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GENERAL RADIOCHEMISTRY AND ROUTINE ANALYTICAL SERVICES PROTOCOL (GRRASP)

000013830

STATEMENT OF WORK

EG&G ROCKY FLATS

ENVIRONMENTAL MANAGEMENT DEPARTMENT
ROCKY FLATS PLANT
GOLDEN, COLORADO

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July 2, 1991
Version 2.1

REVIEWED FOR CLASSIFICATION/UCNI
By Karl L. Gustafson
Date 7/2/91

GENERAL OVERVIEW TO THE STATEMENT OF WORK

Environmental sampling and analysis are conducted at the Department of Energy's Rocky Flats Plant, Golden, Colorado to support environmental management, restoration, and monitoring programs and activities. It is vital to the fulfillment of the Plant's mission, and that of its operator, EG&G Rocky Flats, Inc., that environmental analytical data generated under this Statement of Work be scientifically and technically sound, legally defensible, and produced under a vigorous Quality Assurance Program capable of detecting and correcting deficiencies and preventing fraudulent reporting. All data and documentation supplied must be complete, timely, useable, and validatable.

This Statement of Work seeks to define, to the extent reasonable, the analytical services needed and how these services are to be delivered. The Statement of Work is arranged into two main sections:

Part A - Organics, Inorganics, Water Quality Parameters, and Specialty Analyses.

Part B - Radiochemistry Analyses

These two specifications may be bid on separately or in concert. EG&G will issue the appropriate Part(s) depending on the nature of the analytical services being procured and the capabilities of the recipient laboratory.

Within each Part is a general description of the analytical services required and accompanying specific requirements related to the procurement. Detailed specifications for analytes such as detection limits to be achieved, documentation and deliverables to be submitted, and required laboratory practices are included in the Attachments and Exhibits which are incorporated into each main Part (A or B).

EG&G Rocky Flats requests that prospective bidders read completely and carefully each part of the Statement of Work to ensure that all requirements are clearly understood.

Questions concerning items in the Statement of Work may be directed to the following EG&G Rocky Flats personnel:

Contractual Items:	C. A. LOPEZ (303) 966-3735
Technical/Radiochemistry:	Karen Schoendaller (303) 966-5912
Technical/Organics, Inorganics, WQP, Other:	John Dick (303) 966-5950

GENERAL RADIOCHEMISTRY AND ROUTINE ANALYTICAL SERVICES PROTOCOL (GRRASP)

PART A
GENERAL ANALYTICAL SERVICES PROTOCOL (GASP)
ORGANICS, INORGANICS
WATER QUALITY PARAMETERS
BIOCHEMISTRY
BIOTA

STATEMENT OF WORK

EG&G ROCKY FLATS
ENVIRONMENTAL MANAGEMENT DEPARTMENT
ROCKY FLATS PLANT
GOLDEN, COLORADO

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TABLE OF CONTENTS
PART A

Page

Statement of Work - Part A: Organics, Inorganics, Water Quality Parameters, Biota, and Special Analytical Services for Rocky Flats Plant Environmental Management Department 1

A1.0 Introduction 1
A2.0 Technical Requirements 6
A3.0 Additional Information for Bid 9
A4.0 Acceptance of Data 10
A5.0 Special Terms and Conditions 10

Attachment I Requirements for Sample Analysis, Deliverables, and Documentation Supplied by Analytical Laboratory Subcontractors 12

I General Requirements 12

II Analytical Requirements 13
Media Types 13
Analytical Parameter Tables 14

III Required Deliverables 83
A. Sample Data Package 83
B. Data in Computer Readable Form 83
C. Supporting Documentation Package 83
D. Written Standard Operating Procedures 84
E. Disposition of Documentation and Samples 85
F. Technical Audits 85
G. Out-of-Spec Reporting 85

Exhibit I Water Quality Parameters Analytical Requirements
Requirements for Ion Chromatography Analyses 87
Requirements for Automated Colorimetric Turbidimetric, and Spectrophotometric Analyses 93
Requirements for Potentiometric (Ion Selective Electrode) Analyses 99
Requirements for Titrimetric and Gravimetric Analyses 104

Exhibit II — Data Package Checklists 108
Organic Data 109
Inorganic Data 110
Water Quality Parameters 111
Soil Analysis 112

Exhibit III — Chain-of-Custody and Document Control 113
1.0 Sample Chain-of-Custody 114
2.0 Document Control Procedures 116
3.0 Specifications for Written Standard Operating Procedures 118
Organics Document Inventory 120
Inorganics Document Inventory 121

Exhibit IV — Specification for Biotic Tissue Preparation 122

Exhibit IV — Specification for Diskette Deliverable 125

Statement of Work - Part B: Radioanalytical Services for Rocky Flats Plant Environmental Management Department

STATEMENT OF WORK

PART A

Analytical Services for Rocky Flats Plant
Environmental Management Department

A1.0 INTRODUCTION

This Statement of Work (SOW) pertains to the procurement of analytical chemistry services for samples collected in support of the Rocky Flats Plant Environmental Management Department, and is designated as General Analytical Services Protocol (GASP). Analytical chemistry services are needed for the following parameters:

1.1 EPA-CLP Volatile Organic Target Compound List (CLP-SOW 2/88); Table 1
Quantity: up to 1000 samples.

1.2 Selected Volatile Organics by EPA Method 624; Regulated List, Table 2
Quantity: up to 150 samples.

1.3 Selected Volatile Organics by EPA Method 624; Complete List, Table 3
Quantity: up to 150 samples.

1.4 Selected Volatile Organics by EPA SW-846 Method 8240; Regulated List, Table 4
Quantity: up to 150 samples.

1.5 Selected Volatile Organics by EPA SW-846 Method 8240; Complete List, Table 5
Quantity: up to 150 samples.

1.6 Selected Volatile Organics by EPA Method 524.2; Regulated List, Table 6
Quantity: up to 150 samples.

1.7 Selected Volatile Organics by EPA Method 524.2; Complete List, Table 7
Quantity: up to 150 samples.

1.8 Selected Volatile Organics by EPA Method 502.2; Regulated List, Table 8
Quantity: up to 150 samples.

1.9 Selected Volatile Organics by EPA Method 502.2;
Complete List, Table 9
Quantity: up to 150 samples.

1.10 Selected Volatile Halocarbons by EPA Method 601;
Regulated List, Table 10
Quantity: up to 150 samples.

1.11 Selected Volatile Halocarbons by EPA Method 601;
Complete List, Table 11
Quantity: up to 150 samples.

1.12 Selected Volatile Organics by EPA Method TO-14;
Table 12
Quantity: up to 1000 samples.

1.13 EPA-CLP Semi-Volatile (Base/Neutral/Acid) Organic Target Compound List (CLP-SOW 2/88);
Table 13
Quantity: up to 1000 samples.

1.14 Selected Semi-Volatile Organics by EPA Method 625;
Regulated List, Table 14
Quantity: up to 150 samples.

1.15 Selected Semi-Volatile Organics by EPA Method 625;
Complete List, Table 15
Quantity: up to 150 samples.

1.16 Selected Semi-Volatile Organics by EPA Method 625;
Base/Neutral Extractable List, Table 16
Quantity: up to 150 samples.

1.17 Selected Semi-Volatile Organics by EPA Method 1625;
Regulated List, Table 17
Quantity: up to 150 samples.

1.18 Selected Semi-Volatile Organics by EPA Method 1625;
Complete List, Table 18
Quantity: up to 150 samples.

1.19 Selected Semi-Volatile Organics by EPA SW-846 Method 8270;
Regulated List, Table 19
Quantity: up to 150 samples.

1.20 Selected Semi-Volatile Organics by EPA SW-846 Method 8270;
Complete List, Table 20
Quantity: up to 150 samples.

1.21 Selected Semi-Volatile Organics by EPA Method 525;
Regulated List, Table 21
Quantity: up to 150 samples

1.22 Selected Semi-Volatile Organics by EPA Method 525;
Complete List, Table 22
Quantity: up to 150 samples

1.23 EPA-CLP Pesticides/PCB Target Compound List (CLP-SOW 2/88);
Table 23
Quantity: up to 500 samples.

1.24 Selected Organochlorine Pesticides and PCBs by EPA Method 608;
Regulated List, Table 24
Quantity: up to 150 samples.

1.25 Selected Organochlorine Pesticides and PCBs by EPA Method 608;
Complete List, Table 25
Quantity: up to 150 samples.

1.26 Selected Organochlorine Pesticides and PCBs by EPA Method 505;
Regulated List, Table 26
Quantity: up to 150 samples.

1.27 Selected Organochlorine Pesticides and PCBs by EPA Method 505;
Complete List, Table 27
Quantity: up to 150 samples.

1.28 Selected Organochlorine Pesticides and PCBs by EPA SW-846 Method 8080; Regulated List, Table 28
Quantity: up to 150 samples.

1.29 Selected Organochlorine Pesticides and PCBs by EPA SW-846 Method 8080; Complete List, Table 29
Quantity: up to 150 samples.

1.30 Selected PCBs only by EPA SW-846 Method 8080, Modified;
Partial List, Table 30
Quantity: up to 150 samples.

1.31 Selected Chlorinated Herbicides by EPA Method 615;
Table 31
Quantity: up to 150 samples.

1.32 Selected Organochlorine Herbicides by EPA SW-846 Method 8150;
Table 32
Quantity: up to 150 samples.

1.33 Selected Chlorinated Pesticides by EPA Method 508;
Regulated List, Table 33
Quantity: up to 150 samples.

1.34 Selected Chlorinated Pesticides by EPA Method 508;
Complete List, Table 34
Quantity: up to 150 samples.

1.35 Selected Triazine Pesticides by EPA Method 619;
Table 35
Quantity: up to 150 samples.

1.36 Selected Triazine Pesticides by EPA Method 507;
Table 36
Quantity: up to 150 samples.

1.37 Selected Pesticides, PCBs, and Herbicides by Liquid Chromatography with Mass Spectrometry Detection;
Table 37
Quantity: up to 150 samples.

1.38 Selected Pesticides, PCBs, and Herbicides by Liquid Chromatography with Fluorescence Detection;
Table 38
Quantity: up to 150 samples.

1.39 Selected Nitroso-amines by EPA Method 607;
Table 39
Quantity: up to 150 samples.

1.40 Polynuclear Aromatic Hydrocarbons by EPA Method 610;
Table 40
Quantity: up to 150 samples.

1.41 Dioxin (2,3,7,8-TCDD) by EPA Method 613;
Table 41
Quantity: up to 150 samples.

1.42 EPA-CLP Metals and Cyanide Target Analyte List (7/88); Dissolved, Potentially Dissolved, and Total Metals;
Table 42
Quantity: up to 1000 samples.

1.43 Additional Metals by CLP Methods - Cesium, Chromium (VI), Lithium, Molybdenum, Silica, Strontium, and Tin; Dissolved, Potentially Dissolved, and Total Metals;
Table 43
Quantity: up to 1000 samples.

1.44 Water Quality Parameters - Ammonia, Carbonate/Bicarbonate, Chloride, Cyanide, Dissolved Oxygen, Fluoride, Hexavalent Chromium, Nitrate+Nitrite, Nitrite, Oil & Grease, Total Petroleum Hydrocarbons, Phenolics, pH, Phosphate, ortho-Phosphate, Silica, Specific Conductivity, Sulfate, Sulfide, Sulfide as H_2S, TDS, TSS, %Solids and %Moisture, Total Organic Carbon, Dissolved Organic Carbon, Total Kjeldahl Nitrogen (TKN), Coliforms, Fecal Coliforms, Chemical Oxygen Demand (COD); Table 44
Quantity: up to 1000 samples.

1.45 EPA-TCLP - Granulated Activated Carbon, Fabrics, Plastics, other solid substances, including the eight metals by the technique of standard additions, organochlorine insecticides by Method 8080, chlorinated herbicides by Method 8150, volatile organics by Method 8240, and semi-volatile organics by Method 8270;
Regulated Analytes only, Table 45
Quantity: up to 1000 samples.

1.46 EPA-TCLP - Granulated Activated Carbon, Fabrics, Plastics, other solid substances, including the eight metals by the technique of standard additions, organochlorine insecticides by Method 8080, chlorinated herbicides by Method 8150, volatile organics by Method 8240, and semi-volatile organics by Method 8270;
Complete List, Table 46
Quantity: up to 1000 samples.

1.47 RCRA Hazardous Waste Characterization for Ignitability, Corrosivity, Reactivity, and Toxicity;
Table 47
Quantity: up to 1000 samples.

1.48 Sequential Extraction of Trace Elements from soils, stream sediments, and borehole cuttings.
Table 48
Quantity: up to 150 samples.

1.49 Biochemical Parameters - BOD_5, $CBOD_5$;
Quantity: up to 500 samples.

1.50 Biological Parameters - Fecal Coliform, Coliform;
Quantity: up to 500 samples.

1.51 BIOTA Toxicity Testing
Quantity: up to 150 samples.

1.52 BIOTA - Screening, counting, and characterization by approved methodologies. May or may not be combined with analyses listed above.
Table 52: Quantity: up to 1000 samples.

1.53 TIC - Identification by GC/MS, MS, FTIR, NMR, and other methods of substances detected but not identified by Organic CLP methods. Quantity: up to 150 samples.

1.54 Other - Organic and inorganic analyses by methods within the capabilities of the laboratory but not otherwise specified; to be agreed upon by mutual concurrence.

Bidders' technical proposals should provide adequate detail regarding the technical, analytical, evidentiary, documentary, and reporting approaches to be used. EG&G anticipates that any and all data and documentation generated as a result of this procurement may be subjected to intense regulatory and public scrutiny; all data and documentation may also be discoverable in any resulting legal proceedings. For this reason, bidders are requested to address in particular how they intend to maintain and demonstrate in the laboratory the security and integrity of Rocky Flats Plant samples, extracts, data, and documentation.

A2.0 TECHNICAL REQUIREMENTS

The following are the technical requirements which comprise this procurement:

2.1 The contractor shall analyze up to 1000 samples comprised of the following matrices: Ground Water, Surface Water, Soils, Subsurface Soils, Sludges, Sediments, Granular Activated Carbon, Fabrics, Plastics, Resins, Residues, Filtrates, Retainates, Filters, Filtration Materials, Non-aqueous Solutions, Air, Gases, Biota, Animal Tissues, Plant Tissues, Insect Tissues, Aquatic Tissues, Whole Mammals, Whole Insects, Whole Fish and other Aquatic Life, mixed-matrices, and combinations thereof. Up to 150 Pond Discharge water samples will also be analyzed. Quantities of samples for each analysis are listed in Sections 1.1 through 1.52 of the Introduction.

2.2 Samples to be analyzed for dissolved metals will be filtered in the field. Samples to be analyzed for potentially dissolved metals shall be filtered in the laboratory within 96 hours of sample collection.

2.3 The detection limits needed for the parameters listed in section 1.0 (above) are specified in Tables 1-56 in ATTACHMENT I (REQUIREMENTS FOR SAMPLE ANALYSIS, DELIVERABLES, AND DOCUMENTATION SUPPLIED BY ANALYTICAL LABORATORY SUBCONTRACTORS, 07/02/91).

2.4 Analyses for non-CLP and non-radiochemistry parameters shall be conducted according to SW-846 (3rd Ed.), EPA Methods for Chemical Analyses of Water and Wastes (latest update), and American Public Health Association (APHA), *Standard Methods for the Examination of Water and Wastewater* (latest edition). Where necessary, these methods shall be modified such that the analyses achieve the required detection limits AND parallel the quality control requirements for the respective Organic or

Inorganic CLP-type analyses (i.e., all analyses shall include as applicable: initial and continuing calibration checks, blanks, duplicates, spikes, and laboratory control samples as specified for each analytical method). Blank subtraction is not permitted.

2.5 Deliverables include those specified in Table 55 (Reports/Deliverables) of ATTACHMENT I and shall be submitted according to the schedule included in Table 55. The format and content of data packages submitted for review and validation must conform in all respects to the requirements specified in ATTACHMENT I, Exhibit II (DATA PACKAGE CHECKLISTS). The contractor's proposal shall specifically include a detailed plan for ensuring the completeness and accuracy of data packages and deliverables.

2.6 The contractor shall submit written Standard Operating Procedures (SOPs) including a Quality Assurance/Quality Control Program Plan for each laboratory facility to EG&G within 30 days of contract award or prior to receipt of samples, whichever comes first, and the SOPs shall conform to the requirements specified in Section III, part D of ATTACHMENT I. The contractor must at all times strictly adhere to the SOPs explicitly as written. Deviations must be documented and approved by the contractor's Quality Assurance Officer and the EG&G Analytical Program Chemist prior to implementation. Any deviations shall also be noted and explained in the Case Narratives submitted with each data package.

EG&G understands that the contractor may consider their SOPs to be business confidential documents. EG&G agrees that contractor SOP manuals and QA/QC plan documents will be maintained in confidentiality and will not be copied or distributed outside EG&G without the consent and acknowledgment of the contractor.

2.7 The contractor shall be subject to routine, on-site technical audit and inspection by EG&G, (or designated representatives) not more than 2 times per calendar year during performance of this work. The preliminary pre-award technical audit performed prior to contract award does not count as one of these routine technical audits. Laboratories shall make available during technical audits all requested data and documentation related to this work. Results of technical audits are documented and corrective action responses for technical audit findings, including a schedule for implementation, are required.

On-site inspections, surveillances, or technical audits (announced or unannounced) for the purpose of identifying and resolving deficiencies or verifying corrective action may be performed by EG&G at any time during performance of the contract.

2.8 Laboratories conducting the CLP portions of this work shall be presently participating in the USEPA Contract Laboratory Program (CLP) OR have scored at least 70% on a recent CLP Performance Evaluation (PE) sample

analysis. (This requirement does not apply to non-CLP analyses; however, laboratories performing non-CLP analyses must be certified or qualified for those analyses by a recognized federal, state, or local agency.) Evidence of current participation or PE scores must be included in bidder's proposals.

2.9 Sample Holding Times are defined as the duration between date of sample collection and dates of sample preparation (extraction/distillation) and analysis. For water samples, the holding times specified in 40 CFR 136 shall be applicable to this program. The Validated Time of Sample Receipt (VTSR) from the CLP-SOWs will also apply to laboratory holding times with one exception. The VOA holding time of 10 days from VTSR is reduced to 7 days from time of collection to conform with EPA data validation guidelines for volatile organics. Where discrepancies exist between the 40 CFR 136 criteria and CLP VTSR criteria, the former shall take precedence.

2.10 The contractor shall submit Instrument Detection Limits (IDLs), as appropriate, for each instrument used for conducting EG&G sample analyses. The CLP-SOW method shall be used for determining IDLs for CLP analyses. IDLs for non-CLP analyses shall be determined by using specified EPA methods. The CLP-SOW schedules will be followed for routine submittal; otherwise determined on a quarterly basis.

2.11 The following guidance shall be used for determining Sample Delivery Groups (SDGs) and/or "Batches".

Surface waters and pond waters shall be grouped together for the purpose of batching.

Ground and well waters shall be grouped together for the purpose of batching; special cases involving anticipated matrix effects shall be batched separately. Such situations will be indicated on the chain of custody (COC).

An EG&G "Batch" shall follow the EPA-CLP definition of an SDG, which is 20 samples or those samples received within 14 days, whichever occurs first. Whenever necessary so as not to exceed holding times, smaller batches shall be analyzed. In no instance will batches be split and sent to subtier contract facilities without EG&G technical audit certification as described in section 2.7.

2.13 Sample analyses must be conducted using standard methods when available and shall meet the requirements specified in Attachment I, General Analytical Requirements. Analyses shall be conducted under a documented Quality Assurance/Quality Control (QA/QC) program. Laboratories shall adhere to standard, accepted QA/QC procedures and applicable Good Laboratory Practice Standards (40 CFR 792) during analysis of EG&G samples.

Good Laboratory Practice includes, but is not limited to the following:

Proper dilution of samples exhibiting or causing suspicion of high level concentrations of target compounds so as to allow accurate measurement of the analytes causing the dilution. Normally the dilution factor should be chosen so as to allow a mid to full scale response to the analyte causing the dilution.

Analytical data should be raw and unaltered except for results which are adjusted due to dilutions, moisture content, and method of extraction or clean-up. Results must not be blank subtracted prior to user evaluation.

A3.0 ADDITIONAL INFORMATION FOR BID

The following items are to be considered for preparing bids:

3.1 Unit prices shall be quoted for all analyses including Dissolved, Potentially Dissolved, and Total Metals.

3.2 EG&G may request that technical representatives from the laboratories participating in this program attend periodic technical workshops. These workshops will be held in the Denver Metro Area and will typically last for 2 days. The contractor shall include in the proposal a unit price/meeting for attending these workshops.

3.3 The contractor shall provide pre-cleaned vendor series sample bottles to the field contractors.

3.4 The contractor shall include in sample unit prices the cost of QC sample analyses. Quality control samples are run at a frequency of 5% with the exception of CLP Metals, where the frequency is 10%. Beginning and ending QC samples must be analyzed so as to bracket each run. The CLP-SOW method for sample re-runs shall also apply, i.e., the contractor must demonstrate that a matrix problem exists in order to be compensated for reanalyses.

3.5 Where feasible, the contractor shall use "Ottawa Sand," or equivalent, for preparing laboratory soil or sediment blanks.

A4.0 ACCEPTANCE OF DATA

Due to the stringent reporting requirements imposed on Rocky Flats Plant by various oversight and regulatory agencies, analytical data may need to be used prior to actual acceptance. Because of these requirements, for samples analyzed under this procurement, use of the data will not necessarily constitute acceptance.

EG&G and its designated representatives routinely review and validate analytical data according to EPA and internal functional guidelines. Validation reports are provided to the data users and to the laboratories that generated the data. Only complete and validatable data packages will be accepted. Incomplete, illegible, or unusable data packages will not be accepted and will be returned to the contractor for correction. Validation of the data will continue only when the requested resubmittals render the data packages complete and usable. Timely response to resubmittals from the contractor is required, normally within ten working days from the date of request. Invoices for data which is non-validatable or rejected will not be approved for payment.

A5.0 SPECIAL TERMS AND CONDITIONS

The following special terms and conditions apply to this procurement:

5.1 Some samples may contain radioactivity at levels which exceed twice natural background of 36 Mr/Hour ("background" levels for the general vicinity of the Plant are considered to be 18 Mr/Hour). Background radiation is defined as the natural level of radioactivity indigenous in specific geographical areas due to geological origin of the material, topographics, and radiation from internally-deposited, naturally occurring radionuclides.

Because of this possibility, the contractor must provide suitably licensed facilities to handle analyses of samples with elevated activity levels. All radiochemistry analyses must also be conducted in licensed facilities.

All samples other than "quick-turn pond samples" are screened for activity levels prior to being shipped off Plant-site. EG&G shall apprise the contractor of any samples showing elevated activity levels.

5.2 Disposal of residual samples and extracts is the responsibility of the laboratory, unless it is determined that the residuals are not within USEPA permitted capabilities of the subcontractor or their designated vendor. Such samples may be returned to Rocky Flats Plant for proper disposition.

It is anticipated that most samples will not meet the USEPA's criteria of "mixed-waste". By definition, a mixed-waste is radioactive (>2nCi) and contains organic compounds and/or hazardous/toxic compounds above Plant background. Those samples meeting the criteria of a mixed-waste are to be returned to Rocky Flats Plant after analysis. The contractor will be notified of any samples which may meet this criteria.

ATTACHMENT I

EG&G Statement of Work for Routine Analytical Services

EG&G, Inc.
Rocky Flats Plant
Golden, Colorado

REQUIREMENTS FOR SAMPLE ANALYSIS, DELIVERABLES, AND DOCUMENTATION SUPPLIED BY ANALYTICAL LABORATORY SUBCONTRACTORS

I. General Requirements

In general, sample analyses requirements for the Rocky Flats Plant (RFP) Environmental Management (EM) Department are consistent with those specified in Statements of Work (SOWs) used in the U.S. EPA's Contract Laboratory Program (CLP). These SOWs are used for analysis of parameters where CLP methods are available. The following SOWs apply:

1. *USEPA-CLP, Statement of Work for Organics Analysis, Multi-Media, Multi-Concentration*, 10/86 (Rev. 1/87, 2/87, 7/87, 8/87, 2/88).

2. *USEPA-CLP, Statement of Work for Inorganics Analysis, Multi-Media, Multi-Concentration*, 7/88.

The subcontractor may not deviate from these SOW requirements except as specified in this requirements document, or with written consent of the contracting officer.

For analyses where CLP methods are not available, such as water quality parameters (chlorides, nitrates, sulfates, alkalinity, TDS, etc.) the following methods apply:

1. USEPA, *Test Methods for Evaluating Solid Waste, SW-846, 3rd Edition, 1986.*

2. American Public Health Association (APHA), *Standard Methods for the Examination of Water and Wastewater*, 17th Edition, New York, New York, 1989.

3. USEPA, *Methods for Chemical Analysis of Water and Wastes*, No. 625/6-74-003 (or latest revision).

4. NRC Regulatory Guides.

5. Good Laboratory Practice Standards (40 CFR 792)

The methods for particular analyses must be used such that the required detection limits are achieved: for CLP analyses, the CRQL or CRDL; for non-CLP the PQL, which may be defined as 10 times the EPA published MDL when not otherwise established. MDLs shall

be determined as appropriate for each individual method. Standard methods may be modified or alternative methods substituted only with the written consent of the EG&G Analytical Program Chemist. When dilutions are necessary because of an off scale response or an interference, the dilution factor shall be chosen so as to give a response for the off scale analyte of 50 to 100 percent of full scale. Dilutions resulting in the analyte causing the dilution being reported as "undetected" are not acceptable.

II. Analytical Requirements

Environmental samples consist of the following matrices:

Ground Water, Surface Water, Soils, Subsurface Soils, Sludges, Sediments, Granular Activated Carbon, Fabrics, Plastics, Resins, Residues, Filtrates, Retainates, Filters, Filtration Materials, Non-aqueous Solutions, Air, Gases, Biota, Animal Tissues, Plant Tissues, Insect Tissues, Aquatic Tissues, Whole Mammals, Whole Insects, Whole Fish and other Aquatic Life, mixed-matrices, and combinations thereof.

Aqueous samples may be filtered or non-filtered. For some studies, both filtered and non-filtered samples are analyzed.

Samples may be analyzed for any of the parameters listed in the tables below. Required detection limits for these parameters are included in Tables 1-52. (Note that all table numbers are not present. Table numbers refer to the corresponding section of A1.0 Introduction.) All CLP analyses shall have reporting limits equal to the CRQL or CRDL. Non-CLP analyses shall have reporting limits equal to the PQL, defined as 10 times the published MDL. In cases where the required detection limits are not attained, the contractor is required to verify and document the laboratory detection limits for EG&G and include copies of the documentation in the data package case narrative.

