylphenol	5.0	500
2,4-Dinitrophenol	20.0	2,000
2-Methyl-4,6-dinitrophenol	5.0	500
2-Nitrophenol	5.0	500
4-Nitrophenol	25.0	2,500
Pentachlorophenol	10.0	1,000
Phenol	5.0	500
2,4,6-Trichlorophenol	6.0	600

*Based on the lowest standard that ESE routinely uses taking into account the sample volume and final extract volume. The lowest standard is chosen to be within the range of 5 to 10 times the background noise of the instrument.

†Based on the lowest standard that ESE routinely uses, taking into account sample weight and final extract volume. The lowest standard is chosen to be within the range of 5 to 10 times the background noise of the instrument. The solid detection limits are expressed on a wet weight basis.

Source: ESE.

Table 5-24. Analytes, Precision, and Accuracy Data for Benzidines, EPA 605

Parameter	Aqueous	
	Precision (RPD)	Accuracy (% Recovery)
Benzidine*	30	31-92
3,3'-Dichlorobenzidine	30	35-93

Reference: Accuracy: EPA Method 605--Test Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater, EPA 600/4-82-057, July 1982.
Precision: ESE: meets or exceeds the RPD criteria that can be calculated from the spiking and recovery information presented in the method (EPA 605).

*Matrix spike and QC check sample compound.

Source: ESE.

Table 5-25. Reporting Limit Data for Benzidines, EPA 605

Parameter	Reporting Limit* Aqueous (µg/L)
Benzidine	1.0
3,3'-Dichlorobenzidine	1.5

*Ten times the method detection limit listed in Table 1 of EPA Method 605.

Source: ESE.

Table 5-26. Analytes, Precision, and Accuracy Data for Phthalate Esters, EPA 606 and SW 35010/3520/3540/3550/8060

Parameter	Aqueous		Solid	
	Precision (RPD	Accuracy (%Recovery)	Precision (RPD)	Accuracy (%Recovery)
bis(2-Ethylhexyl)phthlate	30	0-158	50	0-158
Butyl benzyl phthalate	30	30-136	50	30-136
di-n-Butylphthalate*	30	23-136	50	23-136
Diethylphthalate*	30	0-149	50	0-149
Dimethylpthalate	30	0-156	50	0-156
di-n-Octylphthalate*	30	0-114	50	0-114

Reference: Accuracy: EPA Method SW 8060--Test Methods for Evaluating Solid Wastes, EPA-SW-846 3rd Edition, September 1986.
Precision: ESE: meets or exceeds the RPD criteria that can be calculated from the spiking and recovery information presented in the method (SW 8060).

*Matrix spike and QC check sample compound.

Source: ESE.

Table 5-27. Reporting Limit Data for Phthalate Esters, EPA 606 and SW 3510/3520/3540/3550/3060

Parameter	Reporting Limits Aqueous* (µg/L)	Solid† (µg/kg)
bis(2-Ethylhexyl)phthlate	0.15	25
Butyl benzylphthalate	0.15	25
di-n-Butylphthalate	0.15	25
Diethylphthalate	0.15	25
Dimethylpthalate	0.15	25
di-n-Octylphthalate	0.30	50

*Based on the lowest standard that ESE routinely uses, taking into account the sample volume and final extract volume. The lowest standard is chosen to be within the range of 5 to 10 times the background noise of the instrument.

†Based on the lowest standard that ESE routinely uses, taking into account the sample weight and final extract volume. The lowest standard is chosen to be within the range of 5 to 10 times the background noise of the instrument. the solid reporting limits are expressed on a wet weight basis.

Source: ESE.

Table 5-28. Analytes, Precision, and Accuracy Data for Organochlorine Pesticides and PCBs, EPA 608/617 and SW 3510/3520/3540/3550/3030

Parameter	Aqueous Precision (RPD	Aqueous Accuracy (% Recovery)	Solid Precision (RPD)	Solid Accuracy (% Recovery)
Aldrin[a,f]	45[h]	37-127[h]	40[h]	53-133[h]
BHC.A[a]	30	37-134	50	37-134
BHC.B[a]	30	17-147	50	17-147
BHC.D[a]	30	19-140	50	19-140
BHC.G(lindane)[a,f]	51[i]	43-145[i]	42[i]	45-129[i]
Chlordane[f]	30	45-119	50	45-119
DDD.PP[a,f]	30	31-141	50	31-141
DDE.PP[a,f]	30	30-145	50	30-145
DDT.PP[a,f,g]	53	46-152[i]	59[i]	37-155[h]
Dieldrin[a,f]	43[i]	56-142[i]	47	46-140[i]
Endosulfan.A[a]	30	45-153	50	45-153
Endosulfan.B[a]	30	0-202	50	0-202
Endosulfan sulfate[f]	30	26-144	50	26-144
Endrin[a,f]	60[h]	35-155[i]	37[h]	52-126[h]
Endrin aldehyde[f]	40[i]	58-138[i]	53[i]	56-162[i]
Heptachlor[a,f]	38[i]	48-124[h]	59[h]	30-148[h]
Heptachlor epoxide[f]	30	37-142	50	37-142

Table 5-23. Analytes, Precision, and Accuracy Data for Organochlorine Pesticides and PCBs, EPA 608/617 and SW 3510/3520/3540/3550/8080 (Continued, Page 2 of 3)

Parameter	Aqueous Precision (RPD)	Aqueous Accuracy (% Recovery)	Solid Precision (RPD)	Solid Accuracy (% Recovery)
Methoxychlor[f]	44[f]	78-162[f]	53[f]	61-167[f]
Toxaphene[f]	30	41-126	50	41-126
Isodrin[f,j]	27[f]	74-125[f]	10[b]	97-117[b]
Kepone[f,k]	44[b]	26-114[b]	30[b]	98-158[b]
Metolachlor	25[f]	74-130[f]	24[f]	62-110[f]
Kelthane (Dicofol)	20[f]	47-87[f]	19[f]	40-73[f]
PCB-1016[f,m]	30	50-114	50	50-114
PCB-1221[f]	30	15-178	50	15-178
PCB-1232[f]	30	10-215	50	10-215
PCB-1242[f]	30	39-150	50	39-150
PCB-1248[f]	30	38-158	50	38-158
PCB-1254[f]	30	29-131	50	29-131
PCB-1260[f,n]	30	8-127	50	8-127
Dibutylchlorendate[f]	NA	46-146[b]	NA	32-156[b]
Tetrachloro-m-xylene	NA	60-150	NA	60-150
Decachlorobiphenyl	NA	60-150	NA	60-150

Table 5-28. Analytes, Precision, and Accuracy Data for Organochlorine Pesticides and PCBs, EPA 608/617 and SW 3510/3520/3540/3550/8080 (Continued, Page 3 of 3)

Reference: Accuracy: EPA Method SW 8050 and CLP SOW 7/87 for the controlling analytes.
Precision: ESE and CLP SOW 7/87 for the controlling analytes.

Note: NA = not applicable.

[a]Matrix spike and QC check sample compound. For Los Alamos project CLP SOW 12/90 precision and accuracy acceptance criteria will be used.
[b]Accuracy and precision criteria are based on ESE historical data and method detection limit data.
[c]Surrogate: the surrogate is added to all environmental samples and quality control samples.
[d]PCB 1016 and PCB 1260 are only used as matrix spike and QCC samples compounds when using EPA 608/8080 to evaluate PCBs only.
[e]Accuracy and precision data are from ESE method certification.
[f]Based on validation studies performed by ESE (see Appendices D and E).
[g]Appendix IX compounds.
[h]This compound is not included in EPA's parameter lists for Methods 608, 617, and 8080; however, it can be analyzed by EPA method 8080 and is reported if specifically requested by the client (see Appendices L and M for method validation data).
[i]See Appendices L and M for method validation data of isodrin by EPA Method 8050.

