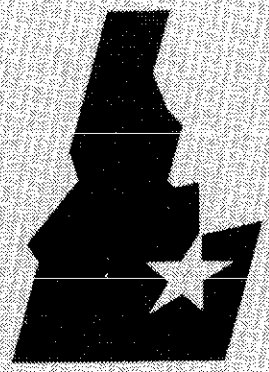

Idaho National Engineering Laboratory

Managed by the U.S. Department of Energy

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INFORMATION ONLY

SAMPLING AND ANALYSIS PLAN FOR THE ORGANIC CONTAMINATION IN THE VADOSE ZONE OPERABLE UNIT 7-08 FOCUSED REMEDIAL INVESTIGATION/ FEASIBILITY STUDY

(VOLUME II)

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EG&G Idaho

Work performed under DOE Contract No. DE-AC07-76ID01570

Appendix N, Part 1
ERP-SOW-47
Organics Analysis

ERP-SOW-47
Revision 1

EG&G Idaho Inc.

BASIC ORDERING AGREEMENT

FOR

ORGANICS ANALYSES

PERFORMED FOR THE

ENVIRONMENTAL RESTORATION PROGRAM

AT THE

IDAHO NATIONAL ENGINEERING LABORATORY

Idaho Falls, Idaho

1/90

Includes Addendum 1 Dated August 31, 1991

BASIC ORDERING AGREEMENT
FOR ORGANIC ANALYSIS

Date: August 1991

Revision 1

APPROVED BY:

D. L. FORSBERG
CHAIRMAN, DATA INTEGRITY REVIEW COMMITTEE

4/17/90
DATE

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SECTION A

SUMMARY OF REQUIREMENTS

PART I

GENERAL REQUIREMENTS

This Basic Ordering Agreement and the attached Addendum (Addendum 1) is an agreement between EG&G Idaho, Inc. (hereinafter referred to as EG&G Idaho, EG&G or the Contractor) and a subcontracted environmental chemical analysis laboratory (hereinafter referred to as the Subcontractor). Work for contracts that reference this basic ordering agreement is not sublettable to any other laboratories. This includes any laboratories affiliated with the Subcontractor in any way including those possessing the same corporate name.

The Subcontractor shall be asked to perform analyses using methods requested in a task specific statement of work. The particular methods requested will vary depending on the needs of the characterization activity. The methods used by the Subcontractor shall typically be U.S.E.P.A. approved methods described in: 40 CFR Part 136, "Test Methods for Evaluating Solid Waste Physical/Chemical Methods" (SW-846), "USEPA Contract Laboratory Program Statement of Work For Organics Analysis" 2/88 (multi-media, multi concentration) or 9/88 (High Concentration), and/or other EPA approved methods (e.g., Method 524.2). The Subcontractor shall follow the protocols in the requested method exactly unless the EG&G Project Officer approves the deviation(s).

The Subcontractor shall use proven instruments and techniques to identify and measure the concentrations of volatile, semivolatile, organochlorine pesticide, organophosphorus pesticide, organochlorine herbicide, and any other organic compounds listed on the target analyte list provided in the specific method requested, or the subset of the target list specified by EG&G Idaho to be of interest. The Subcontractor shall employ state-of-the-art GC/MS, LC/MS, HPLC and/or GC procedures to perform all analyses, including all necessary preparations for analysis.

The Subcontractor shall prepare extracts and dilutions of samples. The Subcontractor may screen extracts by method of his choice (soil characterization highly recommended; water characterization optional) at an initial extract concentration. Then based on the screening response, the Subcontractor shall use the analytical methods described in the task specific Statement of Work to extract and concentrate samples to achieve the Practical Quantitation Limits (PQL) listed in the method (or provided by EG&G when not specified in the method).

During preparation, the Subcontractor shall fortify all samples, blanks, matrix spikes, and matrix spike duplicates with the surrogate spiking compounds listed in the methods (or specified by EG&G). Additionally, all semivolatile extracts and aliquots for volatile organics analysis by GC/MS shall be spiked with the internal standard compounds listed in the method (or specified by EG&G) before injection or purging.

Additionally, for each sample analyzed by GC/MS, the Subcontractor shall conduct mass spectral library searches to determine the possible identity of up to ten (10) nonsurrogate volatile components and up to twenty (20) nonsurrogate semivolatile components that are not on the target analyte list of the specified method.

The analytical services subcontracting Project Officers at EG&G Idaho are fully aware that the science of environmental chemical analysis is constantly changing in an attempt to meet lower detection limits and improve quality control and laboratory productivity. It is the intent of this Basic Ordering Agreement to allow flexibility when method requirements change (e.g., the CLP pesticide/PCB method will soon not require a 72 hour sequence, and the sequence order will change dramatically). Thus, some of the wording in this Basic Ordering Agreement reflect the state of the science at the time of release. New method requirements and technologies will be discussed and requested from the Subcontractor at the time they are approved by EPA and are routinely used in the Subcontractor's facility.

Section E contains chain-of-custody and sample documentation requirements which the Subcontractor must follow in processing samples under this contract, and specifies requirements for written laboratory standard operating procedures.

Sample analysis data, sample documentation and other deliverables shall be reported as specified in Section B.

To ensure proper understanding of language used in this contract, Section F contains a glossary of terms. When a term is used in the text without explanation, the glossary meaning shall be applicable

The samples to be analyzed by the Subcontractor are from known or suspected hazardous waste sites at the Idaho National Engineering Laboratory (INEL) and, potentially, may contain hazardous organic and/or inorganic materials at high concentration levels. Additionally, the samples may contain radionuclides at environmental levels. EG&G Idaho will request information on the maximum radionuclide activity the Subcontractor will accept, and will not ship any samples that have an activity above the Subcontractor's acceptable level. Prior to shipment, the samples will be screened for total counts per minute at sample container contact and/or fully characterized at the INEL Radiation Measurements Laboratory (RML). The sample tag will be marked with the results of such pre-shipment screenings. The Subcontractor should be aware of the potential hazards associated with these samples. It is the Subcontractor's responsibility to take all necessary measures to ensure the health and safety of its employees.

PART II

SPECIFIC REQUIREMENTS

A. For each sample, the Subcontractor shall perform the following tasks:

Task I: Receive and Prepare Hazardous Waste Samples.

1. Receive and handle samples under the chain-of-custody procedures described in Section D.

2. Prepare samples as described in the method specified in the task specific Statement of Work. VOA analysis of water and soil must be completed within 10 days of VTSR (Validated Time of Sample Receipt). If separatory funnel or sonication procedures are employed for extractions for semivolatile and pesticide analyses, extraction of water samples shall be completed within 5 days of VTSR, and extraction of soil samples shall be completed within 10 days of VTSR. If continuous liquid-liquid extraction procedures are employed, extraction of water samples shall be started within 5 days of VTSR.

   Extracts of either soil or water samples must be analyzed within 40 days of VTSR. This does not release the Subcontractor from the data turnaround time specified in Section B, Part I.

Task II: Extraction and Analysis for Identification of Specific Organic Compounds.

1. Extracts and aliquots prepared in Task I shall be analyzed by GC, HPLC, LC/MS and/or GC/MS techniques given in the specified method for the target compounds listed in the task specific statement of work.

2. The target compounds listed in Section C shall be identified as described in the methodologies in Task III below. Automated computer programs may be used to facilitate the identification.

Task III: Qualitative Verification of the Compounds Identified in Task II.

1. The compounds analyzed by GC/MS techniques and initially identified in Task II shall be verified by a qualified analyst competent in the interpretation of mass spectra by comparison of the suspect mass spectrum to the mass spectrum of a standard of the suspected compound. Two criteria must be satisfied to verify the identifications:

   a. Elution of the sample component at the same GC relative retention time as the standard component (this procedure requires the use of multiple internal standards), and

b. Correspondence of the sample component and standard component mass spectra.

2. For establishing correspondence of the GC relative retention time (RRT), the sample component RRT must compare within ± 0.06 RRT units of the RRT of the standard component. For reference, the calibration standard must be run on the same 12-hour time period as the sample.

For comparison of standard and sample component mass spectra, mass spectra obtained on the Subcontractor's GC/MS or LC/MS are required. Once obtained, these standard spectra may be used for identification purposes only if the Subcontractor's GC/MS or LC/MS meets the decafluorotriphenylphosphine (DFTPP), bromofluorobenzene (BFB), or other daily instrument performance requirements specified in the requested method. The standard spectra used may be from a laboratory generated library on the same instrument or obtained from a calibration standard run used to obtain reference RRTs. The requirements for qualitative verification by comparison of mass spectra are as follows:

a. All ions present in the standard mass spectrum at a relative intensity greater than 10 percent (most abundant ion in the spectrum equals 100 percent) must be present in the sample spectrum.

b. The relative intensities of ions specified in (1) must agree within plus or minus 20 percent between the standard and sample spectra.

c. Ions greater than 10 percent in the sample spectrum but not present in the standard spectrum must be accounted for by the analyst making the comparison. When GC/MS or LC/MS computer data processing programs are used to obtain the sample component spectrum, both the processed and raw spectra must be evaluated.

In Task III, the verification process should favor false positives.

3. If a compound analyzed by GC/MS or LC/MS techniques and initially identified in Task II can not be verified by all of the criteria in items 1 and 2 above, but in the technical judgement of the qualified mass spectral interpretation specialist the identification is correct, then the Subcontractor shall report that identification, and proceed with quantification in Task IV.

4. The organic compounds analyzed by GC or HPLC techniques shall have their identifications verified by an analyst competent in the interpretation of chromatograms produced by the instrument. Two criteria must be satisfied to verify the identifications:

a. Elution of the sample component within the retention time window (established by the procedures in the requested method) of the standard component analyzed on the same GC or HPLC column and instrument, as part of the same analytical sequence. The length of the analytical sequence shall be that specified in the requested method's protocols, or as long as the instrument is able to analyze standards with less than 15% difference between responses for the same amount of a given compound injected, and less than a 2% (packed columns) or 0.3% (capillary columns) shift in the retention time of any target analyte in the standards.

b. Analysis of the sample and standard on a second GC or HPLC column with a stationary phase with retention characteristics dissimilar to that used in (a) above, and meeting the same criteria for elution of the sample component and the standard as in (a) above.

Task IV: Quantification of Compounds Verified in Task III.

1. The Subcontractor shall quantify components analyzed by GC/MS techniques and identified in Task II and verified in Task III by the internal standard method stipulated in the requested method. Where multiple internal standards are required by the method, the Subcontractor shall perform quantitation utilizing the internal standards specified in the requested method, or those necessary to complete the forms provided or referenced in the task specific SOW.

2. The Subcontractor shall determine response factors for each 12-hour time period of GC/MS analysis and shall include a calibration check of the initial five point calibration as described in the requested method(s).

3. The Subcontractor shall quantify components analyzed by GC and HPLC techniques and identified in Task II and verified in Task III by the external standard method stipulated in the method(s).

4. The Subcontractor shall perform an initial three-point (or more) calibration, verify its linearity, determine the degradation of labile components, and determine calibration factors for all standards analyzed by GC and HPLC techniques as part of an analytical sequence.

Task V: Tentative Identification of Non-Target Analyte List Components

1. For each GC/MS and/or LC/MS analysis of a sample, the Subcontractor shall conduct mass spectral library searches to determine tentative compound identification as follows. For each volatile fraction, the Subcontractor shall conduct a search to determine the possible identity of ten (10) nonsurrogate organic compounds of greatest concentration which are not listed in the

target analyte list of the requested method. For each base/neutral/acid fraction, the Subcontractor shall conduct a search to determine the possible identification of the twenty (20) nonsurrogate organic compounds of greatest concentration which are not listed on the target analyte list of the requested method. In performing searches, the 1985 (or most recent) release of the National Institute of Standards and Technology library (containing 42,261 spectra) must be used. NOTE: Substances with responses less than 10 percent of the nearest internal standard are not required to be searched in this fashion.

Only after visual comparison of sample spectra with the spectra from the library searches will the mass spectral interpretation specialist assign a tentative identification. If the compound does not meet the identification criteria of Task III, it shall be reported as unknown. The mass spectral specialist should give additional classification of the unknown compound, if possible (i.e., unknown aromatic, unknown hydrocarbon >C20, unknown acid type, unknown chlorinated compound). If probable molecular weights can be distinguished, include them.

Task VI: Quality Assurance/Quality Control Procedures.

1. All specific quality assurance procedures prescribed in the requested method shall be strictly adhered to by the Subcontractor. Records documenting the use of protocol shall be maintained in accordance with the document control procedures prescribed in Section D, and shall be reported in accordance with Section B, Reporting Requirements and Deliverables.

2. The Subcontractor shall perform one spiked sample analysis (matrix spike) and one duplicate spiked sample analysis (matrix spike duplicate), using a sample submitted by EG&G, for each group of samples of a similar matrix (for water or soil samples) and concentration level (for soil samples only), once:

   - each Project of field samples received (a "Project" is defined as a set of samples received from a specific sampling site being characterized, generally a "Project" will be all samples submitted under a single task specific Statement of Work), OR
   - each 20 samples in a Project, OR
   - each 14 calendar day period during which field samples from EG&G Idaho were received (said period beginning with the receipt of the first sample in that Sample Delivery Project),

   whichever is most frequent.

   Matrix spikes and matrix spike duplicates shall be carried through the entire analytical process from extraction to final GC/MS, LC/MS, GC, or HPLC analysis.

3. The Subcontractor shall prepare and analyze one laboratory reagent blank (method blank) for each group of samples of a similar matrix (for water, soil/sediment, or waste samples), extracted by a similar method (separatory funnel, continuous liquid-liquid, soxhlet, sonication, herbicide), and a similar concentration level (for soil samples only), once:

   - each Project of field samples received from EG&G Idaho, OR
   - each 20 samples in a Project, including matrix spikes and re-extractions/re-analyses, OR
   - each 14 calendar day period during which field samples in a Project were received (said period beginning with the receipt of the first sample in that Sample Delivery Project), OR
   - each day samples are extracted,

   <u>whichever is most frequent</u>

   Volatile analysis requires one method blank for each 12-hour time period when volatile compounds are analyzed.

   Method blanks shall be carried through the entire analytical process from extraction to final GC/MS, LC/MS, GC or HPLC analysis.

4. The Subcontractor shall prepare and analyze one QC Check sample (a method blank spiked with all of the analytes of interest) for each group of samples of a similar matrix (for water, soil/sediment, or waste samples), extracted by similar method (separatory funnel, continuous liquid-liquid, soxhlet, sonication, herbicide extraction), and a similar concentration level (for soil samples only), once:

   - each Project of field samples received from EG&G Idaho, OR
   - each 20 samples in a Project of field samples, including matrix spikes and re-extractions/re-analyses, OR
   - each 28 calendar day period which field samples in a Project were received (said period beginning with receipt of the first sample in that Sample Delivery Project),

   <u>whichever is most frequent</u>

   Volatile analysis requires one QC Check sample for each Sample Delivery Project in which volatile compounds are being analyzed.

   QC Check samples shall be carried through the entire analytical process from extraction to final GC/MS, LC/MS, GC, or HPLC analysis.

5. The Subcontractor shall perform instrument calibration (by "hardware tune" using perfluorotributylamine PFTBA) for each 12-hour time period, and verify instrument performance by injecting: decafluorotriphenylphosphine (DFTPP), bromofluorobenzene (BFB) or a compound specified in the method or task specific statement of work, and a specific calibration using standards of defined concentration to monitor response, retention time, and mass spectra.

   Additional quality control shall be conducted in the form of the analysis of Performance Evaluation check samples submitted to the laboratory by EG&G Idaho. The results of comparison studies are due as stipulated in the Delivery Schedule in Section B, Part I. The results of all such control or PE check samples may be used as grounds for termination of non-compliant subcontractors. "Compliant performance" is defined as that which yields correct compound identification and concentration values as determined by EG&G Idaho, as well as meeting the PE task specific requirements for analysis (method specific), quality assurance/quality control (method specific), data reporting and other deliverables (Section B), and sample custody, sample documentation and SOP documentation (Section D).

B. EG&G Idaho has provided to the Subcontractor formats for the reporting of data (Section B). The Subcontractor shall be responsible for completing and returning analysis data sheets in the format specified in this Basic Ordering Agreement (BOA) and within the time specified in the delivery schedule in Section B, Part I.

C. The Subcontractor shall provide analytical equipment and technical expertise for this contract as specified following:

   1. The Subcontractor shall have sufficient gas chromatograph (GC), and gas chromatograph/mass spectrometer/data system (GC/MS/DS) capability to meet all the terms and conditions of the BOA. Additionally, EG&G may request special analytical services requiring use of high performance liquid chromatograph (HPLC), high resolution GC/MS, and/or liquid chromatograph/mass spectrometer/data system instrumentation (LC/MS/DS). Minimum instrument requirements are defined in Part III, Detailed Technical & Management Requirements. The Subcontractor shall maintain, at a minimum, all GC and GC/MS/DS analytical equipment allocated for this BOA at the time of contract award.

   2. The Subcontractor's instrument systems shall have the following:

      a. The GC/MS shall be equipped with a glass jet separator when using packed and wide bore capillary columns.

      b. The computer shall be interfaced by hardware to the mass spectrometer and be capable of acquiring continuous mass scans for the duration of the chromatographic program.

c. The computer will be equipped with mass storage devices for saving all data from the GC/MS and LC/MS runs.

d. Computer software shall be available to allow searching GC/MS or LC/MS runs for specific ions and plotting the intensity of the ions with respect to time or scan number.

e. The GC/MS shall be equipped with a GC to MS interface capable of extending a fused silica capillary column into the ion source.

f. The LC/MS shall be equipped with an interface capable of introducing sample into the ion source. The column to be used will be specified in the method or the task specific Statement of Work.

g. The GC used for analysis of EG&G samples shall be equipped with packed, narrow bore or wide bore capillary columns (see specified analytical method for requirements), an automated data collection system, and a suitable detector as described in the specified method, or task specific SOW.

3. The Subcontractor shall use a magnetic tape storage device capable of recording data and suitable for long-term, off-line storage. The Subcontractor shall retain all raw GC/MS and LC/MS data acquired under this contract on magnetic tape in appropriate instrument manufacturer's format. The Subcontractor is required to retain the magnetic tapes with associated hard-copy tape logbook identifying tape contents (see Section B) for 365 days after data submission. During that time, the Subcontractor shall submit tapes and logbook within 7 days of request.

4. The Subcontractor shall have a computerized MS library search system capable of providing a forward comparison, utilizing the standard spectra contained in the mass spectral library. The 1985 (or most recent) release of the National Institute of Standards and Technology library (containing 42,261 spectra) must be used.

   a. The system shall provide a numerical ranking of the standard spectra most closely corresponding to the sample spectrum examined.

   b. The data system shall have software capable of removing background signal from the system.

5. The Subcontractor shall have, in-house, and operable, a device capable of analyzing purgeable organics as described in methods 601, 602, 624 (40 CFR Part 136), 8010, 8015, 8020, 8030, 8240 and 8260 (SW-846 third Edition, and proposed updates to the third Edition), USEPA CLP SOWs 2/88 and 9/88, 502.2 and 524.2 (Determination of Organic Compounds in Drinking Water, EPA-600/4-88/039).

6. The Subcontractor shall have, in-house, the appropriate standards for all target compounds listed in the target analyte list for the requested analysis prior to accepting any samples from EG&G Idaho. An inquiry will be made by EG&G prior to shipment of samples as to whether this criteria can be met.

D. The Subcontractor should have an IBM or IBM-compatible mini-computer or PC capable of recording required sample data on 5.25 or 3.5 inch floppy double-sided double-density 360 K-byte or 1.2 M-byte diskettes, in ASCII text file format and in accordance with the file, record and field specifications listed in Section G of this BOA. The field specifications in Section G are for the forms used to analyze all the organic Appendix IX compounds only. The purpose of Section G is to allow the Subcontractor to develope electronic deliverables for this BOA in DBase or other ASCII format. Development of the electronic deliverable will aid the data validation/qualification process performed at EG&G on data returned from the Subcontractor. Thus, time spent by the Subcontractor communicating data package inconsistencies to the EG&G Idaho Data Management staff will be minimized with electronic deliverables. Development of the electronic deliverables is optional and not a requirement for performing work for this BOA.

E. The minimum functional requirements necessary to meet the terms and conditions of this contract are listed below. The Subcontractor shall designate and utilize qualified key personnel to perform these functions. EG&G Idaho, Inc. reserves the right to review personnel qualifications and experience. See Part III, Detailed Technical & Management Requirements.

- o GC/MS/DS operation.
- o Mass spectral interpretation.
- o Sample extraction and concentration.
- o Purge and trap volatile organic compounds analysis.
- o Pesticide residue analysis of organochlorine pesticides, PCBs, organophosphorus pesticides, and organochlorine herbicides, including clean-up procedures and diazomethane derivitization.
- o Quality assurance/quality control.
- o Sample receipt, storage, and tracking, including chain-of-custody procedures.

F. The Subcontractor shall respond in a timely manner to requests from data recipients for additional information or explanations that results from the inspection activities of EG&G Idaho or the United States Department of Energy-Idaho Operations Office.

G. The Subcontractor shall preserve all sample extracts after analysis in bottles/vials with teflon lined septa and shall maintain stored extracts at $4^{o}C$ ($\pm 2^{o}C$). The Subcontractor is required to retain the sample extracts for 365 days after data submission. During that time, the Subcontractor shall submit the extracts within 7 days after request.

H. The Subcontractor shall adhere to the chain-of-custody procedures described in Section D. Documentation, as described therein, shall be required to show that all procedures are being strictly followed.

I. Sample shipments to the Subcontractor's facility will be scheduled and coordinated by EG&G Idaho's Project Officer for the particular sampling effort at hand. The Subcontractor shall communicate with the Project Officer by telephone as necessary throughout the process of sample scheduling, shipment, analysis and data reporting, to ensure that samples are properly processed.

If there are problems with samples (e.g., mixed media, containers broken or leaking) or sample documentation/paperwork (e.g., Chain-of-custody reports not with shipment, sample and chain-of-custody report numbers do not correspond) the Subcontractor shall immediately contact the EG&G Idaho Project Officer for resolution.

The Subcontractor shall immediately notify the EG&G Idaho Project Officer regarding any problems and laboratory conditions that affect the timeliness of analysis and data reporting. In particular, the Subcontractor shall notify the EG&G Idaho Project Officer in advance regarding sample data that will be delivered late and shall specify the estimated delivery date.

J. Sample analyses will be scheduled by groups of samples, each defined as a Sample Delivery Group. A Sample Delivery Group (SDG) is defined by the following, whichever is most frequent:

- each group of field samples received from one sampling activity (Project) as scheduled with the Subcontractor by EG&G Idaho in a task specific Statement of Work, OR
- each 20 field samples within the Group, OR
- each 14 calendar day period during which field samples from a single Project are received (said period beginning with the receipt of the first sample in the Sample Delivery Group).

Samples may be assigned to SDGs by matrix (i.e., all soils in one SDG all waters in another), at the discretion of the laboratory. Such assignment must be made at the time the samples are received, and may not be made retroactively.

Data for all samples in a Sample Delivery Group are due concurrently as stipulated in the delivery schedule in Section B, Part I. Data for all samples in a Sample Delivery Group must be submitted together (in one package) in the order specified in Section B. The Sample Delivery Group number is the EG&G sample number of the first sample received in the SDG. When several samples are received together in the first SDG shipment, the SDG number shall be the lowest sample number (considering both alpha and numeric designations) in the first batch of samples received under the SDG. The SDG number is reported on all data reporting forms.

The SDG receipt date is the day the last sample in the SDG is received. Data for all samples in the SDG are due as stipulated in the Delivery Schedule in Section B, Part I.

K. Each sample received by the Subcontractor will be labeled with an EG&G sample number, and accompanied by a chain-of-custody report form bearing the sample number and descriptive information regarding the sample. The Subcontractor shall complete and sign the chain-of-custody report, recording the date of sample receipt, the laboratory's internal sample identification number, and sample condition on receipt for each sample container.

The Subcontractor shall submit signed copies of chain-of-custody reports for all samples in a Sample Delivery Group to the EG&G Idaho Project Officer within 3 calendar days following receipt of the last sample in the Sample Delivery Group. Chain-of-custody reports shall be submitted in Sample Delivery Group sets (i.e., all chain-of-custody reports for a Sample Delivery Group shall be clipped together) with an SDG Cover sheet containing information regarding the Sample Delivery Group, as specified in Section B.

L. Sample Delivery Group numbers and EG&G sample numbers shall be used by the Subcontractor in identifying samples received under this contract both verbally and in reports/correspondence.

M. Samples will routinely be shipped to the Subcontractor through an overnight delivery service. However, as necessary, the Subcontractor shall be responsible for any handling or processing required for the receipt of sample shipments, including pickup of samples at the nearest servicing airport, bus station or other carrier service within the Subcontractor's geographical area. The Subcontractor shall be available to receive sample shipments at any time the delivery service is operating, including Saturdays.

N. The Subcontractor shall accept all samples scheduled by EG&G Idaho, Inc., provided that the total number of samples received in any calendar month does not exceed the monthly limitation expressed in the contract. Should the Subcontractor elect to accept additional samples, the Subcontractor shall remain bound by all contract requirements for analysis of those samples accepted.

PART III

DETAILED TECHNICAL & MANAGEMENT REQUIREMENTS

As cited in Part II, Task VI, the Subcontractor shall have the following technical and management capabilities:

A. TECHNICAL CAPABILITY

1. Technical Functions

a. Mass Spectrometry Laboratory Supervisor

(1) Responsible for all technical efforts of the GC/MS-LC/MS laboratory to meet the requirements of the EG&G Idaho, Inc. contract(s).

(2) Qualifications:

(a) Education:

Minimum of Bachelor's degree in chemistry or any physical science.

(b) Experience:

Minimum of three years of experience in operating and maintaining GC/MS/DS or LC/MS/DS (whichever is applicable to the instrument being operated analyzing EG&G samples) with degree in chemistry or physical science, or three years of experience in operating and maintaining GC/MS/DS or LC/MS/DS, including at least one year of supervisory experience.

b. GC/MS or LC/MS Operator Qualifications

(1) Education:

Minimum of Bachelor's degree in chemistry or any physical science.

(2) Experience:

One year of experience in operating and maintaining GC/MS/DS or LC/MS/DS (whichever is applicable to the instrument being operated analyzing EG&G samples) with degree in chemistry or physical science, or three years of experience in operating and maintaining GC/MS/DS or LC/MS/DS.

c. Mass Spectral Interpretation Specialist Qualifications

(1) Education:

- Minimum of Bachelor's degree in chemistry or any physical science.
- Training course(s) in mass spectral interpretation.

(2) Experience:

Minimum two years experience in mass spectral interpretation.

d. GC or HPLC Laboratory Supervisor

(1) Responsible for all technical efforts of the GC or HPLC laboratory.

(2) Qualifications:

(a) Education:

Minimum of Bachelor's degree in chemistry or any physical science.

(b) Experience:

Minimum of three years of experience in operating and maintaining GC and/or HPLC interpreting GC and/or HPLC chromatograms, including at least one year of supervisory experience.

e. Pesticide Residue Analysis Expert Qualifications

(1) Education:

Minimum of Bachelor's degree in chemistry or any physical science.

(2) Experience:

Minimum of two years of experience in operating and maintaining GC and/or HPLC interpreting GC and/or HPLC chromatograms.

f. Sample Preparation Laboratory Supervisor

(1) Responsible for all technical efforts of sample preparations to meet all terms and conditions of the EG&G Idaho, Inc. contract(s).

(2) Qualifications:

(a) Education:

Minimum of Bachelor's degree in chemistry or any physical science.

(b) Experience:

Minimum of three years of laboratory experience in preparation of environmental samples for organics analysis, including at least one year of supervisory experience in sample preparation laboratory.

g. Extraction/Concentration Expert Qualifications

(1) Education:

Minimum of High School diploma and knowledge of general chemistry.

(2) Experience:

Minimum of one year of experience in organic sample preparation.

h. Technical Staff Redundancy

The bidder shall have a minimum of one (1) chemist available at any one time as a back-up technical person with the following qualifications, to ensure continuous operations to accomplish the required work as specified by the EG&G Idaho contract.

(1) Education:

Minimum of Bachelor's degree in chemistry or any physical science.

(2) Experience: Minimum of one year in each of the following areas -

- o GC/MS operation and maintenance for volatiles and semivolatiles analyses.
- o Mass spectral interpretation.
- o Extraction
- o Pesticide analysis.

2. Facilities

The adequacy of the facilities and equipment is of equal importance as the technical staff to accomplish the required work as specified by the EG&G Idaho contract.

a. Sample Receipt Area

Adequate, contamination-free well ventilated work space provided with chemical resistent bench top for receipt and safe handling of EG&G Idaho samples.

b. Storage Area

Sufficient space to maintain unused EG&G Idaho sample volume for 60 days after data submission and sample extracts for 365 days after data submission. NOTE: Volatiles, semivolatiles, extracts and standards must each be stored in separate refrigeration units.

c. Sample Preparation Area

Adequate, contamination-free, well-ventilated work space provided with:

(1) Benches with chemical resistant tops, exhaust hoods. Note: Standards must be prepared in a glove box or isolated area.

(2) Source of distilled or demineralized organic-free water.

(3) Analytical balance(s) located away from draft and rapid change in temperature.

3. Instrumentation

At a minimum, the Subcontractor shall have the following instruments operative at the time of the Pre-Award Site Evaluation and available for the full duration of the contract.

a. Primary Instrument Requirements

Volatiles	1	GC/MS/DS with purge and trap device
	1	GC/FID/ECD with purge & trap device
Semivolatiles (BNA)	1	GC/MS/DS
Pesticides/PCBs	1	GC/ECD with dual column
	1	GC/NPD or GC/FPD with dual column

b. Secondary Instrument Requirements

The Subcontractor shall have the following instruments in place and operational at any one time as a back-up

The Subcontractor shall have one GC/MS/DS and one GC as back-up systems.

The Subcontractor shall have an in-house stock of instrument parts and circuit boards to ensure continuous operation to meet contract-specific holding and turnaround times.

In addition the Subcontractor may qualify for certain special analytical services contracts from EG&G if the following instrumentation is in-house and staffed with qualified personnel:

- o Supercritical fluid extraction apparatus
- o High Performance Liquid Chromatograph
- o High Resolution Gas Chromatograph/Mass Spectrometer
- o Liquid Chromatograph/Mass Spectrometer/Data System

c. Instrument Specifications

Instrument specifications are described in detail in the methods specified in the task specific Statements of Work that will be issued in conjunction with this BOA.

4. Data Handling and Packaging

The Subcontractor shall be able to submit reports and data packages as specified in the Basic Ordering Agreement Section B. To complete this task, the Subcontractor shall be required to:

a. Provide space, tables and copy machines to meet the subcontractor requirements.

b. Designate personnel.

B. LABORATORY MANAGEMENT CAPABILITY

The Subcontractor must have an organization with well-defined responsibilities for each individual in the management system to ensure sufficient resources for EG&G Idaho contract(s) and to maintain a successful operation. To establish this capability, the Subcontractor shall designate personnel to carry out the following responsibilities for the EG&G Idaho contract. Functions include, but are not limited to, the following:

1. Technical Staff

Responsible for all technical efforts for the EG&G Idaho contract(s).

2. Project Manager

Responsible for overall aspects of EG&G Idaho contract(s) (from sample receipt through data delivery) and shall be the primary contact for the EG&G Idaho Project Officer(s).

3. Sample Custodian

Responsible for receiving the EG&G Idaho samples (logging, handling and storage).

4. Quality Assurance Officer

Responsible for overseeing the quality assurance aspects of the data, review of all EG&G Idaho data packages prior to release of the data, and reporting directly to upper management. The laboratory Quality Assurance Officer is responsible for overseeing all aspects of the laboratory's Quality Assurance Program.

5. Data Reporting and Delivery Officer

Responsible for all aspects of data deliverables: completeness, organization, packaging, copying, and delivery.

SECTION B

REPORTING AND DELIVERABLES REQUIREMENTS

Table of Contents

PART I

REPORTS/DELIVERABLES DISTRIBUTION

The following table iterates the reporting and deliverables requirements and specifies the distribution that is required for each deliverable. NOTE: Specific recipient names and addresses are subject to change during the term of the contract. The Project Officer will notify the Subcontractor in writing of such changes when they occur.

	Item	No. Copies	Delivery Schedule	Distribution (1)	(2)	(3)
*A.	Contract Start-up Plan	3	7 days after contract receipt.	X	X	X
B.	Updated SOPs	1	120 days after contract receipt	X		X
**C.	Chain-of Custody Reports	2	3 days after receipt of last sample in Sample Delivery Group (SDG).***			X
D.	Sample Data Summary Package****	3	28 days after receipt of last sample in SDG			X
E.	Sample Data Package ****	3	28 days after receipt of last sample in SDG.			X
F.	Data in Computer Readable Form	0	Not a current contract requirement. This space reserved pending capability development.			
G.	GC/MS Tapes	Lot	Retain for 365 days after data submission, or submit within 7 days after receipt of written request by PO.	As Directed		

Distribution:
(1) EG&G Idaho Project Officer (PO)
(2) EG&G Idaho Contract Officer (CO)
(3) EG&G Idaho Administrative Records and Document Control (ARDC)

	Item	No. Copies	Delivery Schedule	Distribution (1) (2) (3)
H.	Extracts	Lot	Retain for 365 days after data submission, or submit within 7 days after receipt of written request by PO.	As Directed

* Subcontractor must be prepared to receive samples within 10 days of contract award. NOTE: EG&G Idaho can't guarantee exact adherence to start-up plan that is agreed upon by the PO and the Subcontractor, but will attempt to meet it as close as possible.

** Copies also required in the sample data package.

*** Sample Delivery Group (SDG) is a batch of samples from one sampling activity, received over a period of 14 days or less and not exceeding 20 samples. Data for all samples in the SDG are due concurrently. (see BOA Section A, paragraph J., for further description).

**** Sample Data Summary Package and Sample Data Package must be submitted in triplicate to ARDC

NOTE: Unless otherwise instructed by the EG&G Idaho Project Officer, the Subcontractor shall dispose of unused sample volume and used sample bottles/ containers no earlier than sixty (60) days following submission of analytical data. In the case of samples with radionuclide activity above background, the Subcontractor shall contact the EG&G Idaho Project Officer for instructions on disposal.

Distribution Addresses:

(1) Mr. Cliff Watkins
Environmental Restoration Program
Site Characterization Unit
EG&G Idaho, Inc.
P.O. Box 1625
Idaho Falls, ID 83415-4153

(2) Mr. Daniel R. James
Subcontract Administrator
EG&G Idaho, Inc.
P.O. Box 1625
Idaho Falls, ID 83415-2083

(3) Ms. Donna R. Kirchner
Administrative Records and Document Control (ARDC)
EG&G Idaho, Inc.
P.O. Box 1625
Idaho Falls, ID 83415-1403

PART II

REPORT DESCRIPTION AND ORDER OF DATA DELIVERABLES

The Subcontractor shall provide reports and other deliverables as specified. The required content and form of each deliverable is described in this Section.

All reports and documentation MUST BE:

- Typed, NO HANDWRITTEN NARRATIVES (hand written forms, analyst notations on sample preparation bench sheets, chromatograms, spectra, or other raw data is acceptable),
- Clearly labeled and completed in accordance with instructions in this Section,
- Arranged in the order specified in this Part, and
- Paginated.

If submitted documentation does not conform to the above criteria, the Subcontractor will be required to resubmit such documentation with deficiency(ies) corrected, at no additional cost to the Contractor.

Whenever the Subcontractor is required to submit or resubmit data as a result of an on-site laboratory evaluation or through a PO/DOE-ID action, the the data must be clearly marked as ADDITIONAL DATA and must be sent in triplicate to the the contractual data recipient (ARDC). A cover letter shall be included which describes what data is being delivered, to which EG&G SDG(s) it pertains, and who requested the data.

Whenever the Subcontractor is required to submit or resubmit data as a result of Contract Compliance Screening (CCS) review by EG&G, the data must be sent in triplicate to the contractual data recipient (ARDC), and all three copies must be accompanied by a colored COVER SHEET titled "Laboratory Response To Contract Compliance Screening".

Part III of this Section contains copies of the required reporting data forms in Contractor-specified formats, along with instructions to assist the Subcontractor in accurately providing the Contractor all required data. Data elements with field parameters for reporting data in computer readable form are contained in Section H.

Descriptions of the requirements for each deliverable item are specified in Units A-G of this Part. Items submitted concurrently MUST BE arranged in the order listed. Additionally, the components of each item MUST BE arranged in the order presented in this section when the item is submitted.

Examples of specific data deliverables not included herein may be obtained by submitting a written request to the EG&G Project Officer, stating the information requested, and signed by the Laboratory Manager.

The format for delivery of the Sample Data Package specified (Item E) will be the required format for all data deliverables. In the task specific Statement of Work that will accompany samples from a specific EG&G project, this package of deliverables will be referred to as the standard data package format as specified in the Basic Ordering Agreement. Occasionally, EG&G will not require all of the elements of this standard data package. In these instances, the "abbreviated data package" requirements for data deliverables will be specified in the task specific Statement of Work. The items to be ommitted and/or included from the standard data package will usually be referred to by the numbers used in Item E of this Part of the Basic Ordering Agreement. For example, if the mass spectra of the volatile organics found in the samples is not required they would be referenced as Items E.3.b.4.a. and E.3.6.4.b. in Section B, Part II of the BOA.

Contract Start-up Plan

The Subcontractor shall submit a contract start-up plan for EG&G approval. The plan shall set forth the Subcontractor's proposed schedule for receiving samples starting with the tenth calendar day after award and shall state an estimate of laboratory capacity to receive samples from the Contractor on a sample per month basis. The Project Officer will review the contract start-up plan and will notify the Subcontractor of the plan's status.

NOTE: The Subcontractor shall be required to receive samples within ten days of contract award. EG&G can't guarantee exact adherence to the start-up plan that is agreed upon by the PO and Subcontractor, but will attempt to meet it as closely as possible.

B. Updated SOPs

The Subcontractor shall submit updated copies of all required Standard Operating Procedures (SOPs).

The Subcontractor shall provide SOPs for:

1. Sample receipt and logging.
2. Sample and extract storage.
3. Preventing sample contamination.
4. Security for laboratory and samples.
5. Traceability/Equivalency of standards.
6. Maintaining instruments and logbooks.
7. Sample analysis and data control systems.

8. Glassware cleaning.

9. Technical and managerial review of laboratory operation and data package preparation.

10. Internal review of contractually required quality assurance and quality control data for each individual data package.

11. Sample analysis, data handling and reporting.

12. Chain-of-Custody.

13. Document control, including SDG file preparation.

Note: Such documentation is not required to conform specifically (i.e., in every detail) to this contract's requirements, but shall be representative of standard laboratory operations, and shall give clear evidence of the Subcontractor's ability to successfully fulfill all contract requirements.

C. Chain-of Custody Reports

Original Chain-of-Custody reports with lab receipt information and signed in original Subcontractor signature, for each set of samples collected concurrently and assigned to a Sample Delivery Group.

Chain-of-Custody reports shall be submitted in Sample Delivery Group (SDG) sets (i.e., COCs for all samples in an SDG shall be clipped together), with an SDG Cover Sheet attached.

The SDG Cover Sheet shall contain the following items:

- Lab name
- Sample Analysis Price - full sample price from contract.
- List of EG&G sample numbers of all samples in the SDG, identifying the first and last samples received, and their dates of receipt (VTSRs). NOTE: when more than one sample is received in the first or last SDG shipment, the "first" sample received would be the lowest sample number (considering both alpha and numeric designations); the last sample received would be the highest sample number (considering both alpha and numeric designations).

In addition, each Chain-of-Custody report must be clearly marked with the SDG Number, the sample number of the first sample in the SDG (as described in the following paragraph). This information should be entered below the lab receipt date on the COC report. In addition, the COC report for the last sample received in the SDG must be clearly marked "SDG - FINAL SAMPLE", next to the sample's entry on the COC report.

The EG&G sample number of the first sample received in the SDG is the SDG number. When several samples are received together in the first SDG shipment, the SDG number shall be the lowest number (considering both alpha and numeric designations) in the first group of samples received under the SDG. The SDG number is also reported on all data reporting forms. See Part III of this Section, Forms Instruction Guide.

The Chain-of-Custody reports will typically be multi-sample COC reports, thus all samples on one COC report may not necessarily be in the same SDG. In this instance, the laboratory must make the appropriate number of photocopies of the COC reports, and submit one copy with each SDG cover sheet.

If the laboratory maintains an internal Chain-of-Custody record, tracking movement of samples and extracts through the laboratory, these documents must be copied and submitted with the EG&G Chain-of-Custody reports.

D. Sample Data Summary Package

As specified in the Delivery Schedule, one Sample Data Summary Package shall be delivered in triplicate to ARDC concurrently with delivery of other required sample data. The Sample Data Summary Package consists of copies of specific items from the Sample Data Package. These items are listed below and described under unit E, Sample Data Package.

The Sample Data Summary Package shall be ordered as follows and shall be submitted separately (i.e., separated by rubber bands, clips or other means) directly preceding the Sample Data Package. Sample data forms shall be arranged in increasing EG&G sample number order, considering both letters and numbers. BE002 is a lower number than BF001, as E precedes F in the alphabet.

When more than one analytical method is requested for samples from one SDG the laboratory shall order the Sample Data Summary Package by method using the following order:

1. Volatile Organics by GC/MS (separate by method if more than one is used)

2. Volatile Organics by GC (separate by method if more than one is used)

3. Semivolatile Organics by GC/MS (separate by method if more than one is used)

4. Semivolatile Organics by GC (separate by method if more than one is used)

5. Organochlorine Pesticides/PCBs by GC

6. Organophosphorus Pesticides by GC (if not done by GC/MS, task specific statement of work will specify which will be used. This will depend on the detection limits driven by the Data Quality Objectives of the characterization project.)

7. Chlorophenoxy acid Herbicides by GC

8. Chlorinated Dioxins/Furans by GC/MS

9. Other GC/MS methods

10. Other GC methods

11. LC/MS methods

12. HPLC methods

The Sample Data Summary Package shall contain data for samples in one Sample Delivery Group as follows:

1. Case Narrative

2. By analytical method (e.g., 624, 625, 608, 8140, 8150) and by sample within each fraction tabulated target compound results (Form I) and tentatively identified compounds (Form I, TIC)(VOA and SV by GC/MS and/or LC/MS only).

3. By analytical method - surrogate spike analysis results (Form II) by matrix (water and/or soil) and for soil, by concentration (low or medium)(This is for methods which employ surrogate spikes or where surrogates are designated by EG&G).

4. By analytical method - matrix spike/matrix spike duplicate results (Form III).

5. By analytical method - blank data (Form IV) and tabulated results (Form I) including tentatively identified compounds (Form I, TIC)(VOA and SV by GC/MS and/or LC/MS only).

6. By fraction (VOA and SV by GC/MS and/or LC/MS only) - internal standard area data (Form VIII).

E. Sample Data Package

The Sample Data Package is divided into the major units described below. The last three units are each specific to an analytical method type. If the analysis of a fraction is not required, then that fraction specific unit is not required as a deliverable. The forms referenced may have multiple pages, see Part III and/or the task specific Statement of Work for details.

The Sample Data Package shall include data for analyses of all samples in one Sample Delivery Group, including field samples, reanalyses, blanks, matrix spikes and matrix spike duplicates.

1. Case Narrative

This document shall be clearly labeled "Case Narrative" and shall contain: laboratory name; sample numbers in the Sample Delivery Group (SDG), differentiating between initial analyses and re-analyses; SDG number; and detailed documentation of any quality control, sample, shipment and/or analytical problems encountered in processing the samples reported in the data package.

Whenever data from sample re-analyses are submitted, the Subcontractor shall state in the Case Narrative for each re-analysis, whether it considers the re-analysis to be billable, and if so, why.

The Subcontractor must also include any problems encountered; both technical and administrative, the corrective actions taken, and resolution.

The Case Narrative shall contain the following statement, verbatim: "I certify that this data package is in compliance with the terms and conditions of the EG&G Basic Ordering Agreement and Statement of Work for this project, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his designee, as verified by the following signature." This statement shall be directly followed by signature of the Laboratory Manager or his designee with a typed line below it containing the signer's name and title, and the date of the signature.

Additionally, the Case Narrative itself must be signed in original signature by the Laboratory Manager or his designee and dated.

2. Chain-of-Custody Reports

A copy of the Chain-of-Custody reports submitted in Item A for all of the samples in the SDG. The Chain-of-Custody reports will be arranged in chronological order of sample receipt and by increasing EG&G sample number for those samples received on the same day. Copies of the SDG cover sheet are to be included with the copies of the Chain-of-Custody reports.

If samples are received at the laboratory with multi-sample Chain-of-Custody Reports (COCs), all the samples on one multi-sample COC may not necessarily be in the same SDG. In this instance, the laboratory must make the appropriate number of photocopies of the COC so that a copy is submitted with each data package to which it applies. In addition, in any instance where samples from more than one multi-sample COC are in the same SDG package, the laboratory must submit a copy of the SDG cover sheet with the copies of the COCs.

If the laboratory maintains an external Chain-of-Custody record, tracking movement of samples and extracts through the laboratory, these documents must be copied and submitted with the EG&G Chain-of-Custody reports.

3. GC/MS Volatiles Data

   a. QC Summary

      (1) Surrogate Percent Recovery Summary (Form II VOA)

      (2) Matrix Spike/Matrix Spike Duplicate Summary (Form III VOA)

      (3) Method Blank Summary (Form IV VOA)

          (If more than a single form is necessary, forms must be arranged in chronological order by date of analysis of the blank.)

      (4) GC/MS Tuning and Mass Calibration (Form V VOA)

          BFB in chronological order; by instrument.

      (5) Internal Standard Area Summary (Form VIII VOA)

          In chronological order; by instrument.

      (6) QC Check Sample Summary (Form XI VOA)

   b. Sample Data

      Sample data shall be arranged in packets with the Organic Analysis Data Sheet (Form I VOA, including Form I VOA-TIC), followed by the raw data for volatile samples. These sample packets should then be placed in increasing EG&G sample number order, considering both letters and numbers in ordering samples.

      (1) Target Analyte List Results - Organic Analysis Data Sheet (Form I).

          Tabulated results (identification and quantitation) of the specified target compounds (requested method or task specific SOW will give appropriate targets). The validation and release of these results is authorized by a specific signed statement in the Case Narrative. In the event that the Laboratory Manager can not validate all data reported for each sample, the Laboratory Manager shall provide a detailed description of the problems associated with the sample in the Case Narrative.

On Form I, the appropriate concentration units shall be entered. For example, ug/L for water samples or ug/Kg for soil/sediment samples. No other units are acceptable. NOTE: Report analytical results to one significant figure if the value is less than 10; to two significant figures if the value is greater than 10. The Form I provided in Part IV of this Section contains all of the target analytes for analysis of 40 CFR Part 264 Appendix IX compounds. It is likely that the requested method in the task specific SOW will not include all of the analytes on this form as targets. See the forms instructions in Part III of this Section for details on how to complete these forms.

(2) Tentatively Identified Compounds (Form I VOA-TIC).

This form must be included even if no compounds are found. If so, indicate this on the form by entering "0" in the field for "Number found".

Form I VOA-TIC is the tabulated list of the highest probable match for up to 10 of the nonsurrogate organic compounds not listed in Section C (Target Analyte List), including the Chemical Abstracts Registry CAS number, tentative identification and estimated concentration. For estimating concentration, assume a response factor of 1, and estimate the concentration by comparison of the compound peak height or total area count to the peak height or total area count of the nearest internal standard free of interferences on the reconstructed ion chromatogram. NOTE: The laboratory must be consistent (i.e., use peak height for all comparisons or use total area count for all comparisons).

(3) Reconstructed total ion chromatograms (RIC) for each sample or sample extract.

RICs must be normalized to the largest nonsolvent component, and must contain the following header information:

- o EG&G sample number
- o Date and time of analysis
- o GC/MS instrument ID
- o Lab file ID

Internal standard and surrogate spiking Compounds are to be labeled with the names of the compounds, either directly out from the peak, on a print-out of retention times if retention times are printed over the peak. If automated data system procedures are used for preliminary identification and/or quantification of the Target Analyte List compounds, the complete data system report must be included in all sample data packages, in addition to the reconstructed ion chromatogram. The complete data system report shall include all the information listed below. For laboratories which do not use the automated data system procedures, a laboratory "raw data sheet", containing the following information, must be included in the sample data package in addition to the chromatogram.

- o EG&G sample number
- o Date and time of analysis
- o RT or scan number of identified Target Analyte List compounds
- o Ion used for quantitation with measured area
- o Copy of area table from data system
- o GC/MS instrument ID
- o Lab file ID

(4) For each sample, by each compound identified:

(a) Copies of raw spectra and copies of background-subtracted mass spectra of target compounds listed in the requested method's target analyte list (or in the target list specified in the task specific Statement of Work) that are identified in the sample and corresponding background-subtracted target analyte list standard mass spectra. Spectra must be labeled with EG&G sample number, lab file ID, date and time of analysis, and GC/MS instrument file ID; compound names must be clearly marked on all spectra.

(b) Copies of mass spectra of nonsurrogate organic compounds not listed in the method's target analyte list (or in the target list specified in the task specific Statement of Work) (Tentatively Identified compounds) with associated best-match spectra (three best matches minimum), labeled as in (4)(a) above.

C. Standards Data

(1) Initial calibration Data (Form VI) - in order by instrument, if more than one instrument is used.

(a) VOA standard(s) reconstructed ion chromatograms and quantitation reports (or legible facsimile) for the initial (five point) calibration, labeled as in b.(3) above. Spectra are not required.

(b) All initial calibration data must be included, regardless of when it was performed and for which SDG. When more than one initial calibration is performed, the data must be put in chronological order, by instrument.

(2) Continuing calibration (Form VII) - in order by instrument if more than one instrument is used.

(a) VOA standard(s) reconstructed ion chromatograms and quantitation reports (or legible facsimile) for all continuing (12 hour) calibrations, labeled as in b.(3) above. Spectra are not required.

(b) When more than one continuing calibration is performed, forms must be in chronological order, within fraction and instrument.

(3) Internal Standard Area Summary (Form VIII VOA) - in order by instrument, if more than one instrument is used.

When more than one continuing calibration is performed, forms must be in chronological order, by instrument.

d. Raw QC Data

(1) BFB (for each 12-hour period, for each GC/MS system utilized)

(a) Bar graph spectrum, labeled as in b.(3) above.

(b) Mass listing, labeled as in b.(3) above.

(2) Blank Data - in chronological order. NOTE: This order is different from that used for samples.

(a) Tabulated results (Form I).

(b) Tentatively Identified compounds (Form I VOA-TIC) even if none found.

(c) Reconstructed ion chromatogram(s) and quantitation report(s) or legible facsimile (GC/MS), labeled as in b.(3) above.

(d) Target Analyte List spectra with lab generated standard, labeled as in b.(4) above. Data systems which are incapable of dual display shall provide spectra in order:

- o Raw Target Analyte List compound spectra
- o Enhanced or background-subtracted spectra
- o Laboratory generated Target Analyte List standard spectra.

(e) GC/MS library search spectra for Tentatively Identified compounds (TIC) labeled as in b.(4) above.

(f) Quantitation/Calculation of Tentatively Identified compound(s) (TIC) concentrations.

(3) Matrix Spike Data

(a) Tabulated results (Form I) of nonspiked Target Analyte List compounds. For the spiked Target Analyte List compounds the concentration column on Form I V-1 should be left blank (<u>for the matrix spike compounds only</u>), and the Q column should be given an "S" flag denoting that the compound is a matrix spike. Form I VOA-TIC <u>not</u> required.

(b) Reconstructed ion chromatogram(s) and quantitation report(s) or legible facsimile (GC/MS), labeled as in b. (4) above. Spectra <u>not</u> required.

(4) Matrix Spike Duplicate Data

(a) Tabulated results (Form I) of nonspiked Target Analyte List compounds. For the spiked Target Analyte List compounds the concentration column on Form I V-1 should be left blank (<u>for the matrix spike compounds only</u>), and the Q column should be given an "S" flag denoting that the compound is a matrix spike. Form I VOA-TIC <u>not</u> required.

(b) Reconstructed ion chromatogram(s) and quantitation report(s) or legible facsimile (GC/MS), labeled as in b. (4) above. Spectra <u>not</u> required.

(5) QC Check Sample Data

(a) Tabulated results (Form I) of the spiked Target Analyte List compounds. Form I VOA-TIC not required.

(b) Reconstructed ion chromatogram(s) and quantitation report(s) or legible facsimile (GC/MS), labeled as in b. (4) above. Spectra not required.

4. Semivolatiles Data

a. QC Summary

(1) Surrogate Percent Recovery Summary (Form II SV)

(2) Matrix Spike/Matrix Spike Duplicate Summary (Form III SV).

(3) Method Blank Summary (Form IV SV)

(If more than a single form is necessary, forms must be arranged in chronological order by date of analysis of the blank.)

(4) GC/MS or LC/MS Instrument Performance Criteria (Form V SV)

DFTPP in chronological order; by instrument.

(5) Internal Standard Area Summary (Form VIII SV)

In chronological order; by instrument.

(6) QC Check Sample Summary (Form XI SV)

b. Sample Data

Sample data shall be arranged in packets with the Organic Analysis Data Sheet (Form I SV, including Form I SV-TIC), followed by the raw data for semivolatile samples. These sample packets should then be placed in increasing EG&G sample number order, considering both letters and numbers in ordering samples.

(1) Target Analyte List Results - Organic Analysis Data Sheet (Form I).

Tabulated results (identification and quantitation) of the specified target compounds. The validation and release of these results is authorized by a specific, signed statement in the case Narrative. In the event that the Laboratory Manager can not validate all data reported for each sample, the Laboratory Manager shall provide a detailed description of the problems associated with the sample in the Case Narrative.

On Form I, the appropriate concentration units shall be entered. For example, ug/L for water samples or ug/Kg for soil/sediment samples. No other units are acceptable. NOTE: Report analytical results to one significant figure if the value is less than 10; to two significant figures if the value is greater than 10.

(2) Tentatively Identified Compounds (Form I SV-TIC).

This form must be included even if no compounds are found. If so, indicate this on the form by entering "0" in the field for "Number found".

Form I SV-TIC is the tabulated list of the highest probable match for up to 20 of the nonsurrogate organic compounds not listed in the requested method's target analyte list (or the target list in the task specific statement of work), including the chemical Abstracts Registry CAS number, tentative identification and estimated concentration. For estimating concentration, assume a response factor of 1, and estimate the concentration by comparison of the compound peak height or total area count to the peak height or total area count of the nearest internal standard free of interferences on the reconstructed ion chromatogram. NOTE: The laboratory must be consistent (i.e., use peak height for all comparisons or use total area count for all comparisons).

(3) Reconstructed Ion chromatograms (RIC) for each sample, sample extract, standard, blank, and spiked sample.

RICs must be normalized to the largest nonsolvent component, and must contain the following header information:

- o EG&G sample number
- o Date and time of analysis

- o GC/MS or LC/MS instrument ID
- o Lab file ID

Internal standard and surrogate spiking compounds are to be labeled with the names of the compounds, either directly out from the peak, or on a print out of retention times if retention times are printed over the peak. If automated data system procedures are used for preliminary identification and/or quantification of the Target Analyte List compounds, the complete data system report must be included in all sample data packages, in addition to the reconstructed ion chromatogram. The complete data system report shall include all of the information listed below. For laboratories that do not use the automated data system procedures, a laboratory "raw data sheet", containing the following information, must be included in the sample data package in addition to the chromatogram.

- o EG&G sample number
- o Date and time of analysis
- o RT or scan number of identified Target Analyte List compounds
- o Ion used for quantitation with measured area
- o Copy of area table from data system
- o GC/MS or LC/MS instrument ID
- o Lab file ID

(4) For each sample, by each compound identified:

(a) Copies of raw spectra and copies of background-subtracted mass spectra of target compounds listed in the requested method's target analyte list (or the targets specified in the task specific statement of work) that are identified in the sample and corresponding background-subtracted target analyte list standard mass spectra. Spectra must be labeled with EG&G sample number, lab file ID, date and time of analysis, and GC/MS instrument file ID; compound names must be clearly marked on all spectra.

(b) Copies of mass spectra of nonsurrogate organic compounds not listed in the requested method's target analyte list (or the task specific statement of work) (Tentatively Identified compounds) with associated best-match spectra (three best matches minimum), labeled as in (4)(a) above.

(C) GPC chromatograms.

C. Standards Data

(1) Initial Calibration Data (Form VI) - in order by instrument, if more than one instrument is used.

(a) BNA standard(s) reconstructed ion chromatograms and quantitation reports (or legible facsimile) for the initial (five point) calibration, labeled as in b.(3) above. Spectra are not required.

(b) All initial calibration data must be included, regardless of when it was performed and for which SDG. When more than one initial calibration is performed, the data must be put in chronological order, by instrument.

(2) Continuing Calibration (Form VII) - in order by instrument if more than one instrument is used.

(a) BNA standard(s) reconstructed ion chromatograms and quantitation reports (or legible facsimile) for all continuing (12 hour) calibrations, labeled as in b.(3) above. Spectra are not required.

(b) When more than one continuing calibration is performed, forms must be in chronological order, by instrument.

(3) Internal Standard Area Summary (Form VIII SV-1, SV-2) - in order by instrument, if more than one instrument is used.

When more than one continuing calibration is performed, forms must be in chronological order, by instrument.

d. Raw QC Data

(1) DFTPP or the tuning compound designated in the requested LC/MS method (for each 12-hour period, for each GC/MS or LC/MS system utilized)

(a) Bar graph spectrum, labeled as in b.(3) above.

(b) Mass listing, labeled as in b.(3) above.

(2) Blank Data - in chronological order. NOTE: This order is different from that used for samples.

(a) Tabulated results (Form I)

(b) Tentatively Identified Compounds (Form I SV-TIC) even if none found.

(c) Reconstructed ion chromatogram(s) and quantitation report(s) or legible facsimile (GC/MS or LC/MS), labeled as in b.(3) above.

(d) Target analyte list spectra with lab generated standard, labeled as in b.(4) above. Data systems which are incapable of dual display shall provide spectra in order:

- Raw target analyte list compound spectra
- Enhanced or background-subtracted spectra
- Laboratory generated target analyte list standard spectra.

(e) GC/MS or LC/MS library search spectra for Tentatively Identified Compounds (TIC), labeled as in b.(4) above.

(f) Quantitation/Calculation of Tentatively Identified Compound(s) (TIC) concentrations.

(3) Matrix Spike Data

(a) Tabulated results (Form I) of nonspiked target analyte list compounds. For the spiked target analyte list compounds the concentration column on Form I SV-1 and SV-2 should be left blank (<u>for the matrix spike compounds only</u>), and the Q column should be given an "S" flag denoting that the compound is a matrix spike. Form I SV-TIC <u>not</u> required.

(b) Reconstructed ion chromatogram(s) and quantitation report(s) or legible facsimile (GC/MS), labeled as in b. (4) above. Spectra <u>not</u> required.

(4) Matrix Spike Duplicate Data

(a) Tabulated results (Form I) of nonspiked target analyte list compounds. For the spiked Target Analyte List compounds the concentration column on Form I SV-1 and SV-2 should be left blank (for the matrix spike compounds only), and the Q column should be given an "S" flag denoting that the compound is a matrix spike. Form I SV-TIC not required.

(b) Reconstructed ion chromatogram(s) and quantitation report(s) or legible facsimile (GC/MS or LC/MS), labeled as in b. (4) above. Spectra not required.

(5) QC Check Sample Data

(a) Tabulated results (Form I) of the spiked Target Analyte List compounds. Form I VOA-TIC not required.

(b) Reconstructed ion chromatogram(s) and quantitation report(s) or legible facsimile (GC/MS or LC/MS), labeled as in b. (4) above. Spectra not required.

5. Compounds analyzed by GC or HPLC

a. QC Summary

(1) Surrogate Percent Recovery Summary (Form II)

The appropriate form for the analytical method requested from the forms provided (Part IV of this Section) shall be used. The task specific statement of work will provide appropriate forms and/or instructions for reporting of surrogate results where no form is present in Part IV of this Section. When a method is requested for which an appropriate form has not been provided the Project Officer shall be notified prior to any analyses being done on the samples.

(2) Matrix Spike/Matrix Spike Duplicate Summary (Form III)

The appropriate form for the analytical method requested from the forms provided (Part IV of this Section) shall be used. The task specific statement of work will provide appropriate forms and/or instructions for reporting of matrix spike results where no form is present in Part IV of this Section. When a method is requested for which an appropriate form has not been provided the Project Officer shall be notified prior to any analyses being done on the samples.

(3) Method Blank Summary (Form IV)

(If more than a single form is necessary, forms must be arranged in chronological order by date of analysis of the blank.)

The appropriate form for the analytical method requested from the forms provided (Part IV of this Section) shall be used. The task specific statement of work will provide appropriate forms and/or instructions for reporting of blank summaries where no form is present in Part IV of this Section. When a method is requested for which an appropriate form has not been provided the Project Officer shall be notified prior to any analyses being done on the samples.

(4) QC Check Sample Summary (Form XI)

The appropriate form for the analytical method requested from the forms provided (Part IV of this Section) shall be used. The task specific statement of work will provide appropriate forms and/or instructions for reporting of QC Check sample summaries where no form is present in Part IV of this Section. When a method is requested for which an appropriate form has not been provided the Project Officer shall be notified prior to any analyses being done on the samples.

b. Sample Data

Sample data shall be arranged in packets with the Organic Analysis Data Sheet (Form I), followed by the raw data for the samples. These sample packets should then be placed in increasing EG&G sample number order, considering both letters and numbers in ordering samples.

The appropriate form for the analytical method requested from the forms provided (Part IV of this Section) shall be used. The task specific statement of work will provide appropriate forms and/or instructions for reporting of target analyte results where no form is present in Part IV of this Section. When a method is requested for which an appropriate form has not been provided the Project Officer shall be notified prior to any analyses being done on the samples.

(1) Target Analyte List Results - Organic Analysis Data Sheet (Form I).

Tabulated results (identification and quantitation) of the target compounds specified in the requested method or the task specific statement of work. The validation and release of these results is authorized by a specific, signed statement in the Case Narrative. In the event that the Laboratory Manager can not validate all data reported for each sample, the Laboratory Manager shall provide a detailed description of the problems associated with the sample in the Case Narrative.

On Form I, the appropriate concentration units shall be entered. For example, ug/L for water samples or ug/Kg for soil/sediment samples. No other units are acceptable.

NOTE: Report analytical results to two significant figures for all GC or HPLC analytical results.

(2) Copies of GC or HPLC chromatograms.

All chromatograms must be labeled with the following information:

- o EG&G sample number
- o Volume injected (ul)
- o Date and time of injection
- o GC or HPLC column identification (by stationary phase)
- o GC or HPLC instrument identification

- o Positively identified compounds (including surrogate spikes) must be labeled with the names of the compounds, either directly out from the peak, or on a print-out of retention times if retention times are printed over the peak.

(3) Copies of GC or HPLC chromatograms from second GC or HPLC column confirmation. Chromatograms to be labeled as in (2) above.

(4) GC or HPLC Integration report or data system print-out and calibration plots (area vs. concentration) for 4,4'-DDT, 4,4'-DDD, 4,4'-DDE, toxaphene, or any other instance that manual calibration curves must be plotted.

(5) Manual work sheets.

(6) UV traces from GPC (where appropriate).

(7) If target analytes are confirmed by GC/MS or LC/MS, the Subcontractor shall submit copies of raw spectra and copies of background-subtracted mass spectra of target compounds listed in the requested method's target analyte list that are identified in the sample and corresponding background subtracted target analyte list standard mass spectra. Compound names must be clearly marked on all mass spectra. For multicomponent pesticides/PCBs confirmed by GC/MS or LC/MS, the Subcontractor shall submit mass spectra of three major peaks of multicomponent compounds from samples and standards.

c. Standards Data

(1) Form VIII - Evaluation Standards Summary (all GC or HPLC columns)

(2) Form IX - Quantitation Standards Summary (all GC or HPLC columns)

(3) Form X - Identification Summary (only required for positive results)

(4) Standard chromatograms and data system print-outs for all standards to include:

- o Linearity Standard Mixes (Evaluation Standards)
- o Quantitation Standard Mixes (Individual Mixes)

- o All multiresponse pesticides/PCBs (where appropriate)
- o All extra quantitation standards necessary for a particular method (e.g., DDT series mixes)
- o A copy of the computer reproduction or strip chart recorder output covering the 100 fold range

(a) All chromatograms are required to have the following:

- o Label all chromatograms with the "EG&G sample number" for standards (where such numbers are specified), i.e. OCPEVALA, OCPEVALB, etc. (See Part III, Form Instruction Guide, for details).
- o Label all standard peaks for all individual compounds either directly out from the peak or on the print-out of retention times if retention times are printed over the peak.
- o List total nanograms (ng) or micrograms (ug) injected for each component in the standard.
- o A print-out of retention times and corresponding peak areas must accompany each chromatogram.
- o Date and time of injection.
- o GC or HPLC column identification (by stationary phase).
- o GC or HPLC instrument identification.

d. Raw QC Data

(1) Blank Data - in chronological order. NOTE: This order is different from that used for samples.

(a) Tabulated Results (Form I).

(b) Chromatogram(s) and data system print-out(s) (GC or HPLC) for each GC or HPLC column and instrument used for analysis, labeled as in b.(2) above.

(2) Matrix Spike Data

(a) Tabulated results (Form I) of the nonspike Target Analyte List compounds. For the spiked Target Analyte List compounds the concentration column on Form I should be left blank (for the matrix spike compounds only), and the Q column should have an "S" flag denoting that the compound is a matrix spike.

(b) Chromatogram(s) and data system print-out(s) (GC or HPLC) labeled as in b.(2) above.

(2) Matrix Spike Duplicate Data

(a) Tabulated results (Form I) of the nonspike Target Analyte List compounds. For the spiked Target Analyte List compounds the concentration column on Form I should be left blank (for the matrix spike compounds only), and the Q column should have an "S" flag denoting that the compound is a matrix spike.

(b) Chromatogram(s) and data system print-out(s) (GC or HPLC) labeled as in b.(2) above.

(3) QC Check Sample Data

(a) Tabulated results (Form I) of the spiked Target Analyte List compounds.

(b) Chromatogram(s) and data system print-out(s) (GC or HPLC) labeled as in b.(2) above.

G. GC/MS and LC/MS Tapes

The Subcontractor must store all raw and processed GC/MS and LC/MS data on magnetic tape, in appropriate instrument manufacturer's format. This tape must include data for samples, blanks, matrix spikes, matrix spike duplicates, initial calibrations, continuing calibrations, BFB and DFTPP (where appropriate), as well as all laboratory-generated spectral libraries and quantitation reports required to generate the data package. The Subcontractor shall maintain a written reference logbook crossreferencing the tape files to EG&G sample number, calibration data, standards, blanks, matrix spikes, and matrix spike duplicates. The logbook should include EG&G sample numbers and standard and blank ID's, identified by Sample Delivery Group.

The Subcontractor is required to retain the GC/MS and LC/MS tapes for 365 days after data submission. During that time, the Subcontractor shall submit tapes and associated logbook pages within seven days after receipt of a written request from the EG&G Project Officer.

H. Extracts

The Subcontractor shall preserve sample extracts at $4^{o}C$ ($\pm 2^{o}C$) in bottles/vials with Teflon-lined septa. Extract bottles/vials shall be labeled with EG&G sample number, and Sample Delivery Group number. A logbook of stored extracts shall be maintained, listing EG&G sample numbers and associated SDG number.

The Subcontractor is required to retain extracts for 365 days following data submission. During that time, the Subcontractor shall submit extracts and associated logbook pages within seven days after receipt of a written request from the EG&G Project Officer.

PART III

FORM INSTRUCTION GUIDE

This Part of the BOA includes specific instructions for the completion of all required forms that have been provided in this contract. Each of the forms provided is specific to a given fraction (volatile, semivolatile, organochlorine pesticide, organophosphorous pesticide, organochlorine herbicide), and in some instances specific to a given matrix (water or soil) within each fraction. These are the forms that shall be used when <u>any</u> method for the analysis of volatile organics by GC/MS, semivolatile organics by GC/MS, organochlorine pesticides by GC/ECD, organophosphorus pesticides by GC, or organochlorine herbicides by GC is requested. The Subcontractor shall submit only those forms pertaining to the fractions analyzed for a given sample or samples. For instance, if a sample is scheduled for volatile analysis only, provide only VOA forms. There are currently four pages relating to the semivolatile fraction for forms I, VI, VII and two pages relating to the semivolatile fraction for form VIII. Whenever semivolatiles are analyzed and one of the above-named forms is required, <u>all</u> pages (SV-1, SV-2, SV-3 and SV-4) must be submitted for forms I, VI and VII, and <u>both</u> pages (SV-1 and SV-2) must be submitted for form VIII. If a sample is scheduled for organochlorine pesticide/PCB analysis only, <u>both</u> pages OCPEST-1 and OCPEST-2 must be submitted. There are also two pages to forms I, VI, VII, and VIII for volatile analysis. The important point is to be sure to submit all required pages for all the required forms for the fraction analyzed. It is likely that the method requested in the task specific statement of work will not include all of the compounds present on the Forms I for a given fraction. When this is the case, the task specific statement of work will indicate which analytes are to be reported and included in the standards as target analytes. For the non-target analytes the Subcontractor shall enter a "NR" in the spaces on the forms next to compounds that are not covered by the requested target analyte list. These instructions are arranged in the following order (the forms listed are the Appendix IX Analytes forms, but the instructions apply to all forms provided):

A. General Information and Header Information

B. Organic Analysis Data Sheets

Form I VOA-1,	Form I SV-1,	Form I OCPEST-1,
Form I VOA-2,	Form I SV-2,	Form I OCPEST-2,
Form I VOA-TIC	Form I SV-3	Form I OPPEST
	Form I SV-4	Form I OCHERB
	Form I SV-TIC	

C. Surrogate Recovery

Form II VOA-1,	Form II SV-1,	Form II OCPEST-1,
Form II VOA-2,	Form II SV-2,	Form II OCPEST-2,
		Form II OPPEST-1,
		Form II OPPEST-2,
		Form II OCHERB-1,
		Form II OCHERB-2,

D. Matrix Spike/Matrix Spike Duplicate Recovery

Form III VOA-1	Form III SV-1	Form III OCPEST-1
Form III VOA-2	Form III SV-2	Form III OCPEST-2
		Form III OPPEST-1
		Form III OPPEST-2
		Form III OCHERB-1
		Form III OCHERB-2

E. Method Blank Summary

Form IV VOA	Form IV SV	Form IV OCPEST
		Form IV OPPEST
		Form IV OCHERB

F. GC/MS Tuning and Mass Calibration

Form V VOA	Form V SV

G. Initial Calibration Data

Form VI VOA-1	Form VI SV-1
Form VI VOA-2	Form VI SV-2
	Form VI SV-3
	Form VI SV-4

H. Continuing Calibration Data

Form VII VOA-1	Form VII SV-1
Form VII VOA-2	Form VII SV-2
	Form VII SV-3
	Form VII SV-4

I. Internal Standard Area Summary

Form VIII VOA-1	Form VIII SV-1
Form VIII VOA-2	Form VIII SV-2

J. Pesticide Evaluation Standards Summary

Form VIII OCPEST-1
Form VIII OCPEST-2
Form VIII OPPEST-1
Form VIII OPPEST-2
Form VIII OCHERB-1
Form VIII OCHERB-2

K. Pesticide/PCB Standards Summary

Form IX OCPEST-1
Form IX OCPEST-2
Form IX OPPEST
Form IX OCHERB

L. Pesticide/PCB Identification

Form X OCPEST
Form X OPPEST
Form X OCHERB

M. QC Check Sample Recovery

Form XI VOA-1	Form XI SV-1	Form XI OCPEST
Form XI VOA-2	Form XI SV-2	Form XI OPPEST
	Form XI SV-3	Form XI OCHERB
	Form XI SV-4	

A. General Information and Header Information

The data reporting forms presented in Part IV have been designed in conjunction with the computer-readable data format specified in Section F, Data Dictionary and Format for Data Deliverables in Computer-Readable Format. The specific length of each variable for computer-readable data transmission purposes is given in the data dictionary (Section F). Information entered on these forms must not exceed the size of the field given on the form, including such laboratory-generated items as Lab Name and Lab Sample ID.