Sample analyses must be conducted using standard methods. Analyses shall be conducted under a documented quality assurance/quality control (QA/QC) program. EG&G expects laboratories to adhere to standard, accepted QA/QC procedures and applicable *Good Laboratory Practice Standards* (40 CFR 792) during analysis of EG&G samples.

TABLE 1

EPA-CLP VOLATILE ORGANIC TARGET COMPOUND LIST

			WATER	SOIL
	Analyte	CAS NO.	CRQL (ug/L)	CRQL (ug/Kg)
1.	Chloromethane	74-87-3	10	10
2.	Bromomethane	74-83-9	10	10
3.	Vinyl Chloride	75-01-4	10	10
4.	Chloroethane	75-00-3	10	10
5.	Methylene Chloride	75-09-2	5	5
6.	Acetone	67-64-1	10	10
7.	Carbon Disulfide	75-15-0	5	5
8.	1,1-Dichloroethene	75-35-4	5	5
9.	1,1-Dichloroethane	75-34-3	5	5
10.	1,2-Dichloroethene (Total)	540-59-0	5	5
11.	Chloroform	67-66-3	5	5
12.	1,2-Dichloroethane	107-06-2	5	5
13.	2-Butanone	78-93-3	10	10
14.	1,1,1-Trichloroethane	71-55-6	5	5
15.	Carbon Tetrachloride	56-23-5	5	5
16.	Vinyl Acetate	108-05-4	10	10
17.	Bromodichloromethane	75-27-4	5	5
18.	1,2-Dichloropropane	78-87-5	5	5
19.	cis-1,3-Dichloropropene	10061-01-5	5	5
20.	Trichloroethene	79-01-6	5	5
21.	Dibromochloromethane	124-48-1	5	5
22.	1,1,2-Trichloroethane	79-00-5	5	5
23.	Benzene	71-43-2	5	5
24.	trans-1,3-Dichloropropene	10061-02-6	5	5

25.	Bromoform	75-25-2	5	5
26.	4-Methyl-2-pentanone	108-10-1	10	10
27.	2-Hexanone	591-78-6	10	10
28.	Tetrachloroethene	127-18-4	5	5
29.	Toluene	108-88-3	5	5
30.	1,1,2,2-Tetrachloroethane	79-34-5	5	5
31.	Chlorobenzene	108-90-7	5	5
32.	Ethyl Benzene	100-41-4	5	5
33.	Styrene	100-42-5	5	5
34.	Xylenes (Total)	1330-20-7	5	5

TABLE 2

VOLATILE ORGANICS BY EPA METHOD 624 REGULATED LIST

Analyte	CAS No.	MDL (ug/L)
Acrylonitrile	107-13-1	1.0
Benzene	71-43-2	4.4
Carbon Tetrachloride	56-23-5	2.8
Chlorobenzene	108-90-7	6.0
Chloroform	67-66-3	1.6
Dichloroethane 1,2	107-06-2	2.8
Dichloroethylene 1,1	75-35-4	2.8
Dichloroethylene 1,2 trans	156-60-5	1.6
Dichloropropane 1,2	78-87-5	6.0
Ethylbenzene	100-41-4	7.2
Tetrachloroethane 1,1,2,2	79-34-3	6.9
Tetrachloroethylene	127-18-4	4.1
Toluene	108-88-3	6.0
Trichloroethane 1,1,1	71-55-6	3.8
Trichloroethane 1,1,2	79-00-5	5.0
Trichloroethylene	79-01-6	1.9

TABLE 3

VOLATILE ORGANICS BY EPA METHOD 624 COMPLETE LIST

Analyte	CAS No.	MDL (ug/L)
Acrylonitrile	107-13-1	1.0
Benzene	71-43-2	4.4
Bromodichloromethane	75-27-4	2.2
Bromoform	75-25-2	4.7
Carbon Tetrachloride	56-23-5	2.8
Chlorobenzene	108-90-7	6.0
Chloroform	67-66-3	1.6
Dibromochloromethane	124-48-1	3.1
Dichloroethane 1,1	75-34-3	4.7
Dichloroethane 1,2	107-06-2	2.8
Dichloroethylene 1,1	75-35-4	2.8
Dichloroethylene 1,2 trans	156-60-5	1.6
Dichloropropane 1,2	78-87-5	6.0
Dichloropropene 1,3 cis	10061-01-5	5.0
Dichloropropene 1,3 trans	10061-02-6	nd
Ethylbenzene	100-41-4	7.2
Methylene Chloride	75-09-2	2.8
Tetrachloroethane 1,1,2,2	79-34-5	6.9
Tetrachloroethylene	127-18-4	4.1
Toluene	108-88-3	6.0
Trichloroethane 1,1,1	71-55-6	3.8
Trichloroethane 1,1,2	79-00-5	5.0
Trichloroethylene	79-01-6	1.9

TABLE 4

VOLATILE ORGANICS BY EPA METHOD 8240 REGULATED LIST

		WATER	SOIL
Analyte	CAS No.	PQL (ug/L)	PQL (ug/Kg)
Benzene	71-43-2	5	5
Carbon Tetrachloride	56-23-5	5	5
Chlorobenzene	108-90-7	5	5
Chloroform	67-66-3	5	5
Dichloroethane 1,2	107-06-2	5	5
Dichloroethylene 1,1	75-35-4	5	5
Dichloroethylene 1,2 trans	156-60-5	5	5
Dichloropropane 1,2	78-87-5	5	5
Ethylbenzene	100-41-4	5	5
Tetrachloroethane 1,1,2,2	79-34-5	5	5
Tetrachloroethylene	127-18-4	5	5
Toluene	108-88-3	5	5
Trichloroethane 1,1,1	71-55-6	5	5
Trichloroethane 1,1,2	79-00-5	5	5
Trichloroethylene	79-01-6	5	5
Vinyl Chloride	75-01-4	10	10

TABLE 5

VOLATILE ORGANICS BY EPA METHOD 8240 COMPLETE LIST

		WATER	SOIL
Analyte	CAS No.	PQL (ug/L)	PQL (ug/Kg)
Acetone	67-64-1	100	100
Benzene	71-43-2	5	5
Bromodichloromethane	75-27-4	5	5
Bromoform	75-25-2	5	5
Bromomethane	74-83-9	10	10
Butanone 2	78-93-3	100	100
Carbon Disulfide	75-15-0	5	5
Carbon Tetrachloride	56-23-5	5	5
Chlorobenzene	108-90-7	5	5
Chloroethane	75-00-3	10	10
Chloroethylvinyl ether 2	100-75-8	10	10
Chloroform	67-66-3	5	5
Chloromethane	74-87-3	10	10
Dibromochloromethane	124-48-1	5	5
Dichloroethane 1,1	75-34-3	5	5
Dichloroethane 1,2	107-06-2	5	5
Dichloroethylene 1,1	75-35-4	5	5
Dichloroethylene 1,2 trans	156-60-5	5	5
Dichloropropane 1,2	78-87-5	5	5
Dichloropropene 1,3 cis	10061-01-5	5	5
Dichloropropene 1,3 trans	10061-02-6	5	5
Ethylbenzene	100-41-4	5	5
Hexanone 2	591-78-6	50	50
Methylene Chloride	75-09-2	5	5
Pentanone 2 (4 Methyl)	108-10-1	50	50
Styrene	100-42-5	5	5

Tetrachloroethane 1,1,2,2	79-34-5	5	5
Tetrachloroethylene	127-18-4	5	5
Toluene	108-88-3	5	5
Trichloroethane 1,1,1	71-55-6	5	5
Trichloroethane 1,1,2	79-00-5	5	5
Trichloroethylene	79-01-6	5	5
Vinyl Chloride	75-01-4	10	10
Vinyl Acetate	108-05-4	50	50
Xylenes (Total)	1330-20-7	5	5

TABLE 6

VOLATILE ORGANICS BY EPA METHOD 524.2 REGULATED LIST

Analyte	Cas No.	MDL (ug/L)
Benzene	71-43-2	0.03
Carbon Tetrachloride	56-23-5	0.08
Chlorobenzene	108-90-7	0.03
Chloroform	67-66-3	0.02
Dichlorobenzene 1,2	95-50-1	0.05
Dichlorobenzene 1,3	541-73-1	0.05
Dichlorobenzene 1,4	106-46-7	0.04
Dichloroethane 1,2	107-06-2	0.02
Dichloroethylene 1,1	75-35-4	0.05
Dichloroethylene 1,2 cis-	156-59-2	0.06
Dichloroethylene 1,2 trans-	156-60-5	0.03
Dichloropropane 1,2	78-87-5	0.02
Ethylbenzene	100-41-4	0.03
Ethylene Dibromide	106-93-4	0.02
Hexachlorobutadiene	87-68-3	0.04
Tetrachloroethane 1,1,2,2	79-34-3	0.20
Tetrachloroethylene	127-18-4	0.05
Toluene	108-88-3	0.08
Trichloroethane 1,1,1	71-55-6	0.04
Trichloroethane 1,1,2	79-00-5	0.03
Trichloroethylene	79-01-6	0.02
Vinyl Chloride	75-01-4	0.04

TABLE 7

VOLATILE ORGANICS BY EPA METHOD 524.2 COMPLETE LIST

Analyte	CAS No.	MDL (ug/L)
Benzene	71-43-2	0.03
Bromobenzene	108-86-1	0.11
Bromochloromethane	74-97-5	0.07
Bromodichloromethane	75-27-4	0.03
Bromoform	75-25-2	0.20
Bromomethane	74-83-9	0.06
Butylbenzene n	104-51-8	0.03
Butylbenzene sec	135-98-8	0.12
Butylbenzene tert	98-06-6	0.33
Carbon Tetrachloride	56-23-5	0.08
Chlorobenzene	108-90-7	0.03
Chloroethane	75-00-3	0.02
Chloroform	67-66-3	0.02
Chloromethane	74-87-3	0.05
Chlorotoluene 2	95-49-8	0.05
Chlorotoluene 4	106-43-4	0.05
Cyanogen chloride		0.30
Dibromochloromethane	124-48-1	0.07
Dibromo-3-chloropropane 1,2	96-12-8	0.05
Dibromoethane 1,2	106-93-4	0.02
Dibromomethane	74-95-3	0.03
Dichlorobenzene 1,2	95-50-1	0.05
Dichlorobenzene 1,3	541-73-1	0.05
Dichlorobenzene 1,4	106-46-7	0.04
Dichlorodifluoromethane	75-71-8	0.11
Dichloroethane 1,1	75-34-3	0.03
Dichloroethane 1,2	107-06-2	0.02

Dichloroethylene 1,1	75-35-4	0.05
Dichloroethylene 1,2 cis-	156-59-2	0.06
Dichloroethylene 1,2 trans-	156-60-5	0.03
Dichloropropane 1,2	78-87-5	0.02
Dichloropropane 1,3	142-28-9	0.04
Dichloropropane 2,2	590-20-7	0.05
Dichloropropene 1,1	563-58-6	0.02
Ethylbenzene	100-41-4	0.03
Hexachlorobutadiene	87-68-3	0.04
Isopropylbenzene	98-82-8	0.10
Isopropyltoluene 4-	99-87-6	0.26
Methylene Chloride	75-09-2	0.09
Naphthalene	91-20-3	0.04
Propylbenzene n-	103-65-1	0.06
Styrene	100-42-5	0.06
Tetrachloroethane 1,1,1,2	630-20-6	0.04
Tetrachloroethane 1,1,2,2	79-34-5	0.20
Tetrachloroethylene	127-18-4	0.05
Toluene	108-88-3	0.08
Trichlorobenzene 1,2,3	87-61-6	0.04
Trichlorobenzene 1,2,4	120-82-1	0.20
Trichloroethane 1,1,1	71-55-6	0.04
Trichloroethane 1,1,2	79-00-5	0.03
Trichloroethylene	79-01-6	0.02
Trichlorofluoromethane	75-69-4	0.07
Trichloropropane 1,2,3	96-18-4	0.03
Trimethylbenzene 1,2,4	95-63-6	0.04
Trimethylbenzene 1,3,5	108-67-8	0.02
Vinyl Chloride	75-01-4	0.04
Xylene o-	95-47-6	0.06

Xylene m-	108-38-3	0.03
Xylene p-	106-42-3	0.06

TABLE 8

VOLATILE ORGANICS BY EPA METHOD 502.2 REGULATED LIST

Analyte	CAS No.	MDL (ug/L)
Benzene	71-43-2	0.01
Carbon Tetrachloride	56-23-5	0.01
Chlorobenzene	108-90-7	0.02
Chloroform	67-66-3	0.02
Dichlorobenzene 1,2	95-50-1	0.02
Dichlorobenzene 1,3	541-73-1	0.02
Dichlorobenzene 1,4	106-46-7	0.01
Dichloroethane 1,2	107-06-2	0.03
Dichloroethylene 1,1	75-35-4	0.07
Dichloroethylene 1,2 cis	156-59-2	0.01
Dichloroethylene 1,2 trans	156-60-5	0.05
Dichloropropane 1,2	78-87-5	0.01
Ethylbenzene	100-41-4	0.01
Ethylene Dibromide	106-93-4	0.17
Halomethanes		0.02
Hexachlorobutadiene	87-68-3	0.02
Tetrachloroethane 1,1,1,2	630-20-6	0.01
Tetrachloroethane 1,1,2,2	79-34-5	0.01
Tetrachloroethylene	127-18-4	0.04
Toluene	108-88-3	0.01
Trichloroethane 1,1,1	71-55-6	0.03
Trichloroethylene	79-01-6	0.01
Trihalomethanes (total)		0.10
Vinyl Chloride	75-01-4	0.02

TABLE 9

VOLATILE ORGANICS BY EPA METHOD 502.2 COMPLETE LIST

Analyte	CAS No.	MDL (ug/L)
Benzene	71-43-2	0.01
Bromobenzene	108-86-1	0.04
Bromochloromethane	74-97-5	0.01
Bromodichloromethane	75-27-4	0.10
Bromoform	75-25-2	0.09
Bromomethane	74-83-9	0.19
Butylbenzene n-	104-51-8	0.03
Butylbenzene sec-	135-98-8	0.03
Butylbenzene tert-	98-06-6	0.06
Carbon Tetrachloride	56-23-5	0.02
Chlorobenzene	108-90-7	0.02
Chloroethane	75-00-3	0.13
Chloroform	67-66-3	0.01
Chloromethane	74-87-3	0.10
Chlorotoluene 2	95-49-8	0.03
Chlorotoluene 4	106-43-4	0.02
Dibromochloromethane	124-48-1	0.05
Dibromo-3-chloropropane 1,2	96-12-8	0.20
Dibromoethane 1,2	106-93-4	0.17
Dibromomethane	74-95-3	0.10
Dichlorobenzene 1,2	95-50-1	0.03
Dichlorobenzene 1,3	541-73-1	0.02
Dichlorobenzene 1,4	106-46-7	0.03
Dichlorodifluoromethane	75-71-8	0.29
Dichloroethane 1,1	75-34-3	0.03
Dichloroethane 1,2	107-06-2	0.03
Dichloroethylene 1,1	75-35-4	0.04

Dichloroethylene 1,2 cis	156-59-2	0.03
Dichloroethylene 1,2 trans	156-60-5	0.03
Dichloropropane 1,2	78-87-5	0.03
Dichloropropane 1,3	142-28-9	0.02
Dichloropropane 2,2	590-20-7	0.05
Dichloropropene 1,1	563-58-6	0.02
Dichloropropene 1,3 cis	10061-01-5	0.06
Dichloropropene 1,3 trans	10061-02-6	0.06
Ethylbenzene	100-41-4	0.04
Hexachlorobutadiene	87-68-3	0.05
Isopropylbenzene	98-82-8	0.02
Isopropyltoluene 4	99-87-6	0.02
Methylene Chloride	75-09-2	0.01
Naphthalene	91-20-3	0.02
Propylbenzene n	103-65-1	0.03
Styrene	100-42-5	0.10
Tetrachloroethane 1,1,2,2	79-34-5	0.01
Tetrachloroethane 1,1,1,2	630-20-6	0.01
Tetrachloroethylene	127-18-4	0.02
Toluene	108-88-3	0.02
Trichlorobenzene 1,2,3	87-61-6	0.05
Trichlorobenzene 1,2,4	120-82-1	0.06
Trichloroethane 1,1,1	71-55-6	0.01
Trichloroethane 1,1,2	79-00-5	0.04
Trichloroethylene	79-01-6	0.03
Trichlorofluoromethane	75-69-4	0.34
Trichloropropane 1,2,3	96-18-4	0.02
Trihalomethanes (total)		0.10
Trimethylbenzene 1,2,4	95-63-6	0.02
Trimethylbenzene 1,3,5	108-67-8	0.03

Vinyl Chloride	75-01-4	0.01
Xylene o	95-47-6	0.02
Xylene m	108-38-3	0.02
Xylene p	106-42-3	0.02

TABLE 10

VOLATILE ORGANICS BY EPA METHOD 601 REGULATED LIST

Analyte	CAS No.	MDL (ug/L)
Carbon Tetrachloride	56-23-5	0.12
Chlorobenzene	108-90-7	0.25
Chloroform	67-66-3	0.05
Dichlorobenzene 1,2	95-50-1	0.15
Dichlorobenzene 1,3	541-73-1	0.32
Dichlorobenzene 1,4	106-46-7	0.24
Dichloroethane 1,2	107-06-2	0.03
Dichloroethylene 1,1	75-35-4	0.13
Dichloroethylene 1,2 trans	156-60-5	0.10
Dichloropropane 1,2	78-87-5	0.04
Tetrachloroethane 1,1,2,2	79-34-3	0.03
Tetrachloroethylene	127-18-4	0.03
Trichloroethane 1,1,1	71-55-6	0.03
Trichloroethane 1,1,2	79-00-5	0.02
Trichloroethylene	79-01-6	0.12
Vinyl Chloride	75-01-4	0.18

TABLE 11

VOLATILE ORGANICS BY EPA METHOD 601 COMPLETE LIST

Analyte	CAS No.	MDL (ug/L)
Bromodichloromethane	75-27-4	0.10
Bromoform	75-25-2	0.20
Bromomethane	74-83-9	1.18
Carbon Tetrachloride	56-23-5	0.12
Chlorobenzene	108-90-7	0.25
Chloroethane	75-00-3	0.52
Chloroethylvinyl ether	100-75-8	0.13
Chloroform	67-66-3	0.05
Chloromethane	74-87-3	0.06
Dibromochloromethane	124-48-1	0.09
Dichlorobenzene 1,2	95-50-1	0.15
Dichlorobenzene 1,3	541-73-1	0.32
Dichlorobenzene 1,4	106-46-7	0.24
Dichlorodifluoromethane	75-71-8	1.81
Dichloroethane 1,1	75-34-3	0.07
Dichloroethane 1,2	107-06-2	0.03
Dichloroethylene 1,1	75-35-4	0.13
Dichloroethylene 1,2 trans	156-60-5	0.10
Dichloropropane 1,2	78-87-5	0.04
Dichloropropene 1,3 cis	10061-01-5	0.34
Dichloropropene 1,3 trans	10061-02-6	0.20
Methylene Chloride	75-09-2	0.25
Tetrachloroethane 1,1,2,2	79-34-5	0.03
Tetrachloroethylene	127-18-4	0.03
Trichloroethane 1,1,1	71-55-6	0.03
Trichloroethane 1,1,2	79-00-5	0.02
Trichloroethylene	79-01-6	0.12

Vinyl Chloride	75-01-4	0.18

TABLE 12

VOLATILE ORGANICS BY EPA METHOD TO-14 COMPLETE LIST

Analyte	CAS No.	TO-14
Benzene	71-43-2	tbd
Carbon Tetrachloride	56-23-5	tbd
Chlorobenzene	108-90-7	tbd
Chloroform	67-66-3	tbd
Dibromoethane 1,2	106-93-4	tbd
Dichlorobenzene 1,2	95-50-1	tbd
Dichlorobenzene 1,3	541-73-1	tbd
Dichlorobenzene 1,4	106-46-7	tbd
Dichloroethane 1,1	75-34-3	tbd
Dichloroethane 1,2	107-06-2	tbd
Dichloroethylene 1,2 cis	156-59-2	tbd
Dichloropropane 1,2	78-87-5	tbd
Dichloropropene 1,3 cis	10061-01-5	tbd
Dichloropropene 1,3 trans	10061-02-6	tbd
Ethylbenzene	100-41-4	tbd
Hexachlorobutadiene	87-68-3	tbd
Styrene	100-42-5	tbd
Tetrachloroethane 1,1,2,2	79-34-5	tbd
Tetrachloroethylene	127-18-4	tbd
Toluene	108-88-3	tbd
Trichlorobenzene 1,2,4	120-82-1	tbd
Trichloroethane 1,1,1	71-55-6	tbd
Trichloroethane 1,1,2	79-00-5	tbd
Trichloroethylene	79-01-6	tbd
Trimethylbenzene 1,2,4	95-63-6	tbd
Trimethylbenzene 1,3,5	108-67-8	tbd
Vinyl Chloride	75-01-4	tbd

Xylene o	95-47-6	tbd
Xylene m	108-38-3	tbd
Xylene p	106-42-3	tbd

TABLE 13

EPA-CLP SEMI-VOLATILE ORGANIC TARGET COMPOUND LIST

			WATER	SOIL
	Analyte	CAS No.	CRQL (ug/L)	CRQL (ug/Kg)
35.	Phenol	108-95-2	10	330
36.	bis(2-Chloroethyl)ether	111-44-4	10	330
37.	2-Chlorophenol	95-57-8	10	330
38.	1,3-Dichlorobenzene	541-73-1	10	330
39.	1,4-Dichlorobenzene	106-46-7	10	330
40.	Benzyl alcohol	100-51-6	10	330
41.	1,2-Dichlorobenzene	95-50-1	10	330
42.	2-Methylphenol	95-48-7	10	330
43.	bis(2-Chloroisopropyl)ether	108-60-1	10	330
44.	4-Methylphenol	106-44-5	10	330
45.	N-Nitroso-di-n-dipropylamine	621-64-7	10	330
46.	Hexachloroethane	67-72-1	10	330
47.	Nitrobenzene	98-95-3	10	330
48.	Isophorone	78-59-1	10	330
49.	2-Nitrophenol	88-75-5	10	330
50.	2,4-Dimethylphenol	105-67-9	10	330
51.	Benzoic acid	65-85-0	50	1600
52.	bis(2-Chloroethoxy)methane	111-91-1	10	330
53.	2,4-Dichlorophenol	120-83-2	10	330
54.	1,2,4-Trichlorobenzene	120-82-1	10	330
55.	Naphthalene	91-20-3	10	330
56.	4-Chloroaniline	106-47-3	10	330
57.	Hexachlorobutadiene	87-68-3	10	330
58.	4-Chloro-3-methylphenol	59-50-7	10	330
	(para-chloro-meta-cresol)			
59.	2-Methylnaphthalene	91-57-6	10	330

60.	Hexachlorocyclopentadiene	77-47-4	10	330
61.	2,4,6-Trichlorophenol	88-06-2	10	330
62.	2,4,5-Trichlorophenol	95-95-4	50	1600
63.	2-Chloronaphthalene	91-58-7	10	330
64.	2-Nitroaniline	88-74-4	50	1600
65.	Dimethylphthalate	131-11-3	10	330
66.	Acenaphthylene	208-96-8	10	330
67.	2,6-Dinitrotoluene	606-20-2	10	330
68.	3-Nitroaniline	99-09-2	50	1600
69.	Acenaphthene	83-32-9	10	330
70.	2,4-Dinitrophenol	51-28-5	50	1600
71.	4-Nitrophenol	100-02-7	50	1600
72.	Dibenzofuran	132-64-9	10	330
73.	2,4-Dinitrotoluene	121-14-2	10	330
74.	Diethylphthalate	84-66-2	10	330
75.	4-Chlorophenyl-phenyl ether	7005-72-3	10	330
76.	Fluorene	86-73-7	10	330
77.	4-Nitroaniline	100-01-6	50	1600
78.	4,6-Dinitro-2-methylphenol	534-52-1	50	1600
79.	N-nitrosodiphenylamine	86-30-6	10	330
80.	4-Bromophenyl-phenylether	101-55-3	10	330
81.	Hexachlorobenzene	118-74-1	10	330
82.	Pentachlorophenol	87-86-5	50	1600
83.	Phenanthrene	85-01-8	10	330
84.	Anthracene	120-12-7	10	330
85.	Di-n-butylphthalate	84-74-2	10	330
86.	Fluoranthene	206-44-0	10	330
87.	Pyrene	129-00-0	10	330
88.	Butylbenzylphthalate	85-68-7	10	330
89.	3,3'-Dichlorobenzidine	91-94-1	20	660

90.	Benzo(a)anthracene	56-55-3	10	330
91.	Chrysene	218-01-9	10	330
92.	bis(2-Ethylhexyl)phthalate	117-81-7	10	330
93.	Di-n-octylphthalate	117-84-0	10	330
94.	Benzo(b)fluoranthene	205-99-2	10	330
95.	Benzo(k)fluoranthene	207-08-9	10	330
96.	Benzo(a)pyrene	50-32-8	10	330
97.	Indeno(1,2,3-cd)pyrene	193-39-5	10	330
98.	Dibenz(a,h)anthracene	53-70-3	10	330
99.	Benzo(g,h,i)perylene	191-24-2	10	330

TABLE 14

SEMI-VOLATILE ORGANICS BY EPA METHOD 625 REGULATED LIST

Analyte	CAS No.	MDL (ug/L)
Aldrin	309-00-2	1.9
Benzidine	92-87-5	44.0
Chloroethyl Ether (Bis-2)	111-44-4	5.7
DDT	50-29-3	4.7
Dichlorobenzene 1,2	95-50-1	1.9
Dichlorobenzene 1,3	541-73-1	1.9
Dichlorobenzene 1,4	106-46-7	4.4
Dichlorobenzidine	91-94-1	16.5
Dichlorophenol 2,4	120-83-2	2.7
Dieldrin	60-57-1	2.5
Heptachlor	76-44-8	1.9
Heptachlor Epoxide	1024-57-3	2.2
Hexachlorobenzene	118-74-1	1.9
Hexachlorobutadiene	87-68-3	0.9
Hexachlorocyclohexane, Beta	319-85-7	4.2
Hexachloroethane	67-72-1	1.6
Isophorone	78-59-1	2.2
Nitrobenzene	98-95-3	1.9
Nitrosodiphenylamine N	86-30-6	1.9
Pentachlorophenol	87-86-5	3.6
Trichlorophenol 2,4,6	88-06-2	2.7
Chlorophenol 2	95-57-8	3.3
Monohydric phenol	108-95-2	1.5
PCB 1221	11104-28-2	30.0
PCB 1254	11097-69-1	36.0