Source: ESE.

Table 5-29. Reporting Limit Data for Organochlorine Pesticides and PCBs, EPA 608 and SW 3510/3520/3540/3550/8080

Parameter	Reporting Limits Aqueous* (µg/L)	Reporting Limits Solid† (µg/kg)
Aldrin	0.006	3
BHC,A	0.006	3
BHC,B	0.006	3
BHC,D	0.006	3
BHC,G(lindane)	0.006	3
Chlordane	0.030	20
DDD,PP	0.006	3
DDE,PP'	0.006	3
DDT,PP'	0.006	3
Dieldrin	0.006	3
Endosulfan,A	0.006	3
Endosulfan,B	0.006	3
Endosulfan sulfate	0.006	3
Endrin	0.006	3
Endrin aldehyde	0.006	3
Heptachlor	0.006	3
Heptachlor epoxide	0.006	3
Methoxychlor	0.006	3
Toxaphene	0.6	300
PCB-1016	0.12	60
Mirex	0.2	100
Trifluralin	0.1	50
PCNB	0.02	1

Table 5-29. Reporting Limit Data for Organochlorine Pesticides and PCBs, EPA 608 and SW 3510/3520/3540/3550/8080
(Continued, Page 2 of 2)

Parameter	Reporting Limits Aqueous* (µg/L)	Solid† (µg/kg)
Isodrin	0.05	8
Kepone	0.10	50
Metolachlor	0.06	10
Kelthane (Dicofol)	0.06	10
PCB-1221	0.12	60
PCB-1232	0.12	60
PCB-1242	0.12	60
PCB-1248	0.12	60
PCB-1254	0.12	60
PCB-1260	0.12	60

*Based on the lowest standard that ESE routinely uses, taking into account the sample volume and final extract volume. The lowest standard is chosen to be within the range of 5 to 10 times the background noise of the instrument.

†Based on the lowest standard that ESE routinely uses, taking into account sample weight and final extract volume. The lowest standard is chosen to be within the range of 5 to 10 times the background noise of the instrument. The solid reporting limits are expressed on a wet weight basis.

Source: ESE.

Table 5-30. Analytes, Precision, and Accuracy Data for Polynuclear Aromatic Hydrocarbons, EPA 610 and SW 3510/3520/3540/3550/8310

Parameter	Aqueous Precision (RPD	Aqueous Accuracy (% Recovery)	Solid Precision (RPD)	Solid Accuracy (% Recovery)
Acenaphthene*,**	30'	49-109'	50	0-124
Acenaphthylene*,**	25'	53-103'	50	0-139
Anthracene*,**	40'	44-124'	50	0-126
Benzo(a)anthracene**	30	12-135	50	12-135
Benzo(a)pyrene*,**	38'	45-121'	62'	27-151'
Benzo(b)fluoranthene**	30	6-150	50	6-150
Benzo(ghi)perylene**	30	0-116	50	0-116
Benzo(k)fluoranthene*,**	41'	41-123'	55'	22-132'
Chrysene**	30	0-199	50	0-199
Dibenzyl(a,h)anthracene**	30	0-110'	50	0-110
Fluoranthene**	30	14-123	50	14-123
Fluorene*,**	35'	40-110'	49'	25-123'
Indeno(1,2,3-cd)pyrene**	30	0-116	50	0-116
Naphthalene*,**	48'	21-117'	50	0-122
Phenanthrene*,**	32'	52-116'	50	0-155
Pyrene**	30	0-140	50	0-140
1-Methylnaphthalene**	37'	23-97'	37'	23-97'

Table 5-30. Analytes, Precision, and Accuracy Data for Polynuclear Aromatic Hydrocarbons, EPA 610 and SW 3510/3520/3540/3550/8310 (Continued, Page 2 of 2)

Parameter	Aqueous		Solid	
	Precision (RPD	Accuracy (%Recovery)	Precision (RPD)	Accuracy (%Recovery)
2-Methylnaphthalene**	37'	23-97'	37'	23-97'
Methylnaphthalene, total	37'	23-97'	75'	10-160'

Reference: Accuracy: EPA Method SW 8310--Test Methods for Evaluating Solid Wastes, EPA-SW-846 3rd Edition, September 1986.
Precision: ESE: meets or exceeds the RPD criteria that can be calculated from the spiking and recovery information presented in the method (SW 8310).

*Matrix spike and QC check sample compound.
'Accuracy and precision criteria are based on ESE historical data.
**Appendix IX compounds.

Source: ESE.

Table 5-31. Reporting Limit Data for Polynuclear Aromatic Hydrocarbons, EPA 610 and SW 3510/3520/3540/3550/8310

Parameter	Reporting Limits Aqueous* (µg/L)	Solid† (µg/kg)
Acenaphthene	2.5	84
Acenaphthylene	1.5	44
Anthracene	0.095	3.5
Benzo(a)anthracene	0.002	0.05
Benzo(a)pyrene	0.004	0.4
Benzo(b)fluoranthene	0.001	0.02
Benzo(ghi)perylene	0.006	0.20
Benzo(k)fluoranthene	0.001	0.01
Chrysene	0.03	0.80
Dibenzo(a,h)anthracene	0.004	0.07
Fluoranthene	0.003	0.08
Fluorene	0.25	10
Indeno(1,2,3-cd)pyrene	0.004	0.15
Naphthalene	0.90	23
Phenanthrene	0.07	4.0
Pyrene	0.03	0.6
1-Methylnaphthalene	1.5	45
2-Methylnaphthalene	1.2	36
Methylnaphthalene, total	3.0	63

Table 5-31. Reporting Limit Data for Polynuclear Aromatic Hydrocarbons, EPA 610 and SW 3510/3520/3540/3550/3310
(Continued, Page 2 of 2)

---

*Based on the lowest standard that ESE routinely uses, taking into account the sample volume and final extract volume. The lowest standard is chosen to be within the range of 5 to 10 times the background noise of the instrument.

†Based on the lowest standard that ESE routinely uses, taking into account sample weight and final extract volume. The solid reporting limits are expressed on a wet weight basis. The lowest standard is chosen to be within the range of 5 to 10 times the background noise of the instrument.

Source: ESE.

Table 5-32. Analytes, Precision, and Accuracy Data for Chlorinated Herbicides, EPA 615 and SW 8150.

Parameter	Aqueous Precision (RPD	Aqueous Accuracy (% Recovery)	Solid Precision (RPD)	Solid Accuracy (% Recovery)
2,4-D*,**	55'	9-119'	48'	35-131'
2,4-DB	30	84-102	50	84-102
2,4,5-T**	30	67-103	50	67-103
2,4,5-TP/Silvex'der.*,**	51'	33-135'	41'	61-143'
Dicamba (banvel)*	47'	21-115'	32'	57-121'
Dalapon	30	42-90	50	42-90
Dichlorprop	30	91-103	50	91-103
Dinoseb**	30	74-100	50	74-100
MCPA	30	86-110	50	86-110
MCPP	30	82-106	50	82-106

Reference: Accuracy: EPA Method SW 8150--Test Methods for Evaluating Solid Wastes, EPA-SW-846 3rd Edition, September 1986.
Precision: ESE; meets or exceeds the RPD criteria that can be calculated from the spiking and recovery information presented in the method (SW 8150).

*Matrix spike and QC check sample compound.
'Accuracy and precision criteria are based on ESE historical data.
**Appendix IX compounds.

Source: ESE.