Note that on the hardcopy forms (Part IV), the space provided for entries is greater in some instances than the length prescribed for the variable as written to diskette (see Section F). Greater space is provided on the hardcopy forms for the sake of visual clarity.

The forms provided will be used to report data acquired using the analytical method(s) specified in the task specific statement of work. Data reported on a set of forms must represent only one of the methods performed even if the the form may be applicable to more than one method. For example, if EPA methods 625 and 8270 are both requested in the task specific statement of work, the results from the analysis of extracts by method 625 must be reported on a separate set of forms than the results from the 8270 anlyses.

Values must be reported on the hardcopy forms according to the individual form instructions in this Part. For example, results for concentrations of VOA compounds must be reported to two significant figures if the value is greater than or equal to 10. Values can be written to the diskette file in any format that does not exceed the field specification as given in the record specifications and discussed in "Record Structure" paragraph 5 of Section F.

All characters which appear on the data reporting forms presented in the BOA (Section B, Part IV) must be reported by the Subcontractor when submitting data, and the format of the forms submitted must be identical to that shown in the BOA. No information may be added, deleted, or moved from its specified position without prior written approval of the EG&G Project Officer. The names of the various fields and compounds

(i.e., "Lab Code," "Chloromethane") must appear as they do on the forms in the BOA, including the options specified in the form (i.e., "Matrix: (soil/water)" must appear , not just "Matrix").

Alphabetic entries made onto the forms by the Subcontractor shall be in ALL UPPERCASE letters (i.e., "LOW", not "Low" or "low"). If an entry does not fill the entire blank space provided on the form, null characters shall be used to remove the remaining underscores that comprise the blank line. (See Section F for more detailed instructions.) However, do not remove the underscores or vertical bar characters that delineate "boxes" on the forms. The only exception would be those underscores at the bottom of a "box" that are intended as a data entry line (for instance, see Form 2A, line 30. If data must be entered on line 30, it will replace underscores)

Six pieces of information are common to the header sections of each data reporting form. They are: Lab Name, Contract, Lab Code, Case No., SAS No., and SDG No. Where applicable, this information must be entered on every form and must match on every form. No deviations from this requirement are allowed without prior written approval of the EG&G Project Officer.

The "Lab Name" shall be the name chosen by the Subcontractor to identify the laboratory. It may not exceed 25 characters.

The "Lab Code" is an alphabetical abbreviation of up to 6 letters, assigned by EG&G, to identify the laboratory and aid in data processing. This lab code shall be assigned by EG&G at the time a contract is awarded, and shall not be modified by the Subcontractor, except at the direction of EG&G.

The "Case No." is a five digit code assigned by EG&G Idaho to analytical batches from a single Project.

The "Contract" is the number of the EG&G subcontract under which the analyses were performed.

The "SDG No." is the Sample Delivery Group number. The Sample Delivery Group (SDG) number is the EG&G Sample Number of the first sample received in the SDG. When several samples are received together in the first SDG shipment, the SDG number shall be the lowest sample number (considering both alpha and numeric designations) in the first group of samples received under the SDG.

The "SAS No." is the number of the analytical method used for the analysis of the samples represented on that particular form. This method will be that specified in the task specific statement of work.

The other information common to most of the forms is the "EG&G Sample No.". This number appears either in the upper righthand corner of the form, or as the left column of a table summarizing data from a number of

samples. When "EG&G Sample No." is entered into the triple-spaced box in the upper righthand corner of Form I or Form X, it should be entered on the middle line of the three lines that comprise the box.

All samples, matrix spikes, matrix spike duplicates, blanks and standards shall be identified with an EG&G Sample Number. For samples, matrix spikes and matrix spike duplicates, the EG&G Sample Number is the unique identifying number given in the Chain-of-Custody Report that accompanied that sample.

In order to facilitate data assessment, the following sample suffixes must be used:

XXXXXXXXXXX	-	EG&G sample number
XXXXXXXXXXXMS	-	matrix spike sample
XXXXXXXXXXXMSD	-	matrix spike duplicate sample
XXXXXXXXXXXRE	-	re-analyzed sample
XXXXXXXXXXXDL	-	sample analyzed at a secondary dilution

The use of multiple applicable suffixes may be required to completely facilitate data assessment. For example, a matrix spike duplicate requiring analysis at a further dilution to get a saturated compound within the calibration range would be identified with the EG&G Sample Number "XXXXXXXXXXXMSDDL".

Form VIII OCPEST, OPPEST and OCHERB requires that all samples analyzed in a given analytical sequence be specified, regardless of whether or not they are part of the SDG being reported. Therefore, use "ZZZZZ" as the EG&G Sample No. for any sample analyses not associated with the SDG being reported.

For blanks, QC check samples and standards, the following identification scheme must be used as the "EG&G Sample No."

1. Volatile blanks shall be identified as VBLK##.
   Volatile QC check samples shall be identified as VBLKQC.

2. Semivolatile blanks shall be identified as SBLK##.
   Semivolatile QC check samples shall be identified as SBLKQC

3. Organochlorine pesticide/PCB blanks shall be identified as OCPBLK##.
   Organochlorine pesticide/PCB QC check samples shall be identified as OCPBLKQC.

4. Organophosphorus pesticide blanks shall be identified as OPPBLK##
   Organophosphorus pesticide QC check samples shall be identified as OPPBLKQC

5. Organochlorine herbicide blanks shall be identified as OCHBLK##
   Organochlorine herbicide QC check samples shall be identified as OCHBLKQC

The "EG&G Sample No." must be unique within an SDG. Within a fraction, a laboratory must achieve this by replacing the two-character "##" terminator of the identifier with one or two characters (other than "QC") or numbers, or a combination of both. For example, possible identifiers for volatile blanks would be VBLK1, VBLK2, VBLKA1, VBLKB2, VBLK10, VBLKAB, etc.

5. Volatile and semivolatile standards shall be identified as FSTD###, where:

   F - fraction (V for volatiles; S for semivolatiles).

   STD - indicates a standard.

   ### - the concentration in ug/L of volatile standards (i.e., 20, 50, 100, 150, and 200 for a 5-mL purge volume using the CLP SOW method for volatiles analysis), or the amount injected in ng for semivolatile standards (i.e., 20, 50, 80, 120, and 160).

   These designations will have to be concatenated with other information to uniquely identify each standard.

5. Pesticide/PCB standards shall be identified as specified in the instructions for Form VIII.

   Several other pieces of information are common to many of the Data Reporting Forms. These include: Matrix, Sample wt/vol, Level, Lab Sample ID, and Lab File ID

   For "Matrix" enter "SOIL" for soil/sediment samples, and enter "WATER" for water samples. NOTE: The matrix must be spelled out. Abbreviations such as "S" or "W" shall not be used.

   For "Sample wt/vol" enter the number of grams (for soil) or milliliters (for water) of sample used in the first blank line, and the units, either "G" or "ML" in the second blank.

   For "Level" enter the determination of concentration level made from the screening of soils. Enter as "LOW" or "MED", not "L" or "M". All water samples are "LOW" level and shall be entered as such.

   "Lab Sample ID" is an optional laboratory-generated internal identifier. Up to 12 alpha-numeric characters may be reported here.

   "Lab File ID" is the laboratory-generated name of the GC/MS data system file containing information pertaining to a particular analysis. Up to 14 alpha-numeric characters may be used here.

   Forms II, IV, V, VIII, IX and X contain a field labeled "page _ of _" in the bottom lefthand corner. If the number of entries required on any of these forms exceeds the available space, continue entries on

another copy of the same fraction-specific form, duplicating all header information. If a second page is required, number them consecutively, as "page 1 of 2" and "page 2 of 2". If a second page is not required, number the page "page 1 of 1." NOTE: These forms are method-specific, fraction-specific, and often matrix-specific within fraction. For example, Form II VOA-1 and Form II VOA-2 are for different data. Therefore, do not number the pages of all ten versions of Form II as "1 of 10, 2 of 10, etc." Only number pages <u>within</u> a method-specific, fraction-specific and matrix-specific form.

For rounding off numbers to the appropiate level of precision, observe the following common rules. If the figure following those to be retained is less than 5, drop it (round down). If the figure is greater than 5, drop it and increase the last digit to be retained by 1 (round up). If the figure following the last digit to be retained equals 5, round up if the digit to be retained is odd, and round down if that digit is even.

B. Organic Analysis Data Sheet (Form I)

1. Form I VOA-1, Form I VOA-2, Form I SV-1, Form I SV-2, Form I SV-3, Form I SV-4, Form I OCPEST-1, Form I OCPEST-2, Form I OPPEST, Form I OCHERB (and the other Form I's provided)

   This form is used for tabulating and reporting sample analysis results for the method-specific target analyte list compounds. If all fractions are not requested to be analyzed, only the pages specifically required must be submitted. For example, if VOA analysis only is requested, Form I VOA-1, Form I VOA-2, and Form I VOA-TIC must be submitted. Simmilarly, if the organophosphorus pesticide analysis is the only analysis requested, only Form I OPPEST must be submitted for that sample.

   Complete the header information on each page of Form I required according to the instructions in unit A, and as follows:

   For volatiles, for "% moisture not dec.", enter the nondecanted percent moisture. For semivolatiles and all pesticide/herbicide fractions, enter values for both nondecanted percent moisture and decanted percent moisture, in the appropiate fields. Report percent moisture (decanted or not decanted) to the nearest whole percentage point (i.e., 5%, not 5.3%). If a decanted percent moisture is not determined, because the sample has no standing water over it, leave "% moisture dec." blank. Leave these fields blank for Form I for method blanks.

   For volatiles, enter the type of GC column used in "Column: (nar/wide)." Enter "NAR" for narrow bore capillary columns (<0.53 mm i.d.), and "WIDE" for wide bore capillary columns. If a packed column is used for volatiles analysis enter "PACK" in this field.

For semivolatiles, organochlorine pesticides/PCBs, organophosphorous pesticides and organochlorine herbicides, enter the method of extraction as "SEPF" for separatory funnel, and "CONT" for continuous liquid-liquid extraction, "SONC" for sonication (soils only), "SOXH" for soxhlet extraction (soils only), or "HERB" for the extraction procedures described in the method specified for chlorophenoxy acid herbicide analysis.

If gel permeation chromatography, "GPC Cleanup" was performed, enter "Y" for yes. Otherwise, enter "N" for no, if GPC was not performed.

For soil samples only, enter pH for semivolatile and all pesticide/herbicide fractions, reported to 0.1 pH units.

"Date Received" is the date of sample receipt at the laboratory, as noted on the Chain-of-Custody form (i.e., the VTSR). It should be entered as MM/DD/YY.

"Date Extracted" and "Date Analyzed" should be entered in a similar fashion. If continuous liquid-liquid extraction procedures are used, enter the date on which the procedure was started for "Date Extracted". If separatory funnel or sonication procedures are used, enter the date on which the procedure was completed. For pesticide/herbicide samples, the date of analysis should be the date and time of the first GC analysis performed. The date of sample receipt will be compared with the extraction and analysis dates of each fraction to ensure that contract holding times were not exceeded.

If a sample has been diluted for analysis, enter the "Dilution Factor" as a single number, such as 100 for a 1 to 100 dilution of the sample. Enter 0.1 for concentration of 10 to 1. If a sample was not diluted, enter 1.

For positively identified target compounds, the Subcontractor shall report the concentrations detected as uncorrected for blank contaminants.

For volatile and semivolatile results, report analytical results to one significant figure if the value is less than 10, and two significant figures above 10.

Report all pesticide/herbicide results to two significant figures.

The appropiate concentration units, ug/L or ug/kg, must be entered.

If the result is a value greater than or equal to the quantitation limit, report the value.

If a compound that is listed on the form(s) provided is not on the target analyte list of the method specified in the task specific statement of work, an "NR" must be entered in the concentration column next to that compound. Conversely, if a compound is not present on the form(s)

provided and it is on the target analyte list of the requested method (e.g., the organophosphorus pesticides on the forms provided are only those present in Appendix IX, not all of the method 8140 target analytes) the additional compounds from the method's target list must be entered on the blank spaces provided on the forms. If a subset of a requested method's target list is desired, this will be specified in the task specified Statement of Work.

Under the column labeled "Q" for qualifier, flag each result with the specific Data Reporting Qualifiers listed below. The Subcontractor is encouraged to use additional flags or footnotes. The definition of such flags must be explicit and must be included in the Case Narrative.

For reporting results to EG&G, the following contract specific qualifiers are to be used. The seven qualifiers defined below <u>are</u> <u>not</u> subject to modification by the laboratory. Up to five qualifiers may be reported on Form I for each compound.

The seven EG&G-defined qualifiers to be used are as follows:

U - Indicates compound was analyzed for but not detected. The sample quantitation limit, or method detection limit for method 524.2 (see Section C, Part I), must be corrected for dilution and for percent moisture. For example, 10 U for phenol in water if the sample final volume is the protocol-specified final volume and the method quantitation limit for phenol is 10 ug/L. If a 1 to 10 dilution of extract is necessary, the reported limit is 100 U. For a soil sample, the value must <u>also</u> be adjusted for percent moisture. For example, if the sample had 24% moisture <u>and</u> a 1 to 10 dilution factor, and the sample quantitation limit for phenol is 330 ug/Kg would be corrected to:

$$\frac{(330\ U)}{D} \times df \qquad \text{where } D = \frac{100 - \%\ \text{moisture}}{100}$$

and df = dilution factor

at 24 % moisture, $D = \frac{100-24}{100} = 0.76$

$$\frac{(330\ U)}{.76} \times 10 = 4300\ U$$ rounded to the appropiate number of significant figures

J - Indicates an estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed, or when the mass spectral data indicate the presence of a compound that meets the identification criteria but the result is less than the sample quantitation limit but greater than zero. For example, if the

sample quantitation limit is 10 ug/L, but a concentration of 3 ug/L is calculated, report it as 3 J. The sample quantitation limit must be adjusted for the U flag, so that if a sample with 24% moisture and a 1 to 10 dilution factor has a calculated concentration of 300 ug/Kg and a sample quantitation limit of 430 ug/kg, report the concentration as 300 J on Form I.

C - This flag applies to pesticide and/or herbicide results where the identification has been confirmed by GC/MS. Single component pesticides and/or herbicides $\geq$ 10 ng/ul in the final extract shall be confirmed by GC/MS.

B - This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contaminination and warns the data user to take appropriate action. This flag must be used for a TIC as well as for a positively identified target compound.

E - This flag identifies compounds whose concentrations exceed the calibration range of the GC/MS instrument for that specific analysis. This flag will <u>not</u> apply to compounds analyzed by GC methods. If one or more compounds has a response representing a concentration greater than the highest concentration used in the initial calibration of the instrument, the sample or extract must be diluted and re-analyzed. All such compounds with a response greater than the highest concentration used in the initial calibration should have the concentration flagged with an "E" on the Form I for the original analysis. If the dilution of the extract causes any compounds identified in the first analysis to be below the calibration range in the second analysis, then the results of both analyses shall be reported on separate Forms I. The Form I for the diluted sample shall have the "DL" suffix appended to the sample number. NOTE: For total xylenes, where three isomers are quantified as two peaks when using capillary column chromatography, the calibration range of <u>each peak</u> should be considered separately, e.g., a diluted analysis is <u>not</u> required for total xylenes unless the concentration of either peak separately exceeds 200 ug/L.

D - This flag identifies all compounds identified in an analysis at a secondary dilution factor. If a sample or extract is re-analyzed at a higher dilution factor, as in the "E" flag above, the "DL" suffix is appended to the sample number on the Form I for the diluted sample, and <u>all</u> concentration and quantitation limit values reported on that Form I are flagged with the "D" flag.

A - This flag indicates that a TIC is a suspected aldol-condensation product.

S - This flag indicates that the compound is a matrix spike and thus, the concentration is not reported on Form I.

X - Other specific flags may be required to properly define the results. If used, they must be fully described and such description attached to the Sample Data Summary Package and the Case Narrative. Begin by using "X"

needed. If more than five qualifiers are required for a sample result, use the "X" flag to combine several flags, as needed. For instance, the "X" flag might combine the "A", "B", and "D" flags for some sample.

The combination of flags "BU" or "UB" is expressly prohibited. Blank contaminants are flagged "B" only when they are also detected in the sample.

2. Form I VOA-TIC and Form I SV-TIC

Fill in all header information as above.

Report Tentatively Identified Compounds (TIC) including CAS number, compound name, retention time, and the estimated concentration (criteria for qualitative identification of TICs are given in Section A, Part II, Task III, substituting the term "library spectrum" for every occurence of the term "standard spectrum"). Retention time must be reported in minutes and decimal minutes, not seconds or minutes:seconds.

Quantitation of Tentatively Identified Compounds shall be accomplished using the method specified in the USEPA Contract Laboratory Progam Statement of Work for Organics Analysis (2/88 revision), Exhibit D/SV, paragraph 7.3

If in the opinion of the mass spectral interpretation specialist, no valid tentative identification can be made, the compound shall be reported as unknown.

Include a Form I VOA-TIC or SV-TIC for every volatile and semivolatile fraction of every sample and method blank analyzed, even if no TICs are found. Total the number of TICs found, including aldol-condensation products (but see below), and enter this number in the "Number TICs found." If none were found, enter "0" (zero). Form I VOA-TIC or SV-TIC must be provided for every analysis, including required dilutions and reanalyses, even if no TICs are found.

If the name of a compound exceeds the 28 spaces in the TIC column, truncate the name to 28 characters. If the compound is an unknown, restrict description to no more than 28 characters (i.e., unknown hydrocarbon, etc.).

Peaks that are suspected as aldol-condensation reaction products (i.e., 4-methyl-4-hydroxy-2-pentanone and 4-methyl-3-pentene-2-one) shall be summarized on this form, flagged "A", and included in the total "Number TICs found," but not counted as part of the 20 most intense non-target semivolatile compounds to be searched.

C. Surrogate Recovery (Form II)

Form II is used to report the recoveries of the surrogate compounds added to each sample, blank, matrix spike, matrix spike duplicate and QC check sample. Form II is matrix-specific as well as fraction-specific, so that surrogate recoveries for volatile water samples are reported on a different version of Form II than volatile soil sample surrogate recoveries.

Complete all header information and enter EG&G Sample Numbers as described in part A. For soil samples only, specify the "level" as "LOW" or "MED", as on Form I. Do not mix low and medium level samples on one form. Complete one for each level. For each surrogate, report the percent recovery to the number of significant figures given by the QC limits at the bottom of the form.

Flag each surrogate recovery outside the QC limits with an asterisk (*). The asterisk must be placed in the last space in each appropriate column, under the "#" symbol. In the far righthand column, total the number of surrogate recoveries outside the QC limits for each sample.

If no surrogates were outside the limits, enter "0".

If the surrogates are diluted out in any analysis, enter the calculated recovery or "0" (zero) if the surrogate is not detected, and flag the surrogate recoveries with a "D" in the column under the "#" symbol. Do not include results flagged "D" in the total number of recoveries for each sample outside the QC limits.

The pesticide surrogate recovery limits are only advisory, but the Subcontractor must flag those recoveries outside the advisory QC limits or diluted out, nonetheless.

Number all pages as described in part A.

D. Matrix Spike/Matrix Spike Duplicate Recovery (Form III)

This form is used to report the results of the analyses of a matrix spike and matrix spike duplicate. As with the surrogate recovery form (II), the form is matrix-specific within each fraction.

Complete the header information as instructed in Part A, including the EG&G Sample Number for the matrix spike without the suffixes MS or MSD.

For soil samples, specify "level" as "LOW" or "MED", as on Form I. SDGs containing soil samples at both levels require MS/MSD at each level, therefore, for soils, prepare one form for each level.

All water samples are "Low". Therefore, there is no MS/MSD for "medium level waters", and none shall be reported.

In the upper box in Form III, under "SPIKE ADDED", enter the calculated concentration in ug/L or ug/Kg (according to the matrix) that results from adding each spiked compound to the aliquot chosen for the matrix spike (MS). For instance, for base/neutral compounds in medium level soils, if 100 ug of spike are added to 1 g of soil, and the percent moisture is 0%, the resulting concentration is 100,000 ug/Kg. Enter the "SAMPLE CONCENTRATION", in similar units, of each spike compound detected in the original sample. If a spike compound was not detected during the analysis of the original sample, enter the sample result as "0" (zero). Under "MS CONCENTRATION", enter the actual concentration of each spike compound detected in the matrix spike aliquot. Calculate the percent recovery of each spike compound in the matrix spike aliquot to the nearest whole percent and enter under "MS % REC". Flag all percent recoveries outside the QC limits with an asterick (*). The asterisk must be placed in the last space of the percent recovery column, under the "#" symbol.

Complete the lower box on Form III in a similar fashion, using the results of the analysis of the matrix spike duplicate (MSD) aliquot. Calculate the relative percent difference (RPD) between the matrix spike recovery and the matrix spike duplicate recovery, and enter this value in the lower box under "% RPD". Compare the RPDs to the QC limits given on the form, and flag each RPD outside the QC limits with an asterick (*) in the last space of the "% RPD" column, under the "#" symbol.

$$RPD = \frac{D1 - D2}{(D1 + D2)/2} \times 100$$

where

RPD = Relative Percent Difference
D1 = First Sample Value
D2 = Second Sample Value

Summarize the values outside the QC limits at the bottom of the page. No further action is required by the laboratory. Performance-based QC limits will be generated and updated from recovery and RPD data.

E. Method Blank Summary (Form IV)

This form summarizes the samples associated with each method blank analysis. A copy of the appropriate Form IV is required for each blank.

Complete the header information on Form IV as described in Part A. Laboratory method blanks must be uniquely identified in the data package (see Unit A of the Forms Instruction Guide).

For volatile and semivolatile blanks, enter the "Instrument ID", "Date Analyzed", "Matrix" and "Level". All water blanks are "LOW". The "Time Analyzed" shall be in military time.

For semivolatile and pesticide/herbicide blanks, enter the method of extraction as "SEPF" for separatory funnel, "SONC" for sonication, "CONT" for continuous liquid-liquid, "SOXH" for soxhlet, or "HERB" for herbicide extraction. For semivolatile and pesticide/herbicide method blanks, enter the date of extraction of the blank.

Contaminants identified in GC and/or HPLC analyses must meet the identification criteria in Section A, Task III, Item 4, which requires analysis of the blank on two different GC or LC Columns. Therefore, enter the date, time and instrument ID of both analyses on the appropriate method blank summary. The information on the two analyses is differentiated as Date Analyzed (1), Date Analyzed (2), etc. If the analyses were run simultaneously, the order of reporting is not important, but must be consistent with the information reported on Form X. Otherwise (1) shall be the first analysis, and (2) the second. Identify both GC or LC columns by stationary phase under "GC Column ID". For mixed phase columns, do not enter "mixed". If the stationary phase identifier contains a manufacturer's identifier, such as "SP" or "DB", these characters may be deleted in order to fit the identifier into the 10-character field.

For Pesticide/herbicide blanks, enter "Matrix" and "Level" in a similar fashion as for the other fractions. All water samples are "LOW". Enter "Lab File ID" only if GC/MS confirmation was required. Otherwise, leave blank.

For any fraction, as appropriate, summarize the samples associated with a given method blank in the table below the header, entering EG&G Sample Number, and Lab Sample ID. For volatiles, enter the Lab File ID and time of analysis of each sample. For semivolatiles enter Lab File ID. For semivolatiles, GC and HPLC analysis, enter the date of analysis of each sample. For GC and HPLC analysis, if only one analysis is required (i.e., no target analytes to be confirmed), leave blank the fields for the second analysis.

Number all pages as described in part A.

F. GC/MS Instrument Performance Criteria (Form V)

This form is used to report the results of GC/MS instrument performance verification for volatiles and semivolatiles, and to summarize the date and time of analysis of samples, standards, blanks, matrix spikes, matrix spike duplicates, and QC check samples associated with each 12-hour GC/MS performance verification. Complete the header information as in part A. Enter the "Lab File ID" for the injection containing the GC/MS performance check compound (BFB for volatiles, DFTPP for semivolatiles). Enter the "Instrument ID". Enter the date and time of injection of the performnace check compound. Enter time as military time. For volatiles, enter the matrix and level, as there are separate calibrations for water samples, low soil samples, and medium samples (see the requested method's protocols). For volatiles, also enter the type of GC column used as "NAR", "WIDE", or "PACK" under "Column."

For each ion listed on the form, enter the percent relative abundance in the righthand column. Report relative abundances to the number of significant figures given for each ion in the ion abundance criteria column.

All relative abundances must be reported as a number. If zero, enter "0", not a dash or other non-numeric character. Where parentheses appear, compute the percentage of the ion abundance of the mass given in the appropriate footnote, and enter that value in the parentheses.

In the lower half of the form, list all samples, standards, blanks, matrix spikes, matrix spike duplicates, and QC check samples analyzed under that tune in chronological order, by time of analysis (in military time). Refer to unit A of this Section for specific instructions for identifying standards and blanks. Enter "EG&G Sample No.", "Lab Sample ID", "Lab File ID", "Date Analyzed", and "Time Analyzed" for all standards, samples, blanks, matrix spikes, matrix spike duplicates, and QC check samples.

The GC/MS tune expires twelve hours from the time of injection of the tuning compound (BFB or DFTPP) listed at the top of the form. In order to meet the tuning requirements, a sample, standard, blank, matrix spike, matrix spike duplicate, or QC check sample must be injected within twelve hours of the injection of the tuning compound.

Number all pages as described in part A.

G. Initial Calibration Data (Form VI)

After an instrument has undergone an initial five-point[1] calibration at the specific concentration levels described in the requested method or the task specific statement of work, and after all initial calibration criteria have been met, the laboratory must

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[1] For Semivolatiles, eighteen compounds: 2-Picoline, N-Nitrosomethylethylamine, Benzoic acid, N-Nitrosopyrrolidine, 1,4-Phenylenediamine, 2-Nitroaniline, 3-Nitroaniline, 2,4-Dinitrophenol, 4-Nitrophenol, 1,4-Naphthoquinone, 4,6-Dinitro-2-methylphenol, 2,4,5-Trichlorophenol, Pentachlorophenol, 4-Nitroaniline, 4-Nitroquinoline-1-oxide, a,a-Dimethylphenethylamine, Methapyriline, and Hexachlorophene will only require a four-point initial calibration at 50, 80, 120, and 160 total nanograms because detection at less than 50 nanograms per injection is difficult. If a four-point calibration is performed for these compounds, leave the field for RRF20 blank on the appropriate Form VI. Four of these eighteen compounds: 1,4-Phenylenediamine, 1,4-Naphthoquinone, Methapyrilene, and Hexachlorophene may require initial calibration at concentrations other than the 20, 50, 80, 120 and 160 nanograms specified because these compounds are not amenable to gas chromatography analysis. If different concentrations from those specified on the form VI are used for calibration, the RRF values must be listed on the form and an explanation of the concentrations used shall be documented in the case narrative.

complete and submit a Form VI for each volatile or semivolatile target analyte initial calibration performed which is relevant to the samples, blanks, matrix spikes, matrix spike duplicates, QC check samples in the SDG, regardless of when that calibration was performed.

Complete all header information as in part A. Enter the "SDG No." for the current data package, regardless of the original SDG for which the initial calibration was performed. Enter "Instrument ID" and the date(s) of the calibration. If the calendar date changes during the calibration procedure, the inclusive dates should be given on Form VI. For volatiles, enter matrix, level, and column, as on Form V. Enter the "Lab File ID" for each of the five calibration standards injected. Complete the response factor data for the five calibration points (calibration factors may be necessary if external calibration is to be used for some of the GC methods, e.g., methods 8010, 8020, 8040, or 8100), and then calculate and report the average relative response factor (RRF) (or calibration factor, CF) for all target analytes and surrogate compounds. The laboratory must report the %RSD for all compounds. All CCC compounds must have a %RSD of less than or equal to 30.0 percent (GC/MS methods only). All VOA SPCC compounds analyzed by GC/MS must have a minimum average relative response factor (RRF) of 0.300 (0.250 for Bromoform). For the analysis of volatiles in water using USEPA Method 524.2, the concentrations of the five initial calibration standards will be specified by EG&G in the task specific statement of work. The Subcontractor shall complete the form by filling in the specified concentrations in the ten spaces marked RRF___. All Semivolatile (BNA) SPCC compounds analyzed by GC/MS must have a minimum average relative response factor (RRF) of 0.050.

$$\%RSD = \frac{\text{Standard deviation (SD)}}{\text{mean } (\bar{x})} \times 100$$

where:

RSD = Relative Standard Deviation

mean = Mean of the 5 initial RRFs for a compound.

SD = Standard deviation of the average RRFs for a compound.

$$SD = \sqrt{\sum_{i=1}^{N} \frac{(x_i - \bar{x})^2}{N - 1}}$$

H. Continuing Calibration Data (Form VIIs)

The Continuing Calibration Data Form is used to verify the calibration of the GC/MS system by the analysis of specific calibration standards. A Continuing Calibration Data Form is required for each twelve (12) hour time period for both volatile and semivolatile target analyte GC/MS analyses.

The Subcontractor laboratory must analyze calibration standards and meet all criteria outlined in the Quality control section of the requested method. After meeting specific criteria for both SPCC and

CCC compounds, a Continuing Calibration Data Form must be completed and submitted.

Complete all header information as in part A. Enter instrument ID, date and time of continuing calibration, the Lab File ID of the continuing calibration standard, and date of initial calibration (give inclusive dates if initial calibration is performed over more than one date). For volatiles, enter matrix, level, and column, as on Forms V and VI. Using the appropiate Initial Calibration (Volatile or Semivolatile) fill in the average relative response factor (RRF) for each compound.

Report the relative response factor (RRF50) from the continuing calibration standard analysis. For the analysis of volatiles in water by USEPA method 524.2, the concentration of the continuing calibration standard will be specified by EG&G in the task specific statement of work. The Subcontractor shall complete the form by filling in the specified concentration in the space marked RRF___. Calculate the Percent Difference (%D) for all compounds. For CCC compounds, ensure that the %D is less than or equal to 25.0 percent. After this criterion has been met, report the Percent Difference for <u>all</u> compounds on the target analyte list of the requested method and surrogate compounds.

$$\% \text{ Difference} = \frac{\overline{RRF}_i - RRF_c}{\overline{RRF}_i} \times 100$$

where:

$\overline{RRF}_i$ = average relative response factor from initial calibration.

RRF_c = relative response factor from continuing calibration standard.

<u>All</u> semivolatile standards are analyzed at 50 total ng. The exception to this is when analysis of 1,4-Phenylenediamine, 1,4-Naphthoquinone, Methapyrilene, and Hexachlorophene are requested. These compounds must be present in the continuing calibration standard at a level consistent with 50 total nanograms of the other target analytes (i.e., the second lowest total nanograms injected in the initial calibration).

I. Internal Standard Area Summary (Form VIII VOA and SV)

This form is used to summarize the peak areas of the internal standards added to all volatile and semivolatile samples, blanks, matrix spikes, matrix spike duplicates, and QC check samples. The data are used to determine when changes in internal standard responses will adversely affect quantification of target compounds. This form must be completed each time a continuing calibration is performed, or when samples are analyzed under the same GC/MS tune as an initial calibration.

Complete the header information as in part A. Enter the Lab File ID of the continuing calibration standard, as well as the date and time of analysis of the continuing calibration standard. If samples are analyzed immediately following an initial calibration, before another GC/MS tune and a continuing calibration, Form VIII shall be completed on the basis of the internal standard areas of the 50 ug/L initial calibration standard for volatiles, and the 50 ng initial calibration standard for semivolatiles. Use the date and time of analysis of this standard, and its Lab File ID and areas in place of those of a continuing calibration standard.

For volatiles, enter matrix, level, and column, as on Forms V, VI, and VII.

From the results of the analysis of the continuing calibration standard, enter the area measured for each internal standard and its retention time under the appropriate column in the row labeled "12 HOUR STD". For each internal standard, calculate the upper limit as the area of the particular standard plus 100% of its area (i.e., two times the area in the 12 HOUR STD box), and the lower limit as the area of the internal standard minus 50% of its area (i.e., one half the area in the 12 HOUR STD box). Report these values in the boxes labeled "UPPER LIMIT" and "LOWER LIMIT" respectively.

For each sample, blank, matrix spike, matrix spike duplicate, and QC check sample analyzed under a given continuing calibration, enter the EG&G Sample Number and the area measured for each internal standard and its retention time. If the internal standard area is outside the upper or lower limits calculated above, flag that area with an asterisk (*). The asterisk must be placed in the far right hand space of the box for each internal standard area, directly under the "#" symbol.

J. Pesticide Evaluation Standards Summary (Form VIII OCPEST, OPPEST, OCHERB)

These forms are used to report the analytical sequence for pesticide and/or herbicide analysis.

The laboratory shall complete all the header information as in Unit A. Enter dates of analyses, GC column ID and Instrument ID. Identify GC Column by stationary phase. For mixed phase columns, do not enter "mixed". If the stationary phase identifier contains a manufacturer's identifier, such as "SP" or "DB", these characters may be deleted in order to fit the identifier into the 10-character field.

Evaluation Standard Mix A, B, and C must be analyzed at the initiation of every analytical sequence to check the linearity of the GC system. Calculate and report the Calibration Factor (CF) (total peak area[2]/amount)

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2 The term peak height may be substituted for the term peak area,

injected in nanograms) for each of the appropriate pesticides and/or herbicides and the surrogate for the particular fraction at each concentration level. Calculate and report the percent relative standard deviation (%RSD) for each of the compounds (Eq. 1.1). The RSD must be less than 10.0 percent for each of the compounds on the form. The 10% RSD criteria pertain only to the column being used for quantitation, however, to determine that no pesticides/herbicides are present is a form of quantitation.

For Organochlorine pesticide/PCB analysis if the %RSD for 4,4'-DDT exceeds 10.0 percent, plot a standard curve and determine the ng for each sample from that curve.

$$\%RSD = \frac{\text{Standard deviation (SD)}}{\text{mean } (\bar{x})} \times 100 \qquad \text{Eq. 1.1}$$

where:

RSD = Relative Standard Deviation

mean $(\bar{x})$ = Mean of the 3 initial CFs for a compound.

SD = Standard deviation of the average RRFs for a compound.

$$SD = \sqrt{\sum_{i=1}^{N} \frac{(x_i - \bar{x})^2}{N - 1}}$$

For Organochlorine Pesticide/PCB analyses Evaluation Standard Mix B must be analyzed near the beginning of the analytical sequence, after the first five samples, and then every ten samples thereafter during the analytical sequence.

For Form VIII-OCPEST, calculate and report the percent breakdown for 4,4'-DDT and/or Endrin for the mixed phase GC column using Equations 1.2 and 1.3. Enter the Date Analyzed and Time Analyzed for each analysis of the evaluation Standard Mix B.

For Form VIII-OCPEST calculate the percent breakdown for Endrin and/or 4,4'-DDT on the OV-1 or equivalent GC column using Equations 1.2 and 1.3. The combined percent breakdown must not exceed 20.0 percent for Endrin and 4,4'-DDT.

$$\%\text{ breakdown for 4,4'-DDT} = \frac{\text{Total DDT degradation peak area}^3\text{(DDE + DDD)}}{\text{Total DDT peak area}^3\text{ (DDT + DDE + DDD)}} \times 100 \qquad \text{Eq.1.2}$$

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[3] The term peak height may be substituted for the term peak area.

$$\text{\% breakdown for Endrin} = \frac{\text{Total Endrin degradation peak areas}^3 \text{ (Endrin Aldehyde + Endrin Ketone)}}{\text{Total Endrin Peak Area}^3\text{(Endrin + Endrin Aldehyde + Endrin Ketone)}} \times 100 \quad \text{Eq.1.3}$$

Enter the values for the breakdown of Endrin and 4,4'-DDT in their respective columns on Form VIII-OCPEST.

If Endrin cannot be separated from 4,4'-DDT on the OV-1 or equivalent GC column, calculate a combined percent breakdown for Endrin/4,4'-DDT using Equation 1.4. The combined degradation must not exceed 20.0 percent. Leave the endrin and 4,4'-DDT columns blank if they cannot be separated, and report only the combined breakdown.

$$\text{Combined \% breakdown} = \frac{\text{Total Endrin/DDT degradation peak area}^3 \text{ (DDD, DDE, Endrin Aldehyde, Endrin Ketone)}}{\text{Total Endrin/DDT degradation peak area}^3 \text{ (Endrin, Endrin Aldehyde, Endrin Ketone, DDD, DDE, DDT)}} \times 100 \quad \text{Eq.1.4}$$

Complete the header information on each second page of Form VIII OPPEST, OCPEST and OCHERB as on the first page.

For each sample, standard, matrix spike, matrix spike duplicate, blank, and QC check sample, enter the EG&G sample number, lab sample ID, date and time of analysis. Each sample analyzed as part of the analytical sequence must be reported on the second page of Form VIII OPPEST, OCPEST and OCHERB even if it is not associated with the SDG, in order to determine if the proper sequence of samples and standards was followed. However, the laboratory may use the EG&G Sample No. of "ZZZZZ" to distinguish all samples that are not part of the SDG being reported.

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3 The term peak height may be substituted for the term peak area.

For pesticide, PCB, and herbicide standards, the following scheme shall be used to enter "EG&G Sample Number".

Name	EG&G Sample Number
Evaluation Mix A	###EVALA
Evaluation Mix B	###EVALB
Evaluation Mix C	###EVALC
Individual Mix A	###INDA
Individual Mix B[4]	###INDB
Toxaphene	TOXAPH
Chlordane (technical)	CHLORD
Aroclor 1016	AR1016
Aroclor 1221	AR1221
Aroclor 1232	AR1232
Aroclor 1242	AR1242
Aroclor 1248	AR1248
Aroclor 1254	AR1254
Aroclor 1260	AR1260

where:

### =	The pesticide/herbicide fraction being analyzed, for organochlorine pesticides/PCBs ### = OCP, for organophosphorus pesticides ### = OPP, and for organochlorine herbicides ### = OCH.

If Individual Mix A and B for any of the pesticide/herbicide analyses are combined into one mixture, the EG&G Sample Number shall be entered as INDAB. Similarly, the permitted mixture of Aroclor 1016 and Aroclor 1260 shall be entered as AR1660.

Every standard, sample, matrix spike, matrix spike duplicate, QC check sample, and blank must contain the fraction specific surrogate spike(s) at the specified level for both water or soil/sediment samples. The retention time shift for the fraction specific surrogate on packed columns must not exceed 2.0 percent (0.3 percent for capillary columns) difference (%D) between the initial standard (Evaluation Standard Mix A) and any blank, standard, sample, matrix spike, matrix spike duplicate, or QC check sample analyzed during the analytical sequence. Calculate and report the percent difference (%D) for all samples, standards, blanks, matrix spikes, matrix spike duplicates, and QC check samples, according to Eq 1.5.

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[4] Individual Mix B is not required for any fraction if all of the requested target analyte compounds can be separated with greater than 25% resolution on the GC column used.

$$\% \text{ Difference} = \frac{RT_i - RT_s}{RT_i} \times 100 \qquad \text{Eq 1.5}$$

where:

RT_i = absolute retention time of the fraction specific surrogate in the initial standard (Evaluation Mix A).

RT_s = absolute retention time of the fraction specific surrogate in the sample, matrix spike, matrix spike duplicate, blank, QC check sample, or any standard analyzed after Evaluation Mix A.

Enter the retention time shift for the fraction specific surrogate in the "%D" column. Flag all values outside the QC limits by entering an asterisk (*) in the last column, under the "*". If the retention time shift cannot be calculated due to interfering peaks, leave the %D column blank, flag the value with an asterisk, and document the problem in the Case Narrative.

Number this page as described in Unit A.

Form VIII OCPEST, OPPEST, OCHERB is required for each fraction, for each analytical sequence, for each GC system used, and for each GC column used to analyze target list pesticides, PCBs, and herbicides.

K. Pesticide/Herbicide Standards Summary (Form IX)

These forms are used to monitor variations in the Calibration Factor and retention time for each mid-level standard analyzed between samples by a GC method each analytical sequence.

The laboratory shall complete the header information as in Unit A. Enter dates of analyses, GC column ID and instrument ID. GC column identification must be by stationary phase. For mixed phase columns, do not enter "mixed". If the stationary phase identifier contains a manufacturer's identifier, such as "SP" or "DB", these characters may be deleted in order to fit the identifier into the 10-character field.

Individual Standard Mix A and, where appropriate, Individual Standard Mix B must be analyzed near the beginning of an analytical sequence (before the analysis of any samples). The Individual Standard Mixes must also be analyzed periodically during sample analysis (at the intervals specified in the requested method or task specific statement of work), and at the end of the analytical sequence. Form IX is designed to compare the first analysis of each of the standards to each subsequent analysis. Therefore, a copy of Form IX must be completed for each analysis of Individual Standard Mix(es), and (for organochlorine pesticide/PCB analysis) each multi-response standard after the analysis of samples has begun. For each copy of Form IX for a given analytical sequence, the data entered in the left hand column

will be identical. The header over the left hand column contains the inclusive dates and times of analysis of the standards reported on the left side of Form IX. Considering the first analysis of Individual Standard Mix A, Individual Standard Mix B (where appropriate), and all the multi-response pesticides and PCBs (for Form IX-OCPEST), enter the first and last dates and times of analysis of these standards. If Aroclors 1221 and 1232 are not analyzed as part of the sequence being reported, do not include the dates and times of their analysis, but do include their Calibration Factor data on the Form IX.

Report the retention time of each compound in the left hand column labeled "RT". Retention times must be reported in minutes and decimal minutes (i.e., 1.99 minutes), not in seconds, or minutes:seconds. Calculate the retention time window for each compound, according to the instructions in the requested method or task specific statement of work. Report the retention time window for each compound as a range of two values, i.e., from 1.48 to 1.54. Enter the lower value of the range in the column under "RT WINDOW" labeled "FROM". Enter the upper value of the range in the column under "TO". Do not separate the two values with a hyphen, and do not enter the retention time window as a plus/minus value such as ±0.03. NOTE: By definition, the center of the retention time window must be the retention time listed immediately to the left of the retention time window.

Calculate the calibration factor for each compound according to Equation 1.6 and report the value under the left hand column labeled "CALIBRATION FACTOR".

For each subsequent analysis of an Individual Standard Mix A or B, or a multi-response compound (for organochlorine pesticide/PCB analysis), complete the right hand spaces for date and time of analysis and the EG&G Sample No. for the standard (see Unit J), and the columns labeled "RT" and "CALIBRATION FACTOR" with the results from that analysis. NOTE: While the left-hand side of Form IX will contain retention times, retention time windows, and calibration factors for all the compounds, the right-hand side will contain data from the analysis of only one particular standard.

$$\text{Calibration Factor} = \frac{\text{Total peak area}^{6} \text{ of a Standard}}{\text{Total mass injected (ng)}} \qquad \text{Eq 1.6}$$

Calculate and report the percent difference in the Calibration Factor for each compound using Equation 1.7.

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6 The term peak height may be substituted for the term peak area.

$$\text{Percent Difference (\%D)} = \frac{|Ab_1 - Ab_2|}{Ab_1} \times 100 \qquad \text{Eq. 1.7}$$

where:

Ab_1 = Calibration Factor from the initial standard for the analytical sequence

Ab_2 = Calibration Factor from the subsequent standard.

The absolute percent difference between the individual Calibration factors for each compound in the pesticide or herbicide standard may vary no more than 15.0 percent for a quantitation run, or more than 20.0 percent for a confirmation run. Primary runs must meet the criteria required for quantitation if no other analyses are performed.

If the calibration factors calculated from analyses of compounds in the Individual Standard Mix are to be used for quantifying pesticide, PCB, or herbicide concentrations in samples preceding the analysis on the right hand side of the form, then enter "Y" for yes, in the column labeled "QNT Y/N" for each compound quantified. If the results are not used for quantitation of a particular compound, enter "N", for no. Determining that no compounds are present above the PQL is a form of quantitation.

For each subsequent analysis of an Individual Standard Mix A or B, or multi-response compound (for organochlorine pesticide/PCB analyses), complete the right hand side of a copy of Form IX, with the results of the initial analyses of all the compounds as the data in the left-hand side.

For multi-component analytes, the single largest peak characteristic of the compound must be used. A characteristic peak will not exist for compound mixtures such as Aroclor 1016 and Aroclor 1242. In these cases utilization of a common peak is acceptable.

Regardless of which standards are reported on subsequent pages of Form IX, number all pages sequentially as described in Unit A. As Individual mixes must be analyzed at the end of an analytical sequence, there will always be at least two pages of Form IX, 1 of 2, and 2 of 2, except where Mixes A & B have been combined for capillary column analysis, or where only one individual mix is necessary to separate all target analytes (e.g., Appendix IX organochlorine herbicide analysis).

L. Pesticide/PCB/Herbicide Identification (Form X)

This form summarizes the tentative and confirmed identity of all target list pesticide/PCB/herbicides detected in a given sample by a given analysis. It reports the retention times of the compound on both columns on which it was analyzed, as well as the retention time windows of the standard for that compound on both of these columns. One copy of Form X is required for each sample or blank in which

target analyte list pesticides, PCBs, or herbicides are detected. The Form X is analysis specific, thus a total of three Forms X may be required for a single sample if target compounds are detected in three fractions (OCPEST, OPPEST, and OCHERB). If no target compounds are detected in a given sample for a given fraction, no copy of Form X is required for that sample representing analysis of that fraction.

Complete the header information as in Unit A. Enter the Column ID (by stationary phase) for each of the two columns, one as GC Column (1), the other as (2). For mixed phase columns, do not enter "mixed". If the stationary phase identifier contains a manufacturer's identifier, such as "SP" or "DB", these characters may be deleted in order to fit the identifier into the 10-character field. Enter the Instrument ID associated with each GC column directly below. Enter the Lab File ID only if the compounds were confirmed by GC/MS.

For each target analyte list pesticide, PCB, or herbicide detected, enter the name of the compound as it appears abbreviated on Form IX (limited to 14 characters) under "PESTICIDE/PCB" on Form X-OCPEST, under "PESTICIDE" on Form X-OPPEST, and/or under "HERBICIDE" on Form X-OCHERB. Use the abbreviations of the compound names given on Form IX. Enter the retention times on each column of the compounds detected in the sample next to the appropriate column designation (1 or 2). Enter the retention time windows on each column of the appropriate standard. These data must correspond to those on Form IX, and are entered in a similar manner. The lower value is entered under the "FROM" column, the upper value under the "TO" column. Do not use a hyphen.

Under "Quant? (Y/N)" enter "Y" for the GC column (1 or 2) used for quantitation, and "N" for the other column, for each compound. Do not leave this field blank for either GC column.

Under "GC/MS? (Y/N)" enter "Y" for both GC columns if the compound was confirmed by GC/MS. Enter "N" for both GC columns if the compound was not confirmed by GC/MS.

If more Pesticide/PCB/Herbicide target analyte list compounds are identified in an individual sample than can be reported on one copy of Form X, then complete as many additional copies of Form X as necessary, duplicating all header information, and numbering the pages as described in Unit A.

M. QC Check Sample Summary (Form XI)

This form is used to report results of the analysis of a QC check sample. As with the surrogate recovery form (II), and the matrix spike recovery form (III), the form is required for each matrix within each fraction.

Complete the header information as instructed in Unit A.

For soil samples, specify the "level" as "LOW" or "MED", as on Form I. SDGs containing soil samples at both levels require QC Check samples at each level, therefore, for soils, prepare one form for each level.

All water samples are "Low". Therefore, there is no QC Check sample for "medium level waters", and none shall be reported.

In the box on Form XI, under "SPIKE ADDED", enter the calculated concentration in ug/L or ug/Kg (according to the matrix) that results from adding each target analyte list compound to the aliquot chosen for the QC Check sample. For instance, for base/neutral compounds in medium level soils, if 100 ug of spike are added to 1 g of blank soil matrix, the resulting concentration is 100,000 ug/Kg. Under "CONCENTRATION", enter the actual concentration of each spike compound detected in the QC check sample. Calculate the percent recovery of each spike compound in the QC check sample to the nearest whole percent, and enter under "% REC".

PART IV

DATA REPORTING FORMS

This Part of the BOA contains the required data reporting forms that had been prepared prior to the date this BOA was issued for bid. This Part of the BOA will be updated as EG&G identifies new methods and/or reporting requirements. The methods of analysis are constantly seeking improvement and EG&G intends to stay abreast of changes when they occur. As methods improve, the reporting requirements will likely change with the improvement. The subcontractor will be provided with the new data reporting forms and instructions on which forms are to be replaced or whether the new forms simply represent additions to the existing forms in this Part.

DATA REPORTING FORMS
FOR APPENDIX IX ANALYTES

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET
APPENDIX IX ANALYTES

EG&G Sample No. [ ]

Lab Name:_____ Contract: _____

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

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

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

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

% Moisture: not dec. _____ Date Analyzed: _____

Column: (nar/wide) _____ Dilution Factor:_____

	CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg)_____	Q
1	74-87-3	Chloromethane		
2	74-83-9	Bromomethane		
3	75-01-4	Vinyl Chloride		
4	75-00-3	Chloroethane		
5	75-09-2	Methylene Chloride		
6	67-64-1	Acetone		
7	75-15-0	Carbon Disulfide		
8	75-35-4	1,1-Dichloroethene		
9	75-34-3	1,1-Dichloroethane		
10	540-59-0	1,2-Dichloroethene (total)		
11	67-66-3	Chloroform		
12	107-06-2	1,2-Dichloroethane		
13	78-93-3	2-Butanone		
14	71-55-6	1,1,1-Trichloroethane		
15	56-23-5	Carbon Tetrachloride		
16	108-05-4	Vinyl Acetate		
17	75-27-4	Bromodichloromethane		
18	78-87-58	1,2-Dichloropropane		
19	10061 01-5	cis-1,3-Dichloropropene		
20	79-01-6	Trichloroethene		
21	124-48-1	Dibromochloromethane		
22	79-00-5	1,1,2-Trichloroethane		
23	71-43-2	Benzene		
24	10061-02-6	trans-1,3-Dichloropropene		
25	75-25-2	Bromoform		
26	108-10-1	4-Methyl-2-pentanone		
27	591-78-6	2-Hexanone		
28	127-18-4	Tetrachloroethene		
29	79-34-5	1,1,2,2-Tetrachloroethane		
30	108-88-3	Toluene		
31	108-90-7	Chlorobenzene		
32	100-41-4	Ethylbenzene		
33	100-42-5	Styrene		
34	1330-20-7	Xylene (total)		

1B
VOLATILE ORGANICS ANALYSIS DATA SHEET
APPENDIX IX ANALYTES

EG&G Sample No. _____

Lab Name:_____ Contract: _____

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

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

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

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

% Moisture: not dec. _____ Date Analyzed: _____

Column: (nar/wide) _____ Dilution Factor:_____

	CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg)_____	Q
1	75-71-8	Dichlorodifluoromethane		
2	75-69-4	Trichlorofluoromethane		
3	156-60-5	trans-1,2-Dichloroethene		
4	74-88-4	Iodomethane		
5	107-05-1	Allyl chloride		
6	156-69-4	cis-1,2-Dichloroethene		
7	107-12-0	Propionitrile		
8	75-05-8	Acetonitrile		
9	107-02-8	Acrolein		
10	126-99-8	2-Chloro-1,3-butadiene		
11	107-13-1	Acrylonitrile		
12	123-91-1	1,4-Dioxane		
13	126-98-7	Methacrylonitrile		
14	80-62-6	Methyl methacrylate		
15	74-95-3	Dibromomethane		
16	78-83-1	Isobutyl alcohol		
17	106-93-4	1,2-Dibromoethane		
18	630-20-6	1,1,1,2-Tetrachloroethane		
19	1330-20-7	Xylene (total meta & para)		
20	95-47-6	Xylene (ortho)		
21	96-18-4	1,2,3-Trichloropropane		
22	110-57-6	trans-1,4-Dichloro-2-butene		
23	96-12-8	1,2-Dibromo-3-chloropropane		
24	110-86-1	Pyridine		

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
APPENDIX IX ANALYTES

EG&G Sample No. _____

Lab Name:_____ Contract: _____

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

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

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

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

% Moisture: not dec._____ dec._____ Date Extracted: _____

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

GPC Cleanup: (Y/N) ___ pH:_____ Dilution Factor:_____

	CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg)_____	Q
1	108-95-2	Phenol		
2	111-44-4	bis(2-Chloroethyl)ether		
3	95-57-8	2-Chlorophenol		
4	541-73-1	1,3-Dichlorobenzene		
5	106-46-7	1,4-Dichlorobenzene		
6	100-51-6	Benzyl alcohol		
7	95-50-1	1,2-Dichlorobenzene		
8	95-48-7	2-Methylphenol		
9	108-60-1	bis(2-Chloroisopropyl)ether		
10	106-44-5	4-Methylphenol		
11	621-64-7	N-Nitroso-di-n-propylamine		
12	67-72-1	Hexachloroethane		
13	98-95-3	Nitrobenzene		
14	78-59-1	Isophorone		
15	88-75-5	2-Nitrophenol		
16	105-67-9	2,4-Dimethylphenol		
17	65-85-0	Benzoic acid		
18	111-91-1	bis(2-Chloroethoxy)methane		
19	120-83-2	2,4-Dichlorophenol		
20	120-82-1	1,2,4-Trichlorobenzene		
21	91-20-3	Naphthalene		
22	106-47-8	4-Chloroaniline		
23	87-68-3	Hexachlorobutadiene		
24	59-40-7	4-Chloro-3-methylphenol		
25	91-57-6	2-Methylnaphthalene		
26	77-47-4	Hexachlorocyclopentadiene		
27	88-06-2	2,4,6-Trichlorophenol		
28	95-95-4	2,4,5-Trichlorophenol		
29	91-58-7	2-Chloronaphthalene		
30	88-74-4	2-Nitroaniline		
31	131-11-3	Dimethylphthalate		
32	208-96-8	Acenaphthylene		
33	606-20-2	2,6-Dinitrotoluene		

ID

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
APPENDIX IX ANALYTES

EG&G Sample No. _____

Lab Name:_____ Contract: _____

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

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

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

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

% Moisture: not dec._____ dec._____ Date Extracted: _____

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

GPC Cleanup: (Y/N) ___ pH:_____ Dilution Factor:_____

	CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg)_____	Q
1	99-09-2	3-Nitroaniline		
2	83-32-9	Acenaphthene		
3	51-28-5	2,4-Dinitrophenol		
4	100-02-7	4-Nitrophenol		
5	132-64-9	Dibenzofuran		
6	121-14-2	2,4-Dinitrotoluene		
7	84-66-2	Diethylphthalate		
8	7005-72-3	4-Chlorophenyl-phenylether		
9	86-73-7	Fluorene		
10	100-01-6	4-Nitroaniline		
11	534-52-1	4,6-Dinitro-2-methylphenol		
12	86-30-6	N-Nitrosodiphenylamine (1)		
13	101-55-3	4-Bromophenyl-phenylether		
14	118-74-1	Hexachlorobenzene		
15	87-86-5	Pentachlorophenol		
16	85-01-8	Phenanthrene		
17	120-12-7	Anthracene		
18	84-74-2	Di-n-butylphthalate		
19	206-44-0	Fluoranthene		
20	129-00-0	Pyrene		
21	85-68-7	Butylbenzylphthalate		
22	91-94-1	3,3'-Dichlorobenzidine		
23	56-55-3	Benzo(a)anthracene		
24	218-01-9	Chrysene		
25	117-81-7	bis(2-Ethylhexyl)phthalate		
26	117-84-0	Di-n-octylphthalate		
27	205-99-2	Benzo(b)fluoranthene		
28	207-08-9	Benzo(k)fluoranthene		
29	50-32-8	Benzo(a)pyrene		
30	193-39-5	Indeno(1,2,3-cd)pyrene		
31	53-70-3	Dibenz(a,h)anthracene		
32	191-24-2	Benzo(g,h,i)perylene		

(1) - Cannot be separated from Diphenylamine

1E
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
APPENDIX IX ANALYTES

EG&G Sample No. _____

Lab Name: _____ Contract: _____

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

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

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

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

% Moisture: not dec._____ dec._____ Date Extracted: _____

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

GPC Cleanup: (Y/N) ___ pH:_____ Dilution Factor:_____

	CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg)_____	Q
1	110-86-1	Pyridine		
2	62-75-9	N-Nitrosodimethylamine		
3	97-63-2	Ethyl methacrylate		
4	80-62-6	Methyl methacrylate		
5	109-06-8	2-Picoline		
6	10595-95-6	N-Nitrosomethylethylamine		
7	66-27-3	Methylmethanesulfonate		
8	55-18-5	N-Nitrosodiethylamine		
9	62-50-0	Ethyl methanesulfonate		
10	76-01-7	Pentachloroethane		
11	62-53-3	Aniline		
12	930-55-2	N-Nitrosopyrrolidine		
13	98-86-2	Acetophenone		
14	59-89-2	N-Nitrosomorpholine		
15	95-53-4	O-Toluidine		
16	108-39-4	3-Methylphenol		
17	100-75-4	N-Nitrosopiperidine		
18	126-68-1	O,O,O-Triethylphosphorothioate		
19	1220-9-8	a,a-Dimethylphenethylamine		
20	87-65-0	2,6-Dichlorophenol		
21	1888-71-7	Hexachloropropene		
22	106-50-3	1,4-Phenylenediamine		
23	924-16-3	N-Nitroso-di-n-butylamine		
24	94-59-7	Safrole		
25	95-94-3	1,2,4,5-Tetrachlorobenzene		
26	120-58-1	Isosafrole		

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
APPENDIX IX ANALYTES

EG&G Sample No. _____

Lab Name:_____ Contract: _____

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

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

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

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

% Moisture: not dec._____ dec._____ Date Extracted: _____

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

GPC Cleanup: (Y/N) ___ pH:_____ Dilution Factor:_____

	CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg)_____	Q
1	130-15-4	1,4-Naphthoquinone		
2	99-65-0	1,3-Dinitrobenzene		
3	608-93-5	Pentachlorobenzene		
4	134-32-7	1-Naphthylamine		
5	91-59-8	2-Naphthylamine		
6	58-90-2	2,3,4,6-Tetrachlorophenol		
7	99-55-8	5-Nitro-o-toluidine		
8	122-39-4	Diphenylamine		
9	99-35-4	1,3,5-Trinitrobenzene		
10	62-44-2	Phenacetin		
11	297-97-2	Thionazin		
12	92-67-1	4-Aminobiphenyl		
13	82-68-8	Pentachloronitrobenzene		
14	23950-58-5	Pronamide		
15	88-85-7	Dinoseb		
16	56-57-5	4-Nitroquinoline-1-oxide		
17	91-80-5	Methapyrilene		
18	140-57-8	Aramite		
19	60-11-7	p-(Dimethylamino)azobenzene		
20	119-93-7	3,3'-dimethylbenzidine		
21	52-85-7	Famphur		
22	53-96-3	2-Acetylaminofluorene		
23	57-97-6	7,12-Dimethylbenz(a) anthracene		
24	56-49-5	3-Methylcholanthrene		
25	70-30-4	Hexachlorophene		

1G

ORGANOCHLORINE PESTICIDE ANALYSIS DATA SHEET
APPENDIX IX ANALYTES

EG&G Sample No. [ ]

Lab Name:_____ Contract: _____

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

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

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

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

% Moisture: not dec._____ dec._____ Date Extracted: _____

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

GPC Cleanup: (Y/N) ___ pH:_____ Dilution Factor:_____

	CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg)_____	Q
1	319-84-6	alpha-BHC		
2	319-85-7	beta-BHC		
3	319-86-8	delta-BHC		
4	58-89-9	gamma-BHC (Lindane)		
5	76-44-8	Heptachlor		
6	309-00-2	Aldrin		
7	1024-57-3	Heptachlor epoxide		
8	959-98-8	Endosulfan I		
9	60-57-1	Dieldrin		
10	72-55-9	4,4'-DDE		
11	72-20-8	Endrin		
12	33213-65-9	Endosulfan II		
13	72-54-8	4,4'-DDD		
14	1031-07-8	Endosulfan sulfate		
15	50-29-3	4,4'-DDT		
16	72-43-5	Methoxychlor		
17	53494-70-5	Endrin ketone		
18	5103-71-9	alpha-Chlordane		
19	5103-74-2	gamma-Chlordane		
20	8001-35-2	Toxaphene		
21	12674-11-2	Aroclor-1016		
22	11104-28-2	Aroclor-1221		
23	11141-16-5	Aroclor-1232		
24	53469-21-9	Aroclor-1242		
25	12672-29-6	Aroclor-1248		
26	11097-69-1	Aroclor-1254		
27	11096-82-5	Aroclor-1260		

1H

ORGANOCHLORINE PESTICIDE ANALYSIS DATA SHEET
APPENDIX IX ANALYTES

EG&G Sample No. _____

Lab Name:_____ Contract: _____

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

Matrix: _____ Lab Sample ID: _____

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

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

% Moisture: not dec._____ dec._____ Date Extracted: _____

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

GPC Cleanup: (Y/N) ___ pH:_____ Dilution Factor:_____

	CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg)_____	Q
1	465-73-6	Isodrin		
2	143-50-0	Kepone		
3	7421-93-4	Endrin aldehyde		
4	2303-16-4	Di-allate		
5	57-74-9	Chlordane (Technical)		
6	510-15-6	Chlorobenzilate		

1I

ORGANOPHOSPHORUS PESTICIDE ANALYSIS DATA SHEET
APPENDIX IX ANALYTES

EG&G Sample No. _____

Lab Name:_____ Contract: _____

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

Matrix: _____ Lab Sample ID: _____

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

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

% Moisture: not dec._____ dec._____ Date Extracted: _____

Extraction: (SepF/Cont/Soxh) _____ Date Analyzed: _____

GPC Cleanup: (Y/N) ___ pH:_____ Dilution Factor:_____

	CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg)_____	Q
1	298-02-2	Phorate		
2	3689-24-5	Sulfotepp		
3	298-04-4	Disulfoton		
4	60-51-5	Dimethoate		
5	298-00-0	Methyl parathion		
6	56-38-2	Parathion		

1J

ORGANOCHLORINE HERBICIDE ANALYSIS DATA SHEET
APPENDIX IX ANALYTES

EG&G Sample No. [   ]

Lab Name: ____________________ Contract: __________

Lab Code: __________ Case No: ________ SAS No: ________ SDG No: __________

Matrix: (soil/water) ______ Lab Sample ID: __________

Sample wt/vol: ______ (g/mL) ______ Lab File ID: __________

Level: (low/med) ______ Date Received: __________

% Moisture: not dec. ______ dec. ______ Date Extracted: __________

Extraction: (Herb) ______ Date Analyzed: __________

GPC Cleanup: (Y/N) ___ pH: ______ Dilution Factor: __________

CONCENTRATION UNITS: (ug/L or ug/Kg) ______

	CAS NO.	COMPOUND	CONCENTRATION	Q
1	94-75-7	2,4-D		
2	93-72-1	Silvex		
3	93-76-5	2,4,5-T		

1K

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS
APPENDIX IX ANALYTES

EG&G Sample No. _____

Lab Name:_____ Contract: _____

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

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

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

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

% Moisture: not dec. _____ Date Analyzed: _____

Column: (nar/wide) _____ Dilution Factor:_____

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

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					

1L

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS
APPENDIX IX ANALYTES

EG&G Sample No. _____

Lab Name:_____ Contract: _____

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

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

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

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

% Moisture: not dec._____ dec._____ Date Extracted: _____

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

GPC Cleanup: (Y/N) ___ pH:_____ Dilution Factor:_____

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

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
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2A
WATER VOLATILE SURROGATE RECOVERY
APPENDIX IX ANALYTES

Lab Name:_____ Contract:_____

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

	EG&G SAMPLE NO.	S1 (TOL)#	S2 (BFB)#	S3 (DCE)#	OTHER	OUT
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
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23						
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25						
26						
27						
28						
29						
30						

		QC LIMITS
S1	(TOL) - Toluene-d8	(88-110)
S2	(BFB) - Bromofluorobenzene	(86-115)
S3	(DCE) = 1,2-Dichloroethane-d4	(76-114)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogates diluted out

2B
SOIL VOLATILE SURROGATE RECOVERY
APPENDIX IX ANALYTES

Lab Name:_____ Contract:_____

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

Level: (low/med) _____

	EG&G SAMPLE NO.	S1 (TOL)#	S2 (BFB)#	S3 (DCE)#	OTHER	OUT
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
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18						
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22						
23						
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25						
26						
27						
28						
29						
30						

		QC LIMITS
S1	(TOL) = Toluene-d8	(81-117)
S2	(BFB) = Bromofluorobenzene	(74-121)
S3	(DCE) = 1,2-Dichloroethane-d4	(70-121)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogates diluted out

2C
WATER SEMIVOLATILE SURROGATE RECOVERY
APPENDIX IX ANALYTES

Lab Name:_____ Contract:_____

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

	EG&G SAMPLE NO.	S1 (NBZ)#	S2 (FBP)#	S3 (TPH)#	S4 (PHL)#	S5 (2FP)#	S6 (TBP)#	OTHER	TOT OUT
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
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16									
17									
18									
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21									
22									
23									
24									
25									
26									
27									
28									
29									
30									

		QC LIMITS
S1	(NBZ) = Nitrobenzene-d5	(35-114)
S2	(FBP) = 2-Fluorobiphenyl	(43-116)
S3	(TPH) = Terphenyl-d14	(33-141)
S4	(PHL) = Phenol-d6	(10-94)
S5	(2FP) = 2-Fluorophenol	(21-100)
S6	(TBP) = 2,4,6-Tribromophenol	(10-123)

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

2D
SOIL SEMIVOLATILE SURROGATE RECOVERY
APPENDIX IX ANALYTES

Lab Name:_____ Contract:_____

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

Level: (low/med) _____

	EG&G SAMPLE NO.	S1 (NBZ)#	S2 (FBP)#	S3 (TPH)#	S4 (PHL)#	S5 (2FP)#	S6 (TBP)#	OTHER	TOT OUT
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
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21									
22									
23									
24									
25									
26									
27									
28									
29									
30									

		QC LIMITS
S1	(NBZ) = Nitrobenzene-d5	(23-120)
S2	(FBP) = 2-Fluorobiphenyl	(30-115)
S3	(TPH) = Terphenyl-d14	(18-137)
S4	(PHL) = Phenol-d6	(24-113)
S5	(2FP) = 2-Fluorophenol	(25-121)
S6	(TBP) = 2,4,6-Tribromophenol	(19-122)

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

2E
WATER ORGANOCHLORINE PESTICIDE SURROGATE RECOVERY
APPENDIX IX ANALYTES

Lab Name:_____ Contract:_____

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

	EG&G SAMPLE NO.	S1 (DBC)#	S2 (TCMX)#
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
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19			
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26			
27			
28			
29			
30			

	ADVISORY QC LIMITS
S1 (DBC) = Dibutylchlorendate	(24-154)
S2 (TCMX) = Tetrachloro-meta-xylene	(24-154)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogates diluted out

2F
SOIL ORGANOCHLORINE PESTICIDE SURROGATE RECOVERY
APPENDIX IX ANALYTES

Lab Name:_____ Contract:_____

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

Level: (low/med) _____

	EG&G SAMPLE NO.	S1 (DBC)#	S2 (TCMX)#
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
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29			
30			

ADVISORY QC LIMITS

S1 (DBC) = Dibutylchlorendate (24-150)
S2 (TCMX) = Tetrachloro-meta-xylene (24-150)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogates diluted out

2G
WATER ORGANOPHOSPHORUS PESTICIDE SURROGATE RECOVERY
APPENDIX IX ANALYTES

Lab Name:_____ Contract:_____

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

	EG&G SAMPLE NO.	S1 (EPN)#	OTHER
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
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25			
26			
27			
28			
29			
30			

ADVISORY
QC LIMITS
(53-121)

S1 (EPN) = EPN (CAS No. 2104-64-5)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogates diluted out

2H

SOIL ORGANOPHOSPHORUS PESTICIDE SURROGATE RECOVERY
APPENDIX IX ANALYTES

Lab Name:_____ Contract:_____

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

Level: (low/med) _____

	EG&G SAMPLE NO.	S1 (EPN)#	OTHER
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
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22			
23			
24			
25			
26			
27			
28			
29			
30			

ADVISORY
QC LIMITS
(53-123)

S1 (EPN) = EPN (CAS No. 2104-64-5)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogates diluted out

2I
WATER ORGANOCHLORINE HERBICIDE SURROGATE RECOVERY
APPENDIX IX ANALYTES

Lab Name:_____ Contract:_____

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

	EG&G SAMPLE NO.	S1 (DCA)#	OTHER
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
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29			
30			

ADVISORY QC LIMITS (24-154)

S1 (DCA) = Dicamba

Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogates diluted out

2J
SOIL ORGANOCHLORINE HERBICIDE SURROGATE RECOVERY
APPENDIX IX ANALYTES

Lab Name:_____ Contract:_____

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

Level: (low/med) _____

	EG&G SAMPLE NO.	S1 (DCA)#	OTHER
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
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23			
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25			
26			
27			
28			
29			
30			

ADVISORY
QC LIMITS
(24-150)

S1 (DCA) = Dicamba

Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogates diluted out

3A
WATER VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY
APPENDIX IX ANALYTES

Lab Name:_____ Contract:_____

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

Matrix Spike - EG&G Sample No.: _____

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

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

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

* Values outside of QC limits

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

COMMENTS: _____
_____

3B
SOIL VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY
APPENDIX IX ANALYTES