TABLE 15

SEMI-VOLATILE ORGANICS BY EPA METHOD 625 COMPLETE LIST

Analyte	CAS No.	MDL (ug/L)
Acenaphthene	83-32-9	1.9
Acenapthylene	208-96-8	3.5
Aldrin	309-00-2	1.9
Anthracene	120-12-7	1.9
Benzidine	92-87-5	44.0
Benzo(a)anthracene	56-55-3	7.8
Benzo(b)fluoranthene	205-99-2	4.8
Benzo(k)fluoranthene	207-08-9	2.5
Benzo(g,h,i)perylene	191-24-2	4.1
Benzo(a)pyrene	50-32-8	2.5
Bromophenyl-phenyl ether 4	101-55-3	1.9
Butylbenzylphthalate	85-68-7	2.5
Chloroethyl Ether (Bis-2)	111-44-4	5.7
Chloroethoxymethane (Bis-2)	111-91-1	5.3
Chlorophenyl-phenyl ether 4	7005-72-3	4.2
Chloronaphthalene 2	91-58-7	1.9
Chlorophenol 2	95-57-8	3.3
Chlorophenol 4 3-methyl	59-50-7	3.0
Chrysene	218-01-9	2.5
DDD 4,4'	72-54-8	2.8
DDE 4,4'	72-55-9	5.6
DDT 4,4'	50-29-3	4.7
Dibenz(a,h)anthracene	53-70-3	2.5
Dibutylphthalate	84-74-2	2.5
Dichlorobenzene 1,2	95-50-1	1.9
Dichlorobenzene 1,3	541-73-1	1.9
Dichlorobenzene 1,4	106-46-7	4.4

Dichlorobenzidine 3,3'	91-94-1	16.5
Dichlorophenol 2,4	120-83-2	2.7
Dieldrin	60-57-1	2.5
Diethylphthalate	84-66-2	1.9
Dimethylphenol 2,4	105-67-9	2.7
Dimethylphthalate	131-11-3	1.6
Dinitro-2-methylphenol 4,6	534-52-1	24.0
Dinitrophenol 2,4	51-28-5	42.0
Dinitrotoluene 2,4	121-14-2	5.7
Dinitrotoluene 2,6	606-20-2	1.9
Dioctylphthalate	117-84-0	2.5
Endosulfan sulfate	1031-07-8	5.6
Ethylhexylphthalate (2-Bis)	117-81-7	2.5
Fluoranthene	206-44-0	2.2
Fluorene	86-73-7	1.9
Heptachlor	76-44-8	1.9
Heptachlor Epoxide	1024-57-3	2.2
Hexachlorobenzene	118-74-1	1.9
Hexachlorobutadiene	87-68-3	0.9
Hexachlorocyclohexane, Beta	319-85-7	4.2
Hexachlorocyclohexane, Delta	319-86-8	3.1
Hexachloroethane	67-72-1	1.6
Indeno(1,2,3-cd)pyrene	193-39-5	3.7
Isophorone	78-59-1	2.2
Naphthalene	91-20-3	1.6
Nitrobenzene	98-95-3	1.9
Nitrophenol 2	88-75-5	3.6
Nitrophenol 4	100-02-7	2.4
Nitrosodiphenylamine N	86-30-6	1.9
PCB 1221	11104-28-2	30.0

PCB 1254	11097-69-1	36.0
Pentachlorophenol	87-86-5	3.6
Phenanthrene	85-01-8	5.4
Phenol	108-95-2	1.5
Pyrene	129-00-0	1.9
Trichlorobenzene 1,2,4	120-82-1	1.9
Trichlorophenol 2,4,6	88-06-2	2.7

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TABLE 16

SEMI-VOLATILE ORGANICS BY EPA MET
BASE/NEUTRAL EXTRACTABLE LI

Analyte	CAS No.	M
Acenaphthene	83-32-9	
Acenapthylene	208-96-8	
Aldrin	309-00-2	
Anthracene	120-12-7	
Benzidine	92-87-5	
Benzo(a)anthracene	56-55-3	
Benzo(b)fluoranthene	205-99-2	
Benzo(k)fluoranthene	207-08-9	
Benzo(g,h,i)perylene	191-24-2	
Benzo(a)pyrene	50-32-8	
Bromophenyl-phenyl ether 4	101-55-3	
Butylbenzylphthalate	85-68-7	
Chloroethyl Ether (Bis-2)	111-44-4	
Chloroethoxymethane (Bis-2)	111-91-1	
Chlorophenyl-phenyl ether 4	7005-72-3	
Chloronaphthalene 2	91-58-7	
Chrysene	218-01-9	
DDD 4,4'	72-54-8	
DDE 4,4'	72-55-9	
DDT 4,4'	50-29-3	
Dibenz(a,h)anthracene	53-70-3	
Dibutylphthalate	84-74-2	
Dichlorobenzene 1,2	95-50-1	
Dichlorobenzene 1,3	541-73-1	
Dichlorobenzene 1,4	106-46-7	
Dichlorobenzidine 3,3'	91-94-1	

Dieldrin	60-57-1	2.5
Diethylphthalate	84-66-2	1.9
Dimethylphthalate	131-11-3	1.6
Dinitrotoluene 2,4	121-14-2	5.7
Dinitrotoluene 2,6	606-20-2	1.9
Dioctylphthalate	117-84-0	2.5
Endosulfan sulfate	1031-07-8	5.6
Ethylhexylphthalate (2-Bis)	117-81-7	2.5
Fluoranthene	206-44-0	2.2
Fluorene	86-73-7	1.9
Heptachlor	76-44-8	1.9
Heptachlor Epoxide	1024-57-3	2.2
Hexachlorobenzene	118-74-1	1.9
Hexachlorobutadiene	87-68-3	0.9
Hexachlorocyclohexane, Beta	319-85-7	4.2
Hexachlorocyclohexane, Delta	319-86-8	3.1
Hexachloroethane	67-72-1	1.6
Indeno(1,2,3-cd)pyrene	193-39-5	3.7
Isophorone	78-59-1	2.2
Naphthalene	91-20-3	1.6
Nitrobenzene	98-95-3	1.9
Nitrophenol 2	88-75-5	3.6
Nitrosodiphenylamine N	86-30-6	1.9
PCB 1221	11104-28-2	30.0
PCB 1254	11097-69-1	36.0
Phenanthrene	85-01-8	5.4
Phenol	108-95-2	1.5
Pyrene	129-00-0	1.9
Trichlorobenzene 1,2,4	120-82-1	1.9

TABLE 17

SEMI-VOLATILE ORGANICS BY EPA METHOD 1625 REGULATED LIST

Analyte	CAS No.	MDL (ug/L)
Benzidine	92-87-5	50
Chloroethyl Ether (Bis-2)	111-44-4	10
Dichlorobenzene 1,2	95-50-1	10
Dichlorobenzene 1,3	541-73-1	10
Dichlorobenzene 1,4	106-46-7	10
Dichlorobenzidine	91-94-1	50
Dichlorophenol 2,4	120-83-2	10
Diphenylhydrazine 1,2	122-66-7	20
Hexachlorobenzene	118-74-1	10
Hexachlorobutadiene	87-68-3	10
Hexachlorocyclopentadiene	77-47-4	10
Hexachloroethane	67-72-1	10
Isophorone	78-59-1	10
Nitrobenzene	98-95-3	10
Nitrosodimethylamine N	62-75-9	50
Nitrosodiphenylamine N	86-30-6	20
Pentachlorophenol	87-86-5	50
Trichlorophenol 2,4,5	95-95-5	10
Trichlorophenol 2,4,6	88-06-2	10
Chlorophenol	95-57-8	10
Monohydric phenol	108-95-2	10

TABLE 18

SEMI-VOLATILE ORGANICS BY EPA METHOD 1625 COMPLETE LIST

Analyte	CAS No.	MDL (ug/L)
Acenaphthene	83-32-9	10
Acenapthylene	208-96-8	10
Anthracene	120-12-7	10
Benzidine	92-87-5	50
Benzo(a)anthracene	56-55-3	10
Benzo(b)fluoranthene	205-99-2	10
Benzo(k)fluoranthene	207-08-9	10
Benzo(g,h,i)perylene	191-24-2	20
Benzo(a)pyrene	50-32-8	10
Biphenyl	92-52-4	10
Bromophenyl-phenyl ether 4	101-55-3	10
Butylbenzylphthalate	85-68-7	10
Carbazole	86-74-8	20
Chloroethyl Ether (Bis-2)	111-44-4	10
Chloroethoxymethane (Bis-2)	111-91-1	10
Chlorophenyl-phenyl ether 4	7005-72-3	10
Chloroisopropyl Ether (Bis-2)	108-60-1	10
Chloronaphthalene 2	91-58-7	10
Chlorophenol 2	95-57-8	10
Chlorophenol 4 3-methyl	59-50-7	10
Chrysene	218-01-9	10
Decane	124-18-5	10
Dibenz(a,h)anthracene	53-70-3	20
Dibenzofuran	132-64-9	10
Dibutylphthalate	84-74-2	10
Dichlorobenzene 1,2	95-50-1	10
Dichlorobenzene 1,3	541-73-1	10

Dichlorobenzene 1,4	106-46-7	10
Dichlorobenzidine 3,3'	91-94-1	50
Dichlorophenol 2,4	120-83-2	10
Diethylphthalate	84-66-2	10
Dimethylphenol 2,4	105-67-9	10
Dimethylphthalate	131-11-3	10
Dinitro-2-methylphenol 4,6	534-52-1	20
Dinitrophenol 2,4	51-28-5	50
Dinitrotoluene 2,4	121-14-2	10
Dinitrotoluene 2,6	606-20-2	10
Dioctylphthalate	117-84-0	10
Diphenyl amine	122-39-4	20
Diphenyl ether	101-84-8	10
Diphenylhydrazine 1,2	122-66-7	20
Docosane	629-97-0	10
Dodecane	112-40-2	10
Eicosane	112-95-8	10
Ethylhexylphthalate (2-Bis)	117-81-7	10
Fluoranthene	206-44-0	10
Fluorene	86-73-7	10
Hexachlorobenzene	118-74-1	10
Hexachlorobutadiene	87-68-3	10
Hexachlorocyclopentadiene	77-47-4	10
Hexachloroethane	67-72-1	10
Hexacosane	630-01-3	10
Hexadecane	544-76-3	10
Indeno(1,2,3-cd)pyrene	193-39-5	20
Isophorone	78-59-1	10
Naphthalene	91-20-3	10
Naphthylamine Beta	91-59-8	50

Nitrobenzene	98-95-3	10
Nitrophenol 2	88-75-5	20
Nitrophenol 4	100-02-7	50
Nitrosodimethylamine N	62-75-9	50
Nitrosodiphenylamine N	86-30-6	20
Nitrosodipropylamine N	621-64-7	20
Octacosane	630-02-4	10
Octadecane	593-45-3	10
Pentachlorophenol	87-86-5	50
Phenanthrene	85-01-8	10
Phenol	108-95-2	10
Pyrene	129-00-0	10
Styrene	100-42-5	10
Tetracosane	646-31-1	10
Tetradecane	629-59-4	10
Triacontane	638-68-8	10
Trichlorobenzene 1,2,3	87-61-6	10
Trichlorobenzene 1,2,4	120-82-1	10
Trichlorophenol 2,3,6	93-37-55	10
Trichlorophenol 2,4,5	95-95-5	10
Trichlorophenol 2,4,6	88-06-2	10

TABLE 19

SEMI-VOLATILE ORGANICS BY EPA METHOD 8270 REGULATED LIST

		WATER	SOIL
Analyte	CAS No.	PQL (ug/L)	PQL (ug/Kg)
Aldrin	309-00-2	10	660
Chloroethyl Ether (Bis-2)	111-44-4	10	660
Chlorophenol 2	95-57-8	10	660
DDT 4,4'	50-29-3	10	660
Dichlorobenzene 1,2	95-50-1	10	660
Dichlorobenzene 1,3	541-73-1	10	660
Dichlorobenzene 1,4	106-46-7	10	660
Dichlorobenzidine 3,3'	91-94-1	20	1320
Dichlorophenol 2,4	120-83-2	10	660
Dieldrin	60-57-1	10	660
Dinitrotoluene 2,4	121-14-2	10	660
Diphenylhydrazine 1,2	122-66-7	2	132
Heptachlor	76-44-8	10	660
Heptachlor Epoxide	1024-57-3	10	660
Hexachlorobenzene	118-74-1	10	660
Hexachlorobutadiene	87-68-3	10	660
Hexachlorocyclopentadiene	77-47-4	10	660
Hexachloroethane	67-72-1	10	660
Isophorone	78-59-1	10	660
Methoxychlor	72-43-5	10	660
Nitrobenzene	98-95-3	10	660
Nitrosodibutylamine N	924-16-3	10	660
Nitrosodiethylamine N	55-18-5	10	660
Nitrosodimethylamine N	62-75-9	10	660
Nitrosodiphenylamine N	86-30-6	10	660
Pentachlorobenzene	608-93-5	10	660

Pentachlorophenol	87-86-5	50	3300
Phenol	108-95-2	10	660
Tetrachlorobenzene 1,2,4,5	95-94-3	10	660
Trichlorophenol 2,4,5	95-95-5	10	660
Trichlorophenol 2,4,6	88-06-2	10	660

TABLE 20

SEMI-VOLATILE ORGANICS BY EPA METHOD 8270 COMPLETE LIST

		WATER	SOIL
Analyte	CAS No.	PQL (ug/L)	PQL (ug/Kg)
Acenaphthene	83-32-9	10	660
Acenapthylene	208-96-3	10	660
Aldrin	309-00-2	10	660
Anthracene	120-12-7	10	660
Benzo(a)anthracene	56-55-3	10	660
Benzo(b)fluoranthene	205-99-2	10	660
Benzo(k)fluoranthene	207-08-9	10	660
Benzo(g,h,i)perylene	191-24-2	10	660
Benzo(a)pyrene	50-32-8	10	660
Benzoic acid	65-85-0	50	3300
Benzyl alcohol	100-51-6	20	1320
Bromophenyl-phenyl ether 4	101-55-3	10	660
Butylbenzylphthalate	85-68-7	10	660
Chloroaniline 4	106-47-8	20	1320
Chloroethyl Ether (Bis-2)	111-44-4	10	660
Chloroethoxymethane (Bis-2)	111-91-1	10	660
Chlorophenyl-phenyl ether 4	7005-72-3	10	660
Chloroisopropyl Ether (Bis-2)	108-60-1	10	660
Chloronaphthalene 2	91-58-7	10	660
Chlorophenol 2	95-57-8	10	660
Chlorophenol 4 3-methyl	59-50-7	20	1320
Chrysene	218-01-9	10	660
Cresol ortho	95-48-7	10	660
Cresol para	106-44-5	10	660
DDT 4,4'	50-29-3	10	660
Dibenz(a,h)anthracene	53-70-3	10	660

Dibenzofuran	132-64-9	10	660
Dibutylphthalate	84-74-2	10	660
Dichlorobenzene 1,2	95-50-1	10	660
Dichlorobenzene 1,3	541-73-1	10	660
Dichlorobenzene 1,4	106-46-7	10	660
Dichlorobenzidine 3,3'	91-94-1	20	1320
Dichlorophenol 2,4	120-83-2	10	660
Dieldrin	60-57-1	10	660
Diethylphthalate	84-66-2	10	660
Dimethylphenol 2,4	105-67-9	10	660
Dimethylphthalate	131-11-3	10	660
Dinitro-2-methylphenol 4,6	534-52-1	50	3300
Dinitrophenol 2,4	51-28-5	50	3300
Dinitrotoluene 2,4	121-14-2	10	660
Dinitrotoluene 2,6	606-20-2	10	660
Dioctylphthalate	117-84-0	10	660
Diphenylhydrazine 1,2	122-66-7	2	132
Ethylhexylphthalate (2-Bis)	117-81-7	10	660
Fluoranthene	206-44-0	10	660
Fluorene	86-73-7	10	660
Heptachlor	76-44-8	10	660
Heptachlor Epoxide	1024-57-3	10	660
Hexachlorobenzene	118-74-1	10	660
Hexachlorobutadiene	87-68-3	10	660
Hexachlorocyclopentadiene	77-47-4	10	660
Hexachloroethane	67-72-1	10	660
Indeno(1,2,3-cd)pyrene	193-39-5	10	660
Isophorone	78-59-1	10	660
Methoxychlor	72-43-5	10	660
Naphthalene	91-20-3	10	660

Naphthalene 2-methyl	91-57-6	10	660
Nitroaniline 2	88-74-4	50	3300
Nitroaniline 3	99-09-2	50	3300
Nitroaniline 4	100-01-6	50	3300
Nitrobenzene	98-95-3	10	660
Nitrophenol 2	88-75-5	10	660
Nitrophenol 4	100-02-7	50	3300
Nitrosodibutylamine N	924-16-3	10	660
Nitrosodiethylamine N	55-18-5	10	660
Nitrosodimethylamine N	62-75-9	10	660
Nitrosodiphenylamine N	86-30-6	10	660
Nitrosodipropylamine N	621-64-7	10	660
Pentachlorobenzene	608-93-5	10	660
Pentachlorophenol	87-86-5	50	3300
Phenanthrene	85-01-8	10	660
Phenol	108-95-2	10	660
Pyrene	129-00-0	10	660
Tetrachlorobenzene 1,2,4,5	95-94-3	10	660
Trichlorobenzene 1,2,4	120-82-1	10	660
Trichlorophenol 2,4,5	95-95-5	10	660
Trichlorophenol 2,4,6	88-06-2	10	660

TABLE 21

SEMI-VOLATILE ORGANICS BY EPA METHOD 525 REGULATED LIST

Analyte	CAS No.	MDL (ug/L)
Aldrin	309-00-2	0.100
Atrazine	1912-24-9	0.100
Endrin	72-20-8	0.500
Heptachlor	76-44-8	0.040
Heptachlor Epoxide	1024-57-3	0.200
Hexachlorobenzene	118-74-1	0.100
Hexachlorocyclohexane, Gamma	58-89-9	0.100
Hexachlorocyclopentadiene	77-47-4	0.030
Methoxychlor	72-43-5	0.040
Pentachlorophenol	87-86-5	0.300
Simazine	122-34-9	0.200
Toxaphene	8001-35-2	9.000

TABLE 22

SEMI-VOLATILE ORGANICS BY EPA METHOD 525 COMPLETE LIST

Analyte	CAS No.	MDL (ug/L)
Acenapthylene	208-96-8	0.100
Aldrin	309-00-2	0.100
Anthracene	120-12-7	0.040
Atrazine	1912-24-9	0.100
Benzo(a)anthracene	56-55-3	0.040
Benzo(b)fluoranthene	205-99-2	0.200
Benzo(k)fluoranthene	207-08-9	0.200
Benzo(g,h,i)perylene	191-24-2	0.100
Benzo(a)pyrene	50-32-8	0.040
Butylbenzylphthalate	85-68-7	0.300
Chlordane alpha	5103-71-9	0.200
Chlordane gamma	5103-74-2	0.100
Chlorobiphenyl 2	2051-60-7	0.100
Chrysene	218-01-9	0.040
Dibenz(a,h)anthracene	53-70-3	0.100
Dibutylphthalate	84-74-2	0.300
Dichlorobiphenyl 2,3	16605-91-7	0.100
Diethylphthalate	84-66-2	0.800
Di(2-ethylhexyl)phthalate	103-23-1	0.600
Di(2-ethylhexyl)adipate	117-81-7	0.600
Dimethylphthalate	131-11-3	0.040
Endrin	72-20-8	0.500
Fluorene	86-73-7	0.200
Heptachlor	76-44-8	0.040
Heptachlor Epoxide	1024-57-3	0.200
Heptachlorobiphenyl 2,2',3,3',4,4',6	52663-71-5	0.100
Hexachlorobenzene	118-74-1	0.100

Hexachlorobiphenyl 2,2',4,4',5,6'	60145-22-4	0.100
Hexachlorocyclohexane, Gamma	58-89-9	0.100
Hexachlorocyclopentadiene	77-47-4	0.030
Indeno(1,2,3-cd)pyrene	193-39-5	0.100
Methoxychlor	72-43-5	0.040
Octachlorobiphenyl 2,2',3,3',4,5',6,6'	40186-71-8	0.200
Pentachlorobiphenyl 2,2',3',4,6	60233-25-2	0.100
Pentachlorophenol	87-86-5	0.300
Phenanthrene	85-01-8	0.010
Pyrene	129-00-0	0.020
Simazine	122-34-9	0.200
Tetrachlorobiphenyl 2,2',4,4'	2437-79-8	0.100
Toxaphene	8001-35-2	9.000
Trichlorobiphenyl 2,4,5	15862-07-4	0.060

TABLE 23

EPA-CLP PESTICIDES/PCB TARGET COMPOUND LIST

			WATER	SOIL
	Analyte	CAS No.	CRQL (ug/L)	CRQL (ug/Kg)
100.	alpha-BHC	319-84-6	0.05	8.0
101.	beta-BHC	319-85-7	0.05	8.0
102.	delta-BHC	319-86-8	0.05	8.0
103.	gamma-BHC (Lindane)	58-89-9	0.05	8.0
104.	Heptachlor	76-44-8	0.05	8.0
105.	Aldrin	309-00-2	0.05	8.0
106.	Heptachlor epoxide	1024-57-3	0.05	8.0
107.	Endosulfan I	959-98-8	0.05	8.0
108.	Dieldrin	60-57-1	0.10	16.0
109.	4,4'-DDE	72-55-9	0.10	16.0
110.	Endrin	72-20-8	0.10	16.0
111.	Endosulfan II	33213-65-9	0.10	16.0
112.	4,4'-DDD	72-54-8	0.10	16.0
113.	Endosulfan sulfate	1031-07-8	0.10	16.0
114.	4,4'-DDT	50-29-3	0.10	16.0
115.	Methoxychlor	72-43-5	0.5	80.0
116.	Endrin ketone	53494-70-5	0.10	16.0
117.	alpha-Chlordane	5103-71-9	0.5	80.0
118.	gamma-Chlordane	5103-74-2	0.5	80.0
119.	Toxaphene	8001-35-2	1.0	160.0
120.	Aroclor-1016	12674-11-2	0.5	80.0
121.	Aroclor-1221	11104-28-2	0.5	80.0
122.	Aroclor-1232	11141-16-5	0.5	80.0
123.	Aroclor-1242	53469-21-9	0.5	80.0
124.	Aroclor-1248	12672-29-6	0.5	80.0

125.	Aroclor-1254	11097-69-1	1.0	160.0
126.	Aroclor-1260	11096-82-5	1.0	160.0

Note:Specific quantitation limits are highly matrix dependent. The quantitation limits listed herein are provided for guidance and may not always be achievable.