Table 5-33. Reporting Limit Data for Chlorinated Herbicides, EPA 615 and SW 8150

Parameter	Reporting Limits Aqueous* (µg/L)	Reporting Limits Solid† (µg/kg)
2,4-D	0.03	3
2,4-DB	0.03	3
2,4,5-T	0.03	3
2,4,5-TP/Silvex + der.	0.03	3
Dicamba (banvel)	0.03	3
Dalapon	0.03	3
Dichlorprop	0.03	3
Dinoseb	0.03	3
MCPA	0.60	50
MCPP	0.60	50

*Based on the lowest standard that ESE routinely uses, taking into account the sample volume and final extract volume. The lowest standard is chosen to be within the range of 5 to 10 times the background noise of the instrument.

†Based on the lowest standard that ESE routinely uses, taking into account sample weight and final extract volume. The lowest standard is chosen to be within the range of 5 to 10 times the background noise of the instrument. The solid reporting limits are expressed on a wet weight basis.

Source: ESE.

Table 5-34. Analytes, Precision, and Accuracy Data for Organophosphorous Pesticides, EPA 622/614 and SW 3510/3520/3540/3550/8140

Parameter	Aqueous Precision (RPD	Aqueous Accuracy (% Recovery)	Solid Precision (RPD)	Solid Accuracy (% Recovery)
Bolstar	30	46-84	50	46-84
Chlorpyrifos	30	82-115	50	82-115
Coumaphos	30	71-147	50	71-147
Demeton	30	36-99	50	36-99
Diazinon*	47**	61-155**	294**	75-133**
Dichlorvos	30	49-95	50	49-95
Disulfoton**	30	55-109	50	55-109
Ethoprop	30	88-113	50	88-113
Fenthion	30	9-128	50	9-128
Fensulfothion	30	43-145	50	43-145
Guthion (methylazinphos)*	51**	44-146**	51**	59-161**
Malathion*	35**	64-134**	31**	66-128**
Merphos	30	97-144	50	97-144
Mevinphos	30	33-80	50	33-80
Naled	30	54-102	50	54-102
Ethylparathion***	43**	65-151**	49**	61-159**
Methylparathion**	30	80-112	50	80-112

Table 5-34. Analytes, Precision, and Accuracy Data for Organophosphorous Pesticides, EPA 622/614 and SW 3510/3520/3540/3550/8140 (Continued, Page 2 of 3)

Parameter	Aqueous Precision (RPD	Aqueous Accuracy (% Recovery)	Solid Precision (RPD)	Solid Accuracy (% Recovery)
Phorate**	30	36-89	50	36-89
Ronnel	30	82-116	50	82-116
Stirofos	30	48-84	50	48-84
Tokuthion	30	44-85	50	44-85
Trichloronate	30	49-161	50	49-161
Alachlor***	N/A	N/A	19	112-150
Metribuzin***	N/A	N/A	31	62-124
EPTC*	25	70-120	6	97-109
Butylate*	23	61-107	7	95-114
Pebulate*	22	69-113	11	89-111
Vernolate*	23	69-115	8	94-110
Atrazine*	32	79-143	32	61-125
Terbufos*	16	79-111	15	88-118
Hexazinone*	50	56-150	50	40-140
Famphur**	61	52-174	40	69-149
0,0,0-Triethyl Phosphorothioate**,***,***	44	41-129	14	107-135
Sulfotepp**,***,***	28	50-106	13	99-125

Table 5-34. Analytes, Precision, and Accuracy Data for Organophosphorous Pesticides, EPA 622/614 and SW 3510/3520/3540/3550/8140 (Continued, Page 3 of 3)

Parameter	Aqueous Precision (RPD	Aqueous Accuracy (% Recovery)	Solid Precision (RPD)	Solid Accuracy (% Recovery)
Thionazin['''''''']	22	64-108	13	92-118

Reference: Accuracy: EPA Method SW 8140--Test Methods for Evaluating Solid Wastes, EPA-SW-846 3rd Edition, September 1986.
Precision: ESE: meets or exceeds the RPD criteria that can be calculated from the spiking and recovery information presented in the method (SW 8140).

Note: N/A = spiking and recovery information not available.

[*]Matrix spike and QC check sample compound.
[*]Precision and accuracy criteria are based on validation studies performed by ESE (see Appendices F and G).
[**]Accuracy and precision criteria are based on ESE historical data.
[''']Appendix IX compounds.
[***]Precision and accuracy criteria are based on validation studies performed by ESE (see Appendices J and K).
[''''']This compound is not included in EPA's parameter list for Method 614, 622, and 8140; however, it can be analyzed by EPA Method 8140 and is reported if specifically requested by the client.

Source: ESE.

Table 5-35. Reporting Limit Data for Organophosphorous Pesticides, EPA 614/622 and SW 3510/3520/3540/3550/8140

Parameter	Reporting Limits Aqueous* (µg/L)	Reporting Limits Solid† (µg/kg)
Bolstar	0.3	50
Chlorpyrifos	0.3	50
Coumaphos	3.0	500
Demeton	0.3	50
Diazinon	0.3	50
Dichlorvos	0.3	50
Disulfoton	0.3	50
Ethoprop	0.3	50
Fenthion	0.3	50
Fensulfothion	1.5	250
Guthion (methylazinphos)	3.0	500
Malathion	0.3	50
Merphos	0.3	50
Mevinphos	0.3	50
Naled	1.5	250
Ethylparathion	0.3	50
Methylparathion	0.3	50
Phorate	0.3	50
Ronnel	0.3	50
Stirofos	0.6	100

Table 5-35. Reporting Limit Data for Organophosphorous Pesticides, EPA 614/622 and SW 3510/3520/3540/3550/8140 (Continued, Page 2 of 2)

Parameter	Reporting Limits Aqueous* (µg/L)	Solid† (µg/kg)
Tokuthion	0.3	50
Trichloronate	0.3	50
Alachlor	N/A	100
Metribuzin	N/A	250
EPTC	0.3	50
Butylate	0.3	50
Pebulate	0.3	50
Vernolate	0.3	50
Atrazine	0.6	100
Terbufos	0.3	50
Hexazinone	1.5	250
Famphur	0.5	70
0,0,0-Triethyl Phosphorothioate	0.5	70
Sulfotepp	0.5	70
Thionazin	0.5	70

Note: N/A = reporting limit not available.

*Based on the lowest standard that ESE routinely uses, taking into account the sample volume and final extract volume. The lowest standard is chosen to be within the range of 5 to 10 times the background noise of the instrument.

†Based on the lowest standard that ESE routinely uses, taking into account sample weight and final extract volume. The lowest standard is chosen to be within the range of 5 to 10 times the background noise of the instrument. The solid reporting limits are expressed on a wet weight basis.

Source: ESE.