Lab Name:_____ Contract:_____

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

Matrix Spike - EG&G Sample No.: _____ Level: (low/med) _____

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

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

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

* Values outside of QC limits

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

COMMENTS: _____
_____

3C
WATER SEMIVOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY
APPENDIX IX ANALYTES

Lab Name:_____ Contract:_____

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

Matrix Spike - EG&G Sample No.: _____

	COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS % REC #	QC LIMITS REC.
1	Phenol					12- 89
2	2-Chlorophenol					27-123
3	1,4-Dichlorobenzene					36- 97
4	N-Nitroso-di-n-prop.(1)					41-116
5	1,2,4-Trichlorobenzene					39- 98
6	4-Chloro-3-methylphenol					23- 97
7	Acenaphthene					46-118
8	4-Nitrophenol					10- 80
9	2,4-Dinitrotoluene					24- 96
10	Pentachlorophenol					9-103
11	Pyrene					26-127

	COMPOUND	SPIKE ADDED (ug/L)	MSD CONCENTRATION (ug/L)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
1	Phenol					42	12- 89
2	2-Chlorophenol					40	27-123
3	1,4-Dichlorobenzene					28	36- 97
4	N-Nitroso-di-n-prop.(1)					38	41-116
5	1,2,4-Trichlorobenzene					28	39- 98
6	4-Chloro-3-methylphenol					42	23- 97
7	Acenaphthene					31	46-118
8	4-Nitrophenol					50	10- 80
9	2,4-Dinitrotoluene					38	24- 96
10	Pentachlorophenol					50	9-103
11	Pyrene					31	26-127

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

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

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

COMMENTS: _____

_____

3D

SOIL SEMIVOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY
APPENDIX IX ANALYTES

Lab Name:_____ Contract:_____

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

Matrix Spike - EG&G Sample No.: _____ Level: (low/med) _____

	COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
1	Phenol					26- 90
2	2-Chlorophenol					25-102
3	1,4-Dichlorobenzene					28-104
4	N-Nitroso-di-n-prop.(1)					41-126
5	1,2,4-Trichlorobenzene					38-107
6	4-Chloro-3-methylphenol					26-103
7	Acenaphthene					31-137
8	4-Nitrophenol					11-114
9	2,4-Dinitrotoluene					28- 89
10	Pentachlorophenol					17-109
11	Pyrene					35-142

	COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
1	Phenol					35	26- 90
2	2-Chlorophenol					50	25-102
3	1,4-Dichlorobenzene					27	28-104
4	N-Nitroso-di-n-prop.(1)					38	41-126
5	1,2,4-Trichlorobenzene					23	38-107
6	4-Chloro-3-methylphenol					33	26-103
7	Acenaphthene					19	31-137
8	4-Nitrophenol					50	11-114
9	2,4-Dinitrotoluene					47	28- 89
10	Pentachlorophenol					47	17-109
11	Pyrene					36	35-142

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

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

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

COMMENTS: _____

_____

3E

WATER ORGANOCHLORINE PESTICIDE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY
APPENDIX IX ANALYTES

Lab Name:_____ Contract:_____

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

Matrix Spike - EG&G Sample No.: _____

	COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS % REC #	QC LIMITS REC.
1	gamma-BHC (Lindane)					56-123
2	Heptachlor					40-131
3	Aldrin					40-120
4	Dieldrin					52-126
5	Endrin					56-121
6	4,4'-DDT					38-127

	COMPOUND	SPIKE ADDED (ug/L)	MSD CONCENTRATION (ug/L)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
1	gamma-BHC (Lindane)					15	56-123
2	Heptachlor					20	40-131
3	Aldrin					22	40-120
4	Dieldrin					18	52-126
5	Endrin					21	56-121
6	4,4'-DDT					27	38-127

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

* Values outside of QC limits

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

COMMENTS: _____

_____

3F

SOIL ORGANOCHLORINE PESTICIDE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY
APPENDIX IX ANALYTES

Lab Name:_____ Contract:_____

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

Matrix Spike - EG&G Sample No.: _____ Level: (low/med) _____

	COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
1	gamma-BHC (Lindane)					46-127
2	Heptachlor					35-130
3	Aldrin					34-132
4	Dieldrin					31-134
5	Endrin					42-139
6	4,4'-DDT					23-134

	COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
1	gamma-BHC (Lindane)					50	46-127
2	Heptachlor					31	35-130
3	Aldrin					43	34-132
4	Dieldrin					38	31-134
5	Endrin					45	42-139
6	4,4'-DDT					50	23-134

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

* Values outside of QC limits

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

COMMENTS: _____

_____

3G

WATER ORGANOPHOSPHORUS PESTICIDE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY
APPENDIX IX ANALYTES

Lab Name:_____ Contract:_____

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

Matrix Spike - EG&G Sample No.: _____

	COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS % REC #	QC LIMITS REC.
1	Dimethoate					50-120
2	Disulfoton					10- 60
3	Parathion					80-120
4	Methyl parathion					80-120
5	Phorate					0- 90
6	Sulfotep					50-120

	COMPOUND	SPIKE ADDED (ug/L)	MSD CONCENTRATION (ug/L)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
1	Dimethoate					20	50-120
2	Disulfoton					20	10- 60
3	Parathion					20	80-120
4	Methyl parathion					20	80-120
5	Phorate					20	0- 90
6	Sulfotep					20	50-120

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

* Values outside of QC limits

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

COMMENTS: _____
_____

3H

SOIL ORGANOPHOSPHORUS PESTICIDE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY
APPENDIX IX ANALYTES

Lab Name:_____ Contract:_____

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

Matrix Spike - EG&G Sample No.: _____ Level: (low/med) _____

	COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
1	Dimethoate					50-120
2	Disulfoton					10- 60
3	Parathion					80-120
4	Methyl parathion					80-120
5	Phorate					0- 90
6	Sulfotep					50-120

	COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
1	Dimethoate					43	50-120
2	Disulfoton					43	10- 60
3	Parathion					43	80-120
4	Methyl parathion					43	80-120
5	Phorate					43	0- 90
6	Sulfotep					43	50-120

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

* Values outside of QC limits

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

COMMENTS: _____
_____

WATER ORGANOCHLORINE HERBICIDE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY
APPENDIX IX ANALYTES

Lab Name:_____ Contract:_____

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

Matrix Spike - EG&G Sample No.: _____

	COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS % REC #	QC LIMITS REC.
1	2,4-D					45-115
2	2,4,5-TP (Silvex)					51-121
3	2,4,5-T					47-117

	COMPOUND	SPIKE ADDED (ug/L)	MSD CONCENTRATION (ug/L)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
1	2,4-D					20	45-115
2	2,4,5-TP (Silvex)					20	51-121
3	2,4,5-T					20	47-117

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

* Values outside of QC limits

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

COMMENTS: _____

3J

SOIL ORGANOCHLORINE HERBICIDE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY
APPENDIX IX ANALYTES

Lab Name:_____ Contract:_____

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

Matrix Spike - EG&G Sample No.: _____ Level: (low/med) _____

	COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
1	2,4-D					30-120
2	2,4,5-TP (Silvex)					46-126
3	2,4,5-T					42-122

	COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
1	2,4-D					42	30-120
2	2,4,5-TP (Silvex)					42	46-126
3	2,4,5-T					42	42-122

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

* Values outside of QC limits

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

COMMENTS: _____

_____

4A
VOLATILE METHOD BLANK SUMMARY
APPENDIX IX ANALYTES

Lab Name:_____ Contract:_____

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

Lab File ID: _____ Lab Sample ID:_____

Date Analyzed: _____ Time Analyzed:_____

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

Instrument ID: _____

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

	EG&G SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
1				
2				
3				
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23				
24				
25				
26				
27				
28				
29				
30				

COMMENTS: _____

4B
SEMIVOLATILE METHOD BLANK SUMMARY
APPENDIX IX ANALYTES

Lab Name:_____ Contract:_____

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

Lab File ID: _____ Lab Sample ID:_____

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

Date Analyzed: _____ Time Analyzed:_____

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

Instrument ID _____

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

	EG&G SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
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21				
22				
23				
24				
25				
26				
27				
28				
29				
30				

COMMENTS: _____

4C

ORGANOCHLORINE PESTICIDE METHOD BLANK SUMMARY
APPENDIX IX ANALYTES

Lab Name:_____ Contract:_____

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

Lab Sample ID: _____ Lab File ID: _____

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

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

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

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

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

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

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

	EG&G SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED 1	DATE ANALYZED 2
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
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21				
22				
23				
24				
25				
26				

COMMENTS: _____

_____

4D

ORGANOPHOSPHORUS PESTICIDE METHOD BLANK SUMMARY
APPENDIX IX ANALYTES

Lab Name:_____ Contract:_____

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

Lab Sample ID: _____ Lab File ID: _____

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

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

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

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

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

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

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

	EG&G SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED 1	DATE ANALYZED 2
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				

COMMENTS: _____

4E

ORGANOCHLORINE HERBICIDE METHOD BLANK SUMMARY
APPENDIX IX ANALYTES

Lab Name:_____ Contract:_____

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

Lab Sample ID: _____ Lab File ID: _____

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

Date Extracted: _____ Extraction: (Herb) _____

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

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

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

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

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

	EG&G SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED 1	DATE ANALYZED 2
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				

COMMENTS: _____

5A

VOLATILE ORGANIC GC/MS TUNING AND MASS CALIBRATION - BROMOFLUOROBENZENE (BFB) APPENDIX IX ANALYTES

Lab Name:_____ Contract:_____

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

Lab File ID: _____ BFB Injection Date:_____

Instrument ID:_____ BFB Injection Time:_____

Matrix:(soil/water) _____ Level:(low/med) _____ Column:(nar/wide) _____

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	15.0 - 40.0% of mass 95	
75	30.0 - 60.0% of mass 95	
95	Base peak, 100% relative abundance	
96	5.0 - 9.0% of mass 95	
173	Less than 2.0% of mass 174	( )1
174	Greater than 50.0% of mass 95	
175	5.0 - 9.0% of mass 174	( )1
176	Greater than 95.0%, but less than 101.0% of mass 174	( )1
177	5.0 - 9.0% of mass 176	( )2

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

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

	EG&G SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					

5B

SEMIVOLATILE ORGANIC GC/MS TUNING AND MASS CALIBRATION - DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP) APPENDIX IX ANALYTES

Lab Name:_____ Contract:_____

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

Lab File ID: _____ DFTPP Injection Date:_____

Instrument ID:_____ DFTPP Injection Time:_____

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
51	30.0 - 60.0% of mass 198	
68	Less than 2.0% of mass 69	( )1
69	Mass 69 relative abundance	
70	Less than 2.0% of mass 69	( )1
127	40.0 - 60.0% of mass 198	
197	Less than 1.0% of mass 198	
198	Base Peak, 100% relative abundance	
199	5.0 to 9.0 of mass 198	
275	10.0 - 30.0% of mass 198	
365	Greater than 1.00% of mass 198	
441	Present, but less than mass 443	
442	Greater than 40.0% of mass 198	
443	17.0 - 23.0% of mass 442	( )2

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

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

	EG&G SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					

6A
VOLATILE ORGANICS INITIAL CALIBRATION DATA
APPENDIX IX ANALYTES

Lab Name:_____ Contract:_____

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

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

Matrix:(soil/water)_____ Level:(low/med)_____ Column:(nar/wide)_____

Min RRF for SPCC(#) = 0.300 (0.250 for Bromoform) Max %RSD for CCC(*) = 30.0%

LAB FILE ID: RRF20 =_____ RRF50 =_____
RRF100=_____ RRF150=_____ RRF200=_____

	COMPOUND	RRF20	RRF50	RRF100	RRF150	RRF200	$\overline{RRF}$	% RSD	
1	Chloromethane								#
2	Bromomethane								
3	Vinyl Chloride								*
4	Chloroethane								
5	Methylene Chloride								
6	Acetone								
7	Carbon Disulfide								
8	1,1-Dichloroethene								
9	1,1-Dichloroethane								
10	1,2-Dichloroethene (total)								
11	Chloroform								*
12	1,2-Dichloroethane								
13	2-Butanone								
14	1,1,1-Trichloroethane								
15	Carbon Tetrachloride								
16	Vinyl Acetate								
17	Bromodichloromethane								
18	1,2-Dichloropropane								*
19	cis-1,3-Dichloropropene								
20	Trichloroethene								
21	Dibromochloromethane								
22	1,1,2-Trichloroethane								
23	Benzene								
24	trans-1,3-Dichloropropene								
25	Bromoform								#
26	4-Methyl-2-pentanone								
27	2-Hexanone								
28	Tetrachloroethene								
29	1,1,2,2-Tetrachloroethane								#
30	Toluene								*
31	Chlorobenzene								#
32	Ethylbenzene								*
33	Styrene								
34	Xylene (total)								
35	Toluene-d8								
36	Bromofluorobenzene								
37	1,2-Dichloroethane-d4								

6B

VOLATILE ORGANICS INITIAL CALIBRATION DATA
APPENDIX IX ANALYTES

Lab Name:_____ Contract:_____

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

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

Matrix:(soil/water)_____ Level:(low/med)_____ Column:(nar/wide)_____

Min RRF for SPCC(#) = 0.050 Max %RSD for CCC(*) = 30.0%

LAB FILE ID: RRF20 =_____ RRF50 =_____
RRF100=_____ RRF150=_____ RRF200=_____

	COMPOUND	RRF20	RRF50	RRF100	RRF150	RRF200	$\overline{RRF}$	% RSD
1	Dichlorodifluoromethane							
2	Trichlorofluoromethane							
3	trans-1,2-Dichloroethene							
4	Iodomethane							
5	Allyl chloride							
6	cis-1,2-Dichloroethene							
7	Propionitrile							
8	Acetonitrile							
9	Acrolein							
10	2-Chloro-1,3-butadiene							
11	Acrylonitrile							
12	1,4-Dioxane							
13	Methacrylonitrile							
14	Methyl methacrylate							
15	Dibromomethane							
16	Isobutyl alcohol							
17	1,2-Dibromoethane							
18	1,1,1,2-Tetrachloroethane							
19	Xylene (total meta & para)							
20	Xylene (ortho)							
21	1,2,3-Trichloropropane							
22	trans-1,4-Dichloro-2-butene							
23	1,2-Dibromo-3-chloropropane							
24	Pyridine							

6C

SEMIVOLATILE ORGANICS INITIAL CALIBRATION DATA
APPENDIX IX ANALYTES

Lab Name:_____ Contract:_____

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

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

Min RRF for SPCC(#) = 0.050 Max %RSD for CCC(*) = 30.0%

LAB FILE ID: RRF20 =_____ RRF50 =_____

RRF80 =_____ RRF120=_____ RRF160=_____

	COMPOUND	RRF20	RRF50	RRF80	RRF120	RRF160	$\overline{RRF}$	% RSD	
1	Phenol	*							*
2	bis(2-Chloroethyl)ether								
3	2-Chlorophenol								
4	1,3-Dichlorobenzene								
5	1,4-Dichlorobenzene	*							*
6	Benzyl alcohol								
7	1,2-Dichlorobenzene								
8	2-Methylphenol								
9	bis(2-Chloroisopropyl)ether								
10	4-Methylphenol								
11	N-Nitroso-di-n-propylamine	#							#
12	Hexachloroethane								
13	Nitrobenzene								
14	Isophorone								
15	2-Nitrophenol	*							*
16	2,4-Dimethylphenol								
17	Benzoic acid								
18	bis(2-Chloroethoxy)methane								
19	2,4-Dichlorophenol	*							*
20	1,2,4-Trichlorobenzene								
21	Napthalene								
22	4-Chloroaniline								
23	Hexachlorobutadiene	*							*
24	4-Chloro-3-methylphenol	*							*
25	2-Methylnaphthalene								
26	Hexachlorocyclopentadiene	#							#
27	2,4,6-Trichlorophenol	*							*
28	2,4,5-Trichlorophenol								
29	2-Chloronaphthalene								
30	2-Nitroaniline								
31	Dimethylphthalate								
32	Acenaphthylene								
33	2,6-Dinitrotoluene								
34	3-Nitroaniline								
35	Acenaphthene	*							*
36	2,4-Dinitrophenol	#							#
37	4-Nitrophenol	#							#

6D

SEMIVOLATILE ORGANICS INITIAL CALIBRATION DATA
APPENDIX IX ANALYTES

Lab Name:_____ Contract:_____

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

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

Min RRF for SPCC(#) = 0.050 Max %RSD for CCC(*) = 30.0%

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

	COMPOUND	RRF20	RRF50	RRF80	RRF120	RRF160	$\overline{RRF}$	% RSD
1	Dibenzofuran							
2	2,4-Dinitrotoluene							
3	Diethylphthalate							
4	4-Chlorophenyl-phenylether							
5	Fluorene							
6	4-Nitroaniline							
7	4,6-Dinitro-2-methylphenol							
8	N-Nitrosodiphenylamine (1)	*						*
9	4-Bromophenyl-phenylether							
10	Hexachlorobenzene							
11	Pentachlorophenol	*						*
12	Phenanthrene							
13	Anthracene							
14	Di-n-butylphthalate							
15	Fluoranthene	*						*
16	Pyrene							
17	Butylbenzylphthalate							
18	3,3'-Dichlorobenzidine							
19	Benzo(a)anthracene							
20	Chrysene							
21	bis(2-Ethylhexyl)phthalate							
22	Di-n-octylphthalate	*						*
23	Benzo(b)fluoranthene							
24	Benzo(k)fluoranthene							
25	Benzo(a)pyrene	*						*
26	Indeno(1,2,3-cd)pyrene							
27	Dibenz(a,h)anthracene							
28	Benzo(g,h,i)perylene							
29	Nitrobenzene-d5							
30	2-Fluorobiphenyl							
31	Terphenyl-d14							
32	Phenol-d6							
33	2-Fluorophenol							
34	2,4,6-Tribromophenol							

(1) Cannot be separated from Diphenylamine

6E
SEMIVOLATILE ORGANICS INITIAL CALIBRATION DATA
APPENDIX IX ANALYTES

Lab Name:_____ Contract:_____

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

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

Min RRF for SPCC(#) = 0.050 Max %RSD for CCC(*) = 30.0%

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

	COMPOUND	RRF20	RRF50	RRF80	RRF120	RRF160	$\overline{RRF}$	% RSD
1	Pyridine							
2	N-Nitrosodimethylamine							
3	Ethyl methacrylate							
4	Methyl methacrylate							
5	2-Picoline							
6	N-Nitrosomethylethylamine							
7	Methylmethanesulfonate							
8	N-Nitrosodiethylamine							
9	Ethyl methanesulfonate							
10	Pentachloroethane							
11	Aniline							
12	N-Nitrosopyrrolidine							
13	Acetophenone							
14	N-Nitrosomorpholine							
15	O-Toluidine							
16	3-Methylphenol							
17	N-Nitrosopiperidine							
18	O,O,O-Triethylphosphorothioate							
19	a,a-Dimethylphenethylamine							
20	2,6-Dichlorophenol							
21	Hexachloropropene							
22	1,4-Phenylenediamine							
23	N-Nitroso-di-n-butylamine							
24	Safrole							
25	1,2,4,5-Tetrachlorobenzene							
26	Isosafrole							

6F

SEMIVOLATILE ORGANICS INITIAL CALIBRATION DATA
APPENDIX IX ANALYTES

Lab Name:_____ Contract:_____

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

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

Min RRF for SPCC(#) = 0.050 Max %RSD for CCC(*) = 30.0%

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

	COMPOUND	RRF20	RRF50	RRF80	RRF120	RRF160	$\overline{RRF}$	% RSD
1	1,4-Naphthoquinone							
2	1,3-Dinitrobenzene							
3	Pentachlorobenzene							
4	1-Naphthylamine							
5	2-Naphthylamine							
6	2,3,4,6-Tetrachlorophenol							
7	5-Nitro-o-toluidine							
8	Diphenylamine							
9	1,3,5-Trinitrobenzene							
10	Phenacetin							
11	Thionazin							
12	4-Aminobiphenyl							
13	Pentachloronitrobenzene							
14	Pronamide							
15	Dinoseb							
16	4-Nitroquinoline-1-oxide							
17	Methapyrilene							
18	Aramite							
19	p-(Dimethylamino)azobenzene							
20	3,3'-dimethylbenzidine							
21	Famphur							
22	2-Acetylaminofluorene							
23	7,12-Dimethylbenz(a) anthracene							
24	3-Methylcholanthrene							
25	Hexachlorophene							

7A
VOLATILE CONTINUING CALIBRATION CHECK
APPENDIX IX ANALYTES

Lab Name:_____ Contract:_____

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

Instrument ID:_____ Calibration Date:_____ Time:_____

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

Matrix: (soil/water)_____ Level: (low/med)_____ Column: (nar/wide)_____

Min RRF50 for SPCC(#) = 0.300 (0.250 for Bromoform) Max %D for CCC(*) = 25.0%

	COMPOUND	$\overline{RRF}$	RRF50	%D
1	Chloromethane	#		#
2	Bromomethane			
3	Vinyl Chloride	*		*
4	Chloroethane			
5	Methylene Chloride			
6	Acetone			
7	Carbon Disulfide			
8	1,1-Dichloroethene	*		*
9	1,1-Dichloroethane	#		#
10	1,2-Dichloroethene (total)			
11	Chloroform	*		*
12	1,2-Dichloroethane			
13	2-Butanone			
14	1,1,1-Trichloroethane			
15	Carbon Tetrachloride			
16	Vinyl Acetate			
17	Bromodichloromethane			
18	1,2-Dichloropropane	*		*
19	cis-1,3-Dichloropropene			
20	Trichloroethene			
21	Dibromochloromethane			
22	1,1,2-Trichloroethane			
23	Benzene			
24	trans-1,3-Dichloropropene			
25	Bromoform	#		#
26	4-Methyl-2-pentanone			
27	2-Hexanone			
28	Tetrachloroethene			
29	1,1,2,2-Tetrachloroethane	#		#
30	Toluene	*		*
31	Chlorobenzene	#		#
32	Ethylbenzene	*		*
33	Styrene			
34	Xylene (total)			
35	Toluene-d8			
36	Bromofluorobenzene			
37	1,2-Dichloroethane-d4			

7B
VOLATILE CONTINUING CALIBRATION CHECK
APPENDIX IX ANALYTES

Lab Name:_____ Contract:_____

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

Instrument ID:_____ Calibration Date:_____ Time:_____

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

Matrix: (soil/water)_____ Level: (low/med)_____ Column: (nar/wide)_____

Min RRF50 for SPCC(#) = 0.050 Max %D for CCC(*) = 25.0%

	COMPOUND	$\overline{RRF}$	RRF50	%D
1	Dichlorodifluoromethane			
2	Trichlorofluoromethane			
3	trans-1,2-Dichloroethene			
4	Iodomethane			
5	Allyl chloride			
6	cis-1,2-Dichloroethene			
7	Propionitrile			
8	Acetonitrile			
9	Acrolein			
10	2-Chloro-1,3-butadiene			
11	Acrylonitrile			
12	1,4-Dioxane			
13	Methacrylonitrile			
14	Methyl methacrylate			
15	Dibromomethane			
16	Isobutyl alcohol			
17	1,2-Dibromoethane			
18	1,1,1,2-Tetrachloroethane			
19	Xylene (total meta & para)			
20	Xylene (ortho)			
21	1,2,3-Trichloropropane			
22	trans-1,4-Dichloro-2-butene			
23	1,2-Dibromo-3-chloropropane			
24	Pyridine			

7C
SEMIVOLATILE CONTINUING CALIBRATION CHECK
APPENDIX IX ANALYTES

Lab Name:_____ Contract:_____

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

Instrument ID:_____ Calibration Date:_____ Time:_____

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

Min RRF50 for SPCC(#) = 0.050 Max %D for CCC(*) = 25.0%

	COMPOUND	$\overline{RRF}$	RRF50	%D
1	Phenol	*		*
2	bis(2-Chloroethyl)ether			
3	2-Chlorophenol			
4	1,3-Dichlorobenzene			
5	1,4-Dichlorobenzene	*		*
6	Benzyl alcohol			
7	1,2-Dichlorobenzene			
8	2-Methylphenol			
9	bis(2-Chloroisopropyl)ether			
10	4-Methylphenol			
11	N-Nitroso-di-n-propylamine	#		#
12	Hexachloroethane			
13	Nitrobenzene			
14	Isophorone			
15	2-Nitrophenol	*		*
16	2,4-Dimethylphenol			
17	Benzoic acid			
18	bis(2-Chloroethoxy)methane			
19	2,4-Dichlorophenol	*		*
20	1,2,4-Trichlorobenzene			
21	Naphthalene			
22	4-Chloroaniline			
23	Hexachlorobutadiene	*		*
24	4-Chloro-3-methylphenol	*		*
25	2-Methylnaphthalene			
26	Hexachlorocyclopentadiene	#		#
27	2,4,6-Trichlorophenol	*		*
28	2,4,5-Trichlorophenol			
29	2-Chloronaphthalene			
30	2-Nitroaniline			
31	Dimethylphthalate			
32	Acenaphthylene			
33	2,6-Dinitrotoluene			
34	3-Nitroaniline			
35	Acenaphthene	*		*
36	2,4-Dinitrophenol	#		#
37	4-Nitrophenol	#		#

SEMIVOLATILE CONTINUING CALIBRATION CHECK
APPENDIX IX ANALYTES

Lab Name:_____ Contract:_____

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

Instrument ID:_____ Calibration Date:_____ Time:_____

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

Min RRF50 for SPCC(#) = 0.050 Max %D for CCC(*) = 25.0%

	COMPOUND	RRF	RRF50	%D	
1	Dibenzofuran				
2	2,4-Dinitrotoluene				
3	Diethylphthalate				
4	4-Chlorophenyl-phenylether				
5	Fluorene				
6	4-Nitroaniline				
7	4,6-Dinitro-2-methylphenol				
8	N-Nitrosodiphenylamine (1)	*			*
9	4-Bromophenyl-phenylether				
10	Hexachlorobenzene				
11	Pentachlorophenol	*			*
12	Phenanthrene				
13	Anthracene				
14	Di-n-butylphthalate				
15	Fluoranthene	*			*
16	Pyrene				
17	Butylbenzylphthalate				
18	3,3'-Dichlorobenzidine				
19	Benzo(a)anthracene				
20	Chrysene				
21	bis(2-Ethylhexyl)phthalate				
22	Di-n-octylphthalate	*			*
23	Benzo(b)fluoranthene				
24	Benzo(k)fluoranthene				
25	Benzo(a)pyrene	*			*
26	Indeno(1,2,3-cd)pyrene				
27	Dibenz(a,h)anthracene				
28	Benzo(g,h,i)perylene				
29	Nitrobenzene-d5				
30	2-Fluorobiphenyl				
31	Terphyenyl-d14				
32	Phenol-d6				
33	2-Fluorophenol				
34	2,4,6-Tribromophenol				

(1) Cannot be separated from Diphenylamine

7E
SEMIVOLATILE CONTINUING CALIBRATION CHECK
APPENDIX IX ANALYTES

Lab Name:_____ Contract:_____

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

Instrument ID:_____ Calibration Date:_____ Time:_____

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

Min RRF50 for SPCC(#) = 0.050 Max %D for CCC(*) = 25.0

	COMPOUND	$\overline{RRF}$	RRF50	%D
1	Pyridine			
2	N-Nitrosodimethylamine			
3	Ethyl methacrylate			
4	Methyl methacrylate			
5	2-Picoline			
6	N-Nitrosomethylethylamine			
7	Methylmethanesulfonate			
8	N-Nitrosodiethylamine			
9	Ethyl methanesulfonate			
10	Pentachloroethane			
11	Aniline			
12	N-Nitrosopyrrolidine			
13	Acetophenone			
14	N-Nitrosomorpholine			
15	O-Toluidine			
16	3-Methylphenol			
17	N-Nitrosopiperidine			
18	0,0,0-Triethylphosphorothioate			
19	a,a-Dimethylphenethylamine			
20	2,6-Dichlorophenol			
21	Hexachloropropene			
22	1,4-Phenylenediamine			
23	N-Nitroso-di-n-butylamine			
24	Safrole			
25	1,2,4,5-Tetrachlorobenzene			
26	Isosafrole			

7F
SEMIVOLATILE CONTINUING CALIBRATION CHECK
APPENDIX IX ANALYTES

Lab Name:_____ Contract:_____

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

Instrument ID:_____ Calibration Date:_____ Time:_____

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

Min RRF50 for SPCC(#) = 0.050 Max %D for CCC(*) = 25.0

	COMPOUND	$\overline{RRF}$	RRF50	%D
1	1,4-Naphthoquinone			
2	1,3-Dinitrobenzene			
3	Pentachlorobenzene			
4	1-Naphthylamine			
5	2-Naphthylamine			
6	2,3,4,6-Tetrachlorophenol			
7	5-Nitro-o-toluidine			
8	Diphenylamine			
9	1,3,5-Trinitrobenzene			
10	Phenacetin			
11	Thionazin			
12	4-Aminobiphenyl			
13	Pentachloronitrobenzene			
14	Pronamide			
15	Dinoseb			
16	4-Nitroquinoline-1-oxide			
17	Methapyrilene			
18	Aramite			
19	p-(Dimethylamino)azobenzene			
20	3,3'-dimethylbenzidine			
21	Famphur			
22	2-Acetylaminofluorene			
23	7,12-Dimethylbenz(a) anthracene			
24	3-Methylcholanthrene			
25	Hexachlorophene			

8A
VOLATILE INTERNAL STANDARD AREA SUMMARY
APPENDIX IX ANALYTES

Lab Name:_____ Contract:_____

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

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

Instrument ID:_____ Time Analyzed:_____

Matrix: (soil/water)_____ Level: (low/med)_____ Column: (nar/wide)_____

	IS1(BCM) AREA #	RT	IS2(DFB) AREA #	RT	IS3(CBZ) AREA #	RT
12 HOUR STD						
UPPER LIMIT						
LOWER LIMIT						
EG&G SAMPLE NO.						
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						

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

UPPER LIMIT = + 100%
of internal standard area.
LOWER LIMIT = - 50%
of internal standard area.

Column used to flag internal standard area values with an asterisk

8B
VOLATILE INTERNAL STANDARD AREA SUMMARY
APPENDIX IX ANALYTES

Lab Name:_____ Contract:_____

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

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

Instrument ID:_____ Time Analyzed:_____

Matrix: (soil/water)_____ Level: (low/med)_____ Column: (nar/wide)_____

	IS4(DCB) AREA #	RT
12 HOUR STD		
UPPER LIMIT		
LOWER LIMIT		
EG&G SAMPLE NO.		
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		

IS4 (DCB) = 1,4-dichlorobenzene-d4

UPPER LIMIT = + 100%
of internal standard area.
LOWER LIMIT = - 50%
of internal standard area.

Column used to flag internal standard area values with an asterisk

8C
SEMIVOLATILE INTERNAL STANDARD AREA SUMMARY
APPENDIX IX ANALYTES

Lab Name:_____ Contract:_____

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

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

Instrument ID:_____ Time Analyzed:_____

	IS1(DCB) AREA #	RT	IS2(NPT) AREA #	RT	IS3(ANT) AREA #	RT
12 HOUR STD						
UPPER LIMIT						
LOWER LIMIT						
EG&G SAMPLE NO.						
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						

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

UPPER LIMIT = + 100%
of internal standard area.
LOWER LIMIT = - 50%
of internal standard area.

Column used to flag internal standard area values with an asterisk

8D

SEMIVOLATILE INTERNAL STANDARD AREA SUMMARY
APPENDIX IX ANALYTES

Lab Name:_____ Contract:_____

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

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

Instrument ID:_____ Time Analyzed:_____

	IS1(PHN) AREA #	RT	IS2(CRY) AREA #	RT	IS3(PRY) AREA #	RT
12 HOUR STD						
UPPER LIMIT						
LOWER LIMIT						
EG&G SAMPLE NO.						
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						

IS1 (PHN) = Phenanthrene-d10
IS2 (CRY) = Chrysene-d12
IS3 (PRY) = Perylene-d12

UPPER LIMIT = + 100%
of internal standard area.
LOWER LIMIT = - 50%
of internal standard area.

Column used to flag internal standard area values with an asterisk

8E
ORGANOCHLORINE PESTICIDE EVALUATION STANDARDS SUMMARY
APPENDIX IX ANALYTES

Lab Name:_____ Contract:_____

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

Instrument ID:_____ GC Column ID:_____

Dates of Analyses:_____ to _____

Evaluation Check for Linearity

	PESTICIDE	CALIBRATION FACTOR EVAL MIX A	CALIBRATION FACTOR EVAL MIX B	CALIBRATION FACTOR EVAL MIX C	%RSD (</= 10.0%)
1	Aldrin				
2	Endrin				
3	4,4'-DDT				
4	DBC				
5	TCMX				

(1) If > 10.0% RSD, plot a standard curve and determine the ng for each sample in that set from the curve.

Evaluation Check for 4,4'-DDT/Endrin Breakdown
(percent breakdown expressed as total degradation)

		DATE ANALYZED	TIME ANALYZED	ENDRIN	4,4'-DDT	COMBINED (2)
	INITIAL					
1	EVAL MIX B					
2	EVAL MIX B					
3	EVAL MIX B					
4	EVAL MIX B					
5	EVAL MIX B					
6	EVAL MIX B					
7	EVAL MIX B					
8	EVAL MIX B					
9	EVAL MIX B					
10	EVAL MIX B					
11	EVAL MIX B					
12	EVAL MIX B					
13	EVAL MIX B					
14	EVAL MIX B					

(2) See Form instructions.

8F

ORGANOCHLORINE PESTICIDE EVALUATION STANDARDS SUMMARY

Evaluation of Retention Time Shift for Dibutylchlorendate

APPENDIX IX ANALYTES

Lab Name:_____ Contract:_____

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

Instrument ID:_____ GC Column ID:_____

Dates of Analyses:_____ to _____

	EG&G SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED	TIME ANALYZED	% D	*
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						
31						
32						
33						
34						
35						
36						
37						
38						

* Values outside of QC limits (2.0% for packed columns, 0.3% for capillary columns)

8G

ORGANOPHOSPHORUS PESTICIDE EVALUATION STANDARDS SUMMARY
APPENDIX IX ANALYTES

Lab Name:_____ Contract:_____

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

Instrument ID:_____ GC Column ID:_____

Dates of Analyses:_____ to _____

Evaluation Check for Linearity

	PESTICIDE	CALIBRATION FACTOR EVAL MIX A	CALIBRATION FACTOR EVAL MIX B	CALIBRATION FACTOR EVAL MIX C	%RSD (</= 10.0%)	
1	Phorate					
2	Sulfotep					
3	Dimethoate					(1)
4	Disulfoton					
5	Methyl parathion					
6	EPN					

(1) If > 10.0% RSD, plot a standard curve and determine the ng for each sample in that set from the curve.

8H

ORGANOPHOSPHORUS PESTICIDE EVALUATION STANDARDS SUMMARY
Evaluation of Retention Time Shift for EPN
APPENDIX IX ANALYTES

Lab Name:_____ Contract:_____

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

Instrument ID:_____ GC Column ID:_____

Dates of Analyses:_____ to _____

	EG&G SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED	TIME ANALYZED	% D	*
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						
31						
32						
33						
34						
35						
36						
37						
38						

* Values outside of QC limits (2.0% for packed columns, 0.3% for capillary columns)

8I

ORGANOCHLORINE HERBICIDE EVALUATION STANDARDS SUMMARY
APPENDIX IX ANALYTES

Lab Name:_____ Contract:_____

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

Instrument ID:_____ GC Column ID:_____

Dates of Analyses:_____ to _____

Evaluation Check for Linearity

	PESTICIDE	CALIBRATION FACTOR EVAL MIX A	CALIBRATION FACTOR EVAL MIX B	CALIBRATION FACTOR EVAL MIX C	%RSD (</= 10.0%)
1	2,4-D				
2	Silvex				
3	2,4,5-T				
4	Dicamba				

(1)

(1) If > 10.0% RSD, plot a standard curve and determine the ng for each sample in that set from the curve.

8J

ORGANOCHLORINE HERBICIDE EVALUATION STANDARDS SUMMARY
Evaluation of Retention Time Shift for Dicamba
APPENDIX IX ANALYTES

Lab Name:_____ Contract:_____

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

Instrument ID:_____ GC Column ID:_____

Dates of Analyses:_____ to _____

	EG&G SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED	TIME ANALYZED	% D	*
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						
31						
32						
33						
34						
35						
36						
37						
38						

* Values outside of QC limits (2.0% for packed columns, 0.3% for capillary columns)

9A
ORGANOCHLORINE PESTICIDE/PCB STANDARDS SUMMARY
APPENDIX IX ANALYTES

Lab Name:_____ Contract:_____

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

Instrument ID:_____ GC Column ID:_____

		DATE(S) OF ANALYSIS FROM: TO:			DATE OF ANALYSIS / TIME OF ANALYSIS / EG&G SAMPLE NO. (STANDARD)				
		TIME(S) OF ANALYSIS FROM: TO:							
	COMPOUND	RT	RT WINDOW FROM	RT WINDOW TO	CALIBRATION	RT	CALIBRATION FACTOR	QNT Y/N	%D
1	alpha-BHC								
2	beta-BHC								
3	delta-BHC								
4	gamma-BHC								
5	Heptachlor								
6	Aldrin								
7	Hept. epoxide								
8	Endosulfan I								
9	Dieldrin								
10	4,4'-DDE								
11	Endrin								
12	Endosulfan II								
13	4,4'-DDD								
14	Endo. sulfate								
15	4,4'-DDT								
16	Methoxychlor								
17	Endrin ketone								
18	a. Chlordane								
19	g. Chlordane								
20	Toxaphene								
21	Aroclor-1016								
22	Aroclor-1221								
23	Aroclor-1232								
24	Aroclor-1242								
25	Aroclor-1248								
26	Aroclor-1254								
27	Aroclor-1260								

Under QNT Y/N: enter Y if quantitation was performed, N if not performed.
%D must be less than or equal to 15.0% for quantitation, and less than or equal to 20.0% for confirmation.

Note: Determining that no compounds were found above the CRQL is a form of quantitation, and therefore at least one column must meet the 15.0% criteria.

For multicomponent analytes, the single largest peak that is characteristic of the component should be used to establish retention time and %D. Identification of such analytes is based primarily on pattern recognition.

9B

ORGANOCHLORINE PESTICIDE/PCB STANDARDS SUMMARY
APPENDIX IX ANALYTES

Lab Name:_____ Contract:_____

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

Instrument ID:_____ GC Column ID:_____

		DATE(S) OF ANALYSIS	FROM:			DATE OF ANALYSIS			
			TO:			TIME OF ANALYSIS			
		TIME(S) OF ANALYSIS	FROM:			EG&G SAMPLE NO. (STANDARD)			
			TO:						
	COMPOUND	RT	RT WINDOW FROM	RT WINDOW TO	CALIBRATION	RT	CALIBRATION FACTOR	QNT Y/N	%D
1	Isodrin								
2	Kepone								
3	Endrin aldehyde								
4	Di-allate								
5	Chlordane (Technical)								
6	Chlorobenzilate								

Under QNT Y/N: enter Y if quantitation was performed, N if not performed.
%D must be less than or equal to 15.0% for quantitation, and less than or equal to 20.0% for confirmation.

Note: Determining that no compounds were found above the CRQL is a form of quantitation, and therefore at least one column must meet the 15.0% criteria.

For multicomponent analytes, the single largest peak that is characteristic of the component should be used to establish retention time and %D. Identification of such analytes is based primarily on pattern recognition.

9C
ORGANOPHOSPHORUS PESTICIDE STANDARDS SUMMARY
APPENDIX IX ANALYTES

Lab Name:_____ Contract:_____

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

Instrument ID:_____ GC Column ID:_____

		DATE(S) OF ANALYSIS FROM:_____ TO:_____ TIME(S) OF ANALYSIS FROM:_____ TO:_____				DATE OF ANALYSIS_____ TIME OF ANALYSIS_____ EG&G SAMPLE NO. (STANDARD) _____			
	COMPOUND	RT	RT WINDOW FROM	RT WINDOW TO	CALIBRATION	RT	CALIBRATION FACTOR	QNT Y/N	%D
1	Phorate								
2	Sulfotep								
3	Dimethoate								
4	Disulfoton								
5	Methyl Parathion								
6	Parathion								

Under QNT Y/N: enter Y if quantitation was performed, N if not performed.
%D must be less than or equal to 15.0% for quantitation, and less than or equal to 20.0% for confirmation.

Note: Determining that no compounds were found above the CRQL is a form of quantitation, and therefore at least one column must meet the 15.0% criteria.

For multicomponent analytes, the single largest peak that is characteristic of the component should be used to establish retention time and %D. Identification of such analytes is based primarily on pattern recognition.

9D

ORGANOCHLORINE HERBICIDE STANDARDS SUMMARY
APPENDIX IX ANALYTES

Lab Name:_____ Contract:_____

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

Instrument ID:_____ GC Column ID:_____

		DATE(S) OF ANALYSIS FROM: TO:				DATE OF ANALYSIS			
		TIME(S) OF ANALYSIS FROM: TO:				TIME OF ANALYSIS			
						EG&G SAMPLE NO. (STANDARD)			
	COMPOUND	RT	RT WINDOW FROM	RT WINDOW TO	CALIBRATION	RT	CALIBRATION FACTOR	QNT Y/N	%D
1	2,4-D								
2	Silvex								
3	2,4,5-T								

Under QNT Y/N: enter Y if quantitation was performed, N if not performed.
%D must be less than or equal to 15.0% for quantitation, and less than or equal to 20.0% for confirmation.

Note: Determining that no compounds were found above the CRQL is a form of quantitation, and therefore at least one column must meet the 15.0% criteria.

For multicomponent analytes, the single largest peak that is characteristic of the component should be used to establish retention time and %D. Identification of such analytes is based primarily on pattern recognition.

10A
ORGANOCHLORINE PESTICIDE/PCB IDENTIFICATION
APPENDIX IX ANALYTES

EG&G Sample No. [ ]

Lab Name:_____ Contract: _____
Lab Code:_____ Case No:_____ SAS No:_____ SDG No:_____
GC Column ID (1): _____ GC Column ID (2): _____
Instrument ID (1): _____ Instrument ID (2): _____
Lab Sample ID: _____
Lab File ID: _____ (only if confirmed by GC/MS)

PESTICIDE/PCB	RETENTION TIME	RT WINDOW OF STANDARD From	To	QUANT? (Y/N)	GC/MS? (Y/N)
01_____	Column 1 _____	_____	_____	-	-
02	Column 2 _____	_____	_____	-	-
03_____	Column 1 _____	_____	_____	-	-
04	Column 2 _____	_____	_____	-	-
05_____	Column 1 _____	_____	_____	-	-
06	Column 2 _____	_____	_____	-	-
07_____	Column 1 _____	_____	_____	-	-
08	Column 2 _____	_____	_____	-	-
09_____	Column 1 _____	_____	_____	-	-
10	Column 2 _____	_____	_____	-	-
11_____	Column 1 _____	_____	_____	-	-
12	Column 2 _____	_____	_____	-	-

Comments: _____

10B
ORGANOPHOSPHORUS PESTICIDE IDENTIFICATION
APPENDIX IX ANALYTES

EG&G Sample No. [ ]

Lab Name:_____ Contract: _____
Lab Code:_____ Case No:_____ SAS No:_____ SDG No:_____
GC Column ID (1): _____ GC Column ID (2): _____
Instrument ID (1): _____ Instrument ID (2): _____
Lab Sample ID: _____
Lab File ID: _____ (only if confirmed by GC/MS)

PESTICIDE/PCB	RETENTION TIME	RT WINDOW OF STANDARD From	To	QUANT? (Y/N)	GC/MS? (Y/N)
01_____	Column 1 _____	_____	_____	-	-
02	Column 2 _____	_____	_____	-	-
03_____	Column 1 _____	_____	_____	-	-
04	Column 2 _____	_____	_____	-	-
05_____	Column 1 _____	_____	_____	-	-
06	Column 2 _____	_____	_____	-	-
07_____	Column 1 _____	_____	_____	-	-
08	Column 2 _____	_____	_____	-	-
09_____	Column 1 _____	_____	_____	-	-
10	Column 2 _____	_____	_____	-	-
11_____	Column 1 _____	_____	_____	-	-
12	Column 2 _____	_____	_____	-	-

Comments: _____

1OC
ORGANOCHLORINE HERBICIDE IDENTIFICATION
APPENDIX IX ANALYTES

EG&G Sample No. [ ]

Lab Name: _____ Contract: _____
Lab Code: _____ Case No: _____ SAS No: _____ SDG No: _____
GC Column ID (1): _____ GC Column ID (2): _____
Instrument ID (1): _____ Instrument ID (2): _____
Lab Sample ID: _____
Lab File ID: _____ (only if confirmed by GC/MS)

PESTICIDE/PCB	RETENTION TIME	RT WINDOW OF STANDARD From	To	QUANT? (Y/N)	GC/MS? (Y/N)
01 _____	Column 1 _____	_____	_____	-	-
02	Column 2 _____	_____	_____	-	-
03 _____	Column 1 _____	_____	_____	-	-
04	Column 2 _____	_____	_____	-	-
05 _____	Column 1 _____	_____	_____	-	-
06	Column 2 _____	_____	_____	-	-
07 _____	Column 1 _____	_____	_____	-	-
08	Column 2 _____	_____	_____	-	-
09 _____	Column 1 _____	_____	_____	-	-
10	Column 2 _____	_____	_____	-	-
11 _____	Column 1 _____	_____	_____	-	-
12	Column 2 _____	_____	_____	-	-

Comments: _____

11A
VOLATILE QC CHECK SAMPLE SUMMARY
APPENDIX IX ANALYTES

EG&G Sample No.

Lab Name:_____ Contract: _____

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

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

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

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

% Moisture: not dec. _____ Date Analyzed: _____

Column: (nar/wide) _____ Dilution Factor:_____

	COMPOUND (ug/L or ug/Kg)	SPIKE ADDED _____	QC CHECK SAMPLE CONC. _____	QC CHECK % REC
1	Chloromethane			
2	Bromomethane			
3	Vinyl Chloride			
4	Chloroethane			
5	Methylene Chloride			
6	Acetone			
7	Carbon Disulfide			
8	1,1-Dichloroethene			
9	1,1-Dichloroethane			
10	1,2-Dichloroethene (total)			
11	Chloroform			
12	1,2-Dichloroethane			
13	2-Butanone			
14	1,1,1-Trichloroethane			
15	Carbon Tetrachloride			
16	Vinyl Acetate			
17	Bromodichloromethane			
18	1,2-Dichloropropane			
19	cis-1,3-Dichloropropene			
20	Trichloroethene			
21	Dibromochloromethane			
22	1,1,2-Trichloroethane			
23	Benzene			
24	trans-1,3-Dichloropropene			
25	Bromoform			
26	4-Methyl-2-pentanone			
27	2-Hexanone			
28	Tetrachloroethene			
29	1,1,2,2-Tetrachloroethane			
30	Toluene			
31	Chlorobenzene			
32	Ethylbenzene			
33	Styrene			
34	Xylene (total)			

11B
VOLATILE QC CHECK SAMPLE SUMMARY
APPENDIX IX ANALYTES

EG&G Sample No. _____

Lab Name: _____ Contract: _____

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

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

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

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

% Moisture: not dec. _____ Date Analyzed: _____

Column: (nar/wide) _____ Dilution Factor: _____

	COMPOUND (ug/L or ug/Kg)	SPIKE ADDED _____	QC CHECK SAMPLE CONC. _____	QC CHECK % REC
1	Dichlorodifluoromethane			
2	Trichlorofluoromethane			
3	trans-1,2-Dichloroethene			
4	Iodomethane			
5	Allyl chloride			
6	cis-1,2-Dichloroethene			
7	Propionitrile			
8	Acetonitrile			
9	Acrolein			
10	2-Chloro-1,3-butadiene			
11	Acrylonitrile			
12	1,4-Dioxane			
13	Methacrylonitrile			
14	Methyl methacrylate			
15	Dibromomethane			
16	Isobutyl alcohol			
17	1,2-Dibromoethane			
18	1,1,1,2-Tetrachloroethane			
19	Xylene (total meta & para)			
20	Xylene (ortho)			
21	1,2,3-Trichloropropane			
22	trans-1,4-Dichloro-2-butene			
23	1,2-Dibromo-3-chloropropane			
24	Pyridine			

11C
SEMIVOLATILE QC CHECK SAMPLE SUMMARY
APPENDIX IX ANALYTES

EG&G Sample No.

Lab Name:_____ Contract: _____

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

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

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

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

% Moisture: not dec._____ dec._____ Date Extracted: _____

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

GPC Cleanup: (Y/N) ___ pH:_____ Dilution Factor:_____

	COMPOUND (ug/L or ug/Kg)	SPIKE ADDED _____	QC CHECK SAMPLE CONC. _____	QC CHECK % REC
1	_Phenol			
2	_bis(2-Chloroethyl)ether			
3	_2-Chlorophenol			
4	_1,3-Dichlorobenzene			
5	_1,4-Dichlorobenzene			
6	_Benzyl alcohol			
7	_1,2-Dichlorobenzene			
8	_2-Methylphenol			
9	_bis(2-Chloroisopropyl)ether			
10	_4-Methylphenol			
11	_N-Nitroso-di-n-propylamine			
12	_Hexachloroethane			
13	_Nitrobenzene			
14	_Isophorone			
15	_2-Nitrophenol			
16	_2,4-Dimethylphenol			
17	_Benzoic acid			
18	_bis(2-Chloroethoxy)methane			
19	_2,4-Dichlorophenol			
20	_1,2,4-Trichlorobenzene			
21	_Naphthalene			
22	_4-Chloroaniline			
23	_Hexachlorobutadiene			
24	_4-Chloro-3-methylphenol			
25	_2-Methylnaphthalene			
26	_Hexachlorocyclopentadiene			
27	_2,4,6-Trichlorophenol			
28	_2,4,5-Trichlorophenol			
29	_2-Chloronaphthalene			
30	_2-Nitroaniline			
31	_Dimethylphthalate			
32	_Acenaphthylene			
33	_2,6-Dinitrotoluene			

11D
SEMIVOLATILE QC CHECK SAMPLE SUMMARY
APPENDIX IX ANALYTES

EG&G Sample No.

Lab Name:_____ Contract: _____

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

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

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

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

% Moisture: not dec._____ dec._____ Date Extracted: _____

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

GPC Cleanup: (Y/N) ___ pH:_____ Dilution Factor:_____

	COMPOUND (ug/L or ug/Kg)	SPIKE ADDED _____	QC CHECK SAMPLE CONC. _____	QC CHECK % REC
1	3-Nitroaniline			
2	Acenaphthene			
3	2,4-Dinitrophenol			
4	4-Nitrophenol			
5	Dibenzofuran			
6	2,4-Dinitrotoluene			
7	Diethylphthalate			
8	4-Chlorophenyl-phenylether			
9	Fluorene			
10	4-Nitroaniline			
11	4,6-Dinitro-2-methylphenol			
12	N-Nitrosodiphenylamine (1)			
13	4-Bromophenyl-phenylether			
14	Hexachlorobenzene			
15	Pentachlorophenol			
16	Phenanthrene			
17	Anthracene			
18	Di-n-butylphthalate			
19	Fluoranthene			
20	Pyrene			
21	Butylbenzylphthalate			
22	3,3'-Dichlorobenzidine			
23	Benzo(a)anthracene			
24	Chrysene			
25	bis(2-Ethylhexyl)phthalate			
26	Di-n-octylphthalate			
27	Benzo(b)fluoranthene			
28	Benzo(k)fluoranthene			
29	Benzo(a)pyrene			
30	Indeno(1,2,3-cd)pyrene			
31	Dibenz(a,h)anthracene			
32	Benzo(g,h,i)perylene			

(1) - Cannot be separated from Diphenylamine

11C
SEMIVOLATILE QC CHECK SAMPLE SUMMARY
APPENDIX IX ANALYTES

EG&G Sample No.

Lab Name:_____ Contract: _____

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

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

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

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

% Moisture: not dec._____ dec._____ Date Extracted: _____

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

GPC Cleanup: (Y/N) ___ pH:_____ Dilution Factor:_____

	COMPOUND (ug/L or ug/Kg)	SPIKE ADDED _____	QC CHECK SAMPLE CONC. _____	QC CHECK % REC
1	_Phenol			
2	_bis(2-Chloroethyl)ether			
3	_2-Chlorophenol			
4	_1,3-Dichlorobenzene			
5	_1,4-Dichlorobenzene			
6	_Benzyl alcohol			
7	_1,2-Dichlorobenzene			
8	_2-Methylphenol			
9	_bis(2-Chloroisopropyl)ether			
10	_4-Methylphenol			
11	_N-Nitroso-di-n-propylamine			
12	_Hexachloroethane			
13	_Nitrobenzene			
14	_Isophorone			
15	_2-Nitrophenol			
16	_2,4-Dimethylphenol			
17	_Benzoic acid			
18	_bis(2-Chloroethoxy)methane			
19	_2,4-Dichlorophenol			
20	_1,2,4-Trichlorobenzene			
21	_Naphthalene			
22	_4-Chloroaniline			
23	_Hexachlorobutadiene			
24	_4-Chloro-3-methylphenol			
25	_2-Methylnaphthalene			
26	_Hexachlorocyclopentadiene			
27	_2,4,6-Trichlorophenol			
28	_2,4,5-Trichlorophenol			
29	_2-Chloronaphthalene			
30	_2-Nitroaniline			
31	_Dimethylphthalate			
32	_Acenaphthylene			
33	_2,6-Dinitrotoluene			

11D
SEMIVOLATILE QC CHECK SAMPLE SUMMARY
APPENDIX IX ANALYTES

EG&G Sample No.

Lab Name:_____ Contract: _____

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

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

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

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

% Moisture: not dec._____ dec._____ Date Extracted: _____

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

GPC Cleanup: (Y/N) ___ pH:_____ Dilution Factor:_____

	COMPOUND (ug/L or ug/Kg)	SPIKE ADDED _____	QC CHECK SAMPLE CONC. _____	QC CHECK % REC
1	3-Nitroaniline			
2	Acenaphthene			
3	2,4-Dinitrophenol			
4	4-Nitrophenol			
5	Dibenzofuran			
6	2,4-Dinitrotoluene			
7	Diethylphthalate			
8	4-Chlorophenyl-phenylether			
9	Fluorene			
10	4-Nitroaniline			
11	4,6-Dinitro-2-methylphenol			
12	N-Nitrosodiphenylamine (1)			
13	4-Bromophenyl-phenylether			
14	Hexachlorobenzene			
15	Pentachlorophenol			
16	Phenanthrene			
17	Anthracene			
18	Di-n-butylphthalate			
19	Fluoranthene			
20	Pyrene			
21	Butylbenzylphthalate			
22	3,3'-Dichlorobenzidine			
23	Benzo(a)anthracene			
24	Chrysene			
25	bis(2-Ethylhexyl)phthalate			
26	Di-n-octylphthalate			
27	Benzo(b)fluoranthene			
28	Benzo(k)fluoranthene			
29	Benzo(a)pyrene			
30	Indeno(1,2,3-cd)pyrene			
31	Dibenz(a,h)anthracene			
32	Benzo(g,h,i)perylene			

(1) - Cannot be separated from Diphenylamine

11E
SEMIVOLATILE QC CHECK SAMPLE SUMMARY
APPENDIX IX ANALYTES

EG&G Sample No.

Lab Name:_____ Contract: _____

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

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

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

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

% Moisture: not dec._____ dec._____ Date Extracted: _____

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

GPC Cleanup: (Y/N) ___ pH:_____ Dilution Factor:_____

	COMPOUND (ug/L or ug/Kg)	SPIKE ADDED _____	QC CHECK SAMPLE CONC. _____	QC CHECK % REC
1	_Pyridine			
2	_N-Nitrosodimethylamine			
3	_Ethyl methacrylate			
4	_Methyl methacrylate			
5	_2-Picoline			
6	_N-Nitrosomethylethylamine			
7	_Methylmethanesulfonate			
8	_N-Nitrosodiethylamine			
9	_Ethyl methanesulfonate			
10	_Pentachloroethane			
11	_Aniline			
12	_N-Nitrosopyrrolidine			
13	_Acetophenone			
14	_N-Nitrosomorpholine			
15	_O-Toluidine			
16	_3-Methylphenol			
17	_N-Nitrosopiperidine			
18	_O,O,O-Triethylphosphorothioate			
19	_a,a-Dimethylphenethylamine			
20	_2,6-Dichlorophenol			
21	_Hexachloropropene			
22	_1,4-Phenylenediamine			
23	_N-Nitroso-di-n-butylamine			
24	_Safrole			
25	_1,2,4,5-Tetrachlorobenzene			
26	_Isosafrole			

11F
SEMIVOLATILE QC CHECK SAMPLE SUMMARY
APPENDIX IX ANALYTES

EG&G Sample No.

Lab Name:_____ Contract: _____

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

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

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

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

% Moisture: not dec._____ dec._____ Date Extracted: _____

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

GPC Cleanup: (Y/N) ___ pH:_____ Dilution Factor:_____

	COMPOUND (ug/L or ug/Kg)	SPIKE ADDED _____	QC CHECK SAMPLE CONC. _____	QC CHECK % REC
1	1,4-Naphthoquinone			
2	1,3-Dinitrobenzene			
3	Pentachlorobenzene			
4	1-Naphthylamine			
5	2-Naphthylamine			
6	2,3,4,6-Tetrachlorophenol			
7	5-Nitro-o-toluidine			
8	Diphenylamine			
9	1,3,5-Trinitrobenzene			
10	Phenacetin			
11	Thionazin			
12	4-Aminobiphenyl			
13	Pentachloronitrobenzene			
14	Pronamide			
15	Dinoseb			
16	4-Nitroquinoline-1-oxide			
17	Methapyrilene			
18	Aramite			
19	p-(Dimethylamino)azobenzene			
20	3,3'-dimethylbenzidine			
21	Famphur			
22	2-Acetylaminofluorene			
23	7,12-Dimethylbenz(a) anthracene			
24	3-Methylcholanthrene			
25	Hexachlorophene			

11G

ORGANOCHLORINE PESTICIDE QC CHECK SAMPLE SUMMARY
APPENDIX IX ANALYTES

EG&G Sample No. _____

Lab Name:_____ Contract: _____

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

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

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

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

% Moisture: not dec._____ dec._____ Date Extracted: _____

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

GPC Cleanup: (Y/N) ___ pH:_____ Dilution Factor:_____

	COMPOUND (ug/L or ug/Kg)	SPIKE ADDED _____	QC CHECK SAMPLE CONC. _____	QC CHECK % REC
1	_alpha-BHC			
2	_beta-BHC			
3	_delta-BHC			
4	_gamma-BHC (Lindane)			
5	_Heptachlor			
6	_Aldrin			
7	_Heptachlor epoxide			
8	_Endosulfan I			
9	_Dieldrin			
10	_4,4'-DDE			
11	_Endrin			
12	_Endosulfan II			
13	_4,4'-DDD			
14	_Endosulfan sulfate			
15	_4,4'-DDT			
16	_Methoxychlor			
17	_Endrin ketone			
18	_alpha-Chlordane			
19	_gamma-Chlordane			
20	_Toxaphene			
21	_Aroclor-1016			
22	_Aroclor-1221			
23	_Aroclor-1232			
24	_Aroclor-1242			
25	_Aroclor-1248			
26	_Aroclor-1254			
27	_Aroclor-1260			

11H

ORGANOCHLORINE PESTICIDE QC CHECK SAMPLE SUMMARY

APPENDIX IX ANALYTES

EG&G Sample No.

Lab Name:______________________ Contract: __________

Lab Code:__________ Case No:________ SAS No:________ SDG No:__________

Matrix: (soil/water)______ Lab Sample ID: __________

Sample wt/vol: ______(g/mL)______ Lab File ID: __________

Level: (low/med) ______ Date Received: __________

% Moisture: not dec.______ dec.______ Date Extracted: __________

Extraction: (SepF/Cont/Sonc) ______ Date Analyzed: __________

GPC Cleanup: (Y/N) ___ pH:______ Dilution Factor:__________

	COMPOUND (ug/L or ug/Kg)	SPIKE ADDED	QC CHECK SAMPLE CONC.	QC CHECK % REC
1	Isodrin			
2	Kepone			
3	Endrin aldehyde			
4	Di-allate			
5	Chlordane (Technical)			
6	Chlorobenzilate			

ORGANOPHOSPHORUS PESTICIDE QC CHECK SAMPLE SUMMARY
APPENDIX IX ANALYTES

EG&G Sample No. [ ]

Lab Name:_____ Contract: _____

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

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

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

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

% Moisture: not dec._____ dec._____ Date Extracted: _____

Extraction: (SepF/Cont/Soxh) _____ Date Analyzed: _____

GPC Cleanup: (Y/N) ___ pH:_____ Dilution Factor:_____

	COMPOUND (ug/L or ug/Kg)	SPIKE ADDED _____	QC CHECK SAMPLE CONC. _____	QC CHECK % REC
1	_Phorate			
2	_Sulfotepp			
3	_Disulfoton			
4	_Dimethoate			
5	_Methyl parathion			
6	_Parathion			

11J
ORGANOCHLORINE HERBICIDE QC CHECK SAMPLE SUMMARY
APPENDIX IX ANALYTES

EG&G Sample No.

Lab Name: ____________ Contract: ________

Lab Code: ________ Case No: ________ SAS No: ________ SDG No: ________

Matrix: (soil/water) ______ Lab Sample ID: ________

Sample wt/vol: ______ (g/mL) ______ Lab File ID: ________

Level: (low/med) ______ Date Received: ________

% Moisture: not dec. ______ dec. ______ Date Extracted: ________

Extraction: (Herb) ______ Date Analyzed: ________

GPC Cleanup: (Y/N) ___ pH: ______ Dilution Factor: ________

	COMPOUND (ug/L or ug/Kg)	SPIKE ADDED	QC CHECK SAMPLE CONC.	QC CHECK % REC
1	2,4-D			
2	Silvex			
3	2,4,5-T			

DATA REPORTING FORMS
FOR EPA METHOD 524.2 (Rev. 3.0) COMPOUNDS

1 A

VOLATILE ORGANICS ANALYSIS DATA SHEET
EPA Method 524.2 (Rev. 3.0)

EG&G Sample No. _____

Lab Name: _____ Contract: _____

Lab Code: _____ SDG No: _____

Case No.: _____ Lab Sample ID: _____

Sample Volume: _____ (mL) _____ Lab File ID: _____

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

Column: (nar/wide) _____ Date Analyzed: _____

Dilution Factor: _____

	CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L) _____	Q
1	75-71-8	Dichlorodifluoromethane		
2	74-87-3	Chloromethane		
3	75-01-4	Vinyl Chloride		
4	74-83-9	Bromomethane		
5	75-00-3	Chloroethane		
6	75-35-4	1,1-Dichloroethene		
7	75-09-2	Methylene Chloride		
8	156-60-5	trans-1,2-Dichloroethene		
9	75-34-3	1,1-Dichloroethane		
10	590-20-7	2,2-Dichloropropane		
11	156-69-4	cis-1,2-Dichloroethene		
12	67-66-3	Chloroform		
13	74-97-5	Bromochloromethane		
14	71-55-6	1,1,1-Trichloroethane		
15	56-23-5	Carbon Tetrachloride		
16	563-58-6	1,1-Dichloropropene		
17	71-43-2	Benzene		
18	107-06-2	1,2-Dichloroethane		
19	79-01-6	Trichloroethene		
20	78-87-58	1,2-Dichloropropane		
21	75-27-4	Bromodichloromethane		
22	74-95-3	Dibromomethane		
23	10061-02-6	trans-1,3-Dichloropropene		
24	108-88-3	Toluene		
25	10061-01-5	cis-1,3-Dichloropropene		
26	79-00-5	1,1,2-Trichloroethane		
27	127-18-4	Tetrachloroethene		
28	142-28-9	1,3-Dichloropropane		
29	124-48-1	Dibromochloromethane		

1 B

VOLATILE ORGANICS ANALYSIS DATA SHEET
EPA Method 524.2 (Rev. 3.0)

EG&G Sample No. _____

Lab Name: _____ Contract: _____

Lab Code: _____ SDG No: _____

Case No.: _____ Lab Sample ID: _____

Sample Volume: _____ (mL)_____ Lab File ID: _____

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

Column: (nar/wide) _____ Date Analyzed: _____

Dilution Factor: _____

	CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L)_____	Q
1	106-93-4	1,2-Dibromoethane		
2	108-90-7	Chlorobenzene		
3	630-20-6	1,1,1,2-Tetrachloroethane		
4	100-41-4	Ethylbenzene		
5	1330-20-7	Xylene (total meta & para)		
6	95-47-6	Xylene (ortho)		
7	100-42-5	Styrene		
8	75-25-2	Bromoform		
9	98-82-8	Isopropylbenzene		
10	79-34-5	1,1,2,2-Tetrachloroethane		
11	108-86-1	Bromobenzene		
12	96-18-4	1,2,3-Trichloropropane		
13	103-65-1	n-Propylbenzene		
14	95-49-8	2-Chlorotoluene		
15	108-67-8	1,3,5-Trimethylbenzene		
16	106-43-4	4-Chlorotoluene		
17	98-06-6	tert-Butylbenzene		
18	95-63-6	1,2,4-Trimethylbenzene		
19	135-98-8	sec-Butylbenzene		
20	541-73-1	1,3-Dichlorobenzene		
21	106-46-7	1,4-Dichlorobenzene		
22	104-51-8	n-Butylbenzene		
23	95-50-1	1,2-Dichlorobenzene		
24	96-12-8	1,2-Dibromo-3-chloropropane		
25	120-82-1	1,2,4-Trichlorobenzene		
26	87-68-3	Hexachlorobutadiene		
27	91-20-3	Naphthalene		
28	87-61-6	1,2,3-Trichlorobenzene		

1 C

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS
EPA Method 524.2 (Rev. 3.0)

EG&G Sample No. _____

Lab Name:_____ Contract: _____

Lab Code:_____ SDG No: _____

Case No.:_____ Lab Sample ID: _____

Sample Volume: _____ (mL)_____ Lab File ID: _____

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

Column: (nar/wide) _____ Date Analyzed: _____

Dilution Factor:_____

Number TICs found: _____

CONCENTRATION UNITS:
(ug/L)_____

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					

WATER VOLATILE SURROGATE RECOVERY
EPA Method 524.2 (Rev. 3.0)

Lab Name:_____ Contract:_____

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

	EG&G SAMPLE NO.	S1 (BFB)#	S2 (DCB)#	OTHER	OTHER	OUT
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						

	QC LIMITS
S1 (BFB) - Bromofluorobenzene	(86-115)
S2 (DCB) = 1,2-Dichlorobenzene-d4	(76-114)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogates diluted out

WATER VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY
EPA Method 524.2 (Rev. 3.0)

Lab Name:_____ Contract:_____

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

Matrix Spike - EG&G Sample No.: _____

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

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

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

* Values outside of QC limits

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

COMMENTS: _____
_____

VOLATILE METHOD BLANK SUMMARY
EPA Method 524.2 (Rev. 3.0)

Lab Name:_____ Contract:_____

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

Lab File ID: _____ Lab Sample ID:_____

Date Analyzed: _____ Time Analyzed:_____

Instrument ID: _____ Level: (low/med)_____

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

	EG&G SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				

COMMENTS: _____

VOLATILE ORGANIC GC/MS TUNING AND MASS CALIBRATION - BROMOFLUOROBENZENE (BFB)
EPA Method 524.2 (Rev. 3.0)

Lab Name:_____ Contract:_____

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

Lab File ID: _____ BFB Injection Date:_____

Instrument ID:_____ BFB Injection Time:_____

Level:(low/med) _____ Column:(nar/wide) _____

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	15.0 - 40.0% of mass 95	
75	30.0 - 80.0% of mass 95	
95	Base peak, 100% relative abundance	
96	5.0 - 9.0% of mass 95	
173	Less than 2.0% of mass 174	( )1
174	Greater than 50.0% of mass 95	
175	5.0 - 9.0% of mass 174	( )1
176	Greater than 95.0%, but less than 101.0% of mass 174	( )1
177	5.0 - 9.0% of mass 176	( )2

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

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

	EG&G SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
1					
2					
3					
4					
5					
6					
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6 A
VOLATILE ORGANICS INITIAL CALIBRATION DATA
EPA Method 524.2 (Rev. 3.0)

Lab Name:_____ Contract:_____

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

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

Level:(low/med)_____ Column:(nar/wide)_____

NOTE: If the %RSD is ≤ 10%, the RRF may be used for quantitation following successful continuing calibration.

LAB FILE ID: RRF___=_____ RRF___=_____
RRF___=_____ RRF___=_____ RRF___=_____

	COMPOUND	RRF___	RRF___	RRF___	RRF___	RRF___	$\overline{RRF}$	% RSD
1	Dichlorodifluoromethane							
2	Chloromethane							
3	Vinyl Chloride							
4	Bromomethane							
5	Chloroethane							
6	1,1-Dichlorethene							
7	Methylene Chloride							
8	trans-1,2-Dichloroethene							
9	1,1-Dichloroethane							
10	2,2-Dichloropropane							
11	cis-1,2-Dichloroethene							
12	Chloroform							
13	Bromochloromethane							
14	1,1,1-Trichloroethane							
15	Carbon Tetrachloride							
16	1,1-Dichloropropene							
17	Benzene							
18	1,2-Dichloroethane							
19	Trichloroethene							
20	1,2-Dichloropropane							
21	Bromodichloromethane							
22	Dibromomethane							
23	trans-1,3-Dichloropropene							
24	Toluene							
25	cis-1,3-Dichloropropene							
24	1,1,2-Trichloroethane							
25	Tetrachloroethene							
26	1,3-Dichloropropane							
27	Dibromochloromethane							
28	1,2-Dibromoethane							
29	Bromofluorobenzene							
30	1,2-Dichlorobenzene-d4							

6 B

VOLATILE ORGANICS INITIAL CALIBRATION DATA
EPA Method 524.2 (Rev. 3.0)

Lab Name:_____ Contract:_____

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

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

Level:(low/med)_____ Column:(nar/wide)_____

NOTE: If the %RSD is ≤ 10%, the RRF may be used for quantitation following successful continuing calibration.