TABLE 24

ORGANOCHLORINE PESTICIDES AND PCBS BY EPA METHOD 608
REGULATED LIST

Analyte	CAS No.	MDL (ug/L)
Aldrin	309-00-2	0.004
Chlordane	57-74-9	0.014
DDT	50-29-3	0.012
Dieldrin	60-57-1	0.002
Endrin	72-20-8	0.006
Heptachlor	76-44-8	0.003
Heptachlor Epoxide	1024-57-3	0.083
Hexachlorocyclohexane, Alpha	319-84-6	0.003
Hexachlorocyclohexane, Beta	319-85-7	0.006
Hexachlorocyclohexane, Gamma	58-89-9	0.004
Polychlorinated Biphenyls (PCBs)	1336-36-3	0.200
Toxaphene	8001-35-2	0.240
PCB 1242	53469-21-9	0.065

TABLE 25

ORGANOCHLORINE PESTICIDES AND PCBS BY EPA METHOD 608
COMPLETE LIST

Analyte	CAS No.	MDL (ug/L)
Aldrin	309-00-2	0.004
Chlordane	57-74-9	0.014
DDD 4,4'	72-54-8	0.011
DDE 4,4'	72-55-9	0.004
DDT 4,4'	50-29-3	0.012
Dieldrin	60-57-1	0.002
Endosulfan I	959-98-8	0.014
Endosulfan II	33213-65-9	0.004
Endosulfan sulfate	1031-07-8	0.066
Endrin	72-20-8	0.006
Endrin aldehyde	7421-93-4	0.023
Heptachlor	76-44-8	0.003
Heptachlor Epoxide	1024-57-3	0.083
Hexachlorocyclohexane, Alpha	319-84-6	0.003
Hexachlorocyclohexane, Beta	319-85-7	0.006
Hexachlorocyclohexane, Delta	319-86-8	0.009
Hexachlorocyclohexane, Gamma	58-89-9	0.004
PCB 1242	53469-21-9	0.065
Polychlorinated Biphenyls (PCBs)	1336-36-3	0.200
Toxaphene	8001-35-2	0.240

TABLE 26

ORGANOCHLORINE PESTICIDES AND PCBS BY EPA METHOD 505
REGULATED LIST

Analyte	CAS No.	MDL (ug/L)
Aldrin	309-00-2	0.007
Atrazine	1912-24-9	2.400
Chlordane	57-74-9	0.140
Dieldrin	60-57-1	0.012
Endrin	72-20-8	0.063
Heptachlor	76-44-8	0.003
Heptachlor Epoxide	1024-57-3	0.004
Hexachlorobenzene	118-74-1	0.002
Hexachlorocyclohexane, Gamma	58-89-9	0.003
Hexachlorocyclopentadiene	77-47-4	0.130
Methoxychlor	72-43-5	0.960
Simazine	122-34-9	6.800
Toxaphene	8001-35-2	1.000
PCB 1016	12674-11-2	0.080
PCB 1221	11104-28-2	15.000
PCB 1232	11141-16-5	0.480
PCB 1242	53469-21-9	0.310
PCB 1248	12672-29-6	0.102
PCB 1254	11097-69-1	0.102
PCB 1260	11096-82-5	0.189

TABLE 27

ORGANOCHLORINE PESTICIDES AND PCBS BY EPA METHOD 505
COMPLETE LIST

Analyte	CAS No.	MDL (ug/L)
Alachlor	5972-60-8	0.225
Aldrin	309-00-2	0.007
Atrazine	1912-24-9	2.400
Chlordane	57-74-9	0.140
Chlordane alpha	5103-71-9	0.006
Chlordane gamma	5103-74-2	0.012
Dieldrin	60-57-1	0.012
Endrin	72-20-8	0.063
Heptachlor	76-44-8	0.003
Heptachlor Epoxide	1024-57-3	0.004
Hexachlorobenzene	118-74-1	0.002
Hexachlorocyclohexane, Gamma	58-89-9	0.003
Hexachlorocyclopentadiene	77-47-4	0.130
Methoxychlor	72-43-5	0.960
Nonachlor cis		0.027
Nonachlor trans	39765-80-5	0.011
PCB 1016	12674-11-2	0.080
PCB 1221	11104-28-2	15.000
PCB 1232	11141-16-5	0.480
PCB 1242	53469-21-9	0.310
PCB 1248	12672-29-6	0.102
PCB 1254	11097-69-1	0.102
PCB 1260	11096-82-5	0.189
Simazine	122-34-9	6.800
Toxaphene	8001-35-2	1.000

TABLE 28

ORGANOCHLORINE PESTICIDES AND PCBS BY EPA METHOD 8080
REGULATED LIST

		WATER	SOIL
Analyte	CAS No.	PQL (ug/L)	PQL (ug/Kg)
Aldrin	309-00-2	0.04	2.68
Chlordane	57-74-9	0.14	9.38
DDT 4,4'	50-29-3	0.12	8.04
Dieldrin	60-57-1	0.02	1.34
Endrin	72-20-8	0.06	4.02
Heptachlor	76-44-8	0.03	2.01
Heptachlor Epoxide	1024-57-3	0.83	55.61
Hexachlorocyclohexane, Alpha	319-84-6	0.03	2.01
Hexachlorocyclohexane, Beta	319-85-7	0.06	4.02
Hexachlorocyclohexane, Gamma	58-89-9	0.04	2.68
Methoxychlor	72-43-5	1.76	117.92
Toxaphene	8001-35-2	2.40	160.80

TABLE 29

ORGANOCHLORINE PESTICIDES AND PCBS BY EPA METHOD 8080
COMPLETE LIST

		WATER	SOIL
Analyte	CAS No.	PQL (ug/L)	PQL (ug/Kg)
Aldrin	309-00-2	0.04	2.68
Chlordane	57-74-9	0.14	9.38
DDD 4,4'	72-54-8	0.11	7.37
DDE 4,4'	72-55-9	0.04	2.68
DDT 4,4'	50-29-3	0.12	8.04
Dieldrin	60-57-1	0.02	1.34
Endosulfan I	959-98-8	0.14	9.38
Endosulfan II	33213-65-9	0.04	2.68
Endosulfan sulfate	1031-07-8	0.66	44.22
Endrin	72-20-8	0.06	4.02
Endrin aldehyde	7421-93-4	0.23	15.41
Heptachlor	76-44-8	0.03	2.01
Heptachlor Epoxide	1024-57-3	0.83	55.61
Hexachlorocyclohexane, Alpha	319-84-6	0.03	2.01
Hexachlorocyclohexane, Beta	319-85-7	0.06	4.02
Hexachlorocyclohexane, Delta	319-86-8	0.09	6.03
Hexachlorocyclohexane, Gamma	58-89-9	0.04	2.68
Methoxychlor	72-43-5	1.76	117.92
PCB 1242	53469-21-9	0.65	43.55
Toxaphene	8001-35-2	2.40	160.80

TABLE 30

SELECTED PCBs ONLY BY EPA METHOD 8080 MODIFIED

		WATER	SOIL
Analyte	CAS No.	PQL (ug/L)	PQL (ug/Kg)
PCB 1016	12674-11-2	2.0	134
PCB 1221	11104-28-2	2.0	134
PCB 1232	11141-16-5	1.3	87
PCB 1242	53469-21-9	0.65	44
PCB 1248	12672-29-6	0.65	44
PCB 1254	11097-69-1	0.65	44
PCB 1260	11096-82-5	0.65	44

TABLE 31

CHLORINATED HERBICIDES by EPA METHOD 615

Analyte	CAS No.	MDL (ug/L)
Dalapon	75-99-0	5.80
Dicamba	1918-00-9	0.27
Dichlorophenoxyacetic Acid (2,4-D)	94-75-7	1.20
Dichlorophenoxybutanoic acid (2,4-DB)	94-82-6	0.91
Dichlorophenoxypropionic acid	120-36-5	0.65
Dinoseb	88-85-7	0.07
MCPA	94-74-6	249
MCPP	93-65-2	192
Trichlorophenoxyacetic acid (2,4,5-T)	93-76-5	0.20
Trichlorophenoxypropionic Acid (2,4,5 -TP)	93-72-1	0.17

TABLE 32

ORGANOCHLORINE HERBICIDES by EPA METHOD 8150

Analyte	CAS No.	MDL (ug/L)
Dichlorophenoxyacetic Acid (2,4-D)	94-75-7	1.20
Trichlorophenoxypropionic Acid (2,4,5 -TP)	93-72-1	0.17

TABLE 33

CHLORINATED PESTICIDES by EPA METHOD 508 REGULATED LIST

Analyte	CAS No.	MDL (ug/L)
Aldrin	309-00-2	0.075
DDT	50-29-3	0.060
Dieldrin	60-57-1	0.020
Endrin	72-20-8	0.015
Heptachlor	76-44-8	0.010
Heptachlor Epoxide	1024-57-3	0.015
Hexachlorobenzene	118-74-1	0.008
Hexachlorocyclohexane, Alpha	319-84-6	0.025
Hexachlorocyclohexane, Beta	319-85-7	0.010
Hexachlorocyclohexane, Gamma	58-89-9	0.010
Hexachlorocyclohexane, Technical		0.015
Methoxychlor	72-43-5	0.050

TABLE 34

CHLORINATED PESTICIDES by EPA METHOD 508 COMPLETE LIST

Analyte	CAS No.	MDL (ug/L)
Aldrin	309-00-2	0.075
Chlordane alpha	5103-71-9	0.002
Chlordane gamma	5103-74-2	0.002
DDD 4,4'	72-54-8	0.003
DDE 4,4'	72-55-9	0.010
DDT 4,4'	50-29-3	0.060
Dieldrin	60-57-1	0.020
Endosulfan I	959-98-8	0.015
Endosulfan II	33213-65-9	0.024
Endosulfan sulfate	1031-07-8	0.015
Endrin	72-20-8	0.015
Endrin aldehyde	7421-93-4	0.025
Heptachlor	76-44-8	0.010
Heptachlor Epoxide	1024-57-3	0.015
Hexachlorobenzene	118-74-1	0.008
Hexachlorocyclohexane, Alpha	319-84-6	0.025
Hexachlorocyclohexane, Beta	319-85-7	0.010
Hexachlorocyclohexane, Delta	319-86-8	0.010
Hexachlorocyclohexane, Gamma	58-89-9	0.010
Hexachlorocyclohexane, Technical		0.015
Methoxychlor	72-43-5	0.050

TABLE 35

TRIAZINE PESTICIDES by EPA METHOD 619

Analyte	CAS No.	MDL (ug/L)
Ametryn	834-12-8	0.06
Atrazine	1912-24-9	0.05
Prometon	1610-18-0	0.03
Prometryn	7287-19-6	0.06
Propazine	139-40-2	0.03
Simetryn	1014-70-6	0.07
Simazine	122-34-9	0.06
Terbuthylazine	5915-41-3	0.03
Terbutryn	886-50-0	0.05

TABLE 36

TRIAZINE PESTICIDES BY EPA METHOD 507

Analyte	CAS No.	MDL (ug/L)
Atrazine	1912-24-9	0.130
Simazine	122-34-9	0.075

TABLE 37

PESTICIDES, PCBS, AND HERBICIDES by LIQUID CHROMATOGRAPHY with MASS SPECTROMETRY DETECTION

This space is reserved for listing of analytes as instrumentation is developed and analytical requirements make necessary the employment of LC/MS methods.

Analyte	CAS No.	Detection Limit

TABLE 38

PESTICIDES, PCBS, AND HERBICIDES by LIQUID CHROMATOGRAPHY with FLUORESCENCE DETECTION

Analyte	CAS No.	MDL
Sulfometuron Methyl		
Bendiocarb		
Diuron		

TABLE 39

NITROSO-AMINES BY EPA METHOD 607

Analyte	CAS No.	MDL (ug/L)
Nitrosodimethylamine N	62-75-9	0.15
Nitrosodiphenylamine N	86-30-6	0.81
Nitrosodipropylamine N	621-64-7	0.46

TABLE 40

POLYNUCLEAR AROMATIC HYDROCARBONS BY EPA METHOD 610

Analyte	CAS No.	MDL
Acenaphthene	83-32-9	1.800
Acenapthylene	208-96-8	2.300
Anthracene	120-12-7	0.660
Benzo(a)anthracene	56-55-3	0.013
Benzo(b)fluoranthrene	205-99-2	0.018
Benzo(k)fluoranthrene	207-08-9	0.017
Benzo(g,h,i)perylene	191-24-2	0.076
Benzo(a)pyrene	50-32-8	0.023
Chrysene	218-01-9	0.150
Dibenz(a,h)anthracene	53-70-3	0.030
Fluoranthene	206-44-0	0.210
Fluorene	86-73-7	0.210
Indeno(1,2,3-cd)pyrene	193-39-5	0.043
Naphthalene	91-20-3	1.800
Phenanthrene	85-01-8	0.640
Polynuclear Aromatic Hydrocarbons	10-53-7	1.000
Pyrene	129-00-0	0.270

TABLE 41

DIOXIN (2,3,7,8-TCDD) BY EPA METHOD 613

Analyte	CAS NO.	MDL (ug/L)
Dioxin (2,3,7,8-TCDD)	1746-01-6	0.002

TABLE 42

CLP TARGET ANALYTE LIST (TAL)
for METALS

		WATER	SOIL
Analyte	CAS No.	CRDL (ug/L)	CRDL (mg/Kg)
Aluminum	7429-90-5	200	40
Antimony	7440-36-0	60	12
Arsenic	7440-38-2	10	2
Barium	7440-39-3	200	40
Beryllium	7440-41-7	5	1.0
Cadmium	7440-43-9	5	1.0
Calcium	7440-70-2	5000	2000
Chromium	7440-47-3	10	2.0
Cobalt	7440-48-4	50	10
Copper	7440-50-8	25	5.0
Cyanide	10-71-9	10	10
Iron, Total	7439-89-6	100	20
Iron, Dissolved	7439-89-6	100	20
Lead	7439-92-1	5	1.0
Magnesium	7439-95-4	5000	2000
Manganese,Total	7439-96-5	15	3.0
Manganese, Dis.	7439-96-5	15	3.0
Mercury	7439-97-6	0.2	0.2
Nickel	7440-02-0	40	8.0
Potassium	7440-09-7	5000	2000
Selenium	7782-49-2	5	1.0
Silver	7440-22-4	10	2.0
Sodium	7440-23-5	5000	2000
Thallium	7440-28-0	10	2.0
Vanadium	7440-62-2	50	10.0

Zinc	7440-66-6	20	4.0

TABLE 43

non-CLP TARGET ANALYTE LIST (TAL)
for METALS

		WATER	SOIL
Analyte	CAS No.	CRDL (ug/L)	CRDL (mg/Kg)
Cesium	7440-46-2	1000	200
Chromium (VI)	7440-47-3	10	1
Lithium	7439-93-2	100	20
Molybdenum	7439-98-7	200	40
Silicon	7440-21-3	100	0
Strontium	7440-24-6	200	40
Tin	7440-31-5	200	40

TABLE 44

Water Quality Parameter List (WQPL)

Parameter	CAS Number	Detection Limits(mg/L)	Method Ref.*
Chloride		5	EPA 325 Series or 300.0
Nitrate/Nitrite as N	10-28-6	5	EPA 353.1 or 353.2
Nitrite as N		5	EPA 354.1
Sulfate		5	EPA 375.4 or 300.0
Fluoride	10-72-0	5	EPA 340 Series or 300.0
Bicarbonate	10-13-9	10	EPA 310.1
Carbonate	10-14-0	10	EPA 310.1
Total Dissolved Solids	10-33-3	10	EPA 160.1
Total Suspended Solids	10-32-2	5	EPA 160.2
Dissolved Oxygen	10-88-8	0.5	S.M. 4500 - O
Oil and Grease	10-30-0	5	EPA 413.1 or 413.2
Total Petroleum Hydrocarbons		1	EPA 418.1
pH	10-29-7	0.1 pH Unit	EPA 150.1
Specific Conductivity	10-34-4	1	EPA 120.1
Sulfide		4.	EPA 376 Series
Phosphorus, Total		5	EPA 365 Series
Phosphate, Ortho	11-36-9	5	EPA 365 Series
Ammonia		5	EPA 350 Series
$CBOD_{5\ day}$	11-03-0	0.5	S.M. 5210B
Fecal Coliform	10-06-0	1	S.M. 9221C
Cyanide		5	EPA 335.2 or 335.3
Phenolics		1	EPA 420 Series
Silica		5	EPA 370.1
Hexavalent Chromium		5	EPA 218.5
TOC/DOC		5	EPA 415.1 or ASTM D4129-82
Total Kjeldahl Nitrogen (TKN)		5	EPA 351 Series

*All equivalent USEPA SW846 methods, Standard Methods, and other methods used or referenced require permission from EG&G Rocky Flats.

TABLE 45

TCLP REGULATED ONLY

Analyte	EPA Method
TCLP Extraction Volatiles (Zero Headspace) Semi-Volatiles Pesticides/Herbicides Metals	EPA
Volatiles	8240
Semi-Volatiles	8270
Pesticides/Herbicides	8080/8150
Metals (Ag, As, Ba, Cd, Cr, Hg, Pb, Se)	6010/7000

TABLE 46

TCLP COMPLETE

Analyte	EPA Method
TCLP Extraction Volatiles (Zero Headspace) Semi-Volatiles Pesticides/Herbicides Metals	EPA
Volatiles	8240
Semi-Volatiles	8270
Pesticides/Herbicides	8080/8150
Metals (Ag, As, Ba, Cd, Cr, Hg, Pb, Se)	6010/7000

TABLE 47

RCRA CHARACTERISTICS

Ignitability/Flashpoint	EPA METHOD
Corrosivity	
pH	9040
Toward Steel	1110
Reactivity (As Total Sulfide & Total Cyanide)	9030/9010
Toxicity (EP)	
EP Toxicity Extraction	1310
Volatiles	8240
Semi-Volatiles	8270
Pesticides/Herbicides	8080/8150
Metals (Ag, As, Ba, Cd, Cr, Hg, Pb, Se)	6010/7000

TABLE 48

SEQUENTIAL EXTRACTION

Metal Parameters	Detection Limit (mg/Kg)
Aluminum	40
Arsenic	2
Barium	40
Beryllium	1.0
Cadmium	1.0
Chromium	2.0
Cobalt	10
Copper	5.0
Iron	20
Lead	1.0
Manganese	3.0
Nickel	8.0
Selenium	1.0
Strontium	40
Zinc	4.0

TABLE 51

BIOTA TOXICITY TESTING

ECOSYSTEM TYPE	TEST
AQUATIC	
FRESH WATER	CLASS I
	Selenastrum capricornutum (alga)
	4 day acute
	7 day chronic
	Ceriodaphnia dubia (cladoceron)
	2 day acute
	7 day chronic
	Pimephales promelas (fathead minnow)
	2 day acute
	7 day chronic
VEGATATION	CLASS I
	Lemna minor (marcophyte)
SEDIMENTS	CLASS II
	Macroinvertebrates
TERRESTRIAL	
SOILS/SEDIMENTS	CLASS I
	Eisenia foetida (earthworm)
	14 day acute
	Latuca sativa L. (lettuce)
	5 day seed germination acute
	CLASS I INDIRECT (ELUATES)
	Selenastrum capricornutum (alga)
	4 day acute
	Ceriodaphnia dubia (cladoceron)
	2 day acute
	Pimephales spp. (fathead minnow)

	2 day acute
	Latuca sativa L. (lettuce)
	5 day root elongation acute
INVERTEBRATES	CLASS I
	Apis spp. (honey bee)
	Pogonomyrmex spp. (harvester ants)
	Acheta deomesticus (crickets)
	grasshoppers
	Caenorhabditis elegans (nematode)
VEGETATION	CLASS II
	Tradscantia spp.
	mutagenicity
	hexaploid wheat
	cytogenicity
MICROBIAL POPULATIONS	CLASS I
	ATP in bacteria
	growth inhibition
	E.Coli
	enzymatic inhibition
	Photobacterium phosphoreum
	bioluminescence inhibition
	Pseudomonas fluorescens
	population density response
	Spirillium volutans
	motility loss
	Respiration inhibition
	Nitrification inhibition

TABLE 52

BIOTA

POPULATION AND COMMUNITY SURVEY	
COMMUNITY TYPE	METHODOLOGY
Periphyton	Taxonomic identification
blue-green algae	Cell density per taxon
green algae	Biomass estimates
	chlorophyll-a
	phaeophytin-a
	ash-free dry weight
	Species diversity
	Relative abundance
Benthic Macroinvertebrates	Taxonomic identification
crayfish	Number of individuals per taxon
fly larvae	Biomass estimates
	ash-free dry weight
	Species diversity
	Relative abundance
Plankton	Taxonomic identification
Phytoplankton	Cell density per taxon
Zooplankton	Biomass estimates
	chlorophyll-a
	phaeophytin-a
	ash-free dry weight
	Species diversity
	Relative abundance

Fish	Taxonomic identification
	Number of individuals per taxon
	Weight
	Length
	Sex
	Age (Fish Scale Analysis)
	Species diversity
	Relative abundance
Terrestrial Invertebrates	Taxonomic identification
insects	Number of individuals per taxon
spiders	Biomass estimates
earthworms	Ash-free dry weight
grasshoppers	Dry weight
	Habitat type/plant species used
	Species diversity
	Relative abundance
Birds	Taxonomic identification
	Number of individuals per taxon
	Weight
	Sex
	Reproductive status
	Adult/young ratio
	Species distribution
	Species diversity
	Relative abundance
Reptiles/Amphibians	Taxonomic identification
	Number of individuals per taxon
	Habitat type
Small mammals	Taxonomic identification
mice	Number of individuals per taxon
voles	Weight

	Sex
	Reproductive status
	Adult/young ratio
	Species distribution
	Species diversity
	Relative abundance
Large mammals	Taxonomic identification
rabbit	Number of individuals per taxon
coyote	Sex
deer	Reproductive status
pronghorn	Adult/young ratio
prairie dog	Species distribution
pocket gopher	Species diversity
	Relative abundance
Terrestrial vegetation	Quantitative surveys
grass	cover
forbes	dominance
schrubs	frequency
trees	diversity
	richness
	height
	production
	density
	Qualitative surveys
	species list
Aquatic vegetation	Qualitative surveys
rooted macrophytes	species list
floating macrophytes	relative abundance

TABLE 55

Reports/Deliverables

	Item	No. Copies	Schedule	Distribution
A.	Sample Data Package with all appropriate supporting documentation	1	45 days after VTSR of last sample in SDG/batch	EM Program Manager of Validation Contractor
B.	Data in Computer Readable Form (Diskette)	2	45 days after VTSR of last sample in SDG/batch	Analysis & Modeling Group of EG&G EM
C.	Supporting Documentation Package	1	Completed no later than 50 days after VTSR of last sample in SDG/batch	Retained by Subcontractor
D.	Written Standard Operating Procedures and QA/QC Plan	2	15 days after contract award; before any samples are shipped	Analytical Program Chemist EG&G

TABLE 52a

BIOTA TISSUE ANALYSIS	
WHOLE BODY BURDENS USING COMPOSITE SAMPLES	TARGET COMPOUND
Periphyton Plankton Benthic macroinvertebrates Terrestrial arthropods Vegetation Fish Small Mammals Amphibians	Semi-volatiles (Table 13) Pesticides (Table 23) Metals (Table 42) Dioxin (Table 41) PAH (Table 40)
SELECTED TISSUES	TARGET COMPOUND
LIVER,KIDNEY,BRAIN,BONE	Metals (Table 42)
Fish Small mammals Large mammals Amphibians	
LIVER,KIDNEY,BRAIN,FAT	
Fish Small mammals Large mammals Amphibians	Semi-volatiles (Table 13) Pesticides/PCB (Table 23) Dioxin (Table 41)
BILE	
Fish Small mammals Large mammals Amphibians	PAH (Table 40)

TABLE 56

ACROLEIN and ACRYLONITRILE by EPA METHOD 603

Analyte	CAS NO.	MDL (ug/L)
Acrolein	107-02-8	0.7
Acrylonitrile	107-13-1	0.5

TABLE 56

BIOTA TISSUE ANALYSIS	
WHOLE BODY BURDENS USING COMPOSITE SAMPLES	TARGET COMPOUND
Periphyton Plankton Benthic macroinvertebrates Terrestrial arthropods Vegetation Fish Small Mammals Amphibians	Semi-volatiles (Table 13) Pesticides (Table 23) Metals (Table 42) Dioxin (Table 41) PAH (Table 40)
SELECTED TISSUES	TARGET COMPOUND
LIVER,KIDNEY,BRAIN,BONE	Metals (Table 42)
Fish Small mammals Large mammals Amphibians	
LIVER,KIDNEY,BRAIN,FAT	
Fish Small mammals Large mammals Amphibians	Semi-volatiles (Table 13) Pesticides/PCB (Table 23) Dioxin (Table 41)
BILE	
Fish Small mammals Large mammals Amphibians	PAH (Table 40)

III. Required Deliverables

Deliverables are those items that must be produced and provided by the subcontractor to EG&G or its designates. These deliverables are described in Table 55. Specifications for the deliverables identified in Table 55 are described below.

A. Sample Data Package

A sample data package is developed for each sample delivery group (SDG) or sample batch. Separate data packages are developed for each of the following types of analysis.

1. Organics (volatiles, semi-volatiles, and pesticides/PCBs)
2. Inorganics (metals)
3. Water Quality Parameters ("Conventional" wet chemistry)

The sample data package consists of the following items:

1. Cover sheet/transmittal letter
2. Case narrative addressing deviations from approved SOPs, detection limit modifications, or other anomalies observed in preparation or analytical activities.
3. Data summary forms

    a. Organics (SOW forms, Forms I-X completed as applicable for analyses performed or equivalent information as required for non-CLP methods.)
    b. Inorganics (SOW Forms I-XIV)
    c. Major ions (sample results; blank, calibration, duplicate, spike, replicate, and standard results; holding times; detection limits; field and lab sample number cross-references)

4. Copies of items listed on the data checklists found in Exhibit II.

B. Data in Computer Readable Form

Electronic data must be supplied for each SDG/batch in a format compatible with EM Department data management systems. Specifications for the type and format of electronic data may be obtained from the EG&G EM Department office. The current specification is to be found as Exhibit IV.

(For purposes of preparing bids and proposals, assume that space delimited ASCII files will be prepared.)

C. Supporting Documentation Package

The supporting documentation package is organized by SDG and is maintained on-site in the laboratory. The supporting documentation package consists of the following:

1. Sample receipt, storage, tracking, document control, and chain-of-custody documents specified in Exhibit III (Chain-of-Custody and Document Control)

2. Originals of the items listed on the data checklists found in Exhibit II (Data Checklists)

3. Standards preparation logbooks (must demonstrate traceability of stock solutions and working standards to primary standard reference materials)

4. Sample preparation logbooks and benchsheets (must include method references, sample numbers, analysts' signatures, and dates)

5. Instrument run logs and maintenance logs - **one set for each instrument** (must indicate the exact order that standards, calibrations, and samples were run; sample and lab numbers; analysts' signatures; run times; and dates)

6. Instrument detection limit determination data

7. Signature list for all laboratory personnel working on the project (includes typed name, initials, title, and handwritten signature and initials)

8. Document Inventory list for each SDG/Batch

This documentation must be maintained in an organized manner allowing for retrieval and reproduction of any of these items. Such retrieval and reproduction will be necessary to perform data review and validation functions and to respond to requests for production of documents for use in legal proceedings. In addition, all items discussed above as related to those listed on the checklists found in Exhibit II must be submitted in copy form with the data package. The supporting documentation serves as evidentiary and admissible records.

D. Written Standard Operating Procedures

No later than 15 working days prior to the pre-award audit, the subcontractor will provide to EG&G one copy of the laboratory's SOPs. No later than 30 working days after contract award, the laboratory shall supply controlled copies of the SOPs as follows: one controlled copy to EG&G and one controlled copy to the validation subcontractor. These SOPs shall be specific to the laboratory and be adapted specifically to analysis of EG&G RFP samples. **Generic and/or general operations SOPs are not acceptable.**

SOPs shall cover the following areas in sufficient detail and reflect actual operating conditions in effect during analysis of EG&G RFP samples:

1. Sample receipt and log-in
2. Sample storage and security
3. Facility security
4. Sample tracking (from receipt to sample disposition)
5. Sample analysis methods and references
6. Data reduction, entry, transcription, verification, and reporting
7. Document control
8. Data package assembly, including electronic deliverables
9. Training Records of personnel and resumes
10. Preparation of standards
11. Equipment maintenance and calibration

12. List of instrumentation and equipment (include date purchased, date installed, model number, manufacturer, and service contracts, if any)
13. Instrument detection limits
14. Acceptance criteria for non-CLP analyses
15. Autosampler load verification
16. RAD Screening of incoming EG&G RFP samples
17. Changing, modifying, updating of procedures

E. Disposition of Documentation and Samples

Documentation and records generated by the subcontractor must be retained on-site by the subcontractor for a period of five calendar years. After this period, records may be disposed of with the following provision:

Prior to six months of the date the subcontractor intends to dispose of documentation and records related to EG&G sample analyses, the subcontractor shall notify the EG&G purchasing agent, or designee, in writing. EG&G retains the right to require physical production of the documentation and records by the subcontractor at any time.

Samples and extracts analyzed by the subcontractor that meet EPA's definition of "mixed waste" may be returned to EG&G for disposition. It is anticipated that most EG&G samples will not meet this definition. Disposition of non-mixed waste residual samples and extracts is the responsibility of the laboratory. Prior to disposition of any EG&G samples, EG&G must be notified in writing and must approve of the disposition in writing. Sample disposal will not be approved until the data has been successfully validated, and all holding times have expired.

Technical Audits

For the duration of the contract, EG&G may conduct up to two on-site technical audits per calendar year (at each subcontractor's facility and ~~subtier~~ subcontractor facilities) for the purpose of verifying adherence to quality assurance/quality control requirements and determining the effectiveness of the QA/QC requirements as implemented for analysis of EG&G samples. Pre-award technical audits may be conducted for additional work requested prior to initiation of such work. The pre-award technical audits shall not be counted as on-site technical audits. EG&G shall provide reasonable advance notice in writing to affected laboratories for scheduling technical audits.

Out-of-Spec Reporting

For some sampling locations, immediate reporting of results above the threshold level is of the utmost importance. Contractor laboratories must examine results on a daily basis, and report any values above threshold immediately to the designated EG&G contact in accordance with the Out-of-Spec procedure described in Exhibit V.