Table 5-36. Analytes, Precision, and Accuracy Data for Volatile Organic Compounds, EPA 624 and SW 5030/8240/8260

Parameter	Aqueous Precision (RPD	Aqueous Accuracy (%Recovery)	Solid Precision (RPD)	Solid Accuracy (%Recovery)
Acetone[d]	53[e]	56-162[e]	53[e]	52-158[e]
Benzene[a,d]	11	76-127	21	66-142
Bromodichloromethane[d]	20	35-155	30	35-155
Bromoform[d]	20	45-169	30	45-169
Bromomethane[d]	20	0-242	30	0-242
Carbon tetrachloride[d]	20	70-140	30	70-140
Chlorobenzene[a,d]	13	75-130	21	60-133
Chlorobenzene[e]	9	89-107	37	76-150
2-Chloroethylvinyl ether	20	0-305	30	0-305
Chloroform[d]	20	51-138	30	51-138
Chloromethane[d]	20	0-273	30	0-273
Dibromochloromethane[d]	20	53-149	30	53-149
Dichlorobenzene,tot.[d]	20	18-190	30	18-190
1,1-Dichloroethane[d]	20	59-155	30	59-155
1,2-Dichloroethane[d]	20	49-155	30	49-155
1,1-Dichloroethylene[a,d]	14	61-145	22	59-172
trans-1,2-Dichloroethene[d]	20	54-156	30	54-156

Table 5-36. Analytes, Precision, and Accuracy Data for Volatile Organic Compounds, EPA 624 and SW 5030/8240/8260 (Continued, Page 2 of 4)

Parameter	Aqueous Precision (RPD	Aqueous Accuracy (% Recovery)	Solid Precision (RPD)	Solid Accuracy (% Recovery)
1,2-Dichloropropane[d]	20	0-210	30	0-210
cis-1,3-Dichloropropene[d]	20	0-227	30	0-227
trans-1,3-Dichloropropene[d]	20	17-183	30	17-183
Methylene chloride[d]	20	0-221	30	0-221
Methyl ethyl ketone[d] (MEK)	42[e]	61-145[e]	79[e]	12-172[e]
Methyl isobutyl ketone[d] (MIBK)	46[e]	50-146[e]	41[e]	78-160[e]
Styrene[d]	13[e]	91-117[e]	13[e]	89-115[e]
1,1,2,2-Tetrachloroethane[d]	20	46-157	30	46-157
Tetrachloroethene[d]	20	64-143	30	64-143
Toluene[a,d]	13	76-125	21	59-139
1,1,1-Trichloroethane[d]	20	52-162	30	52-162
1,1,2-Trichloroethane[d]	20	52-150	30	52-150
Trichloroethene[a,d]	14	71-120	24	62-137
Trichlorofluoromethane[d]	20	17-181	30	17-181
Vinyl chloride[d]	20	0-251	30	0-251
Xylene, total[d]	26[e]	83-135[e]	46[e]	52-144[e]
Toluene-D8[e]	NA	83-110	NA	81-117

Table 5-36. Analytes, Precision, and Accuracy Data for Volatile Organic Compounds, EPA 624 and SW 5030/8240/8260 (Continued, Page 3 of 4)

Parameter	Aqueous Precision (RPD	Aqueous Accuracy (% Recovery)	Solid Precision (RPD)	Solid Accuracy (% Recovery)
4-Bromofluorobenzene[f]	NA	86-115	NA	74-121
1,2-Dichloroethane-D4[f]	NA	76-114	NA	70-121
Dibromofluoromethane[f]	NA	86-118	NA	80-120
Acetonitrile[a,f]	48[e]	120-216[e]	49[e]	91-188[e]
Acrolein[d]	21[e]	75-117[e]	55[e]	6-116[e]
Acrylonitrile[d]	52[e]	25-129[e]	10[e]	72-92[e]
Carbon Disulfide[d]	14[e]	81-109[e]	47[e]	97-191[e]
Chloroprene[a,f]	8[e]	93-109[e]	8[e]	89-105[e]
3-Chloropropene[a,f]	8[e]	87-103[e]	21[e]	116-158[e]
Dichlorodifluoromethane[d]	32[e]	67-131[e]	50[e]	37-137[e]
trans-1,4-Dichloro-2-butene[a,f]	20[e]	69-109[e]	63[e]	0-121[e]
1,4-Dioxane[a,f]	8[e]	95-111[e]	31[e]	83-145[e]
Ethyl Methacrylate[d]	12[e]	112-136[e]	19[e]	100-138[e]
2-Hexanone[d]	41[e]	100-182[e]	98[e]	45-241[e]
Iodomethane[d]	15[e]	84-114[e]	53[e]	61-167[e]
Isobutanol[a,f]	31[e]	71-133[e]	37[e]	74-148[e]
Methacrylonitrile[a,f]	19[e]	52-90[e]	11[e]	87-109[e]

Table 5-36. Analytes, Precision, and Accuracy Data for Volatile Organic Compounds, EPA 624 and SW 5030/8240/8260 (Continued, Page 4 of 4)

Parameter	Aqueous Precision (RPD	Aqueous Accuracy (% Recovery)	Solid Precision (RPD)	Solid Accuracy (% Recovery)
Methyl Methacrylate[d,f]	16[e]	66-95[e]	33[e]	56-122[e]
Pentachloroethane[d,f]	36[e]	48-120[e]	59[e]	20-138[e]
Propionitrile[d,f]	53[e]	114-220[e]	60[e]	25-145[e]
1,1,1,2-Tetrachloroethane[d,f]	6[e]	88-100[e]	23[e]	75-121[e]
1,2,3-Trichloropropane[d]	8[e]	121-137[e]	27[e]	89-143[e]
Vinyl Acetate[d]	37[e]	57-131[e]	33[e]	46-110[e]

Reference: Accuracy: EPA Method SW 8240--Test Methods for Evaluating Solid Wastes, EPA-SW-846 3rd Edition, September 1986 and CLP SOW 7/87 for the controlling analytes.
Precision: ESE (meets or exceeds the RPD criteria that can be calculated from the spiking and recovery information presented in the method (SW 8240) and CLP SOW 7/87 for controlling analytes.

Note: NA = not applicable.

[a]Matrix spike and QC check sample compound.
[b]Surrogate; the surrogate is added to all environmental samples and quality control samples.
[c]Accuracy and precision data are from ESE method certification.
[d]Appendix IX compounds.
[e]Accuracy and precision data are from ESE method detection limit study.
[f]This compound is not included in EPA's lists of compounds (EPA 624, 8240, and 8260) methods; however, it can be analyzed by this method and is reported if specifically requested by the client (see Appendix N for method validation data).
[g]This surrogate will be used only for Los Alamos project.
Source: ESE.

Table 5-37. Reporting Limit Data for Volatile Organic Compounds, EPA 624 and SW 5030/8240/8260

Parameter	Reporting Limits Aqueous* (µg/L)	Reporting Limits Solid** (µg/kg)
Acetone	9.0	5500'
Benzene	2.2	220'
Bromodichloromethane	2.2	110'
Bromoform	2.6	235'
Bromomethane	3.5	290'
Carbon tetrachloride	2.6	220
Chlorobenzene	1.4	300'
Chloroethane	8.2	410
2-Chloroethylvinyl ether	3.1	500'
Chloroform	2.5	110
Chloromethane	4.4	310
Dibromochloromethane	2.3	155'
Dichlorobenzene, total	4.0	350'
1,1-Dichloroethane	2.5	235'
1,2-Dichloroethane	2.5	170
1,1-Dichloroethylene	3.2	200
trans-1,2-Dichloroethene	2.4	120
1,2-Dichloropropane	2.0	300'
cis-1,3-Dichloropropene	2.0	250'
trans-1,3-Dichloropropene	1.6	320'
Ethylbenzene	1.3	360'

Table 5-37. Reporting Limit Data for Volatile Organic Compounds, EPA 624 and SW 5030/8240/8260 (Continued, Page 2 of 3)

Parameter	Reporting Limits Aqueous* (µg/L)	Reporting Limits Solid** (µg/kg)
Methylene chloride	6.4	1000'
Methyl ethyl ketone	10	2400'
Methyl isobutyl ketone	12	600'
Styrene	0.5	355'
1,1,2,2-Tetrachloroethane	1.5	205'
Tetrachloroethene	1.9	205'
Toluene	1.7	300'
1,1,1-Trichloroethane	2.5	190'
1,1,2-Trichloroethane	2.8	250'
Trichloroethene	3.0	120
Trichlorofluoromethane	4.6	300
Vinyl chloride	4.6	360
Xylene, total	3.72	770
Acetonitrile	200	50
Acrolein	100	100
Acrylonitrile	100 '	100'
Carbon Disulfide	5 '	5'
Chloroprene	10'	10 '
3-Chloropropene	50'	50'
Dichlorodifluoromethane	100'	200'
trans-1,4-Dichloro-2-butene	50'	5'
1,4-Dioxane	200'	200'