LAB FILE ID: RRF___=_____ RRF___=_____
RRF___=_____ RRF___=_____ RRF___=_____

	COMPOUND	RRF___	RRF___	RRF___	RRF___	RRF___	$\overline{RRF}$	% RSD
1	Chlorobenzene							
2	1,1,1,2-Tetrachloroethane							
3	Ethylbenzene							
4	Xylene (total meta & para)							
5	Xylene (ortho)							
6	Styrene							
7	Bromoform							
8	Isopropylbenzene							
9	1,1,2,2-Tetrachloroethane							
10	Bromobenzene							
11	1,2,3-Trichloropropane							
12	n-Propylbenzene							
13	2-Chlorotoluene							
14	1,3,5-Trimethylbenzene							
15	4-Chlorotoluene							
16	tert-Butylbenzene							
17	1,2,4-Trimethylbenzene							
18	sec-Butylbenzene							
19	1,3-Dichlorobenzene							
20	1,4-Dichlorobenzene							
21	n-Butylbenzene							
22	1,2-Dichlorobenzene							
23	1,2-Dibromo-3-chloropropane							
24	1,2,4-Trichlorobenzene							
25	Hexachlorobutadiene							
26	Naphthalene							
27	1,2,3-Trichlorobenzene							

7 A
VOLATILE CONTINUING CALIBRATION CHECK
EPA Method 524.2 (Rev. 3.0)

Lab Name:_____ Contract:_____

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

Instrument ID:_____ Calibration Date:_____ Time:_____

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

Level: (low/med)_____ Column: (nar/wide)_____

	COMPOUND	$\overline{RRF}$	RRF___	%D
1	Dichlorodifluoromethane			
2	Chloromethane			
3	Vinyl Chloride			
4	Bromomethane			
5	Chloroethane			
6	1,1-Dichloroethene			
7	Methylene Chloride			
8	trans-1,2-Dichloroethene			
9	1,1-Dichloroethane			
10	2,2-Dichloropropane			
11	cis-1,2-Dichloroethene			
12	Chloroform			
13	Bromochloromethane			
14	1,1,1-Trichloroethane			
15	Carbon Tetrachloride			
16	1,1-Dichloropropene			
17	Benzene			
18	1,2-Dichloroethane			
19	Trichloroethene			
20	1,2-Dichloropropane			
21	Bromodichloromethane			
22	Dibromomethane			
23	trans-1,3-Dichloropropene			
24	Toluene			
25	cis-1,3-Dichloropropene			
24	1,1,2-Trichloroethane			
25	Tetrachloroethene			
26	1,3-Dichloropropane			
27	Dibromochloromethane			
28	1,2-Dibromoethane			
29	Bromofluorobenzene			
30	1,2-Dichlorobenzene-d4			

7 8

VOLATILE CONTINUING CALIBRATION CHECK
EPA Method 524.2 (Rev. 3.0)

Lab Name:_____ Contract:_____

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

Instrument ID:_____ Calibration Date:_____ Time:_____

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

Level: (low/med)_____ Column: (nar/wide)_____

	COMPOUND	$\overline{RRF}$	RRF___	%D
1	Chlorobenzene			
2	1,1,1,2-Tetrachloroethane			
3	Ethylbenzene			
4	Xylene (total meta & para)			
5	Xylene (ortho)			
6	Styrene			
7	Bromoform			
8	Isopropylbenzene			
9	1,1,2,2-Tetrachloroethane			
10	Bromobenzene			
11	1,2,3-Trichloropropane			
12	n-Propylbenzene			
13	2-Chlorotoluene			
14	1,3,5-Trimethylbenzene			
15	4-Chlorotoluene			
16	tert-Butylbenzene			
17	1,2,4-Trimethylbenzene			
18	sec-Butylbenzene			
19	1,3-Dichlorobenzene			
20	1,4-Dichlorobenzene			
21	n-Butylbenzene			
22	1,2-Dichlorobenzene			
23	1,2-Dibromo-3-chloropropane			
24	1,2,4-Trichlorobenzene			
25	Hexachlorobutadiene			
26	Naphthalene			
27	1,2,3-Trichlorobenzene			

8 A

VOLATILE INTERNAL STANDARD AREA SUMMARY
EPA Method 524.2 (Rev. 3.0)

Lab Name:_____ Contract:_____

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

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

Instrument ID:_____ Time Analyzed:_____

Level: (low/med)_____ Column: (pack/cap)_____

	IS1(FBZ) AREA #	RT	IS2( ) AREA #	RT	IS3( ) AREA #	RT
12 HOUR STD						
UPPER LIMIT						
LOWER LIMIT						
EG&G SAMPLE NO.						
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						

IS1 (FBZ) = Fluorobenzene
IS2 ( ) = _____
IS3 ( ) = _____

UPPER LIMIT = + 100%
of internal standard area.
LOWER LIMIT = - 50%
of internal standard area.

Column used to flag internal standard area values with an asterisk

11 A
QC CHECK SAMPLE SUMMARY
EPA Method 524.2 (Rev. 3.0)

EG&G Sample No.

Lab Name:_____ Contract: _____

Lab Code:_____ SDG No: _____

Case No.:_____ Lab Sample ID: _____

Sample vol: _____ (mL)_____ Lab File ID: _____

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

Column: (nar/wide) _____ Date Analyzed: _____

Dilution Factor:_____

	COMPOUND	SPIKE ADDED (ug/L)	QC CHECK SAMPLE CONC. (ug/L)	QC CHECK % REC
1	Chloromethane			
2	Bromomethane			
3	Vinyl Chloride			
4	Chloroethane			
5	Methylene Chloride			
6	Acetone			
7	Carbon Disulfide			
8	1,1-Dichloroethene			
9	1,1-Dichloroethane			
10	1,2-Dichloroethene (total)			
11	Chloroform			
12	1,2-Dichloroethane			
13	2-butanone			
14	1,1,1-Trichloroethane			
15	Carbon Tetrachloride			
16	Vinyl Acetate			
17	Bromodichloromethane			
18	1,2-Dichloropropane			
19	cis-1,3-Dichloropropene			
20	Trichloroethene			
21	Dibromochloromethane			
22	1,1,2-Trichloroethane			
23	Benzene			
24	trans-1,3-Dichloropropene			
25	Bromoform			
26	4-Methyl-2-pentanone			
27	2-Hexanone			
28	Tetrachloroethene			
29	1,1,2,2-Tetrachloroethane			
30	Toluene			
31	Chlorobenzene			
32	Ethylbenzene			
33	Styrene			
34	Xylene (total)			

11 B
QC CHECK SAMPLE SUMMARY
EPA Method 524.2 (Rev. 3.0)

EG&G Sample No.

Lab Name:_____ Contract: _____

Lab Code:_____ SDG No: _____

Case No.:_____ Lab Sample ID: _____

Sample vol: _____ (mL)_____ Lab File ID: _____

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

Column: (nar/wide) _____ Date Analyzed: _____

Dilution Factor:_____

	COMPOUND	SPIKE ADDED (ug/L)	QC CHECK SAMPLE CONC. (ug/L)	QC CHECK % REC
1	Dichlorodifluoromethane			
2	Trichlorofluoromethane			
3	trans-1,2-Dichloroethene			
4	Iodomethane			
5	Allyl chloride			
6	cis-1,2-Dichloroethene			
7	Propionitrile			
8	Acetonitrile			
9	Acrolein			
10	2-Chloro-1,3-butadiene			
11	Acrylonitrile			
12	1,4-Dioxane			
13	Methacrylonitrile			
14	Methyl methacrylate			
15	Dibromomethane			
16	Isobutyl alcohol			
17	1,2-Dibromoethane			
18	1,1,1,2-Tetrachloroethane			
19	Xylene (total meta & para)			
20	Xylene (ortho)			
21	1,2,3-Trichloropropane			
22	trans-1,4-Dichloro-2-butene			
23	1,2-Dibromo-3-chloropropane			
24	Pyridine			

DATA REPORTING FORMS
FOR PRIORITY POLLUTANT ANALYTES

I A
VOLATILE ORGANICS ANALYSIS DATA SHEET
PRIORITY POLLUTANT ANALYTES

EG&G Sample No. _____

Lab Name:_____ Contract: _____

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

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

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

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

% Moisture: not dec. _____ Date Analyzed: _____

Column: (nar/wide) _____ Dilution Factor:_____

	CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg)_____	Q
1	74-87-3	Chloromethane		
2	74-83-9	Bromomethane		
3	75-01-4	Vinyl Chloride		
4	75-00-3	Chloroethane		
5	75-09-2	Methylene Chloride		
6	75-35-4	1,1-Dichloroethene		
7	75-34-3	1,1-Dichloroethane		
8	156-60-5	trans-1,2-Dichloroethene		
9	67-66-3	Chloroform		
10	107-06-2	1,2-Dichloroethane		
11	71-55-6	1,1,1-Trichloroethane		
12	56-23-5	Carbon Tetrachloride		
13	75-27-4	Bromodichloromethane		
14	78-87-58	1,2-Dichloropropane		
15	10061 01-5	cis-1,3-Dichloropropene		
16	79-01-6	Trichloroethene		
17	124-48-1	Dibromochloromethane		
18	79-00-5	1,1,2-Trichloroethane		
19	71-43-2	Benzene		
20	75-25-2	Bromoform		
21	127-18-4	Tetrachloroethene		
22	79-34-5	1,1,2,2-Tetrachloroethane		
23	108-88-3	Toluene		
24	108-90-7	Chlorobenzene		
25	100-41-4	Ethylbenzene		
26	107-02-8	Acrolein		
27	107-13-1	Acrylonitrile		
28	110-75-8	2-Chloroethyl vinyl ether		

1 B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
PRIORITY POLLUTANT ANALYTES

EG&G Sample No. _____

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

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

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

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

% Moisture: not dec._____ dec._____ Date Extracted: _____

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

GPC Cleanup: (Y/N) ___ pH:_____ Dilution Factor:_____

	CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg)_____	Q
1	108-95-2	Phenol		
2	111-44-4	bis(2-Chloroethyl)ether		
3	95-57-8	2-Chlorophenol		
4	541-73-1	1,3-Dichlorobenzene		
5	106-46-7	1,4-Dichlorobenzene		
6	95-50-1	1,2-Dichlorobenzene		
7	108-60-1	bis(2-Chloroisopropyl)ether		
8	621-64-7	N-Nitroso-di-n-propylamine		
9	67-72-1	Hexachloroethane		
10	98-95-3	Nitrobenzene		
11	78-59-1	Isophorone		
12	88-75-5	2-Nitrophenol		
13	105-67-9	2,4-Dimethylphenol		
14	111-91-1	bis(2-Chloroethoxy)methane		
15	120-83-2	2,4-Dichlorophenol		
16	120-82-1	1,2,4-Trichlorobenzene		
17	91-20-3	Naphthalene		
18	87-68-3	Hexachlorobutadiene		
19	59-40-7	4-Chloro-3-methylphenol		
20	77-47-4	Hexachlorocyclopentadiene		
21	88-06-2	2,4,6-Trichlorophenol		
22	91-58-7	2-Chloronaphthalene		
23	131-11-3	Dimethylphthalate		
24	208-96-8	Acenaphthylene		
25	606-20-2	2,6-Dinitrotoluene		
26	83-32-9	Acenaphthene		
27	51-28-5	2,4-Dinitrophenol		
28	100-02-7	4-Nitrophenol		

1 C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
PRIORITY POLLUTANT ANALYTES

EG&G Sample No. [ ]

Lab Name:_____ Contract: _____

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

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

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

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

% Moisture: not dec._____ dec._____ Date Extracted: _____

Extraction: (SepF/Cont/Socn) _____ Date Analyzed: _____

GPC Cleanup: (Y/N) ___ pH:_____ Dilution Factor:_____

	CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg)_____	Q
1	121-14-2	2,4-Dinitrotoluene		
2	84-66-2	Diethylphthalate		
3	7005-72-3	4-Chlorophenyl-phenylether		
4	86-73-7	Fluorene		
5	534-52-1	4,6-Dinitro-2-methylphenol		
6	86-30-6	N-Nitrosodiphenylamine (1)		
7	101-55-3	4-Bromophenyl-phenylether		
8	118-74-1	Hexachlorobenzene		
9	87-86-5	Pentachlorophenol		
10	85-01-8	Phenanthrene		
11	120-12-7	Anthracene		
12	84-74-2	Di-n-butylphthalate		
13	206-44-0	Fluoranthene		
14	129-00-0	Pyrene		
15	85-68-7	Butylbenzylphthalate		
16	91-94-1	3,3'-Dichlorobenzidine		
17	56-55-3	Benzo(a)anthracene		
18	218-01-9	Chrysene		
19	117-81-7	bis(2-Ethylhexyl)phthalate		
20	117-84-0	Di-n-octylphthalate		
21	205-99-2	Benzo(b)fluoranthene		
22	207-08-9	Benzo(k)fluoranthene		
23	50-32-8	Benzo(a)pyrene		
24	193-39-5	Indeno(1,2,3-cd)pyrene		
25	53-70-3	Dibenz(a,h)anthracene		
26	191-24-2	Benzo(g,h,i)perylene		
27	62-75-9	N-Nitrosodimethylamine		
28	92-87-5	Benzidine		
29	122-66-7	1,2-Diphenylhydrazine		

(1) - Cannot be separated from Diphenylamine

1 D

ORGANOCHLORINE PESTICIDE ANALYSIS DATA SHEET
PRIORITY POLLUTANT ANALYTES

EG&G Sample No. [ ]

Lab Name:_____ Contract: _____

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

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

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

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

% Moisture: not dec._____ dec._____ Date Extracted: _____

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

GPC Cleanup: (Y/N) ___ pH:_____ Dilution Factor:_____

	CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg)_____	Q
1	319-84-6	alpha-BHC		
2	319-85-7	beta-BHC		
3	319-86-8	delta-BHC		
4	58-89-9	gamma-BHC (Lindane)		
5	76-44-8	Heptachlor		
6	309-00-2	Aldrin		
7	1024-57-3	Heptachlor epoxide		
8	959-98-8	Endosulfan I		
9	60-57-1	Dieldrin		
10	72-55-9	4,4'-DDE		
11	72-20-8	Endrin		
12	7421-93-4	Endrin aldehyde		
13	33213-65-9	Endosulfan II		
14	72-54-8	4,4'-DDD		
15	1031-07-8	Endosulfan sulfate		
16	50-29-3	4,4'-DDT		
17	8001-35-2	Toxaphene		
18	12674-11-2	Aroclor-1016		
19	11104-28-2	Aroclor-1221		
20	11141-16-5	Aroclor-1232		
21	53469-21-9	Aroclor-1242		
22	12672-29-6	Aroclor-1248		
23	11097-69-1	Aroclor-1254		
24	11096-82-5	Aroclor-1260		
25	57-74-9	Chlordane (Technical)		

2 A
WATER VOLATILE SURROGATE RECOVERY
PRIORITY POLLUTANT ANALYTES

Lab Name:_____ Contract:_____

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

	EG&G SAMPLE NO.	S1 (TOL)#	S2 (BFB)#	S3 (DCE)#	OTHER	OUT
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						

		QC LIMITS
S1	(TOL) - Toluene-d8	(88-110)
S2	(BFB) - Bromofluorobenzene	(86-115)
S3	(DCE) = 1,2-Dichloroethane-d4	(76-114)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogates diluted out

2 B
SOIL VOLATILE SURROGATE RECOVERY
PRIORITY POLLUTANT ANALYTES

Lab Name:_____ Contract:_____

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

Level: (low/med) _____

	EG&G SAMPLE NO.	S1 (TOL)#	S2 (BFB)#	S3 (DCE)#	OTHER	OUT
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						

		QC LIMITS
S1	(TOL) = Toluene-d8	(81-117)
S2	(BFB) = Bromofluorobenzene	(74-121)
S3	(DCE) = 1,2-Dichloroethane-d4	(70-121)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogates diluted out

2 C
WATER SEMIVOLATILE SURROGATE RECOVERY
PRIORITY POLLUTANT ANALYTES

Lab Name:_____ Contract:_____

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

	EG&G SAMPLE NO.	S1 (NBZ)#	S2 (FBP)#	S3 (TPH)#	S4 (PHL)#	S5 (2FP)#	S6 (TBP)#	OTHER	TOT OUT
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									

		QC LIMITS
S1	(NBZ) = Nitrobenzene-d5	(35-114)
S2	(FBP) = 2-Fluorobiphenyl	(43-116)
S3	(TPH) = Terphenyl-d14	(33-141)
S4	(PHL) = Phenol-d6	(10-94)
S5	(2FP) = 2-Fluorophenol	(21-100)
S6	(TBP) = 2,4,6-Tribromophenol	(10-123)

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

2 D
SOIL SEMIVOLATILE SURROGATE RECOVERY
PRIORITY POLLUTANT ANALYTES

Lab Name:_____ Contract:_____

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

Level: (low/med) _____

	EG&G SAMPLE NO.	S1 (NBZ)#	S2 (FBP)#	S3 (TPH)#	S4 (PHL)#	S5 (2FP)#	S6 (TBP)#	OTHER	TOT OUT
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									

		QC LIMITS
S1	(NBZ) = Nitrobenzene-d5	(23-120)
S2	(FBP) = 2-Fluorobiphenyl	(30-115)
S3	(TPH) = Terphenyl-d14	(18-137)
S4	(PHL) = Phenol-d6	(24-113)
S5	(2FP) = 2-Fluorophenol	(25-121)
S6	(TBP) = 2,4,6-Tribromophenol	(19-122)

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

2 E

WATER ORGANOCHLORINE PESTICIDE SURROGATE RECOVERY
PRIORITY POLLUTANT ANALYTES

Lab Name:_____ Contract:_____

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

	EG&G SAMPLE NO.	S1 (DBC)#	S2 (TCMX)#
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			
26			
27			
28			
29			
30			

	ADVISORY QC LIMITS
S1 (DBC) = Dibutylchlorendate	(24-154)
S2 (TCMX) = Tetrachloro-meta-xylene	(24-154)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogates diluted out

2 F

SOIL ORGANOCHLORINE PESTICIDE SURROGATE RECOVERY
PRIORITY POLLUTANT ANALYTES

Lab Name:_____ Contract:_____

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

Level: (low/med) _____

	EG&G SAMPLE NO.	S1 (DBC)#	S2 (TCMX)#
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			
26			
27			
28			
29			
30			

ADVISORY QC LIMITS

S1 (DBC) = Dibutylchlorendate (24-150)
S2 (TCMX) = Tetrachloro-meta-xylene (24-150)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogates diluted out

3 A

WATER VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY
PRIORITY POLLUTANT ANALYTES

Lab Name:_____ Contract:_____

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

Matrix Spike - EG&G Sample No.: _____

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

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

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

* Values outside of QC limits

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

COMMENTS: _____

3 B
SOIL VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY
PRIORITY POLLUTANT ANALYTES

Lab Name:_____ Contract:_____

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

Matrix Spike - EG&G Sample No.: _____ Level: (low/med) _____

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

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

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

* Values outside of QC limits

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

COMMENTS: _____

3 C

WATER SEMIVOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY
PRIORITY POLLUTANT ANALYTES

Lab Name:_____ Contract:_____

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

Matrix Spike - EG&G Sample No.: _____

	COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS % REC #	QC LIMITS REC.
1	Phenol					12- 89
2	2-Chlorophenol					27-123
3	1,4-Dichlorobenzene					36- 97
4	N-Nitroso-di-n-prop.(1)					41-116
5	1,2,4-Trichlorobenzene					39- 98
6	4-Chloro-3-methylphenol					23- 97
7	Acenaphthene					46-118
8	4-Nitrophenol					10- 80
9	2,4-Dinitrotoluene					24- 96
10	Pentachlorophenol					9-103
11	Pyrene					26-127

	COMPOUND	SPIKE ADDED (ug/L)	MSD CONCENTRATION (ug/L)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
1	Phenol					42	12- 89
2	2-Chloropnenol					40	27-123
3	1,4-Dichlorobenzene					28	36- 97
4	N-Nitroso-di-n-prop.(1)					38	41-116
5	1,2,4-Trichlorobenzene					28	39- 98
6	4-Chloro-3-methylphenol					42	23- 97
7	Acenaphthene					31	46-118
8	4-Nitrophenol					50	10- 80
9	2,4-Dinitrotoluene					38	24- 96
10	Pentachlorophenol					50	9-103
11	Pyrene					31	26-127

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

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

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

COMMENTS: _____

_____

3 D

SOIL SEMIVOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY
PRIORITY POLLUTANT ANALYTES

Lab Name:_____ Contract:_____

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

Matrix Spike - EG&G Sample No.: _____ Level: (low/med) _____

	COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
1	Phenol					26- 90
2	2-Chlorophenol					25-102
3	1,4-Dichlorobenzene					28-104
4	N-Nitroso-di-n-prop.(1)					41-126
5	1,2,4-Trichlorobenzene					38-107
6	4-Chloro-3-methylphenol					26-103
7	Acenaphthene					31-137
8	4-Nitrophenol					11-114
9	2,4-Dinitrotoluene					28- 89
10	Pentachlorophenol					17-109
11	Pyrene					35-142

	COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
1	Phenol					35	26- 90
2	2-Chlorophenol					50	25-102
3	1,4-Dichlorobenzene					27	28-104
4	N-Nitroso-di-n-prop.(1)					38	41-126
5	1,2,4-Trichlorobenzene					23	38-107
6	4-Chloro-3-methylphenol					33	26-103
7	Acenaphthene					19	31-137
8	4-Nitrophenol					50	11-114
9	2,4-Dinitrotoluene					47	28- 89
10	Pentachlorophenol					47	17-109
11	Pyrene					36	35-142

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

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

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

COMMENTS: _____

_____

3 E

WATER ORGANOCHLORINE PESTICIDE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY
PRIORITY POLLUTANT ANALYTES

Lab Name:_____ Contract:_____

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

Matrix Spike - EG&G Sample No.: _____

	COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS % REC #	QC LIMITS REC.
1	gamma-BHC (Lindane)					56-123
2	Heptachlor					40-131
3	Aldrin					40-120
4	Dieldrin					52-126
5	Endrin					56-121
6	4,4'-DDT					38-127

	COMPOUND	SPIKE ADDED (ug/L)	MSD CONCENTRATION (ug/L)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
1	gamma-BHC (Lindane)					15	56-123
2	Heptachlor					20	40-131
3	Aldrin					22	40-120
4	Dieldrin					18	52-126
5	Endrin					21	56-121
6	4,4'-DDT					27	38-127

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

* Values outside of QC limits

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

COMMENTS: _____

_____

3 F

SOIL ORGANOCHLORINE PESTICIDE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY
PRIORITY POLLUTANT ANALYTES

Lab Name:_____ Contract:_____

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

Matrix Spike - EG&G Sample No.: _____ Level: (low/med) _____

	COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
1	gamma-BHC (Lindane)					46-127
2	Heptachlor					35-130
3	Aldrin					34-132
4	Dieldrin					31-134
5	Endrin					42-139
6	4,4'-DDT					23-134

	COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
1	gamma-BHC (Lindane)					50	46-127
2	Heptachlor					31	35-130
3	Aldrin					43	34-132
4	Dieldrin					38	31-134
5	Endrin					45	42-139
6	4,4'-DDT					50	23-134

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

* Values outside of QC limits

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

COMMENTS: _____
_____

4 A
VOLATILE METHOD BLANK SUMMARY
PRIORITY POLLUTANT ANALYTES

Lab Name:_____ Contract:_____

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

Lab File ID: _____ Lab Sample ID:_____

Date Analyzed: _____ Time Analyzed:_____

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

Instrument ID: _____

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

	EG&G SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				

COMMENTS: _____

_____

4 B
SEMIVOLATILE METHOD BLANK SUMMARY
PRIORITY POLLUTANT ANALYTES

Lab Name:_____ Contract:_____

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

Lab File ID: _____ Lab Sample ID:_____

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

Date Analyzed: _____ Time Analyzed:_____

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

Instrument ID _____

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

	EG&G SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				

COMMENTS: _____

4 C

ORGANOCHLORINE PESTICIDE METHOD BLANK SUMMARY
PRIORITY POLLUTANT ANALYTES

Lab Name:_____ Contract:_____

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

Lab Sample ID: _____ Lab File ID: _____

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

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

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

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

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

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

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

	EG&G SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED 1	DATE ANALYZED 2
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				

COMMENTS: _____

_____

5 A

VOLATILE ORGANIC GC/MS TUNING AND MASS CALIBRATION - BROMOFLUOROBENZENE (BFB) PRIORITY POLLUTANT ANALYTES

Lab Name:_____ Contract:_____

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

Lab File ID: _____ BFB Injection Date:_____

Instrument ID:_____ BFB Injection Time:_____

Matrix:(soil/water) _____ Level:(low/med) _____ Column:(nar/wide) _____

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	15.0 - 40.0% of mass 95	
75	30.0 - 60.0% of mass 95	
95	Base peak, 100% relative abundance	
96	5.0 - 9.0% of mass 95	
173	Less than 2.0% of mass 174	( )1
174	Greater than 50.0% of mass 95	
175	5.0 - 9.0% of mass 174	( )1
176	Greater than 95.0%, but less than 101.0% of mass 174	( )1
177	5.0 - 9.0% of mass 176	( )2

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

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

	EG&G SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					

5 B

SEMIVOLATILE ORGANIC GC/MS TUNING AND MASS CALIBRATION - DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP) PRIORITY POLLUTANT ANALYTES

Lab Name:_____ Contract:_____

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

Lab File ID: _____ DFTPP Injection Date:_____

Instrument ID:_____ DFTPP Injection Time:_____

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
51	30.0 - 60.0% of mass 198	
68	Less than 2.0% of mass 69	( )1
69	Mass 69 relative abundance	
70	Less than 2.0% of mass 69	( )1
127	40.0 - 60.0% of mass 198	
197	Less than 1.0% of mass 198	
198	Base Peak, 100% relative abundance	
199	5.0 to 9.0 of mass 198	
275	10.0 - 30.0% of mass 198	
365	Greater than 1.00% of mass 198	
441	Present, but less than mass 443	
442	Greater than 40.0% of mass 198	
443	17.0 - 23.0% of mass 442	( )2

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

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

	EG&G SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					

6 A

VOLATILE ORGANICS INITIAL CALIBRATION DATA
PRIORITY POLLUTANT ANALYTES

Lab Name:_____ Contract:_____

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

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

Matrix:(soil/water)_____ Level:(low/med)_____ Column:(nar/wide)_____

Min RRF for SPCC(#) = 0.300 (0.250 for Bromoform). Max %RSD for CCC(*) = 30.0%

LAB FILE ID: RRF20 =_____ RRF50 =_____
RRF100=_____ RRF150=_____ RRF200=_____

	COMPOUND	RRF20	RRF50	RRF100	RRF150	RRF200	$\overline{RRF}$	% RSD	
1	Chloromethane	#							#
2	Bromomethane								
3	Vinyl Chloride	*							*
4	Chloroethane								
5	Methylene Chloride								
6	1,1-Dichloroethene	*							*
7	1,1-Dichloroethane	#							#
8	trans-1,2-Dichloroethene								
9	Chloroform	*							*
10	1,2-Dichloroethane								
11	1,1,1-Trichloroethane								
12	Carbon Tetrachloride								
13	Bromodichloromethane								
14	1,2-Dichloropropane	*							*
15	cis-1,3-Dichloropropene								
16	Trichloroethene								
17	Dibromochloromethane								
18	1,1,2-Trichloroethane								
19	Benzene								
20	Bromoform	#							#
21	Tetrachloroethene								
22	1,1,2,2-Tetrachloroethane	#							#
23	Toluene	*							*
24	Chlorobenzene	#							#
25	Ethylbenzene	*							*
26	Acrolein								*
27	Acrylonitrile								#
28	2-Chloroethyl vinyl ether								*
29	Toluene-d8								
30	Bromofluoropenzene								
31	1,2-Dichloroethane-d4								

6 B

SEMIVOLATILE ORGANICS INITIAL CALIBRATION DATA
PRIORITY POLLUTANT ANALYTES

Lab Name:_____ Contract:_____

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

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

Min RRF for SPCC(#) = 0.050 Max %RSD for CCC(*) = 30.0%

LAB FILE ID: RRF20 =_____ RRF50 =_____

RRF80 =_____ RRF120=_____ RRF160=_____

	COMPOUND	RRF20	RRF50	RRF80	RRF120	RRF160	$\overline{RRF}$	% RSD
1	Phenol	*						*
2	bis(2-Chloroethyl)ether							
3	2-Chlorophenol							
4	1,3-Dichlorobenzene							
5	1,4-Dichlorobenzene	*						*
6	1,2-Dichlorobenzene							
7	bis(2-Chloroisopropyl)ether							
8	N-Nitroso-di-n-propylamine	#						#
9	Hexachloroethane							
10	Nitrobenzene							
11	Isophorone							
12	2-Nitrophenol	*						*
13	2,4-Dimethylphenol							
14	bis(2-Chloroethoxy)methane							
15	2,4-Dichlorophenol	*						*
16	1,2,4-Trichlorobenzene							
17	Naphthalene							
18	Hexachlorobutadiene	*						*
19	4-Chloro-3-methylphenol	*						*
20	Hexachlorocyclopentadiene	#						#
21	2,4,6-Trichlorophenol	*						*
22	2-Chloronaphthalene							
23	Dimethylphthalate							
24	Acenaphthylene							
25	2,6-Dinitrotoluene							
26	Acenaphthene	*						*
27	2,4-Dinitrophenol	#						#
28	4-Nitrophenol	#						#

6 C

SEMIVOLATILE ORGANICS INITIAL CALIBRATION DATA
PRIORITY POLLUTANT ANALYTES

Lab Name:_____ Contract:_____

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

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

Min RRF for SPCC(#) = 0.050 Max %RSD for CCC(*) = 30.0%

LAB FILE ID: RRF20 =_____ RRF50 =_____

RRF80 =_____ RRF120=_____ RRF160=_____

	COMPOUND	RRF20	RRF50	RRF80	RRF120	RRF160	$\overline{RRF}$	% RSD
1	2,4-Dinitrotoluene							
2	Diethylphthalate							
3	4-Chlorophenyl-phenylether							
4	Fluorene							
5	4,6-Dinitro-2-methylphenol							
6	N-Nitrosodiphenylamine (1)	*						*
7	4-Bromophenyl-phenylether							
8	Hexachlorobenzene							
9	Pentachlorophenol	*						*
10	Phenanthrene							
11	Anthracene							
12	Di-n-butylphthalate							
13	Fluoranthene	*						*
14	Pyrene							
15	Butylbenzylphthalate							
16	3,3'-Dichlorobenzidine							
17	Benzo(a)anthracene							
18	Chrysene							
19	bis(2-Ethylhexyl)phthalate							
20	Di-n-octylphthalate	*						*
21	Benzo(b)fluoranthene							
22	Benzo(k)fluoranthene							
23	Benzo(a)pyrene	*						*
24	Indeno(1,2,3-cd)pyrene							
25	Dibenz(a,h)anthracene							
26	Benzo(g,h,i)perylene							
27	N-Nitrosodimethylamine							
28	Benzidine							
29	1,2-Diphenylhydrazine							
30	Nitrobenzene-d5							
31	2-Fluorobiphenyl							
32	Terphenyl-d14							
33	Phenol-d6							
34	2-Fluorophenol							
35	2,4,6-Tribromophenol							

(1) - Cannot be separated from Diphenylamine

7 A

VOLATILE CONTINUING CALIBRATION CHECK
PRIORITY POLLUTANT ANALYTES

Lab Name:_____ Contract:_____

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

Instrument ID:_____ Calibration Date:_____ Time:_____

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

Matrix: (soil/water)_____ Level: (low/med)_____ Column: (nar/wide)_____

Min RRF50 for SPCC(#) = 0.300 (0.250 for Bromoform) Max %D for CCC(*) = 25.0%

	COMPOUND	$\overline{RRF}$	RRF50	%D	
1	Chloromethane	#			#
2	Bromomethane				
3	Vinyl Chloride	*			*
4	Chloroethane				
5	Methylene Chloride				
6	1,1-Dichloroethene	*			*
7	1,1-Dichloroethane	#			#
8	trans-1,2-Dichloroethene				
9	Chloroform	*			*
10	1,2-Dichloroethane				
11	1,1,1-Trichloroethane				
12	Carbon Tetrachloride				
13	Bromodichloromethane				
14	1,2-Dichloropropane	*			*
15	cis-1,3-Dichloropropene				
16	Trichloroethene				
17	Dibromochloromethane				
18	1,1,2-Trichloroethane				
19	Benzene				
20	Bromoform	#			#
21	Tetrachloroethene				
22	1,1,2,2-Tetrachloroethane	#			#
23	Toluene	*			*
24	Chlorobenzene	#			#
25	Ethylbenzene	*			*
26	Acrolein				
27	Acrylonitrile				
28	2-Chloroethyl vinyl ether				
29	Toluene-d8				
30	Bromofluorobenzene				
31	1,2-Dichloroethane-d4				

7 B

SEMIVOLATILE CONTINUING CALIBRATION CHECK
PRIORITY POLLUTANT ANALYTES

Lab Name:_____ Contract:_____

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

Instrument ID:_____ Calibration Date:_____ Time:_____

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

Min RRF50 for SPCC(#) = 0.050 Max %D for CCC(*) = 25.0%

	COMPOUND	$\overline{RRF}$	RRF50	%D	
1	Phenol	*			*
2	bis(2-Chloroethyl)ether				
3	2-Chlorophenol				
4	1,3-Dichlorobenzene				
5	1,4-Dichlorobenzene	*			*
6	1,2-Dichlorobenzene				
7	bis(2-Chloroisopropyl)ether				
8	N-Nitroso-di-n-propylamine	#			#
9	Hexachloroethane				
10	Nitrobenzene				
11	Isophorone				
12	2-Nitrophenol	*			*
13	2,4-Dimethylphenol				
14	bis(2-Chloroethoxy)methane				
15	2,4-Dichlorophenol	*			*
16	1,2,4-Trichlorobenzene				
17	Naphthalene				
18	Hexachlorobutadiene	*			*
19	4-Chloro-3-methylphenol	*			*
20	Hexachlorocyclopentadiene	#			#
21	2,4,6-Trichlorophenol	*			*
22	2-Chloronaphthalene				
23	Dimethylphthalate				
24	Acenaphthylene				
25	2,6-Dinitrotoluene				
26	Acenaphthene	*			*
27	2,4-Dinitrophenol	#			#
28	4-Nitrophenol	#			#

7 C

SEMIVOLATILE CONTINUING CALIBRATION CHECK
PRIORITY POLLUTANT ANALYTES

Lab Name:_____ Contract:_____

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

Instrument ID:_____ Calibration Date:_____ Time:_____

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

Min RRF50 for SPCC(#) = 0.050 Max %D for CCC(*) = 25.0%

	COMPOUND	$\overline{RRF}$	RRF50	%D
1	2,4-Dinitrotoluene			
2	Diethylphthalate			
3	4-Chlorophenyl-phenylether			
4	Fluorene			
5	4,6-Dinitro-2-methylphenol			
6	N-Nitrosodiphenylamine (1)	*		*
7	4-Bromophenyl-phenylether			
8	Hexachlorobenzene			
9	Pentachlorophenol	*		*
10	Phenanthrene			
11	Anthracene			
12	Di-n-butylphthalate			
13	Fluoranthene	*		*
14	Pyrene			
15	Butylbenzylphthalate			
16	3,3'-Dichlorobenzidine			
17	Benzo(a)anthracene			
18	Chrysene			
19	bis(2-Ethylhexyl)phthalate			
20	Di-n-octylphthalate	*		*
21	Benzo(b)fluoranthene			
22	Benzo(k)fluoranthene			
23	Benzo(a)pyrene	*		*
24	Indeno(1,2,3-cd)pyrene			
25	Dibenz(a,h)anthracene			
26	Benzo(g,h,i)perylene			
27	N-Nitrosodimethylamine			
28	Benzidine			
29	1,2-Diphenylhydrazine			
30	Nitrobenzene-d5			
31	2-Fluorobiphenyl			
32	Terphyenyl-d14			
33	Phenol-d6			
34	2-Fluorophenol			
35	2,4,6-Tribromophenol			

(1) Cannot be separated from Diphenylamine

8 A
VOLATILE INTERNAL STANDARD AREA SUMMARY
PRIORITY POLLUTANT ANALYTES

Lab Name:_____ Contract:_____

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

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

Instrument ID:_____ Time Analyzed:_____

Matrix: (soil/water)_____ Level: (low/med)_____ Column: (pack/cap)_____

	IS1(BCM) AREA #	RT	IS2(DFB) AREA #	RT	IS3(CBZ) AREA #	RT
12 HOUR STD						
UPPER LIMIT						
LOWER LIMIT						
EG&G SAMPLE NO.						
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						

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

UPPER LIMIT = + 100%
of internal standard area.
LOWER LIMIT = - 50%
of internal standard area.

Column used to flag internal standard area values with an asterisk

8 B
SEMIVOLATILE INTERNAL STANDARD AREA SUMMARY
PRIORITY POLLUTANT ANALYTES

Lab Name:_____ Contract:_____

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

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

Instrument ID:_____ Time Analyzed:_____

	IS1(DCB) AREA #	RT	IS2(NPT) AREA #	RT	IS3(ANT) AREA #	RT
12 HOUR STD						
UPPER LIMIT						
LOWER LIMIT						
EG&G SAMPLE NO.						
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						

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

UPPER LIMIT = + 100%
of internal standard area.
LOWER LIMIT = - 50%
of internal standard area.

Column used to flag internal standard area values with an asterisk

8 C
SEMIVOLATILE INTERNAL STANDARD AREA SUMMARY
PRIORITY POLLUTANT ANALYTES

Lab Name:_____ Contract:_____

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

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

Instrument ID:_____ Time Analyzed:_____

	IS1(PHN) AREA #	RT	IS2(CRY) AREA #	RT	IS3(PRY) AREA #	RT
12 HOUR STD						
UPPER LIMIT						
LOWER LIMIT						
EG&G SAMPLE NO.						
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						

IS1 (PHN) = Phenanthrene-d10
IS2 (CRY) = Chrysene-d12
IS3 (PRY) = Perylene-d12

UPPER LIMIT = + 100%
of internal standard area.
LOWER LIMIT = - 50%
of internal standard area.

Column used to flag internal standard area values with an asterisk

8 D
ORGANOCHLORINE PESTICIDE EVALUATION STANDARDS SUMMARY
PRIORITY POLLUTANT ANALYTES

Lab Name:_____ Contract:_____

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

Instrument ID:_____ GC Column ID:_____

Dates of Analyses:_____ to _____

Evaluation Check for Linearity

	PESTICIDE	CALIBRATION FACTOR EVAL MIX A	CALIBRATION FACTOR EVAL MIX B	CALIBRATION FACTOR EVAL MIX C	%RSD (</= 10.0%)
1	Aldrin				
2	Endrin				
3	4,4'-DDT				
4	DBC				
5	TCMX				

(1) If > 10.0% RSD, plot a standard curve and determine the ng for each sample in that set from the curve.

Evaluation Check for 4,4'-DDT/Endrin Breakdown
(percent breakdown expressed as total degradation)

		DATE ANALYZED	TIME ANALYZED	ENDRIN	4,4'-DDT	COMBINED (2)
	INITIAL					
1	EVAL MIX B					
2	EVAL MIX B					
3	EVAL MIX B					
4	EVAL MIX B					
5	EVAL MIX B					
6	EVAL MIX B					
7	EVAL MIX B					
8	EVAL MIX B					
9	EVAL MIX B					
10	EVAL MIX B					
11	EVAL MIX B					
12	EVAL MIX B					
13	EVAL MIX B					
14	EVAL MIX B					

(2) See Form instructions.

8 E

ORGANOCHLORINE PESTICIDE EVALUATION STANDARDS SUMMARY
PRIORITY POLLUTANT ANALYTES
Evaluation of Retention Time Shift for Dibutylchlorendate

Lab Name:_____ Contract:_____

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

Instrument ID:_____ GC Column ID:_____

Dates of Analyses:_____ to _____

	EG&G SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED	TIME ANALYZED	% D	*
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						
31						
32						
33						
34						
35						
36						
37						
38						

* Values outside of QC limits (2.0% for packed columns, 0.3% for capillary columns)

9 A

ORGANOCHLORINE PESTICIDE/PCB STANDARDS SUMMARY
PRIORITY POLLUTANT ANALYTES

Lab Name:_____ Contract:_____

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

Instrument ID:_____ GC Column ID:_____

DATE(S) OF ANALYSIS FROM:_____ TO:_____
TIME(S) OF ANALYSIS FROM:_____ TO:_____

DATE OF ANALYSIS_____
TIME OF ANALYSIS_____
EPA SAMPLE NO. (STANDARD) _____

	COMPOUND	RT	RT WINDOW FROM	RT WINDOW TO	CALIBRATION	RT	CALIBRATION FACTOR	QNT Y/N	%D
1	alpha-BHC								
2	beta-BHC								
3	delta-BHC								
4	gamma-BHC (Lindane)								
5	Heptachlor								
6	Aldrin								
7	Heptachlor epoxide								
8	Endosulfan I								
9	Dieldrin								
10	4,4'-DDE								
11	Endrin								
12	Endrin aldehyde								
12	Endosulfan II								
13	4,4'-DDD								
14	Endosulfan sulfate								
15	4,4'-DDT								
20	Toxaphene								
21	Aroclor-1016								
22	Aroclor-1221								
23	Aroclor-1232								
24	Aroclor-1242								
25	Aroclor-1248								
26	Aroclor-1254								
27	Aroclor-1260								
27	Chlordane (Technical)								

Under QNT Y/N: enter Y if quantitation was performed, N if not performed.
%D must be less than or equal to 15.0% for quantitation, and less than or equal to 20.0% for confirmation.

Note: Determining that no compounds were found above the CRQL is a form of quantitation, and therefore at least one column must meet the 15.0% criteria.

For multicomponent analytes, the single largest peak that is characteristic of the component should be used to establish retention time and %D. Identification of such analytes is based primarily on pattern recognition.

10

ORGANOCHLORINE PESTICIDE/PCB IDENTIFICATION
PRIORITY POLLUTANT ANALYTES

EG&G Sample No. [ ]

Lab Name:_____ Contract: _____

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

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

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

Lab Sample ID: _____

Lab File ID: _____ (only if confirmed by GC/MS)

PESTICIDE/PCB	RETENTION TIME		RT WINDOW OF STANDARD From	To	QUANT? (Y/N)	GC/MS? (Y/N)
01_____	Column 1	_____	_____	_____	-	-
02	Column 2	_____	_____	_____	-	-
03_____	Column 1	_____	_____	_____	-	-
04	Column 2	_____	_____	_____	-	-
05_____	Column 1	_____	_____	_____	-	-
06	Column 2	_____	_____	_____	-	-
07_____	Column 1	_____	_____	_____	-	-
08	Column 2	_____	_____	_____	-	-
09_____	Column 1	_____	_____	_____	-	-
10	Column 2	_____	_____	_____	-	-
11_____	Column 1	_____	_____	_____	-	-
12	Column 2	_____	_____	_____	-	-

Comments: _____

SECTION C

TARGET ANALYTE LISTS AND PRACTICAL QUANTITATION LIMITS OR METHOD DETECTION LIMITS

Table of Contents

PART I

INTRODUCTION

This Section of the EG&G Idaho Basic Ordering Agreement gives the target analyte lists that correspond to the forms that have been provided in Section B. The target lists are separated by fraction and in some cases by a specific method. The practical quantitation limits listed in Parts II and IV are based on analysis for these compounds using the methods described in "Test Methods For Evaluating Solid Waste" (SW-846, 3rd Edition, and the proposed updates to the 3rd Edition). The method detection limits listed for USEPA method 524.2 in Part III are those published in the document that contains the method, "Methods for the Determination of Organic Compounds in Drinking Water" (EPA-600/4-88/039).

These lists are to be used for reporting data on the forms provided. The quantitation limits listed will be reported, corrected for dilutions, moisture content etc. (along with the appropriate flag from Section B) when no positive qualitative result for a compound is obtained from a sample, blank, matrix spike, matrix spike duplicate, or QC check sample.

As stated previously, the method detection limits (MDL) listed for method 524.2 are those published in the method. All laboratories participating under this Basic Ordering Agreement will be required to submit the results of the method detection limit determination, described in Sections 10.3 and 13.2 of the referenced method, prior to being eligible to receive samples for this analysis. For reporting undetected qualitative results on the forms for method 524.2, the laboratory shall report the values listed in this Section of the BOA, corrected for dilutions, sample volumes, etc., (along with the appropriate flag from Section B) unless the laboratory's MDL is higher than the MDL listed in this Section. For instances when the laboratory's MDL is higher than the MDL listed in this Section, and no positive qualitative result is obtained for a compound, the Subcontractor shall report the laboratory's MDL, corrected for dilutions, sample volume, etc., with a "U" flag and a laboratory specific flag (e.g., "X"). The Subcontractor shall explain the laboratory specific flags in the case narrative (see Section B, Part III).

The target lists provided in this Section correspond to the current data reporting forms developed at EG&G Idaho. As new reporting and data management capabilities are developed this BOA will be updated and new forms and target lists will be issued.

PART II

RCRA (40 CFR Part 264) APPENDIX IX TARGET ANALYTE LIST AND PRACTICAL QUANTITATION LIMITS

RCRA (40 CFR Part 264) Appendix IX
Target Analyte List and
Practical Quantitation Limits (PQL)*

Volatiles	CAS Number	Quantitation Limits** Water[a] ug/L	Low Soil/Sediment[b] ug/Kg
1. Dichlorodifluoromethane	75-71-8	5	5
2. Chloromethane	74-87-3	5	5
3. Vinyl Chloride	75-01-4	5	5
4. Bromomethane	74-83-9	5	5
5. Chloroethane	75-00-3	5	5
6. Trichlorofluoromethane	75-69-4	5	5
7. 1,1-Dichloroethene	75-35-4	5	5
8. Methylene Chloride	75-09-2	5	5
9. Acetone	67-64-1	10	10
10. Carbon Disulfide	75-15-0	5	5
11. trans-1,2-Dichloroethene	156-60-5	5	5
12. Iodomethane	74-88-4	5	5
13. 1,1-Dichloroethane	75-34-3	5	5
14. cis-1,2-Dichloroethene	156-69-4	5	5
15. Chloroform	75-15-0	5	5
16. 1,1,1-Trichloroethane	71-55-6	5	5
17. Carbon Tetrachloride	56-23-5	5	5
18. Vinyl Acetate	108-05-4	10	10
19. Benzene	71-43-2	5	5
20. 1,2-Dichloroethane	107-06-2	5	5
21. 2-Butanone	78-93-3	10	10
22. Trichloroethene	79-01-6	5	5
23. cis-1,3-Dichloropropene	10061-01-5	5	5
24. 1,2-Dichloropropane	78-87-5	5	5
25. 1,4-Dioxane	123-91-1	5	5
26. Dibromomethane	74-95-3	5	5
27. Bromodichloromethane	75-27-4	5	5
28. Toluene	108-88-3	5	5
29. 1,1,2-Trichloroethane	79-00-5	5	5
30. Tetrachloroethene	127-18-4	5	5
31. 2-Hexanone	591-78-6	10	10
32. 4-Methyl-2-pentanone	108-10-1	10	10
33. Dibromochloromethane	124-48-1	5	5
34. trans-1,3-Dichloropropene	10061-02-6	5	5
35. 1,2-Dibromoethane	106-93-4	5	5

(continued)

Volatiles	CAS Number	Quantitation Limits** Water[a] ug/L	Low Soil/Sediment[b] ug/Kg
36. Chlorobenzene	108-90-7	5	5
37. 1,1,1,2-Tetrachloroethane	630-20-6	5	5
38. Ethyl Benzene	100-41-4	5	5
39. Xylene (Total meta & para)	1330-20-7	5	5
40. Xylene (ortho)	95-47-6	5	5
41. Styrene	100-42-5	5	5
42. Bromoform	75-25-2	5	5
43. 1,1,2,2-Tetrachloroethane	79-34-5	5	5
44. 1,2,3-Trichloropropane	96-18-4	5	5
45. 1,2-Dibromo-3-chloropropane	96-12-8	5	5
46. Acetonitrile	75-05-8	5	5
47. Acrolein	107-02-8	5	5
48. Acrylonitrile	107-13-1	5	5
49. Allyl chloride	107-05-1	5	5
50. Chloroprene (2-Chloro-1,3-butadiene)	126-99-8	5	5
51. Isobutyl alcohol	78-83-1	5	5
52. Methacrylonitrile	126-09-7	5	5
53. Propionitrile	107-12-0	5	5
54. trans-1,4-Dichloro-2-butene	110-57-6	5	5

[a] Practical Quantitation Limits listed assume a 5 mL volume of sample purged. If 25 mL sample is purged divide the listed PQL by 5.

[b] Medium Soil/Sediment Practical Quantitation Limits (PQL) for Volatile Target Analyte List Compounds are 125 times the individual Low Soil/Sediment PQL.

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

** Quantitation Limits listed for soil/sediment are based on wet weight. The quantitation limits calculated by the laboratory for soil/sediment, calculated on a dry weight basis as required by the BOA, will be higher.

Target Analyte List and
Practical Quantitation Limits (PQL)*

Semivolatiles	CAS Number	Quantitation Limits** Water ug/L	Low Soil/Sediment[c] ug/Kg
55. 2-Picoline	109-06-8	50	3300
56. Aniline	62-53-3	10	670
57. Phenol	108-95-2	10	670
58. bis(2-Chloroethyl) ether	111-44-4	10	670
59. 2-Chlorophenol	95-57-8	10	670
60. 1,3-Dichlorobenzene	541-73-1	10	670
61. 1,4-Dichlorobenzene	106-46-7	10	670
62. Benzyl alcohol	100-51-6	10	670
63. 1,2-Dichlorobenzene	95-50-1	10	670
64. N-Nitrosomethylethylamine	10595-95-6	50	3300
65. bis (2-Chloroisopropyl) ether	108-60-1	10	670
66. Methylmethanesulfonate	66-27-3	10	670
67. N-Nitrosodi-n-propylamine	621-64-7	10	670
68. Hexachloroethane	67-72-1	10	670
69. Nitrobenzene	98-95-3	10	670
70. Isophorone	78-59-1	10	670
71. N-Nitrosodiethylamine	55-18-5	20	1300
72. 2-Nitrophenol	88-75-5	10	670
73. 2,4-Dimethylphenol	105-67-9	10	670
74. bis(2-Chloroethoxy) methane	111-91-1	10	670
75. Benzoic acid	65-85-0	50	3300
76. 2,4-Dichlorophenol	120-83-2	10	670
77. Ethyl methanesulfonate	62-50-0	20	1300
78. 1,2,4-Trichlorobenzene	120-82-1	10	670
79. Naphthalene	91-20-3	10	670
80. Hexachlorobutadiene	87-68-3	10	670
81. 4-Chloro-3-methylphenol (para-chloro-meta-cresol)	59-50-7	10	670
82. 2-Methylnaphthalene	91-57-6	10	670
83. 2-Methylphenol	95-48-7	10	670
84. Hexachloropropene	1888-71-7	10	670
85. Hexachlorocyclopentadiene	77-47-4	10	670
86. N-Nitrosopyrrolidine	930-55-2	40	2700
87. Acetophenone	98-86-2	10	670
88. 4-Methylphenol	106-44-5	10	670
89. 2,4,6-Trichlorophenol	88-06-2	10	670

(continued)

Semivolatiles	CAS Number	Quantitation Limits** Water ug/L	Low Soil/Sediment[c] ug/Kg
90. o-Toluidine	95-53-4	10	670
91. 3-Methylphenol	108-39-4	10	670
92. 2-Chloronaphthalene	91-58-7	10	670
93. N-Nitrosopiperidine	100-75-4	20	1300
94. 1,4-Phenylenediamine	106-50-3	10	670
95. 2-Nitroaniline	88-74-4	50	3300
96. Dimethylphthalate	131-11-3	10	670
97. Acenaphthylene	208-96-8	10	670
98. 2,6-Dinitrotoluene	606-20-2	10	670
99. 3-Nitroaniline	99-09-2	50	3300
100. Acenaphthene	83-32-9	10	670
101. 2,4-Dinitrophenol	51-28-5	50	3300
102. 4-Chloroaniline	106-47-8	10	670
103. Isosafrole	120-58-1	10	670
104. Dibenzofuran	132-64-9	10	670
105. 2,4-Dinitrotoluene	121-14-2	10	670
106. 4-Nitrophenol	100-02-7	50	3300
107. 2-Naphthylamine	91-59-8	10	670
108. 1,4-Naphthoquinone	130-15-4	10	670
109. Diethylphthalate	84-66-2	10	670
110. Fluorene	86-73-7	10	670
111. N-Nitroso-di-n-butylamine	924-16-3	10	670
112. 4-Chlorophenyl-phenyl ether	7005-72-3	10	670
113. 4,6-Dinitro-2-methylphenol	534-52-1	50	3300
114. N-Nitrosodiphenylamine	86-30-3	10	670
115. Safrole	94-59-7	10	670
116. Diphenylamine	122-39-4	10	670
117. 1,2,4,5-Tetrachlorobenzene	95-94-3	10	670
118. 1-Naphthylamine	134-32-7	10	670
119. 4-Bromophenyl-phenyl ether	101-55-3	10	670
120. 2,4,5-Trichlorophenol	95-95-4	50	3300
121. Hexachlorobenzene	118-74-1	10	670
122. Pentachlorophenol	87-86-5	50	3300
123. 5-Nitro-o-toluidine	99-55-8	10	670
124. Thionazin	297-97-2	20	1300
125. 4-Nitroaniline	100-01-6	50	3300
126. Phenanthrene	85-01-8	10	670
127. Anthracene	120-12-7	10	670
128. 1,3-Dinitrobenzene	99-65-0	20	1300
129. Pentachlorobenzene	608-93-5	10	670

(continued)

Semivolatiles	CAS Number	Quantitation Limits** Water ug/L	Low Soil/Sediment[C] ug/Kg
130. Pentachloronitrobenzene	82-68-8	20	1300
131. 4-Nitroquinoline-1-oxide	56-57-5	40	2700
132. Di-n-butylphthalate	84-74-2	10	670
133. 2,3,4,6-Tetrachlorophenol	58-90-2	10	670
134. Fluoranthene	206-44-0	10	670
135. 1,3,5-Trinitrobenzene	99-35-4	10	670
136. Pyrene	129-00-0	10	670
137. Phenacetin	62-44-2	20	1300
138. 4-Aminobiphenyl	92-67-1	20	1300
139. a,a-Dimethylphenethylamine	122-09-8	40	2700
140. Pronamide	23950-58-5	10	670
141. Dinoseb	88-85-7	20	1300
142. Butylbenzylphthalate	85-68-7	10	670
143. Benzo(a)anthracene	56-55-3	10	670
144. 3,3'-Dichlorobenzidine	91-94-1	20	1300
145. Chrysene	218-01-9	10	670
146. bis(2-Ethylhexyl)phthalate	117-81-7	10	670
147. 3,3'-Dimethylbenzidine	119-93-7	10	670
148. Methapyrilene	91-80-5	100	6700
149. Di-n-octylphthalate	117-84-0	10	670
150. Aramite	140-57-8	20	1300
151. Benzo(b)fluoranthene	205-99-2	10	670
152. Benzo(k)fluoranthene	207-08-9	10	670
153. Famphur	52-85-7	20	1300
154. Benzo(a)pyrene	50-32-8	10	670
155. 7,12-Dimethylbenz(a)-anthracene	57-97-6	10	670
156. 2-Acetylaminofluorene	53-96-3	20	1300
157. 3-Methylcholanthrene	56-49-5	10	670
158. Indeno(1,2,3-cd)pyrene	193-39-5	10	670
159. Dibenz(a,h)anthracene	53-70-3	10	670
160. Benzo(g,h,i)perylene	191-24-2	10	670
161. Hexachlorophene	70-30-4	500	33000
162. Ethyl methacrylate	97-63-2	10	670
163. N-nitrosomorpholine	59-89-2	10	670
164. Methyl methacrylate	80-62-6	10	670
165. Pentachloroethane	76-01-7	10	670
166. Pyridine	110-86-1	10	670
167. o,o,o-Triethylphosphoro-thioate	126-68-1	10	670
168. 2,6-Dichlorophenol	87-65-0	10	670
169. p-(Dimethylamino)azobenzene	60-11-7	10	670

Semivolatiles	CAS Number	Quantitation Limits** Water ug/L	Low Soil/Sediment[c] ug/Kg
170. N-nitrosodimethylamine	62-75-9	10	670

[c] Medium Soil/Sediment Practical Quantitation Limits (PQL) for semivolatile Target Analyte List compounds are 30 times the individual Low Soil/Sediment PQL. The PQL for non-water miscible waste samples is 75 times the individual Low Soil/Sediment PQL.

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

** PQLs listed for soil/sediment are based on wet weight. The quantitation limits calculated by the laboratory for soil/sediment, calculated on dry weight basis as required by the BOA, will be higher. The PQLs listed are based on a 30-g sample and gel permeation chromatography (GPC) cleanup with no measure taken to account for half the extract being lost in the GPC procedure (e.g., concentration to 0.5 mL rather than 1.0 mL).

Target Analyte List and Practical Quantitation Limits (PQL)*

Organochlorine Pesticides/PCBs	CAS Number	Quantitation Limits** Water ug/L	Low Soil/Sediment[d] ug/Kg
171. alpha-BHC	319-84-6	0.030	2.0
172. beta-BHC	319-85-7	0.060	4.0
173. delta-BHC	319-86-8	0.090	6.0
174. gamma-BHC (Lindane)	58-89-9	0.040	2.7
175. Heptachlor	76-44-8	0.030	2.0
176. Aldrin	309-00-2	0.040	2.7
177. Heptachlor epoxide	1024-57-3	0.83	56.
178. Endosulfan I	959-98-8	0.14	9.4
179. Dieldrin	60-57-1	0.020	1.3
180. 4,4'-DDE	72-55-9	0.040	2.7
181. Endrin	72-20-8	0.060	4.0
182. Endrin aldehyde	7421-93-4	0.23	15.
183. Endosulfan II	33213-65-9	0.040	2.7
184. 4,4'-DDD	72-54-8	0.11	7.4
185. Endosulfan sulfate	1031-07-8	0.66	44.
186. 4,4'-DDT	50-29-3	0.12	8.0
187. Methoxychlor	72-43-5	1.8	120.
188. Endrin Ketone	53494-70-5	0.10	16.
189. alpha-Chlordane	5103-71-9	0.50	80.
190. gamma-Chlordane	5103-74-2	0.50	80.
191. Di-allate	2303-16-4	0.50	80.
192. Chlorobenzilate	510-15-6	0.50	80.
193. Isodrin	465-73-6	0.50	80.
194. Kepone	143-50-0	0.50	80.
195. Chlordane (technical)	57-74-9	0.14	9.4
196. Toxaphene	8001-35-2	2.4	160.
197. Aroclor-1016	12674-11-2	0.50	80.
198. Aroclor-1221	11104-28-2	0.50	80.
199. Aroclor-1232	11141-16-5	0.50	80.
200. Aroclor-1242	53469-21-9	0.65	44.
201. Aroclor-1248	12672-29-6	0.50	80.
202. Aroclor-1254	11097-69-1	1.0	160.
203. Aroclor-1260	11096-82-5	1.0	160.

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[d] Medium Soil/Sediment Practical Quantitation Limits (PQL) for Organochlorine Pesticides/PCB TAL compounds are 15 times the individual Low Soil/Sediment PQL.

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

** Quantitation limits listed for soil/sediment are based on wet weight, and assume GPC cleanup has been performed, and that 30-g of soil has been extracted for organochlorine pesticides/PCBs, separate from the 30-g used for the semivolatiles. If the semivolatile extract is split and solvent exchanged for use in pesticide/PCB analysis, as in the CLP protocol, then the PQLs presented must be doubled. The quantitation limits calculated by the laboratory for soil/sediment, calculated on dry weight basis as required by the 8OA, will be higher.

Target Analyte List and Practical Quantitation Limits (PQL)*

Organophosphorus Pesticides	CAS Number	Quantitation Limits** Water ug/L	Low Soil/Sediment[e] ug/Kg
204. Phorate	298-02-2	0.40	20.
205. Sulfotep	3689-24-5	0.70	35.
206. Dimethoate	60-51-5	2.6	130.
207. Disulfoton	298-04-4	0.70	35.
208. Methyl parathion	298-00-0	1.2	60.
209. Parathion	56-38-2	0.60	30.

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e Medium Soil/Sediment Practical Quantitation Limits (PQL) for Organophosphorus Pesticides TAL compounds are 15 times the individual Low Soil/Sediment PQL.

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

** Quantitation limits listed for soil/sediment are based on wet weight. The quantitation limits calculated by the laboratory for soil/sediment, calculated on dry weight basis as required by the BOA, will be higher.

Target Analyte List and Practical Quantitation Limits (PQL)*

Organochlorine Herbicides	CAS Number	Quantitation Limits** Water ug/L	Soil/Sediment ug/Kg
210. 2,4-D	94-75-7	12.	240.
211. 2,4,5-TP (Silvex)	93-72-1	1.7	34.
212. 2,4,5-T	93-76-5	2.0	40.

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

** Quantitation limits listed for soil/sediment are based on wet weight. The quantitation limits calculated by the laboratory for soil/sediment, calculated on dry weight basis as required by the BOA, will be higher.

PART III

USEPA METHOD 524.2 (Rev. 3.0)
TARGET ANALYTE LIST AND
METHOD DETECTION LIMITS

USEPA Method 524.2 (Rev. 3.0)
Target Analyte List and
Method Detection Limits (MDL)*

Volatiles	CAS Number	Method Detection Limits** Wide Bore Column ug/L	Narrow Bore Column ug/L
1. Dichlorodifluoromethane	75-71-8	0.10	0.11
2. Chloromethane	74-87-3	0.13	0.05
3. Vinyl Chloride	75-01-4	0.17	0.04
4. Bromomethane	74-83-9	0.11	0.06
5. Chloroethane	75-00-3	0.10	0.02
6. 1,1-Dichloroethene	75-35-4	0.12	0.05
7. Methylene Chloride	75-04-2	0.03	0.09
8. trans-1,2-Dichloroethene	156-60-5	0.06	0.03
9. 1,1-Dichloroethane	75-34-3	0.04	0.03
10. 2,2-Dichloropropane	590-20-7	0.35	0.05
11. cis-1,2-Dichloroethene	156-69-4	0.12	0.06
12. Chloroform	67-66-3	0.03	0.02
13. Bromochloromethane	74-97-5	0.04	0.07
14. 1,1,1-Trichloroethane	71-55-6	0.08	0.04
15. Carbon Tetrachloride	56-23-5	0.21	0.08
16. 1,1-Dichloropropene	563-58-6	0.10	0.02
17. Benzene	71-43-2	0.04	0.03
18. 1,2-Dichloroethane	107-06-2	0.06	0.02
19. Trichloroethene	79-01-6	0.19	0.02
20. 1,2-Dichloropropane	78-87-58	0.04	0.02
21. Bromodichloromethane	75-27-4	0.08	0.03
22. Dibromomethane	74-95-3	0.24	0.03
23. trans-1,3-Dichloropropene	10061-02-6	ND	ND
24. Toluene	108-88-3	0.11	0.08
25. cis-1,3-Dichloropropene	10061-01-5	ND	ND
26. 1,1,2-Trichloroethane	79-00-5	0.10	0.03
27. Tetrachloroethene	127-18-4	0.14	0.05
28. 1,3-Dichloropropane	142-28-9	0.04	0.04
29. Dibromochloromethane	124-48-1	0.05	0.07
30. 1,2-Dibromoethane	106-93-4	0.06	0.02
31. Chlorobenzene	108-90-7	0.04	0.03
32. 1,1,1,2-Tetrachloroethane	630-20-6	0.05	0.04
33. Ethylbenzene	100-41-4	0.06	0.03
34. Xylene (total meta & para)	1330-20-7	0.13	0.06
35. Xylene (ortho)	95-47-6	0.11	0.06

USEPA Method 524.2 (Rev. 3.0)
Target Analyte List and
Method Detection Limits (MDL)*

Volatiles	CAS Number	Method Detection Limits** Wide Bore Column ug/L	Narrow Bore Column ug/L
36. Styrene	100-42-5	0.04	0.06
37. Bromoform	75-25-2	0.12	0.20
38. Isopropylbenzene	98-82-8	0.15	0.10
39. 1,1,2,2-Tetrachloroethane	79-34-5	0.04	0.20
40. Bromobenzene	108-86-1	0.03	0.11
41. 1,2,3-Trichloropropane	96-18-4	0.32	0.03
42. n-Propylbenzene	103-65-1	0.04	0.06
43. 2-Chlorotoluene	95-49-8	0.04	0.05
44. 1,3,5-Trimethylbenzene	108-67-8	0.05	0.02
45. 4-Chlorotoluene	106-43-4	0.06	0.05
46. tert-Butylbenzene	98-06-6	0.14	0.33
47. 1,2,4-Trimethylbenzene	95-63-6	0.13	0.04
48. sec-Butylbenzene	135-98-8	0.13	0.12
49. 1,3-Dichlorobenzene	541-73-1	0.12	0.05
50. 1,4-Dichlorobenzene	106-46-7	0.03	0.04
51. n-Butylbenzene	104-51-8	0.11	0.03
52. 1,2-Dichlorobenzene	95-50-1	0.03	0.05
53. 1,2-Dibromo-3-chloropropane	96-12-8	0.26	0.05
54. 1,2,4-Trichlorobenzene	120-82-1	0.04	0.20
55. Hexachlorobutadiene	87-68-3	0.11	0.04
56. Naphthalene	91-20-3	0.04	0.04
57. 1,2,3-Trichlorobenzene	87-61-6	0.03	0.04

* Method detection limits are those published in the method and may not be achievable in all laboratories (see the Introduction to this Section).

** Method 524.2 is applicable to water samples only. The Method Detection Limits are listed for wide bore and narrow bore capillary columns. A wide bore capillary column is defined as having a internal diameter of greater than 0.32 mm. The data for the narrow bore column was obtained using the cryogenic trapping option in the method.

ND Not Determined for this compound. Use the laboratory determined MDL for reporting.

PART IV
PRIORITY POLLUTANT LIST
TARGET ANALYTES
AND
PRACTICAL QUANTITATION LIMITS

Priority Pollutant List
Target Analytes and
Practical Quantitation Limits (PQL)*

Volatiles	CAS Number	Quantitation Limits** Water[a] ug/L	Low Soil/Sediment[b] ug/Kg
1. Chloromethane	74-87-3	5	5
2. Vinyl Chloride	75-01-4	5	5
3. Bromomethane	74-83-9	5	5
4. Chloroethane	75-00-3	5	5
5. 1,1-Dichloroethene	75-35-4	5	5
6. Methylene Chloride	75-09-2	5	5
7. trans-1,2-Dichloroethene	156-60-5	5	5
8. 1,1-Dichloroethane	75-34-3	5	5
9. Chloroform	75-15-0	5	5
10. 1,1,1-Trichloroethane	71-55-6	5	5
11. Carbon Tetrachloride	56-23-5	5	5
12. Benzene	71-43-2	5	5
13. 1,2-Dichloroethane	107-06-2	5	5
14. Trichloroethene	79-01-6	5	5
15. cis-1,3-Dichloropropene	10061-01-5	5	5
16. 1,2-Dichloropropane	78-87-5	5	5
17. Bromodichloromethane	75-27-4	5	5
18. 1,1,2-Trichloroethane	79-00-5	5	5
19. Tetrachloroethene	127-18-4	5	5
20. Dibromochloromethane	124-48-1	5	5
21. Toluene	108-88-3	5	5
22. Chlorobenzene	108-90-7	5	5
23. Ethyl Benzene	100-41-4	5	5
24. Bromoform	75-25-2	5	5
25. 1,1,2,2-Tetrachloroethane	79-34-5	5	5
26. Acrolein	107-02-8	5	5
27. Acrylonitrile	107-13-1	5	5
28. 2-Chloroethyl vinyl ether	110-75-8	10	10

[a] Practical Quantitation Limits listed assume a 5 mL volume of sample purged. If 25 mL sample is purged divide the listed PQL by 5.

b Medium Soil/Sediment Practical Quantitation Limits (PQL) for Volatile Target Analyte List Compounds are 125 times the individual Low Soil/Sediment PQL.

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

** Quantitation Limits listed for soil/sediment are based on wet weight. The quantitation limits calculated by the laboratory for soil/sediment, calculated on a dry weight basis as required by the BOA, will be higher.

Priority Pollutant List
Target Analytes and
Practical Quantitation Limits (PQL)*

Semivolatiles	CAS Number	Quantitation Limits** Water ug/L	Low Soil/Sediment[c] ug/Kg
29. Phenol	108-95-2	10	670
30. bis(2-Chloroethyl) ether	111-44-4	10	670
31. 2-Chlorophenol	95-57-8	10	670
32. 1,3-Dichlorobenzene	541-73-1	10	670
33. 1,4-Dichlorobenzene	106-46-7	10	670
34. 1,2-Dichlorobenzene	95-50-1	10	670
35. N-Nitrosomethylethylamine	10595-95-6	50	3300
36. bis (2-Chloroisopropyl) ether	108-60-1	10	670
37. N-Nitrosodi-n-propylamine	621-64-7	10	670
38. Hexachloroethane	67-72-1	10	670
39. Nitrobenzene	98-95-3	10	670
40. Isophorone	78-59-1	10	670
41. 2-Nitrophenol	88-75-5	10	670
42. 2,4-Dimethylphenol	105-67-9	10	670
43. bis(2-Chloroethoxy) methane	111-91-1	10	670
44. 2,4-Dichlorophenol	120-83-2	10	670
45. 1,2,4-Trichlorobenzene	120-82-1	10	670
46. Naphthalene	91-20-3	10	670
47. Hexachlorobutadiene	87-68-3	10	670
48. 4-Chloro-3-methylphenol (para-chloro-meta-cresol)	59-50-7	10	670
49. Hexachlorocyclopentadiene	77-47-4	10	670
50. 2,4,6-Trichlorophenol	88-06-2	10	670
51. 2-Chloronaphthalene	91-58-7	10	670
52. Dimethylphthalate	131-11-3	10	670
53. Acenaphthylene	208-96-8	10	670
54. 2,6-Dinitrotoluene	606-20-2	10	670
55. Acenaphthene	83-32-9	10	670
56. 2,4-Dinitrophenol	51-28-5	50	3300
57. 2,4-Dinitrotoluene	121-14-2	10	670
58. 4-Nitrophenol	100-02-7	50	3300

(continued)

Semivolatiles	CAS Number	Quantitation Limits** Water ug/L	Low Soil/Sediment[C] ug/Kg
59. Diethylphthalate	84-66-2	10	670
60. Fluorene	86-73-7	10	670
61. 4,6-Dinitro-2-methylphenol	534-52-1	50	3300
62. N-Nitrosodiphenylamine	86-30-3	10	670
63. 4-Bromophenyl-phenyl ether	101-55-3	10	670
64. Hexachlorobenzene	118-74-1	10	670
65. Pentachlorophenol	87-86-5	50	3300
66. Phenanthrene	85-01-8	10	670
67. Anthracene	120-12-7	10	670
68. Di-n-butylphthalate	84-74-2	10	670
69. Fluoranthene	206-44-0	10	670
70. Pyrene	129-00-0	10	670
71. Butylbenzylphthalate	85-68-7	10	670
72. Benzo(a)anthracene	56-55-3	10	670
73. 3,3'-Dichlorobenzidine	91-94-1	20	1300
74. Chrysene	218-01-9	10	670
75. bis(2-Ethylhexyl)phthalate	117-81-7	10	670
76. Di-n-octylphthalate	117-84-0	10	670
77. Benzo(b)fluoranthene	205-99-2	10	670
78. Benzo(k)fluoranthene	207-08-9	10	670
79. Benzo(a)pyrene	50-32-8	10	670
80. Indeno(1,2,3-cd)pyrene	193-39-5	10	670
81. Dibenz(a,h)anthracene	53-70-3	10	670
82. Benzo(g,h,i)perylene	191-24-2	10	670
83. N-nitrosodimethylamine	62-75-9	10	670
84. Benzidine	92-87-5	50	3300
85. 1,2-Diphenylhydrazine	122-66-7	50	3300

C Medium Soil/Sediment Practical Quantitation Limits (PQL) for semivolatile Target Analyte List compounds are 30 times the individual Low Soil/Sediment PQL. The PQL for non-water miscible waste samples is 75 times the individual Low Soil/Sediment PQL.