TT
7/31/91

EXHIBIT I

WATER QUALITY PARAMETERS
ANALYTICAL
REQUIREMENTS

REQUIREMENTS FOR ION CHROMATOGRAPHY ANALYSES

EG&G Rocky Flats
Environmental Management Department

The following are requirements for the determination of inorganic anions using Ion Chromatography (IC). These requirements address instrumentation calibrations, initial and continuing calibration verification, sample holding times, case narratives, quality control including lab control samples, duplicate analyses, blanks, matrix spikes, detection limits, and raw data from instrumentation.

I. GENERAL REQUIREMENTS

The General Requirements section describes the specifications for instrumentation, initial and continuing calibration verification, sample holding times, and case narratives.

1.0 INSTRUMENTATION

1.1 Each laboratory must provide written documentation showing that personnel are experienced at operating IC instrumentation.

1.2 Instrumentation should consist of an analytical system with an ion chromatograph and all required accessories inclusive of syringes, columns, detectors, and compressed gases.

1.3 The laboratory shall identify the instrument manufacturer, model, instrument configuration, program and instrument settings, voltages, dates of installation, and conductivity cell detector.

1.4 The laboratory should set up instrumentation according to the manufacturer's instructions; and changes or modifications thereto shall be documented.

1.5 Detector efficiency, aliquot sizes, and other applicable functions shall be optimized so that the Required Detection Limits (RDL's) are met for the samples. (Table 44)

1.6 The laboratory must maintain an instrument run log and a maintenance log for each instrument used.

2.0 INSTRUMENTATION CALIBRATION AND STANDARDIZATION

2.1 The laboratory should follow instrument manufacturers' instructions using appropriate sources to set readings and calibrate instrument detectors.

2.2 Approved Ion Chromatographic operating methods will be used for EG&G Rocky Flats sample analyses. (Table 44)

2.3 For each analyte of interest, prepare calibration standards at a minimum of three different concentration levels and a blank to establish the calibration curve.

2.4 The concentration range of the standards must not exceed the linear range of the system.

2.5 The lowest standard shall be of a concentration at or near the method detection limit. (All standards shall correspond to the range of concentrations expected in the sample or shall define the working range of the detector.)

2.6 The attenuator range settings must be linear, and each range must be calibrated individually.

2.7 Tabulate peak height or area responses against the concentration to establish a calibration curve for each analyte observed. The correlation coefficient (r^2) must be greater than or equal to 0.995.

2.8 An instrument calibration curve must be generated daily or once every 24 hours and each time the instrument is set up. (If the eluent is changed, a new set of calibration curves must be analyzed and documented.) The instrument standardization date and time must be included in the raw data.

2.9 Working standards must be prepared weekly. Documentation of the working standards with lot numbers and expiration dates shall be submitted as part of the package deliverable.

3.0 INITIAL AND CONTINUING CALIBRATION VERIFICATION

3.1 An Initial Calibration Verification (ICV) sample must be performed after instrument calibration and before any analytical run to verify accuracy of the calibration for each analyte. The ICVs shall be documented and verified for each analyte.

3.2 An EPA certified standard must be used for the ICV solution. If ICV solutions are not available from an EPA source for each analyte, analyses shall be conducted on an independent standard at a concentration other than that used for instrument calibration, but within the calibrated range of the curve.

3.3 When the measurement exceeds control limits for the ICV, the analysis must be terminated, the instrument recalibrated, and the calibration reverified. (See 3.5 for control limits).

3.4 A Continuing Calibration Verification (CCV) sample must be analyzed once every 20 samples and at the end of the analytical sequence in order to bracket the analysis of the EG&G Rocky Flats samples analyzed for that run. The same continuing calibration standard must be used throughout the analysis of the batch and must be of a concentration near the mid-range level of the calibration curves.

3.5 ICV and CCV analysis results must be within the control limits of 85-115% recovery of the true value. Where %R = (found value true value) X 100.

3.6 If the CCV is outside control limits, the analysis must be stopped. Correct the problem, and rerun the preceding samples to the last CCV that was in control limits.

3.7 The ICV must be from a different source than the CCV if an EPA standard is not used.

3.8 Documentation in the runlog/benchsheets must be evident as to when calibration standards were analyzed, their sequence, their true values and their recoveries.

4.0 SAMPLE HOLDING TIMES

4.1 Samples must be analyzed prior to the specified holding times:

ANALYTE	PRESERVATION	HOLDING TIME
Chloride	4°C	28 days
Fluoride	4°C	28 days
Sulfate	4°C	28 days

4.2 Holding times are determined from the collection date to the date of analysis.

4.3 Sample holding times are applicable to both water and soil matrices.

5.0 CASE NARRATIVES

Case Narratives need to be specific for each Sample Delivery Group (SDG) or laboratory "batch" as to abnormalities encountered with samples; e.g., reasons need to be given why proper aliquot size was not used, holding times not met, required detection limits not met, matrix problems explained, accuracy, sample container breakage, etc.

II. QUALITY CONTROL REQUIREMENTS

The Quality Control Requirements section describes the specifications for analyzing laboratory control samples, replicate analyses, blanks, and matrix spike analyses.

1.0 LABORATORY CONTROL SAMPLES (LCS)

1.1 An LCS shall be analyzed for every 20 samples or one for each batch, whichever is more frequent.

1.2 EPA LCS solutions shall be used. If EPA solutions are not available, LCSs may be prepared using stock standards in reagent grade water at a different concentration and source than a calibration verification sample, and within the calibrated range for the instrument. For soils, if EPA solid LCS is unavailable, other EPA QA check samples or other certified materials may be used.

1.3 The laboratory must verify, with raw data, the reported recoveries. Calculate percent recoveries by comparing the reported value against the true value. All aqueous and soil LCS results must be within the control limits of 80-120% recovery.

1.4 All LCS results which fall outside control limits require that the analysis be terminated, the problem corrected, and the samples associated with that LCS be reanalyzed.

1.5 A LCS must be prepared and analyzed with each sample batch.

2.0 DUPLICATE ANALYSES

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

2.2 A laboratory duplicate sample must be analyzed with each sample batch or for every 20 samples, whichever is more frequent.

2.3 Each laboratory will calculate the Relative Percent Difference (RPD) by taking the difference between the sample value and duplicate sample value, and dividing by the average of both readings.

2.4 A control limit of +/- 20% for the RPD shall be met for sample values greater than 5X the required detection limits; and +/- CRDL for sample values less than 5X CRDL.

2.5 A matrix spike duplicate does not constitute a duplicate sample analysis.

3.0 INITIAL AND CONTINUING CALIBRATION BLANKS

3.1 Initial Calibration Blanks (ICBs) shall be analyzed after the calibration and prior to analytical samples to verify the analytical baseline.

3.2 Continuing Calibration Blanks (CCBs) shall be analyzed every 20 samples.

3.3 A CCB must be analyzed after the final CCV following the analytical sequence in order to bracket the EG&G Rocky Flats samples.

3.4 No contaminants above the Instrument Detection Limit (IDL) should be present in the blank(s).

3.5 If the ICB result exceeds the Contract Required Detection Limit (CRDL) for any analyte, terminate analysis, correct the problem, recalibrate, and verify the calibration.

3.6 If a blank concentration is above the CRDL, the lowest concentration of the analyte in the associated samples must be 5X the blank concentration. Otherwise, all samples associated with the blank with the analyte's concentration <5X the blank concentration and above the CRDL, must be reanalyzed for that analyte.

3.7 If the concentration of the blank is below the negative CRDL, then all samples reported below 5X CRDL associated with the blank must be reanalyzed.

3.8 Blanks shall be deionized or distilled water.

3.9 Results of all blank analyses bracketing EG&G Rocky Flats samples shall be reported and documented. The sample concentrations are not to be corrected for any blank results.

4.0 MATRIX SPIKES

4.1 Each laboratory shall provide one matrix spike sample analysis for every 20 samples or each batch, whichever is more frequent.

4.2 The laboratory shall supply results of the spiked sample, the original sample analysis, and the amount of spike solution added.

4.3 Matrix spike recoveries should be within the control limits of 75-125%. Recovery limits do not apply for sample concentrations exceeding spike concentrations by a factor of 4 or more.

4.4 Samples identified as field blanks cannot be used for matrix spike analysis.

III. OTHER DOCUMENTATION - INSTRUMENT DETECTION LIMITS AND RAW DATA

1.0 INSTRUMENT DETECTION LIMITS (IDLs)

1.1 IDLs must meet the requirements of the method selected per analyte and the contract required detection limits specified in Exhibit I, Table 44.

1.2 IDLs shall be submitted along with each set of analytical data.

2.0 RAW DATA

The laboratory shall submit all documentation of analyses (e.g., instrument printout, strip charts, chromatographs, retention time, bench sheets, etc.) involving all EG&G Rocky Flats samples.

3.0 STANDARD OPERATING PROCEDURES (SOPs)

3.1 Laboratory SOP's must be submitted 30 working days after contract award. If SOPs are modified or revised, new versions must be submitted for review and approval by EG&G Rocky Flats prior to implementation.

3.2 SOPs shall reference the method used. If the method used is not reflective of the methods listed on Table 44, the laboratory must have approval from EG&G Rocky Flats to use the method(s) prior to sample analysis.

REQUIREMENTS FOR AUTOMATED COLORIMETRIC, TURBIDIMETRIC, AND SPECTROPHOTOMETRIC ANALYSES

EG&G Rocky Flats
Environmental Management Department

The following are requirements for colorimetric, turbidimetric, and spectrophotometric analysis using auto-analyzer systems. These requirements address instrumentation, methods, calibration of instruments, calibration verification, sample holding times, case narratives, quality control including lab control samples, duplicate samples, blanks, detection limits, spike recovery, instrument efficiency, documentation for calculations, and raw data.

I. GENERAL REQUIREMENTS

The General Requirements section describes the specifications for instrumentation, methods, instrument calibration, calibration verification, sample holding times, and case narratives.

1.0 INSTRUMENTATION

1.1 Each laboratory must provide written documentation that personnel are experienced at operating automated instrumentation.

1.2 The laboratory must demonstrate that the instrument is equipped to present all raw data in order to calculate and verify the final results.

1.3 Each laboratory shall identify the instrument, manufacturer, model, instrument configuration, program and instrument settings, dates of installation, and detector identifications (if applicable).

1.4 The laboratory should set up instrumentation according to the manufacturer's instructions; any changes or modifications thereto shall be documented.

1.5 The laboratory must maintain an instrument run log and a maintenance log for each instrument used.

2.0 METHODS

2.1 Methods are reflected on Table 44 of the analytical requirements in Attachment I of this statement of work.

2.2 If methods other than the methods listed are used, the laboratory shall provide documentation to show equivalency and must be approved by EG&G Rocky Flats prior to sample analysis.

3.0 INSTRUMENT CALIBRATION

3.1 The laboratory should follow instrument manufacturer's instructions using appropriate sources to set readings and calibrate instrument detectors.

3.2 For each analyte of interest, prepare calibration standards at a minimum of three different concentration levels and a blank.

3.3 The concentration range of the standards must not exceed the linear range of the system.

3.4 The lowest standard should be of a concentration at or near the method detection limit.

3.5 Tabulate peak height or area responses against the concentration to establish a calibration curve for each analyte observed. The correlation coefficient (r^2) must be greater than or equal to 0.995.

3.6 The instrument calibration curve must be analyzed daily or once every 24 hours and each time the instrument is set up. The instrument standardization date and time must be included in the raw data.

3.7 Working standards must be prepared weekly, except those that contain nitrite and phosphate which must be prepared fresh daily. Documentation of the working standards with lot numbers and expiration dates shall be submitted as part of the package deliverable.

3.8 Baseline correction is acceptable as long as it is performed after every sample.

4.0 INITIAL AND CONTINUING CALIBRATION VERIFICATION

4.1 An Initial Calibration Verification (ICV) sample must be analyzed immediately after the instrument has been calibrated to verify accuracy of the calibration. ICVs shall be documented and verified for every analyte.

4.2 An EPA certified standard must be used for the ICV solution. If ICV solutions are not available from an EPA source for each analyte, analyses shall be conducted on an independent standard at a concentration other than that used for instrument calibration, but within the calibrated range of the curve.

4.3 A Continuing Calibration Verification (CCV) sample must be analyzed once every 20 samples, and at the end of the analytical sequence in order to bracket the analysis of the EG&G Rocky Flats samples analyzed for that run. The same continuing calibration standard must be used throughout the analysis of the batch and must be of a concentration near the mid-range level of the calibration curves.

4.4 ICV and CCV analysis results must be within the control limits of 85-115% recovery of the true value. Where %R = (found value/true value) X 100.

4.5 When the measurement exceeds control limits for the ICV, the analysis must be terminated, the instrument recalibrated, and the calibration reverified.

4.6 If the CCV is outside of control limits, the analysis must be stopped. Correct the problem immediately, and rerun the preceding samples to the last CCV that was within the control limits.

4.7 The ICV must be from a different source than the CCV if an EPA standard is not used.

4.8 Documentation in the run log/bench sheets must be evident as to when calibration standards were analyzed, their sequence, their true values, and their recoveries.

5.0 SAMPLE HOLDING TIMES

5.1 Samples must be analyzed prior to the specified holding times:

ANALYTE	PRESERVATION	HOLDING TIME
Alkalinity	4°C	14 days
Chloride	4°C	28 days
Total Cyanide	4°C, NaOH to pH>12	14 days
Fluoride	4°C	28 days
Ammonia - N	4°C, H_2SO_4 to pH<2	28 days
Kjeldahl Nitrogen	4°C, H_2SO_4 to pH<2	28 days
Nitrite - N	4°C	48 hours
Nitrate/Nitrite - N	4°C, H_2SO_4 to pH<2	28 days
Total Phosphorus	4°C, H_2SO_4 to pH<2	28 days
Ortho - Phosphate	Filter, 4°C	48 hours
Silica	4°C	28 days
Sulfate	4°C	28 days
Sulfide	4°C, Zinc Acetate + NaOH to pH>9	7 days
Oil/Grease	4°C, H_2SO_4 to pH<2	28 days

5.2 Holding times are determined from the collection date to the date of analysis.

5.3 Sample holding times are applicable to both water and soil matrices.

5.4 Soil samples shall be preserved at 4°C.

6.0 CASE NARRATIVES

Case Narratives need to be specific for each sample delivery group (SDG) or laboratory "batch" as to abnormalities encountered with samples; e.g., reasons need to be given as to why proper aliquot size was not used, holding times not met, required detection limits not met, matrix problems explained, accuracy, sample container breakage, etc.

II. QUALITY CONTROL REQUIREMENTS

The Quality Control Requirements section describes the specifications for analyzing laboratory control samples, duplicate analyses, blanks, and matrix spike analyses.

1.0 LABORATORY CONTROL SAMPLES (LCS)

1.1 An LCS shall be analyzed for every 20 samples, or for each SDG, whichever is more frequent.

1.2 EPA LCS solutions shall be used. If EPA solutions are not available, LCSs may be prepared using stock standards in reagent grade water, at a different concentration and source than the calibration verification sample, and within the calibrated range for the instrument. For soils, if EPA solid LCS is unavailable, other EPA QA check samples or other certified materials may be used.

1.3 The laboratory must verify, with raw data, the reported recoveries. Calculate percent recoveries by comparing the reported value against the true value.

1.4 All LCS results which fall outside control limits require that the analysis be terminated, the problem corrected, and the samples associated with that LCS be reanalyzed.

1.5 The LCS recoveries must be within the control limits of 80-120%.

1.6 A LCS must be prepared and analyzed with each sample batch.

2.0 DUPLICATE ANALYSES

2.1 Samples identified as field blanks may not be used for duplicate sample analysis.

2.2 A laboratory duplicate sample shall be analyzed with each sample batch or for every 20 samples, whichever is more frequent.

2.3 Each laboratory will calculate the relative percent difference by taking the difference between the sample value and duplicate sample value, and dividing by the average of both readings. Precision must be within 20% for aqueous samples and 35% for soil samples for sample values greater than 5X the required detection limits, and +/- CRDL for sample values less than 5X CRDL.

2.4 A matrix spike duplicate does not constitute a duplicate sample analysis.

2.5 A duplicate sample analysis is required for percent solids.

3.0 INITIAL AND CONTINUING CALIBRATION BLANKS

3.1 Initial Calibration Blanks (ICBs) shall be analyzed after the calibration and prior to the analytical samples.

3.2 Continuing Calibration Blanks (CCBs) shall be analyzed every 20 samples.

3.3 A CCB must be analyzed after the final CCV following the analytical sequence in order to bracket the EG&G Rocky Flats samples.

3.4 A Method Blank (MB) shall be analyzed with each process if a preparation procedure is required for the samples.

3.5 No contaminants above the Instrument Detection Limit (IDL) should be present in the blank.

3.6 Blanks shall be prepared and analyzed in the same manner as the samples.

3.7 If the ICB result exceeds the Contract Required Detection Limit (CRDL) for any analyte, terminate analysis, correct the problem, recalibrate and verify the calibration.

3.8 If a blank concentration is above the CRDL, the lowest concentration of that analyte in the associated samples must be 5X the blank concentration. Otherwise, all samples associated with the blank with the analyte's concentration <5X the blank concentration and above the CRDL must be reanalyzed for that analyte.

3.9 Results of all blank analyses bracketing EG&G Rocky Flats samples shall be reported and documented. The sample concentrations are not to be corrected for any blank results.

4.0 MATRIX SPIKES

4.1 Each laboratory shall provide one matrix spike sample analysis for every 20 samples or each batch, whichever is more frequent.

4.2 The laboratory shall supply results of the spiked sample, the original sample analysis, and the amount of spike solution added.

4.3 Matrix spike recoveries should be within the control limits of 75-125%. Recovery limits do not apply for sample concentrations exceeding spike concentrations by a factor of 4 or more.

4.4 Samples identified as field blanks cannot be used for matrix spike analysis.

III. OTHER DOCUMENTATION - INSTRUMENT DETECTION LIMITS AND RAW DATA

1.0 INSTRUMENT DETECTION LIMITS (IDLs)

1.1 IDLs must meet the requirements of the method selected per analyte and the contract required detection limits specified in Exhibit I, Table 44.

1.2 IDLs shall be submitted along with each set of analytical data.

2.0 RAW DATA

The laboratory shall submit all documentation of analyses (e.g., instrument printout, strip charts, chromatographs, retention times, bench sheets, etc.) involving all EG&G Rocky Flats samples.

3.0 STANDARD OPERATING PROCEDURES (SOPs)

3.1 Laboratory SOPs must be submitted 30 working days after contract award. If SOPs are modified or revised, new versions must be submitted for review and approval by EG&G Rocky Flats prior to implementation.

3.2 Laboratory SOPs shall reference the method used. If the method used is not reflective of the methods listed on Table 44, the laboratory must have approval from EG&G Rocky Flats to use the method(s) prior to sample analysis.

REQUIREMENTS FOR POTENTIOMETRIC (ION SELECTIVE ELECTRODE) ANALYSES

EG&G Rocky Flats
Environmental Management Department

The following are requirements for Potentiometric [Ion Selective Electrode (ISE)] analysis. These requirements address instrumentation, instrument calibrations, calibration verification, sample holding times, case narratives, quality control including lab control samples, duplicate analyses, blanks, matrix spikes, documentation for calculations, and raw data.

I. GENERAL REQUIREMENTS

The General Requirements section describes the specifications for instrumentation, instrument calibration verification, and initial and continuing calibrations.

1.0 INSTRUMENTATION

1.1 Instrumentation methods should be set-up as specified by manufacturer's instructions; any changes or modifications thereto shall be documented.

1.2 Detector efficiency, aliquot sizes, and other applicable functions shall be optimized so that the Required Detection Limits (RDL's) are met for the samples. (Table 44)

1.3 The laboratory shall identify the instrument manufacturer, model, instrument configuration, date of installation, and detector identifications. (if applicable)

1.4 The laboratory must maintain an instrument run log and a maintenance log for each instrument used.

2.0 INSTRUMENT CALIBRATION

2.1 The instrument calibration curve shall be generated daily or once every 24 hours and each time the instrument is set up. The instrument standardization date and time must be included in the raw data.

2.2 For each analyte of interest, prepare calibration standards at a minimum of three different concentration levels and a blank to establish the calibration curve. (Logarithmic paper may be required for ISE method).

2.3 For instrumentation incapable of performing the minimum amount of standards, a requirement of a low standard about the detection limit and one of a high concentration shall be used for instrument standardization. Written documentation must be submitted to EG&G Rocky Flats for system approval prior to sample analysis.

2.4 Tabulate peak height or millivolt responses against concentrations to establish a calibration curve for each analyte observed. The correlation coefficient (r^2) must be greater than or equal to 0.995.

3.0 INITIAL AND CONTINUING CALIBRATION VERIFICATION

3.1 The laboratory should follow instrument manufacturer's instructions using appropriate sources to set voltages and calibrate instrument detection.

3.2 An Initial Calibration Verification (ICV) sample must be performed after instrument calibration and before any analytical run to verify the accuracy of the calibration for each analyte. ICV's shall be documented and verified for each analyte.

3.3 An EPA certified standard must be used for the ICV solution. If ICV solutions are not available from an EPA source for each analyte, then the analyses shall be conducted on an independent standard at a concentration other than that used for instrument calibration, and within the calibrated range of the curve.

3.4 Continuing Calibration Verification (CCV) samples must be analyzed once every 20 samples and at the end of the analytical sequence, whichever is more frequent. The same continuing calibration standard must be used throughout the analysis of the SDG and must be of a concentration near the mid-range level of the calibration curves.

3.5 ICV and CCV results must be within the control limits of 85-115% recovery of the true value. Where %R = (found value/true value) X 100.

3.6 If the CCV is outside control limits, the analysis must be stopped. Correct the problem and rerun the preceding samples to the last CCV that was in control limits.

3.7 The ICV must be from a different source than the CCV if an EPA standard is not used.

3.8 Documentation in the runlog/benchsheets must be evident as to when the calibration standards were analyzed, their sequence, their true values, and their recoveries.

4.0 SAMPLE HOLDING TIMES

4.1 Samples must be analyzed prior to the specified holding times:

ANALYTE	PRESERVATION	HOLDING TIME
Fluoride (ISE)	4°C, H_2SO_4 to pH<2	28 days
Ammonia-N (ISE)	4°C, H_2SO_4 to pH<2	28 days
Kjeldahl Nitrogen (ISE)	4°C, H_2SO_4 to pH<2	28 days

4.2 Holding Times are determined from the collection date to the date of analysis.

4.3 Sample holding times are applicable to both water and soil matrices.

4.4 Soil samples shall be preserved at 4°C.

5.0 CASE NARRATIVES

Case Narratives need to be specific for each Sample Delivery Group (SDG) or laboratory "batch" as to abnormalities encountered with samples; e.g., reasons need to be given why proper aliquot size was not used, holding times not met, required detection limits not met, matrix problems explained, accuracy, sample container breakage, etc.

II. QUALITY CONTROL REQUIREMENTS

The Quality Control Requirements section describes the specifications for analyzing laboratory control samples, duplicate analyses, blanks, and matrix spike analyses.

1.0 LABORATORY CONTROL SAMPLES (LCS)

1.1 An LCS shall be analyzed for every 20 samples or for each SDG, whichever is more frequent.

1.2 EPA solutions shall be used. If EPA solutions are not available,(LCSs) may be prepared using stock standards in reagent grade waters at a different concentration and source than the calibration verification sample, and within the calibrated range for the instrument. For soils, if EPA solid LCS is unavailable, other EPA QA check samples or other certified materials may be used.

1.3 The laboratory must verify, with raw data, the reported recoveries. Calculating percent recoveries by comparing the reported value against the true value. All aqueous and soil LCS results must be within the control limits of 80-120% recovery.

1.4 All LCS results which fall outside control limits require that the analysis be terminated, the problem corrected, and the samples associated with that LCS be reanalyzed.

1.5 A LCS must be prepared and analyzed with each sample batch.

2.0 DUPLICATE ANALYSES

2.1 Samples identified as field blanks may not be used for duplicate sample analysis.

2.2 A duplicate sample shall be analyzed with each sample batch or for every 20 samples, whichever is more frequent.

2.3 Each laboratory will calculate the Relative Percent Difference (RPD) by evaluating the difference between the sample value and duplicate sample value, and dividing by the average of both readings.

2.4 A control limit of +/- 20% for the RPD shall be met for sample values greater than 5X the required detection limits, and +/- CRDL for sample values less than 5X CRDL.

2.5 A matrix spike duplicate does not constitute a duplicate sample analysis.

3.0 INITIAL AND CONTINUING CALIBRATION BLANKS

3.1 Initial Calibration Blanks (ICBs) shall be analyzed after the calibration and prior to analytical samples to verify the analytical baseline.

3.2 Continuing Calibration Blanks (CCBs) shall be analyzed every 20 samples.

3.3 A CCB must be analyzed after the final CCV following the analytical sequence in order to bracket the EG&G Rocky Flats samples.

3.4 A Method Blank (MB) shall be analyzed with each process if a preparation procedure is required for the samples.

3.5 No contaminants above the Instrument Detection Limit (IDL) should be present in the blank(s).

3.6 Blanks shall be deionized or distilled water.

3.7 If the ICB result exceeds the Contract Required Detection Limit (CRDL) for any analyte, terminate analysis, correct the problem, recalibrate and verify the calibration. If a blank concentration is above the CRDL, the lowest concentration of that analyte in the associated samples must be 5X the blank concentration. Otherwise, all samples associated with the blank with the analyte's concentration

<5X the blank concentration and above the CRDL must be reanalyzed for that analyte.

3.8 Results of all blank analyses bracketing EG&G Rocky Flats samples shall be reported and documented. The sample concentrations are not to be corrected for any blank results.

4.0 MATRIX SPIKES

4.1 Each laboratory shall provide one matrix spike sample analysis for every 20 samples or each batch, whichever is more frequent.

4.2 The laboratory shall supply results of the spiked sample, the original sample analysis, and the amount of spike solution added.

4.3 Matrix spike recoveries should be within the control limits of 75-125%. Recovery limits do not apply for sample concentrations exceeding spike concentrations by a factor of 4 or more.

4.4 Samples identified as field blanks cannot be used for matrix spike analysis.

III. OTHER DOCUMENTATION - INSTRUMENT DETECTION LIMITS AND RAW DATA

1.0 INSTRUMENT DETECTION LIMITS (IDLs)

1.1 IDLs must meet the requirements of the method selected per analyte and the contract required detection limits specified in Exhibit I, Table 44.

1.2 IDLs shall be submitted along with each set of analytical data.

2.0 RAW DATA

The laboratory shall submit all documentation of analyses (e.g., instrument printout, strip charts, chromatographs, retention time, bench sheets, etc.) involving all EG&G Rocky Flats samples.