Table 5-37. Reporting Limit Data for Volatile Organic Compounds, EPA 624 and SW 5030/8240/8260 (Continued, Page 3 of 3)

Parameter	Reporting Limits Aqueous* (µg/L)	Reporting Limits Solid** (µg/kg)
Ethyl Methacrylate	5[1]	5[1]
2-Hexanone	10[1]	10[1]
Iodomethane	5[1]	5[1]
Isobutanol	1000[1]	1000[1]
Methacrylonitrile	5[1]	5[1]
Methyl Methacrylate	5[1]	5[1]
Pentachloroethane	5[1]	5[1]
Propionitrile	5[1]	5[1]
1,1,1,2-Tetrachloroethane	5[1]	5[1]
1,2,3-Trichloropropane	5[1]	5[1]
Vinyl Acetate	10[1]	10[1]

*Based on ESE's MDL studies conducted according to 40 CFR 136 Appendix B protocols, except for total dichlorobenzene, methyl ethyl ketone, and methyl isobutyl ketone. These compounds are difficult to analyze and do not respond well, therefore, the reporting limits have been adjusted to a concentration that is detected more reliably.

[1]Based on ESE's MDL studies but the reporting limits have been adjusted to a concentration that is detected more reliably.

**Based on ESE's MDL studies conducted according to 40 CFR 136 Appendix B protocols.

Source: ESE.

Table 5-38. Analytes, Precision, and Accuracy Data for Semivolatile Organic Compounds, EPA 625 and SW 3510/3520/3540/3550/8270

Parameter	Aqueous Precision (RPD	Aqueous Accuracy (% Recovery)	Solid Precision (RPD)	Solid Accuracy (% Recovery)
Acenaphthene[1,f]	31	46-118	19	31-137
Acenaphthylene[f]	30	33-146	50	33-146
Anthracene[f]	30	27-133	50	27-133
Benzidine	27[1]	4-58[1]	27[1]	4-58[1]
Benzo(a)anthracene[f]	30	33-143	30	33-143
Benzo(b)fluoranthene[f]	30	24-159	50	24-159
Benzo(k)fluoranthene[f]	30	11-162	50	11-162
Benzo(a)pyrene[f]	30	17-163	50	17-163
Benzo(ghi)perylene[f]	30	0-219	50	0-219
Benzyl alcohol[f]	14	65-93	43	17-103
Butylbenzylphthalate[f]	30	0-152	50	0-152
bis(2-Chloroethyl)ether[f]	30	12-158	50	12-158
bis(2-Chloroethoxy)-methane[f]	30	33-184	50	33-184
bis(2-Ethylhexyl)-phthalate[f]	30	8-158	50	8-158
bis(2-Chloroisopropyl)-ether[f]	30	36-166	50	36-166

Table 5-38. Analytes, Precision, and Accuracy Data for Semivolatile Organic Compounds, EPA 625 and SW 3510/3520/3540/3550/8270 (Continued, Page 2 of 9)

Parameter	Aqueous Precision (RPD	Aqueous Accuracy (% Recovery)	Solid Precision (RPD)	Solid Accuracy (% Recovery)
4-Bromophenylphenyl-ether[f]	30	53-127	50	53-127
Chloronaphthalene[f]	30	60-118	50	60-118
2-Chlorophenol[a,f]	40	27-123	50	25-102
4-Chloro-3-methylphenol[a,f]	42	23-97	33	26-103
4-Chlorophenylphenylether[f]	30	25-158	50	25-158
Chrysene[f]	30	17-168	50	17-168
Dibenzo(a,h)anthracene[f]	30	0-227	50	0-227
di-n-Butylphthalate[f]	30	1-118	50	1-118
1,3-Dichlorobenzene[f]	30	0-172	50	0-172
1,2-Dichlorobenzene[f]	30	32-129	50	32-129
1,4-Dichlorobenzene[a,f]	28	36-97	27	28-104
3,3'-Dichlorobenzidine[f]	30	0-262	50	0-262
2,4-Dichlorophenol[f]	30	39-135	50	39-135
Diethylphthalate[f]	30	0-114	50	0-114
2,4-Dimethylphenol[f]	30	32-119	50	32-119
Dimethylpthalate[f]	30	0-112	50	0-112

Table 5-38. Analytes, Precision, and Accuracy Data for Semivolatile Organic Compounds, EPA 625 and SW 3510/3520/3540/3550/8270 (Continued, Page 3 of 9)

Parameter	Aqueous Precision (RPD	Aqueous Accuracy (% Recovery)	Solid Precision (RPD)	Solid Accuracy (% Recovery)
2,4-Dinitrophenol[f]	30	0-191	50	0-191
2,4-Dinitrotoluene[a,f]	38	24-96	47	28-89
2,6-Dinitrotoluene[f]	30	50-158	50	50-158
di-n-Octylphthalate[f]	30	4-146	50	4-146
Fluoranthene[f]	30	26-137	50	26-137
Fluorene[f]	30	59-121	50	59-121
Hexachlorobenzene[f]	30	0-152	50	0-152
Hexachlorobutadiene[f]	30	24-116	50	24-116
Hexachlorocyclopentadiene[f]	36[e]	9-51[e]	18[e]	33-69[e]
Hexachloroethane[f]	30	40-113	50	40-113
Indeno(1,2,3-cd)pyrene[f]	30	0-171	50	0-171
Isophorone[f]	30	21-196	50	21-196
2-Methyl-4,6-dinitrophenol[f]	30	0-181	50	0-181
Naphthalene[f]	30	21-133	50	21-133
Nitrobenzene[f]	30	30-180	50	35-180
2-Nitrophenol[f]	30	29-182	50	29-182

Table 5-38. Analytes, Precision, and Accuracy Data for Semivolatile Organic Compounds, EPA 625 and SW 3510/3520/3540/3550/8270 (Continued, Page 4 of 9)

Parameter	Aqueous Precision (RPD	Aqueous Accuracy (% Recovery)	Solid Precision (RPD)	Solid Accuracy (% Recovery)
4-Nitrophenol[a,d]	50	10-80	50	11-114
n-Nitrosodimethylamine[f]	16[e]	55-87[e]	16[e]	55-87[e]
n-Nitrosodi-n-propylamine[a,f]	38	41-116	38	41-126
n-Nitrosodiphenylamine[f]	30	85-115	50	85-115
Pentachlorophenol[a,d]	50	9-103	47	17-109
Phenanthrene[f]	30	54-120	50	54-120
Phenol[a,d]	42	12-89	35	26-90
Pyrene[a,f]	31	26-127	36	35-142
1,2,4-Trichlorobenzene[a,f]	28	39-98	23	38-107
2,4,6-Trichlorophenol[f]	30	37-144	50	37-144
2,3,7,8-TCDD	N/A	N/A	N/A	N/A
Acetophenone[f]	8[e]	73-89[e]	12[e]	70-94[e]
2-Acetylaminofluorene[a,e]	10[e]	23-43[e]	11[e]	15-37[e]
4-Aminobiphenyl[f]	14[e]	44-72[e]	48[e]	5-101[e]
Aniline[f]	34[e]	51-119[e]	74[e]	6-154[e]

Table 5-38. Analytes, Precision, and Accuracy Data for Semivolatile Organic Compounds, EPA 625 and SW 3510/3520/3540/3550/8270 (Continued, Page 5 of 9)