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

** PQLs listed for soil/sediment are based on wet weight. The quantitation limits calculated by the laboratory for soil/sediment, calculated on dry weight basis as required by the BOA, will be higher. The PQLs listed are based on a 30-g sample and gel permeation chromatography (GPC) cleanup with no measure taken to account for half the extract being lost in the GPC procedure (e.g., concentration of the extract to 0.5 mL rather than 1.0 mL).

Priority Pollutant List
Target Analytes and
Practical Quantitation Limits (PQL)*

Organochlorine Pesticides/PCBs	CAS Number	Quantitation Limits** Water ug/L	Low Soil/Sediment[d] ug/Kg
86. alpha-BHC	319-84-6	0.030	2.0
87. beta-BHC	319-85-7	0.060	4.0
88. delta-BHC	319-86-8	0.090	6.0
89. gamma-BHC (Lindane)	58-89-9	0.040	2.7
90. Heptachlor	76-44-8	0.030	2.0
91. Aldrin	309-00-2	0.040	2.7
92. Heptachlor epoxide	1024-57-3	0.83	56.
93. Endosulfan I	959-98-8	0.14	9.4
94. Dieldrin	60-57-1	0.020	1.3
95. 4,4'-DDE	72-55-9	0.040	2.7
96. Endrin	72-20-8	0.060	4.0
97. Endrin Aldehyde	7421-93-4	0.23	15.
98. Endosulfan II	33213-65-9	0.040	2.7
99. 4,4'-DDD	72-54-8	0.11	7.4
100. Endosulfan sulfate	1031-07-8	0.66	44.
101. 4,4'-DDT	50-29-3	0.12	8.0
102. Chlordane (technical)	57-74-9	0.14	9.4
103. Toxaphene	8001-35-2	2.4	160.
104. Aroclor-1016	12674-11-2	0.50	80.
105. Aroclor-1221	11104-28-2	0.50	80.
106. Aroclor-1232	11141-16-5	0.50	80.
107. Aroclor-1242	53469-21-9	0.65	44.
108. Aroclor-1248	12672-29-6	0.50	80.
109. Aroclor-1254	11097-69-1	1.0	160.
110. Aroclor-1260	11096-82-5	1.0	160.

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d Medium Soil/Sediment Practical Quantitation Limits (PQL) for Organochlorine Pesticides/PCB TAL compounds are 15 times the individual Low Soil/Sediment PQL.

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

** Quantitation limits listed for soil/sediment are based on wet weight, and assume GPC cleanup has been performed, and that 30-g of soil has been extracted for organochlorine pesticides/PCBs separate from the 30-g used for semivolatiles. If the semivolatile extract is split and solvent exchanged for use in pesticide/PCB analysis, as in the CLP protocol, then the PQLs presented must be doubled. The quantitation limits calculated by the laboratory for soil/sediment, calculated on dry weight basis as required by the contract, will be higher.

SECTION D

QUALITY CONTROL/QUALITY ASSURANCE REQUIREMENTS

Table of Contents

PART I

INTRODUCTION

The purpose of the Quality Assurance/Quality Control (QA/QC) Program outlined herein is to define the minimum procedures that the Subcontractor shall use for the evaluation and documentation of subsampling, analytical methodologies, and the reduction and reporting of data. The Subcontractor must have an aggressive QA/QC program the objective of which is to provide a uniform basis for subsampling, sample handling, instrument conditions, methods control, performance evaluation, and analytical data generation and reporting.

The scope of the Subcontractor's QA/QC program must be for all laboratory operations (from sample receipt, through analysis, to data reduction/reporting) applied to trace organics samples. The requirements outlined in this Section are the minimum requirements for the Subcontractor's QA/QC program. Specific guidance on QA/QC program requirements can be found in EPA document QAMS-005/80; Sections 5.4, 5.5, and 5.7 through 5.16. These requirements must be in place and functional at the time of the pre-award on-site laboratory evaluation conducted by EG&G personnel. The Subcontractor shall submit a copy of the Quality Assurance Plan and any referenced Standard Operating Procedures used in the Plan to the EG&G Environmental Restoration Program Quality Assurance Officer for review and approval prior to the on-site evaluation. The material in this Section includes those audit procedures used to evaluate the application of the procedures outlined within this QA/QC requirements Section.

SECTION II

QA/QC STANDARD OPERATING PROCEDURES

1. The Subcontractor shall have written QA/QC Plan which describes the in-house procedures that are employed to guarantee, to the extent possible, the quality of all analysis activities. It should describe the quality assurance and the quality control procedures used during the analysis. Each Subcontractor should prepare their own standard operating procedures (SOPs) to suit the needs of their organization as they have best determined. The QA/QC Plan should contain the essential elements described in this section.

2. Elements of a QA/QC Plan

2.1 All routine laboratory tasks should have written QA/QC Plan. The Standard Operating Procedures used in the Plan should be detailed documents describing who does what, when, where, how, and why. They shall be sufficiently complete and detailed to ensure that:

2.1.1 Data of known quality and integrity are generated.

2.1.2 The loss of data due to out-of-control conditions is minimized.

2.2 Standard Operating Procedures shall be:

2.2.1 Adequate to establish the traceability of standards, instrumentation, samples, and environmental data.

2.2.2 Simple, so a user with basic education, experience and/or training can properly use them.

2.2.3 Complete enough so the user can follow the directions in a step-wise manner.

2.2.4 Consistent with sound scientific principles.

2.2.5 Consistent with current EPA regulations, guidelines, and EG&G Basic Ordering Agreement (BOA) contract requirements.

2.2.6 Consistent with the instrument manufacturer's specific instruction manuals.

2.3 Standard Operating Procedures shall also provide for documentation sufficiently complete to:

2.3.1 Record the performance of all tasks and their results.

2.3.2 Explain the cause of missing data.

2.3.3 Demonstrate the validation of data each time they are recorded, calculated, or transcribed.

2.4 To accomplish these objectives, Standard Operating Procedures should address the major elements upon which the final quality of the Subcontractor's work depends In the following descriptions these six major areas have been divided into sub-elements, where applicable. These elements include but are not limited to:

2.4.1 Organization and personnel,

2.4.2 Facilities and equipment,

2.4.3 Analytical methodology,

2.4.4 Sample custody procedures,

2.4.5 Quality control, and

2.4.6 Data handling.

3. Organization and Personnel

3.1 QA Policy and Objectives - Each organization should have a written quality assurance policy that should be made known to all organization personnel. Objectives should be established to produce data that meet method specific and subcontract requirements in terms of completeness, precision, accuracy, representativeness, documentation, and comparability. The SOP should require the preparation of a specific QA plan for each analytical method.

3.2 QA Organization - The organization and management of the QA function should be described in the Subcontractor's SOP. Reporting relationships and responsibilities should be clearly defined. A QA Coordinator or Supervisor should be appointed and his responsibilities established.. A description of the QC paper work flow should be available. There should be a clear designation of those who are authorized to approve data and results. Responsibilities for taking corrective action should be assigned to appropriate management personnel.

3.3 Personnel Training - It is highly desirable that there be a training program for employees. This system should include motivation toward producing data of acceptable quality and should involve "practice work" by the new employee. The quality of this work can be immediately verified and discussed by the supervisor, with appropriate corrective action taken.

3.4 Document Control and Revisions. The SOP should include a system for documenting:

3.4.1 Calibration procedures,

3.4.2 Analytical procedures,

3.4.3 Computational procedures,

3.4.4 Quality control procedures,

3.4.5 Bench data,

3.4.6 Operating procedures, or any changes to these procedures, and

3.4.7 Laboratory notebook policy.

3.4.8 Procedures for making revisions to technical procedures or documents must be clearly defined, with the lines of authority indicated. Procedural revisions should be written and distributed to all affected individuals, thus ensuring implementation of changes.

4. Facilities and Equipment

4.1 Procurement and Inventory Procedures - Purchasing guidelines for all equipment and reagents having an effect on data quality should be well-defined and documented. Similarly, performance specifications should be documented for all items of equipment having an effect on data quality. Once any item which is critical to the analysis such as an *in situ* instrument, or reagent is received and accepted by the organization, documentation should be retained of the type, age, and acceptance status of the item. Reagents should be dated upon receipt in order to establish their order of use and to minimize the possibility of exceeding their useful shelf life.

4.2 Preventive Maintenance - Preventive maintenance procedures should be clearly defined and written for each measurement system and required support equipment. When maintenance activity is necessary, it should be documented on standard forms maintained in logbooks. A history of the maintenance record of each system serves as an indication of the adequacy of maintenance schedules and parts inventory.

5. Analytical Methodology

5.1 Calibration and operating procedures - Calibration is the process of establishing the relationship of a measurement system output to a known stimulus. In essence, calibration is a reproducible reference point to which all sample measurements can be correlated. A sound calibration SOP should include provisions for documentation of frequency, conditions, standards, and records reflecting the calibration history of a measurement system.

5.1.1 The accuracy of the calibration standards is an important point to consider since all data will be in reference to the standards used. An SOP for verifying the accuracy of all working standards against primary grade standards should be routinely followed.

5.2 Feedback and Corrective Action - The SOP should specify the corrective action that is to be taken when an analytical or sampling error is discovered or the analytical system is determined to be out of control. The SOP should require documentation of the corrective action and notification of the analyst and customer of the error and correction procedures.

5.3 Method Detection Limits - The limits of detection are important for all of the EPA-approved methods. The SOP should specify the procedures for determining the limits of detection for each method used. The SOP should also specify the frequency at which the limits of detection are determined or checked to ensure that these limits are consistently achievable for each instrument and each analyst responsible for analysis by the method.

6. Sample Custody

6.1 Sample custody is a part of any good laboratory or field operation. Since samples may be needed for legal purposes, "chain-of-custody" procedures, as defined in Section E must be used. However, at a minimum, the following sample custody procedures should be addressed in the QA/QC SOP.

6.2 Chain-of-custody in laboratory operations

6.2.1 Identification of responsible party to act as sample custodian at the laboratory facility authorized to sign for incoming field samples, obtain documents of shipment (e.g., bill of lading number of mail receipt), and verify the data entered onto the sample custody records.

6.2.2 Provision for a laboratory sample custody log consisting of serially numbered standard lab-tracking report sheets.

6.2.3 Specification of laboratory sample custody procedures for sample handling, storage and disbursement for analysis.

7. Quality Control

7.1 Quality Control Procedures - The quality control procedures used during analysis should be described and must conform to those described in the specific methods. The quality control checks routinely performed during sample analysis include method blank analysis to establish background analyte levels, duplicate analysis to establish analytical precision, spiked sample and spiked blank analysis to determine analytical accuracy. The frequency of these quality control checks are defined in the requested method or task specific Statement of Work. Limits of acceptance or rejection are also defined for analysis and control charts should be used. Confirmation procedures should be described in the SOP.

7.2 Control Checks and Internal Audits - A good SOP will make provision for and describe control checks and internal audits by the Subcontractor. Several approaches are used for control checks. These include:

7.2.1 Reference material analysis. Analytical reference materials are available from several commercial and government sources, or they may be prepared in-house. The chemical analysis of these materials has been well established. Such materials can be analyzed alongside routine samples and the results used to check the accuracy of analytical procedures.

7.2.2 Blank analysis. The procedures and the frequency of blank analyses are defined in the requested method or task-specific Statement of Work.

7.2.3 Matrix spike and matrix spike duplicate analysis. The procedures and the frequency of matrix spike analyses are defined in the requested method or task-specific Statement of Work.

7.2.4 Internal audits. Internal audits should be periodically conducted to evaluate the functioning of the QA SOP. This involves an independent check of the performance of the laboratory analysts to determine if prescribed procedures are closely followed.

7.2.5 Trend analysis. Results from blanks and spikes must be evaluated by the QA coordinator or supervisor and the results of the evaluation documented on control charts or other types of charts and reported to laboratory management.

8. Data Handling

8.1 Data Handling, Reporting, and Record Keeping - Data handling, reporting, and record keeping procedures should be described. Data handling and reporting includes all procedures use to record data on standard forms, and in laboratory notebooks. The reporting format for different types of bench data should be described and the forms provided. The contents of notebooks should be specified.

8.1.1 Record keeping of this type serves at least two useful functions: (1) it makes possible the reanalysis of a set of data at a future time, and (2) it may be used in support of the experimental conclusions if various aspects of the analysis are called into question.

8.2 Data Validation - Data validation procedures, defined ideally as a set of computerized and manual checks applied at various appropriate levels of the measurement process, should be in written form and clearly defined for all measurement systems.

8.2.1 Criteria for data validation must be documented and include limits on:

8.2.1.1 Operational parameters such as GC conditions;

8.2.1.2 Calibration data;

8.2.1.3 Special checks unique to each measurement, e.g., successive values/averages;

8.2.1.4 Statistical tests, e.g., outliers; and

8.2.1.5 Manual checks such as hand calculations.

8.2.2 The limits defined in the subcontract ensure a high probability of detecting invalid data for either all or the majority of the measurement systems. The required data validation activities (GC operating conditions, analytical precision, etc.) should be recorded on standard forms in a logbook.

PART III

LABORATORY EVALUATION PROCEDURES

This section outlines the procedures which will be used by the Project Officer or his authorized representative during the subcontract period of performance to conduct laboratory audits to determine the Subcontractor's continuing ability to met the terms and conditions of the subcontract. The evaluation process incorporates two major steps: 1) evaluation of laboratory performance, and 2) on-site inspection of the laboratory to verify continuity of personnel, instrumentation and quality control requirements of the contract. The following is a description of these two steps.

UNIT 1 - EVALUATION OF LABORATORY PERFORMANCE

1. Performance Evaluation Sample Analysis

1.1 The Performance Evaluation (PE) sample set will be sent to a participating laboratory on a routine (frequency to be determined) basis to verify the laboratory's continuing ability to produce acceptable analytical results. These samples will be provided either single blind (recognizable as a PE material and of unknown composition), or double blind (not recognizable as a PE material and of unknown composition).

If received as a single blind, the Subcontractor is required to submit PE sample data in a separate SDG package in accordance with Delivery Schedule requirements for sample data. PE samples received as double blind would be treated as routine samples and data would be submitted in the SDG deliverables package per normal procedure.

1.2 When the PE data are received, results will be scored routinely for identification and quantitation. Results of these scorings will be provided to the Subcontractor. EG&G Idaho may adjust the scores on any given PE sample to compensate for unanticipated difficulties with a particular sample.

1.3 If a laboratory performs unacceptably, the laboratory will be immediately notified by the Project Officer. A laboratory so notified may expect, but EG&G Idaho is not limited to, the following actions: A site visit, a full data audit, and/or laboratory analysis of a second PE sample. Failure by the laboratory to take corrective actions and/or failure of two successive PE sample analyses will require that the laboratory discontinue analysis of samples until such time as the Project Officer has determined that the laboratory may resume analyses.

2. Organic Data Evaluation

2.1 Organic data evaluations are conducted on Subcontractor's Reporting and Deliverables packages by EG&G Idaho. The organic data evaluation provides the contractor with an in-depth inspection and determination of the data packages with regard to achieving QA/QC acceptability.

UNIT 2 - ON-SITE LABORATORY EVALUATION

2. The on-site laboratory evaluation helps to ensure that all the necessary quality control is being applied by the Subcontractor in order to deliver a quality product.

2.1 Quality assurance evaluations allow the evaluators to determine that:

2.1.1 The organization and personnel are qualified to perform assigned tasks,

2.1.2 Adequate facilities and equipment are available,

2.1.3 Complete documentation, including chain-of-custody of samples is being implemented,

2.1.4 Proper analytical methodology is being used following the SOPs,

2.1.5 Adequate analytical quality control, including reference samples, control charts, and documented corrective action measures, is being provided, and

2.1.6 Acceptable data handling and documentation techniques are being used.

2.2 The on-site visit also serves as a mechanism for discussing weaknesses identified through the Performance Evaluation sample analysis or through other review of data deliverables. Lastly, the on-site visit allows the evaluation team to determine if the laboratory has implemented the recommended and/or required corrective actions, with respect to quality assurance, made during the previous on-site visit.

2.3 An on-site visit will be conducted by EG&G Idaho personnel prior to subcontract award and at least annually through the duration of the subcontract. The on-site visit will serve as one criteria for initial subcontract award recommendation, and as a means of checking to ensure all requirements of the subcontract are being met throughout its duration.

SECTION E

CHAIN-OF-CUSTODY, DOCUMENT CONTROL, AND STANDARD OPERATING PROCEDURES

1. Sample Chain-of-Custody

A sample is physical evidence collected from a facility or from the environment. An essential part of hazardous waste investigations is that samples and data may be used as evidence in EPA enforcement proceedings. To satisfy enforcement uses of the data, the following chain-of-custody procedures have been established.

1.1 Sample Identification

To assure traceability of samples while in possession of the subcontractor, a method for sample identification shall be developed and documented in laboratory Standard Operating Procedures (SOPs) (see Section 3). Each sample or sample preparation container shall be labeled with a unique number identifier (or the EG&G sample number). This identifier shall be cross-referenced to the sample tag number and the EG&G sample number. There shall be a written description of the method of assigning this identifier and attaching it to the sample container included in the laboratory SOPs.

1.2.1 A sample is under custody if:

1.2.1.1 It is in your actual possession,
1.2.1.2 It is in your view after being in your physical possession,
1.2.1.3 It was in your possession and then you locked or sealed it up to prevent tampering, or
1.2.1.4 It is in a secure area.

1.2.2 Upon receipt of the samples in custody, the subcontractor shall inspect the shipping container and sample bottles and shall document receiving information as specified in Section 3.2. The sample custodian or a designated representative shall sign and date all appropriate receiving documents at the time of receipt (i.e., EG&G chain-of-custody forms, airbills, etc.). The subcontractor shall contact the EG&G Project Officer if documents are absent, information on receiving documents does not agree, custody seals are not intact, or the sample is not in good condition. The subcontractor shall document resolution of any discrepancies, and this documentation shall become a part of the permanent project file.

1.2.3 Once samples have been accepted by the laboratory, checked, and logged in, they must be maintained in accordance with custody and security requirements specified in 3.3.

2. Document Control Procedures

The goal of the laboratory document control program is to assure that all documents for a specified project will be accounted for when the project is completed. Accountable documents used by subcontracted 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 for delivery to EG&G or are available upon request from the EG&G Project Officer prior to the delivery schedule.

2.1 Preprinted Data Sheets and Logbooks

Preprinted data sheets shall contain the name of the laboratory and be dated and signed by the analyst or individual performing the work. All documents produced by the laboratory which are directly related to the preparation and analysis of EG&G samples shall become the property of EG&G Idaho, Inc., and shall be placed in the project file. For that reason, all observations and results recorded by the laboratory but not on preprinted data sheets are entered into permanent laboratory logbooks. The person responsible for the work shall sign and date each entry and/or page in the logbook. When all data from a project is compiled, copies of all EG&G project-related logbook entries shall be included in the documentation package. Analysts' logbook entries must be in chronological order and shall include only one project per page. Instrument run logs shall be maintained so as to enable a reconstruction of the run sequences of individual instruments.

Because the laboratory must provide copies of the instrument run logs to EG&G, the laboratory may exercise the option of using only laboratory or EG&G sample identification numbers in the logs for sample ID rather than government agency or commercial client names.

Using laboratory or EG&G sample IDs only in the run sequences will assist the laboratory in preserving the confidentiality of commercial clients.

2.2 Error Correction Procedure

All documentation in logbooks and other documents shall be in ink. If an error is made, correction shall be made by crossing a line through the error and entering the correct information. Changes shall be dated and initialed. No information shall be obliterated or rendered unreadable.

2.3 Consistency of Documentation

Before releasing analytical results, the laboratory 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 project is consistent throughout the project file.

2.4 Document Numbering and Inventory Procedure

In order to provide document accountability of the completed analysis records, each item in a project shall be inventoried and assigned a serialized number and identifier associating it to the EG&G project and subcontract number.

Project - Subcontract # - Serialized Number (For example: EG&G CFLF1-C90/132409-0240)

The number of pages of each item must be accounted for if each page is not individually numbered. All documents relevant to each project including logbook pages, bench sheets, mass spectra, chromatograms, custody records, library search results, etc., shall be inventoried. The laboratory shall be responsible for ensuring that all documents generated are placed in the file for inventory and are delivered to EG&G Idaho, Inc. Figure 1 is an example of a document inventory.

2.5 Shipping Data Packages and Project Files

The subcontractor shall have written, controlled procedures to document shipment of deliverables packages to the recipients. Project File Purge shipments require custody seals on the container(s) placed such that it cannot be opened without damaging or breaking the seal. The subcontractor shall also document what was sent, to whom, the date, and the method (carrier) used.

3. Standard Operating Procedures

The subcontractor must have written, controlled standard operating procedures (SOPs) for (1) receipt of samples, (2) maintenance of custody, (3) sample storage, (4) tracking the analysis of samples, and (5) assembly of completed data.

An SOP is defined as a written narrative step-wise description of laboratory operating procedures including examples of laboratory documentation. The SOPs must accurately describe the actual procedures used in the laboratory, and copies of the written SOPs shall be available to the appropriate laboratory personnel. These procedures are necessary to ensure that analytical data

produced under this Basic Ordering Agreement are acceptable for use in EPA enforcement case preparation and litigation. The subcontractor's SOPs shall provide mechanisms and documentation to meet each of the following specifications and shall be used by EG&G as the basis for laboratory evidence audits.

3.1 The subcontractor shall have a designated sample custodian responsible for receipt of samples and have written SOPs describing his/her duties and responsibilities.

3.2 The subcontractor 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:

- o Presence or absence of EG&G chain-of-custody forms
- o Presence or absence of airbills
- o Presence or absence of custody seals on shipping and/or sample containers and their condition
- o Presence or absence of sample tags
- o Sample tag ID numbers if not recorded on the chain-of-custody record(s) or packing list(s)
- o Condition of the shipping container
- o Condition of the sample bottles (e.g., Head space present in VOA bottles, Bottle broken, etc.)
- o Verification of agreement or nonagreement of information on receiving documents
- o Resolution of problems or discrepancies with the EG&G Project Officer

3.3 The subcontractor shall have written SOPs for maintenance of the security of samples after log-in and shall demonstrate security of the sample storage and laboratory areas. The SOPs shall specifically include descriptions of all storage areas for EG&G samples in the laboratory, and steps taken to prevent sample contamination The SOPs shall include a list of authorized personnel who have access or keys to secure storage areas.

3.4 The subcontractor shall have written SOPs for tracking the work performed on any particular sample. The tracking SOP shall include the following:

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

3.4.2 A description of the documentation used to record instrument calibration and other QA/QC activities.

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

3.5 The subcontractor shall have written SOPs for organization and assembly of all documents relating to each EG&G project, including technical and managerial review. Documents shall be filed on EG&G SDG-specific basis. The procedures must 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 project are compiled in one location for submission to EG&G Idaho, Inc. The system must include a document numbering and inventory procedure.

3.6 The subcontractor shall have written SOPs for laboratory safety.

3.7 The subcontractor shall have written SOPs for cleaning of glassware used in preparing and analyzing samples under this Basic Ordering Agreement.

3.8 The subcontractor shall have SOPs for traceability of standards used in sample analysis QA/QC.

4. Handling of Confidential Information

A subcontractor conducting work under this Basic Ordering Agreement may receive EG&G/DOE designated confidential information from the contractor. Confidential information must be handled separately from other documentation developed under this Basic Ordering Agreement. To accomplish this, the following procedures for the handling of confidential information have been established.

4.1 All confidential documents shall be under the supervision of a designated document control officer (DCO).

4.2 Confidential Information

Any samples or information received with a request of confidentiality shall be handled as "confidential." A separate locked file shall be maintained to store this information and shall be segregated from other non-confidential information.

Data generated from confidential samples shall be treated as confidential. Upon receipt of confidential information, the DCO logs these documents into a Confidential Inventory Log. The information is then made available to authorized personnel but only after it has been signed out to that person by the DCO. The documents shall be returned to the locked file at the conclusion of each working day. Confidential information may not be reproduced except upon approval by the EG&G Project Officer. The DCO will enter all copies into the document control system. In addition, this information may not be disposed of except upon approval by the EG&G Project Officer. The DCO shall remove and retain the cover page of any confidential information disposed of for one year and shall keep a record of the disposition in the Confidential Inventory Log.

Figure 1

Example

DOCUMENT INVENTORY

Document Control #*	Document Type	# Pages
EG&G 232-2-0001	Case File Document Inventory Sheet	1
EG&G 232-2-0002	Chain-of-Custody Records	2
EG&G 232-2-0003	Shipping Manifests	2
EG&G 232-2-0004	Sample Tags	50
EG&G 232-2-0005	SMO Inorganics Traffic Reports	10
EG&G 232-2-0006	GC/MS Spectra for Sample B0310	20
EG&G 232-2-0007	GC/MS Spectra for Sample B0311	20
EG&G 232-2-0008	GC/MS Spectra for Sample B0319	20
EG&G 232-2-0009	Analyst's Logbook Pages	6
EG&G 232-2-0010	GC/MS Library Search Worksheets	15
EG&G 232-2-0011	GC Instrument Log Pages	5
EG&G 232-2-0012	GC/MSs QC Data Sheets	4
etc.	etc.	etc.

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

SECTION F

GLOSSARY OF TERMS

GLOSSARY OF TERMS

ALIQUOT - A measured portion of a sample taken for analysis.

ANALYSIS DATE/TIME - The date and military time of the injection of the sample, standard, or blank into the GC/MS, LC/MS, HPLC, or GC system.

BAR GRAPH SPECTRUM - a PLOT OF THE MASS-TO-CHARGE RATIO (M/E) VERSUS RELATIVE INTENSITY OF THE ION CURRENT.

BLANK - See Method Blank

4-BROMOFLUOROBENZENE (BFB) - Compound chosen to establish mass spectral tuning performance for volatile analyses.

CALIBRATION CHECK COMPOUNDS (CCC) - Target compounds used to evaluate the calibration stability (precision) of the GC/MS system. Maximum percent deviations of the CCCs are defined in the requested method's protocol.

CHAIN-OF-CUSTODY REPORT - An EG&G sample identification form filled out by the sampler, which accompanies the sample during shipment to the laboratory and which documents sample condition and receipt by the laboratory.

CHARACTERIZATION - A determination of the approximate concentration range of compounds of interest used to choose the appropriate analytical protocol.

CONCENTRATION LEVEL (Low or Medium) - Characterization of soil samples or sample fractions as low concentration or medium concentration is made on the basis of the laboratory's preliminary screen, not on the basis of information entered on the chain-of-custody report, sample tags, or sample labels, by the sampler.

CONFIRMATION ANALYSIS - See Primary Analysis.

CONTINUING CALIBRATION - Analytical standard run every 12 hours to verify the calibration of the GC/MS system.

CONTINUOUS LIQUID-LIQUID EXTRACTION - Used herein synonymously with the terms continuous extraction, continuous liquid extraction, and liquid extraction.

DAY - Unless otherwise specified, day shall mean calendar day.

DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP) - Compound chosen to establish mass spectral tuning performance for semivolatile analysis.

EXTRACTABLE - A compound that can be partitioned into an organic solvent from the sample matrix and is amenable to gas chromatography. Extractables include BNA, pesticide/PCB, and herbicide compounds.

IN-HOUSE - At the Subcontractor's facility.

INITIAL CALIBRATION - Analysis of analytical standards for a series of different specified concentrations; used to define the linearity and dynamic range of the response of the mass spectrometer to the target compounds.

INTERNAL STANDARDS - Compounds added to every standard, blank, matrix spike, matrix spike duplicate, sample (for VOAs), and sample extract (for semivolatiles) at a known concentration, prior to analysis. Internal standards are used as the basis for quantitation of the target compounds.

LABORATORY - Synonymous with Subcontractor as used herein.

MATRIX - The predominant material of which the sample to be analyzed is composed. For the purpose of this BOA, a sample matrix is either water, soil/sediment, or waste. Matrix is not synonymous with phase (liquid or solid).

MATRIX SPIKE - Aliquot of a matrix (water, soil or waste) fortified (spiked) with known quantities of specific compounds and subjected to the entire analytical procedure in order to indicate the appropriateness of the method for the matrix by measuring recovery.

MATRIX SPIKE DUPLICATE - A second aliquot of the same matrix as the matrix spike (above) that is spiked in order to determine the precision of the method.

METHOD BLANK (Previously termed reagent blank) - An analytical control consisting of all reagents, internal standards and surrogate standards, that is carried through the entire analytical procedure. The method blank is used to define the level of laboratory background contamination.

NARRATIVE (Case Narrative) - Portion of the data package which includes laboratory, contract, Project and sample number identification, and descriptive documentation of any problems encountered in processing the samples, along with corrective action taken and problem resolution. Complete Case Narrative specifications are included in Section B.

PERCENT MOISTURE - An approximation of the amount of water in a soil-sediment sample made by drying an aliquot of the sample at 105°C. The percent moisture determined in this manner also includes contributions from all compounds that may volatilize at 105°C, including water. Percent moisture is determined from decanted samples and from samples that are not decanted.

PHASE - Describes the physical state(s) of the sample. Three "phase designators" are used: Solid, Water Miscible Liquid, Water Immiscible Liquid. A sample may contain multiple phases.

PRIMARY ANALYSIS - One of two types of pesticide/PCB/herbicide analysis by GC/EC, GCINPD, GC/FID, or GC/FPD techniques, the other being the Confirmation Analysis. If the two analyses are run at separate times, the Primary Analysis is the first analysis chronologically, and is used to establish the tentative identification of any pesticides/PCBs/herbicides detected. The identification is then confirmed in the confirmation analysis. If the two analyses are simultaneously, either may be considered the Primary Analysis.

PROJECT - A finite, usually predetermined number of samples collected over a given time period from a particular site. A project consists of one or more Sample Delivery Groups.

PROTOCOL - Describes the exact procedures to be followed with respect to sample receipt and handling, analytical methods, data reporting and deliverables, and document control.

PURGE AND TRAP (DEVICE) - Analytical technique (device) used to isolate volatile (purgeable) organics by stripping the compounds from water or soil by a stream of inert gas, trapping the compounds on a porous polymer trap, and thermally desorbing the trapped compounds onto the gas chromatographic column.

QC CHECK SAMPLE - An analytical control consisting of all reagents, internal standards, and surrogate standards, fortified (spiked) with known quantities of all target analytes for a specific method and subjected to the entire analytical procedure in order to indicate the appropriateness of the method by measuring recovery.

REAGENT WATER - Water in which an interferent is not observed at or above the minimum quantitation limit of the parameters of interest.

RECONSTRUCTED ION CHROMATOGRAM (RIC) - A mass spectral graphical representation of the separation achieved by a gas chromatograph; a plot of total ion current versus retention time.

RECOVERY - A determination of the accuracy of the analytical procedure made by comparing measured values for a fortified (spiked) sample against the known spike values. Recovery is determined by the following equation:

$$\%Rec = \frac{\text{measured value}}{\text{known value}} \times 100\%$$

RELATIVE RESPONSE FACTOR (RRF) - A measure of the relative mass spectral response of an analyte compared to its internal standard. Relative Response Factors are determined by analysis of standards and are used in the calculation of concentrations of analytes in samples. RRF is determined by the following equation:

$$RRF = \frac{A_x}{A_{is}} \times \frac{C_{is}}{C_x}$$

Where A = area of the characteristic ion measured
C = concentration
is = internal standard
x = analyte of interest

RESOLUTION - Also termed separation, the separation between peaks on a chromatogram, calculated by dividing the height of the valley between the peaks by the peak height of the smaller peak being resolved, multipled by 100.

SAMPLE - A portion of material to be analyzed that is contained in single or multiple containers and identified by a unique sample number.

SAMPLE DELIVERY GROUP (SDG) - A unit within a sample Project that is used to identify a set of samples for delivery. An SDG is a set of 20 or fewer samples within a Project, received over a period of up to 14 calendar days. Data from all samples in an SDG are due concurrently. A Sample Delivery Group is defined by one of the following, whichever occurs first.

- Project; or
- Each 20 samples within a Project; or
- Each 14-day calendar period during which samples in a Project are received, beginning with receipt of the first sample in the Project or SDG.

SAMPLE NUMBER (EG&G Sample Number) - A unique identification number designated by EG&G for each sample. The EG&G sample number appears on the sample Chain-of-Custody Report which documents information on that sample.

SEMIVOLATILE COMPOUNDS - Compounds amenable to analysis by extraction of the sample with an organic solvent. Used synonymously with Base/Neutral/Acid (BNA) compounds.

SOIL - Used herein synonymously with soil/sediment and sediment.

STANDARD ANALYSIS - An analytical determination made with known quantities of target compounds; used to determine response factors.

SURROGATES (Surrogate Standard) - Compounds added to every blank, sample, matrix spike, matrix spike duplicate, and standard; used to evaluate analytical efficiency by measuring recovery. For GC/MS or LC/MS analysis, surrogates are brominated, fluorinated, or isotopically labelled compounds not expected to be detected in environmental media.

SYSTEM PERFORMANCE CHECK COMPOUNDS (SPCC) - Target compounds designated to monitor chromatographic performance, sensitivity and compound instability or degradation on active sites. Minimum response factor criteria for the SPCCs are defined in the protocol.

TARGET LIST - A list of compounds designated by the task specific Statement of Work or the requested method.

TENTATIVELY IDENTIFIED COMPOUNDS (TIC) - Compounds detected in samples that are not target compounds, internal standards or surrogate standards. Up to 30 peaks (those greater than 10% of peak areas or heights of nearest internal standards) are subjected to mass spectral library searches for tentative identification.

TIME - When required to record time on any data reporting form, time shall be expressed as Military Time, i.e., a 24-hour clock.

TWELVE-HOUR TIME PERIOD - The twelve (12) hour time period for GC/MS system tuning and standards calibration (initial or continuing calibration) begins at the moment of injection of the DFTPP or BFB analysis that the laboratory submits as documentation of compliant tune. The time period ends after 12 hours has elapsed according to the system clock.

VALIDATED TIME OF SAMPLE RECEIPT (VTSR) - The date on which a sample is received at the Subcontractor's facility, as recorded on the shipper's delivery receipt and Chain-of-Custody Report.

VOLATILE COMPOUNDS - Compounds amenable to analysis by the purge and trap technique. Used synonymously with purgeable compounds.

WIDE BORE CAPILLARY COLUMN - A gas chromatographic column with an internal diameter (ID) that is greater than 0.32 mm. Columns with lesser diameters are classified as narrow bore capillaries.

SECTION G

DATA DICTIONARY AND FORMAT FOR DATA DELIVERABLES IN COMPUTER READABLE FORMAT (APPENDIX IX FORMS ONLY)

FORM I FILE DESCRIPTION
(FORM1)

VOLATILE ORGANICS ANALYSIS DATA SHEET - (FORM 1A)

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'1A'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8- 26	19	EG&G SAMPLE NO.	
27- 49	23	LAB NAME	
50- 57	8	CONTRACT	
58- 63	6	LAB CODE	
64- 68	5	CASE NO.	
69- 74	6	SAS NO.	
75- 86	12	SDG NO.	
87- 91	5	MATRIX	'SOIL ' OR 'WATER'
92-103	12	LAB SAMPLE ID	
104-109	6	SAMPLE WT/VOL	NUMERIC 6.1
110-111	2	SAMPLE WT/VOL UNITS	'G ' OR 'ML'
112-125	14	LAB FILE ID	
126-128	3	LEVEL	'LOW' OR 'MED'
129-136	8	DATE RECEIVED	MM/DD/YY
137-138	2	%MOISTURE NOT DEC	NUMERIC 2
139-146	8	DATE ANALYZED	MM/DD/YY
147-150	4	COLUMN	'NAR ' OR 'WIDE'
151-158	8	DILUTION FACTOR	NUMERIC 8
159-163	5	CONCENTRATION UNITS	'UG/L ' OR 'UG/KG'

DETAIL RECORD 1 (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1-3	3	FORM NUMBER	'1A'
4-5	2	FORM SUFFIX	'AA'-'ZZ'
6-7	2	RECORD TYPE	'D1'
8-17	10	CAS NO.	
18-30	13	RESULT	NUMERIC 13.3
31-35	5	QUALIFIER (Q)	

VOLATILE ORGANICS ANALYSIS DATA SHEET - (FORM 1B)

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'1B'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8- 26	19	EG&G SAMPLE NO.	
27- 49	23	LAB NAME	
50- 57	8	CONTRACT	
58- 63	6	LAB CODE	
64- 68	5	CASE NO.	
69- 74	6	SAS NO.	
75- 86	12	SDG NO.	
87- 91	5	MATRIX	'SOIL ' OR 'WATER'
92-103	12	LAB SAMPLE ID	
104-109	6	SAMPLE WT/VOL	NUMERIC 6.1
110-111	2	SAMPLE WT/VOL UNITS	'G ' OR 'ML'
112-125	14	LAB FILE ID	
126-128	3	LEVEL	'LOW' OR 'MED'
129-136	8	DATE RECEIVED	MM/DD/YY
137-138	2	%MOISTURE NOT DEC	NUMERIC 2
139-146	8	DATE ANALYZED	MM/DD/YY
147-150	4	COLUMN	'NAR ' OR 'WIDE'
151-158	8	DILUTION FACTOR	NUMERIC 8
159-163	5	CONCENTRATION UNITS	'UG/L ' OR 'UG/KG'

DETAIL RECORD 1 (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1-3	3	FORM NUMBER	'1 B'
4-5	2	FORM SUFFIX	'AA'-'ZZ'
6-7	2	RECORD TYPE	'D1'
8-17	10	CAS NO.	
18-30	13	RESULT	NUMERIC 13.3
31-35	5	QUALIFIER (Q)	

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET - (FORM 1C)

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'1C'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8- 26	19	EG&G SAMPLE NO.	
27- 49	23	LAB NAME	
50- 57	8	CONTRACT	
58- 63	6	LAB CODE	
64- 68	5	CASE NO.	
69- 74	6	SAS NO.	
75- 86	12	SDG NO.	
87- 91	5	MATRIX	'SOIL ' OR 'WATER'
92-103	12	LAB SAMPLE ID	
104-109	6	SAMPLE WT/VOL	NUMERIC 6.1
110-111	2	SAMPLE WT/VOL UNITS	'G ' OR 'ML'
112-125	14	LAB FILE ID	
126-128	3	LEVEL	'LOW' OR 'MED'
129-136	8	DATE RECEIVED	MM/DD/YY
137-138	2	% MOISTURE NOT DEC	NUMERIC 2
139-140	2	% MOISTURE DEC	NUMERIC 2
141-148	8	DATE EXTRACTED	MM/DD/YY
149-152	4	EXTRACTION	'SEPF','CONT'OR'SONC'
153-160	8	DATE ANALYZED	MM/DD/YY
161	1	GPC CLEANUP	'Y' OR 'N'
162-165	4	PH	NUMERIC 4.1
166-173	8	DILUTION FACTOR	NUMERIC 8
174-178	5	CONCENTRATION UNITS	'UG/L ' OR 'UG/KG'

DETAIL RECORD 1 (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1-3	3	FORM NUMBER	'1C'
4-5	2	FORM SUFFIX	'AA'-'ZZ'
6-7	2	RECORD TYPE	'D1'
8-17	10	CAS NO.	
18-30	13	RESULT	NUMERIC 13.3
31-35	5	QUALIFIER (Q)	

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET - (FORM 1D)

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'1D'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8- 26	19	EG&G SAMPLE NO.	
27- 49	23	LAB NAME	
50- 57	8	CONTRACT	
58- 63	6	LAB CODE	
64- 68	5	CASE NO.	
69- 74	6	SAS NO.	
75- 86	12	SDG NO.	
87- 91	5	MATRIX	'SOIL ' OR 'WATER'
92-103	12	LAB SAMPLE ID	
104-109	6	SAMPLE WT/VOL	NUMERIC 6.1
110-111	2	SAMPLE WT/VOL UNITS	'G ' OR 'ML'
112-125	14	LAB FILE ID	
126-128	3	LEVEL	'LOW' OR 'MED'
129-136	8	DATE RECEIVED	MM/DD/YY
137-138	2	% MOISTURE NOT DEC	NUMERIC 2
139-140	2	% MOISTURE DEC	NUMERIC 2
141-148	8	DATE EXTRACTED	MM/DD/YY
149-152	4	EXTRACTION	'SEPF','CONT'OR'SONC'
153-160	8	DATE ANALYZED	MM/DD/YY
161	1	GPC CLEANUP	'Y' OR 'N'
162-165	4	PH	NUMERIC 4.1
166-173	8	DILUTION FACTOR	NUMERIC 8
174-178	5	CONCENTRATION UNITS	'UG/L ' OR 'UG/KG'

DETAIL RECORD 1 (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1-3	3	FORM NUMBER	'1D'
4-5	2	FORM SUFFIX	'AA'-'ZZ'
6-7	2	RECORD TYPE	'D1'
8-17	10	CAS NO.	
18-30	13	RESULT	NUMERIC 13.3
31-35	5	QUALIFIER (Q)	

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET - (FORM IE)

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'1E'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8- 26	19	EG&G SAMPLE NO.	
27- 49	23	LAB NAME	
50- 57	8	CONTRACT	
58- 63	6	LAB CODE	
64- 68	5	CASE NO.	
69- 74	6	SAS NO.	
75- 86	12	SDG NO.	
87- 91	5	MATRIX	'SOIL ' OR 'WATER'
92-103	12	LAB SAMPLE ID	
104-109	6	SAMPLE WT/VOL	NUMERIC 6.1
110-111	2	SAMPLE WT/VOL UNITS	'G ' OR 'ML'
112-125	14	LAB FILE ID	
126-128	3	LEVEL	'LOW' OR 'MED'
129-136	8	DATE RECEIVED	MM/DD/YY
137-138	2	% MOISTURE NOT DEC	NUMERIC 2
139-140	2	% MOISTURE DEC	NUMERIC 2
141-148	8	DATE EXTRACTED	MM/DD/YY
149-152	4	EXTRACTION	'SEPF','CONT'OR'SONC'
153-160	8	DATE ANALYZED	MM/DD/YY
161	1	GPC CLEANUP	'Y' OR 'N'
162-165	4	PH	NUMERIC 4.1
166-173	8	DILUTION FACTOR	NUMERIC 8
174-178	5	CONCENTRATION UNITS	'UG/L ' OR 'UG/KG'

DETAIL RECORD 1 (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1-3	3	FORM NUMBER	'1E'
4-5	2	FORM SUFFIX	'AA'-'ZZ'
6-7	2	RECORD TYPE	'D1'
8-17	10	CAS NO.	
18-30	13	RESULT	NUMERIC 13.3
31-35	5	QUALIFIER (Q)	

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET - (FORM 1F)

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'1F'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8- 26	19	EG&G SAMPLE NO.	
27- 49	23	LAB NAME	
50- 57	8	CONTRACT	
58- 63	6	LAB CODE	
64- 68	5	CASE NO.	
69- 74	6	SAS NO.	
75- 86	12	SDG NO.	
87- 91	5	MATRIX	'SOIL ' OR 'WATER'
92-103	12	LAB SAMPLE ID	
104-109	6	SAMPLE WT/VOL	NUMERIC 6.1
110-111	2	SAMPLE WT/VOL UNITS	'G ' OR 'ML'
112-125	14	LAB FILE ID	
126-128	3	LEVEL	'LOW' OR 'MED'
129-136	8	DATE RECEIVED	MM/DD/YY
137-138	2	% MOISTURE NOT DEC	NUMERIC 2
139-140	2	% MOISTURE DEC	NUMERIC 2
141-148	8	DATE EXTRACTED	MM/DD/YY
149-152	4	EXTRACTION	'SEPF','CONT'OR'SONC'
153-160	8	DATE ANALYZED	MM/DD/YY
161	1	GPC CLEANUP	'Y' OR 'N'
162-165	4	PH	NUMERIC 4.1
166-173	8	DILUTION FACTOR	NUMERIC 8
174-178	5	CONCENTRATION UNITS	'UG/L ' OR 'UG/KG'

DETAIL RECORD 1 (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1-3	3	FORM NUMBER	'1F'
4-5	2	FORM SUFFIX	'AA'-'ZZ'
6-7	2	RECORD TYPE	'D1'
8-17	10	CAS NO.	
18-30	13	RESULT	NUMERIC 13.3
31-35	5	QUALIFIER (Q)	

PESTICIDE ORGANICS ANALYSIS DATA SHEET - (FORM 1G)

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'1G'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8- 26	19	EG&G SAMPLE NO.	
27- 49	23	LAB NAME	
50- 57	8	CONTRACT	
58- 63	6	LAB CODE	
64- 68	5	CASE NO.	
69- 74	6	SAS NO.	
75- 86	12	SDG NO.	
87- 91	5	MATRIX	'SOIL ' OR 'WATER'
92-103	12	LAB SAMPLE ID	
104-109	6	SAMPLE WT/VOL	NUMERIC 6.1
110-111	2	SAMPLE WT/VOL UNITS	'G ' OR 'ML'
112-125	14	LAB FILE ID	
126-128	3	LEVEL	'LOW' OR 'MED'
129-136	8	DATE RECEIVED	MM/DD/YY
137-138	2	% MOISTURE NOT DEC	NUMERIC 2
139-140	2	% MOISTURE DEC	NUMERIC 2
141-148	8	DATE EXTRACTED	MM/DD/YY
149-152	4	EXTRACTION	'SEPF','CONT'OR'SONC'
153-160	8	DATE ANALYZED	MM/DD/YY
161	1	GPC CLEANUP	'Y' OR 'N'
162-165	4	PH	NUMERIC 4.1
166-173	8	DILUTION FACTOR	NUMERIC 8
174-178	5	CONCENTRATION UNITS	'UG/L ' OR 'UG/KG'

DETAIL RECORD 1 (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1-3	3	FORM NUMBER	'1G'
4-5	2	FORM SUFFIX	'AA'-'ZZ'
6-7	2	RECORD TYPE	'D1'
8-17	10	CAS NO.	
18-30	13	RESULT	NUMERIC 13.3
31-35	5	QUALIFIER (Q)	

ORGANOCHLORINE PESTICIDE ANALYSIS DATA SHEET - (FORM 1H)

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'1H'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8- 26	19	EG&G SAMPLE NO.	
27- 49	23	LAB NAME	
50- 57	11	CONTRACT	
58- 63	6	LAB CODE	
64- 68	5	CASE NO.	
69- 74	6	SAS NO.	
75- 86	12	SDG NO.	
87- 91	5	MATRIX	'SOIL ' OR 'WATER'
92-103	12	LAB SAMPLE ID	
104-109	6	SAMPLE WT/VOL	NUMERIC 6.1
110-111	2	SAMPLE WT/VOL UNITS	'G' OR 'ML'
112-125	14	LAB FILE ID	
126-128	3	LEVEL	'LOW' OR 'MED'
129-136	8	DATE RECEIVED	MM/DD/YY
137-138	2	% MOISTURE NOT DEC	NUMERIC 2
139-140	2	% MOISTURE DEC	NUMERIC 2
141-148	8	DATE EXTRACTED	MM/DD/YY
149-152	4	EXTRACTION	'SEPF','CONT'OR'SONC'
153-160	8	DATE ANALYZED	MM/DD/YY
161	1	GPC CLEANUP	'Y' OR 'N'
162-165	4	PH	NUMERIC 4.1
166-173	8	DILUTION FACTOR	NUMERIC 8
174-178	5	CONCENTRATION UNITS	'UG/L' OR 'UG/KG'

DETAIL RECORD 1 (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1-3	3	FORM NUMBER	'1H'
4-5	2	FORM SUFFIX	'AA'-'ZZ'
6-7	2	RECORD TYPE	'D1'
8-17	10	CAS NO.	
18-30	13	RESULT	NUMERIC 13.3
31-35	5	QUALIFIER (Q)	

ORGANOPHOSPHORUS PESTICIDE ANALYSIS DATA SHEET - (FORM II)

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'II'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8- 26	19	EG&G SAMPLE NO.	
27- 49	23	LAB NAME	
50- 57	8	CONTRACT	
58- 63	6	LAB CODE	
64- 68	5	CASE NO.	
69- 74	6	SAS NO.	
75- 86	12	SDG NO.	
87- 91	5	MATRIX	'SOIL ' OR 'WATER'
92-103	12	LAB SAMPLE ID	
104-109	6	SAMPLE WT/VOL	NUMERIC 6.1
110-111	2	SAMPLE WT/VOL UNITS	'G' OR 'ML'
112-125	14	LAB FILE ID	
126-128	3	LEVEL	'LOW' OR 'MED'
129-136	8	DATE RECEIVED	MM/DD/YY
137-138	2	% MOISTURE NOT DEC	NUMERIC 2
139-140	2	% MOISTURE DEC	NUMERIC 2
141-148	8	DATE EXTRACTED	MM/DD/YY
149-152	4	EXTRACTION	'SEPF','CONT'OR'SOXH'
153-160	8	DATE ANALYZED	MM/DD/YY
161	1	GPC CLEANUP	'Y' OR 'N'
162-165	4	PH	NUMERIC 4.1
166-173	8	DILUTION FACTOR	NUMERIC 8
174-178	5	CONCENTRATION UNITS	'UG/L ' OR 'UG/KG'

DETAIL RECORD 1 (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1-3	3	FORM NUMBER	'II'
4-5	2	FORM SUFFIX	'AA'-'ZZ'
6-7	2	RECORD TYPE	'D1'
8-17	10	CAS NO.	
18-30	13	RESULT	NUMERIC 13.3
31-35	5	QUALIFIER (Q)	

ORGANOCHLORINE HERBICIDE ANALYSIS DATA SHEET - (FORM 1J)

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'1J'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8- 26	19	EG&G SAMPLE NO.	
27- 49	23	LAB NAME	
50- 57	8	CONTRACT	
58- 63	6	LAB CODE	
64- 68	5	CASE NO.	
69- 74	6	SAS NO.	
75- 86	12	SDG NO.	
87- 91	5	MATRIX	'SOIL ' OR 'WATER'
92-103	12	LAB SAMPLE ID	
104-109	6	SAMPLE WT/VOL	NUMERIC 6.1
110-111	2	SAMPLE WT/VOL UNITS	'G ' OR 'ML'
112-125	14	LAB FILE ID	
126-128	3	LEVEL	'LOW' OR 'MED'
129-136	8	DATE RECEIVED	MM/DD/YY
137-138	2	% MOISTURE NOT DEC	NUMERIC 2
139-140	2	% MOISTURE DEC	NUMERIC 2
141-148	8	DATE EXTRACTED	MM/DD/YY
149-152	4	EXTRACTION	'HERB'
153-160	8	DATE ANALYZED	MM/DD/YY
161	1	GPC CLEANUP	'Y' OR 'N'
162-165	4	PH	NUMERIC 4.1
166-173	8	DILUTION FACTOR	NUMERIC 8
174-178	5	CONCENTRATION UNITS	'UG/L ' OR 'UG/KG'

DETAIL RECORD 1 (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1-3	3	FORM NUMBER	'1J'
4-5	2	FORM SUFFIX	'AA'-'ZZ'
6-7	2	RECORD TYPE	'D1'
8-17	10	CAS NO.	
18-30	13	RESULT	NUMERIC 13.3
31-35	5	QUALIFIER (Q)	

VOLATILE ORGANICS ANALYSIS DATA SHEET - (FORM 1K)
TENTATIVELY IDENTIFIED COMPOUNDS

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'1K'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8- 26	19	EG&G SAMPLE NO.	
27- 49	23	LAB NAME	
50- 57	8	CONTRACT	
58- 63	6	LAB CODE	
64- 68	5	CASE NO.	
69- 74	6	SAS NO.	
75- 86	12	SDG NO.	
87- 91	5	MATRIX	'SOIL ' OR 'WATER'
92-103	12	LAB SAMPLE ID	
104-109	6	SAMPLE WT/VOL	NUMERIC 6.1
110-111	2	SAMPLE WT/VOL UNITS	'G ' OR 'ML'
112-125	14	LAB FILE ID	
126-128	3	LEVEL	'LOW' OR 'MED'
129-136	8	DATE RECEIVED	MM/DD/YY
137-138	2	%MOISTURE NOT DEC	NUMERIC 2
139-146	8	DATE ANALYZED	MM/DD/YY
147-150	4	COLUMN	'NAR ' OR 'WIDE'
151-158	8	DILUTION FACTOR	NUMERIC 8
159-160	2	NUMBER TICS FOUND	NUMERIC 2
161-165	5	CONCENTRATION UNITS	'UG/L ' OR 'UG/KG'

DETAIL RECORD 1 (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1-3	3	FORM NUMBER	'1K'
4-5	2	FORM SUFFIX	'AA'-'ZZ'
6-7	2	RECORD TYPE	'D1'
8-9	2	SEQUENCE NUMBER	NUMERIC 2
10-19	10	CAS NO.	
20-47	28	COMPOUND	
48-53	6	RT	NUMERIC 6.2
54-66	13	ESTIMATED CONCENTRATION	NUMERIC 13.3
67-71	5	QUALIFIER (Q)	

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET - (FORM 1L)
TENTATIVELY IDENTIFIED COMPOUNDS

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'1L'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8- 26	19	EG&G SAMPLE NO.	
27- 49	23	LAB NAME	
50- 57	8	CONTRACT	
58- 63	6	LAB CODE	
64- 68	5	CASE NO.	
69- 74	6	SAS NO.	
75- 86	12	SDG NO.	
87- 91	5	MATRIX	'SOIL ' OR 'WATER'
92-103	12	LAB SAMPLE ID	
104-109	6	SAMPLE WT/VOL	NUMERIC 6.1
110-111	2	SAMPLE WT/VOL UNITS	'G ' OR 'ML'
112-125	14	LAB FILE ID	
126-128	3	LEVEL	'LOW' OR 'MED'
129-136	8	DATE RECEIVED	MM/DD/YY
137-138	2	% MOISTURE NOT DEC	NUMERIC 2
139-140	2	% MOISTURE DEC	NUMERIC 2
141-148	8	DATE EXTRACTED	MM/DD/YY
149-152	4	EXTRACTION	'SEPF','CONT'OR'SONC'
153-160	8	DATE ANALYZED	MM/DD/YY
161	1	GPC CLEANUP	'Y' OR 'N'
162-165	4	PH	NUMERIC 4.1
166-173	8	DILUTION FACTOR	NUMERIC 8
174-175	2	NUMBER TICS FOUND	NUMERIC 2
176-180	5	CONCENTRATION UNITS	'UG/L ' OR 'UG/KG'

DETAIL RECORD 1 (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1-3	3	FORM NUMBER	'1L'
4-5	2	FORM SUFFIX	'AA'-'ZZ'
6-7	2	RECORD TYPE	'D1'
8-9	2	SEQUENCE NUMBER	NUMERIC 2
10-19	10	CAS NO.	
20-47	28	COMPOUND	
48-53	6	RT	NUMERIC 6.2
54-66	13	ESTIMATED CONCENTRATION	NUMERIC 13.3
67-71	5	QUALIFIER (Q)	

FORM II FILE DESCRIPTORS
(FORM2)

WATER VOLATILE SURROGATE RECOVERY - (FORM 2A)

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'2A'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8-30	23	LAB NAME	
31-38	8	CONTRACT	
39-44	6	LAB CODE	
45-49	5	CASE NO.	
50-55	6	SAS NO.	
56-67	12	SDG NO.	
68-69	2	PAGE	NUMERIC 2
70-71	2	OF	NUMERIC 2

DETAIL RECORD 1 (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'2A'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D1'
8- 9	2	SEQUENCE NUMBER	NUMERIC 2
10-28	19	EG&G SAMPLE NO.	
29-31	3	S1 (TOL)	NUMERIC 3
32	1	S1 OUT FLAG	BLANK OR 'D' OR '*'
33-35	3	S2 (BFB)	NUMERIC 3
36	1	S2 OUT FLAG	BLANK OR 'D' OR '*'
37-39	3	S3 (DCE)	NUMERIC 3
40	1	S3 OUT FLAG	BLANK OR 'D' OR '*'
41-43	3	OTHER	NUMERIC 3
44	1	TOTAL OUT	NUMERIC 1

SOIL VOLATILE SURROGATE RECOVERY - (FORM 2B)

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'2B'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8-30	23	LAB NAME	
31-38	8	CONTRACT	
39-44	6	LAB CODE	
45-49	5	CASE NO.	
50-55	6	SAS NO.	
56-67	12	SDG NO.	
68-70	3	LEVEL	'LOW' OR 'MED'
71-72	2	PAGE	NUMERIC 2
72-74	2	OF	NUMERIC 2

DETAIL RECORD 1 (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'2B'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D1'
8- 9	2	SEQUENCE NUMBER	NUMERIC 2
10-28	19	EG&G SAMPLE NO.	
29-31	3	S1 (TOL)	NUMERIC 3
32	1	S1 OUT FLAG	BLANK OR 'D' OR '*'
33-35	3	S2 (BFB)	NUMERIC 3
36	1	S2 OUT FLAG	BLANK OR 'D' OR '*'
37-39	3	S3 (DCE)	NUMERIC 3
40	1	S3 OUT FLAG	BLANK OR 'D' OR '*'
41-43	3	OTHER	NUMERIC 3
44	1	TOTAL OUT	NUMERIC 1

WATER SEMIVOLATILE SURROGATE RECOVERY - (FORM 2C)

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'2C'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8-30	23	LAB NAME	
31-38	8	CONTRACT	
39-44	6	LAB CODE	
45-49	5	CASE NO.	
50-55	6	SAS NO.	
56-67	12	SDG NO.	
68-69	2	PAGE	NUMERIC 2
70-71	2	OF	NUMERIC 2

DETAIL RECORD 1 (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'2C'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D1'
8- 9	2	SEQUENCE NUMBER	NUMERIC 2
10-28	19	EG&G SAMPLE NO.	
29-31	3	S1 (NBZ)	NUMERIC 3
32	1	S1 OUT FLAG	BLANK OR 'D' OR '*'
33-35	3	S2 (FBP)	NUMERIC 3
36	1	S2 OUT FLAG	BLANK OR 'D' OR '*'
37-39	3	S3 (TPH)	NUMERIC 3
40	1	S3 OUT FLAG	BLANK OR 'D' OR '*'
41-43	3	S4 (PHL)	NUMERIC 3
44	1	S4 OUT FLAG	BLANK OR 'D' OR '*'
45-47	3	S5 (2FP)	NUMERIC 3
48	1	S5 OUT FLAG	BLANK OR 'D' OR '*'
49-51	3	S6 (TBP)	NUMERIC 3
52	1	S6 OUT FLAG	BLANK OR 'D' OR '*'
53-55	3	OTHER	NUMERIC 3
56	1	TOTAL OUT	NUMERIC 1

SOIL SEMIVOLATILE SURROGATE RECOVERY - (FORM 2D)

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'2D'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8-30	23	LAB NAME	
31-38	8	CONTRACT	
39-44	6	LAB CODE	
45-49	5	CASE NO.	
50-55	6	SAS NO.	
56-67	12	SDG NO.	
68-70	3	LEVEL	'LOW' OR 'MED'
71-72	2	PAGE	NUMERIC 2
73-74	2	OF	NUMERIC 2

DETAIL RECORD 1 (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'2D'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D1'
8- 9	2	SEQUENCE NUMBER	NUMERIC 2
10-28	19	EG&G SAMPLE NO.	
29-31	3	S1 (NBZ)	NUMERIC 3
32	1	S1 OUT FLAG	BLANK OR 'D' OR '*'
33-35	3	S2 (FBP)	NUMERIC 3
36	1	S2 OUT FLAG	BLANK OR 'D' OR '*'
37-39	3	S3 (TPH)	NUMERIC 3
40	1	S3 OUT FLAG	BLANK OR 'D' OR '*'
41-43	3	S4 (PHL)	NUMERIC 3
44	1	S4 OUT FLAG	BLANK OR 'D' OR '*'
45-47	3	S5 (2FP)	NUMERIC 3
48	1	S5 OUT FLAG	BLANK OR 'D' OR '*'
49-51	3	S6 (TBP)	NUMERIC 3
52	1	S6 OUT FLAG	BLANK OR 'D' OR '*'
53-55	3	OTHER	NUMERIC 3
56	1	TOTAL OUT	NUMERIC 1

WATER ORGANOCHPESTICIDE SURROGATE RECOVERY - (FORM 2E)

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'2E'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8-30	23	LAB NAME	
31-38	8	CONTRACT	
39-44	6	LAB CODE	
45-49	5	CASE NO.	
50-55	6	SAS NO.	
56-67	12	SDG NO.	
68-69	2	PAGE	NUMERIC 2
70-71	2	OF	NUMERIC 2

DETAIL RECORD 1 (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'2E'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D1'
8- 9	2	SEQUENCE NUMBER	NUMERIC 2
10-28	19	EG&G SAMPLE NO.	
29-31	3	S1 (DBC)	NUMERIC 3
32	1	S1 OUT FLAG	BLANK OR 'D' OR '*'
33-35	3	S2 (TCMX)	NUMERIC 3
36	1	S2 OUT FLAG	BLANK OR 'D' OR '*'

SOIL ORGANOCHLORINE PESTICIDE SURROGATE RECOVERY - (FORM 2F)

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'2F'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8-30	23	LAB NAME	
31-38	8	CONTRACT	
39-44	6	LAB CODE	
45-49	5	CASE NO.	
50-55	6	SAS NO.	
56-67	12	SDG NO.	
68-70	3	LEVEL	'LOW' OR 'MED'
71-72	2	PAGE	NUMERIC 2
73-74	2	OF	NUMERIC 2

DETAIL RECORD 1 (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'2F'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D1'
8- 9	2	SEQUENCE NUMBER	NUMERIC 2
10-28	19	EG&G SAMPLE NO.	
29-31	3	S1 (DBC)	NUMERIC 3
32	1	S1 OUT FLAG	BLANK OR 'D' OR '*'
33-35	3	S2 (TCMX)	NUMERIC 3
36	1	S2 OUT FLAG	BLANK OR 'D' OR '*'

WATER ORGANOPHOSPHORUS PESTICIDE SURROGATE RECOVERY - (FORM 2G)

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'2G'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8-30	23	LAB NAME	
31-38	8	CONTRACT	
39-44	6	LAB CODE	
45-49	5	CASE NO.	
50-55	6	SAS NO.	
56-67	12	SDG NO.	
68-69	2	PAGE	NUMERIC 2
70-71	2	OF	NUMERIC 2

DETAIL RECORD 1 (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'2G'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D1'
8- 9	2	SEQUENCE NUMBER	NUMERIC 2
10-28	19	EG&G SAMPLE NO.	
29-31	3	S1 (EPN)	NUMERIC 3
32	1	S1 OUT FLAG	BLANK OR 'D' OR '*'
33-35	3	OTHER	NUMERIC 3

SOIL ORGANOPHOSPHORUS PESTICIDE SURROGATE RECOVERY - (FORM 2H)

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'2H'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8-30	23	LAB NAME	
31-38	8	CONTRACT	
39-44	6	LAB CODE	
45-49	5	CASE NO.	
50-55	6	SAS NO.	
56-67	12	SDG NO.	
68-70	3	LEVEL	'LOW' OR 'MED'
71-72	2	PAGE	NUMERIC 2
73-74	2	OF	NUMERIC 2

DETAIL RECORD 1 (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'2H'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D1'
8- 9	2	SEQUENCE NUMBER	NUMERIC 2
10-28	19	EG&G SAMPLE NO.	
29-31	3	S1 (EPN)	NUMERIC 3
32	1	S1 OUT FLAG	BLANK OR 'D' OR '*'
33-35	3	OTHER	NUMERIC 3

FORM III FILE DESCRIPTION

WATER VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY - (FORM 3A)

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'3A'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8-30	23	LAB NAME	
31-38	8	CONTRACT	
39-44	6	LAB CODE	
45-49	5	CASE NO.	
50-55	6	SAS NO.	
56-67	12	SDG NO.	
68-86	19	MATRIX SPIKE - EG&G SAMPLE NO.	
87-88	2	RPD: # OUTSIDE QC LIMITS	NUMERIC 2
89-90	2	RPD: TOTAL	NUMERIC 2
91-92	2	SPIKE RECOVERY: # OUT	NUMERIC 2
93-94	2	SPIKE RECOVERY: TOTAL	NUMERIC 2

DETAIL RECORD 1 (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'3A'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D1'
8-31	24	COMPOUND	
32-40	9	SPIKE ADDED (UG/L)	NUMERIC 9.3
41-53	13	SAMPLE CONC. (UG/L)	NUMERIC 13.3
54-66	13	MS CONC. (UG/L)	NUMERIC 13.3
67-69	3	MS% REC.	NUMERIC 3
70	1	MS% REC. FLAG	BLANK OR '*'

DETAIL RECORD 2 (D2)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'3A'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D2'
8-31	24	COMPOUND	
32-40	9	SPIKE ADDED (UG/L)	NUMERIC 9.3
41-53	13	MSD CONC. (UG/L)	NUMERIC 13.3
54-56	3	MSD% REC.	NUMERIC 3
57	1	MSD% REC. OUT FLAG	BLANK OR '*'
58-60	3	% RPD	NUMERIC 3
61	1	% RPD OUT FLAG	BLANK OR '*'

COMMENT RECORD 1 (C1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'3A'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'C1'
8-72	65	COMMENT LINE 1	

COMMENT RECORD 2 (C2)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'3A'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'C2'
8-72	65	COMMENT LINE 2	

SOIL VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY - (FORM 3B)

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'3B'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8-30	23	LAB NAME	
31-38	8	CONTRACT	
39-44	6	LAB CODE	
45-49	5	CASE NO.	
50-55	6	SAS NO.	
56-67	12	SDG NO.	
68-86	19	MATRIX SPIKE - EG&G SAMPLE NO.	
87-89	3	LEVEL	'LOW' OR 'MED'
90-91	2	RPD: # OUTSIDE QC LIMITS	NUMERIC 2
92-93	2	RPD: TOTAL	NUMERIC 2
94-95	2	SPIKE RECOVERY: # OUT	NUMERIC 2
96-97	2	SPIKE RECOVERY: TOTAL	NUMERIC 2

DETAIL RECORD 1 (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'3B'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D1'
8-31	24	COMPOUND	
32-40	9	SPIKE ADDED (UG/L)	NUMERIC 9.3
41-53	13	SAMPLE CONC. (UG/L)	NUMERIC 13.3
54-66	13	MS CONC. (UG/L)	NUMERIC 13.3
67-69	3	MS% REC.	NUMERIC 3
70	1	MS% REC. FLAG	BLANK OR '*'

DETAIL RECORD 2 (D2)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'3B'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D2'
8-31	24	COMPOUND	
32-40	9	SPIKE ADDED (UG/L)	NUMERIC 9.3
41-53	13	MSD CONC. (UG/L)	NUMERIC 13.3
54-56	3	MSD% REC.	NUMERIC 3
57	1	MSD% REC. OUT FLAG	BLANK OR '*'
58-60	3	% RPD	NUMERIC 3
61	1	% RPD OUT FLAG	BLANK OR '*'

COMMENT RECORD 1 (C1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'3B'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'C1'
8-72	65	COMMENT LINE 1	

COMMENT RECORD 2 (C2)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'3B'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'C2'
8-72	65	COMMENT LINE 2	

WATER SEMIVOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY - (FORM 3C)

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'3C'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8-30	23	LAB NAME	
31-38	8	CONTRACT	
39-44	6	LAB CODE	
45-49	5	CASE NO.	
50-55	6	SAS NO.	
56-67	12	SDG NO.	
68-86	19	MATRIX SPIKE - EG&G SAMPLE NO.	
87-88	2	RPD: # OUTSIDE QC LIMITS	NUMERIC 2
89-90	2	RPD: TOTAL	NUMERIC 2
91-92	2	SPIKE RECOVERY: # OUT	NUMERIC 2
93-94	2	SPIKE RECOVERY: TOTAL	NUMERIC 2

DETAIL RECORD 1 (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'3C'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D1'
8-31	24	COMPOUND	
32-40	9	SPIKE ADDED (UG/L)	NUMERIC 9.3
41-53	13	SAMPLE CONC. (UG/L)	NUMERIC 13.3
54-66	13	MS CONC. (UG/L)	NUMERIC 13.3
67-69	3	MS% REC.	NUMERIC 3
70	1	MS% REC. FLAG	BLANK OR '*'

DETAIL RECORD 2 (D2)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'3C'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D2'
8-31	24	COMPOUND	
32-40	9	SPIKE ADDED (UG/L)	NUMERIC 9.3
41-53	13	MSD CONC. (UG/L)	NUMERIC 13.3
54-56	3	MSD% REC.	NUMERIC 3
57	1	MSD% REC. OUT FLAG	BLANK OR '*'
58-60	3	% RPD	NUMERIC 3
61	1	% RPD OUT FLAG	BLANK OR '*'

COMMENT RECORD 1 (C1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'3C'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'C1'
8-72	65	COMMENT LINE 1	

COMMENT RECORD 2 (C2)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'3C'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'C2'
8-72	65	COMMENT LINE 2	

SOIL SEMIVOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY - (FORM 3D)

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'3D'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8-30	23	LAB NAME	
31-38	8	CONTRACT	
39-44	6	LAB CODE	
45-49	5	CASE NO.	
50-55	6	SAS NO.	
56-67	12	SDG NO.	
68-86	19	MATRIX SPIKE - EG&G SAMPLE NO.	
87-89	3	LEVEL	'LOW' OR 'MED'
90-91	2	RPD: # OUTSIDE QC LIMITS	NUMERIC 2
92-93	2	RPD: TOTAL	NUMERIC 2
94-95	2	SPIKE RECOVERY: # OUT	NUMERIC 2
96-97	2	SPIKE RECOVERY: TOTAL	NUMERIC 2

DETAIL RECORD 1 (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'3D'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D1'
8-31	24	COMPOUND	
32-40	9	SPIKE ADDED (UG/L)	NUMERIC 9.3
41-53	13	SAMPLE CONC. (UG/L)	NUMERIC 13.3
54-66	13	MS CONC. (UG/L)	NUMERIC 13.3
67-69	3	MS% REC.	NUMERIC 3
70	1	MS% REC. FLAG	BLANK OR '*'