3.0 STANDARD OPERATING PROCEDURES (SOPs)

3.1 Laboratory SOPs must be submitted 30 working days after contract award. If SOPs are modified or revised, new versions must be submitted for review and approval by EG&G Rocky Flats prior to implementation.

3.2 SOPs shall reference the method used. If the method used is not reflective of the methods listed on Table 44, the laboratory must have approval from EG&G Rocky Flats to use the method(s) prior to sample analysis.

REQUIREMENTS FOR TITRIMETRIC AND GRAVIMETRIC ANALYSES

EG&G Rocky Flats
Environmental Management Department

The following are requirements for Titrimetric and Gravimetric Analyses using standard laboratory glassware. These requirements address calibrations, sample holding times, case narratives, quality control including lab control samples, duplicate analyses, blanks, matrix spikes, documentation for calculations, and raw data.

I. GENERAL REQUIREMENTS

The General Requirements section describes the specifications for calibrations, sample holding times, and case narratives.

1.0 CALIBRATIONS

1.1 Balances must be calibrated by a certified technician and appropriate "S" class weights shall be used.

1.2 Results of balance calibration shall be entered into instrument logs daily or each day the balance is to be used.

1.3 The laboratory must maintain an instrument run log and a maintenance log for each instrument used.

1.4 Results of the balance calibration shall be a part of the deliverable package to verify baseline activity.

2.0 SAMPLE HOLDING TIMES

2.1 Samples must be analyzed prior to the specified holding times:

ANALYTE	PRESERVATION	HOLDING TIME
Alkalinity	4°C	14 days
Chloride	4°C	28 days
Cyanide	4°C, NaOH to pH>12 0.6g ascorbic acid	14 days
Sulfide	4°C, Zn acetate, NaOH to pH>9	7 days
COD	4°C, H_2SO_4 to pH<2	28 days
Oil/Grease	4°C, H_2SO_4 to pH<2	28 days

2.2 Holding Times are determined from the collection date to the date of analysis.
2.3 Sample holding times are applicable to both water and soil samples.
2.4 Soil samples shall be preserved at 4°C.

3.0 CASE NARRATIVES

Case Narratives need to be specific for each batch as to abnormalities encountered with samples; (e.g., reasons need to be given why proper amount of sample was not used, holding times not met, required detection limits were not met, matrix problems explained, accuracy, etc.)

II. QUALITY CONTROL REQUIREMENTS

The Quality Control Requirements section describes the specifications for analyzing laboratory control samples, duplicate analyses, blanks, and matrix spike analyses.

1.0 LABORATORY CONTROL SAMPLES (LCS)

1.1 An LCS shall be analyzed for every 20 samples or for each SDG, whichever is more frequent.

1.2 EPA solutions shall be used. If EPA solutions are not available, LCSs may be prepared using stock standards in reagent grade water, at a different concentration and source than a calibration verification sample, and within the calibrated range for the instrument. For soils, if EPA solid LCS in unavailable, other EPA QA check samples or other certified materials may be used.

1.3 The laboratory must verify, with raw data, the reported recoveries. Calculating percent recoveries by comparing the reported value against the true value.

1.4 All aqueous and soil LCS results must be within the control limits of 80-120% recovery.

1.5 A LCS must be prepared and analyzed with each sample batch.

2.0 DUPLICATE ANALYSIS

2.1 Samples identified as field blanks may not be used for duplicate sample analysis.

2.2 A duplicate sample shall be analyzed with each sample batch or for every 20 samples, whichever is more frequent.

2.3 Each laboratory will calculate the relative percent difference by evaluating the difference between the sample value and duplicate sample value, and dividing by the average of both readings.

2.4 A matrix spike duplicate does not constitute a duplicate sample analysis.

3.0 CALIBRATION BLANKS

3.1 The Initial Calibration Blanks (ICBs) shall be analyzed prior to the sample run to verify the baseline.

3.2 No contaminants above the Method Detection Limit (MDL) should be present in the blanks.

3.3 Blanks shall be deionized or distilled water.

3.4 If the calibration blank result exceeds the Method Detection Limit (MDL), the calibration blank shall be reanalyzed.

3.5 If the ICB result exceeds the Contract Required Detection Limit (CRDL) for any analyte, terminate analysis, correct the problem, recalibrate and verify the calibration.

3.6 If any blank concentration is above the CRDL the lowest concentration of that analyte in the associated samples must be 5X the blank concentration. Otherwise, all samples associated with the blank with the analyte concentration being <5X the blank concentration and above the CRDL, must be reanalyzed for the analyte.

3.7 If the concentration of the blank is below the negative CRDL, then all samples reported below 5X CRDL associated with the blank must be reanalyzed.

3.8 The sample concentrations are not to be corrected for any blank results.

4.0 MATRIX SPIKES

4.1 At least one spike sample analysis shall be performed for each sample batch.

4.2 Samples identified as field blanks cannot be used for spike analysis.

4.3 The laboratory shall supply results of the spiked sample, the original sample analysis, and the amount of spike solution added.

4.4 Matrix spike recoveries must be within the control limits of 75-125%. Recovery limits do not apply for sample concentrations exceeding spike concentrations by a factor of 4 or more.

III. OTHER DOCUMENTATION - INSTRUMENT DETECTION LIMITS AND RAW DATA

1.0 INSTRUMENT DETECTION LIMITS (IDLs)

1.1 IDLs must meet the requirements of the method selected per analyte and the Contract Required Detection Limits (CRDL's) specified in Exhibit I, Table 44.

1.2 IDLs shall be submitted along with each set of analytical data.

2.0 RAW DATA

The laboratory shall submit all documentation of analyses (e.g., instrument printout, strip charts, chromatographs, retention times, bench sheets, etc.) involving all EG&G Rocky Flats sample analyses.

3.0 STANDARD OPERATING PROCEDURES (SOPs)

3.1 Laboratory SOPs must be submitted 30 working days after contract award. If SOPs are modified or revised, new versions must be submitted for review and approval by EG&G Rocky Flats prior to implementation.

3.2 SOPs shall reference the method used. If the SOP used is not reflective of the methods listed on Table 44, the method used in the facility must have approval from EG&G Rocky Flats to use the method(s) prior to sample analysis.

EXHIBIT II

DATA PACKAGE CHECKLISTS

1. Organics
2. Inorganics
3. Water Quality Parameters
4. Soil Parameters

RAS ORGANIC DATA COMPLETENESS CHECKLIST

- _____ Case Narrative
- _____ Quality Control Summary Package
  - _____ Surrogate Recovery Summary (Form II)
  - _____ MS/MSD Summary (Form III)
  - _____ Reagent Blank Summary (Form IV)
  - _____ GC/MS Tuning and Mass Calibration (Form V)
- _____ Sample Data Package
  - _____ Holding Times
  - _____ Organic Analysis Data Sheets (Form I)
  - _____ Reconstructed Ion Chromatogram(s) (RIC)
  - _____ GC/EC Chromatograms
  - _____ Quantitation Reports
  - _____ Mass Spectral Data
  - _____ EPA/NIH Mass Spectral Library Search for TICs
- _____ Standards Data Package
  - _____ Current List of Laboratory/Instrument Detection Limits
  - _____ Initial Calibration Data (Form VI) for each instrument
  - _____ Continuing Calibration Data (Form VII) for each instrument
  - _____ Pesticide Evaluation Standards Summary (Form VIII)
  - _____ Pesticide/PCB Standards Summary (Form IX)
  - _____ Pesticide/PCB Identification (Form X) for positive results only
  - _____ VOA and BNA Standards RICs
  - _____ VOA and BNA Standards Quantitation Reports
  - _____ Pesticide/PCB Standard Chromatograms and Data System Printouts
- _____ Raw QC Package
  - _____ DFTPP and BFB mass spectra and mass listings
  - _____ Reagent Blank data
    - _____ Organic Analysis Data Sheets (Form I)
    - _____ RIC
    - _____ Quantitation Reports
    - _____ Mass Spectral Data
    - _____ EPA/NIH Library Search for TICs
    - _____ GC/EC Chromatograms and Data System Printouts
  - _____ Matrix Spike/Matrix Spike Duplicate Data
    - _____ Organic Analysis Data Sheets
    - _____ RIC
    - _____ Quantitation Reports
    - _____ Mass Spectral Data
    - _____ EPA/NIH Library search for TICs
    - _____ GC/EC Chromatograms and Data System Printouts
- _____ Sample Tracking Package
  - _____ Chain-of-custody Records
  - _____ Sample Log-in/Receipt Records
  - _____ Preparation/Extraction Logbook Pages/Benchsheets
  - _____ Instrument Run Logs
- _____ Method References

RAS INORGANIC DATA COMPLETENESS CHECKLIST

_____ Inorganic Cover Page
_____ Inorganic Analysis Data Sheets (Form I)
_____ Initial Calibration and Calibration Verification Results (Form II)
_____ Continuing Calibration Verification Results (Form II)
_____ Linear Range Analysis and CRDL Standard for AA (Form II, Part 2)
_____ Blank Analysis Results (Form III)
_____ ICP Interference Check Sample Results (Form IV)
_____ Spiked Sample Results (Form V)
_____ Post-digest Spiked Sample Analysis (Form V, Part 2)
_____ Duplicate Sample Results (Form VI)
_____ Instrument Detection Limits (Form VII) or (Form XI - Quarterly)
_____ Laboratory Control Sample results (Form VII)
_____ Standard Addition Results (Form VIII)
_____ ICP Serial Dilution Results (Form IX)
_____ Holding Times Summary Sheet (Form X)
_____ ICP Interelement Correction Factors (Form XII - Quarterly)
_____ ICP Linear Ranges (Form XIII - Quarterly)
_____ Raw Data
    _____ Samples
    _____ Calibration Standards
    _____ Blanks
    _____ Spikes
    _____ Duplicates
    _____ ICP QC (ICS and Serial Dilution)
    _____ ICS
    _____ Furnace AA
    _____ Mercury Analysis
    _____ Cyanide Analysis
_____ Percent Solids Calculations - Solids Only
_____ Sample Prep/Digestion Logs
_____ Chain-of-Custody
_____ Sample Description
_____ Case Narrative
_____ Method References

WATER QUALITY PARAMETER DATA COMPLETENESS CHECKLIST

___Document Inventory (Accounts for all documents in the data package. Documents are numbered according to type or form).

___Case Narrative (Used to record any abnormalities involved in analysis of the sample set. Record sample container breakage, instrument downtime, sample matrix problems, holding times which were exceeded, etc.)

___Quality Control Summary Package
___Instrument Calibration Raw Data Results (Record the standardization date, time, and linear range analysis. Submit standard traceability records including lot numbers. The instrument must be calibrated daily or once every 24 hours and each time the instrument is set up.)
___Blank Results (Record the results of the initial and continuing blanks for all sample analyses. Samples must be bracketed by an initial and continuing calibration blank. A continuing calibration blank must be analyzed once every 20 samples and at the end of every analytical sequence; exception to gravimetric and titrimetric analyses where an ICB only is required.)
___Initial and Continuing Calibration Verification (Record the results of the initial and continuing calibration verification, true value, actual value, and percent recovery. Samples must be bracketed by an initial and continuing calibration verification; exception to gravimetric and titrimetric analyses where an ICV only is required.)
___Matrix Blank Results
___Field Blank Results (Record the results of the field blank if one was submitted to the laboratory.)
___Laboratory Control Sample Results (Record the identification, true value, actual value, and percent recovery for all LCS samples.)
___Lab Duplicate Results (Record the results of both samples and the calculated relative percent difference.)
___Spike Sample Results (Record the results in percent recovery for the original and applied sample along with amount of the spike solution added.)
___Field Duplicate Results (Record the results of both samples and the calculated relative percent difference - where available.)
___Raw Data (Recorded as in the analytical sequence for SDG.)
___Samples___Calibration Standards___Blanks
___Spikes___Duplicates___LCS
___ICV___CCB
___Percent Solid Calculations - Solids only.

___Sample Data Package
___Holding Times Summary (Record the date sampled, data analyzed, and the calculated holding time.)
___Sample Analysis Results Summary (Printed report of the analytical results. Include a notation to indicate which sample results were achieved by reanalysis of the sample.)

___Sample Preparation Logbook Pages/Bench Sheets

___Chain-Of-Custody (Copies of Chain-Of-Custody Records and internal Chain-Of-Custody.)

___Instrument Logbook Pages and Strip Charts (where applicable)
___Method References

SOIL ANALYSIS (OTHER PARAMETER) DATA COMPLETENESS CHECKLIST

___Document Inventory (Accounts for all documents in the data package. Documents are numbered according to type or form.)

___Case Narrative (Used to record any abnormalities involved in analysis of the sample set. Record sample container breakage, instrument downtime, sample matrix problems, holding times which were exceeded, etc.)

___Quality Control Summary Package
___Instrument Calibration Raw Data Results (Record the standardization date, time, and linear range analysis. Submit standard traceability records including lot numbers. The instrument must be calibrated daily or once every 24 hours and each time the instrument is set up.)
___Blank Results (Record the results of the initial and continuing blanks for all sample analyses. Samples must be bracketed by an initial and continuing calibration blank. A continuing calibration blank must be analyzed once every 20 samples and at the end of every analytical sequence; exception to gravimetric and titrimetric analyses where an ICB only is required.)
___Initial and Continuing Calibration Verification (Record the results of the initial and continuing calibration verification, true value, actual value, and percent recovery. Samples must be bracketed by an initial and continuing calibration verification; exception to gravimetric and titrimetric analyses where an ICV only is required.)
___Matrix Blank Results
___Field Blank Results (Record the results of the field blank if one was submitted to the laboratory.)
___Laboratory Control Sample Results (Record the identification, true value, actual value, and percent recovery for all LCS samples.)
___Lab Duplicate Results (Record the results of both samples and the calculated relative percent difference.)
___Spike Sample Results (Record the results in percent recovery for the original and applied sample along with amount of the spike solution added.)
___Field Duplicate Results (Record the results of both samples and the calculated relative percent difference - where available.)
___Raw Data (Recorded as in the analytical sequence for SDG.)
___Samples___Calibration Standards___Blanks
___Spikes___Duplicates___LCS
___ICV___CCB
___Percent Solid Calculations - Solids only.
___Sample Prep Logbook Pages/Bench Sheets

___Sample Data Package
___Holding Times Summary (Record the date sampled, data analyzed, and the calculated holding time.)
___Sample Analysis Results Summary (Printed report of the analytical results. Include a notation to indicate which sample results were achieved by reanalysis of the sample.)
___Sample Preparation Logbook Pages/Bench Sheets
___Chain-Of-Custody (Copies of Chain-Of-Custody Records and internal Chain-Of-Custody.)
___Instrument Logbook Pages and Strip Charts (where applicable)

___Method References

EXHIBIT III

CHAIN-OF-CUSTODY AND DOCUMENT CONTROL

1.0 SAMPLE CHAIN-OF-CUSTODY

A sample is physical evidence collected from a facility or from the environment. An essential part of the hazardous waste investigation effort is that the evidence gathered be controlled. To accomplish this, the following sample identification, chain-of-custody, sample receiving, and sample tracking procedures have been established.

1.1 Sample Identification

The contractor shall have a specified method for maintaining identification of samples throughout the laboratory.

Each sample and sample preparation container shall be labeled with the field assigned EG&G Rocky Flats sample number or a unique laboratory identifier. If a unique laboratory identifier is used, it shall be cross-referenced to the EG&G Rocky Flats field number.

1.2 Chain-of-Custody Procedures

The contractor shall have procedures ensuring that sample custody is maintained and documented. A sample is under custody if:

It is in your possession, or
It is in your view after being in your possession, or
It was in your possession and you locked it up, or
It is in a designated secure area. (Secure areas shall be accessible only to authorized personnel.)

1.3 Sample Receiving Procedures

1.3.1 The contractor shall designate a sample custodian responsible for receiving all samples.

1.3.2 The contractor shall designate a representative to receive samples in the event that the sample custodian is not available.

1.3.3 The condition of the shipping containers and sample bottles shall be inspected upon receipt by the sample custodian or his/her representative.

1.3.4 The condition of the custody seals (intact/not intact) shall be inspected upon receipt by the sample custodian or his/her representative.

1.3.5 The sample custodian or his/her representative shall check for the presence or absence of the following documents accompanying the sample shipment:

Airbills
Custody seals
Custody records
Sample tags

1.3.6 The sample custodian or his/her representative shall sign and date all forms (e.g., custody records, and airbills) accompanying the samples at the time of sample receipt.

1.3.7 The sample custodian or his/her representative shall record and cross-reference sample tag identification numbers to the sample label numbers (if not already recorded on the chain-of-custody record(s)).

1.3.8 The contractor shall contact the EM Department Manager or designee to resolve discrepancies and problems such as absent documents, conflicting information, broken custody seals, and unsatisfactory sample condition (e.g., leaking sample bottle).

1.3.9 The following information shall be explicitly documented by the sample custodian or his/her representative as samples are received and inspected:

Condition of the shipping container
Presence or absence and condition of custody seals on shipping and/or sample containers
Condition of the sample bottles
Presence or absence of airbills
Presence or absence of custody records
Presence or absence of sample tags
Sample tag identification numbers cross-referenced to the sample label numbers if not recorded on the chain-of-custody record(s)
Verification of agreement or non-agreement of information on shipping documents
Problems or discrepancies and their resolution

1.4 Sample Tracking Procedures

The contractor shall maintain records documenting all phases of sample handling from receipt to final analysis. The records shall include documentation of the movement of samples and prepared samples into and out of designated laboratory storage areas.

2.0 DOCUMENT CONTROL PROCEDURES

Controlled documents used by contract laboratories shall include, but not be limited to, logbooks, chain-of-custody records, sample work sheets, bench sheets, and other documents relating to the sample or sample analyses. The following document control procedures have been established to assure that all laboratory records are assembled and stored.

2.1 Preprinted Laboratory Forms and Logbooks

2.1.1 All documents produced by the contractor which are directly related to the preparation and analysis of RFP EM Department samples shall become the property of EG&G. All observations and results recorded by the laboratory but not on preprinted laboratory forms shall be entered into permanent laboratory logbooks. When all data from a sample batch is compiled, all original laboratory forms and copies of all sample-related logbook entries shall be included in the documentation package.

2.1.2 The contractor shall identify the activity recorded on all laboratory documents which are directly related to the preparation and analysis of RFP EM samples, including the EG&G Rocky Flats field assigned sample number.

2.1.3 Pre-printed laboratory forms shall contain the name of the laboratory and be dated and signed by the person responsible for performing the activity at the time an activity is performed.

2.1.4 Logbook entries shall be dated and signed by the person responsible for performing the activity at the time an activity is performed.

2.1.5 Logbook entries shall be in chronological order. Entries in logbooks, with the exception of instrument run logs and extraction logs, shall include only one sample batch per page.

2.1.6 Instrument run logs shall be maintained so as to enable a reconstruction of the run sequence of individual instruments.

The laboratory may use only laboratory or field assigned sample identification numbers in the logs for sample identification.

2.1.7 Corrections to supporting documents and raw data shall be made by drawing a single line through the error and entering the correct information. Corrections and additions to supporting documents and raw data shall be dated and initialed. No information shall be obliterated or rendered unreadable.

All notations shall be recorded in ink.

Unused portions of documents shall be "z'd" out.

2.2 Consistency of Documentation

The contractor shall assign a document control officer responsible for the organization and assembly of sample files.

Before releasing analytical results, the document control officer shall assemble and cross-check the information on sample tags, custody records, lab bench sheets, personal and instrument logs, and other relevant data to ensure that data pertaining to each particular sample or case is consistent throughout the case file.

2.3 Document Numbering and Inventory Procedure

In order to provide document accountability of the completed analysis records, each item in a case shall be inventoried and assigned a serialized number and sample delivery group identifier.

Sample Delivery Group (SDG) number - Serialized number (for example: 232-0001)

The number of pages of each item shall be accounted for if each page is not individually numbered. All documents relevant to each case, including logbook pages, bench sheets, mass spectra, chromatograms, custody records, library research results, etc., shall be inventoried. The document control officer shall be responsible for ensuring that all documents generated are placed in the file for inventory and are available for inspection. The document control officer shall place the sample tags in plastic bags in the file. Figure 1 is an example of a document inventory.

3.0 SPECIFICATIONS FOR WRITTEN STANDARD OPERATING PROCEDURES

The contractor shall have written standard operating procedures (SOPs) for receipt of samples, maintenance of custody, sample identification, sample storage, tracking the analysis of samples, and assembly of completed data.

An SOP is defined as a written narrative stepwise description of laboratory operating procedures including examples of laboratory documents. The SOPs shall accurately describe the actual procedures used in the laboratory, and copies of the written SOPs shall be available to the appropriate laboratory personnel. The contractor's SOPs shall provide mechanisms and documentation to meet each of the following specifications.

3.1 The contractor shall have written SOPs describing the sample custodian's duties and responsibilities.

3.2 The contractor shall have written SOPs for receiving and logging in of the samples. The procedures shall include but not be limited to documenting the following information:

3.2.1 Presence or absence of chain-of-custody forms

3.2.2 Presence or absence of airbills

3.2.3 Presence or absence of custody seals on shipping and/or sample containers and their condition

3.2.4 Presence or absence of sample tags

3.2.5 Sample tag ID numbers if not recorded on the chain-of-custody record(s) or packing list(s)

3.2.6 Condition of the shipping container

3.2.7 Condition of the sample bottles

3.2.8 Verification of agreement or non-agreement of information on receiving documents

3.2.9 Resolution of problems or discrepancies

3.2.10 The definition of any terms used to describe sample condition upon receipt

3.3 The contractor shall have written SOPs for maintaining identification of samples throughout the laboratory.

If the contractor assigns unique laboratory identifiers, written SOPs shall include a description of the method used to assign the unique laboratory identifier and cross-reference to the field assigned sample number.

If the contractor uses prefixes or suffixes in addition to sample identification numbers, the written SOPs shall include their definitions.

3.4 The contractor shall have written SOPs describing all storage areas for RFP EM samples in the laboratory. The SOPs shall include a list of authorized personnel who have access or keys to secure storage areas.

3.5 The contractor shall have written SOPs describing the method by which the laboratory maintains samples under custody.

3.6 The contractor shall have written SOPs describing the method by which the laboratory maintains the security of any areas identified as secure.

3.7 The contractor shall have written SOPs for tracking the work performed on any particular sample. The tracking SOP shall include:

A description of the documents used to record sample receipt, sample storage, sample transfers, sample preparations, and sample analyses.

A description of the documents used to record calibration and QA/QC laboratory work.

Examples of document formats and laboratory documents used in the sample receipt, sample storage, sample transfer, and sample analyses.

A narrative step-wise description of how documents are used to track samples.

3.8 The contractor shall have written SOPs for organization and assembly of all documents relating to each sample delivery group. Documents shall be filed on a delivery group-specific basis. The procedures shall ensure that all documents including logbook pages, sample tracking records, chromatographic charts, computer printouts, raw data summaries, correspondence, and any other written documents having reference to the sample delivery group are compiled in one location. The written SOPs shall include:

A description of the numbering and inventory method, and an example of the document inventory form.

A description of the method used by the laboratory to verify consistency and completeness of the case file.

(Organics Example)

Figure 1

232-0001
Laboratory Name
Sample Delivery
Group No. 232

DOCUMENT INVENTORY

Document Control #[1*]	Document Type	# Pages
232-0001	Document Inventory Sheet	1
232-0002	Chain-of-Custody Records	2
232-0003	Shipping Manifests	2
232-0004	Sample Tags	50
232-0005	GC/MS Spectra for Sample B0310	20
232-0006	GC/MS Spectra for Sample B0311	20
232-0007	GC/MS Spectra for Sample B0319	20
232-0008	Analysts' Logbook Pages	6
232-0009	GC/MS Library Search Worksheets	15
232-0010	GC Instrument Log Pages	5
232-0011	GC/MS QC Data Sheets	4
etc.	etc.	etc.

[1*]This number is to be recorded on each set of documents.

(Inorganics Example)

Figure 1

232-0001
Laboratory Name
Sample Delivery
Group No. 232

DOCUMENT INVENTORY

Document Control #[2*]	Document Type	# Pages
232-0001	Document Inventory Sheet	1
232-0002	Chain-of-Custody Records	2
232-0003	Shipping Manifests	2
232-0004	Sample Tags	50
232-0005	Inorganics Analysis Data Summary Sheets	10
232-0006	Analysts' Notebook Pages	14
232-0007	ICAP and AA Instrument Logbook Pages	12
etc.	etc.	etc.

[2*]This number is to be recorded on each set of documents.

EXHIBIT IV

SPECIFICATIONS FOR BIOTIC TISSUE PREPARATION
(METALS, SEMI-VOLATILES, PESTICIDES, PCBs, DIOXIN, PAH)

REQUIREMENTS FOR TISSUE PREPARATION

EG&G Rocky Flats
Environmental Management Department

The following are requirements for the preparation of whole body and selected tissue prior to analysis for metals, semi-volatiles, pesticides, PCBs, Dioxin and PAH.

I. MICROWAVE DIGESTION FOR CLP METALS

1. Grind whole body (for all but fish, the body must be skinned) to a consistent texture in a Hobart (or similar type) grinder. Consistent means there is no longer recognizable tissue types. Freeze-dry the ground sample in half-gram portions. For whole body samples, randomly select 3 half-gram subsamples for microwaving. For selected tissue samples, randomly select 1 subsample for microwaving.

2. Place the half-gram freeze-dried subsample into the microwave digestion unit and add 2.0 ml. of ultra-pure nitric acid. Let stand 30 min.

3. Microwave 2 min at 20% power. Vent and cool to room temperature.

4. Microwave 5 min at 20% power. Vent and cool to room temperature.

5. Microwave 2 min at 60% power. Vent and cool to room temperature. Repeat step 5.

6. Bring the digested solution up to 50 ml with deionized water.

7. Sample is now ready for CLP metal analysis.

II. SONICATION/EXTRACTION FOR SEMI-VOLATILES, PESTICIDES, PCB, PAH AND DIOXIN

1. Grind whole body (for all but fish, the body must be skinned) to a consistent texture in a Hobart (or similar type) grinder. Consistent means there is no longer recognizable tissue types. Freeze-dry the ground sample in half-gram portions. For whole body samples, randomly select 3 half-gram subsamples for sonication. For selected tissue samples, randomly select 1 subsample for sonication.