Parameter	Aqueous Precision (RPD	Aqueous Accuracy (% Recovery)	Solid Precision (RPD)	Solid Accuracy (% Recovery)
Aramite[f,g]	11[e]	14-36[e]	16[e]	10-42[e]
1,4-Benzenediamine[f,g]	24[e]	51-99[e]	N/A	N/A[e]
p-Benzoquinone[f,g]	29[e]	19-77[e]	49[e]	64-162[e]
4-Chloroaniline[f]	20[e]	48-87[e]	89[e]	0-149[e]
Chlorobenzilate[f,g]	12[e]	66-90[e]	14[e]	63-91[e]
1-Chloronaphthalene[f]	8[e]	70-86[e]	12[e]	75-99[e]
Dibenz(a,j)acridine[f]	19[e]	69-107[e]	40[e]	0-58[e]
Diallate[f,g]	8[e]	41-57[e]	8[e]	43-59[e]
Dibenzofuran[f]	14[e]	71-99[e]	42[e]	40-124[e]
2,6-Dichlorophenol[f]	10[e]	69-89[e]	14[e]	62-90[e]
Dimethoate[f,g]	22[e]	43-92[e]	13[e]	59-85[e]
p-(Dimethylamino)azobenzene[f]	8[e]	57-73[e]	15[e]	46-76[e]
7,12-Dimethylbenz(a)anthracene[f]	12[e]	43-67[e]	11[e]	12-34[e]
3,3-Dimethylbenzidine[f,g]	24[e]	11-59[e]	15[e]	3-33[e]
m-Dinitrobenzene[f,g]	8[e]	32-45[e]	15[e]	38-68[e]

Table 5-38. Analytes, Precision, and Accuracy Data for Semivolatile Organic Compounds, EPA 625 and SW 3510/3520/3540/3550/8270 (Continued, Page 6 of 9)

Parameter	Aqueous Precision (RPD	Aqueous Accuracy (% Recovery)	Solid Precision (RPD)	Solid Accuracy (% Recovery)
Diphenylamine[f]	7[e]	68-82[e]	14[e]	56-85[e]
Diphenylhydrazine[f]	8[e]	67-83[e]	16[e]	65-97[e]
Ethylmethanesulfonate[f]	7[e]	72-86[e]	16[e]	64-96[e]
a,a-Dimethylphenylamine[f]	93[e]	0-149[e]	N/A	N/A
Hexachlorophene[f,g]	N/A	N/A	N/A	N/A
Hexachloropropene[f,g]	17[e]	45-79[e]	14[e]	54-82[e]
Isosafrole[f,g]	12[e]	64-88[e]	23[e]	50-106[e]
Methapyrilene[f,g]	66[e]	15-147[e]	N/A	N/A
3-Methylcholanthrene[f]	14[e]	41-69[e]	42[e]	9-93[e]
Methylmethanesulfonate[f,g]	36[e]	35-107[e]	24[e]	52-100[e]
2-Methylnaphthalene[f]	17[e]	55-89[e]	25[e]	49-105[e]
2-Methylphenol(o-Cresol)[f]	20[e]	58-98[e]	43[e]	17-103[e]
3-Methylphenol(m-Cresol)[f,g]	8[e]	64-80[e]	10[e]	59-79[e]
4-Methylphenol(p-Cresol)[f]	15[e]	72-102[e]	36[e]	28-100[e]
1-Naphthylamine[f]	23[e]	26-72[e]	7[e]	6-20[e]
2-Naphthylamine[f]	13[e]	35-61[e]	15[e]	22-52[e]

Table 5-3S. Analytes, Precision, and Accuracy Data for Semivolatile Organic Compounds, EPA 625 and SW 3510/3520/3540/3550/8270 (Continued, Page 7 of 9)

Parameter	Aqueous Precision (RPD	Aqueous Accuracy (% Recovery)	Solid Precision (RPD)	Solid Accuracy (% Recovery)
2-Nitroaniline[f]	13[e]	45-71[e]	18[e]	48-84[e]
3-Nitroaniline[f]	25[e]	28-78[e]	22[e]	40-84[e]
4-Nitroaniline[f]	33[e]	63-91[e]	45[e]	75-165[e]
N-Nitrosodiethylamine[f,g]	13[e]	63-91[e]	14[e]	67-95[e]
N-Nitroso-di-n-butylamine[f]	20[e]	66-106[e]	17[e]	71-105[e]
N-Nitrosomethyl-ethylamine[f,g]	79[e]	13-171[e]	23[e]	29-75[e]
N-Nitrosomorpholine[f,g]	18[e]	54-90[e]	22[e]	49-93[e]
N-Nitrosopiperidine[f]	15[e]	64-94[e]	17[e]	57-91[e]
Nitroquinoline-1-oxide[f,g]	57[e]	0-113[e]	53[e]	11-117[e]
Nitrosopyrrolidine[f,g]	25[e]	52-102[e]	16[e]	53-85[e]
1,4-Naphthoquinone[f,g]	5[e]	44-54[e]	16[e]	45-77[e]
5-Nitro-o-toluidine[f,g]	23[e]	25-71[e]	10[e]	41-61[e]
Pentachlorobenzene[f]	7[e]	70-84[e]	10[e]	77-97[e]
Pentachloronitrobenzene[f]	44[e]	0-81[e]	36[e]	15-87[e]
Phenacetin[f]	10[e]	65-85[e]	16[e]	56-88[e]

Table 5-38. Analytes, Precision, and Accuracy Data for Semivolatile Organic Compounds, EPA 625 and SW 3510/3520/3540/3550/8270 (Continued, Page 8 of 9)

Parameter	Aqueous Precision (RPD	Aqueous Accuracy (% Recovery)	Solid Precision (RPD)	Solid Accuracy (% Recovery)
2-Picoline[f]	53[e]	0-98[e]	44[e]	0-70[e]
Pronamide[f]	15[e]	51-81[e]	13[e]	57-83[e]
Pyridine[f,g]	79[e]	5-163[e]	40[e]	0-45[e]
Resorcinol[f,g]	15[e]	11-41[e]	55[e]	17-127[e]
1,2,4,5-Tetrachloro-benzene[f]	13[e]	61-87[e]	10[e]	77-97[e]
2,3,4,6-Tetrachlorophenol[f]	16[e]	48-80[e]	12[e]	48-72[e]
2,4,5-Trichlorophenol[f]	17[e]	58-92[e]	44[e]	11-99[e]
1,3,5-Trinitrobenzene[f,g]	18[e]	39-75[e]	38[e]	0-75[e]
o-Toluidine[f,g]	8[e]	71-87[e]	13[e]	60-86[e]
Safrole[f,g]	25[e]	50-100[e]	23[e]	58-104[e]
Nitrobenzene-D5[h]	NA	35-114	NA	23-120[e]
2-Fluorobiphenyl[h]	NA	43-116	NA	30-115[e]
p-Terphenyl-D4[h]	NA	33-141	NA	18-137
Phenol-D6[h]	NA	10-94	NA	24-113
2-Fluorophenol[h]	NA	21-100	NA	25-121
2,4,6-Tribromophenol[h]	NA	10-123	NA	19-122

Table 5-38. Analytes, Precision, and Accuracy Data for Semivolatile Organic Compounds, EPA 625 and SW 3510/3520/3540/3550/8270 (Continued, Page 9 of 9)

Reference: Accuracy: EPA Method SW 8270--Test Methods for Evaluating Solid Wastes, EPA-SW-846 3rd Edition, September 1986 and CLP SOW 7/87 for the controlling analytes. Precision: ESE (meets or exceeds the RPD criteria that can be calculated from the spiking and recovery information presented in the method (SW 8270) and CLP SOW7/87 for controlling analytes.