DETAIL RECORD 2 (D2)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'3D'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D2'
8-31	24	COMPOUND	
32-40	9	SPIKE ADDED (UG/L)	NUMERIC 9.3
41-53	13	MSD CONC. (UG/L)	NUMERIC 13.3
54-56	3	MSD% REC.	NUMERIC 3
57	1	MSD% REC. OUT FLAG	BLANK OR '*'
58-60	3	% RPD	NUMERIC 3
61	1	% RPD OUT FLAG	BLANK OR '*'

COMMENT RECORD 1 (C1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'3D'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'C1'
8-72	65	COMMENT LINE 1	

COMMENT RECORD 2 (C2)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'3D'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'C2'
8-72	65	COMMENT LINE 2	

WATER ORGANOCHLORINE PESTICIDE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY - (FORM 3E)

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'3E'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8-30	23	LAB NAME	
31-38	8	CONTRACT	
39-44	6	LAB CODE	
45-49	5	CASE NO.	
50-55	6	SAS NO.	
56-67	12	SDG NO.	
68-86	19	MATRIX SPIKE - EG&G SAMPLE NO.	
87-88	2	RPD: # OUTSIDE QC LIMITS	NUMERIC 2
89-90	2	RPD: TOTAL	NUMERIC 2
91-92	2	SPIKE RECOVERY: # OUT	NUMERIC 2
93-94	2	SPIKE RECOVERY: TOTAL	NUMERIC 2

DETAIL RECORD 1 (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'3E'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D1'
8-31	24	COMPOUND	
32-40	9	SPIKE ADDED (UG/L)	NUMERIC 9.3
41-53	13	SAMPLE CONC. (UG/L)	NUMERIC 13.3
54-66	13	MS CONC. (UG/L)	NUMERIC 13.3
67-69	3	MS% REC.	NUMERIC 3
70	1	MS% REC. FLAG	BLANK OR '*'

DETAIL RECORD 2 (D2)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'3E'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D2'
8-31	24	COMPOUND	
32-40	9	SPIKE ADDED (UG/L)	NUMERIC 9.3
41-53	13	MSD CONC. (UG/L)	NUMERIC 13.3
54-56	3	MSD% REC.	NUMERIC 3
57	1	MSD% REC. OUT FLAG	BLANK OR '*'
58-60	3	% RPD	NUMERIC 3
61	1	% RPD OUT FLAG	BLANK OR '*'

COMMENT RECORD 1 (C1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'3E'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'C1'
8-72	65	COMMENT LINE 1	

COMMENT RECORD 2 (C2)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'3E'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'C2'
8-72	65	COMMENT LINE 2	

SOIL ORGANOCHLORINE PESTICIDE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY - (FORM 3F)

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'3F'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8-30	23	LAB NAME	
31-38	8	CONTRACT	
39-44	6	LAB CODE	
45-49	5	CASE NO.	
50-55	6	SAS NO.	
56-67	12	SDG NO.	
68-86	19	MATRIX SPIKE - EG&G SAMPLE NO.	
87-89	3	LEVEL	'LOW' OR 'MED'
90-91	2	RPD: # OUTSIDE QC LIMITS	NUMERIC 2
92-93	2	RPD: TOTAL	NUMERIC 2
94-95	2	SPIKE RECOVERY: # OUT	NUMERIC 2
96-97	2	SPIKE RECOVERY: TOTAL	NUMERIC 2

DETAIL RECORD 1 (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'3F'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D1'
8-31	24	COMPOUND	
32-40	9	SPIKE ADDED (UG/L)	NUMERIC 9.3
41-53	13	SAMPLE CONC. (UG/L)	NUMERIC 13.3
54-66	13	MS CONC. (UG/L)	NUMERIC 13.3
67-69	3	MS% REC.	NUMERIC 3
70	1	MS% REC. FLAG	BLANK OR '*'

DETAIL RECORD 2 (D2)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'3F'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D2'
8-31	24	COMPOUND	
32-40	9	SPIKE ADDED (UG/L)	NUMERIC 9.3
41-53	13	MSD CONC. (UG/L)	NUMERIC 13.3
54-56	3	MSD% REC.	NUMERIC 3
57	1	MSD% REC. OUT FLAG	BLANK OR '*'
58-60	3	% RPD	NUMERIC 3
61	1	% RPD OUT FLAG	BLANK OR '*'

COMMENT RECORD 1 (C1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'3F'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'C1'
8-72	65	COMMENT LINE 1	

COMMENT RECORD 2 (C2)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'3F'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'C2'
8-72	65	COMMENT LINE 2	

WATER ORGANOPHOSPHORUS PESTICIDE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY - (FORM 3G)

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'3G'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8-30	23	LAB NAME	
31-38	8	CONTRACT	
39-44	6	LAB CODE	
45-49	5	CASE NO.	
50-55	6	SAS NO.	
56-67	12	SDG NO.	
68-86	19	MATRIX SPIKE - EG&G SAMPLE NO.	
87-88	2	RPD: # OUTSIDE QC LIMITS	NUMERIC 2
89-90	2	RPD: TOTAL	NUMERIC 2
91-92	2	SPIKE RECOVERY: # OUT	NUMERIC 2
93-94	2	SPIKE RECOVERY: TOTAL	NUMERIC 2

DETAIL RECORD 1 (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'3G'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D1'
8-31	24	COMPOUND	
32-40	9	SPIKE ADDED (UG/L)	NUMERIC 9.3
41-53	13	SAMPLE CONC. (UG/L)	NUMERIC 13.3
54-66	13	MS CONC. (UG/L)	NUMERIC 13.3
67-69	3	MS% REC.	NUMERIC 3
70	1	MS% REC. FLAG	BLANK OR '*'

DETAIL RECORD 2 (D2)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'3G'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D2'
8-31	24	COMPOUND	
32-40	9	SPIKE ADDED (UG/L)	NUMERIC 9.3
41-53	13	MSD CONC. (UG/L)	NUMERIC 13.3
54-56	3	MSD% REC.	NUMERIC 3
57	1	MSD% REC. OUT FLAG	BLANK OR '*'
58-60	3	% RPD	NUMERIC 3
61	1	% RPD OUT FLAG	BLANK OR '*'

COMMENT RECORD 1 (C1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'3G'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'C1'
8-72	65	COMMENT LINE 1	

COMMENT RECORD 2 (C2)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'3G'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'C2'
8-72	65	COMMENT LINE 2	

SOIL ORGANOPHOSPHORUS PESTICIDE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY - (FORM 3H)

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'3H'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8-30	23	LAB NAME	
31-38	8	CONTRACT	
39-44	6	LAB CODE	
45-49	5	CASE NO.	
50-55	6	SAS NO.	
56-67	12	SDG NO.	
68-86	19	MATRIX SPIKE - EG&G SAMPLE NO.	
87-89	3	LEVEL	'LOW' OR 'MED'
90-91	2	RPD: # OUTSIDE QC LIMITS	NUMERIC 2
92-93	2	RPD: TOTAL	NUMERIC 2
94-95	2	SPIKE RECOVERY: # OUT	NUMERIC 2
96-97	2	SPIKE RECOVERY: TOTAL	NUMERIC 2

DETAIL RECORD 1 (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'3H'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D1'
8-31	24	COMPOUND	
32-40	9	SPIKE ADDED (UG/L)	NUMERIC 9.3
41-53	13	SAMPLE CONC. (UG/L)	NUMERIC 13.3
54-66	13	MS CONC. (UG/L)	NUMERIC 13.3
67-69	3	MS% REC.	NUMERIC 3
70	1	MS% REC. FLAG	BLANK OR '*'

DETAIL RECORD 2 (D2)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'3H'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D2'
8-31	24	COMPOUND	
32-40	9	SPIKE ADDED (UG/L)	NUMERIC 9.3
41-53	13	MSD CONC. (UG/L)	NUMERIC 13.3
54-56	3	MSD% REC.	NUMERIC 3
57	1	MSD% REC. OUT FLAG	BLANK OR '*'
58-60	3	% RPD	NUMERIC 3
61	1	% RPD OUT FLAG	BLANK OR '*'

COMMENT RECORD 1 (C1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'3H'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'C1'
8-72	65	COMMENT LINE 1	

COMMENT RECORD 2 (C2)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'3H'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'C2'
8-72	65	COMMENT LINE 2	

WATER ORGANOCHLORINE HERBICIDE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY - (FORM 3I)

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'3I'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8-30	23	LAB NAME	
31-38	8	CONTRACT	
39-44	6	LAB CODE	
45-49	5	CASE NO.	
50-55	6	SAS NO.	
56-67	12	SDG NO.	
68-86	19	MATRIX SPIKE - EG&G SAMPLE NO.	
87-88	2	RPD: # OUTSIDE QC LIMITS	NUMERIC 2
89-90	2	RPD: TOTAL	NUMERIC 2
91-92	2	SPIKE RECOVERY: # OUT	NUMERIC 2
93-94	2	SPIKE RECOVERY: TOTAL	NUMERIC 2

DETAIL RECORD 1 (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'3I'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D1'
8-31	24	COMPOUND	
32-40	9	SPIKE ADDED (UG/L)	NUMERIC 9.3
41-53	13	SAMPLE CONC. (UG/L)	NUMERIC 13.3
54-66	13	MS CONC. (UG/L)	NUMERIC 13.3
67-69	3	MS% REC.	NUMERIC 3
70	1	MS% REC. FLAG	BLANK OR '*'

DETAIL RECORD 2 (D2)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'3I'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D2'
8-31	24	COMPOUND	
32-40	9	SPIKE ADDED (UG/L)	NUMERIC 9.3
41-53	13	MSD CONC. (UG/L)	NUMERIC 13.3
54-56	3	MSD% REC.	NUMERIC 3
57	1	MSD% REC. OUT FLAG	BLANK OR '*'
58-60	3	% RPD	NUMERIC 3
61	1	% RPD OUT FLAG	BLANK OR '*'

COMMENT RECORD 1 (C1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'3I'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'C1'
8-72	65	COMMENT LINE 1	

COMMENT RECORD 2 (C2)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'3I'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'C2'
8-72	65	COMMENT LINE 2	

SOIL ORGANOCHLORINE HERBICIDE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY - (FORM 3J)

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'3J'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8-30	23	LAB NAME	
31-38	8	CONTRACT	
39-44	6	LAB CODE	
45-49	5	CASE NO.	
50-55	6	SAS NO.	
56-67	12	SDG NO.	
68-86	19	MATRIX SPIKE - EG&G SAMPLE NO.	
87-89	3	LEVEL	'LOW' OR 'MED'
90-91	2	RPD: # OUTSIDE QC LIMITS	NUMERIC 2
92-93	2	RPD: TOTAL	NUMERIC 2
94-95	2	SPIKE RECOVERY: # OUT	NUMERIC 2
96-97	2	SPIKE RECOVERY: TOTAL	NUMERIC 2

DETAIL RECORD 1 (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'3J'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D1'
8-31	24	COMPOUND	
32-40	9	SPIKE ADDED (UG/L)	NUMERIC 9.3
41-53	13	SAMPLE CONC. (UG/L)	NUMERIC 13.3
54-66	13	MS CONC. (UG/L)	NUMERIC 13.3
67-69	3	MS% REC.	NUMERIC 3
70	1	MS% REC. FLAG	BLANK OR '*'

DETAIL RECORD 2 (D2)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'3J'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D2'
8-31	24	COMPOUND	
32-40	9	SPIKE ADDED (UG/L)	NUMERIC 9.3
41-53	13	MSD CONC. (UG/L)	NUMERIC 13.3
54-56	3	MSD% REC.	NUMERIC 3
57	1	MSD% REC. OUT FLAG	BLANK OR '*'
58-60	3	% RPD	
61	1	% RPD OUT FLAG	BLANK OR '*'

COMMENT RECORD 1 (C1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'3J'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'C1'
8-72	65	COMMENT LINE 1	

COMMENT RECORD 2 (C2)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'3J'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'C2'
8-72	65	COMMENT LINE 2	

FORM IV FILE DESCRIPTION
(FORM4)

VOLATILE METHOD BLANK SUMMARY - (FORM 4A)

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'4A'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8- 30	23	LAB NAME	
31- 38	8	CONTRACT	
39- 44	6	LAB CODE	
45- 49	5	CASE NO.	
50- 55	6	SAS NO.	
56- 67	12	SDG NO.	
68- 81	14	LAB FILE ID	
82- 93	12	LAB SAMPLE ID	
94-101	8	DATE ANALYZED	MM/DD/YY
102-105	4	TIME ANALYZED	HHMM
106-110	5	MATRIX	'SOIL ' OR 'WATER'
111-113	3	LEVEL	'LOW' OR 'MED'
114-123	10	INSTRUMENT ID	
124-125	2	PAGE	NUMERIC 2
126-127	2	OF	NUMERIC 2

DETAIL RECORD I (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'4A'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D1'
8- 9	2	SEQUENCE NUMBER	NUMERIC 2
10-28	19	EG&G SAMPLE NO.	
29-40	12	LAB SAMPLE ID	
41-54	14	LAB FILE ID	
55-58	4	TIME ANALYZED	HHMM

COMMENT RECORD 1 (C1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'4A'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'C1'
8-72	65	COMMENT LINE 1	

COMMENT RECORD 2 (C2)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'4A'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'C2'
8-72	65	COMMENT LINE 2	

SEMIVOLATILE METHOD BLANK SUMMARY - (FORM 4B)

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'4B'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8- 30	23	LAB NAME	
31- 38	8	CONTRACT	
39- 44	6	LAB CODE	
45- 49	5	CASE NO.	
50- 55	6	SAS NO.	
56- 67	12	SDG NO.	
68- 81	14	LAB FILE ID	
82- 93	12	LAB SAMPLE ID	
94-101	8	DATE EXTRACTED	MM/DD/YY
102-105	4	EXTRACTION	'SEPF','CONT'OR'SONC'
106-113	8	DATE ANALYZED	MM/DD/YY
114-117	4	TIME ANALYZED	HHMM
118-122	5	MATRIX	'SOIL ' OR 'WATER'
123-125	3	LEVEL	'LOW' OR 'MED'
126-135	10	INSTRUMENT ID	
136-137	2	PAGE	NUMERIC 2
138-139	2	OF	NUMERIC 2

DETAIL RECORD I (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'4B'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D1'
8- 9	2	SEQUENCE NUMBER	NUMERIC 2
10-28	19	EG&G SAMPLE NO.	
29-40	12	LAB SAMPLE ID	
41-54	14	LAB FILE ID	
55-58	8	DATE ANALYZED	MM/DD/YY

COMMENT RECORD 1 (C1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'4B'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'C1'
8-72	65	COMMENT LINE 1	

COMMENT RECORD 2 (C2)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'4B'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'C2'
8-72	65	COMMENT LINE 2	

ORGANOCHLORINE PESTICIDE METHOD BLANK SUMMARY - (FORM 4C)

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'4C'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8- 30	23	LAB NAME	
31- 38	8	CONTRACT	
39- 44	6	LAB CODE	
45- 49	5	CASE NO.	
50- 55	6	SAS NO.	
56- 67	12	SDG NO.	
68- 79	12	LAB SAMPLE ID	
80- 93	14	LAB FILE ID	
94- 98	5	MATRIX	'SOIL' OR 'WATER'
99-101	3	LEVEL	'LOW' OR 'MED'
102-109	8	DATE EXTRACTED	MM/DD/YY
110-113	4	EXTRACTION	'SEPF','CONT'OR'SONC'
114-121	8	DATE ANALYZED (1)	MM/DD/YY
122-129	8	DATE ANALYZED (2)	MM/DD/YY
130-133	4	TIME ANALYZED (1)	HHMM
134-137	4	TIME ANALYZED (2)	HHMM
138-147	10	INSTRUMENT ID (1)	
148-157	10	INSTRUMENT ID (2)	
158-167	10	GC COLUMN ID (1)	
168-177	10	GC COLUMN ID (2)	
178-179	2	PAGE	NUMERIC 2
180-181	2	OF	NUMERIC 2

DETAIL RECORD I (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'4C'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D1'
8- 9	2	SEQUENCE NUMBER	NUMERIC 2
10-28	19	EG&G SAMPLE NO.	
29-40	12	LAB SAMPLE ID	
41-49	8	DATE ANALYZED (1)	MM/DD/YY
50-57	8	DATE ANALYZED (2)	MM/DD/YY

COMMENT RECORD 1 (C1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'4C'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'C1'
8-72	65	COMMENT LINE 1	

COMMENT RECORD 2 (C2)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'4C'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'C2'
8-72	65	COMMENT LINE 2	

ORGANOPHOSPHORUS PESTICIDE METHOD BLANK SUMMARY - (FORM 4D)

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'4D'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8- 30	23	LAB NAME	
31- 38	8	CONTRACT	
39- 44	6	LAB CODE	
45- 49	5	CASE NO.	
50- 55	6	SAS NO.	
56- 67	12	SDG NO.	
68- 79	12	LAB SAMPLE ID	
80- 93	14	LAB FILE ID	
94- 98	5	MATRIX	'SOIL' OR 'WATER'
99-101	3	LEVEL	'LOW' OR 'MED'
102-109	8	DATE EXTRACTED	MM/DD/YY
110-113	4	EXTRACTION	'SEPF','CONT'OR'SOXH'
114-121	8	DATE ANALYZED (1)	MM/DD/YY
122-129	8	DATE ANALYZED (2)	MM/DD/YY
130-133	4	TIME ANALYZED (1)	HHMM
134-137	4	TIME ANALYZED (2)	HHMM
138-147	10	INSTRUMENT ID (1)	
148-157	10	INSTRUMENT ID (2)	
158-167	10	GC COLUMN ID (1)	
168-177	10	GC COLUMN ID (2)	
178-179	2	PAGE	NUMERIC 2
180-181	2	OF	NUMERIC 2

DETAIL RECORD I (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'4D'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D1'
8- 9	2	SEQUENCE NUMBER	NUMERIC 2
10-28	19	EG&G SAMPLE NO.	
29-40	12	LAB SAMPLE ID	
41-49	8	DATE ANALYZED (1)	MM/DD/YY
50-57	8	DATE ANALYZED (2)	MM/DD/YY

COMMENT RECORD 1 (C1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'4D'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'C1'
8-72	65	COMMENT LINE 1	

COMMENT RECORD 2 (C2)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'4D'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'C2'
8-72	65	COMMENT LINE 2	

ORGANOCHLORINE HERBICIDE METHOD BLANK SUMMARY - (FORM 4E)

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'4E'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8- 30	23	LAB NAME	
31- 38	8	CONTRACT	
39- 44	6	LAB CODE	
45- 49	5	CASE NO.	
50- 55	6	SAS NO.	
56- 67	12	SDG NO.	
68- 79	12	LAB SAMPLE ID	
80- 93	14	LAB FILE ID	
94- 98	5	MATRIX	'SOIL' OR 'WATER'
99-101	3	LEVEL	'LOW' OR 'MED'
102-109	8	DATE EXTRACTED	MM/DD/YY
110-113	4	EXTRACTION	'Herb'
114-121	8	DATE ANALYZED (1)	MM/DD/YY
122-129	8	DATE ANALYZED (2)	MM/DD/YY
130-133	4	TIME ANALYZED (1)	HHMM
134-137	4	TIME ANALYZED (2)	HHMM
138-147	10	INSTRUMENT ID (1)	
148-157	10	INSTRUMENT ID (2)	
158-167	10	GC COLUMN ID (1)	
168-177	10	GC COLUMN ID (2)	
178-179	2	PAGE	NUMERIC 2
180-181	2	OF	NUMERIC 2

DETAIL RECORD I (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'4E'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D1'
8- 9	2	SEQUENCE NUMBER	NUMERIC 2
10-28	19	EG&G SAMPLE NO.	
29-40	12	LAB SAMPLE ID	
41-49	8	DATE ANALYZED (1)	MM/DD/YY
50-57	8	DATE ANALYZED (2)	MM/DD/YY

COMMENT RECORD 1 (C1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'4E'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'C1'
8-72	65	COMMENT LINE 1	

COMMENT RECORD 2 (C2)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'4E'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'C2'
8-72	65	COMMENT LINE 2	

FORM V FILE DESCRIPTION
(FORM5)

VOLATILE ORGANIC GC/MS TUNING AND MASS CALIBRATION - (FORM 5A)
BROMOFLUOROBENZENE (BFB)

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'5A'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8- 30	23	LAB NAME	
31- 38	8	CONTRACT	
39- 44	6	LAB CODE	
45- 49	5	CASE NO.	
50- 55	6	SAS NO.	
56- 67	12	SDG NO.	
68- 81	14	LAB FILE ID	
82- 89	8	BFB INJECTION DATE	MM/DD/YY
90- 99	10	INSTRUMENT ID	
100-103	4	BFB INJECTION TIME	HHMM
104-108	5	MATRIX	'SOIL ' OR 'WATER'
109-111	3	LEVEL	'LOW' OR 'MED'
112-115	4	COLUMN	'NAR' OR 'WIDE'
116-117	2	PAGE	NUMERIC 2
118-119	2	OF	NUMERIC 2

DETAIL RECORD 1 (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'5A'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D1'
8-10	3	M/E	NUMERIC 3
11-15	5	% RELATIVE ABUNDANCE	NUMERIC 5.1
16-20	5	% MASS (WHERE APPLICABLE)	NUMERIC 5.1

DETAIL RECORD 2 (D2)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'5A'
4- 5	2	FORM SUFFIX	AA-ZZ
6- 7	2	RECORD TYPE	'D2'
8- 9	2	SEQUENCE NUMBER	NUMERIC 2
10-28	19	EG&G SAMPLE NO.	
29-40	12	LAB SAMPLE ID	
41-54	14	LAB FILE ID	
55-62	8	DATE ANALYZED	MM/DD/YY
63-66	4	TIME ANALYZED	HHMM

SEMIVOLATILE ORGANIC GC/MS TUNING AND MASS CALIBRATION - (FORM 5B)
DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'5B'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8- 30	23	LAB NAME	
31- 38	8	CONTRACT	
39- 44	6	LAB CODE	
45- 49	5	CASE NO.	
50- 55	6	SAS NO.	
56- 67	12	SDG NO.	
68- 81	14	LAB FILE ID	
82- 89	8	DFTPP INJECTION DATE	MM/DD/YY
90- 99	10	INSTRUMENT ID	
100-103	4	DFTPP INJECTION TIME	HHMM
104-105	2	PAGE	NUMERIC 2
106-107	2	OF	NUMERIC 2

DETAIL RECORD 1 (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'5B'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D1'
8-10	3	M/E	NUMERIC 3
11-16	6	% RELATIVE ABUNDANCE	NUMERIC 6.2
17-21	5	% MASS (WHERE APPLICABLE)	NUMERIC 5.1

DETAIL RECORD 2 (D2)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'5B'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D2'
8- 9	2	SEQUENCE NUMBER	NUMERIC 2
10-28	19	EG&G SAMPLE NO.	
29-40	12	LAB SAMPLE ID	
41-54	14	LAB FILE ID	
55-62	8	DATE ANALYZED	MM/DD/YY
63-66	4	TIME ANALYZED	HHMM

FORM VI FILE DESCRIPTION
(FORM6)

VOLATILE ORGANICS INITIAL CALIBRATION DATA - (FORM 6A)

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'6A'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8- 30	23	LAB NAME	
31- 38	8	CONTRACT	
39- 44	6	LAB CODE	
45- 49	5	CASE NO.	
50- 55	6	SAS NO.	
56- 67	12	SDG NO.	
68- 77	10	INSTRUMENT ID	
78- 85	8	CALIBRATION DATE 1	MM/DD/YY
86- 93	8	CALIBRATION DATE 2	MM/DD/YY
94- 98	5	MATRIX	'SOIL ' OR 'WATER'
99-101	3	LEVEL	'LOW' OR 'MED'
102-105	4	COLUMN	'NAR' OR 'WIDE'
106-119	14	RRF20 LAB FILE ID	
120-133	14	RRF50 LAB FILE ID	
134-147	14	RRF100 LAB FILE ID	
148-161	14	RRF150 LAB FILE ID	
162-175	14	RRF200 LAB FILE ID	

DETAIL RECORD 1 (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'6A'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D1'
8-38	31	COMPOUND	
39-43	5	RRF20	NUMERIC 5.3
44-48	5	RRF50	NUMERIC 5.3
49-53	5	RRF100	NUMERIC 5.3
54-58	5	RRF150	NUMERIC 5.3
59-63	5	RRF200	NUMERIC 5.3
64-68	5	AVERAGE RRF	NUMERIC 5.3
69-73	5	% RSD	NUMERIC 5.1

VOLATILE ORGANICS INITIAL CALIBRATION DATA - (FORM 6B)

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'6B'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8- 30	23	LAB NAME	
31- 38	8	CONTRACT	
39- 44	6	LAB CODE	
45- 49	5	CASE NO.	
50- 55	6	SAS NO.	
56- 67	12	SDG NO.	
68- 77	10	INSTRUMENT ID	
78- 85	8	CALIBRATION DATE 1	MM/DD/YY
86- 93	8	CALIBRATION DATE 2	MM/DD/YY
94- 98	5	MATRIX	'SOIL ' OR 'WATER'
99-101	3	LEVEL	'LOW' OR 'MED'
102-105	4	COLUMN	'NAR' OR 'WIDE'
106-119	14	RRF20 LAB FILE ID	
120-133	14	RRF50 LAB FILE ID	
134-147	14	RRF100 LAB FILE ID	
148-161	14	RRF150 LAB FILE ID	
162-175	14	RRF200 LAB FILE ID	

DETAIL RECORD 1 (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'6B'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D1'
8-38	31	COMPOUND	
39-43	5	RRF20	NUMERIC 5.3
44-48	5	RRF50	NUMERIC 5.3
49-53	5	RRF100	NUMERIC 5.3
54-58	5	RRF150	NUMERIC 5.3
59-63	5	RRF200	NUMERIC 5.3
64-68	5	AVERAGE RRF	NUMERIC 5.3
69-73	5	% RSD	NUMERIC 5.1

SEMIVOLATILE ORGANICS INITIAL CALIBRATION DATA - (FORM 6C)

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'6C'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8- 30	23	LAB NAME	
31- 38	8	CONTRACT	
39- 44	6	LAB CODE	
45- 49	5	CASE NO.	
50- 55	6	SAS NO.	
56- 67	12	SDG NO.	
68- 77	10	INSTRUMENT ID	
78- 85	8	CALIBRATION DATE 1	MM/DD/YY
86- 93	8	CALIBRATION DATE 2	MM/DD/YY
94-107	14	RRF20 LAB FILE ID	
108-121	14	RRF50 LAB FILE ID	
122-135	14	RRF80 LAB FILE ID	
136-149	14	RRF120 LAB FILE ID	
150-163	14	RRF160 LAB FILE ID	

DETAIL RECORD 1 (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'6C'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D1'
8-38	31	COMPOUND	
39-43	5	RRF20	NUMERIC 5.3
44-48	5	RRF50	NUMERIC 5.3
49-53	5	RRF80	NUMERIC 5.3
54-58	5	RRF120	NUMERIC 5.3
59-63	5	RRF160	NUMERIC 5.3
64-68	5	AVERAGE RRF	NUMERIC 5.3
69-73	5	% RSD	NUMERIC 5.1

SEMIVOLATILE ORGANICS INITIAL CALIBRATION DATA - (FORM 6D)

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'6D'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8- 30	23	LAB NAME	
31- 38	8	CONTRACT	
39- 44	6	LAB CODE	
45- 49	5	CASE NO.	
50- 55	6	SAS NO.	
56- 67	12	SDG NO.	
68- 77	10	INSTRUMENT ID	
78- 85	8	CALIBRATION DATE 1	MM/DD/YY
86- 93	8	CALIBRATION DATE 2	MM/DD/YY
94-107	14	RRF20 LAB FILE ID	
108-121	14	RRF50 LAB FILE ID	
122-135	14	RRF80 LAB FILE ID	
136-149	14	RRF120 LAB FILE ID	
150-163	14	RRF160 LAB FILE ID	

DETAIL RECORD 1 (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'6D'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D1'
8-38	31	COMPOUND	
39-43	5	RRF20	NUMERIC 5.3
44-48	5	RRF50	NUMERIC 5.3
49-53	5	RRF80	NUMERIC 5.3
54-58	5	RRF120	NUMERIC 5.3
59-63	5	RRF160	NUMERIC 5.3
64-68	5	AVERAGE RRF	NUMERIC 5.3
69-73	5	% RSD	NUMERIC 5.1

SEMIVOLATILE ORGANICS INITIAL CALIBRATION DATA - (FORM 6E)

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'6E'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8- 30	23	LAB NAME	
31- 38	8	CONTRACT	
39- 44	6	LAB CODE	
45- 49	5	CASE NO.	
50- 55	6	SAS NO.	
56- 67	12	SDG NO.	
68- 77	10	INSTRUMENT ID	
78- 85	8	CALIBRATION DATE 1	MM/DD/YY
86- 93	8	CALIBRATION DATE 2	MM/DD/YY
94-107	14	RRF20 LAB FILE ID	
108-121	14	RRF50 LAB FILE ID	
122-135	14	RRF80 LAB FILE ID	
136-149	14	RRF120 LAB FILE ID	
150-163	14	RRF160 LAB FILE ID	

DETAIL RECORD 1 (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'6E'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D1'
8-38	31	COMPOUND	
39-43	5	RRF20	NUMERIC 5.3
44-48	5	RRF50	NUMERIC 5.3
49-53	5	RRF80	NUMERIC 5.3
54-58	5	RRF120	NUMERIC 5.3
59-63	5	RRF160	NUMERIC 5.3
64-68	5	AVERAGE RRF	NUMERIC 5.3
69-73	5	% RSD	NUMERIC 5.1

SEMIVOLATILE ORGANICS INITIAL CALIBRATION DATA - (FORM 6F)

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'6F'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8- 30	23	LAB NAME	
31- 38	8	CONTRACT	
39- 44	6	LAB CODE	
45- 49	5	CASE NO.	
50- 55	6	SAS NO.	
56- 67	12	SDG NO.	
68- 77	10	INSTRUMENT ID	
78- 85	8	CALIBRATION DATE 1	MM/DD/YY
86- 93	8	CALIBRATION DATE 2	MM/DD/YY
94-107	14	RRF20 LAB FILE ID	
108-121	14	RRF50 LAB FILE ID	
122-135	14	RRF80 LAB FILE ID	
136-149	14	RRF120 LAB FILE ID	
150-163	14	RRF160 LAB FILE ID	

DETAIL RECORD 1 (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'6F'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D1'
8-38	31	COMPOUND	
39-43	5	RRF20	NUMERIC 5.3
44-48	5	RRF50	NUMERIC 5.3
49-53	5	RRF80	NUMERIC 5.3
54-58	5	RRF120	NUMERIC 5.3
59-63	5	RRF160	NUMERIC 5.3
64-68	5	AVERAGE RRF	NUMERIC 5.3
69-73	5	% RSD	NUMERIC 5.1

FORM VII FILE DESCRIPTION
(FORM7)

VOLATILE CONTINUING CALIBRATION CHECK - (FORM 7A)

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'7A'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8- 30	23	LAB NAME	
31- 38	8	CONTRACT	
39- 44	6	LAB CODE	
45- 49	5	CASE NO.	
50- 55	6	SAS NO.	
56- 67	12	SDG NO.	
68- 77	10	INSTRUMENT ID	
78- 85	8	CALIBRATION DATE	MM/DD/YY
86- 89	4	CALIBRATION TIME	HHMM
90-103	14	LAB FILE ID	
104-111	8	INIT. CALIB. DATE 1	MM/DD/YY
112-119	8	INIT. CALIB. DATE 2	MM/DD/YY
120-124	5	MATRIX	'SOIL ' OR 'WATER'
125-127	3	LEVEL	'LOW' OR 'MED'
128-131	4	COLUMN	'NAR' OR 'WIDE'

DETAIL RECORD 1 (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'7A'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D1'
8-38	31	COMPOUND	
39-43	5	AVERAGE RRF	NUMERIC 5.3
44-48	5	RRF50	NUMERIC 5.3
49-53	5	% D	NUMERIC 5.1

VOLATILE CONTINUING CALIBRATION CHECK - (FORM 7B)

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'7B'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8- 30	23	LAB NAME	
31- 38	8	CONTRACT	
39- 44	6	LAB CODE	
45- 49	5	CASE NO.	
50- 55	6	SAS NO.	
56- 67	12	SDG NO.	
68- 77	10	INSTRUMENT ID	
78- 85	8	CALIBRATION DATE	MM/DD/YY
86- 89	4	CALIBRATION TIME	HHMM
90-103	14	LAB FILE ID	
104-111	8	INIT. CALIB. DATE 1	MM/DD/YY
112-119	8	INIT. CALIB. DATE 2	MM/DD/YY
120-124	5	MATRIX	'SOIL ' OR 'WATER'
125-127	3	LEVEL	'LOW' OR 'MED'
128-131	4	COLUMN	'NAR' OR 'WIDE'

DETAIL RECORD 1 (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'7B'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D1'
8-38	31	COMPOUND	
39-43	5	AVERAGE RRF	NUMERIC 5.3
44-48	5	RRF50	NUMERIC 5.3
49-53	5	% D	NUMERIC 5.1

SEMIVOLATILE CONTINUING CALIBRATION CHECK - (FORM 7C)

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'7C'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8- 30	23	LAB NAME	
31- 38	8	CONTRACT	
39- 44	6	LAB CODE	
45- 49	5	CASE NO.	
50- 55	6	SAS NO.	
56- 67	12	SDG NO.	
68- 77	10	INSTRUMENT ID	
78- 85	8	CALIBRATION DATE	MM/DD/YY
86- 89	4	CALIBRATION TIME	HHMM
90-103	14	LAB FILE ID	
104-111	8	INIT. CALIB. DATE 1	MM/DD/YY
112-119	8	INIT. CALIB. DATE 2	MM/DD/YY

DETAIL RECORD 1 (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'7C'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D1'
8-38	31	COMPOUND	
39-43	5	AVERAGE RRF	NUMERIC 5.3
44-48	5	RRF50	NUMERIC 5.3
49-53	5	% D	NUMERIC 5.1

SEMIVOLATILE CONTINUING CALIBRATION CHECK - (FORM 7D)

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'7D'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8- 30	23	LAB NAME	
31- 38	8	CONTRACT	
39- 44	6	LAB CODE	
45- 49	5	CASE NO.	
50- 55	6	SAS NO.	
56- 67	12	SDG NO.	
68- 77	10	INSTRUMENT ID	
78- 85	8	CALIBRATION DATE	MM/DD/YY
86- 89	4	CALIBRATION TIME	HHMM
90-103	14	LAB FILE ID	
104-111	8	INIT. CALIB. DATE 1	MM/DD/YY
112-119	8	INIT. CALIB. DATE 2	MM/DD/YY

DETAIL RECORD 1 (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'7D'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D1'
8-38	31	COMPOUND	
39-43	5	AVERAGE RRF	NUMERIC 5.3
44-48	5	RRF50	NUMERIC 5.3
49-53	5	% D	NUMERIC 5.1

SEMIVOLATILE CONTINUING CALIBRATION CHECK - (FORM 7E)

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'7E'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8- 30	23	LAB NAME	
31- 38	8	CONTRACT	
39- 44	6	LAB CODE	
45- 49	5	CASE NO.	
50- 55	6	SAS NO.	
56- 67	12	SDG NO.	
68- 77	10	INSTRUMENT ID	
78- 85	8	CALIBRATION DATE	MM/DD/YY
86- 89	4	CALIBRATION TIME	HHMM
90-103	14	LAB FILE ID	
104-111	8	INIT. CALIB. DATE 1	MM/DD/YY
112-119	8	INIT. CALIB. DATE 2	MM/DD/YY

DETAIL RECORD 1 (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'7E'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D1'
8-38	31	COMPOUND	
39-43	5	AVERAGE RRF	NUMERIC 5.3
44-48	5	RRF50	NUMERIC 5.3
49-53	5	% D	NUMERIC 5.1

SEMIVOLATILE CONTINUING CALIBRATION CHECK - (FORM 7F)

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'7F'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8- 30	23	LAB NAME	
31- 38	8	CONTRACT	
39- 44	6	LAB CODE	
45- 49	5	CASE NO.	
50- 55	6	SAS NO.	
56- 67	12	SDG NO.	
68- 77	10	INSTRUMENT ID	
78- 85	8	CALIBRATION DATE	MM/DD/YY
86- 89	4	CALIBRATION TIME	HHMM
90-103	14	LAB FILE ID	
104-111	8	INIT. CALIB. DATE 1	MM/DD/YY
112-119	8	INIT. CALIB. DATE 2	MM/DD/YY

DETAIL RECORD 1 (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'7F'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D1'
8-38	31	COMPOUND	
39-43	5	AVERAGE RRF	NUMERIC 5.3
44-48	5	RRF50	NUMERIC 5.3
49-53	5	% D	NUMERIC 5.1

FORM VIII FILE DESCRIPTION
(FORM8)

VOLATILE INTERNAL STANDARD AREA SUMMARY - (FORM 8A)

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'8A'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8- 30	23	LAB NAME	
31- 38	8	CONTRACT	
39- 44	6	LAB CODE	
45- 49	5	CASE NO.	
50- 55	6	SAS NO.	
56- 67	12	SDG NO.	
68- 81	14	LAB FILE ID (STANDARD)	
82- 89	8	DATE ANALYZED	MM/DD/YY
90- 99	10	INSTRUMENT ID	
100-103	4	TIME ANALYZED	HHMM
104-108	5	MATRIX	'SOIL ' OR 'WATER'
109-111	3	LEVEL	'LOW' OR 'MED'
112-115	4	COLUMN	'NAR' OR 'WIDE'
116-117	2	PAGE	NUMERIC 2
118-119	2	OF	NUMERIC 2

DETAIL RECORD 1 (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'8A'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D1'
		12 HOUR STANDARD -	
8- 16	9	IS1 (BCM) AREA	NUMERIC 9
17- 22	6	RT	NUMERIC 6.2
23- 31	9	IS2 (DFB) AREA	NUMERIC 9
32- 37	6	RT	NUMERIC 6.2
38- 46	9	IS3 (CBZ) AREA	NUMERIC 9
47- 52	6	RT	NUMERIC 6.2
		UPPER LIMIT -	
53- 61	9	IS1 (BCM) AREA	NUMERIC 9
62- 70	9	IS2 (DFB) AREA	NUMERIC 9
71- 79	9	IS3 (CBZ) AREA	NUMERIC 9
		LOWER LIMIT -	
80- 88	9	IS1 (BCM) AREA	NUMERIC 9
89- 97	9	IS2 (DFB) AREA	NUMERIC 9
98-106	9	IS3 (CBZ) AREA	NUMERIC 9

DETAIL RECORD 2 (D2)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'8A'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D2'
8- 9	2	SEQUENCE NUMBER	NUMERIC 2
10- 28	19	EG&G SAMPLE NO.	
29- 37	9	IS1 (BCM) AREA	NUMERIC 9
38	1	IS1 (BCM) AREA FLAG	BLANK OR '*'
39- 44	6	RT	NUMERIC 6.2
45- 53	9	IS2 (DFB) AREA	NUMERIC 9
54	1	IS2 (DFB) AREA FLAG	BLANK OR '*'
55- 60	6	RT	NUMERIC 6.2
61- 69	9	IS3 (CBZ) AREA	NUMERIC 9
70	1	IS3 (CBZ) AREA FLAG	BLANK OR '*'
71- 76	6	RT	NUMERIC 6.2

VOLATILE INTERNAL STANDARD AREA SUMMARY - (FORM 8B)

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'8B'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8- 30	23	LAB NAME	
31- 38	8	CONTRACT	
39- 44	6	LAB CODE	
45- 49	5	CASE NO.	
50- 55	6	SAS NO.	
56- 67	12	SDG NO.	
68- 81	14	LAB FILE ID (STANDARD)	
82- 89	8	DATE ANALYZED	MM/DD/YY
90- 99	10	INSTRUMENT ID	
100-103	4	TIME ANALYZED	HHMM
104-108	5	MATRIX	'SOIL ' OR 'WATER'
109-111	3	LEVEL	'LOW' OR 'MED'
112-115	4	COLUMN	'NAR' OR 'WIDE'
116-117	2	PAGE	NUMERIC 2
118-119	2	OF	NUMERIC 2

DETAIL RECORD 1 (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'8B'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D1'
8- 16	9	12 HOUR STANDARD - IS4 (DCB) AREA	NUMERIC 9
17- 22	6	RT	NUMERIC 6.2
23- 31	9	UPPER LIMIT - IS4 (DCB) AREA	NUMERIC 9
32- 40	9	LOWER LIMIT - IS4 (DCB) AREA	NUMERIC 9

DETAIL RECORD 2 (D2)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'8B'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D2'
8- 9	2	SEQUENCE NUMBER	NUMERIC 2
10- 28	19	EG&G SAMPLE NO.	
29- 37	9	IS1 (DCB) AREA	NUMERIC 9
38	1	IS1 (DCB) AREA FLAG	BLANK OR '*'
39- 44	6	RT	NUMERIC 6.2

SEMIVOLATILE INTERNAL STANDARD AREA SUMMARY - (FORM 8C)

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'8C'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8- 30	23	LAB NAME	
31- 38	8	CONTRACT	
39- 44	6	LAB CODE	
45- 49	5	CASE NO.	
50- 55	6	SAS NO.	
56- 67	12	SDG NO.	
68- 81	14	LAB FILE ID (STANDARD)	
82- 89	8	DATE ANALYZED	MM/DD/YY
90- 99	10	INSTRUMENT ID	
100-103	4	TIME ANALYZED	HHMM
104-105	2	PAGE	NUMERIC 2
106-107	2	OF	NUMERIC 2

DETAIL RECORD 1 (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'8C'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D1'
		12 HOUR STANDARD -	
8- 16	9	IS1 (DCB) AREA	NUMERIC 9
17- 22	6	RT	NUMERIC 6.2
23- 31	9	IS2 (NPT) AREA	NUMERIC 9
32- 37	6	RT	NUMERIC 6.2
38- 46	9	IS3 (ANT) AREA	NUMERIC 9
47- 52	6	RT	NUMERIC 6.2
		UPPER LIMIT -	
53- 61	9	IS1 (DCB) AREA	NUMERIC 9
62- 70	9	IS2 (NPT) AREA	NUMERIC 9
71- 79	9	IS3 (ANT) AREA	NUMERIC 9
		LOWER LIMIT -	
80- 88	9	IS1 (DCB) AREA	NUMERIC 9
89- 97	9	IS2 (NPT) AREA	NUMERIC 9
98-106	9	IS3 (ANT) AREA	NUMERIC 9

DETAIL RECORD 2 (D2)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'8C'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D2'
8- 9	2	SEQUENCE NUMBER	NUMERIC 2
10- 28	19	EG&G SAMPLE NO.	
29- 37	9	IS1 (DCB) AREA	NUMERIC 9
38	1	IS1 (DCB) AREA FLAG	BLANK OR '*'
39- 44	6	RT	NUMERIC 6.2
45- 53	9	IS2 (NPT) AREA	NUMERIC 9
54	1	IS2 (NPT) AREA FLAG	BLANK OR '*'
55- 60	6	RT	NUMERIC 6.2
61- 69	9	IS3 (ANT) AREA	NUMERIC 9
70	1	IS3 (ANT) AREA FLAG	BLANK OR '*'
71- 76	6	RT	NUMERIC 6.2

SEMIVOLATILE INTERNAL STANDARD AREA SUMMARY - (FORM 8D)

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'8D'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8- 30	23	LAB NAME	
31- 38	8	CONTRACT	
39- 44	6	LAB CODE	
45- 49	5	CASE NO.	
50- 55	6	SAS NO.	
56- 67	12	SDG NO.	
68- 81	14	LAB FILE ID (STANDARD)	
82- 89	8	DATE ANALYZED	MM/DD/YY
90- 99	10	INSTRUMENT ID	
100-103	4	TIME ANALYZED	HHMM
104-105	2	PAGE	NUMERIC 2
106-107	2	OF	NUMERIC 2

DETAIL RECORD 1 (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'8D'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D1'
		12 HOUR STANDARD -	
8- 16	9	IS1 (PHN) AREA	NUMERIC 9
17- 22	6	RT	NUMERIC 6.2
23- 31	9	IS2 (CRY) AREA	NUMERIC 9
32- 37	6	RT	NUMERIC 6.2
38- 46	9	IS3 (PRY) AREA	NUMERIC 9
47- 52	6	RT	NUMERIC 6.2
		UPPER LIMIT -	
53- 61	9	IS1 (PHN) AREA	NUMERIC 9
62- 70	9	IS2 (CRY) AREA	NUMERIC 9
71- 79	9	IS3 (PRY) AREA	NUMERIC 9
		LOWER LIMIT -	
80- 88	9	IS1 (PHN) AREA	NUMERIC 9
89- 97	9	IS2 (CRY) AREA	NUMERIC 9
98-106	9	IS3 (PRY) AREA	NUMERIC 9

DETAIL RECORD 2 (D2)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'8D'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D2'
8- 9	2	SEQUENCE NUMBER	NUMERIC 2
10- 28	19	EG&G SAMPLE NO.	
29- 37	9	IS4 (PHN) AREA	NUMERIC 9
38	1	IS4 (PHN) AREA FLAG	BLANK OR '*'
39- 44	6	RT	NUMERIC 6.2
45- 53	9	IS5 (CRY) AREA	NUMERIC 9
54	1	IS5 (CRY) AREA FLAG	BLANK OR '*'
55- 60	6	RT	NUMERIC 6.2
61- 69	9	IS6 (PRY) AREA	NUMERIC 9
70	1	IS6 (PRY) AREA FLAG	BLANK OR '*'
71- 76	6	RT	NUMERIC 6.2

ORGANOCHLORINE PESTICIDE EVALUATION STANDARDS SUMMARY - (FORM 8E)

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'8E'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8- 30	23	LAB NAME	
31- 38	8	CONTRACT	
39- 44	6	LAB CODE	
45- 49	5	CASE NO.	
50- 55	6	SAS NO.	
56- 67	12	SDG NO.	
68- 77	10	INSTRUMENT ID	
78- 87	10	GC COLUMN ID	
		DATES OF ANALYSES	
88- 95	8	FROM:	MM/DD/YY
96-103	8	TO:	MM/DD/YY

DETAIL RECORD 1 (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'8E'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D1'
8- 23	16	PESTICIDE	
24- 34	11	CALIB. FACTOR EVAL MIX A	NUMERIC 11
35- 45	11	CALIB. FACTOR EVAL MIX B	NUMERIC 11
46- 56	11	CALIB. FACTOR EVAL MIX C	NUMERIC 11
57- 61	5	% RSD	NUMERIC 5.1

DETAIL RECORD 2 (D2)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'8E'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D2'
8- 9	2	SEQUENCE NUMBER	NUMERIC 2
10- 17	8	DATE ANALYZED	MM/DD/YY
18- 21	4	TIME ANALYZED	HHMM
22- 26	5	ENDRIN	NUMERIC 5.1
27- 31	5	4,4'-DDT	NUMERIC 5.1
32- 36	5	COMBINED	NUMERIC 5.1

ORGANOCHLORINE PESTICIDE EVALUATION STANDARDS SUMMARY - (FORM 8F)
EVALUATION OF RETENTION TIME SHIFT FOR DIBUTYLCHLORENDATE

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'8F'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8- 30	23	LAB NAME	
31- 38	8	CONTRACT	
39- 44	6	LAB CODE	
45- 49	5	CASE NO.	
50- 55	6	SAS NO.	
56- 67	12	SDG NO.	
68- 77	10	INSTRUMENT ID	
78- 87	10	GC COLUMN ID	
		DATES OF ANALYSES	
88- 95	8	FROM:	MM/DD/YY
96-103	8	TO:	MM/DD/YY
104-105	2	PAGE	NUMERIC 2
106-107	2	OF	NUMERIC 2

DETAIL RECORD 1 (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'8F'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D1'
8- 9	2	SEQUENCE NUMBER	NUMERIC 2
10- 28	19	EG&G SAMPLE NO.	
29- 40	12	LAB SAMPLE ID	
41- 48	8	DATE ANALYZED	MM/DD/YY
49- 52	4	TIME ANALYZED	HHMM
53- 57	5	% D	NUMERIC 5.1
58	1	FLAG	BLANK OR '*'

ORGANOPHOSPHORUS PESTICIDE EVALUATION STANDARDS SUMMARY - (FORM 8G)

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'8G'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8- 30	23	LAB NAME	
31- 38	8	CONTRACT	
39- 44	6	LAB CODE	
45- 49	5	CASE NO.	
50- 55	6	SAS NO.	
56- 67	12	SDG NO.	
68- 77	10	INSTRUMENT ID	
78- 87	10	GC COLUMN ID	
		DATES OF ANALYSES	
88- 95	8	FROM:	MM/DD/YY
96-103	8	TO:	MM/DD/YY

DETAIL RECORD 1 (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'8G'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D1'
8- 23	16	PESTICIDE	
24- 34	11	CALIB. FACTOR EVAL MIX A	NUMERIC 11
35- 45	11	CALIB. FACTOR EVAL MIX B	NUMERIC 11
46- 56	11	CALIB. FACTOR EVAL MIX C	NUMERIC 11
57- 61	5	% RSD	NUMERIC 5.1

ORGANOPHOSPHORUS PESTICIDE EVALUATION STANDARDS SUMMARY - (FORM 8H)
EVALUATION OF RETENTION TIME SHIF~ FOR EPN

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'8H'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8- 30	23	LAB NAME	
31- 38	8	CONTRACT	
39- 44	6	LAB CODE	
45- 49	5	CASE NO.	
50- 55	6	SAS NO.	
56- 67	12	SDG NO.	
68- 77	10	INSTRUMENT ID	
78- 87	10	GC COLUMN ID	
		DATES OF ANALYSES	
88- 95	8	FROM:	MM/DD/YY
96-103	8	TO:	MM/DD/YY
104-105	2	PAGE	NUMERIC 2
106-107	2	OF	NUMERIC 2

DETAIL RECORD 1 (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'8H'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D1'
8- 9	2	SEQUENCE NUMBER	NUMERIC 2
10- 28	19	EG&G SAMPLE NO.	
29- 40	12	LAB SAMPLE ID	
41- 48	8	DATE ANALYZED	MM/DD/YY
49- 52	4	TIME ANALYZED	HHMM
53- 57	5	% D	NUMERIC 5.1
58	1	FLAG	BLANK OR '*'

ORGANOCHLORINE HERBICIDE EVALUATION STANDARDS SUMMARY - (FORM 8I)

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'8I'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8- 30	23	LAB NAME	
31- 38	8	CONTRACT	
39- 44	6	LAB CODE	
45- 49	5	CASE NO.	
50- 55	6	SAS NO.	
56- 67	12	SDG NO.	
68- 77	10	INSTRUMENT ID	
78- 87	10	GC COLUMN ID	
		DATES OF ANALYSES	
88- 95	8	FROM:	MM/DD/YY
96-103	8	TO:	MM/DD/YY

DETAIL RECORD 1 (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'8I'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D1'
8- 23	16	PESTICIDE	
24- 34	11	CALIB. FACTOR EVAL MIX A	NUMERIC 11
35- 45	11	CALIB. FACTOR EVAL MIX B	NUMERIC 11
46- 56	11	CALIB. FACTOR EVAL MIX C	NUMERIC 11
57- 61	5	% RSD	NUMERIC 5.1

ORGANOCHLORINE HERBICIDE EVALUATION STANDARDS SUMMARY - (FORM 8J)
EVALUATION OF RETENTION TIME SHIFT FOR DICAMBA

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'8J'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8- 30	23	LAB NAME	
31- 38	8	CONTRACT	
39- 44	6	LAB CODE	
45- 49	5	CASE NO.	
50- 55	6	SAS NO.	
56- 67	12	SDG NO.	
68- 77	10	INSTRUMENT ID	
78- 87	10	GC COLUMN ID	
		DATES OF ANALYSES	
88- 95	8	FROM:	MM/DD/YY
96-103	8	TO:	MM/DD/YY
104-105	2	PAGE	NUMERIC 2
106-107	2	OF	NUMERIC 2

DETAIL RECORD 1 (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'8J'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D1'
8- 9	2	SEQUENCE NUMBER	NUMERIC 2
10- 28	19	EG&G SAMPLE NO.	
29- 40	12	LAB SAMPLE ID	
41- 48	8	DATE ANALYZED	MM/DD/YY
49- 52	4	TIME ANALYZED	HHMM
53- 57	5	% D	NUMERIC 5.1
58	1	FLAG	BLANK OR '*'

FORM IX FILE DESCRIPTION
(FORM9)

ORGANOCHLORINE PESTICIDE/PCB STANDARDS SUMMARY - (FORM 9A)

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'9A'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8- 30	23	LAB NAME	
31- 38	8	CONTRACT	
39- 44	6	LAB CODE	
45- 49	5	CASE NO.	
50- 55	6	SAS NO.	
56- 67	12	SDG NO.	
68- 77	10	INSTRUMENT ID	
78- 87	10	GC COLUMN ID	
88- 95	8	DATE OF ANALYSIS FROM:	MM/DD/YY
96-103	8	DATE OF ANALYSIS	MM/DD/YY
104-111	8	DATE OF ANALYSIS TO:	MM/DD/YY
112-115	4	TIME OF ANALYSIS	HHMM
116-119	4	TIME OF ANALYSIS FROM:	HHMM
120-123	4	TIME OF ANALYSIS TO:	HHMM
124-142	19	EG&G SAMPLE NO. (STANDARD)	
143-144	2	PAGE	NUMERIC 2
145-146	2	OF	NUMERIC 2

DETAIL RECORD 1 (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'9A'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D1'
8- 28	21	COMPOUND	
29- 34	6	RT	NUMERIC 6.2
35- 40	6	RT WINDOW FROM:	NUMERIC 6.2
41- 46	6	RT WINDOW TO:	NUMERIC 6.2
47- 57	11	CALIBRATION FACTOR	NUMERIC 11
58- 63	6	RT	NUMERIC 6.2
64- 74	11	CALIBRATION FACTOR	NUMERIC 11
75	1	QUANT	'Y' OR 'N'
76- 80	5	% D	NUMERIC 5.1

ORGANOCHLORINE PESTICIDE/PCB STANDARDS SUMMARY - (FORM 9B)

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'9B'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8- 30	23	LAB NAME	
31- 38	8	CONTRACT	
39- 44	6	LAB CODE	
45- 49	5	CASE NO.	
50- 55	6	SAS NO.	
56- 67	12	SDG NO.	
68- 77	10	INSTRUMENT ID	
78- 87	10	GC COLUMN ID	
88- 95	8	DATE OF ANALYSIS FROM:	MM/DD/YY
96-103	8	DATE OF ANALYSIS	MM/DD/YY
104-111	8	DATE OF ANALYSIS TO:	MM/DD/YY
112-115	4	TIME OF ANALYSIS	HHMM
116-119	4	TIME OF ANALYSIS FROM:	HHMM
120-123	4	TIME OF ANALYSIS TO:	HHMM
124-142	19	EG&G SAMPLE NO. (STANDARD)	
143-144	2	PAGE	NUMERIC 2
145-146	2	OF	NUMERIC 2

DETAIL RECORD 1 (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'9B'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D1'
8- 28	21	COMPOUND	
29- 34	6	RT	NUMERIC 6.2
35- 40	6	RT WINDOW FROM:	NUMERIC 6.2
41- 46	6	RT WINDOW TO:	NUMERIC 6.2
47- 57	11	CALIBRATION FACTOR	NUMERIC 11
58- 63	6	RT	NUMERIC 6.2
64- 74	11	CALIBRATION FACTOR	NUMERIC 11
75	1	QUANT	'Y' OR 'N'
76- 80	5	% D	NUMERIC 5.1

ORGANOPHOSPHORUS PESTICIDE STANDARDS SUMMARY - (FORM 9C)

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'9C'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8- 30	23	LAB NAME	
31- 38	8	CONTRACT	
39- 44	6	LAB CODE	
45- 49	5	CASE NO.	
50- 55	6	SAS NO.	
56- 67	12	SDG NO.	
68- 77	10	INSTRUMENT ID	
78- 87	10	GC COLUMN ID	
88- 95	8	DATE OF ANALYSIS FROM:	MM/DD/YY
96-103	8	DATE OF ANALYSIS	MM/DD/YY
104-111	8	DATE OF ANALYSIS TO:	MM/DD/YY
112-115	4	TIME OF ANALYSIS	HHMM
116-119	4	TIME OF ANALYSIS FROM:	HHMM
120-123	4	TIME OF ANALYSIS TO:	HHMM
124-142	19	EG&G SAMPLE NO. (STANDARD)	
143-144	2	PAGE	NUMERIC 2
145-146	2	OF	NUMERIC 2

DETAIL RECORD 1 (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'9C'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D1'
8- 28	21	COMPOUND	
29- 34	6	RT	NUMERIC 6.2
35- 40	6	RT WINDOW FROM:	NUMERIC 6.2
41- 46	6	RT WINDOW TO:	NUMERIC 6.2
47- 57	11	CALIBRATION FACTOR	NUMERIC 11
58- 63	6	RT	NUMERIC 6.2
64- 74	11	CALIBRATION FACTOR	NUMERIC 11
75	1	QUANT	'Y' OR 'N'
76- 80	5	% D	NUMERIC 5.1

ORGANOCHLORINE HERBICIDE STANDARDS SUMMARY - (FORM 9D)

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'9D'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8- 30	23	LAB NAME	
31- 38	8	CONTRACT	
39- 44	6	LAB CODE	
45- 49	5	CASE NO.	
50- 55	6	SAS NO.	
56- 67	12	SDG NO.	
68- 77	10	INSTRUMENT ID	
78- 87	10	GC COLUMN ID	
88- 95	8	DATE OF ANALYSIS FROM:	MM/DD/YY
96-103	8	DATE OF ANALYSIS	MM/DD/YY
104-111	8	DATE OF ANALYSIS TO:	MM/DD/YY
112-115	4	TIME OF ANALYSIS	HHMM
116-119	4	TIME OF ANALYSIS FROM:	HHMM
120-123	4	TIME OF ANALYSIS TO:	HHMM
124-142	19	EG&G SAMPLE NO. (STANDARD)	
143-144	2	PAGE	NUMERIC 2
145-146	2	OF	NUMERIC 2

DETAIL RECORD 1 (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'9D'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D1'
8- 28	21	COMPOUND	
29- 34	6	RT	NUMERIC 6.2
35- 40	6	RT WINDOW FROM:	NUMERIC 6.2
41- 46	6	RT WINDOW TO:	NUMERIC 6.2
47- 57	11	CALIBRATION FACTOR	NUMERIC 11
58- 63	6	RT	NUMERIC 6.2
64- 74	11	CALIBRATION FACTOR	NUMERIC 11
75	1	QUANT	'Y' OR 'N'
76- 80	5	% D	NUMERIC 5.1

FORM X FILE DESCRIPTION
(FORM 10)

ORGANOCHLORINE PESTICIDE/PCB IDENTIFICATION - (FORM 10A)

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'10A'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8- 26	19	EG&G SAMPLE NO.	
27- 49	23	LAB NAME	
50- 57	8	CONTRACT	
58- 63	6	LAB CODE	
64- 68	5	CASE NO.	
69- 74	6	SAS NO.	
75- 86	12	SDG NO.	
87- 96	10	GC COLUMN ID (1)	
97-106	10	GC COLUMN ID (2)	
107-116	10	INSTRUMENT ID (1)	
117-126	10	INSTRUMENT ID (2)	
127-138	12	LAB SAMPLE ID	
139-152	14	LAB FILE ID (IF GC/MS)	
153-154	2	PAGE	NUMERIC 2
155-156	2	OF	NUMERIC 2

DETAIL RECORD 1 (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'10A'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D1'
8- 9	2	SEQUENCE NUMBER	NUMERIC 2
10- 30	21	PESTICIDE/PCB	
31- 36	6	RETENTION TIME COLUMN 1	NUMERIC 6.2
37- 42	6	RT WINDOW OF STANDARD FROM:	NUMERIC 6.2
43- 48	6	TO:	NUMERIC 6.2
49	1	QUANT?	'Y' OR 'N'
50	1	GC/MS?	'Y' OR 'N'

DETAIL RECORD 2 (D2)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'10A'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D2'
8- 9	2	SEQUENCE NUMBER	NUMERIC 2
10- 30	21	PESTICIDE/PCB	
31- 36	6	RETENTION TIME	
		COLUMN 2	NUMERIC 6.2
37- 42	6	RT WINDOW OF STANDARD	
		FROM:	NUMERIC 6.2
43- 48	6	TO:	NUMERIC 6.2
49	1	QUANT?	'Y' OR 'N'
50	1	GC/MS?	'Y' OR 'N'

COMMENT RECORD 1 (C2)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'10A'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'C1'
8- 72	65	COMMENT LINE 1	

COMMENT RECORD 2 (C2)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'10A'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'C2'
8- 72	65	COMMENT LINE 2	

ORGANOPHOSPHORUS PESTICIDE IDENTIFICATION - (FORM 10B)

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'10B'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8- 26	19	EG&G SAMPLE NO.	
27- 49	23	LAB NAME	
50- 57	8	CONTRACT	
58- 63	6	LAB CODE	
64- 68	5	CASE NO.	
69- 74	6	SAS NO.	
75- 86	12	SDG NO.	
87- 96	10	GC COLUMN ID (1)	
97-106	10	GC COLUMN ID (2)	
107-116	10	INSTRUMENT ID (1)	
117-126	10	INSTRUMENT ID (2)	
127-138	12	LAB SAMPLE ID	
139-152	14	LAB FILE ID (IF GC/MS)	
153-154	2	PAGE	NUMERIC 2
155-156	2	OF	NUMERIC 2

DETAIL RECORD 1 (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'10B'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D1'
8- 9	2	SEQUENCE NUMBER	NUMERIC 2
10- 30	21	PESTICIDE/PCB	
31- 36	6	RETENTION TIME COLUMN 1	NUMERIC 6.2
37- 42	6	RT WINDOW OF STANDARD FROM:	NUMERIC 6.2
43- 48	6	TO:	NUMERIC 6.2
49	1	QUANT?	'Y' OR 'N'
50	1	GC/MS?	'Y' OR 'N'

DETAIL RECORD 2 (D2)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'10B'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D2'
8- 9	2	SEQUENCE NUMBER	NUMERIC 2
10- 30	21	PESTICIDE/PCB	
31- 36	6	RETENTION TIME	
		COLUMN 2	NUMERIC 6.2
37- 42	6	RT WINDOW OF STANDARD	
		FROM:	NUMERIC 6.2
43- 48	6	TO:	NUMERIC 6.2
49	1	QUANT?	'Y' OR 'N'
50	1	GC/MS?	'Y' OR 'N'

COMMENT RECORD 1 (C2)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'10B'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'C1'
8- 72	65	COMMENT LINE 1	

COMMENT RECORD 2 (C2)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'10B'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'C2'
8- 72	65	COMMENT LINE 2	

ORGANOCHLORINE HERBICIDE IDENTIFICATION - (FORM 10C)

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'10C'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8- 26	19	EG&G SAMPLE NO.	
27- 49	23	LAB NAME	
50- 57	8	CONTRACT	
58- 63	6	LAB CODE	
64- 68	5	CASE NO.	
69- 74	6	SAS NO.	
75- 86	12	SDG NO.	
87- 96	10	GC COLUMN ID (1)	
97-106	10	GC COLUMN ID (2)	
107-116	10	INSTRUMENT ID (1)	
117-126	10	INSTRUMENT ID (2)	
127-138	12	LAB SAMPLE ID	
139-152	14	LAB FILE ID (IF GC/MS)	
153-154	2	PAGE	NUMERIC 2
155-156	2	OF	NUMERIC 2

DETAIL RECORD 1 (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'10C'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D1'
8- 9	2	SEQUENCE NUMBER	NUMERIC 2
10- 30	21	PESTICIDE/PCB	
31- 36	6	RETENTION TIME COLUMN 1	NUMERIC 6.2
37- 42	6	RT WINDOW OF STANDARD FROM:	NUMERIC 6.2
43- 48	6	TO:	NUMERIC 6.2
49	1	QUANT?	'Y' OR 'N'
50	1	GC/MS?	'Y' OR 'N'

DETAIL RECORD 2 (D2)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'10C'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D2'
8- 9	2	SEQUENCE NUMBER	NUMERIC 2
10- 30	21	PESTICIDE/PCB	
31- 36	6	RETENTION TIME	
		COLUMN 2	NUMERIC 6.2
37- 42	6	RT WINDOW OF STANDARD	
		FROM:	NUMERIC 6.2
43- 48	6	TO:	NUMERIC 6.2
49	1	QUANT?	'Y' OR 'N'
50	1	GC/MS?	'Y' OR 'N'

COMMENT RECORD 1 (C2)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'10C'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'C1'
8- 72	65	COMMENT LINE 1	

COMMENT RECORD 2 (C2)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'10C'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'C2'
8- 72	65	COMMENT LINE 2	

FORM XI FILE DESCRIPTION
(FORM XI)

VOLATILE QC CHECK SAMPLE SUMMARY - (FORM 11A)

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'11A'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8- 26	19	EG&G SAMPLE NO.	
27- 49	23	LAB NAME	
50- 57	8	CONTRACT	
58- 63	6	LAB CODE	
64- 68	5	CASE NO.	
69- 74	6	SAS NO.	
75- 86	12	SDG NO.	
87- 91	5	MATRIX	'SOIL' OR 'WATER'
92-103	12	LAB SAMPLE ID	
104-109	6	SAMPLE WT/VOL	NUMERIC 6.1
110-111	2	SAMPLE WT/VOL UNITS	'G' OR 'ML'
112-125	14	LAB FILE ID	
126-128	3	LEVEL	'LOW' OR 'MED'
129-136	8	DATE RECEIVED	MM/DD/YY
137-138	2	% MOISTURE NOT DEC	NUMERIC 2
139-146	8	DATE ANALYZED	MM/DD/YY
147-150	4	COLUMN	'NAR' OR 'WIDE'
151-158	8	DILUTION FACTOR	NUMERIC 8
159-163	5	SPIKE ADDED	'UG/L' OR 'UG/KG'
164-168	5	QC CHECK SAMPLE CONC.	'UG/L' OR 'UG/KG'

DETAIL RECORD 1 (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'11A'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D1'
8-38	31	COMPOUND	
39-47	9	SPIKE ADDED (UG/L)	NUMERIC 9.3
48-60	13	QC CHECK SAMPLE CONC.(UG/L)	NUMERIC 13.3
61-63	3	QC CHECK % REC	NUMERIC 3

VOLATILE QC CHECK SAMPLE SUMMARY - (FORM 11B)

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'11B'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8- 26	19	EG&G SAMPLE NO.	
27- 49	23	LAB NAME	
50- 57	8	CONTRACT	
58- 63	6	LAB CODE	
64- 68	5	CASE NO.	
69- 74	6	SAS NO.	
75- 86	12	SDG NO.	
87- 91	5	MATRIX	'SOIL' OR 'WATER'
92-103	12	LAB SAMPLE ID	
104-109	6	SAMPLE WT/VOL	NUMERIC 6.1
110-111	2	SAMPLE WT/VOL UNITS	'G' OR 'ML'
112-125	14	LAB FILE ID	
126-128	3	LEVEL	'LOW' OR 'MED'
129-136	8	DATE RECEIVED	MM/DD/YY
137-138	2	% MOISTURE NOT DEC	NUMERIC 2
139-146	8	DATE ANALYZED	MM/DD/YY
147-150	4	COLUMN	'NAR' OR 'WIDE'
151-158	8	DILUTION FACTOR	NUMERIC 8
159-163	5	SPIKE ADDED	'UG/L' OR 'UG/KG'
164-168	5	QC CHECK SAMPLE CONC.	'UG/L' OR 'UG/KG'

DETAIL RECORD 1 (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'11B'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D1'
8-38	31	COMPOUND	
39-47	9	SPIKE ADDED (UG/L)	NUMERIC 9.3
48-60	13	QC CHECK SAMPLE CONC.(UG/L)	NUMERIC 13.3
61-63	3	QC CHECK % REC	NUMERIC 3

SEMIVOLATILE QC CHECK SAMPLE SUMMARY - (FORM 11C)

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'11C'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8- 26	19	EG&G SAMPLE NO.	
27- 49	23	LAB NAME	
50- 57	8	CONTRACT	
58- 63	6	LAB CODE	
64- 68	5	CASE NO.	
69- 74	6	SAS NO.	
75- 86	12	SDG NO.	
87- 91	5	MATRIX	'SOIL' OR 'WATER'
92-103	12	LAB SAMPLE ID	
104-109	6	SAMPLE WT/VOL	NUMERIC 6.1
110-111	2	SAMPLE WT/VOL UNITS	'G' OR 'ML'
112-125	14	LAB FILE ID	
126-128	3	LEVEL	'LOW' OR 'MED'
129-136	8	DATE RECEIVED	MM/DD/YY
137-138	2	% MOISTURE NOT DEC	NUMERIC 2
139-140	2	% MOISTURE DEC	NUMERIC 2
141-148	8	DATE EXTRACTED	MM/DD/YY
149-152	4	EXTRACTION	'SEPF','CONT''SONC'
153-160	8	DATE ANALYZED	MM/DD/YY
161	1	GPC CLEANUP	'Y' OR 'N'
162-165	4	PH	NUMERIC 4.1
166-173	8	DILUTION FACTOR	NUMERIC 8
174-178	5	SPIKE ADDED	'UG/L' OR 'UG/KG'
179-183	5	QC CHECK SAMPLE CONC.	'UG/L' OR 'UG/KG'

DETAIL RECORD 1 (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'11C'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D1'
8-38	31	COMPOUND	
39-47	9	SPIKE ADDED (UG/L)	NUMERIC 9.3
48-60	13	QC CHECK SAMPLE CONC.(UG/L)	NUMERIC 13.3
61-63	3	QC CHECK % REC	NUMERIC 3

SEMIVOLATILE QC CHECK SAMPLE SUMMARY - (FORM 11D)

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'11D'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8- 26	19	EG&G SAMPLE NO.	
27- 49	23	LAB NAME	
50- 57	8	CONTRACT	
58- 63	6	LAB CODE	
64- 68	5	CASE NO.	
69- 74	6	SAS NO.	
75- 86	12	SDG NO.	
87- 91	5	MATRIX	'SOIL' OR 'WATER'
92-103	12	LAB SAMPLE ID	
104-109	6	SAMPLE WT/VOL	NUMERIC 6.1
110-111	2	SAMPLE WT/VOL UNITS	'G' OR 'ML'
112-125	14	LAB FILE ID	
126-128	3	LEVEL	'LOW' OR 'MED'
129-136	8	DATE RECEIVED	MM/DD/YY
137-138	2	% MOISTURE NOT DEC	NUMERIC 2
139-140	2	% MOISTURE DEC	NUMERIC 2
141-148	8	DATE EXTRACTED	MM/DD/YY
149-152	4	EXTRACTION	'SEPF','CONT''SONC'
153-160	8	DATE ANALYZED	MM/DD/YY
161	1	GPC CLEANUP	'Y' OR 'N'
162-165	4	PH	NUMERIC 4.1
166-173	8	DILUTION FACTOR	NUMERIC 8
174-178	5	SPIKE ADDED	'UG/L' OR 'UG/KG'
179-183	5	QC CHECK SAMPLE CONC.	'UG/L' OR 'UG/KG'