2. Weigh 10 g of ground tissue into a centrifuge bottle. Add 100 ml of methylene chloride.

3. Sonicate 2 min (medium) with a 'Polytron' or similar instrument.

3. Decant off the methylene chloride through a Whatman #1 filter and save the liquid.

4. Add 100 ml of methylene chloride to the tissue sample and repeat the sonication and decanting 2x.

5. Put the 300 ml of methylene chloride extractant into a 500 ml boiling flask. Evaporate on a 'Rotovap' or similar instrument until about 5 ml remain.

6. Transfer the liquid to a 13 ml test tube and dry evaporate using a 'N-Evap' or similar instrument until 0.2 ml remains.

7. Bring to 1 ml with hexane.

8. Evaporate to 0.2 ml again. This procedure removes most of the methylene chloride.

9. Bring to 1 ml with hexane. The sample is now ready for clean-up and analysis using CLP methods.

EXHIBIT V

SPECIFICATION FOR DISKETTE DELIVERABLE

JAN 23 10 21 AM '93

EXHIBIT V

SPECIFICATION FOR DISKETTE DELIVERABLE

1.0

Thi
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TITLE:

2.0

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SPECIFICATION FOR PROVIDING THE ELECTRONIC DELIVERABLE LAB DATA TO THE ROCKY FLATS ENVIRONMENTAL DATA MANAGEMENT SYSTE

3.0

3.2

Approval:

William D. Ruan

MANAGER, ANALYSIS AND
MODELING GROUP

5/3/91

DATE

1.0 PURPOSE

This specification describes the responsibilities and activities for providing the electronic deliverable lab data from environmental samples collected at the EG&G Rocky Flats Plant (RFP) site as specified in the scope of work for all contract labs. This data shall be electronically transferred into the Rocky Flats Environmental Database (RFEDS).

2.0 SCOPE

This specification applies to electronic deliverables of analytical data provided by contract labs under the direction of the Environmental Monitoring and Assessment Division (EMAD).

3.0 TERMS/DEFINITIONS

3.1 RFEDS	The Rocky Flats Environmental Database.
3.2 Standard RFEDS Format	The format defined in this specification to be used for all RFEDS electronic deliverables.
3.3 EMAD	Environmental Monitoring and Assessment Division.
3.4 ELECTRONIC DELIVERABLE	A PC-DOS (Personal Computer-Disk Operating System) diskette containing ASCII (American National Standard Code for Information Interchange) text files of analytical data in the RFEDS format.
3.5 CAS Number	A unique number assigned to a chemical compound by the Chemical Abstract Service of the American Chemical Society.

3.6	RFEDS SPECIFIC CAS Number	A unique number used in RFEDS for specific chemical compounds where there is no formal Cas number.
3.7	Test Group Code	RFEDS code for the method used to analyze a group of samples.

4.0 RESPONSIBILITIES

4.1 The EMAD Analysis and Modeling Group (AMG) is responsible for providing the labs with the RFEDS data format. It is also responsible for quality checking all received electronic deliverables and ensuring compliance with this specification.

4.2 The contract labs are responsible for providing electronic deliverables of all analytical data from environmental samples collected under the supervision of EMAD on the RFP site. Contract labs are also responsible for conducting and documenting verification of data and performing regular data backups. The contract labs shall also provide copies of the Chain of Custody (COC) and sample receipt verification forms on a weekly basis.

4.3 The EMAD/AMG Analytical Program Chemists are responsible for ensuring that the analytical labs receiving samples are providing electronic deliverables for all results and that any new labs granted contracts are provided with this specification. The Analytical Program Chemists are responsible for ensuring that the requirement to use this specification is incorporated into each laboratory contract statement of work (SOW). The Analytical Program Chemists shall check for data verification procedures during their audits and shall include a statement of data verification procedures in the Audit Report. This shall include data entry quality control and a standard backup procedure.

5.0 PROCEDURE

5.1 Introduction

The overall goal of this activity is to receive good quality, electronic data for direct input into RFEDS. For questions about the electronic deliverable contact Annette Primrose at (303) 966-7041 or Steve Singer at (303) 966-5748. For any questions dealing with contract specifications or items of a chemical nature, contact Karen Schoendaller at (303) 966-5912 or Dr. John Dick at (303) 966-5950.

5.2 Electronic Deliverable

The data shall be provided as an ASCII text file on a PC-DOS disk using the standard RFEDS format. The lab batch identification number (ID) shall be used as the file name. Two copies of each file shall be provided on separate diskettes to Annette Primrose or Steve Singer of the EMAD Analysis and Modeling Group. The diskettes will be clearly labelled with the lab name and the name of the files. The mailing address is:

Annette Primrose/Steve Singer
EG&G Rocky Flats, Inc.
Rocky Flats Plant/EMAD/AMG
Bldg. T130B
P.O. Box 464
Golden, Colorado 80402-0464

5.3 RFEDS Format

The RFEDS format consists of a file containing a header record, a variable number of analytical records and a trailer record. Each record shall be 226 characters long and shall be terminated by a carriage return. The file name shall be derived from the lab batch number. Fields shall be delimited by spaces, not tabs. Data within fields shall be left justified. A complete description and example of the RFEDS format with field names and field lengths is included in Appendix A.

5.3.1 <u>The header record</u> shall consist of the lab project number, the file creation date, and the number of records in the file including the header and trailer records.

5.3.2 Each Analytical record represents one analytical result for a given sample and contains the fields as described in Appendix A. All data shall be left justified within each field, one value per field and fields containing no data shall contain blanks. Each record shall contain the following fields:

FIELD NAME	DESCRIPTION
Sample Number	EG&G sample number. The labs shall not alter the EG&G sample number without prior permission from EMAD/AMG.
Sample Matrix	Matrix type of the sample. Appendix C lists the allowable matrix types.
Lab Batch Number	The number used by the lab to identify a group of samples that were analyzed together.
Lab ID	There is an RFEDS identification code for each contract lab. If a lab has not received one, contact EMAD/AMG.
Lab Blank Sample Number	The lab sample number of the lab blank analyzed with a sample group.
Lab Test Panel Code	The analytical results code based on the analysis type. These are given in Appendix D.
Result Identifier	RFEDS codes that differentiate between actual analytical results and duplicates or spikes. Listed in Appendix E.
CAS Numbers	The formal CAS number assigned to an analyte by the Chemical Abstract Service. If a formal CAS number is not available, use the appropriate RFEDS specific CAS number listed in

	Appendix B. If a CAS number cannot be found, contact Annette Primrose, (303) 966-7041 or Steve Singer, (303) 966-5748. Do not use abbreviations.
Result	The analytical result for a chemical compound. Use numbers, not characters. Use minus signs in front of negative results, and do not use scientific notation. If the result is undetected at the detection limit, put the detection limit in this field and a "U" in the Result Qualifier field. For Rads, use the actual measured activity even if it is below the detection limit.
Result Qualifier	A code for identifying the reliability of the result. These are listed in Appendix F.
2 Sigma Error	Error data is provided for Radionuclide analyses only.
Unit of Measure	The unit of measure for the result. This shall match the unit of measure used for the contract required detection limit since the CRDL unit of measure is not provided. Appendix G lists the allowable abbreviations. The unit of measure for blanks and lab control samples shall match the unit of measure used for the sample.
Parameter Name	Name of the compound analyzed. Industry standard abbreviations are acceptable.

Contract Required Detection Limit	Use the detection limit specified for the analysis type as required in the contract. For diluted samples, use a detection limit corrected for the dilution factor. For soils, use a detection limit corrected for percent moisture. For soils that have been diluted, correct for both the dilution factor and percent moisture. For Rads only, use the actual Minimum Detected Activity of the sample instead of the detection limit.

5.4 Chain of Custody and Sample Receipt Verification Forms

A copy of all COC forms and all sample receipt verification forms shall be provided every Friday for the samples received that week by a contract lab. The copies shall be sent Federal Express or faxed to:

Annette Primrose/Steve Singer
EG&G Rocky Flats, Inc.
Rocky Flats Plant
EMAD/AMG
Bldg. T130B
P.O. Box 464
Golden, Colorado 80402-0464

Fax number: (303) 966-6070

APPENDIX A

Header Record

The first record of each file shall have the Project Number, the file date and the number of records in the file including the header and trailer records. The format is:

Position	Field Length	Field
1 - 20	20	Lab project number or code
21 - 28	8	File Date (MM/DD/YY)
29 - 33	5	Number of records in file

Analytical Records

There shall be one record for each result. All data shall be left justified within the fields and fields with no data must contain blanks. Do not use abbreviations for the CAS number. The format is as follows:

Position	Field Length	Field
1 - 20	20	EG&G sample number
21 - 28	8	Sample collection date (MM/DD/YY)
29 - 33	5	Sample collection time (HH:MM)
33 - 48	15	Lab generated batch number
49 - 56	8	Sample matrix (Appendix C)
57 - 76	20	Lab generated sample number
77 - 81	5	Lab ID - Provided by EG&G
82 - 89	8	Sample preparation date (MM/DD/YY)
90 - 97	8	Analysis date (MM/DD/YY)
98 - 102	5	Analysis time (HH:MM)
103 - 122	20	Lab blank sample number
123 - 132	10	Lab test panel code (Appendix D)
133 - 135	3	Result identifier (Appendix E)
136 - 146	11	CAS number (Appendix B)
147 - 156	10	Result, detection limit if not detected
157 - 161	5	Qualifier (Appendix F)
162 - 171	10	2 sigma error - Rad data only
172 - 179	8	Unit of measure (Appendix G)
180 - 186	7	Retention time-Tentative id compounds only
187 - 216	30	Parameter name
217 - 226	10	Contract Required Detection Limit

Trailer Record

The last record of the file shall consist of three left justified dollar signs.

Position	Field Length	Field
1 - 3	3	$$$

2029-38-01-0000	04/13/9011													
FEA1040790	04/07/90	9004G842	WATER	9004G842-0030	LABA	04/09/9004/10/90	90G88042-MB10	WQFL	IAQ	10		MG/L	TOTAL SUSPENDED SOLIDS	5
FCA1040790	04/07/90	9004G842	WATER	9004G842-0040	AAAA	04/09/9004/10/90	90G88042-MB10	WQFL	IAQ	15		MG/L	TOTAL SUSPENDED SOLIDS	5
B5040790	04/07/90	9004G842	WATER	9004G842-0050	AAAA	04/09/9004/10/90	90G55042-MB10	WQFL	IAQ	23		MG/L	TOTAL SUSPENDED SOLIDS	5
FEB5040790	04/07/90	9004G842	WATER	9004G842-0060	AAAA	04/09/9004/10/90	90G55042-MB10	WQFL	IAQ	19		MG/L	TOTAL SUSPENDED SOLIDS	5
FCB5040790	04/07/90	9004G842	WATER	9004G842-0070	AAAA	04/09/9004/10/90	90G55042-MB10	WQFL	IAQ	18		MG/L	TOTAL SUSPENDED SOLIDS	5
C2040790	04/07/90	9004G842	WATER	9004G842-0080	AAAA	04/09/9004/10/90	90G55042-MB10	WQFL	IAQ	10		MG/L	TOTAL SUSPENDED SOLIDS	5
FEC2040790	04/07/90	9004G842	WATER	9004G842-0090	AAAA	04/09/9004/10/90	90G55042-MB10	WQFL	IAQ	5	U	MG/L	TOTAL SUSPENDED SOLIDS	5
FCC2040790	04/07/90	9004G842	WATER	9004G842-0100	AAAA	04/09/9004/10/90	90G55042-MB10	WQFL	MS	98		%	% REC (TSS)	
FCC2040790	04/07/90	9004G842	WATER	9004G842-0100	AAAA	04/09/9004/10/90	90G55042-MB10	WQFL	IAQ	5	U	MG/L	TOTAL SUSPENDED SOLIDS	5
ESS														

APPENDIX B

ANALYTE NAME	RFEDS SPECIFIC CAS NUMBER
ACIDITY	10-70-8
ACIDITY, AS CaCO3	10-70-8
ADIPATES	10-52-6
ALKALINITY (as CaCO3)	10-09-3
ALKYL METHYL ISOQUINOLINIUM CHLORIDE	10-56-0
ARSENATES	10-42-4
ARSENITES	10-43-5
BACTERIA, TOTAL	11-05-2
BETA PARTICLE AND PHOTON RADIOACTIVITY	10-55-9
BICARBONATE AS CACO3	10-13-9
BIOCHEMICAL OXYGEN DEMAND (BOD)	10-26-4
BIOCHEMICAL OXYGEN DEMAND (BOD5)	10-26-4
CARBON, TOTAL INORGANIC (TIC)	10-76-4
CARBON, TOTAL VOLATILE ORGANIC	10-25-3
CARBONATE	10-14-0
CBOD5	11-03-0
CHEMICAL BIOLOGICAL OXYGEN DEMAND (5-DAY)	11-03-0
CHEMICAL OXYGEN DEMAND (COD)	10-27-5
CHLORINATED BENZENES, N.O.S.	10-16-2
CHLORINATED ETHANE, N.O.S.	10-17-3
CHLORINATED FLUOROCARBONS, N.O.S.	10-18-4
CHLORINATED NAPHTHALENE, N.O.S.	10-19-5
CHLORINATED PHENOL, N.O.S.	10-20-8
CHLORINE, FREE AVAILABLE	11-00-7
CHLORINE, FREE RESIDUAL	11-01-8
CHLORINE, TOTAL RESIDUAL	11-04-1
CHLOROALKYLETHERS, N.O.S.	10-21-9
COKE OVEN EMISSIONS	10-63-9
COLIFORM, TOTAL	10-46-8
COLOR	10-83-3
CORROSIVITY	10-37-7
CYANIDE, AMENABLE	10-87-7
CYANIDE, FREE	10-71-9
CYANIDES (SOLUBLE SALTS AND COMPLEXES), N.O.S.	10-93-5
DISSOLVED OXYGEN	10-88-8
ENDRIN METABOLITES	10-95-7
ETHYLENEBISDITHIOCARBAMIC ACID, SALTS AND ESTERS	10-96-8
FECAL COLIFORM	10-06-0
FLUORIDE, SOLUBLE	10-72-0
FOAMING AGENTS	10-84-4
GIARDIA LAMBLIA	10-48-0
GLYCOL ETHERS	10-61-7
GROSS ALPHA - DISSOLVED	10-79-7
GROSS ALPHA - SUSPENDED	10-78-6
GROSS BETA - DISSOLVED	10-81-1
GROSS BETA - SUSPENDED	10-80-0
GROSS GAMMA	10-82-2
HALOMETHANE, N.O.S.	10-22-0

ANALYTE NAME	RFEDS SPECIFIC CAS NUMBER
HARDNESS, TOTAL	11-02-9
HARDNESS (as CaCO3)	10-92-4
HEXACHLORODIBENZOFURANS	10-65-1
HEXACHLORODIBENZO-p-DIOXINS	10-64-0
IGNITABILITY	10-36-6
LEGIONELLA	10-51-5
meta and para XYLENES	11-57-4
NICOTINE SALTS	10-97-9
NITRATE/NITRITE (as N)	10-28-6
NTA	10-91-3
NVSS	11-06-3
N-ALKYL-N-(2-CYANOETHYL)-1,3-DIAMINOPROPANE	10-58-2
ODOR	10-85-5
OIL AND GREASE	10-30-0
OIL AND GREASE BY IR	11-42-7
ORGANORHODIUM COMPLEX	10-45-7
ORTHOPHOSPHATE	11-36-9
PAH'S	10-53-7
PENTACHLORODIBENZOFURANS	10-67-3
PENTACHLORODIBENZO-p-DIOXINS	10-66-2
PETROLEUM HYDROCARBONS, TOTAL RECOVERABLE	10-90-2
pH	10-29-7
PHENOLS, TOTAL	10-03-7
PHTHALIC ACID ESTERS, NOS	10-23-1
PLUTONIUM-239/240	10-12-8
PNA'S	10-53-7
POLYCYCLIC ORGANIC MATTER (INC. COKE OVEN EMISSIONS)	10-44-6
POLYNUCLEAR AROMATIC HYDROCARBONS	10-53-7
PU-239/240	10-12-8
RADIONUCLIDES	10-62-8
RADIUM-226/228	10-54-8
REACTIVITY	10-38-8
RESIDUE, FILTERABLE	10-33-3
RESIDUE, NONFILTERABLE	10-32-2
RESIDUE, SETTLEABLE	10-74-2
RESIDUE, TOTAL	10-31-1
RESIDUE, VOLATILE	10-73-1
RETORT	10-30-0
SACCHARIN SALTS	10-98-0
SALINITY (FROM CHLORIDE)	10-40-2
SALINITY (FROM SODIUM)	10-41-3
SETTLEABLE SOLIDS	10-74-2
SILICA, DISSOLVED	10-89-9
SOLIDS, NONVOLATILE SUSPENDED	11-06-3
SOLIDS, TOTAL	10-31-1
SOLIDS, TOTAL SETTLEABLE	10-74-2
SOLIDS, TOTAL VOLATILE	10-73-1
SPECIFIC CONDUCTIVITY	10-34-4
STRONTIUM-89/90	11-10-9

ANALYTE NAME	RFEDS SPECIFIC CAS NUMBER
STANDARD PLATE COUNT	10-50-4
STRYCHNINE SALTS	10-99-1
SURFACTANTS (MBAS)	10-75-3
SUSPENDED SOLIDS, NONVOLATILE	11-06-3
TEMPERATURE	10-86-6
TETRACHLORODIBENZOFURANS	10-69-5
TETRACHLORODIBENZO-p-DIOXINS-	10-68-4
TOTAL BACTERIA	11-05-2
TOTAL DISSOLVED SOLIDS (TDS)	10-33-3
TOTAL HARDNESS	11-02-9
TOTAL KJELDAHL NITROGEN	10-07-1
TOTAL ORGANIC CARBON (TOC)	10-35-5
TOTAL ORGANIC HALIDES	10-10-6
TOTAL ORGANIC HALOGEN	10-10-6
TOTAL ORGANIC NITROGEN	10-04-8
TOTAL SOLIDS	10-31-1
TOTAL SUSPENDED SOLIDS (TSS)	10-32-2
TOTAL SUSPENDED SOLIDS (TSS)	10-32-2
TOTAL VOLATILE ORGANIC CARBON	10-25-3
TOTAL VOLATILE SOLIDS (TVS)	10-73-1
TRIHALOMETHANES (THM)	10-77-5
TURBIDITY, NTU	10-08-2
URANIUM, TOTAL	11-09-6
URANIUM-233,-234	11-08-5
URANIUM-233,-238,-239	11-07-4
URANIUM-235/236	10-11-7
VIRUSES	10-49-1
% MOISTURE	10-00-4
% SOLIDS	10-02-6
1,2,3,4,7,8-HEXACHLORODIBENZO-p-DIOXIN	10-15-1
1-(ALKYLAMINO)-3-AMINOPROPANE ACETATE SHAUGHNESSY	10-57-1
1-(ALKYLAMINO)-3-AMINOPROPANE DIACETATE SHAUGHNESSY	10-60-6
1-(ALKYLAMINO)-3-AMINOPROPANE MONOACETATE	10-59-3
2,4-D, SALTS AND ESTERS	10-94-6

APPENDIX C

SAMPLE MATRIX TYPES

WATER	All water-based samples.
SED	All sediment based samples including soil samples.
SLUDGE	Chemical sludge, mixtures of which are neither solid or particularly liquid.
FILTER	Specifically applies to samples composed of the air filters.
CHAR	Material collected from charcoal filters.
FILTSOX	Cloth covers for the charcoal filters.

APPENDIX D

LAB TEST PANEL CODES

VOCCLPTCL	CLP Target Compound List Volatile Organics
SVOCLPTCL	CLP Target Compound List Semivolatile Organics
PSTCLPTCL	CLP Target Compound List Pesticides/PCBs
TRIPES619	Triazine Pesticides - EPA method 619
CLHERB615	Chlorinated Herbicides - EPA method 615
OCLPEST608	Organochlorine Pesticides/PCBs EPA method 608
SELCOM625	Selected Compounds EPA method 625
SELCOM525	Selected Compounds EPA method 525
SELCO502.2	Selected Compounds EPA method 502.2
PSTPCB508	Pesticides/PCBs EPA method 508
SELCOM505	Selected Compounds EPA method 505
PAHCOM610	PAH Compounds EPA method 610
SELNA607	Selected Nitroso-Amines EPA method 607
DIOX613	Dioxins EPA method 613
DMETCLPTAL	CLP target analyte list Metals-Dissolved
SMETCLPTCL	CLP target analyte list Metals-Total
PDMETCLPTAL	CLP target analyte list Metals-Potentially Dissolved
DMETNOCLP	Non-CLP target analyte list Metals-Dissolved
SMETNOCLP	Non-CLP target analyte list Metals-Total
PDMETNOCLP	Non-CLP target Metals-Potentially Dissolved
WQPL	Water Quality parameter list
DRADS	Dissolved Radionuclides
TRADS	Total Radionuclides

APPENDIX E

RESULT IDENTIFIER

BLK	Blanks including Rad blanks
BS	Method Blank spike.
BSD	Blank spike duplicate.
DUP	Duplicate sample.
MS	Matrix spike.
MSD	Matrix spike duplicate.
MB	Matrix Blank
SPK	Spikes including Rad spikes
TIC	Tentatively identified compounds.
TRG	Regular target compound.
RB	Reagent Blank
REX	Re-extraction
SUR	Surrogate sample.

APPENDIX F

RESULT QUALIFIER

U	A compound was analyzed but not detected.
J	Indicates an estimated value for a tentatively identified compound or analyte that meets the identification criteria but had a result less than the specified detection limit.
B	Compound was found in the blank and in the sample.
T	Compound was found in the TCLP extraction blank and in the sample.
E	Concentration exceed calibration range of the instrument.
I	Indicates interference.
D	Surrogate/matrix spike recoveries were not obtained because the extract had to be diluted for analysis.
DL	Indicates a secondary dilution.
DF	Dilution factor.
X	Result is by calculation.

APPENDIX G

UNITS OF MEASURE

pCi/L	Picocuries per liter
pCi/g	Picocuries per gram
pCi/kg	Picocuries per kilogram
mg/L	Milligrams per liter
ug/L	Micrograms per liter
mg/g	Milligrams per gram
ug/g	Micrograms per gram
mg/Kg	Milligrams per kilogram
ug/Kg	Micrograms per kilogram

EXHIBIT VI

OUT-OF-SPECIFICATION REPORTING

This Appendix defines the action criteria and communication path for reporting data outside specified control limits. Out-of-Specification (OOS) data reporting applies to specified surface and ground water samples collected at the Rocky Flats Plant. Sample Chain-of-Custody (COC) forms will be clearly marked to indicate that the sample is subject to the requirements of Out-of-Specification reporting.

Contract Laboratories will report analytical results that are equal to or are greater than the specified Control Guide value, stated in Figure I, to the EMAD OOS Report Coordinator within 24 hours of determination via FAX or phone. OOS data will be reported using the form in Figure II, or similar format. Include any related analytical operations problems that may help to explain the OOS result, e.g., contaminated blank, recovery problems, or problems with control.

Contract Laboratories will also report weekly analytical results to the EMAD OOS Report Coordinator via FAX or phone by noon on Friday each week. The weekly notification will state whether or not there were out-of-specification results occurring during that week. Figure III illustrates an acceptable weekly one-page reporting form.

Figure 1. Control Specification Analytes and Reporting Limits

ANALYTE	CONTROL GUIDE	(UNITS)
METALS		
Aluminum	5.0	mg/L
Antimony	0.15	mg/L
Arsenic	0.05	mg/L
Barium	1.0	mg/L
Beryllium	0.1	mg/L
Cadmium	0.01	mg/L
Chromium	0.05	mg/L
Cobalt	0.05	mg/L
Copper	1.0	mg/L
Iron (dissolved)	0.3	mg/L
Iron	1.0	mg/L
Lead	0.05	mg/L
Manganese (dissolved)	0.05	mg/L
Manganese	1.0	mg/L
Mercury	0.002	mg/L
Nickel	0.2	mg/L
Selenium	0.01	mg/L
Silver	0.05	mg/L
Thallium	0.013	mg/L
Vanadium	0.10	mg/L
Zinc	5.0	mg/L
RADIONUCLIDES		
Americium 241	0.05	pCi/L
Cesium 137	80	pCi/L
Curium 244	60	pCi/L
Gross Alpha	7	pCi/L
Gross Beta	5	pCi/L
Neptunium 237	30	pCi/L
Plutonium 239, 240	0.05	pCi/L
Radium 226 and 228	5	pCi/L
Strontium 89 and 90	8	pCi/L
Thorium 230 and 232	60	pCi/L
Tritium	500	pCi/L
Uranium (Total)	5	pCi/L

VOLATILE ORGANIC CONSTITUENTS

For all VOCs the control guide is the method detection limit specified by contract. Positive detections in laboratory blancks should also be reported, when a target Compound is present in both the lab blank and sample.

WATER QUALITY PARAMETER LISTS		
CBOD5 day/BOD5 day	10	mg/L
Chloride	250.0	mg/L
Cyanide	0.20	mg/L
Fecal Coliform	400	c/100ml
Nitrate	10.0	mg/L
Nitrite	1.0	mg/L
Sulfate	250.0	mg/L
Total Phosphorus	8	mg/L
Total Residual Chlorine	0.5	mg/L
Total Suspended Solids	30.0	mg/L
Atrazine	3.0	ug/L
Simazine	4.0	ug/L

FIGURE II. OUT-OF-SPECIFICATION DATA PREPORT FORM

ROCKY FLATS SAMPLE NUMBER	LABORATORY SAMPLE NUMBER	SAMPLE LOCATION	SAMPLE DATE	ANALYTE	CONTROL GUIDE	UNITS	RESULT	ERROR	UNITS	COMMENTS

COMMENTS:

FORM DIRECTIONS:

ROCKY FLATS SAMPLE NUMBER: This number is a five digit nuber preceeded and followed by two alphabet characters. Ex. NP12345WC

LABORATORY SAMPLE NUMBER: This number is a contract lab assinged number, if applicable.

SAMPLE LOCATION: This is the sample collection location specified on the Rocky Flats Chain-Of-Custody.

SAMPLE DATE: This is the date the sample was collected specified on the Chain-Of-Custody.

ANALYTE: This is the parameter being analyzed.

CONTROL GUIDE: This value is stated in the EG&G General Radiochemistry and Routine Analytical Services Protocol (Exhibit VI).

RESULT ERROR: This is a + or - value or NR if this value if not reported/not applicable.

COMMENTS: If anlalyte is a VOC state the analytical method used.
If there was a positive detection in laboratory blank or any problem with laboratory controls, state the problem.

LABORATORY _____ DATE REPORTED _____

Figure III. Weekly Out-of-Specification FAX Report Form

Contract Laboratory Name

WEEKLY
Out-of-Specification Report

To: Beth Montano
EG&G Rocky Flats/EMAD
Phone:(303)966-5576
FAX: (303)966-6070

DATE: _____

Relevant analytical results for the time period form _____ to _____ have been reviewed in accordance with the Standard Operating Procedure entitled "Out-of Specification Reporting for EG&G Rocky Flats.