Note: N/A = spiking and recovery information is not available.
NA = not applicable.

[a]Matrix spike and QC check sample compound.
[b]Surrogate: the surrogate is added to all environmental samples and quality control samples.
[c]Accuracy and precision criteria taken from Methods for the Determination of Organic Compounds in Drinking Water, EPA/600/4-88/039, December, 1988.
[d]Accuracy and precision data are from ESE method certification.
[e]Accuracy and precision data are from ESE method detection limit study.
[f]Appendix IX compounds.
[g]This compound is not included in EPA's list of compounds (EPA 625, 8270) for these methods; however, it can be analyzed by this method and is reported if specifically requested by the client (see Appendix O for method validation data).

Source: ESE.

Table 5-39. Reporting Limit Data for Semivolatile Organic Compounds, EPA 625 and SW 3510/3520/3540/3550/3270

Parameter	Reporting Limits Aqueous* (µg/L)	Reporting Limits Solid* (µg/kg)
Acenaphthene	1.0	70
Acenaphthylene	1.0	70
Anthracene	1.0	70
Benzidine	5.0	2,000
Benzo(a)anthracene	1.0	100
Benzo(b)fluoranthene	1.5	100
Benzo(k)fluoranthene	1.5	100
Benzo(a)pyrene	2.0	140
Benzo(ghi)perylene	2.5	160
Benzyl alcohol	2.0	140
Butylbenzylphthalate	1.5	100
bis(2-Chloroethyl)ether	1.5	70
bis(2-Chloroethoxy)methane	1.0	70
bis(2-Ethylhexyl)phthalate	2.0	100
bis(2-Chloroisopropyl)ether	1.0	70
4-Bromophenylphenylether	1.0	140
2-Chloronaphthalene	1.0	70
2-Chlorophenol	2.0	140
4-Chloro-3-methylphenol	1.5	140
4-Chlorophenylphenylether	1.0	100
Chrysene	2.5	100
Dibenzo(a,h)anthracene	2.5	160

Table 5-39. Reporting Limit Data for Semivolatile Organic Compounds, EPA 625 and SW 3510/3520/3540/3550/8270
(Continued, Page 2 of 7)

Parameter	Reporting Limits Aqueous* (µg/L)	Reporting Limits Solid* (µg/kg)
Dioxin (scan)	1.0	70
di-n-Butylphthalate	1.0	70
1,3-Dichlorobenzene	1.0	70
1,2-Dichlorobenzene	1.0	70
1,4-Dichlorobenzene	1.0	70
3,3'-Dichlorobenzidine	5.0	500
2,4-Dichlorophenol	2.0	140
Diethylphthalate	1.0	70
2,4-Dimethylphenol	2.0	500
Dimethylpthalate	2.0	70
2,4-Dinitrophenol	30.0	1,300
2,4-Dinitrotoluene	2.0	140
2,6-Dinitrotoluene	2.0	140
di-n-Octylphthalate	2.4	140
Fluoranthene	1.0	70
Fluorene	1.0	70
Hexachlorobenzene	2.0	100
Hexachlorobutadiene	2.0	140
Hexachlorocyclopentadiene	2.0	1000
Hexachloroethane	1.5	100
Indeno(1,2,3-cd)pyrene	2.5	160

Table 5-39. Reporting Limit Data for Semivolatile Organic Compounds, EPA 625 and SW 3510/3520/3540/3550/3270
(Continued, Page 3 of 7)

Parameter	Reporting Limits Aqueous* (µg/L)	Reporting Limits Solid* (µg/kg)
Isophorone	1.0	160
2-Methyl-4,6-dinitrophenol	20.0	1,000
Naphthalene	1.0	70
Nitrobenzene	1.0	70
2-Nitrophenol	2.0	140
4-Nitrophenol	10.0	500
n-Nitrosodimethylamine	1.0	100
n-Nitrosodi-n-propylamine	1.0	100
n-Nitrosodiphenylamine	1.0	70
Pentachlorophenol	10.0	500
Phenanthrene	1.0	70
Phenol	2.0	140
Pyrene	1.0	70
1,2,4-Trichlorobenzene	1.0	100
2,4,6-Trichlorophenol	4.5	300
2-Methylnaphthalene	1.0	100
2,3,7,8-TCDD	1.0	70

Table 5-39. Reporting Limit Data for Semivolatile Organic Compounds, EPA 625 and SW 3510/3520/3540/3550/3270
(Continued, Page 4 of 7)

Parameter	Reporting Limits Aqueous* (µg/L)	Reporting Limits Solid* (µg/kg)
Acetophenone	1.0	70
2-Acetylaminofluorene	1.5	140
4-Aminobiphenyl	1.0	70
Aniline	2.0	300
Aramite	2.0	140
1,4-Benzenediamine	30.0	ND
p-Benzoquinone	1.0	70
4-Chloroaniline	2.0	300
Chlorobenzilate	1.0	70
1-Chloronaphthalene	1.0	70
Dibenz(a,j)acridine	1.0	1200
Diallate	1.0	70
Dibenzofuran	1.0	120
2,6-Dichlorophenol	1.0	70
Dimethoate	1.0	70
p-Dimethylaminoazobenzene	1.0	70

Table 5-39. Reporting Limit Data for Semivolatile Organic Compounds, EPA 625 and SW 3510/3520/3540/3550/8270
(Continued, Page 5 of 7)

Parameter	Reporting Limits Aqueous* (µg/L)	Reporting Limits Solid* (µg/kg)
7,12-Dimethylbenz(a)anthracene	1.0	140
3,3-Dimethylbenzidine	1.5	450
m-Dinitrobenzene	1.5	200
Diphenylamine	1.0	70
Diphenylhydrazine	1.0	70
Ethylmethanesulfonate	1.0	70
α,α-Dimethylphenethylamine	11.0	ND
Hexachlorophene	ND	ND
Hexachloropropene	4.0	140
Isosafrole	1.0	70
Methapyrilene	55.0	ND
3-Methylcholanthrene	1.0	100
Methylmethanesulfonate	1.0	70
2-Methylnaphthalene	1.0	100
2-Methylphenol (o-Cresol)	2.0	140
3-Methylphenol (m-Cresol)	1.0	70
4-Methylphenol (p-Cresol)	2.0	140

Table 5-39. Reporting Limit Data for Semivolatile Organic Compounds, EPA 625 and SW 3510/3520/3540/3550/8270
(Continued, Page 6 of 7)

Parameter	Reporting Limits Aqueous* (µg/L)	Reporting Limits Solid* (µg/kg)
1-Naphthylamine	1.0	330
2-Naphthylamine	1.0	70
2-Nitroaniline	2.0	300
3-Nitroaniline	2.0	300
4-Nitroaniline	2.0	400
N-Nitrosodiethylamine	1.0	70
N-Nitrosomethylethylamine	2.0	70
N-Nitroso-di-n-butylamine	1.0	70
N-Nitrosomorpholine	1.0	70
N-Nitrosopiperidine	1.0	70
4-Nitroquinoline-1-oxide	26.0	1,600
Nitrosopyrrolidine	1.0	70
1,4-Naphthoquinone	1.0	70
5-Nitro-o-toluidine	1.0	70
Pentachlorobenzene	1.0	70
Pentachloronitrobenzene	2.0	100

Table 5-39. Reporting Limit Data for Semivolatile Organic Compounds, EPA 625 and SW 3510/3520/3540/3550/8270
(Continued, Page 7 of 7)

Parameter	Reporting Limits Aqueous* (µg/L)	Reporting Limits Solid* (µg/kg)
Phenacetin	1.0	70
2-Picoline	2.0	330
Pronamide	1.0	70
Pyridine	10.0	300
Resorcinol	10.0	420
1,2,4,5-Tetrachlorobenzene	1.0	70
2,4,5-Trichlorophenol	3.0	300
2,3,4,6-Tetrachlorophenol	1.0	70
1,3,5-Trinitrobenzene	2.0	330
o-Toluidine	1.0	70
Safrole	1.0	70

Note: ND = not detected.