DETAIL RECORD 1 (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'11D'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D1'
8-38	31	COMPOUND	
39-47	9	SPIKE ADDED (UG/L)	NUMERIC 9.3
48-60	13	QC CHECK SAMPLE CONC.(UG/L)	NUMERIC 13.3
61-63	3	QC CHECK % REC	NUMERIC 3

SEMIVOLATILE QC CHECK SAMPLE SUMMARY - (FORM 11E)

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'11E'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8- 26	19	EG&G SAMPLE NO.	
27- 49	23	LAB NAME	
50- 57	8	CONTRACT	
58- 63	6	LAB CODE	
64- 68	5	CASE NO.	
69- 74	6	SAS NO.	
75- 86	12	SDG NO.	
87- 91	5	MATRIX	'SOIL' OR 'WATER'
92-103	12	LAB SAMPLE ID	
104-109	6	SAMPLE WT/VOL	NUMERIC 6.1
110-111	2	SAMPLE WT/VOL UNITS	'G' OR 'ML'
112-125	14	LAB FILE ID	
126-128	3	LEVEL	'LOW' OR 'MED'
129-136	8	DATE RECEIVED	MM/DD/YY
137-138	2	% MOISTURE NOT DEC	NUMERIC 2
139-140	2	% MOISTURE DEC	NUMERIC 2
141-148	8	DATE EXTRACTED	MM/DD/YY
149-152	4	EXTRACTION	'SEPF','CONT''SONC'
153-160	8	DATE ANALYZED	MM/DD/YY
161	1	GPC CLEANUP	'Y' OR 'N'
162-165	4	PH	NUMERIC 4.1
166-173	8	DILUTION FACTOR	NUMERIC 8
174-178	5	SPIKE ADDED	'UG/L' OR 'UG/KG'
179-183	5	QC CHECK SAMPLE CONC.	'UG/L' OR 'UG/KG'

DETAIL RECORD 1 (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'11E'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D1'
8-38	31	COMPOUND	
39-47	9	SPIKE ADDED (UG/L)	NUMERIC 9.3
48-60	13	QC CHECK SAMPLE CONC.(UG/L)	NUMERIC 13.3
61-63	3	QC CHECK % REC	NUMERIC 3

SEMIVOLATILE QC CHECK SAMPLE SUMMARY - (FORM 11F)

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'11F'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8- 26	19	EG&G SAMPLE NO.	
27- 49	23	LAB NAME	
50- 57	8	CONTRACT	
58- 63	6	LAB CODE	
64- 68	5	CASE NO.	
69- 74	6	SAS NO.	
75- 86	12	SDG NO.	
87- 91	5	MATRIX	'SOIL' OR 'WATER'
92-103	12	LAB SAMPLE ID	
104-109	6	SAMPLE WT/VOL	NUMERIC 6.1
110-111	2	SAMPLE WT/VOL UNITS	'G' OR 'ML'
112-125	14	LAB FILE ID	
126-128	3	LEVEL	'LOW' OR 'MED'
129-136	8	DATE RECEIVED	MM/DD/YY
137-138	2	% MOISTURE NOT DEC	NUMERIC 2
139-140	2	% MOISTURE DEC	NUMERIC 2
141-148	8	DATE EXTRACTED	MM/DD/YY
149-152	4	EXTRACTION	'SEPF','CONT''SONC'
153-160	8	DATE ANALYZED	MM/DD/YY
161	1	GPC CLEANUP	'Y' OR 'N'
162-165	4	PH	NUMERIC 4.1
166-173	8	DILUTION FACTOR	NUMERIC 8
174-178	5	SPIKE ADDED	'UG/L' OR 'UG/KG'
179-183	5	QC CHECK SAMPLE CONC.	'UG/L' OR 'UG/KG'

DETAIL RECORD 1 (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'11F'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D1'
8-38	31	COMPOUND	
39-47	9	SPIKE ADDED (UG/L)	NUMERIC 9.3
48-60	13	QC CHECK SAMPLE CONC.(UG/L)	NUMERIC 13.3
61-63	3	QC CHECK % REC	NUMERIC 3

ORGANOCHLORINE PESTICIDE QC CHECK SAMPLE SUMMARY - (FORM 11G)

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'11G'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8- 26	19	EG&G SAMPLE NO.	
27- 49	23	LAB NAME	
50- 57	8	CONTRACT	
58- 63	6	LAB CODE	
64- 68	5	CASE NO.	
69- 74	6	SAS NO.	
75- 86	12	SDG NO.	
87- 91	5	MATRIX	'SOIL' OR 'WATER'
92-103	12	LAB SAMPLE ID	
104-109	6	SAMPLE WT/VOL	NUMERIC 6.1
110-111	2	SAMPLE WT/VOL UNITS	'G' OR 'ML'
112-125	14	LAB FILE ID	
126-128	3	LEVEL	'LOW' OR 'MED'
129-136	8	DATE RECEIVED	MM/DD/YY
137-138	2	% MOISTURE NOT DEC	NUMERIC 2
139-140	2	% MOISTURE DEC	NUMERIC 2
141-148	8	DATE EXTRACTED	MM/DD/YY
149-152	4	EXTRACTION	'SEPF','CONT''SONC'
153-160	8	DATE ANALYZED	MM/DD/YY
161	1	GPC CLEANUP	'Y' OR 'N'
162-165	4	PH	NUMERIC 4.1
166-173	8	DILUTION FACTOR	NUMERIC 8
174-178	5	SPIKE ADDED	'UG/L' OR 'UG/KG'
179-183	5	QC CHECK SAMPLE CONC.	'UG/L' OR 'UG/KG'

DETAIL RECORD 1 (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'11G'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D1'
8-38	31	COMPOUND	
39-47	9	SPIKE ADDED (UG/L)	NUMERIC 9.3
48-60	13	QC CHECK SAMPLE CONC.(UG/L)	NUMERIC 13.3
61-63	3	QC CHECK % REC	NUMERIC 3

ORGANOCHLORINE PESTICIDE QC CHECK SAMPLE SUMMARY - (FORM 11H)

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'11H'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8- 26	19	EG&G SAMPLE NO.	
27- 49	23	LAB NAME	
50- 57	8	CONTRACT	
58- 63	6	LAB CODE	
64- 68	5	CASE NO.	
69- 74	6	SAS NO.	
75- 86	12	SDG NO.	
87- 91	5	MATRIX	'SOIL' OR 'WATER'
92-103	12	LAB SAMPLE ID	
104-109	6	SAMPLE WT/VOL	NUMERIC 6.1
110-111	2	SAMPLE WT/VOL UNITS	'G' OR 'ML'
112-125	14	LAB FILE ID	
126-128	3	LEVEL	'LOW' OR 'MED'
129-136	8	DATE RECEIVED	MM/DD/YY
137-138	2	% MOISTURE NOT DEC	NUMERIC 2
139-140	2	% MOISTURE DEC	NUMERIC 2
141-148	8	DATE EXTRACTED	MM/DD/YY
149-152	4	EXTRACTION	'SEPF','CONT''SONC'
153-160	8	DATE ANALYZED	MM/DD/YY
161	1	GPC CLEANUP	'Y' OR 'N'
162-165	4	PH	NUMERIC 4.1
166-173	8	DILUTION FACTOR	NUMERIC 8
174-178	5	SPIKE ADDED	'UG/L' OR 'UG/KG'
179-183	5	QC CHECK SAMPLE CONC.	'UG/L' OR 'UG/KG'

DETAIL RECORD 1 (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'11H'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D1'
8-38	31	COMPOUND	
39-47	9	SPIKE ADDED (UG/L)	NUMERIC 9.3
48-60	13	QC CHECK SAMPLE CONC.(UG/L)	NUMERIC 13.3
61-63	3	QC CHECK % REC	NUMERIC 3

ORGANOPHOSPHORUS PESTICIDE QC CHECK SAMPLE SUMMARY - (FORM 11I)

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'11I'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8- 26	19	EG&G SAMPLE NO.	
27- 49	23	LAB NAME	
50- 57	8	CONTRACT	
58- 63	6	LAB CODE	
64- 68	5	CASE NO.	
69- 74	6	SAS NO.	
75- 86	12	SDG NO.	
87- 91	5	MATRIX	'SOIL' OR 'WATER'
92-103	12	LAB SAMPLE ID	
104-109	6	SAMPLE WT/VOL	NUMERIC 6.1
110-111	2	SAMPLE WT/VOL UNITS	'G' OR 'ML'
112-125	14	LAB FILE ID	
126-128	3	LEVEL	'LOW' OR 'MED'
129-136	8	DATE RECEIVED	MM/DD/YY
137-138	2	% MOISTURE NOT DEC	NUMERIC 2
139-140	2	% MOISTURE DEC	NUMERIC 2
141-148	8	DATE EXTRACTED	MM/DD/YY
149-152	4	EXTRACTION	'SEPF','CONT''SOXH'
153-160	8	DATE ANALYZED	MM/DD/YY
161	1	GPC CLEANUP	'Y' OR 'N'
162-165	4	PH	NUMERIC 4.1
166-173	8	DILUTION FACTOR	NUMERIC 8
174-178	5	SPIKE ADDED	'UG/L' OR 'UG/KG'
179-183	5	QC CHECK SAMPLE CONC.	'UG/L' OR 'UG/KG'

DETAIL RECORD 1 (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'11I'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D1'
8-38	31	COMPOUND	
39-47	9	SPIKE ADDED (UG/L)	NUMERIC 9.3
48-60	13	QC CHECK SAMPLE CONC.(UG/L)	NUMERIC 13.3
61-63	3	QC CHECK % REC	NUMERIC 3

ORGANOCHLORINE HERBICIDE QC CHECK SAMPLE SUMMARY - (FORM 11J)

HEADER RECORD 1 (H1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'11J'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'H1'
8- 26	19	EG&G SAMPLE NO.	
27- 49	23	LAB NAME	
50- 57	8	CONTRACT	
58- 63	6	LAB CODE	
64- 68	5	CASE NO.	
69- 74	6	SAS NO.	
75- 86	12	SDG NO.	
87- 91	5	MATRIX	'SOIL' OR 'WATER'
92-103	12	LAB SAMPLE ID	
104-109	6	SAMPLE WT/VOL	NUMERIC 6.1
110-111	2	SAMPLE WT/VOL UNITS	'G' OR 'ML'
112-125	14	LAB FILE ID	
126-128	3	LEVEL	'LOW' OR 'MED'
129-136	8	DATE RECEIVED	MM/DD/YY
137-138	2	% MOISTURE NOT DEC	NUMERIC 2
139-140	2	% MOISTURE DEC	NUMERIC 2
141-148	8	DATE EXTRACTED	MM/DD/YY
149-152	4	EXTRACTION	'HERB'
153-160	8	DATE ANALYZED	MM/DD/YY
161	1	GPC CLEANUP	'Y' OR 'N'
162-165	4	PH	NUMERIC 4.1
166-173	8	DILUTION FACTOR	NUMERIC 8
174-178	5	SPIKE ADDED	'UG/L' OR 'UG/KG'
179-183	5	QC CHECK SAMPLE CONC.	'UG/L' OR 'UG/KG'

DETAIL RECORD 1 (D1)

COLUMN (S)	LENGTH	CONTENTS	FORMAT/CONTENTS
1- 3	3	FORM NUMBER	'11J'
4- 5	2	FORM SUFFIX	'AA'-'ZZ'
6- 7	2	RECORD TYPE	'D1'
8-38	31	COMPOUND	
39-47	9	SPIKE ADDED (UG/L)	NUMERIC 9.3
48-60	13	QC CHECK SAMPLE CONC.(UG/L)	NUMERIC 13.3
61-63	3	QC CHECK % REC	NUMERIC 3

ADDENDUM 1

EG&G IDAHO, INC.
BASIC ORDERING AGREEMENT
FOR
ORGANIC ANALYSES
PERFORMED FOR THE
ENVIRONMENTAL RESTORATION PROGRAM
AT THE
IDAHO NATIONAL ENGINEERING LABORATORY

Idaho Falls, Idaho

Addendum Effective Date: 8/31/91

ADDENDUM 1

EG&G IDAHO, INC.
BASIC ORDERING AGREEMENT
FOR
ORGANIC ANALYSES
PERFORMED FOR THE
ENVIRONMENTAL RESTORATION PROGRAM
AT THE
IDAHO NATIONAL ENGINEERING LABORATORY

Prepared by:

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Date

Reviewed by:

J. P. Shea, Chairman, ERP Independent Review Committee — 8/8/91
Date

Approved by:

D. J. Yurman, Acting Manager, Data Management Unit — 8/8/91
Date

PURPOSE

The purpose of this addendum is to address additional requirements that the EG&G Idaho, Inc., Environmental Restoration Program (ERP) has identified for procurement of chemical analytical services. These requirements result from regulatory changes, both nationally and at the Idaho National Engineering Laboratory (INEL), since the time the basic ordering agreement (BOA) was first released for proposal.

BACKGROUND/OBJECTIVE

The INEL is a United States Department of Energy facility. The Department of Energy, Idaho Field Office (DOE-ID) is responsible for operations at the INEL. The environmental restoration activities at the INEL are being performed in accordance with a federal facilities agreement (FFA). This FFA is also a tri-party interagency agreement. The three parties signatory to the agreement are DOE-ID, the United States Environmental Protection Agency (EPA) Region X, and the State of Idaho Department of Health and Welfare. This agreement stipulates requirements for delivery of data to the State of Idaho and/or EPA. The agreement states that "quality assured data" must be delivered to the project mangers (State of Idaho and/or EPA) within 75 days of sample collection. Quality assured data is interpreted as data that have been independently validated. Because of this language in the agreement and the turnaround times for sample analyses that EG&G Idaho has been experiencing, the first addition to the BOA will specify a schedule for liquidated damages and incentive awards. These schedules are to ensure timely delivery of data within the turnaround times specified in the BOA (Section B, page B-3). If data are available to EG&G Idaho within the time frame specified in the BOA, the independent validation should be able to be completed within 75 days from sample collection.

The BOA was finalized in January 1990. In March of 1990, the EPA promulgated the toxicity characteristic leaching procedure (TCLP) to replace the extraction procedure (EP) for the toxicity characteristic determination of Resource Conservation and Recovery Act (RCRA) waste. In June, the EPA published some clarifications to the procedure as it originally appeared in March. Since the BOA did not address requirements for TCLP analysis, the EG&G Idaho ERP requirements for TCLP are provided with this addendum.

Proposers shall adjust their original pricing based on the information provided by the addendum. The pricing schedule has also been expanded to be more detailed than the original pricing schedule in the request for proposal. This has been done to allow EG&G Idaho to have a better estimate for the cost of a wider variety of analytical services obtained under this subcontract.

ADDITIONAL REQUIREMENTS

1. Positive Incentive

Early delivery incentives shall be based on subcontractor delivery of a complete and compliant deliverable (items C, D, E, and when specified F, on page B-3 of the BOA) prior to the delivery date required in the BOA. Early delivery incentive awards will be on a per sample analysis basis and will be expressed as a percentage of the quoted price for the analysis. The early delivery incentive schedule is presented in the table below.

Table 1. Early delivery incentives

Number of Days Prior to Required Delivery Date	Positive Incentive	Total Incentive Limit
1 - 10	1% per day early	10% of full sample analysis

2. Liquidated Damages

Acceptance of late delivery of analytical data under this subcontract is solely for the purpose of mitigating damages and does not waive EG&G Idaho's right to terminate for default.

The subcontractor will pay EG&G Idaho fixed, agreed, and liquidated damages if the subcontractor fails to supply the required deliverable (items C, D, E, and when specified F, on page B-3 of the BOA) within the time specified in this subcontract or any future modification. Liquidated damages will be assessed on a per sample analysis basis and will not exceed 70% of the quoted sample analysis price. A schedule of liquidated damages to be levied for each calendar day of delay is presented in Table 2. If data delivery occurs on a Saturday, Sunday, or Monday, liquidated damages will only be assessed through the preceding Friday, as no provision for data receipt on weekends is in place at EG&G Idaho.

Table 2. Liquidated damages per billable sample preparation/analysis per day of delivery delay[a]

Delay	Liquidated Damages
Day 1	22% sample analysis price
Days 2-7	2% sample analysis price per day
Day 8	22% sample analysis price
Day 9-15	2% sample analysis price per day

a. Liquidated damages will only be assessed on the late portion of the deliverable required by a task-specific statement of work.

Alternatively, EG&G Idaho may terminate this subcontract in whole or in part under the Termination for Default clause in this subcontract if delivery or performance of the service requested in this subcontract is delayed. The subcontractor shall be liable for fixed, agreed, and liquidated damages accruing until the time EG&G Idaho may reasonably obtain delivery or performance of services similar to those requested in this subcontract. The liquidated damages shall be in addition to excess costs under the Termination clause.

A one time liquidated damages charge of 10% of the analysis bid price will be assessed per sample for data that was late because of initial noncompliance, but was corrected by the subcontractor within the allowed period (10 days from receipt of written notification of the noncompliance).

A one time liquidated damages charge of 30% of the analysis bid price will be assessed per sample for data that was late because initial noncompliance and was not corrected, but EG&G Idaho has elected to accept it in its noncompliant state.

The subcontractor shall not be charged with liquidated damages when the delay in delivery or performance of requested services occurs because of causes beyond the control and without the fault or negligence of the subcontractor as defined in the Termination for Default clause in this subcontract.

3. TCLP Requirements

The following requirements are set to meet the data interpretation needs relative to the TCLP method as it relates to EPA SW-846 and RCRA. The forms attached to this addendum (Appendix A) shall be used for reporting TCLP results. All surrogate spiking compounds and internal standards necessary to complete the forms must be used. The forms instructions found in the BOA apply. There are some additional fields on the TCLP forms that must be completed. Most of the additions are to the header fields and instructions for completion of the additional fields are as follows.

- The "Sample Matrix" field identifies the matrix of the sample that is received at the laboratory. This field must be completed as SOIL, WATER, or OTHER depending on the characteristics of the sample. When samples having multiple phases are received, a water miscible phase must be identified as "WATER," an oil miscible phase must be identified as "OTHER," and a solid phase must be identified as "SOIL." If more than three phases are present in the sample or if some unusual combination of phases is present (e.g., two liquid phases neither of which is water miscible), then more than one phase may be identified as "OTHER" in the sample matrix field. The laboratory sample identification and laboratory file identification will be used to concatenate the data from the two similar phases.

- The "Date of ZHE" field shall contain the date that the zero headspace extraction (ZHE) was begun.

- The "Date of TCLP Extraction" field shall contain the date that the TCLP extraction was begun.

- The "Date Extracted" field shall contain the date that the preparatory extraction for the semivolatile, organochlorine pesticide, or organochlorine herbicide analyses were begun.

The forms for TCLP volatile organic analysis and semivolatile organic analysis both have fields for entering data for the compounds pyridine and 1,4-dichlorobenzene. The intent of this is to allow the laboratory to analyze for these two compounds in the fraction of the subcontractor's choice. It is not necessary to analyze for these two compounds in both the volatile and semivolatile fraction, but they must be present in the standard mixture for one of these two fractions. The two compounds may be analyzed for in separate fractions (e.g., pyridine as a volatile organic and 1,4-dichlorobenzene as a semivolatile organic).

The forms for the TCLP semivolatile analysis contain the fields for entering data for the specific methylphenol (cresol) isomers and a field for entering total cresol data. If the chromatographic column used in the semivolatile analysis is capable of separating the three cresol isomers, then the fields for the specific isomers must be used. If the chromatographic column used is unable to separate any pair of the isomers, then the data from the three isomers must be summed and presented in the "cresol" field only. The exception to this is on the calibration data forms (Form VI-TCLP and Form VII-TCLP). On the calibration data forms, the relative response factors reported shall be for each isomer that can be separated. For example, if meta-cresol can be separated from a peak that contains both ortho- and para-cresol, then the calibration data for the meta-cresol shall be entered in the "m-cresol" field and the calibration data for the ortho and para isomer coelution shall be entered in the "cresol" field.

The following quality control procedures shall also be required for analysis of EG&G Idaho samples using the TCLP:

For samples to be analyzed for the RCRA toxicity characteristic using the TCLP method requires that, "a matrix spike shall be performed for each waste type (e.g., wastewater treatment sludge, contaminated soil, etc.)." Thus, for all organic analyses performed on the TCLP extracts, the laboratory will be required to analyze a matrix spike and matrix spike duplicate for one of the TCLP extracts from each waste type present in the sample delivery group

(SDG). More specifics on definitions of "waste type" will be given in the task-specific statements of work for each project requiring TCLP.

The new Chapter 1 in EPA SW-846 requires that spiking must be performed so that back calculations can be done to correct for matrix spike recoveries. This is referred to as correction for bias in the new Chapter 1. Recent presentations by EPA personnel indicate that the bias correction language will be removed prior to promulgation of the new Chapter One of SW-846. For the purposes of the EG&G Idaho ERP BOA, the laboratory shall report all quantitative results without correction for matrix spike and/or blank concentrations. The laboratory must analyze a matrix spike and matrix spike duplicate with all of the target analytes of interest in the spiking solution. EXCEPTION: It will not be necessary to spike the compounds toxaphene and technical chlordane in the matrix spiked TCLP extracts to be prepared and analyzed for organochlorine pesticides. If either of these two pesticide mixtures is detected in any TCLP extract, EG&G Idaho project personnel (Cliff Watkins, 208-525-5942) shall be contacted immediately so that arrangements for obtaining an additional sample for spiking can be made. All compounds analyzed in each fraction must be used as matrix spikes. It is the opinion of the EG&G Idaho ERP Sample Management Office (SMO) staff that there is not enough information determined from spiking the sample with phenol, for example, and then making a judgement about the recovery of m-cresol based on the phenol matrix spike results. Guidance for the concentration of matrix spiking compounds is found in Section 8.2.2 of the TCLP method found in the Federal Register, Vol. 55, No. 126, June 29, 1990.

An additional quality control requirement for TCLP analyses shall be the analysis of a ZHE blank and a 12-hour method blank for TCLP volatile organic analyses. The ZHE blank shall be required at the frequency of one per SDG. The laboratory shall report the results of the ZHE blank and method blank(s) on all applicable data reporting forms, including Form IV VOA-TCLP. The "date of ZHE" field shall be completed for the ZHE blank and shall be left blank for the 12-hour method blank(s). The 12-hour method blank(s) shall be identified in accordance with the requirements stated in Section B, page B-33 of the BOA. The ZHE blanks shall be identified using the EG&G Idaho sample identification

"ZHEBLK" for the ZHE blank analyzed for that SDG. The ZHE blank shall consist of an appropriate portion of the extraction fluid that has been exposed to all equipment and procedural steps as the samples analyzed with the SDG. The method blank shall consist of the laboratory's organic-free water that is spiked with surrogate spiking solution and analyzed by the same purge and trap gas chromatography/mass spectrometry technique as the TCLP extracts.

The data deliverable for TCLP analyses shall meet the requirements found in Section B, Part II of the BOA.

4. Electronic Data Deliverable

The original language in the BOA stated that data in computer readable format was not a requirement. The capability of the laboratory to submit data in computer readable format is still not a requirement for eligibility for the subcontractor. The EG&G Idaho ERP now has the ability to accept USEPA Contract Laboratory Program (CLP) data in the diskette Format A for electronic deliverables. The EG&G Idaho ERP SMO will assess the subcontractor's ability to deliver a Format A diskette and will request these deliverables only from the laboratories that can comply with the request. The "agency standard" for electronic data deliverables is currently under development and EG&G Idaho may require electronic data deliverables in this format in the future.

5. On-site Laboratory Evaluation Frequency

On page D-11, Unit 2.3 of the BOA, the frequency that EG&G Idaho will perform on-site laboratory evaluations was stated as annually. The requirement for annual on-site evaluations is being changed to an 18-month frequency, effective with this addendum.

6. Sample/Laboratory Waste Disposal

For radioactively contaminated samples, EG&G Idaho will accept return of all unused sample volumes shipped to the analytical laboratory. For samples that are not radioactively contaminated, the laboratory shall inform the EG&G Idaho ERP SMO, in writing, of the unused sample volumes (by sample number) that will be disposed of and shall dispose of these samples properly. For samples that are radioactively contaminated, the subcontractor shall notify the EG&G Idaho ERP SMO in writing of the unused sample volumes (by sample number) prior to the return of these samples. The ERP SMO will then provide the subcontractor written notification specifying the address where these radioactively contaminated unused sample volumes are to be shipped.

Some projects at EG&G Idaho will request return of all unused sample volumes (whether they are radioactively contaminated or not); thus, the written communication is mandatory and a written response must be received from EG&G Idaho before sample disposal occurs. The written correspondence from the subcontractor must specify the means the subcontractor will use to dispose of the unused sample volumes that are not radioactively contaminated. EG&G Idaho reserves the right to investigate and/or audit the disposal facility used to dispose of unused sample volumes.

Unless otherwise specified in a task specific statement of work, the responsibility for disposal of any waste generated at the laboratory shall be the responsibility of the subcontractor. This includes waste generated from preparation and analysis of radioactively contaminated samples or those samples that are not radioactively contaminated. This waste includes, but may not be limited to: laboratory clothing/glassware, soil/sediment remaining after organic or TCLP extraction, water saturated with methylene chloride and water/methylene chloride emulsions resultant from organic extractions of water samples and TCLP extracts, methylene chloride extracts, hexane extracts, and other organic solvent extracts. EG&G Idaho must receive written notification of the method for disposal of these laboratory generated wastes. EG&G Idaho reserves the right to investigate and/or audit the disposal facility used to

dispose of any laboratory generated wastes that were generated during the analysis of EG&G Idaho samples.

7. Address Corrections

The addresses on page B-5 of the BOA should be corrected to the following:

(1) Mr. Cliff Watkins
Environmental Restoration Program
Sample Management Office
EG&G Idaho, Inc.
P. O. Box 1625
Idaho Falls, ID 83415-1410

(2) No Change from the address presented on page B-5 of the BOA.

(3) Ms. Donna R. Kirchner, Field Data Coordinator
Environmental Restoration Program
Administrative Record and Document Control (ARDC)
EG&G Idaho, Inc.
P. O. Box 1625
Idaho Falls, ID 83415-3904

APPENDIX A

TCLP REPORTING FORMS

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET
TCLP

EG&G Sample No. [ ]

Lab Name: _____ Contract: _____

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

Sample Matrix: (soil/water/other) _____

Extract Matrix: (water) _____ Lab Sample ID: _____

Extract vol: _____ (mL) __ Lab File ID: _____

Level: (low) ___ Date Received: _____

% Moisture: not dec. __ dec. __ Date of ZHE: _____

Column: (nar/wide/pack) ____ Date Analyzed: _____

Dilution Factor: _____

	CAS NO.	COMPOUND	CONCENTRATION UNITS (ug/L)	Q	TCLP MAXIMUM CONCENTRATION (ug/L)
1	75-01-4	Vinyl Chloride			200
2	78-93-3	Methylethylketone(2-Butanone)			200000
3	75-35-4	1,1-Dichloroethene			700
4	67-66-3	Chloroform			6000
5	107-06-2	1,2-Dichloroethane			500
6	56-23-5	Carbon Tetrachloride			500
7	79-01-6	Trichloroethene			500
8	71-43-2	Benzene			500
9	127-18-4	Tetrachloroethene			700
10	108-90-7	Chlorobenzene			100000
11	106-46-7	1,4-Dichlorobenzene			7500
12	110-86-1	Pyridine			5000

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TCLP

EG&G Sample No.

Lab Name: ____________ Contract: ______

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

Sample Matrix: (soil/water/other) ______ Lab Sample ID: ______

Extract Matrix: (water) ______ Lab File ID: ______

Extract vol: ______ (mL) __ Date Received: ______

Level: (low/med) __ Date of TLCP Extraction ______

% Moisture: not dec. ____ dec. ____ Date Extracted: ______

Extraction: (SepF/Cont/Sonc) ____ Date Analyzed: ______

GPC Cleanup: (Y/N) __ pH: __ Dilution Factor: ______

	CAS NO.	COMPOUND	CONCENTRATION UNITS (ug/L)	Q	TCLP MAXIMUM CONCENTRATION (ug/L)
1	95-48-7	O-Cresol			200000
2	108-39-4	M-Cresol			200000
3	106-44-5	P-Cresol			200000
4		Cresol			200000
5	67-72-1	Hexachloroethane			3000
6	98-95-3	Nitrobenzene			2000
7	87-68-3	Hexchlorobutadiene			500
8	88-06-2	2,4,6-Trichlorophenol			2000
9	95-95-4	2,4,5-Trichlorophenol			400000
10	121-14-2	2,4-Dinitrotoluene			130
11	118-74-1	Hexachlorobenzene			130
12	87-86-5	Pentachlorophenol			100000
13	106-46-7	1,4-Dichlorobenzene			7500
14	110-86-1	Pyridine			5000

1C

ORGANOCHLORINE PESTICIDE ANALYSIS DATA SHEET
TCLP

EG&G Sample No. [ ]

Lab Name: _____ Contract: _____

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

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

Extract Matrix: (water) _____ Lab File ID: _____

Extract vol: _____ (mL) __ Date Received: _____ __

Level: (low) ____ Date of TCLP Extraction: _____

% Moisture: not dec. ____ dec. ____ Date Extracted: _____

Preparatory Extraction: (SepF/Cont) ____ Date Analyzed: _____

GPC Cleanup: (Y/N) __ pH: __ Dilution Factor: _____

	CAS NO.	COMPOUND	CONCENTRATION UNITS (ug/L)	Q	TCLP MAXIMUM CONCENTRATION (ug/L)
1	58-89-9	gamma-BHC (Lindane)			400
2	57-74-9	Chlordane			30
3	72-20-8	Endrin			20
4	76-44-8	Heptachlor			8
5	72-43-5	Methoxychlor			10000
6	8001-35-2	Toxaphene			500
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1D
ORGANOCHLORINE HERBICIDE ANALYSIS DATA SHEET
TCLP

EG&G Sample No.

Lab Name: ____________ Contract: ________

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

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

Extract Matrix: (water) _____ Lab File ID: ______________

Extract vol: ______ (mL) ____ Date Received: ________

Level: (low) _____ Date of TCLP Extraction: ________

% Moisture: not dec. ____ dec. ____ Date Extracted: ________

Extraction: (Herb) ____ Date Analyzed: ________

GPC Cleanup: (Y/N) __ pH: ____ Dilution Factor: ________

	CAS NO.	COMPOUND	CONCENTRATION UNITS (ug/L)	Q	TCLP MAXIMUM CONCENTRATION (ug/L)
1	94-75-7	2,4-D			10000
2	93-72-1	Silvex			1000

2A
VOLATILE SURROGATE RECOVERY
TCLP

Lab Name: _____ Contract: _____

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

	EG&G SAMPLE NO.	S1 (TOL)	#	S2 (BFB)	#	S3 (DCE)	#	OTHER	TOT OUT
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									

	QC LIMITS
S1 (TOL) = Toluene-d8	(88-110)
S2 (BFB) = Bromofluorobenzene	(86-115)
S3 (DCE) = 1,2-Dichloroethane-d4	(76-114)

\# Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogates diluted out

2B
SEMIVOLATILE SURROGATE RECOVERY
TCLP

Lab Name: _____ Contract: _____

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

	EG&G SAMPLE NUMBER	S1 (NBZ)#	S2 (FBP)#	S3 (TPH)#	S4 (PHL)#	S5 (2FP)#	S6 (TBP)#	OTHER	TOT OUT
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									

	QC LIMITS
S1 (NBZ)=Nitrobenzene-d5	(35-114)
S2 (FBP)=2-Fluorobiphenyl	(43-116)
S3 (TPH)=Terphenyl-14	(33-141)
S4 (PHL)=Phenol-d6	(10-94)
S5 (2FP)=2-Fluorophenol	(21-100)
S6 (TBP)=2,4,6-Tribromophenol	(10-123)

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

2C

ORGANOCHLORINE PESTICIDE SURROGATE RECOVERY
TCLP

Lab Name: _____ Contract: _____

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

	EG&G SAMPLE NO.	S1 (DBC)#	S2 (TCMX)#	S3 (DCB)#
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				

	ADVISORY QC LIMITS
S1 (DBC) = Dibutylchlorendate	(24-154)
S2 (TCMX) = Tetrachloro-meta-xylene	(24-154)
S3 (DCB) = Decachlorobiphenyl	(24-154)

Column used to flag recovery values

* Values outside of QC limits

D Surrogates diluted out

2D
ORGANOCHLORINE HERBICIDE SURROGATE RECOVERY
TCLP

Lab Name: _____ Contract: _____

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

	EG&G SAMPLE NO.	S1 (DCA)	#	OTHER
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				

ADVISORY QC LIMITS (24-154)

S1 (DCA) = Dicamba

Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogates diluted out

3A

VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY
TCLP

Lab Name: _____ Contact: _____

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

Matrix Spike - EPA Sample No.: _____

	COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS % REC #	QC LIMITS REC.
1	Vinyl Chloride					60-140
2	Methylethylketone(2-butanone)					60-140
3	1,1-Dichloroethene					61-145
4	Chloroform					60-140
5	1,2-Dichloroethane					76-114
6	Carbon Tetrachloride					60-140
7	Trichloroethene					71-120
8	Benzene					76-127
9	Tetrachloroethene					60-140
10	Chlorobenzene					60-140
11	1-4-Dichlorobenzene					60-140
12	Pyridine					10-105

	COMPOUND	SPIKE ADDED (ug/L)	MSD CONCENTRATION (ug/L)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
1	Vinyl Chloride					15	60-140
2	Methylethylketone(2-butanone)					15	60-140
3	1,1-Dichloroethene					14	61-145
4	Chloroform					15	60-140
5	1,2-Dichloroethane					15	76-114
6	Carbon Tetrachloride					15	60-140
7	Trichloroethene					14	71-120
8	Benzene					11	76-127
9	Tetrachloroethene					15	60-140
10	Chlorobenzene					15	60-140
11	1,4-Dichlorobenzene					15	60-140
12	Pyridine					25	10-105

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

* Values outside of QC limits

RPD: __ out of __ outside limits

Spike Recovery: __ out of __ outside limits

Comments: _____

3B

SEMIVOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY
TCLP

Lab Name: _____ Contract: _____

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

Matrix Spike - EG&G Sample No.: _____

	COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS % REC #	QC LIMITS REC.
1	O-Cresol					10-104
2	M-Cresol					11-103
3	P-Cresol					12-105
4	Cresol					10-105
5	Hexachloroethane					20-100
6	Nitrobenzene					35-115
8	Hexchlorobutadiene					10- 95
8	2,4,6-Trichlorophenol					11-101
9	2,4,5-Trichlorphenol					11-101
10	2,4-Dinitrotoluene					24- 96
11	Hexachlorobenzene					30-107
12	Pentachlorophenol					9-103
13	1,4-Dichlorobenzene					60-140
14	Pyridine					10-105

	COMPOUND	SPIKE ADDED (ug/L)	MSD CONCENTRATION (ug/L)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
1	O-Cresol					50	10-104
2	M-Cresol					50	11-103
3	P-Cresol					50	12-105
4	Cresol					50	10-105
5	Hexachloroethane					40	20-100
6	Nitrobenzene					40	35-115
7	Hexchlorobutadiene					40	10- 95
8	2,4,6-Trichlorophenol					50	11-101
9	2,4,5-Trichlorphenol					50	11-101
10	2,4-Dinitrotoluene					38	24- 96
11	Hexachlorobenzene					40	30-107
12	Pentachlorophenol					50	9-103
13	1,4-Dichlorobenzene					15	60-140
14	Pyridine					60	10-105

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

RPD: __ out of __ outside limits

Spike Recovery: __ out of __ outside limits

Comments: _____

3C

ORGANOCHLORINE PESTICIDE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY
TCLP

Lab Name: _____ Contract: _____

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

Matrix Spike - EG&G Sample No.: _____ (Single Component Pesticides)

Matrix Spike - EG&G Sample No.: _____ (Chlordane)

Matrix Spike - EG&G Sample No.: _____ (Toxaphene)

	COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS % REC #	QC LIMITS REC.
1	gamma-BHC (Lindane)					56-123
2	Chlordane					56-120
3	Endrin					56-121
4	Heptachlor					40-131
5	Methoxychlor					55-124
6	Toxaphene					40-135

	COMPOUND	SPIKE ADDED (ug/L)	MSD CONCENTRATION (ug/L)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC
1	gamma-BHC (Lindane)					15	56-123
2	Chlordane					22	56-120
3	Endrin					21	56-121
4	Heptachlor					20	40-131
5	Methoxychlor					21	55-124
6	Toxaphene					24	40-135

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

* Values outside of QC limits

RPD: __ out of __ outside limits

Spike Recovery: __ out of __ outside limits

COMMENTS: _____

_____

_____

3D

ORGANOCHLORINE HERBICIDE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY
TCLP

Lab Name: _____ Contract: _____

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

Matrix Spike - EG&G Sample No.: _____

	COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS % REC #	QC LIMITS REC.
1	2,4-D					45-115
2	2,4,5-TP (Silvex)					51-121

	COMPOUND	SPIKE ADDED (ug/L)	MSD CONCENTRATION (ug/L)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC
1	2,4-D					20	45-115
2	2,4,5-TP (Silvex)					20	51-121

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

* Values outside of QC limits

RPD: __ out of __ outside limits

Spike Recovery: __ out of __ outside limits

COMMENTS: _____

4A
VOLATILE METHOD BLANK SUMMARY
TCLP

Lab Name: _____ Contract: _____

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

Lab File ID: _____ Lab Sample ID: _____

Date of ZHE: _____ Time Analyzed: ____

Date Analyzed: _____ Level:(low) ___

Sample Matrix:(water) _____

Instrument ID: _____

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

	EG&G SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				

COMMENTS:

4B
SEMIVOLATILE METHOD BLANK SUMMARY
TCLP

Lab Name: _____ Contract: _____

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

Lab File ID: _____ Lab Sample ID: _____

Date TCLP Extracted: _____ Extraction:(SepF/Cont) ____

Date Prep Analyzed: _____ Time Analyzed: ____

Matrix:(water) _____ Level:(low) ___

Instrument ID: _____

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

	EG&G SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				

COMMENTS: _____

4C
ORGANOCHLORINE PESTICIDE METHOD BLANK SUMMARY
TCLP

Lab Name: _____ Contract: _____

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

Lab Sample ID: _____ Lab File ID: _____

Matrix:(water) _____ Level:(low) ___

Date TCLP Extraction: _____ Extraction: (SepF/Cont) ____

Date Prep Extraction: _____

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

Time Analyzed (1): ____ Time Analyzed (2): ____

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

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

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

	EG&G SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED 1	DATE ANALYZED 2
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				

COMMENTS: _____

4E

ORGANOCHLORINE HERBICIDE METHOD BLANK SUMMARY
TCLP

Lab Name: _____ Contract: _____

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

Lab Sample ID: _____ Lab File ID: _____

Matrix:(water) _____ Level:(low) ___

Date TCLP Extraction: _____ Extraction: (Herb) ____

Date Prep Extraction: _____

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

Time Analyzed (1): ____ Time Analyzed (2): ____

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

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

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

	EG&G SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED 1	DATE ANALYZED 2
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				

COMMENTS:

5A

VOLATILE ORGANIC GC/MS TUNING AND MASS CALIBRATION - BROMOFLUOROBENZENE (BFB) TCLP

Lab Name: _____ Contract: _____

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

Lab File ID: _____ BFB Injection Date: _____

Instrument ID: _____ BFB Injection Time: ____

Column:(nar/wide/pack/) ____

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	15.0 - 40.0% of mass 95	
75	30.0 - 60.0% of mass 95	
95	Base peak,100% relative abundance	
96	5.0 - 9.0% of mass 95	
173	Less than 2.0% of mass 174	( )1
174	Greater than 50.0% of mass 95	
175	5.0 - 9.0% of mass 174	( )1
176	Greater than 95.0%,but less than 101.0% of mass 174	( )1
177	5.0 - 9.0% of mass 176	( )2

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

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

	EG&G SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					

5B
SEMIVOLATILE ORGANIC GC/MS TUNING AND MASS CALIBRATION - DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)
TCLP

Lab Name: _____ Contract: _____

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

Lab File ID: _____ DFTPP Injection Date: _____

Instrument ID: _____ DFTPP Injection Time: _____

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
51	30.0 - 60.0% of mass 198	
68	Less than 2.0% of mass 69	_____(_____)1
69	Mass 69 relative abundance	
70	Less than 2.0% of mass 69	_____(_____)1
127	40.0 - 60.0% of mass 198	
197	Less than 1.0% of mass 198	
198	Base Peak, 100% relative abundance	
199	5.0 to 9.0% of mass 198	
275	10.0 - 30.0% of mass 198	
365	Greater than 1.00% of mass 198	
441	Present, but less than mass 443	
442	Greater than 40.0% of mass 198	
443	17.0 - 23.0 of mass 442	_____(_____)2

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

THIS TUNE APPLIES TO THE FOLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	EG&G SAMPLE NUMBER	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					

6A

VOLATILE ORGANICS INITIAL CALIBRATION DATA
TCLP

Lab Name: _____ Contract: _____

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

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

Matrix:(water) _____ Level:(low) ___ Column:(nar/wide/pack) ____

Min RRF for SPCC(#) = 0.300 Max %RSD for CCC(*) = 30.0%

LAB FILE ID: RRF20 = _____ RRF50 = _____
RRF100= _____ RRF150= _____ RRF200= _____

	COMPOUND	RRF20	RRF50	RRF100	RRF150	RRF200	RRF	% RSD
1	Vinyl Chloride	*						*
2	Methylethylketone(2-butanone)							
3	1,1-Dichloroethene	*						*
4	Chloroform	*						*
5	1,2-Dichloroethane							*
6	Carbon Tetrachloride							
7	Trichloroethene							
8	Benzene							
9	Tetrachloroethene							
10	Chlorobenzene	#						#
11	1,4-Dichlorobenzene	*						*
12	Pyridine							
13	Toluene-d8							
14	Bromofluorobenzene							
15	1,2-Dichloroethane-d4							

6B

SEMIVOLATILE ORGANICS INITIAL CALIBRATION DATA
TCLP

Lab Name: _____ Contract: _____

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

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

Max %RSD for CCC(*) = 30.0%

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

	COMPOUND	RRF 20	RRF 50	RRF 80	RRF 120	RRF 160	RRF	% RSD	
1	O-Cresol								
2	M-Cresol								
3	P-Cresol								
4	Cresol								
5	Hexachloroethane								
6	Nitrobenzene								
7	Hexchlorobutadiene								
8	2,4,6-Trichlorophenol								*
9	2,4,5-Trichlorphenol								
10	2,4-Dinitrotoluene								
11	Hexachlorobenzene								
12	Pentachlorophenol								*
13	1,4-Dichlorobenzene								*
14	Pyridine								
15	Nitrobenzene-d5								
16	2-Fluorobiphenyl								
17	Terphenyl-14								
18	Phenol-d6								
19	2-Flurophenol								
20	2,4,6-Tribromophenol								

7A

VOLATILE CONTINUING CALIBRATION CHECK
TCLP

Lab Name: _____ Contract: _____

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

Instrument ID: _____ Calibration Date: _____ Time: ____

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

Matrix:(water) _____ Level:(low) ___ Column:(nar/wide/pack) ____

Min RRF50 for SPCC(#) = 0.300 Max %D for CCC(*) = 25.0%

	COMPOUND	RRF	RRF50	% D
1	Vinyl Chloride *			*
2	Methylethylketone(2-butanone)			
3	1,1-Dichloroethene *			*
4	Chloroform *			*
5	1,2-Dichloroethane			*
6	Carbon Tetrachloride			
7	Trichloroethene			
8	Benzene			
9	Tetrachloroethene			
10	Chlorobenzene #			#
11	1,4-Dichlorobenzene *			*
12	Pyridine			
13	Toluene-d8			
14	Bromofluorobenzene			
15	1,2-Dichloroethane-d4			

7B

SEMIVOLATILE CONTINUING CALIBRATION CHECK
TCLP

Lab Name: _____ Contract: _____

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

Instrument ID: _____ Calibration Date: _____ Time: ____

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

Max %D for CCC(*) = 25.0%

	COMPOUND	RRF	RRF50	%D	
1	O-Cresol				
2	M-Cresol				
3	P-Cresol				
4	Cresol				
5	Hexachloroethane				
6	Nitrobenzene				
7	Hexchlorobutadiene				
8	2,4,6-Trichlorophenol	*			*
9	2,4,5-Trichlorphenol				
10	2,4-Dinitrotoluene				
11	Hexachlorobenzene				
12	Pentachlorophenol	*			*
13	1,4-Dichlorobenzene	*			*
14	Pyridine				
15	Nitobenzene-d5				
16	2-Fluorobiphenyl				
17	Terphenyl-14				
18	Phenol-d6				
19	2-Fluorophenol				
20	2,4,6-Tribromophenol				

8A
VOLATILE INTERNAL STANDARD AREA SUMMARY
TCLP

Lab Name: _____ Contract: _____

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

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

Instrument ID: _____ Time Analyzed: ____

Matrix:(water) _____ Level:(low) ___ Column:(nar/wide/pack) ____

	IS1(BCM) AREA	#	RT	IS2(DFB) AREA	#	RT	IS3(CBZ) AREA	#	RT
12 HOUR STD									
UPPER LIMIT									
LOWER LIMIT									
EG&G SAMPLE NO.									
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									

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

UPPER LIMIT = + 100% of internal standard area.
LOWER LIMIT = - 50% of internal standard area.

Column used to flag internal standard area values with an asterisk

SEMIVOLATILE INTERNAL STANDARD AREA SUMMARY
TCLP

Lab Name: _____ Contract: _____

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

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

Instrument ID: _____ Time Analyzed: _____

	IS1(DCB) AREA	#	RT	IS2(NPT) AREA	#	RT	IS3(ANT) AREA	#	RT
12 HOUR STD									
UPPER LIMIT									
LOWER LIMIT									
EG&G SAMPLE NUMBER									
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									

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

UPPER LIMIT = + 100% of internal standard area.
LOWER LIMIT = - 50% of internal standard area.

Column used to flag internal standard area values with an asterisk

8C

SEMIVOLATILE INTERNAL STANDARD AREA SUMMARY
TCLP

Lab Name: _____ Contract: _____

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

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

Instrument ID: _____ Time Analyzed: _____

	IS4(PHN) AREA	#	RT	IS5(CRY) AREA	#	RT	IS6(PRY) AREA	#	RT
12 HOUR STD									
UPPER LIMIT									
LOWER LIMIT									
EG&G SAMPLE NUMBER									
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									

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

UPPER LIMIT = + 100% of internal standard area.
LOWER LIMIT = - 50% of internal standard area.

Column used to flag internal standard area values with an asterisk

8D

ORGANOCHLORINE PESTICIDE EVALUATION STANDARDS SUMMARY
TCLP

Lab Name: _____ Contract: _____

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

Instrument ID: _____ GC Column ID: _____

Dates of Analyses: _____ to _____

Evaluation Check for Linearity

	PESTICIDE	CALIBRATION FACTOR EVAL MIX A	CALIBRATION FACTOR EVAL MIX B	CALIBRATION FACTOR EVAL MIX C	%RSD (</= 10.0%)
1	gamma-BHC (Lindane)				
2	Endrin				
3	Heptachlor				
4	DBC				
5	TCMX				
6	DCB				

(1) If > 10.0% RSD, plot a standard curve and determine the ng for each sample in that set from the curve.

Evaluation Check for Endrin Breakdown
(percent breakdown expressed as total degradation)

		DATE ANALYZED	TIME ANALYZED	ENDRIN
	INITIAL EVAL MIX B			
1	EVAL MIX B			
2	EVAL MIX B			
3	EVAL MIX B			
4	EVAL MIX B			
5	EVAL MIX B			
6	EVAL MIX B			
7	EVAL MIX B			
8	EVAL MIX B			
9	EVAL MIX B			
10	EVAL MIX B			
11	EVAL MIX B			
12	EVAL MIX B			
13	EVAL MIX B			
14	EVAL MIX B			

(2) See Form instructions.

8E
ORGANOCHLORINE PESTICIDE EVALUATION STANDARDS SUMMARY
Evaluation of Retention Time Shift for Dibutylchlorendate
TCLP

Lab Name: _____ Contract: _____

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

Instrument ID: _____ GC Column ID: _____

Dates of Analyses: _____ to _____

	EG&G SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED	TIME ANALYZED	% D	*
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						
31						
32						
33						
34						
35						
36						
37						
38						

* Values outside of QC limits (2.0% for packed columns, 0.3% for capillary columns)

8F

ORGANOCHLORINE HERBICIDE EVALUATION STANDARDS SUMMARY
TCLP

Lab Name: _____ Contract: _____

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

Instrument ID: _____ GC Column ID: _____

Dates of Analyses: _____ to _____

Evaluation Check for Linearity

	HERBICIDE	CALIBRATION FACTOR EVAL MIX A	CALIBRATION FACTOR EVAL MIX B	CALIBRATION FACTOR EVAL MIX C	%RSD (</= 10.0%)
1	2,4-D				
2	Silvex				
3	Dicamba				

8G
ORGANOCHLORINE HERBICIDE EVALUATION STANDARDS SUMMARY
Evaluation of Retention Time Shift for Dicamba
TCLP

Lab Name: _____ Contract: _____

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

Instrument ID: _____ GC Column ID: _____

Dates of Analyses: _____ to _____

	EG&G SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED	TIME ANALYZED	% D	*
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
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21						
22						
23						
24						
25						
26						
27						
28						
29						
30						
31						
32						
33						
34						
35						
36						
37						
38						

* Values outside of QC limits (2.0% for packed columns, 0.3% for capillary columns)

9A
ORGANOCHLORINE PESTICIDE STANDARDS SUMMARY
TCLP

Lab Name: _____ Contract: _____

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

Instrument ID: _____ GC Column ID: _____

		DATE(S) OF ANALYSIS FROM:				DATE OF ANALYSIS			
		TO:				TIME OF ANALYSIS			
		TIME(S) OF ANALYSIS FROM:				EG&G SAMPLE NO. (STANDARD)			
		TO:							
	COMPOUND	RT	RT WINDOW FROM	RT WINDOW TO	CALIBRATION FACTOR	RT	CALIBRATION FACTOR	QNT Y/N	%D
1	gamma-BHC(Lindane)								
2	Chlordane								
3	Endrin								
4	Heptachlor								
5	Methoxychlor								
6	Toxaphene								
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									

Under QNT Y/N: enter Y if quantitation was performed, N if not performed.
%D must be less than or equal to 15.0% for quantitation, and less than or equal to 20.0% for confirmation.

NOTE: Determining that no compounds were found above the CRQL is a form of quantitation, and therefore at least one column must meet the 15.0% criteria.

For multicomponent analytes, the single largest peak that is characteristic of the conponent should be used to establish retention time and %D. Identification of such analytes is based primarily on pattern recognition.

ORGANOCHLORINE HERBICIDE STANDARDS SUMMARY
TCLP

Lab Name: _____ Contract: _____

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

Instrument ID: _____ GC Column ID: _____

DATE(S) OF ANALYSIS FROM: _____ TO: _____	DATE OF ANALYSIS _____
TIME(S) OF ANALYSIS FROM: _____ TO: _____	TIME OF ANALYSIS _____
	EG&G SAMPLE NO. (STANDARD) _____

	COMPOUND	RT	RT WINDOW FROM	RT WINDOW TO	CALIBRATION FACTOR	RT	CALIBRATION FACTOR	QNT Y/N	%D
1	2,4-D								
2	Silvex								
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									

Under QNT Y/N: enter Y if quantitation was performed, N if not performed. %D must be less than or equal to 15.0% for quantitation, and less than or equal to 20.0% for confirmation.

NOTE: Determining that no compounds were found above the CRQL is a form of quantitation, and therefore at least one column must meet the 15.0% criteria.

For multicomponent analytes, the single largest peak that is characteristic of the conponent should be used to establish retention time and %D. Identification of such analytes is based primarily on pattern recognition.

10A
ORGANOCHLORINE PESTICIDE IDENTIFICATION
TCLP

EG&G Sample No. [ ]

Lab Name: _____ Contract: _____

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

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

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

Lab Sample ID: _____

Lab File ID: _____ (only if confirmed by GC/MS)

	PESTICIDE	RETENTION TIME		RT WINDOW OF STANDARD From	To	QUANT? (Y/N)	GC/MS? (Y/N)
01	_____	Column 1	___	___	___	-	-
02		Column 2	___	___	___		
03	_____	Column 1	___	___	___	-	-
04		Column 2	___	___	___		
05	_____	Column 1	___	___	___	-	-
06		Column 2	___	___	___		
07	_____	Column 1	___	___	___	-	-
08		Column 2	___	___	___		
09	_____	Column 1	___	___	___	-	-
10		Column 2	___	___	___		
11	_____	Column 1	___	___	___	-	-
12		Column 2	___	___	___		

COMMENTS: _____

_____

10B

ORGANOCHLORINE HERBICIDE IDENTIFICATION
TCLP

EG&G Sample No. [ ]

Lab Name: _____ Contract: _____

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

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

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

Lab Sample ID: _____

Lab File ID: _____ (only if confirmed by GC/MS)

	HERBICIDE	RETENTION TIME		RT WINDOW OF STANDARD From	To	QUANT? (Y/N)	GC/MS? (Y/N)
01	_____	Column 1	___	___	___	-	-
02		Column 2	___	___	___	-	-
03	_____	Column 1	___	___	___	-	-
04		Column 2	___	___	___	-	-
05	_____	Column 1	___	___	___	-	-
06		Column 2	___	___	___	-	-
07	_____	Column 1	___	___	___	-	-
08		Column 2	___	___	___	-	-
09	_____	Column 1	___	___	___	-	-
10		Column 2	___	___	___	-	-
11	_____	Column 1	___	___	___	-	-
12		Column 2	___	___	___	-	-

COMMENTS:

PRICING SCHEDULE

All work shall be performed in accordance with the "EG&G Idaho, Inc. Basic Ordering Agreement for Organics Analyses Performed For the Environmental Restoration Program At The Idaho National Engineering Laboratory", and subsequent addendums.

Note 1:

EG&G Idaho shall be billable for the matrix spike and matrix spike duplicate analyses required by the BOA. The method blank analyses required by the BOA are not billable analyses. The reanalyses that are required by the methods requested and/or those specified in the task-specific statements of work shall be billable. There shall be a separate billing schedule for reanalyses that require reinjection of an extract only, as opposed to those requiring a reextraction and reanalysis.

Note 2:

All samples must be extracted or analyzed within the holding time specified in the methods below for all analysis types. EG&G Idaho will pay 0% of the analysis bid price for any sample extracted/analyzed after the holding time has expired. If the laboratory identifies an instance where holding times will not be met, the laboratory shall contact EG&G project personnel (Mr. Cliff Watkins, 208-525-5942) about the possibility for obtaining a replacement.

Note 3:

All samples analyzed when the analytical sequence is in an out of control condition or the method requirements have not been met (e.g., insufficient number of method blanks, CCCs or SPCCs not within acceptable limits, internal standard areas out of the +100% to -50% range, surrogate spike recoveries outside acceptable QC limits) must be re-extracted/reanalyzed at no extra cost to EG&G. The exception to this is when a problem with internal standard areas or surrogate recoveries is duplicated on two subsequent analyses (e.g., the recovery of the same surrogate is low on two subsequent extractions and analyses). When this occurs both the original analysis and reanalysis must be submitted to EG&G. The suffix "RE" shall be added to the EG&G sample ID to identify the second analysis of the sample. EG&G Idaho will be billable at the full bid price for both the original and the reanalysis in these instances, as long as there are no violations of the holding time requirements. When the noncompliant situation is not realized by the laboratory EG&G Idaho will pay 85% of the bid price for that sample. If the problem is with the internal standard areas, the sample need not be reextracted. The extract must be reinjected following any routine maintenance to the instrument that might alleviate the problem (e.g., cleaning the injection port, cutting off a few centimeters of the chromatographic column at the injection port end). If the same internal standard exhibits the same problem with area (e.g., less than 50% both times) then the problem shall be considered out of the control of the laboratory. The routine maintenance performed to try to alleviate the problem must be documented in the case narrative. If all of the stated requirements for reanalysis based on internal standard area QC deviations are met then EG&G will be billable at the full bid price for the original

preparation and analysis of the sample, and for the reinjection of the reanalysis. The suffix "RE" shall be added to the EG&G sample ID to identify the second analysis of the extract.

Note 4:

EG&G Idaho anticipates sending 20 or more samples for analysis under each individual task order. This is an estimate only and is not guaranteed or implied.

Note 5:

All costs associated with sample analysis and disposal as specified in the "EG&G Idaho, Inc. Basic Ordering Agreement for Organics Analyses Performed For the Environmental Restoration Program At The Idaho National Engineering Laboratory" shall be included in the unit price per sample analyzed.

Note 6:

The target analytes applicable to each method listed below are specified in Section C of the BOA or the Addendum 1 to the BOA (Attachment 1). Pricing shall reflect the analyte list and all reporting specified.

Note 7:

If a particular analysis is not performed by the Subcontractor it should be so indicated by filling in the "Price Per Sample" field with the words "Not Available."

A. Basic Sample Analyses for Organic Compounds

Type of Analysis	Method	Price Per Sample Water	Soil	Waste
Appendix IX; SW-846	8140 or 8141			
	8150 or 8151			
	8270			
	8240 or 8260			
	8080 or 8081			
Priority Pollutant; SW-846	8240 or 8260			
	8270			
	8080 or 8081			
Volatile Organics	524.2		N/A	N/A

Pricing Schedule

A. Basic Sample Analyses for Organic Compounds (continued)

Type of Analysis	Method		Price Per Sample Water	Soil	Waste
Complete USEPA CLP Organics Analysis	2/88 Contract				
	VOA		_____	_____	_____
	SVOA		_____	_____	_____
	Pest./PCB		_____	_____	_____
	3/90 Contract				
	VOA		_____	_____	_____
	SVOA		_____	_____	_____
	Pest/PCB		_____	_____	_____
TCLP: (Extraction SVOA herbicides, Pesticides, ZHE, Volatiles)	1311		N/A	_____	_____
TCLP: (ZHE for Volatiles only)	1311		N/A	_____	_____
TCLP Extracts (or water samples for TCLP list)	Semivolatile Organics	3510/3520 8270	_____	_____	_____
TCLP Extracts (or water samples for TCLP list)	Volatile Organics	8240/8260	_____	_____	_____
TCLP Extracts (or water samples for TCLP list)	Organo-chlorine pesticides by GC/ECD	3510/3520 8080/8081	_____	_____	_____

A. Basic Sample Analyses for Organic Compounds (continued)

Type of Analysis	Method	Price Per Sample Water	Soil	Waste
TCLP Extracts (or water samples for TCLP list)	Organo-chlorine herbs. by GC/ECD 8150/8151			
Halogenated VOCs	8010			
Aromatic VOCs	8020			
Acrylonitrile, Acetonitrile, Acrolein	8030			
SVOA Reinjection of Extracts for QC reasons only.	8270/CLP			
Total Petroleum Hydrocarbons (TPH)	418.1			
Total Organic Carbon (TOC)	SOP*			

* The offeror shall submit to EG&G Idaho, proposed method(s) for the determination of total organic carbon (TOC). The method(s) submitted must be written and include the estimated quantitation limit and provisions for quality control measurements, including matrix spike recovery, calibration of the measurement system, and analysis of method blanks.

B. Mixed Waste Sample Analysis (mixed waste is defined here as water, soil, or other waste that is radioactively contaminated)

Type of Analysis	Method	Price Per Sample Water	Soil	Waste
Appendix IX; SW-846	8140 or 8141			
	8150 or 8151			
	8270			
	8240 or 8260			
	8080 or 8081			
Priority Pollutant; SW-846	8240 or 8260			
	8270			
	8080 or 8081			
Volatile Organics	524.2		N/A	N/A
Complete USEPA CLP Organics Analysis	2/88 Contract			
	VOA			
	SVOA			
	Pest./PCB			
	3/90 Contract			
	VOA			
	SVOA			
	Pest/PCB			
TCLP: (Extraction SVOA herbicides, Pesticides, ZHE, Volatiles)	1311	N/A		
TCLP: (ZHE for Volatiles only)	1311	N/A		
TCLP Extracts (or water samples for TCLP list)	Semivolatile Organics 3510/3520 8270			

B. Mixed Waste Sample Analysis (continued)

Type of Analysis		Method	Price Per Sample Water	Soil	Waste
TCLP Extracts (or water samples for TCLP list)	Volatile Organics	8240/8260	_____	_____	_____
TCLP Extracts (or water samples for TCLP list)	Organo-chlorine pesticides by GC/ECD	3510/3520 8080/8081	_____	_____	_____
TCLP Extracts (or water samples for TCLP list)	Organo-chlorine herbicides by GC/ECD	8150/8151	_____	_____	_____
Halogenated VOCs		8010	_____	_____	_____
Aromatic VOCs		8020	_____	_____	_____
Acrylonitrile, Acetonitrile, Acrolein		8030	_____	_____	_____
SVOA Reinjection of Extracts for QC reasons only.		8270/CLP	_____	_____	_____
Total Petroleum Hydrocarbons (TPH)		418.1	_____	_____	_____

B. Mixed Waste Sample Analysis (continued)

Type of Analysis	Method	Price Per Sample Water	Soil	Waste
Total Organic Carbon (TOC)	SOP*	_____	_____	_____

* The offeror shall submit to EG&G Idaho, proposed method(s) for the determination of total organic carbon (TOC). The method(s) submitted must be written and include the estimated quantitation limit and provisions for quality control measurements, including matrix spike recovery, calibration of the measurement system, and analysis of method blanks.

C. Special Analytical Services

1. Hazardous Waste Samples

Type of Analysis	Method	Price Per Sample Water	Soil	Waste
Full CLP Dioxin Analysis	8/87 Contract	_____	_____	_____
SW-846 with a data package analogous to that delivered with the CLP Dioxin Analysis Protocol	8280	_____	_____	_____
F-Listed solvents	8240 or 8260 (plus any direct injection technique necessary to analyze for all of the RCRA F-listed solvents as target analytes, i.e. in the standards) (Normally these analyses will be done on TCLP extracts to determine if the Contaminant Concentration Waste Extract (CCWE) exceeds the treatment standard. Do <u>not</u> include the price for the TCLP extraction in the price quote. The price for the TCLP extraction is quoted in (A.) above.)	_____	_____	_____

C. Special Analytical Services

2. Mixed Waste Sample Analysis (mixed waste is defined here as water, soil, or other waste that is radioactively contaminated)

Type of Analysis	Method	Price Per Sample Water	Soil	Waste
Full CLP Dioxin Analysis	8/87 Contract	_____	_____	_____
SW-846 with a data package analogous to that delivered with the CLP Dioxin Analysis Protocol	8280	_____	_____	_____
F-Listed solvents	8240 or 8260 (plus any direct injection technique necessary to analyze for all of the RCRA F-listed solvents as target analytes, i.e. in the standards) (Normally these analyses will be done on TCLP extracts to determine if the Contaminant Concentration Waste Extract (CCWE) exceeds the treatment standard. Do not include the price for the TCLP extraction in the price quote. The price for the TCLP extraction is quoted in (A.) above.)	_____	_____	_____

Authorized Signature and Title _____

Company _____ Date _____

ERP-SOW-59

STATEMENT OF WORK FOR INORGANIC ANALYSES PERFORMED FOR THE ENVIRONMENTAL RESTORATION PROGRAM AT THE IDAHO NATIONAL ENGINEERING LABORATORY

September 1991

Idaho National Engineering Laboratory
Environmental Restoration Program
EG&G Idaho, Inc.
Idaho Falls, Idaho 83415

STATEMENT OF WORK FOR INORGANIC ANALYSES PERFORMED FOR THE ENVIRONMENTAL RESTORATION PROGRAM AT THE IDAHO NATIONAL ENGINEERING LABORATORY

Sample Management Office
Environmental Restoration Program
EG&G Idaho, Inc.

Statement of Work No. ERP-SOW-59

Prepared by:

R. J. Sheehan, Scientist, ERP SMO — August 29, 1991 (Date)

Reviewed by:

J. P. Shea, Chairman
Environmental Restoration Program
Independent Review Committee — 10/11/91 (Date)

Approved by:

J. E. Ferguson, Manager
Data Management Unit — 10/10/91 (Date)

CONTENTS

ACRONYMS AND DEFINITIONS

AA	atomic absorption
ARDC	Administrative Record and Document Control
CCB	continuing calibration blank
CCV	continuing calibration verification
CLP	Contract Laboratory Program
COC	chain of custody
CRA	AA standard at the CRDL
CRDL	contract required detection limit
CRI	ICP standard at two times the CRDL
CRM	standard for miscellaneous analysis at the CRDL
DOE	Department Of Energy
ERP	Environmental Restoration Program
ICB	initial calibration blank
ICP	inductively coupled plasma atomic emission spectrometer
ICP/MS	inductively coupled plasma/mass spectrometry
ICS	interference check sample
ICSA	ICS consisting of only the interferents
ICSAB	ICS consisting of analytes mixed with the interferents
ICV	initial calibration verification
IDL	instrument detection limit
INEL	Idaho National Engineering Laboratory
ISOW	inorganic statement of work (ERP-SOW-59)
LCS	laboratory control sample
LQAP	laboratory quality assurance plan
LRA	linear range analysis
L&V	limitations and validation report
MDL	method detection limit
PB	preparation blank
PE	performance evaluation
SA	subcontracts administrator

SDG	sample delivery group
SMO	Sample Management Office
SOP	standard operating procedure
SOW	statement of work
SOW-390	SOW-3/90 Contract Laboratory Program statement of work
TAL	target analyte list
USEPA	United States Environmental Protection Agency

STATEMENT OF WORK FOR INORGANIC ANALYSES PERFORMED FOR THE ENVIRONMENTAL RESTORATION PROGRAM AT THE IDAHO NATIONAL ENGINEERING LABORATORY

1. INTRODUCTION

EG&G Idaho, Inc., is the management and operations contractor for the Department of Energy (DOE) at the Idaho National Engineering Laboratory (INEL) research and development facility located near Idaho Falls, Idaho. The EG&G Idaho Environmental Restoration Program (ERP), which is a group in the Waste Management Operations Department of EG&G Idaho, is responsible for restoration of various waste disposal sites within INEL boundaries. The ERP Sample Management Office (SMO), under the auspices of the EG&G Idaho ERP, has been delegated the responsibility of formulating an inorganic statement of work (ISOW) subcontract.

This ISOW subcontract specifies the requirements common to all ERP analytical services for inorganic parameters. Individual task orders shall be submitted to the subcontractor to support ERP projects. The task orders will be accompanied by a task-specific statement of work (SOW) for the project. These task-specific SOWs will specify the number of samples, analyses, any specific quality control additional to the methods [e.g., spike frequency, lower contract required detection limit (CRDL)], and expected performance period for the task.

This ISOW was written to clarify the EG&G Idaho ERP requirements for subcontractors that analyze INEL samples for inorganic constituents. Since written communication of detailed requirements is such a formidable task, it was decided that the *United States Environmental Protection Agency* (USEPA) *Contract Laboratory Program* (CLP) *SOW for Inorganic Analysis Multi-Media, Multi-Concentration* document[1] (hereinafter referred to as SOW-390) would be the document used as the primary contractual agreement between EG&G Idaho and a subcontracted inorganic chemical analysis laboratory (hereinafter referred to as the Subcontractor). SOW-390 was chosen as the basis for the ISOW for several reasons. Various editions to the inorganic CLP SOW have been evolving over the course of the last ten years. At the time of this publication, SOW-390 is the latest edition to the inorganic CLP

SOW. SOW-390 is a thorough and technically sound work order document. One of the most appealing aspects of using a CLP SOW is that most laboratories are familiar with using this type of protocol for performing inorganic environmental analyses. In addition to soliciting SOW-390 protocol methods, the ISOW may be used as a vehicle to request other types of inorganic procedures, such as wet chemistry, ion chromatography, toxicity characteristic leaching procedure, and inductively coupled plasma/mass spectrometry (ICP/MS).

Because SOW-390 is written specifically for a target analyte list (TAL) of 23 metals and cyanide, certain aspects of SOW-390 protocol will have to be modified to accommodate inorganic parameters that are not contained in the TAL. Any pertinent SOW-390 protocol modifications that are not found in this ISOW will be specified in the task-specific SOWs. In order to correlate the language of the SOW-390 to the EG&G Idaho ERP ISOW, the term "EG&G Idaho ERP" will replace "USEPA" or "Government", "ERP SMO" will replace the "USEPA CLP SMO," and "Subcontractor" will replace "Contractor" whenever the SOW-390 document is being referenced by this ISOW. It is acknowledged that interpretation problems will arise whenever a document of this size is modified to fit a more general array of analyses. In order to minimize deviations from the ISOW's main objectives, SOW-390 will be followed by the Subcontractor exactly as written, unless one of the following three requirements is met: (1) requirements are presented in the task-specific SOW or EG&G Idaho ERP ISOW, which are to be used in favor of SOW-390 protocol, (2) an addendum to the ISOW is distributed by the ERP SMO that changes SOW-390 requirements, or (3) the Subcontractor is given written permission by the ERP SMO to deviate from SOW-390 protocol. The technical contact that needs to be notified by the Subcontractor of a request to implement requirement (3) above will be:

Mr. Robert J. Sheehan
EG&G Idaho, Inc.
ERP Sample Management Office
Idaho Falls, Idaho 83415-1410
(208) 525-5940.

All technical questions and/or concerns with any aspect of this subcontract or the task- specific SOWs issued under this subcontract shall also be directed to Mr. Sheehan.

2. MODIFICATIONS TO SOW-390

Although SOW-390 was written for a specified TAL, the majority of the requirements can be expanded to cover any inorganic constituent for which analysis is requested. This section of the ISOW is designed to make modifications to the individual exhibits that are presented in SOW-390. All Subcontractor personnel that will be doing analyses involving INEL ERP samples are required to have read SOW-390 and the ISOW. Proof of compliance to this required reading must be documented by the Subcontractor. The Subcontractor's laboratory quality assurance plan (LQAP) must contain a section that outlines employee training procedures. The training program initiated by the Subcontractor for this subcontract should provide evidence that the required reading was performed. If any of the Subcontractor personnel do not understand SOW-390 or ISOW subcontract requirements or find parts of these documents either contradictory or unintelligible, their concerns must be resolved with the ERP SMO before the Subcontractor's technical proposal is submitted to EG&G Idaho. Failure on the Subcontractor's part to voice any questions or concerns to the ERP SMO about this subcontract will be considered a declaration of understanding and acceptance of the subcontract in its entirety.