DATA OUT-OF-SPECIFICATION

☐ NO

☐ YES (see attached data)

_____ Phone: _____

Name and title of person sending the report

EXHIBIT VI

OUT-OF-SPECIFICATION REPORTING

This Appendix defines the action criteria and communication path for reporting data outside specified control limits. Out-of-Specification (OOS) data reporting applies to specified surface and ground water samples collected at the Rocky Flats Plant. Sample Chain-of-Custody (COC) forms will be clearly marked to indicate that the sample is subject to the requirements of Out-of-Specification reporting.

Contract Laboratories will report analytical results that are equal to or are greater than the specified Control Guide value, stated in Figure I, to the EMAD OOS Report Coordinator within 24 hours of determination via FAX or phone. OOS data will be reported using the form in Figure II, or similar format. Include any related analytical operations problems that may help to explain the OOS result, e.g., contaminated blank, recovery problems, or problems with control.

Contract Laboratories will also report weekly analytical results to the EMAD OOS Report Coordinator via FAX or phone by noon on Friday each week. The weekly notification will state whether or not there were out-of-specification results occurring during that week. Figure III illustrates an acceptable weekly one-page reporting form.

Figure I. Out-of-Specification Analytes and Reporting Limits

ANALYTE	CONTROL GUIDE	(UNITS)
METALS		
Aluminum	5.0	mg/L
Antimony	0.15	mg/L
Arsenic	0.05	mg/L
Barium	1.0	mg/L
Beryllium	0.1	mg/L
Cadmium	0.01	mg/L
Chromium	0.05	mg/L
Cobalt	0.05	mg/L
Copper	1.0	mg/L
Iron (dissolved)	0.3	mg/L
Iron	1.0	mg/L
Lead	0.05	mg/L
Manganese (dissolved)	0.05	mg/L
Manganese	1.0	mg/L
Mercury	0.002	mg/L
Nickel	0.2	mg/L
Selenium	0.01	mg/L
Silver	0.05	mg/L
Thallium	0.013	mg/L
Vanadium	0.10	mg/L
Zinc	5.0	mg/L
RADIONUCLIDES		
Americium 241	0.05	pCi/L
Cesium 137	80	pCi/L
Curium 244	60	pCi/L
Gross Alpha	7	pCi/L
Gross Beta	5	pCi/L
Neptunium 237	30	pCi/L
Plutonium 239, 240	0.05	pCi/L
Radium 226 and 228	5	pCi/L
Strontium 89 and 90	8	pCi/L
Thorium 230 and 232	60	pCi/L
Tritium	500	pCi/L
Uranium (Total)	5	pCi/L

VOLATILE ORGANIC CONSTITUENTS

For all VOCs the control guide is the method detection limit specified by contract. Positive detections in laboratory blancks should also be reported, when a target Compound is present in both the lab blank and sample.

WATER QUALITY PARAMETER LISTS		
CBOD5 day/BOD5 day	10	mg/L
Chloride	250.0	mg/L
Cyanide	0.20	mg/L
Fecal Coliform	400	c/100ml
Nitrate	10.0	mg/L
Nitrite	1.0	mg/L
Sulfate	250.0	mg/L
Total Phosphorus	8	mg/L
Total Residual Chlorine	0.5	mg/L
Total Suspended Solids	30.0	mg/L
Atrazine	3.0	ug/L
Simazine	4.0	ug/L

FIGURE II. OUT-OF-SPECIFICATION DATA PREPORT FORM

ROCKY FLATS SAMPLE NUMBER	LABORATORY SAMPLE NUMBER	SAMPLE LOCATION	SAMPLE DATE	ANALYTE	CONTROL GUIDE	UNITS	RESULT	ERROR	UNITS	COMMENTS

COMMENTS:

FORM DIRECTIONS:

ROCKY FLATS SAMPLE NUMBER: This number is a five digit nuber preceeded and followed by two alphabet characters. Ex. NP12345WC

LABORATORY SAMPLE NUMBER: This number is a contract lab assinged number, if applicable.

SAMPLE LOCATION: This is the sample collection location specified on the Rocky Flats Chain-Of-Custody.

SAMPLE DATE: This is the date the sample was collected specified on the Chain-Of-Custody.

ANALYTE: This is the parameter being analyzed.

CONTROL GUIDE: This value is stated in the EG&G General Radiochemistry and Routine Analytical Services Protocol (Exhibit VI).

RESULT ERROR: This is a + or - value or NR if this value if not reported/not applicable.

COMMENTS: If anlalyte is a VOC state the analytical method used.
If there was a positive detection in laboratory blank or any problem with laboratory controls, state the problem.

LABORATORY _____ DATE REPORTED _____

Figure III. Weekly Out-of-Specification FAX Report Form

Contract Laboratory Name

WEEKLY
Out-of-Specification Report

To: Beth Montano
EG&G Rocky Flats/EMAD
Phone:(303)966-5576
FAX: (303)966-6070

DATE: _____

Relevant analytical results for the time period form _____ to _____ have been reviewed in accordance with the Standard Operating Procedure entitled "Out-of Specification Reporting for EG&G Rocky Flats.

DATA OUT-OF-SPECIFICATION

☐ NO

☐ YES (see attached data)

_____ Phone: _____

Name and title of person sending the report

Header Record
The first record of each file shall have the Project Number, the file date and the number of records in the file including the header and trailer records. The format is:

Position	Field Length	Field
1 - 20	20	Lab project number or code
21 - 28	8	File Date (MM/DD/YY)
29 - 33	5	Number of records in file

Analytical Records
There shall be one record for each result. All data shall be left justified within the fields and fields with no data must contain blanks. Do not use abbreviations for the CAS number. The format is as follows:

Position	Field Length	Field
1 - 20	20	EG&G sample number
21 - 28	8	Sample collection date (MM/DD/YY)
29 - 33	5	Sample collection time (HH:MM)
34 - 48	15	Lab generated batch number
49 - 56	8	Sample matrix (Appendix C)
57 - 76	20	Lab generated sample number
77 - 81	5	Lab ID - Provided by EG&G
82 - 89	8	Sample preparation date (MM/DD/YY)
90 - 97	8	Analysis date (MM/DD/YY)
98 - 102	5	Analysis time (HH:MM)
103 - 122	20	Lab blank sample number
123 - 132	10	Lab test panel code (Appendix D)
133 - 135	3	Result identifier (Appendix E)
136 - 146	11	CAS number (Appendix B)
147 - 156	10	Result, detection limit if not detected
157 - 161	5	Qualifier (Appendix F)
162 - 171	10	2 sigma error - Rad data only
172 - 179	8	Unit of measure (Appendix G)
180 - 186	7	Retention time-Tentative id compounds only
187 - 216	30	Parameter name
217 - 226	10	Contract Required Detection Limit
227 - 234	8	Invoice date (MM/DD/YY)
235 - 244	10	Price for this analysis (no $)

Trailer Record
The last record of the file shall consist of three left justified dollar signs.

Position	Field Length	Field
1 - 3	3	$$$

Appendix IX Analyte Listing
BNA Analytes

Based on 40 CFR 264, Federal Register, 52(131)

Common Name	CAS Number	Fraction	Method	WATER POL (ug/L)	SOIL POL (ug/L)
Acenaphthene	83-32-9	BNA	8270	10	330
Acenapthylene	208-96-8	BNA	8270	10	330
Anthracene	120-12-7	BNA	8270	10	330
Benzo(a)anthracene \ 1,2-Benzanthracene	56-55-3	BNA	8270	10	330
Benzo(b)fluoranthene	205-99-2	BNA	8270	10	330
Benzo(k)fluoranthene	207-08-9	BNA	8270	10	330
Benzo(g,h,i)perylene	191-24-2	BNA	8270	10	330
Benzo(a)pyrene	50-32-8	BNA	8270	10	330
Benzoic acid	65-85-0	BNA	8270	50	1700
Benzyl alcohol	100-51-6	BNA	8270	10	330
4-Bromophenyl-phenylether	101-55-3	BNA	8270	10	330
Butylbenzylphthalate	85-68-7	BNA	8270	10	330
4-Chloroaniline \ p-Chloroaniline	106-47-8	BNA	8270	10	330
bis(2-Chloroethyl) ether	111-44-4	BNA	8270	10	330
bis(2-Chloroethoxy) methane	111-91-1	BNA	8270	10	330
4-Chlorophenyl-phenyl ether	7005-72-3	BNA	8270	10	330
bis(2-Chloroisopropyl) ether	108-60-1	BNA	8270	10	330
2-Chloronaphthalene	91-58-7	BNA	8270	10	330
2-Chlorophenol \ o-Chlorophenol	95-57-8	BNA	8270	10	330
4-Chloro-3-methylphenol \ p-Chloro-m-cresol	59-50-7	BNA	8270	20	330
Chrysene	218-01-9	BNA	8270	10	330
2-Methylphenol \ o-Cresol	95-48-7	BNA	8270	10	330
4-Methylphenol \ p-Cresol	106-44-5	BNA	8270	10	330
Dibenz(a,h)anthracene	53-70-3	BNA	8270	10	330
Dibenzofuran	132-64-9	BNA	8270	10	330
Di-n-butylphthalate	84-74-2	BNA	8270	10	330
1,2-Dichlorobenzene \ o-Dichlorobenzene	95-50-1	BNA	8270	10	330
1,3-Dichlorobenzene \ m-Dichlorobenzene	541-73-1	BNA	8270	10	330
1,4-Dichlorobenzene \ p-Dichlorobenzene	106-46-7	BNA	8270	10	330
3,3'-Dichlorobenzidine	91-94-1	BNA	8270	20	660
2,4-Dichlorophenol	120-83-2	BNA	8270	10	330
Diethylphthalate	84-66-2	BNA	8270	10	330
2,4-Dimethylphenol	105-67-9	BNA	8270	10	330
Dimethylphthalate	131-11-3	BNA	8270	10	330
4,6-Dinitro-2-methylphenol	534-52-1	BNA	8270	50	1700
2,4-Dinitrophenol	51-28-5	BNA	8270	50	1700
2,4-Dinitrotoluene	121-14-2	BNA	8270	10	330
2,6-Dinitrotoluene	606-20-2	BNA	8270	10	330
Di-n-octylphthalate	117-84-0	BNA	8270	10	330
bis(2-Ethylhexyl)phthalate	117-81-7	BNA	8270	10	330
Fluoranthene	206-44-0	BNA	8270	10	330
Fluorene	86-73-7	BNA	8270	10	330
Hexachlorobenzene	118-74-1	BNA	8270	10	330
Hexachlorobutadiene	87-68-3	BNA	8270	10	330
Hexachlorocyclopentadiene	77-47-4	BNA	8270	10	330
Hexachloroethane	67-72-1	BNA	8270	10	330
Isophorone	78-59-1	BNA	8270	10	330
Naphthalene	91-20-3	BNA	8270	10	330
2-Methylnaphthalene	91-57-6	BNA	8270	10	330
2-Nitroaniline \ o-Nitroaniline	88-74-4	BNA	8270	50	1700
3-Nitroaniline \ m-Nitroaniline	99-09-2	BNA	8270	50	1700
4-Nitroaniline \ p-Nitroaniline	100-01-6	BNA	8270	50	1700
Nitrobenzene	98-95-3	BNA	8270	10	330
2-Nitrophenol \ o-Nitrophenol	88-75-5	BNA	8270	10	330

Appendix IX Analyte Listing
BNA Analytes

Based on 40 CFR 264, Federal Register, 52(131)

Common Name	CAS Number	Fraction	Method	WATER PQL (ug/L)	SOIL PQL (ug/L)
4-Nitrophenol \ p-Nitrophenol	100-02-7	BNA	8270	50	1700
N-Nitrosodiphenylamine	86-30-6	BNA	8270	10	330
N-Nitroso-di-n-propylamine	621-64-7	BNA	8270	10	330
Pentachlorophenol	87-86-5	BNA	8270	50	1700
Phenanthrene	85-01-8	BNA	8270	10	330
Phenol	108-95-2	BNA	8270	10	330
Pyrene	129-00-0	BNA	8270	10	330
Indeno[1,2,3-cd]pyrene	193-39-5	BNA	8270	10	330
1,2,4-Trichlorobenzene	120-82-1	BNA	8270	10	330
2,4,5-Trichlorophenol	95-95-4	BNA	8270	50	1700
2,4,6-Trichlorophenol	88-06-2	BNA	8270	10	330
1,2,4,5-Tetrachlorobenzene	95-94-3	BNA	8270	10	330
1,3,5-Trinitrobenzene \ sym-Trinitrobenzene	99-35-4	BNA	8270	100	3300
1,3-Dinitrobenzene \ m-Dinitrobenzene	99-65-0	BNA	8270	20	660
1,4-Dioxane \ p-Dioxane	123-91-1	BNA	8270	20	660
1,4-Naphthoquinone	130-15-4	BNA	8270	50	1700
1-Naphthylamine	134-32-7	BNA	8270	10	330
2,3,4,6-Tetrachlorophenol	58-90-2	BNA	8270	10	330
2,6-Dichlorophenol	87-63-0	BNA	8270	10	330
2-Acetylaminofluorene \ 2-AAF	53-96-3	BNA	8270	20	660
2-Naphthylamine	91-59-8	BNA	8270	10	330
2-Picoline \ 2-Methylpyridine	109-06-8	BNA	8270	10	330
2-sec-Butyl-4,6-dinitrophenol \ Dinoseb	88-85-7	BNA	8270	20	660
3,3'-Dimethylbenzidine	119-93-7	BNA	8270	20	660
3-Methylcholanthrene	56-49-5	BNA	8270	10	330
3-Methylphenol \ m-Cresol	108-39-4	BNA	8270	10	330
4-Aminobiphenyl	97-67-1	BNA	8270	10	330
4-Nitroquinoline-1-oxide	56-57-5	BNA	8270	50	1700
5-Nitro-o-toluidine	99-55-8	BNA	8270	20	660
7,12-Dimethylbenzene[a]anthracene	57-97-6	BNA	8270	20	660
Acetophenone	98-86-2	BNA	8270	10	330
alpha, alpha-dimethylphenethylamine	122-09-8	BNA	8270	50	1700
Aniline	62-53-3	BNA	8270	50	1700
Aramite	140-57-8	BNA	8270	20	660
Chlorobenzilate	510-15-6	BNA	8270	10	330
Dialiate	2303-16-4	BNA	8270	10	330
Diphenylamine	122-39-4	BNA	8270	10	330
Ethyl methacrylate	97-63-2	BNA	8270	10	330
Ethyl methanesulfonate	62-50-0	BNA	8270	10	330
Hexachlorophene	70-30-4	BNA	8270	100	3300
Hexachloropropene	1888-71-7	BNA	8270	20	660
Isosafrole	120-58-1	BNA	8270	10	330
Methapyrilene	91-80-5	BNA	8270	25	830
Methyl methacrylate	80-62-6	BNA	8270	10	330
Methyl methanesulfonate	66-27-3	BNA	8270	10	330
N-Nitroso-di-n-butylamine	924-16-3	BNA	8270	10	330
N-Nitrosodiethylamine	55-18-5	BNA	8270	10	330
N-Nitrosodimethylamine	62-75-9	BNA	8270	10	330
N-Nitrosomethylethylamine	10595-95-6	BNA	8270	10	330
N-Nitrosomorpholine	59-89-2	BNA	8270	20	660
N-Nitrosopiperidine	100-75-4	BNA	8270	50	330
N-Nitrosopyrrolidine	930-55-2	BNA	8270	50	1700
o-Toluidine	95-53-4	BNA	8270	10	330

Appendix IX Analyte Listing
BNA Analytes

Based on 40 CFR 264, Federal Register, 52(131)

Common Name	CAS Number	Fraction	Method	WATER PQL (ug/L)	SOIL PQL (ug/L)
p-Dimethylaminoazobenzene	60-11-7	BNA	8270	20	660
p-Phenylenediamine	106-50-3	BNA	8270	20	660
Pentachlorobenzene	608-93-5	BNA	8270	10	330
Pentachloroethane	76-01-7	BNA	8270	10	330
Pentachloronitrobenzene	82-68-2	BNA	8270	10	330
Phenacetin	62-44-2	BNA	8270	10	330
Pronamide	23950-58-5	BNA	8270	10	330
Pyridine	110-86-1	BNA	8270	20	660
Safrole	94-59-7	BNA	8270	10	330

Appendix IX Analyte Listing
VOA Analytes

Based on 40 CFR 264, Federal Register, 52(131)

Common Name	CAS Number	Fraction	Method	WATER POL (ug/L)	SOIL POL (ug/L)
Acetone	67-64-1	VOA	8240	10	10
Benzene	71-43-2	VOA	8240	5	5
Bromodichloromethane	75-27-4	VOA	8240	5	5
Bromoform \ Tribromomethane	75-25-2	VOA	8240	5	5
Bromomethane \ Methyl bromide	74-83-9	VOA	8240	10	10
2-Butanone \ Methyl ethyl ketone \ MEK	78-93-3	VOA	8240	10	10
Carbon Disulfide	75-15-0	VOA	8240	5	5
Carbon Tetrachloride	56-23-5	VOA	8240	5	5
Chlorobenzene	108-90-7	VOA	8240	5	5
Chloroethane \ Ethyl chloride	75-00-3	VOA	8240	10	10
Chloroform	67-66-3	VOA	8240	5	5
Chloromethane \ Methyl chloride	74-87-3	VOA	8240	10	10
Dibromochloromethane \ Chlorodibromomethane	124-48-1	VOA	8240	5	5
1,1-Dichloroethane	75-34-3	VOA	8240	5	5
1,2-Dichloroethane \ Ethylenedichloride	107-06-2	VOA	8240	5	5
1,1-Dichloroethene \ 1,1-Dichloroethylene	75-35-4	VOA	8240	5	5
1,2-Dichloroethene (total)	156-60-5	VOA	8240	5	5
1,2-Dichloropropane	78-87-5	VOA	8240	5	5
cis-1,3-Dichloropropene	10061-01-5	VOA	8240	5	5
trans-1,3-Dichloropropene	10061-02-6	VOA	8240	5	5
Ethylbenzene	100-41-4	VOA	8240	5	5
2-Hexanone	591-78-6	VOA	8240	10	10
Methylene Chloride \ Dichloromethane	75-09-2	VOA	8240	5	5
4-Methyl-2-pentanone \ MIBK	108-10-1	VOA	8240	10	10
Styrene	100-42-5	VOA	8240	5	5
1,1,2,2-Tetrachloroethane	79-34-5	VOA	8240	5	5
Tetrachloroethene \ PCE \ Tetrachloroethylene	127-18-4	VOA	8240	5	5
Toluene	108-88-3	VOA	8240	5	5
1,1,1-Trichloroethane \ Methyl chloroform	71-55-6	VOA	8240	5	5
1,1,2-Trichloroethane	79-00-5	VOA	8240	5	5
Trichloroethylene	79-01-6	VOA	8240	5	5
Vinyl Chloride	75-01-4	VOA	8240	10	10
Vinyl Acetate	108-05-4	VOA	8240	10	10
Xylenes (Total)	1330-20-7	VOA	8240	5	5
1,1,1,2-Tetrachloroethane	630-20-6	VOA	8240	10	10
1,2,3-Trichloropropane	96-18-4	VOA	8240	10	10
1,2-Dibromo-3-chloropropane \ DBCP	96-12-8	VOA	8240	50	50
1,2-Dibromoethane \ Ethylene dibromide \ EDB	106-93-4	VOA	8240	20	20
3-Chloropropene \ Allyl chloride	107-05-1	VOA	8240	10	10
Acetonitrile \ Methyl cyanide	75-05-8	VOA	8240	100	100
Acrolein	107-02-8	VOA	8240	500	500
Acrylonitrile	107-13-1	VOA	8240	100	100
Chloroprene \ 2-Chloro-1,3-butadiene	126-99-8	VOA	8240	100	100
Dibromomethane \ Methylene bromide	74-95-3	VOA	8240	20	20
Dichlorodifluoromethane	75-71-8	VOA	8240	20	20
Iodomethane \ Methyl iodide	74-88-4	VOA	8240	10	10
Isobutyl alcohol \ Isobutanol	78-83-1	VOA	8240	2000	2000
Methacrylonitrile	126-98-7	VOA	8240	20	20
Propionitrile \ Ethyl cyanide	107-12-0	VOA	8240	50	50
trans-1,4-Dichloro-2-butene	110-57-6	VOA	8240	20	20
Trichlorofluoromethane	75-69-4	VOA	8240	20	20

Appendix IX Analyte Listing
Organo Chlorine Pesticide/PCB

Based on 40 CFR 264, Federal Register 52(131)

Common Name	CAS Number	Fraction	Method	WATER PQL (ug/L)	SOIL PQL (ug/L)
Aldrin	309-00-2	PEST/PCB	8080	0.05	8
alpha-BHC \ Hexachlorocyclohexane, Alpha	319-84-6	PEST/PCB	8080	0.05	8
alpha-Chlordane	5103-71-9	PEST/PCB	8080	0.5	80
Aroclor-1016	12674-11-2	PEST/PCB	8080	0.5	80
Aroclor-1221	11104-28-2	PEST/PCB	8080	0.5	80
Aroclor-1232	11141-16-3	PEST/PCB	8080	0.5	80
Aroclor-1242	53469-21-9	PEST/PCB	8080	0.5	80
Aroclor-1248	12672-29-6	PEST/PCB	8080	0.5	80
Aroclor-1254	11097-69-1	PEST/PCB	8080	1	160
Aroclor-1260	11096-82-5	PEST/PCB	8080	1	160
beta-BHC \Hexachlorocyclohexane, Beta	319-85-7	PEST/PCB	8080	0.05	8
DDD 4,4'	72-54-8	PEST/PCB	8080	0.1	16
DDE 4,4'	72-55-9	PEST/PCB	8080	0.1	16
DDT 4,4'	50-29-3	PEST/PCB	8080	0.1	16
delta-BHC \Hexachlorocyclohexane, Delta	319-86-8	PEST/PCB	8080	0.05	8
Dieldrin	60-57-1	PEST/PCB	8080	0.1	16
Endosulfan I	959-98-8	PEST/PCB	8080	0.05	8
Endosulfan II	33213-65-9	PEST/PCB	8080	0.1	16
Endosulfan sulfate	1031-07-8	PEST/PCB	8080	0.1	16
Endrin	72-20-8	PEST/PCB	8080	0.1	16
Endrin aldehyde	7421-93-4	PEST/PCB	8080	0.1	16
gamma-BHC \ Lindane	58-89-9	PEST/PCB	8080	0.05	8
gamma-Chlordane	5103-74-2	PEST/PCB	8080	0.5	80
Heptachlor	76-44-8	PEST/PCB	8080	0.05	8
Heptachlor epoxide	1024-57-3	PEST/PCB	8080	0.05	8
Isodrin (Stereoisomer of Aldrin)	465-73-6	PEST/PCB	8080	0.5	8
Kepone	143-50-0	PEST/PCB	8080	0.1	16
Methoxychlor	72-43-5	PEST/PCB	8080	0.5	80
Toxaphene \ Camphechlor	8001-35-2	PEST/PCB	8080	1	160

Appendix IX Analyte Listing
Organo Phosphorus Pesticides

Based on 40 CFR 264, Federal Register 52(131)

Common Name	CAS Number	Fraction	Method	WATER PQL (ug/L)	SOIL PQL (ug/L)
Thionazin	297-97-2	OP PEST	8140	0.7	25
Phorate	298-02-2	OP PEST	8140	0.5	10
Disulfoton \ Di-Syston	298-04-4	OP PEST	8140	1.5	25
Dimethoate	60-51-5	OP PEST	8140	2.0	200
Methyl Parathion	298-00-0	OP PEST	8140	1.5	50
Parathion	56-38-2	OP PEST	8140	1.6	40
Famphur \ Famophos	52-85-7	OP PEST	8140	5.0	200
O,O,O-Triethyl phosphorothioate	126-68-1	OP PEST	8140	0.3	10
Sulfotepp \ Tetraethyl dithiopyrophosphate	3689-24-5	OP PEST	8140	9.0	250

Appendix IX Analyte Listing
Herbicides

Based on 40 CFR 264, Federal Register 52(131)

Common Name	CAS Number	Fraction	Method	WATER POL (ug/L)	SOIL POL (ug/L)
2,4-D \ 2,4-Dichlorophenoxyacetic acid	94-75-7	Herbicide	8150	1	100
2,4, 5-TP \ Silvex	93-72-1	Herbicide	8150	1	100
2,4,5-T \ 2,4,5-Trichloroacetic acid	93-76-5	Herbicide	8150	1	100

Appendix IX Analyte Listing
Dioxins

Based on 40 CFR 264, Federal Register, 52(131)

Common Name	CAS Number	Fraction	Method	WATER PQL (ug/L)	SOIL PQL (ug/L)
Polychlorinated di-benzo-p-dioxins \ PCDDs	(total)	DIOXIN	8280	0.01	1
Polychlorinated di-benzofurans \ PCDFs	(total)	DIOXIN	8280	0.01	1
2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746-01-6	DIOXIN	8280	0.005	1

Appendix IX Analyte Listing
Inorganic Analytes

Based on 40 CFR 264, Federal Register 52(131)

Common Name	CAS Number	Fraction	Method	WATER PQL (ug/L)	SOIL PQL (ug/L)
Antimony	7440-36-0	Inorganic	6010	100	10000
Arsenic	7440-38-2	Inorganic	7060	2	200
Barium	7440-39-3	Inorganic	6010	50	5000
Beryllium	7440-41-7	Inorganic	6010	5	500
Cadmium	7440-43-9	Inorganic	6010	5	500
Chromium	7440-47-3	Inorganic	6010	20	2000
Cobalt	7440-48-4	Inorganic	6010	20	2000
Copper	7440-50-8	Inorganic	6010	20	2000
Cyanide	57-12-5	Inorganic	9010	10	1000
Lead	7439-92-1	Inorganic	7421	50	5000
Mercury	7439-97-6	Inorganic	7470	0.2	100
Nickel	7440-02-0	Inorganic	6010	20	2000
Selenium	7782-49-2	Inorganic	7741	2	200
Silver	7440-22-4	Inorganic	6010	2	200
Sulfide	18496-25-8	Inorganic	9030	200	5000
Thallium	7440-28-0	Inorganic	7841	300	30000
Tin	7440-31-5	Inorganic	6010	100	10000
Vanadium	7440-62-2	Inorganic	6010	10	1000
Zinc	7440-66-6	Inorganic	6010	10	1000