*Based on ESE's MDL studies; however, the reporting limits of compounds that are difficult to analyze; were adjusted to a concentration that is detected more reliably. The MDL studies were conducted according to the 40 CFR 136 Appendix B protocols.

Source: ESE.

Table 5-40. Analytes, Precision, and Accuracy Data for Carbamates and Urea Pesticides, EPA 632 and Modified 632*

Parameter	Aqueous Precision (RPD	Aqueous Accuracy (% Recovery)	Solid Precision (RPD)	Solid Accuracy (% Recovery)
Aldicarb	NA	NA	5	92-102
Aldicarb sulfone	NA	NA	4	64-72
Aldicarb sulfoxide	NA	NA	4	13-22
Carbaryl (sevin)'	55''	34-144''	43''	35-124''
Carbofuran'	37''	53-127''	34''	43-111''
Diuron'	29''	60-118''	19''	58-96''
Linuron'	26''	66-118''	37''	42-116''
Methiocarb	35	87-103	29	71-129
Methomyl	35	67-82	4	66-74
Monuron	35	92-102	23	82-128
Oxamyl	35	62-112	5	55-65
Fluorometron'	35	64-143	35	64-134
Propoxur	22	65-109	22	65-109
Barban'	12	86-110	12	86-110
Chloropham	12	83-107	12	83-107
Neburon	20	76-116	20	76-116
Propham'	18	70-106	18	70-106

Reference:' Accuracy: EPA Method 632--Test Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater, EPA, January 1982.
Precision: ESE, meets or exceeds the RPD criteria that was calculated from the spiking and recovery information presented in the method (EPA 632).

Note: NA = method is not applicable.

* See Appendix A for Modified Method 632.
' Matrix spike and QC check sample compound.
'' Based on the data validation study.
'' Accuracy and precision criteria are based on ESE historical data.

Source: ESE.

Table 5-41. Reporting Limit Data for Carbamates and Urea Pesticides, EPA 632 and Modified 632

Parameter	Reporting Limits Aqueous* (µg/L)	Solid** (µg/kg)
Aldicarb	NA	250
Aldicarb sulfone	NA	250
Aldicarb sulfoxide	NA	250
Carbaryl (sevin)	1.5	550
Carbofuran	2.5	1,000
Diuron	0.6	260
Linuron	0.65	270
Methiocarb	5.0	2,000
Methomyl	3.0	1,500
Monuron	0.65	260
Oxamyl	1.5	510
Fluorometron	0.5	200
Propoxur	4.0	1,700
Barban	2.0	940
Chlorpropham	1.5	700
Neburon	0.5	47
Propham	2.5	1,100

*Based on the lowest standard that ESE routinely uses, taking into account the sample volume and final extract volume. The lowest standard is chosen to be within the range of 5 to 10 times the background noise of the instrument.

**Based on the lowest standard that ESE routinely uses, taking into account the sample weight and final extract volume. The lowest standard is chosen to be within the range of 5 to 10 times the background noise of the instrument. The solid reporting limits are expressed on a weight basis.

Source: ESE.

Table 5-42. Analytes, Precision, and Accuracy Data for Chlorinated Hydrocarbons, EPA 612 and SW 3510/3520/3540/3550/8120

	Aqueous		Solid	
	Precision (RPD)	Accuracy (% Recovery)	Precision (RPD)	Accuracy (% Recovery)
2-Chloronaphthalene	30	9-148	50	9-148
1,2-Dichlorobenzene*	30	9-160	50	9-160
1,3-Dichlorobenzene	30	0-150	50	0-150
1,4-Dichlorobenzene	30	13-157	50	13-157
Hexachlorobenzene*	30	15-159	50	15-159
Hexachlorobutadiene*	30	0-139	50	0-139
Hexachlorocyclopentadiene	30	0-111	50	0-111
Hexachloroethane*	30	8-139	50	8-139
1,2,4-Trichlorobenzene*	30	5-149	50	5-149

Reference: Accuracy: EPA Method SW8120--Test Methods for Evaluating Solid Wastes, EPA-SW-846 3rd Edition, September 1986.
Precision: ESE, meets or exceeds the RPD criteria that can be calculated from the spiking and recovery information presnted in the method SW 8120.

*Matrix spike and QC check sample compound.

Source: ESE.

Table 5-43. Reporting Limit Data for Chlorinated Hydrocarbons, EPA 612 and SW 3510/3520/3540/3550/8120

Parameter	Reporting Limits Aqueous* (µg/L)	Reporting Limits Solid† (µg/kg)
2-Chloronaphthalene	0.200	40.0
1,2-Dichlorobenzene	0.100	20.0
1,3-Dichlorobenzene	0.100	20.0
1,4-Dichlorobenzene	0.100	20.0
Hexachlorobenzene	0.012	2.00
Hexachlorobutadiene	0.012	2.10
Hexachlorocyclopentadiene	0.012	2.40
Hexachlorethane	0.012	2.40
1,2,4-Trichlorobenzene	0.15	2.60

*Based on the lowest standard that ESE routinely uses, taking into account the sample volume and final extract volume. The lowest standard is chosen to be within the range of 5 to 10 times the background noise of the instrument.

†Based on the lowest standard that ESE routinely uses, taking into account the sample weight and final extract volume. The lowest standard is chosen to be within the range of 5 to 10 times the background noise of the instrument. The solid reporting limits are expressed on a wet weight basis.

Source: ESE.

Table 5-44. Analytes, Precision, and Accuracy Data for Triazines, EPA 619

Parameter	Aqueous Precision (RPD)	Aqueous Accuracy (% Recovery)
Ametryne*	30	74-134
Atrazine	30	78-138
Prometon*	17	50-84
Prometryne	51	59-161
Propazine	24	92-140
Simatryn	36	147-200
Simazine*	24	75-123
Terbutylazine	45	69-159
Terbutryn	36	47-119

Reference: Accuracy and Precision: EPA Method 619 -- Test Method for Organic Chemical Analysis of Municipal and Industrial Wastewater, EPA 600/4-82-057, July 1982.

*Matrix spike and QC check sample compound.

Source: ESE.

Table 5-45. Reporting Limit Data for Triazines, EPA 619

Parameter	Reporting Limits Aqueous* (µg/L)
Ametryn	0.3
Atrazine	0.3
Prometon	1.2
Prometryne	0.6**
Propazine	0.3**
Simatryn	0.7**
Simazine	0.6**
Terbuthylazine	0.3**
Terbutryn	0.6**

*Based on the lowest standard that ESE routinely uses, taking into account the sample volume and final extract volume. The lowest standard is chosen to be within the range of 5 to 10 times the background noise of the instrument.
**Ten times the detection limits specified in the Method EPA 619.

Source: ESE.

Table 5-46. Analytes, Precision, and Accuracy Data for Organonitrogen Pesticides, EPA 633

Parameter	Aqueous	
	Precision (RPD)	Accuracy (% Recovery)
Bromacil*	40	82-162
Deet	6	99-111
Hexazinone*	23	78-124
Metrabuzin*	29	83-141
Terbacil	25	61-111
Triadimefon	13	84-110
Tricyclazole	22	56-100

Reference: Accuracy and Precision: EPA Method 633--Test Method for Organic Chemical Analysis of Municipal and Industrial Wastewater, EPA 600/4-82-057, July 1982.

*Matrix spike and QC check sample compound.

Source: ESE.