2.1 Summary of Requirements (SOW-390, Exhibit A)

Subcontractors under this ISOW may not sublet any task orders or any portion of a task order to other laboratories. This includes any laboratories affiliated with the Subcontractor in any way, including those possessing the same corporate name, unless both laboratories have complied fully with the requirements specified in this ISOW for ERP SMO laboratory approval, and both have submitted technical proposals during the request for proposal phase of this subcontract.

The Subcontractor will be asked to perform analyses using methods that are USEPA-approved, either directly or by reciprocity (e.g., American Society for Testing and Materials, Standard Methods, etc.). For purposes of this subcontract, the SOW-390 TAL will not necessarily be the only target list requested. Analytes not contained in the SOW-390 TAL and non-SOW-390 methods may also be requested under this subcontract.

Prior to accepting any EG&G Idaho ERP samples, the Subcontractor shall have, in house, the appropriate standards required to run all of the inorganic constituents that have been requested by the EG&G Idaho ERP project manager.

The Subcontractor must provide written documentation, before the subcontract is awarded, on the number of samples per analysis that their laboratory can easily handle for this subcontract in a one-month time frame. These numbers should be based, not only on the analysis of the samples, but also on the completion of the final report in SOW-390 format. Care should be exercised in the formulation of these numbers because they will be expected to be met if the Subcontractor is awarded the subcontract. The onsite evaluation performed by EG&G Idaho prior to the subcontract award will assess the Subcontractor's ability to meet this sample load based on numbers of instruments observed, qualified personnel, etc.

The Subcontractor must submit a complete list of all inorganic analyses, including wet chemistry, that they are experienced in doing and wish to be EG&G Idaho ERP-approved to perform. The method(s) and standard operating procedures (SOPs) used for each analysis, along with the names of the personnel experienced with these methods, must also be submitted by the Subcontractor. Complete resumés, laboratory training SOPs, and employee training records for all Subcontractor personnel associated with EG&G Idaho ERP work, must be submitted to the ERP SMO. After reviewing all resumés, training SOPs, and employee training records, the ERP SMO will delegate which analyses each individual will be authorized to perform under this subcontract. No Subcontractor personnel will be allowed to work on any phase of this subcontract without prior written approval from the ERP SMO.

All instrumentation descriptions, including type, manufacturer, model, age, purchase date, and method of servicing, must be submitted by the Subcontractor for each and every instrument used for INEL ERP work. It must also be noted which personnel are experienced in the operation of each instrument. The amount of experience each operator has on an instrument must be documented and supplied with the instrument information.

Samples must be assigned to sample delivery groups (SDGs) by matrix (i.e., all soils in one SDG, all waters in another). An SDG is a group of 20 or fewer samples that were collected from a common site within a short enough time frame so that all requested analyses can be performed by the

Subcontractor before any of the analytical holding times have expired. Each data package submitted by the Subcontractor is required to contain one and only one SDG.

The samples to be analyzed by the Subcontractor are from known or suspected hazardous waste sites at the INEL and have the potential of containing hazardous organic and/or inorganic materials at high concentration levels. Additionally, the samples may contain radionuclides at environmental levels. EG&G Idaho will request information on the maximum radionuclide activity the Subcontractor will accept, and will not ship any samples that have an activity above the Subcontractor's acceptable limit. Prior to shipment, the samples will be screened for total counts per minute at sample container contact and/or fully characterized at the INEL Radiation Measurements Laboratory. The sample tag will be marked with the results of the pre-shipment screenings. The Subcontractor should be aware of the potential hazards associated with these samples. It is the Subcontractor's responsibility to take all necessary precautions to ensure the health and safety of their employees.

Subcontractors must validate all of their data prior to submitting the data packages to the EG&G Idaho ERP. The Subcontractor's data will be validated again by either the ERP SMO or a validation representative to the ERP SMO (see Section 3). The Subcontractor will be given copies of all data validation reports and will be expected to rectify any procedural or reporting deficiencies detected by the data validator. If the ERP SMO has determined that deviations from the requirements in the subcontract agreement have resulted in a nonconformance, reanalysis of the samples, at the Subcontractor's expense, will be required upon request of the SMO.

The Subcontractor is required to retain unused sample volume and used sample containers until given written notice by the ERP SMO or 180 days after the sample collection date, whichever comes first. Unused sample volume and used sample containers will then be disposed of in accordance with the Subcontractor's LQAP. (NOTE: The LQAP must be submitted to and approved by the EG&G Idaho ERP before any subcontract is awarded.)

Contrary to SOW-390, INEL field sample numbers will likely be longer than six digits in length. If the Subcontractor's electronic data system cannot handle the complete field sample number, the hardcopy submitted by the Subcontractor must have the complete field number delineated on the forms,

even if this means completing the number with a legible hand entry. The Subcontractor will be required to provide a diskette deliverable with all SOW-390 data packages (see Section 2.8).

The Subcontractor is required to immediately notify the ERP SMO if any of the holding times for INEL samples are in danger of being exceeded before the analysis is complete.

EG&G Idaho reserves the right to formulate and enforce addendums to this ISOW. Subcontractors will receive any addendums that the ERP SMO publishes. The Subcontractor will not be held liable to follow addendums that are received while a successfully bid upon project is in progress, but will be held liable for those same addendums on future projects that have not been bid upon before the receipt of the addendums.

2.2 Deliverables and Reporting Requirements (SOW-390, Exhibit B)

2.2.1 Deliverables

NOTE: Distribution of deliverables will be to whichever of the following groups are specified:

- EG&G Idaho ERP SMO
- EG&G Idaho Subcontracts Administrator (SA)
- EG&G Idaho Administrative Record and Document Control (ARDC).

A. Three copies of the **technical proposal** and the **LQAP** will be delivered to the SA as specified in the request for proposal.

B. One copy of the Subcontractor's updated **SOPs** (see SOW-390, Exhibit B, pages B-5 and B-6) will be delivered within 45 calendar days after the subcontract is awarded. This copy will be submitted to the ERP SMO.

C. One copy of the **chain-of-custody (COC) forms** will be submitted to ARDC within three calendar days after the Subcontractor receives the last sample in an SDG. [NOTE: The laboratory sample custodian shall return the yellow copy of the COC form and the shipping

document (Form EG&G-361) immediately upon receipt of the samples at the laboratory. The laboratory shall return the original EG&G Idaho COC form, along with the laboratory's internal COC documentation, when submitting the last data package produced for samples represented on the EG&G Idaho COC form.]

D. Two copies of the **sample data package** (see SOW-390, Exhibit B, pages B-7 through B-11) will be delivered within 28 calendar days after the Subcontractor receives the last sample in an SDG. Both copies will be submitted to ARDC for distribution.

E. Three copies of **data in computer readable format** (see SOW-390, Exhibit B, pages B-11 through B-13) will be delivered within 28 calendar days after the Subcontractor receives the last sample in an SDG. The data shall be submitted on an IBM or IBM-compatible, 3.5-in., double-sided, double-density, 720 K-byte or a high-density, 1.44 M-byte diskette (see Section 2.8). All three copies will be submitted to ARDC for permanent file and distribution.

F. One copy of the **complete SDG file** (see SOW-390, Exhibit B, pages B-13 and B-14) will be delivered within 28 calendar days after the Subcontractor receives the last sample in an SDG. This copy will be submitted to ARDC for permanent file.

G. Two copies of **semiannual and annual verification of instrument parameters** will be delivered as follows:

The Subcontractor shall perform and report semiannual (due prior to the beginning of sample analysis and updated every April and October thereafter) verification of instrument detection limits (IDLs), specified in Exhibit E of SOW-390, for each atomic absorption (AA), ICP, and other pertinent instrument (e.g., ICP/MS if approved by the EG&G Idaho ERP) used under this subcontract. For ICP instrumentation, the Subcontractor shall also perform and report annual (due prior to the beginning of sample analysis and updated every April thereafter) interelement correction factors (including method of determination, wavelengths used, and integration times). Forms containing only the results for semiannual and annual verification of instrument parameters must be submitted in each SDG data package. Submission of semiannual and annual verification of instrument parameters must include the raw data used to determine those values reported.

One copy will be submitted to the SMO and one copy will be submitted to ARDC.

Distribution Addresses:

Mr. Cliff Watkins
Environmental Restoration Program
Sample Management Office
EG&G Idaho, Inc.
P.O. Box 1625
Idaho Falls, ID 83415-1410

Ms. Renee Simmons
Subcontracts Administrator
EG&G Idaho, Inc.
P.O. Box 1625
Idaho Falls, ID 83415-2082

Ms. Donna R. Kirchner
Administrative Records and Document Control
EG&G Idaho, Inc.
P.O. Box 1625
Idaho Falls, ID 83415-3904.

2.2.2 Reporting

All raw data pages, including instrument printouts, must contain the date that they were produced and the initials of the analyst responsible for their production. Instrumentation descriptions, including type, manufacturer, and model, must be included with the raw data associated with each analytical instrument used to generate results for this subcontract.

All pages in the data packages, including copies, must be completely legible and understandable. The cost to EG&G Idaho for data validation is substantial. Since data validation costs rise when validators spend time trying to decipher carelessly prepared data packages, unclear and illegible data pages will not be tolerated. The Subcontractor will be required to resubmit any reporting forms and/or raw data pages deemed illegible by the ERP SMO.

There is a great emphasis on documentation at the INEL. Raw data are the most important aspect in producing high quality documentation. The submitted raw data must be complete and understandable.

All reporting forms must be able to be regenerated by a source entirely independent of the Subcontractor, using only the submitted raw data as an information outlet.

The raw data must contain complete and understandable information on the sources and preparation procedures used in making initial calibration verification (ICV), continuing calibration verification (CCV), initial calibration blank (ICB), continuing calibration blank (CCB), preparation blank (PB), CRDL, interference check sample solution A (ICSA), interference check sample solution AB (ICSAB), laboratory control sample (LCS), calibration standards, and spiking solutions.

Complete and understandable information on how interelement and/or isobaric correction factors are calculated and used must be presented in the raw data.

Any raw data present on instrument printouts that are not used for generating the final data package must be clearly marked on the printout. This needs to be done in order to expedite the data validation process.

Results for requested analytes that are on the SOW-390 TAL will be entered on the forms contained in SOW-390. For any requested analyte that is not contained on the SOW-390 TAL, the data must be entered on modified versions of all pertinent CLP-type reporting forms. These modified forms will be similar to SOW-390 forms, with the versatility to be used for most inorganic parameters. Copies of these modified forms are included in Appendix A of this ISOW. Special forms will be provided by EG&G Idaho with the task-specific SOW if CLP forms or the forms provided in Appendix A are not appropriate.

A case narrative is required for every data package submitted by the Subcontractor. The case narrative should be formatted as follows:

- This document shall be clearly labeled "Case Narrative" and shall contain:
  - Laboratory name
  - Sample numbers in the SDG, differentiating between initial analyses and reanalyses

- SDG number

- Detailed documentation of any quality control, sample, shipment, and/or analytical problems encountered in processing the samples reported in the data package.

- Whenever data from reanalyses are submitted, the Subcontractor shall state in the case narrative for **each** reanalysis, whether it considers the reanalysis to be billable, and if so, why.

- The Subcontractor must also include any problems encountered; both technical and administrative, the corrective actions taken, and resolution.

- The case narrative shall contain the following statement, **verbatim**:

> I certify that this data package is in compliance with the terms and conditions of the EG&G Idaho Inorganic Statement Of Work and any task specific Statements of Work for this project, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the laboratory manager or his designee, as verified by the following signature.

This statement shall be directly followed by signature of the laboratory manager or his/her designee with a typed line below it containing the signer's name and title, and the date of the signature.

- Additionally, the case narrative itself must be signed in original signature by the laboratory manager or his designee and dated.

The State of Idaho, DOE, and USEPA Region X, have allocated relatively short time frames for EG&G Idaho ERP projects to be completed. Since laboratory analyses and data submittal are included in these allocated time frames, the EG&G Idaho ERP requires the Subcontractor to meet all stipulated turnaround times and sample holding times as outlined in this ISOW and/or task-specific SOWs. Due to the large number of samples that will be taken at the INEL, the EG&G Idaho ERP will be employing a number of subcontractors to do inorganic analyses. Subcontractors must only commit themselves to a sample load that they can easily complete in the required turnaround times.

2.3 Inorganic Target Analyte List (SOW-390, Exhibit C)

For this subcontract, inorganic analyte additions or deletions to the CLP TAL may be requested in the task-specific SOW. The CRDLs for analytes to be analyzed that are not on the CLP TAL will be provided for the Subcontractor by the ERP SMO by way of the task-specific SOW.

2.4 Analytical Methods (SOW-390, Exhibit D)

All INEL samples must be kept at 4°C (±2°C) upon receipt until they have undergone method-specific sample preparation. (NOTE: Some samples will require cold storage until the time of the analysis, depending on the parameters being tested.) The inside cooler temperature must be noted on the COC forms at the time the sample shipment arrives at the laboratory. All sample bottles must be capped tightly except at the time of sample preparation or sample analysis.

Any analytical methods that are used for this subcontract must be USEPA and/or ERP SMO approved. The USEPA is currently formulating a SOW that allows samples to be analyzed by ICP/MS methodology.[2] Once this SOW is published and put into circulation, the ISOW will most likely be revised to include analyses by ICP/MS methods. If the Subcontractor wishes to use ICP/MS methodology before the ISOW allows for such methodology, the Subcontractor must submit an ICP/MS SOP to the ERP SMO for acceptance. ERP approval for the use of ICP/MS methodology by a Subcontractor will be granted on a case by case basis. All calibration, tuning, and interference correction procedures for ICP/MS methodology must be outlined in detail in the Subcontractor's SOP. The ICP/MS SOP must also address the subject of the Subcontractor's electronic deliverables capability (e.g., can the Subcontractor's submitted electronically stored data be printed out to exactly match the concentrations calculated and printed on the original hard copy of the raw data?).

If an ICP/MS instrument is used for this subcontract, the ICP/MS operator is required to have the same qualifications for ICP/MS operation as the inductively coupled plasma atomic emission spectrometer (ICP) operator is required to have for ICP operation under SOW-390 (see SOW-390, Exhibit A, page A-10).

In order to clarify quality control requirements when using the ICP/MS technique, the following controls must be implemented when ICP/MS instrumentation is used.

- All blanks (ICB,CCB, and PB) must be within ± the CRDL.

- The CRDL standards for furnace AA (CRA) will be used and must be within ±10% of the actual values for As, Pb, Sb, Se, and Tl. (NOTE: If the CRA value is over the ICP/MS calibration range, the CRA may be diluted for the analysis, but must be dilution corrected for reporting purposes.) All other metals will use ICP (CRI) CRDL standards and will require no corrective action limits. (NOTE: In the future, action limits will be required for the CRI solution if stipulated in USEPA CLP SOW revisions.)

- The composition of the ICSA and ICSAB solutions must be addressed in the Subcontractor's ICP/MS SOP. Isobaric elemental, molecular, and doubly charged interference corrections, which use established isotopic response ratios or parent-to-oxide ratios (providing an oxide internal standard is used) will be used to program the ICP/MS data system to help eliminate false positive test results.

- The ICP serial dilution analysis must not cause the reported values to be flagged as estimated (see SOW-390 for qualifying flag discussion) for As, Pb, Sb, Se, and Tl.

- The pre-digestion spikes for As, Pb, Sb, Se, and Tl must be made at the concentrations listed in SOW-390 for furnace AA analysis. The spike recovery must be within the limits of 75 to 125% unless the sample concentration exceeds the spike concentration by a factor of four or more.

- If any of these first five requirements are not met for As, Pb, Sb, Se, or Tl, the nonconforming analyte must be reanalyzed using SOW-390 furnace procedures.

- All analytes that are normally run by ICP must follow all of the rules and requirements that SOW-390 mandates for ICP analyses.

2.5 Quality Assurance/Quality Control Requirements (SOW-390, Exhibit E)

The Subcontractor's laboratory shall have and shall maintain an effective quality assurance program to govern all areas affecting quality during the receival, analysis, and reporting of samples.

The quality assurance program must be structured to control all areas affecting quality. These areas include, but are not limited to, the following:

- Sample and material identification, storage, and handling
- Chain-of-custody procedures
- Qualification, certification, and training of personnel
- Document control and revision
- Control of nonconformances
- Corrective action
- Independent data verification

2.5.1 Standard Operating Procedures (SOPs)

The Subcontractor is required to submit written SOPs to the ERP SMO, for each method of analysis it will be performing that is not clearly outlined in either SOW-390 or ISOW documents, prior to using these methods under this subcontract. The ERP SMO will either accept or reject the Subcontractor's SOP for each particular method of analysis. If deviations from the Subcontractor's SOPs are required by the ERP SMO, these deviations will be detailed in a task-specific SOW.

The DOE *Environmental Compliance and Planning Manual* [3] invokes QAMS 005/80 on laboratories performing work for DOE. Most laboratory operations can be standardized and written as SOPs. The subcontracting laboratory must have written SOPs for all areas of operation that can be standardized and that add to the production of quality data. All employees associated with a particular area of operation must adhere to the SOPs for that same area. These areas include, but are not limited to, the following:

- Sample receipt and storage
- Data package preparation
- Standards preparation
- Sample preparation
- Sample chain of custody
- Analytical procedures
- Technical review of data
- Quality assurance/quality control self-inspection
- Instrument maintenance and calibration
- Preparation of glassware
- Use of logbooks
- Laboratory corrective action
- Data validation
- Records storage and retention
- Preparation of reagents
- Handling and disposal of hazardous materials.

2.5.2 Instrument Calibration

Instruments must be calibrated according to procedures described in SOW-390. For inorganic analytes that are not on the SOW-390 TAL, instrument calibration procedures must be approved by the ERP SMO before any ERP samples are analyzed. Whenever the ERP SMO approves calibration procedures for inorganic analytes that are not on the SOW-390 TAL, the procedures must be documented by the Subcontractor.

2.5.3 ICV and CCV

Every inorganic analysis performed under this subcontract is required to run ICVs and CCVs at the intervals described in SOW-390, unless the ERP SMO specifically tells the Subcontractor otherwise. For inorganic analytes that are not on the SOW-390 TAL, the control limits for both ICVs and CCVs will be ±10% of the true value, unless the ERP SMO specifically tells the Subcontractor otherwise.

2.5.4 CRDL Standards for Furnace AA (CRA), ICP (CRI), and Miscellaneous (CRM)

A standard at the CRDL (see Section 2.3) must be analyzed for all requested inorganic analytes not listed on the SOW-390 TAL, unless specific instructions are given to the contrary by the ERP SMO. Analytes that are requested from the SOW-390 TAL will follow the protocol outlined in SOW-390.

2.5.5 ICB, CCB, and PB

Every inorganic analysis performed under this subcontract is required to run ICBs, CCBs, and PBs at the intervals described in SOW-390, unless the ERP SMO specifically tells the Subcontractor otherwise. For inorganic analytes that are not on the SOW-390 TAL, the control limits for ICBs, CCBs, and PBs will be ± the CRDL (see Section 2.3), unless the ERP SMO specifically tells the Subcontractor otherwise.

2.5.6 ICP Interference Check Sample

Every analyte that is run by ICP must be contained in the ICSAB. For each analyte that does not have an ICSAB concentration listed in SOW-390, add between 100 and 1000 times the IDL concentration for that particular analyte to the ICSAB. [NOTE: Until the USEPA promulgates a SOW for ICP/MS analyses and this SOW is incorporated into a revised ISOW, the interference check samples for ICP/MS (if applicable) will only be addressed in the Subcontractor's ICP/MS SOP.]

2.5.7 Spike Sample

At least one pre-digestion spike must be run under this subcontract, for each batch of samples, for each analysis performed, unless specific instructions to the contrary are given by the ERP SMO. If specific spiking levels are not listed in SOW-390 for a particular analyte, spike the solution with five times the CRDL (see Section 2.3) of that analyte. Unless specifically stated in SOW-390 to the contrary, any parameter that warrants a qualifying flag of "N" must have a post- digestion spike analyzed. (NOTE: A batch must not exceed 20 samples and each sample in the batch must be of similar matrix.)

2.5.8 Duplicate Sample

Every batch of samples under this subcontract must have at least one duplicate prepared and analyzed according to the specifications outlined in SOW-390. Certain inorganic analyses, at the discretion of the ERP SMO, could be required to have a duplicate for every sample prepared and analyzed. When this is necessary, it shall be stated in the task-specific SOW.

2.5.9 LCS Sample

Each inorganic analysis under this subcontract must have an LCS associated with every batch. Unless instructions to the contrary are given by the ERP SMO, the protocol outlined in SOW-390 will govern the preparation and analysis of each LCS.

2.5.10 ICP Serial Dilution Sample

The ICP serial dilution sample, as defined in SOW-390, will be required when samples are analyzed by either ICP or ICP/MS methods. At the discretion of the ERP SMO, a serial dilution sample may also be required for other methods of analysis. When this is required, it shall be stated in the task-specific SOW.

2.5.11 IDL Determination

Any metal analyte requested that is not on the SOW-390 TAL, must undergo the same IDL determination procedure as described in SOW-390. When wet chemical procedures are requested by a USEPA-approved method, the literature-listed method detection limit (MDL) for that analyte can be substituted for the IDL. The IDL determination procedure will be required every 6 months instead of every 3 months as stated in SOW-390.

2.5.12 Interelement Corrections for ICP

Interelement correction factors must be calculated for the ICP as outlined in SOW-390. The raw data are required to contain complete information on how interelement correction factors are calculated and used. (NOTE: The raw data are required to contain complete information on how isobaric elemental and molecular-ion correction factors are calculated and used if ICP/MS methodology is incorporated.)

2.5.13 Linear Range Analysis (LRA)

The linear range analysis (LRA) will follow the protocol outlined in SOW-390, with an additional requirement that the LRA must be run and be within $\pm 5\%$ of the actual value for every ICP and ICP/MS instrumental run. The LRA must be the first analytical sample (see SOW-390, Exhibit G, for analytical sample definition) to be analyzed after each instrumental calibration.

2.5.14 Furnace AA

All metals that could not meet SOW-390 CRDLs or other SOW-390 requirements, by either ICP or ICP/MS, must be analyzed by furnace methods as outlined in SOW-390. (NOTE: Mercury will be run by cold vapor AA.)

2.5.15 Analytical and Facility Performance Check

The Subcontractor can expect an onsite audit of their laboratory by ERP SMO personnel before any subcontract is awarded. Before EG&G Idaho schedules any onsite audit trip with the Subcontractor,

a compendium of the laboratory's SOW-390 required SOPs must be sent to the ERP SMO for review and acceptance. Once the subcontract is awarded, EG&G Idaho reserves the right to audit the Subcontractor's facility at any time deemed necessary during the performance period.

As of September 1991, the ERP SMO does not have a performance evaluation (PE) program implemented. Until a PE program is set up, the Subcontractor can expect to receive only double blind performance evaluation samples. Once an ERP PE program is in place, the Subcontractor will be required to satisfactorily analyze single blind PE samples on a semiannual basis. The Subcontractor will be responsible for obtaining a pre-agreed upon number of PE sample parameter results, within specified concentration control limits, in order to retain ERP laboratory approval. The laboratory will semiannually receive a maximum of two single blind PE samples, per matrix, for each parameter the laboratory will be ERP-certified to perform. The Subcontractor should be aware, before submitting any sample price bids, that the single blind PE sample analyses will be performed at the Subcontractor's expense.

2.6 Chain of Custody, Document Control, and SOPs (SOW-390, Exhibit F)

As mentioned previously, documentation is very important to the EG&G Idaho ERP and DOE. All documents required by this subcontract must be kept in a neat and legible manner. It should be noted that all data produced by the Subcontractor may be useless if proper document control procedures are not followed.

All SOPs outlined in SOW-390 are required to be written by the Subcontractor and approved by the ERP SMO before any subcontract can be awarded. All Subcontractor personnel who will deal with INEL samples in any way, will be required to have read, understood, and been trained in the use of SOPs. Both evidence of SOPs training for personnel and evidence of SOPs implementation by personnel must be documented. The Subcontractor can expect to be audited to these procedures precisely as they are written.

2.7 Glossary of Terms (SOW-390, Exhibit G)

For this subcontract, the term analyte will be defined as the element, ion, compound, or aggregate property of a sample an analysis seeks to determine.

A USEPA-type traffic report will not be used for this project. The INEL equivalent to the USEPA traffic report will be the EG&G Idaho ERP COC forms.

For this subcontract, low or medium concentration levels will not be defined. Since this ISOW considers the concentration level to be relative in nature, the "Level (low/med):" section on the inorganic data sheets does not need to be filled in. (NOTE: If the Subcontractor's CLP software requires an entry in this section, either "low" or "med" may be used.)

2.8 Data Dictionary and Format for Data Deliverables in Computer Readable Format (SOW-390, Exhibit H)

This subcontract requires data from analyses performed using SOW-390 protocol to be submitted in both hard copy and electronic form. The electronic data must be generated using USEPA Format A. The USEPA is currently working to define the Agency standard for diskette deliverable data format. It is likely that at some time during the performance period of this subcontract, this standard format will be finalized. EG&G Idaho will require the subcontractor to convert from Format A to the new standard upon request. Until the time of request for such conversion, Format A will be the only allowable format for diskette deliverables. The data shall be submitted on an IBM or IBM-compatible, 3.5-in., double-sided, double-density, 720 K-byte or a high-density, 1.44 M-byte diskette. The data dictionary for the Format A diskette deliverable is found in Exhibit H of SOW-390.

Any Subcontractor that cannot deliver data in the specified electronic form will not be considered for this EG&G Idaho subcontract.

3. INORGANIC LABORATORY DATA VALIDATION

The inorganic laboratory data submitted by the Subcontractor will be subject to 100% validation by either the ERP SMO or a representative of the ERP SMO. Any reported data points that have not met the subcontract agreement are susceptible to penalty. The penalty will be in the form of either nonpayment for, or reanalysis of, the data points in question. Flagrant or continual infractions of the terms of this subcontract by the Subcontractor will result in the termination of the Subcontractor's services.

A description of the EG&G Idaho data validation procedure is presented to the ISOW Subcontractor in order to help minimize analytical and reporting nonconformances. (Guidelines for inorganic data validation and a full description of the procedure are provided in References 4 and 5, respectively.) The following section on the data validation process describes how the ERP SMO or a representative of the ERP SMO will validate the Subcontractor's data packages.

3.1 Inorganic Validation Process

The data validator must receive legible copies of all correspondence, instructions, and complete data packages that were exchanged between EG&G Idaho and the subcontracting laboratory. Access to this information is essential in order to evaluate the laboratory based on their ability to comply with subcontract requirements. Each SDG must be validated separately. There will be three parts to the data validation process: (1) data confirmation, (2) data clarification, and (3) data assessment. The validation process parts are outlined as follows:

PART 1: DATA CONFIRMATION

The first part of the validation process is to confirm whether or not all of the data that are entered on the report forms can be derived directly from the raw data pages. Comments describing the laboratory's analytical performance and compliance to the subcontract requirements will be documented throughout this part of the validation process.

The raw data will be checked for the following:

- Completeness and legibility
- Comparability to the COC forms
- Understandable preparation sheets for standards and quality assurance/quality control solutions
- Detailed explanation for any calculations or data manipulations
- Compliance to the task-specific SOW and the ISOW including, but not limited to, the following:
  - Holding times
  - Calibrations
  - Blanks
  - Interference check samples
  - Laboratory control samples
  - Duplicate analyses
  - Matrix spikes
  - Serial dilutions
  - Method of standard additions
- Detailed explanation for the determination and use of interelement correction factors
- Accuracy of statements made in the case narrative
- Detailed explanation for any manufacturer programmed qualifiers entered on raw data instrument printouts

- A copy of the certificate of authenticity from the manufacturer of laboratory control samples

- Detailed explanation of any nonconforming data and subsequent corrective actions taken

- General good laboratory practice.

PART 2: DATA CLARIFICATION

After a comprehensive comparison of the raw data to the reported data has been completed, the data clarification process begins. This part of the process involves putting qualifying flags next to reported values that for one reason or another have questionable accuracy. The usability of data is compromised whenever validation qualifying flags have been added. Descriptions of the validation qualifying flags that will be used are as follows:

- U - The material was analyzed for, but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.

- J - The analyte was analyzed for and was positively identified, but the associated numerical value may not be consistent with the amount actually present in the environmental sample.

- R - The data are unusable.

- UJ - The material was analyzed for, but was not detected. The associated value is an estimate and may be inaccurate or imprecise.

PART 3: DATA ASSESSMENT

The data assessment part of the validation process is the formulation of a comprehensive inorganic data limitations and validation (L&V) report. This report will include a description of any results that were given qualifying flags by the data validator. The total number of data points that were analyzed by the laboratory will be listed, along with the total number of data points that required validation qualifying flags. The percentage of compromised data will be reported.

The L&V report will be a detailed summation of the entire validation process. Comments concerning the laboratory's performance will be included and will be based on their compliance to deliver the subcontractually agreed upon product. All comments will be stated as clearly and accurately as possible, since both the project manager and the laboratory will be given copies of the L&V report. Any problems that were caused by EG&G Idaho ERP (such as a poorly written statement of work), rather than by laboratory deficiencies, will also be noted.

It is the intention of the ERP SMO to foster a relationship with the Subcontractor that will facilitate the production of data that conform to the ISOW subcontractual requirements. The L&V report is a means of documenting a Subcontractor's performance. The Subcontractor will avoid repeated requests to conform to the requirements if the recommendations delineated by the data validator in the L&V report are implemented.

4. REFERENCES

1. *USEPA Contract Laboratory Program Statement of Work for Inorganic Analysis, Multi-Media Multi-Concentration*, Document Number ILM01.0, March, 1990 (CLP SOW-390).

2. *Inductively Coupled Plasma - Mass Spectrometry*, Method 6020, Revision 1, Draft, U.S. Environmental Protection Agency, April 1990.

3. *Environmental Compliance and Planning Manual*, DOE/ID-10166, Rev. 3, Department of Energy, April 1991.

4. *Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses*, prepared for the Hazardous Site Evaluation Division, U.S. Environmental Protection Agency, compiled by Ruth Bleyler, Sample Management Office, Viar & Company, prepared by the USEPA Data Review Work Group, July 1, 1988.

5. "Standard Operating Procedure For Inorganic Data Validation," SMO-SOP-12.1.5, Environmental Restoration Program, EG&G Idaho, Inc., 1991.

APPENDIX A

MODIFIED REPORTING FORMS

COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

Lab Name: ______________________ Contract: __________

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

SOW No.: _____

EG&G Sample No.	Lab Sample ID.

Were ICP interelement corrections applied? Yes/No ___

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

Comments:

____

____

____

____

Release of the data contained in this hardcopy data package and in the computer-readable data submitted on floppy diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Lab Manager: ______________________

Date: __/__/__

EG&G Sample No.

INORGANIC ANALYSIS DATA SHEET

Lab Name: _____ Contract: _____

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

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

% Solids: _____ Date Received: _____

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

CAS No.	Analyte	Concentration	C	Q	M

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: ___

Comments:

_____

_____

_____

_____

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: _____ Contract: _____

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

Initial Calibration Source: _____

Continuing Calibration Source: _____

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	

2B

CRDL STANDARD FOR AA AND ICP

Lab Name: _____ Contract: _____

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

AA CRDL Standard Source: _____

ICP CRDL Standard Source: _____

Concentration Units: ug/L

Analyte	CRDL Standard for AA			CRDL Standard for ICP				
	True	Found	%R	True	Initial Found	%R	Final Found	%R

3
BLANKS

Lab Name: _____ Contract: _____

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

Preparation Blank Matrix (soil/water): _____

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

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M

ICP INTERFERENCE CHECK SAMPLE

Lab Name: _____ Contract: _____

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

ICP ID Number: _____ ICS Source: _____

Concentration Units: ug/L

Analyte	True Sol. A	True Sol. AB	Initial Found Sol. A	Initial Found Sol. AB	Initial Found %R	Final Found Sol. A	Final Found Sol. AB	Final Found %R

EG&G SAMPLE NO.

5A

SPIKE SAMPLE RECOVERY

Lab Name: _____ Contract: _____

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

Matrix (soil/water): _____

% Solids for Sample: _____

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

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M

Comments:

_____

_____

_____

_____

EG&G SAMPLE NO.

5B

POST DIGEST SPIKE SAMPLE RECOVERY

Lab Name: _____ Contract: _____

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

Concentration Units: ug/L

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M

Comments:

_____

_____

_____

_____

EG&G SAMPLE NO.

6
DUPLICATES

Lab Name: _____ Contract: _____

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

Matrix (soil/water): _____

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

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

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	M

LABORATORY CONTROL SAMPLE

Lab Name: _____ Contract: _____

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

Solid LCS Source: _____

Aqueous LCS Source: _____

Analyte	Aqueous (ug/L) True	Found	%R	Solid (mg/kg) True	Found	C	Limits		%R

8

STANDARD ADDITION RESULTS

Lab Name: _____ Contract: _____

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

Concentration Units: ug/L

EG&G Sample No.	An	0 ADD ABS	1 ADD CON	1 ADD ABS	2 ADD CON	2 ADD ABS	3 ADD CON	3 ADD ABS	Final Conc.	r	Q

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EG&G SAMPLE NO.

ICP SERIAL DILUTIONS

Lab Name: _____ Contract: _____

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

Matrix (soil/water): _____

Concentration Units: ug/L

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	M

10

INSTRUMENT DETECTION LIMITS (SEMI-ANNUAL)

Lab Name: _____ Contract: _____

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

ICP ID Number: _____ Date: __/__/__

Flame AA ID Number: _____

Furnace AA ID Number: _____

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M

Comments:

_____

_____

_____

_____

ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: _____ Contract: _____

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

ICP ID Number: _____ Date: __/__/__

Analyte	Wave-length (nm)	Interelement Correction Factors for: Al	Ca	Fe	Mg	__

Comments:

_____

_____

_____

_____

ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: _____ Contract: _____

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

ICP ID Number: _____ Date: __/__/__

Analyte	Wave-length (nm)	Interelement Correction Factors for:				
		__	__	__	__	__

Comments:

_____

_____

_____

_____

12

ICP LINEAR RANGES

Lab Name: _____ Contract: _____

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

ICP ID Number: _____ Date: __/__/__

Analyte	Integ. Time (Sec.)	Concentration (ug/L)	M

Comments:

_____

_____

_____

_____

13
PREPARATION LOG

Lab Name: ____________________ Contract: __________

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

Method: __

EG&G Sample No.	Preparation Date	Weight (gram)	Volume (mL)

ANALYSIS RUN LOG

Lab Name: _____ Contract: _____

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

Instrument ID Number: _____ Method: __

Start Date: _____ End Date: _____

EG&G Sample No.	D/F	Time	% R	Analytes

Appendix O, Part 1
SOP for Validation of
Organic Gas Data

APPENDIX O

Validation Procedures

APPENDIX O

Contents

EG&G IDAHO, INC.
ENVIRONMENTAL RESTORATION PROGRAM
SAMPLE MANAGEMENT OFFICE

STANDARD OPERATING PROCEDURE NO. SMO-SOP-12.1.3

VALIDATION OF VOLATILE AND SEMIVOLATILE ORGANIC GAS CHROMATOGRAPHY/MASS SPECTROMETRY DATA

For USEPA Methods
8240, 8270, 524.2, and CLP

EG&G IDAHO, INC.
ENVIRONMENTAL RESTORATION PROGRAM
SAMPLE MANAGEMENT OFFICE

STANDARD OPERATING PROCEDURE NO. SMO-SOP-12.1.3

VALIDATION OF VOLATILE AND SEMIVOLATILE ORGANIC GAS CHROMATOGRAPHY/MASS SPECTROMETRY DATA

Prepared by:

Rod Grant — 8/9/91

R. D. Grant, Scientist, ERP SMO — Date

Reviewed by:

David L. Adkins for J. P. Shea — 8/9/91

J. P. Shea, Chairman, ERP Independent Review Committee — Date

Approved by:

W. J. Yurman — 8/9/91

D. J. Yurman, Acting Manager,
Data Management Unit — Date

CONTENTS

EG&G IDAHO, INC.
ENVIRONMENTAL RESTORATION PROGRAM
SAMPLE MANAGEMENT OFFICE
STANDARD OPERATING PROCEDURE
VALIDATION OF VOLATILE AND SEMIVOLATILE
ORGANIC GAS CHROMATOGRAPHY/MASS SPECTROMETRY DATA

1. PURPOSE AND SCOPE

This document is a standard operating procedure (SOP) designed to offer guidance in the evaluation and validation of volatile and semivolatile organic gas chromatography/mass spectrometry (GC/MS) data.

The specific areas covered in this SOP include holding times, instrument performance, calibrations, blanks, surrogates, field duplicates, matrix spikes, compound identification, compound quantitation, reported detection limits, and final assessment for the sample delivery group (SDG).

2. ACRONYMS/DEFINITIONS

CLP	Contract Laboratory Procedure
COC	Chain of Custody
EPA	Environmental Protection Agency
ERP	Environmental Restoration Program
GC	Gas Chromatography
IS	Internal Standard
L&V	Limitations and validation
MPD	Matrix Spike Duplicate
MS	Mass Spectrometry
MS	Matrix Spike
NIST	National Institute of Standards and Technology
RIC	Reconstructed Ion Chromatogram
RPD	Relative Percent Differences
RQL	Required Quantitation Limit
RRF	Relative Response Factor
RRT	Relative Retention Time
RSD	Relative Standard Deviation
SDG	Sample Delivery Group
SMO	Sample Management Office
SOP	Standard Operating Procedure
SOW	Statement of Work
TCL	Target Compound List
TIC	Tentatively Identified Compound
VOA	Volatile Organic Analysis
VOC	Volatile Organic Compound
BFB	Bromofluorobenzene - volatile tuning compound
BNA	Base/neutral/acid compounds - compounds analyzed by semivolatile technique.

DFTPP — Decafluorotriphenylphosphine - semivolatile tuning compound

m/z — Charge (z) to mass (m) ratio measured by GC/MS

RPD — Relative percent difference (between matrix spike and matrix spike duplicate)

SDG — Sample delivery group - Defined by one of the following, whichever occurs first:

- Project of field samples
- Each group of 20 field samples with a project
- Each 14-day calendar period during which field samples in a project are received, beginning with receipt of the first sample in the SDG.

TIC — Tentatively identified compound - a compound not specified for analysis by EG&G Idaho

3. DESCRIPTION

SDGs routinely have unique samples that require special attention by the reviewer. Field blanks, field duplicates, equipment rinsates, and performance audit samples need to be identified. The sampling records (field log books, chain-of-custody (COC) records etc.) should provide:

- A project officer for the site
- A complete list of samples with notations on
  - Sample matrix
  - Blanks
  - Field duplicates, if applicable
  - Field spikes, if applicable
  - Quality control (QC) audit sample, if applicable
  - Shipping dates
  - Laboratory name
  - Preservation information.

The COC record includes sample descriptions and the date of sampling. The narrative is another source of general information. Notable problems with matrices, insufficient sample volume for analysis or reanalysis, and unusual events should be found in the narrative.

4. PRECAUTIONS AND LIMITATIONS

In order to use this SOP effectively, the reviewer should have experience in gas chromatography analyses and data review and a general overview of the SDG. The exact number of samples, sample identification, and sample matrix are essential information. Background information on the site is helpful but is often difficult to obtain. The EG&G Idaho, Environmental Restoration Program (ERP) Sample Management Office (SMO) is the best source for background information on a specific sampling site (for ERP projects), answers, or further direction.

The most restrictive validation flag must always be assigned to the data in all instances where the data requires qualification for more than one reason. For example, nondetect data that must be flagged as rejected "R" because of holding time violations and must also be qualified with the quantitation flagged as estimated "UJ" must always be flagged as rejected "R".

5. VOLATILES AND SEMIVOLATILES PROCEDURE

The following are the requirements (listed by section) to be checked for validation:

I. Holding Times

II. GC/MS Tuning

III. Calibration

- Initial
- Continuing

IV. Blanks

V. Surrogate Recovery

VI. Matrix Spike/Matrix Spike Duplicate (MS/MPD)

VII. Field Duplicate

VIII. Internal Standards Performance

IX. Target Compound Identification (TIC)

X. Compound Quantitation and Reported Detection Limits

XI. Tentatively Identified Compounds (TIC)

XII. System Performance

XIII. QC Check Samples For 524.2

XIII. Overall Assessment of Data for an SDG

I. HOLDING TIMES

A. Criteria

The EG&G Idaho ERP SMO requirements for sample holding times are as follows:

All Purgeables:

Unpreserved aromatic volatiles must be analyzed within 7 days and nonaromatic volatiles must be analyzed within 14 days from the time of collection. Aromatic and nonaromatic volatiles must be analyzed within 14 days from the time of sample collection if the samples were preserved with hydrochloric acid and stored at 4°C.

Extractables:

Soils/sediments/sludges: All samples must be extracted within 14 days of sample collection. Extracts must be analyzed within 40 days of sample extraction. Samples and extracts must always be stored at 4°C.

Water: All samples must be extracted within 7 days of sample collection. Extracts must be analyzed within 40 days of sample extraction. Samples and extracts must always be stored at 4°C.

B. Evaluation Procedure

Establish holding times by comparing the sample collection date on the EG&G Idaho COC form with the dates of extraction and analysis on Form I. Examine the sample records (COC form, field logbooks, etc.) to determine if samples were properly preserved. The samples must be presumed unpreserved if no indication of preservation is stated in the sampling documentation.

C. Action

1. If holding times are exceeded:

   Flag all positive results as estimated quantities (J) and compound quantitation limits as estimated (UJ). State in the limitations and validation (L&V) report that holding times were exceeded.

2. If holding times are exceeded by more than double the allowable holding time:

Flag non-detect data as unusable for any purpose (R) and flag all positive results as estimated quantities (J). State in the limitations and validation (L&V) report that holding times were exceeded.

II. GC/MS TUNING

A. Criteria

SEMIVOLATILE:

1. Decafluorotriphenylphosphine (DFTPP)

m/z	Ion Abundance Criteria
51	30.0 to 60.0% of m/z 198
68	Less than 2.0% of m/z 69
70	Less than 2.0% of m/z 69
127	40.0 to 60.0% of m/z 198
197	Less than 1.0% of m/z 198
198	Base peak, 100% relative abundance
199	5.0 to 9.0% of m/z 198
275	10.0 to 30.0% of m/z 198
365	Greater than 1.00% of m/z 198
441	Present, but less than m/z 443
442	Greater than 40.0% of m/z 198
443	17.0 to 23.0% of m/z 442

VOLATILE:

2. Bromofluorobenzene (BFB)

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

VOLATILE, Method 524.2:

m/z	Ion Abundance Criteria
50	15.0 to 40.0% of the base peak
75	30.0 to 80.0% of the base peak
95	Base peak, 100% relative abundance
96	5.0 to 9.0% of the base peak
173	Less than 2.0% of m/z 174
174	Greater than 50.0% of the base peak
175	5.0 to 9.0% of m/z 174
176	Greater than 95.0%, but less than 101.0% of m/z 174
177	5.0 to 9.0% of m/z 176

B. Evaluation Procedure

1. Verify from the raw data that the mass calibration is correct.

2. Compare the data presented on each GC/MS tuning and mass calibration (Form V) with each mass listing submitted.

3. Ensure the following:

   a. Form V is present for each 12-hour period that samples are analyzed.

   b. The laboratory has not made any transcription errors.

   c. The appropriate number of significant figures has been reported (number of significant figures given for each ion in the ion abundance criteria column).

   d. The laboratory has not made any calculation errors. For example, the percent mass of m/z 443 relative to the mass of m/z 442 is calculated using the following equation:

$$\% \text{ abundance} = \frac{\text{relative abundance of m/z 443}}{\text{relative abundance of m/z 442}} \times 100 \qquad (1)$$

4. If possible, verify that spectra were generated using appropriate background subtraction techniques. Background subtraction should be straightforward and designed only to eliminate column bleed or instrument background ions. Background subtraction actions resulting in spectral distortions for the sole purpose of meeting the contract specifications are contrary to the quality assurance objectives and are, therefore, unacceptable.

C. Action

If mass calibration is in error, classify all associated data as unusable (R).

III. CALIBRATION

A. Criteria

1. Initial Calibration

   a. Volatile and Semivolatile Fractions

      1) All average relative response factors ($\overline{RRF}$) for target compound list (TCL) analytes must be $\geq$0.05.

      2) All percent relative standard deviations (%RSD) must be $\leq$30% ($\leq$20% for 524.2).

2. Continuing Calibration

   a. Volatile and Semivolatile Fractions

      1) All RRFs for TCL analytes must be $\geq$0.05.

      2) All percent differences (D%) must be $\leq$25% ($\leq$30% for 524.2).

B. Evaluation Procedure

1. Initial Calibration

   a. Evaluate the RRF and $\overline{RRF}$ for all target compounds and verify the following:

      1) Check and recalculate the RRF and $\overline{RRF}$ for one or more volatile and semivolatile target compounds; verify that the recalculated value(s) agree with the laboratory reported value(s) (Form VI).

      2) Verify that all volatile and semivolatile target compounds have $\overline{RRF}$ of at least 0.05.

   b. Evaluate the percent Relative Standard Deviation (%RSD) for all target compounds and verify the following:

      1) Check and recalculate the %RSD for one or more target compounds; verify that the recalculated value agrees with the laboratory reported value. The %RSD is calculated using equations (2) and (3).

$$\sigma = \sqrt{\sum_{i=1}^{n} \frac{(x_i - \bar{x})^2}{(n-1)}} \qquad (2)$$

$$\% \text{ RSD} = \frac{\sigma}{\bar{x}} \cdot 100 \qquad (3)$$

where

σ = standard deviation of five response factors

$\bar{x}$ = mean of five response factors.

2) Verify that all target compounds (volatile and semivolatile) have a %RSD of ≤30%; (≤20% for 524.2).

c. Perform a more comprehensive recalculation (10%) if errors are detected in the calculations of either the $\overline{RRF}$ or the %RSD. Recalculate all RRF, $\overline{RRF}$ and %RSD values if systematic calculation errors are detected.

2. Continuing Calibration

a. Evaluate the RRF for all target compounds.

1) Verify that all volatile and semivolatile target compounds have RRFs of at least 0.05.

b. 1) Recalculate the RRF and the percent difference (%D) between initial calibration $\overline{RRF}$ and continuing calibration RRFs for one or more compounds. Recalculate the %D using the following equation:

$$\%D = \frac{\overline{RRF}_I - RRF_C}{\overline{RRF}_I} \times 100 \qquad (4)$$

where

$\overline{RRF}_I$ = average RRF from initial calibration.

RRF_c = RRF from continuing calibration standard.

2) Verify that the percent difference is ≤25%, (≤30% for 524.2) for all volatile and semivolatile target compounds.

c. Perform a more comprehensive recalculation (10%) if errors are detected. Recalculate all RRF and percent difference values if systematic calculation errors are encountered.

C. Action

1. Initial Calibration

a. If any volatile or semivolatile target compound result has a $\overline{RRF}$ of less than 0.05:

1) Flag positive results for that compound as estimated (J).

2) Flag non-detects for that compound as unusable (R).

b. If any volatile or semivolatile target compound has a %RSD of greater than 30% (20% for 524.2):

1) Flag positive results for that compound as estimated (J).

2) Qualify non-detects with the quantitation limit flagged as estimated (UJ) if:

60% ≤ %RSD ≤ 90%

40% ≤ %RSD ≤ 80% for 524.2.

3) Flag non-detects as unusable (R) if:

%RSD > 90%

%RSD > 80% for 524.2.

2. Continuing Calibration

a. If any volatile or semivolatile target compound has a RRF of less than 0.05:

1) Flag positive results for that compound as estimated (J).

2) Flag non-detects for that compound as unusable (R).

b. If any volatile or semivolatile target compound has a percent difference between initial and continuing calibration of greater than 25% (30% for 524.2):

1) Flag all positive results for that compound as estimated (J).

2) Qualify non-detects with the quantitation limit flagged as estimated (UJ) if:

$50\% \leq \%D \leq 75\%$

$60\% \leq \%D \leq 90\%$ for 524.2.

3) Flag non-detects as unusable (R) if:

$\%D > 75\%$

$\%D > 90\%$ for 524.2.

IV. BLANKS

A. Criteria

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

B. Evaluation Procedure

1. Review the results of all associated blank(s), Form I(s), and raw data (chromatograms, reconstructed ion chromatograms, quantitation reports, or data system printouts).

2. Verify that method blank analysis has been reported per matrix, per concentration level, for each GC/MS system used to analyze volatile organic analysis (VOA) samples, and for each extraction batch for semivolatiles. The reviewer can use the method blank summary (Form IV) to assist in identifying samples associated with each method blank.

C. Action

Action in the case of unsuitable blank results depends on the circumstances and origin of the blank. No positive sample results should be reported unless the concentration of the compound in the sample exceeds 10 times the amount in any blank for the common contaminants listed below, or 5 times the amount for other compounds. In instances where more than one blank is associated with a given sample, qualification should be based on a comparison with the associated blank having the highest concentration of a contaminant. The results must not be corrected by subtracting any blank value. Specific actions are as follows:

1. No action is taken if a compound is found in a blank but not found in the sample.

2. Any compound (other than the five listed below) detected in the sample and also detected in any associated blank must be qualified when the sample concentration is less than five times the blank concentration. Analytical results are qualified by elevating the limit of detection when the sample concentration is less than 10 times the blank concentration for the following five compounds:

   Common lab contaminants:

   - Methylene chloride
   - Acetone
   - Toluene
   - 2-butanone
   - Common phthalate esters

   The reviewer should note that the blank analyses may not involve the same weights, volumes, or dilution factors as the associated samples. Sample weights, volumes, and dilutions must be taken into consideration when applying the 5x and 10x criteria, so that a comparison of the total amount of contamination is actually made.

   There may be instances where little or no contamination was present in the associated blanks but qualification of the sample was deemed necessary. Contamination introduced through dilution solvent is one example. Instances of contamination introduced through dilution solvent can be detected when contaminants are found in the diluted sample result but are absent in the undiluted sample result. The sample value should be reported as a non-detect if the reviewer determines that contamination is from a source other than the sample. The 5x or 10x rule does not apply in cases of contamination from a source other than the sample where the contamination is not reflected in the associated blank.

3. The following are examples of applying the blank qualification guidelines.

Case 1: The sample result is greater than the required quantitation limit (RQL) but is less than the required amount (5x or 10x) from the blank result.

	Rule	
	10x	5x
Blank result	7	7
RQL	5	5
Sample result	60	30
Qualified sample result	60U	30U

In the example for the 10x rule, sample results <70 (or 10 x 7) would be qualified as non-detects. In the case of the 5x rule, sample results <35 (or 5 x 7) would be qualified as non-detects.

Case 2: Sample result is less than the RQL and is also less than the required amount (5x or 10x) from the blank result.

	Rule	
	10x	5x
Blank result	6	6
RQL	5	5
Sample result	4J	4J
Qualified sample result	5U	5U

Case 3: Sample result is greater than the required amount (5x or 10x) from the blank result.

	Rule	
	10x	5x
Blank result	10	10
RQL	5	5
Sample result	120	60
Qualified sample result	120	60

Sample results exceed the adjusted blank results of 100 (or 10 x 10) and 50 (or 5 x 10), for both the 10x and 5x rules, respectively.

4. All compounds affected should be flagged as unusable (R), due to interference, in all samples affected if gross contamination exists (e.g., saturated peaks by GC/MS).

V. SURROGATE RECOVERY

A. Criteria

Sample and blank surrogate recoveries for volatiles and semivolatiles must be within the limits specified in the analytical method or applicable statement of work (SOW) (Form II).

B. Evaluation Procedure

1. Check the raw data (e.g., chromatograms, quantitation list, etc.) to verify the recoveries on the surrogate recovery form (Form II).

2. The following should be determined from the surrogate recovery form(s):

   a. If any two surrogates within a base/neutral or acid fraction (or one surrogate for the VOA fraction) are out of specification, or if any one base/neutral, acid, or VOA surrogate has a recovery of <10%, the sample(s) should be reanalyzed.

   b. The laboratory has failed to perform satisfactorily if surrogate recoveries are out of specification with no evidence of repurging, reinjection, or reextraction.

   c. Verify that no blanks have surrogates outside the recovery criteria.

3. Validate and report all analyses any time there are two or more analyses for a particular fraction.

C. Action

The following approaches are suggested based on a review of all data from the SDG for surrogate spike recoveries out of specification.

1. If at least two surrogates in a base/neutral or acid fraction or one surrogate in the volatile fraction are out of specification, but have recoveries >10%:

   a. Positive results for that fraction are flagged as estimated (J).

   b. Negative results for that fraction are qualified with the sample quantitation limit flagged as estimated (UJ).

2. If any surrogate in a fraction shows less than 10% recovery:

   a. Positive results for that fraction are flagged as estimated (J).

   b. Negative results for that fraction are flagged as unusable (R).

3. In the special case of a blank analysis with surrogates out of specification, the reviewer must give special consideration to the validity of associated sample data. The basic concern is whether the blank problems represent an isolated problem with the blank alone or whether there is a fundamental problem with the analytical process. For example, if one or more samples in the batch show acceptable surrogate recoveries, the reviewer may choose to consider the blank problem an isolated occurrence.

VI. MATRIX SPIKE/MATRIX SPIKE DUPLICATE

A. Criteria

1. Spike recoveries must be within the advisory limits established in the appropriate analytical method or applicable SOW (Form III).

2. The relative percent differences (RPD) between MS/MSD recoveries must be within the advisory limits established in the appropriate analytical method or applicable SOW (Form III).

B. Evaluation Procedure

1. Inspect the results for the MS/MSD recovery (Form III).

2. Verify the transcriptions from the raw data and verify the calculations.

C. Action

No action is taken on MS/MSD data alone to qualify an entire SDG. However the data reviewer may use the MS/MSD results in conjunction with other QC criteria and determine the need for some qualification of the data.

The data reviewer should first try to determine to what extent the results of the MS/MSD affect the associated data. This determination should be made with regard to the MS/MSD sample itself, as well as specific analytes for all samples associated with the MS/MSD. All qualification of data based on MS/MSD results should be documented in detail in the L&V report.

VII. FIELD DUPLICATES

A. Criteria

There are no specific review criteria for field duplicate analyses comparability.

B. Evaluation Procedures

Field duplicates should be identified using EG&G Idaho COC forms or sample field logbooks. The reviewer should compare the positive results reported for each sample and calculate the RPD. The final L&V report should mention incidences of one sample of a duplicate pair having a positive result and the other sample of the duplicate pair having non-detect results (whether due to different dilution or not).

C. Action

Report the RPD between field duplicates in the final report. Evaluation of the field duplicate data will be made by the appropriate EG&G Idaho ERP project management personnel.

VIII. INTERNAL STANDARDS PERFORMANCE

A. Criteria

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

2. The retention time of the IS must not vary more than ±30 seconds from the associated calibration standard.

B. Evaluation Procedure

1. Check the raw data (e.g., chromatograms, quantitation lists) to verify the recoveries reported on the internal standard area summary (Form VIIIA, VIIIB).

2. Verify that all retention times and IS areas are acceptable.

3. The reviewer will validate and report all analyses any time there are two or more analyses for a particular fraction.

C. Action

1. If an IS area count is outside -50% or +100% of the associated standard,

   a. Flag positive results for compounds quantitated using that IS as estimated (J) for that sample fraction.

b. Flag non-detects for compounds quantitated using that IS with the sample quantitation limit classified as estimated (UJ) for that sample fraction.

c. Flag positive results as estimated quantities (J) and flag non-detect results as unusable (R) if area counts are below 25%.

2. The chromatographic profile for a given sample must be examined to determine if any false positives or false negatives exist if an IS retention time varies by more than 30 seconds. All data associated with an IS having a retention time shift of greater than ± 1 minute must be flagged as unusable (R).

IX. TARGET COMPOUND IDENTIFICATION

A. Criteria

1. The compound must be within ±0.06 relative retention time (RRT) units of the standard RRT.

2. Mass spectra of the sample compound and a current laboratory-generated standard must match according to the following criteria:

   a. All ions present in the standard mass spectrum at a relative intensity >10% must be present in the sample spectrum.

   b. The relative intensities of ions specified above must agree within ±20% of the standard and sample spectra. (Example: For an ion with an abundance of 50% in the standard spectrum, the corresponding sample ion abundance must be between 30% and 70%.)

   c. Ions greater than 10% in the sample spectrum, but not present in the standard spectrum, must be considered and accounted for.

B. Evaluation Procedure

1. Check that the RRT of reported compounds is within 0.06 RRT units of the reference standard.

2. Check the laboratory standard spectra versus the sample compound spectra.

3. The reviewer should be aware of situations (e.g., high concentration samples preceding low concentration samples) when sample carryover is a possibility and should use judgment to determine if instrument cross-contamination has affected any positive compound identification.

C. Action

1. Flag all such data as not detected (U) if the reviewer determines that incorrect identifications were made.

2. All cases of suspected cross-contamination must be discussed in the L&V report.

X. COMPOUND QUANTITATION AND REPORTED DETECTION LIMITS

A. Criteria

1. Compound quantitation, as well as the adjustment of the RQL, must be calculated according to the analytical method or appropriate SOW.

2. Compound RRF values must be calculated based on the IS specified in the analytical method or applicable SOW. Quantitation must be based on the quantitation ion (m/z) specified in the analytical method. The compound quantitation must be based on the RRF from the appropriate daily standard (continuing calibration standard).

B. Evaluation Procedure

1. All raw data should be examined to check the calculation of all sample results reported by the laboratory. Quantitation lists, chromatograms, and sample preparation logsheets should be compared to the reported positive sample results and quantitation limits (Form 1).

2. Verify that the correct internal standard, quantitation ion, and RRF were used to quantitate the compound.

3. Verify that the RQLs have been adjusted to reflect all sample dilutions, concentrations, splits, cleanup activities, and dry-weight factors that are not accounted for by the method.

C. Action

The analytical laboratory may be contacted by the reviewer to obtain information that could resolve any discrepancies. The reviewer must flag the data associated with a particular discrepancy as unusable (R) if the discrepancy remains unresolved.

XI. TENTATIVELY IDENTIFIED COMPOUNDS

A. Criteria

1. The laboratory must conduct a mass spectral search of the National Institute of Standards and Technology (NIST) library and report the possible identity for the 10 largest VOC fraction peaks and the 20 largest base/neutral/acid (BNA) fraction peaks that are not surrogates, IS, or TCL compounds, but which have an area/height greater than 10% of the nearest IS. Tentatively Identified Compound (TIC) results are reported for each sample on the organic analyses data sheet (Form I, TIC).

2. Guidelines for tentative identification are as follows:

   a. Major ions (>10% relative intensity) in the reference spectrum should be present in the sample spectrum.

   b. The relative intensities of the major ions should agree within ±20% of the sample and the reference spectra.

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

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

   e. The reviewer will flag the TIC "unknown" when the above criteria are not met.

B. Evaluation Procedure

1. Check the raw data to verify that the laboratory has generated a library search for all required peaks in the chromatograms (samples and blanks).

2. Blank chromatograms should be examined to verify that TIC peaks present in the samples are not found in the blanks. A thorough check of blank chromatograms may require looking for peaks that are less than 10% of the internal standard height but are present in the blank chromatogram at a similar RRT when a low-level non-target compound that is a common artifact or laboratory contaminant is detected in a sample.

3. All mass spectra in every sample and blank must be examined.

4. All reasonable choices must be considered since TIC library searches often yield several candidate compounds having a closely matching spectrum.

5. Common laboratory artifacts/contaminants and their sources (aldol products, solvent preservatives/reagent contaminants, etc.) may be present in blanks and not reported as sample TICs.

   Examples:

   a. Common lab contaminants: CO_2 (m/e 44), siloxanes (me/e 73), diethyl ether, hexane, certain freons (1,1,2-trichloro-1,2,2-trifluoroethane or fluoro-trichloromethane), phthalates at levels less than 100 µg/l or 4000 µg/kg.

   b. Solvent preservatives: Cyclohexene is a methylene chloride preservative. Related by-products include cyclohexanone, cyclohexenone, cyclohexanol, cyclohexenol, chlorocyclohexene, and chlorocyclohexanol.

   c. Aldol reaction products of acetone include 4-hydroxy-4-methyl-2-pentanone, 4-methyl-2-penten-2-one, and 5,5-dimethyl-2(5H)-furanone.

6. Occasionally, a target compound may be identified in the proper analytical fraction by nontarget library search procedures even though it was not found on the quantitation list. If the total area quantitation method was used, the reviewer should request that the laboratory recalculate the result using the proper quantitation ion. In addition, the reviewer should evaluate other sample chromatograms and check library reference retention times on quantitation lists to determine whether the false negative result is an isolated occurrence or whether data from the entire SDG may be affected.

7. TCL compounds may be identified in more than one fraction. Verify that quantitation is made from the proper fraction.

C. Action

1. All TIC results should be flagged as tentatively identified with estimated concentrations (JN).

2. General actions related to the review of TIC results are as follows:

   a. If it is determined that a tentative identification of a non-target compound is not acceptable, the tentative identification should be changed to "unknown" or an appropriate identification.

   b. If all required peaks were not library searched, the reviewer should request these data from the laboratory.

3. TIC results that are not sufficiently above the level in the blank should not be reported. (Dilutions and sample size must be taken into account when comparing the amounts present in blanks and samples.)

4. When a compound is not found in any blanks but is a suspected artifact or common laboratory contaminant, the result must be flagged as unusable (R).

5. Other case factors may influence TIC judgments. If a sample TIC match is poor but other samples have a TIC with a good library match, similar RRT, and the same ions, identification information may be inferred from the other sample TIC results.

XII. SYSTEM PERFORMANCE

During the period following instrument performance QC checks (e.g., blanks, tuning, calibration), changes may occur in the system that degrade the quality of the data. While this degradation would not be directly shown by QC checks until the next required series of analytical QC runs, a thorough review of the ongoing data acquisition can yield indicators of instrument performance.

Some examples of instrument performance indicators for various factors are as follows:

1. Abrupt, discrete shifts in reconstructed ion chromatogram (RIC) baseline may indicate gain or threshold changes.

2. Poor chromatographic performance affects both qualitative and quantitative results. Indications of substandard performance include:

   a. High RIC background levels or shifts in absolute retention times of IS

   b. Excessive baseline rise at elevated temperature

   c. Extraneous peaks

   d. Loss of resolution as suggested by factors such as nonresolution of 2,4- and 2,5-dinitrotoluene

   e. Peak tailing or peak splitting may result in inaccurate quantitation.

Continued analytical activity with degraded performance suggests lack of attention or professional experience. Based on the instrument performance indicators, the data reviewer must decide if the system has degraded to the point of affecting data quality or validity. If data quality may have been affected, data should be qualified as estimated (UJ).

XIII. QC CHECK SAMPLES FOR 524.2

No qualification of data shall be made on the basis of QC check samples. Percent recovery values outside the 80 to 120% criteria required by the method shall be mentioned in the L&V report to EG&G Idaho.

XIV. OVERALL ASSESSMENT OF DATA FOR AN SDG

It is appropriate for the data reviewer to make professional judgments and express concerns and comments on the validity of the overall data package. The overall assessment is particularly appropriate for SDGs in which there are several QC criteria out of specification. The additive nature of QC factors out of specification is difficult to assess in an objective manner, but the reviewer has a responsibility to inform users concerning data quality and data limitations in order to assist the user in avoiding inappropriate use of the data while not precluding any consideration of the data at all.

GLOSSARY A

DATA QUALIFIER DEFINITIONS

For the purposes of this document, the following code letters and associated definitions are provided:

U - The material was analyzed for but was not detected. The associated numerical value is the sample quantitation limit.

J - The analyte was positively identified in the sample, but the associated numerical value may not be an accurate representation of the amount actually present in the environmental sample. The data should be seriously considered for decision making and are usable for many purposes.

A subscript may be added to the "J" flag to indicate which of the following QC criteria were not met:

- J_1 Blank contamination: indicates high bias and/or false positives
- J_2 Calibration range exceeded: indicates possible low bias.
- J_3 Holding times not met: indicates results are biased low.
- J_4 Other QC outside control limits: indicates that bias is not readily determined.

R - The data are unusable (may or may not be present). Resampling and reanalysis is necessary for verification.

N - Presumptive evidence of the presence of the material.

NJ - Presumptive evidence of the presence of the material at an estimated quantity.

UJ - The material was analyzed for but was not detected. The sample quantitation limit is an estimated quantity.

The reviewer must explain and thoroughly document the use of any qualifiers other than the ones listed above.

Appendix O, Part 2
SOP for Validation of
Chromatographic Data

EG&G IDAHO, INC.
ENVIRONMENTAL RESTORATION PROGRAM
SAMPLE MANAGEMENT OFFICE

STANDARD OPERATING PROCEDURE NO. SMO-SOP-12.1.4

VALIDATION OF GAS CHROMATOGRAPHIC DATA

For use in the validation of
organochlorine pesticide/PCB,
organophosphorus pesticide,
and organochlorine herbicide
data using USEPA Contract Laboratory Program
protocols

EG&G IDAHO, INC.
ENVIRONMENTAL RESTORATION PROGRAM
SAMPLE MANAGEMENT OFFICE

STANDARD OPERATING PROCEDURE NO. SMO-SOP-12.1.4

VALIDATION OF GAS CHROMATOGRAPHIC DATA

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EG&G IDAHO, INC.
ENVIRONMENTAL RESTORATION PROGRAM
SAMPLE MANAGEMENT OFFICE
STANDARD OPERATING PROCEDURE
VALIDATION OF
GAS CHROMATOGRAPHIC DATA

1. PURPOSE AND SCOPE

This document is a standard operating procedure (SOP) designed to offer guidance in the evaluation and validation of gas chromatographic data.

The specific areas covered by this SOP include holding times, instrument performance, calibrations, blanks, surrogates, field duplicates, matrix spikes, compound identification, compound quantitation, reported detection limits, and final assessment for the sample delivery group (SDG).

2. ACRONYMS/DEFINITIONS

COC	Chain of Custody
ERP	Environmental Restoration Program
GC	Gas Chromatography
L&V	Limitations and Validation
MS	Matrix Spike
MSD	Matrix Spike Duplicate
QC	Quality Control
RPD	Relative Percent Differences
RQL	Required Quantitation Limit
RSD	Relative Standard Deviation
SDG	Sample Delivery Group
SMO	Sample Management Office
SOP	Standard Operating Procedure

CF	Calibration Factor
Primary analysis	One of two types of compound analysis by GC/EC techniques, the other being confirmation analysis. If the two analyses are run at separate times, the primary analysis is the first analysis chronologically and is used to establish the tentative identification of any target compounds detected. The identification is then confirmed in the confirmation analysis. If the two analyses are performed simultaneously, either may be considered the primary analysis. Either may be used for quantitation if contract criteria are met.
QA	Quality assurance - Total program for ensuring the reliability of data.
QC	Quality control - Route application of procedures for controlling the monitoring process.

RPD Relative percent difference (between matrix spike and matrix spike duplicate)

RT Retention Time

SDG Sample delivery group - Defined by one of the following, whichever occurs first:

- Project of field samples
- Each group of 20 field samples with a project
- Each 14-day calendar period during which field samples in a project are received, beginning with receipt of the first sample in the SDG.

3. DESCRIPTION

SDGs routinely have unique samples that require special attention by the reviewer. Field blanks, field duplicates, equipment rinsates, and performance audit samples need to be identified. The sampling records (field log books, chain-of-custody (COC) records etc.) should provide:

- A project officer for the site
- A complete list of samples with notations on:
  - Sample matrix
  - Blanks
  - Field duplicates, if applicable
  - Field spikes, if applicable
  - Quality control (QC) audit sample, if applicable
  - Shipping dates
  - Laboratory name
  - Preservation information.

The COC record includes sample descriptions and the date of sampling. The reviewer must take into account lag times between sampling and shipping while assessing sample holding times.

The narrative is another source of general information. Notable problems with matrices, insufficient sample volume for analysis or reanalysis, and unusual events should be found in the narrative.

4. PRECAUTIONS/LIMITATIONS

The reviewer should have experience in gas chromatography (GC) analyses and data review and a general overview of the SDG in order to use this SOP effectively. The exact number of samples, their assigned numbers and sample matrix are essential information. Background information on the site is helpful but is often difficult to locate. The EG&G Idaho Environmental Restoration Program (ERP) Sample Management Office (SMO) is the best source for this information (for ERP projects), answers, or further direction.

The most restrictive validation flag must always be assigned to the data in all instances where the data requires qualification for more than one reason. For example, non-detect data that must be flagged as rejected "R" because of holding time violations and must also be qualified with the quantitation flagged as estimated "UJ" must always be flagged as rejected "R".

5. GAS CHROMATOGRAPHIC PROCEDURE

The following are the requirements (listed by section) to be checked for validation:

I. Holding Times

II. Instrument Performance

III. Calibration

- Initial
- Analytical Sequence
- Continuing

IV. Blanks

V. Surrogate Recovery

VI. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

VII. Field Duplicates

VIII. Compound Identification

IX. Quantitation and Reported Detection Limits

X. Overall Assessment of Data for an SDG

I. HOLDING TIMES

A. Criteria

The EG&G Idaho ERP SMO requirements for sample holding times are as follows:

Soils/Sediments/sludges: All samples must be extracted within 14 days of sample collection. Extracts must be analyzed within 40 days of sample extraction. Samples and extracts must always be stored at 4°C.

Water: All samples must be extracted within 7 days of sample collection. Extracts must be analyzed within 40 days of sample extraction. Samples and extracts must always be stored at 4°C.

B. Evaluation Procedure

Actual holding times are established by comparing the sample collection date on the EG&G Idaho COC form with the dates of extraction and analysis on Form I. Examine the sample records (COC form, field logbooks etc.) to determine if the samples were properly preserved. It must be assumed that the samples are unpreserved if there is no indication of preservation in the sampling documentation.

C. Action

If holding times are exceeded, flag all positive results as estimated (J) and sample quantitation limits as estimated (UJ) and state in the final report that holding times were exceeded.

If holding times are exceeded by more than double the allowable holding time, flag non-detect data as unusable (R) and flag all positive results as estimated (J)

II. INSTRUMENT PERFORMANCE

A. Criteria

1. Retention Time Windows

   The laboratory must report retention time window data on the standards summary (Form IX) for each GC column used to analyze samples.

2. Surrogate Retention Time Check

   The retention time of the surrogate compound in each analysis must be compared to the retention time of the surrogate in Evaluation Standard Mix A. The percent difference between the retention time of the surrogate compound in a given analysis and the retention time of the surrogate compound in Evaluation Standard Mix A must

not exceed 2.0% for packed columns, 0.3% for narrow-bore capillary columns, and 1.5% for wide-bore capillary columns. The percent difference (%D) is calculated using the following equation:

$$\%D = \frac{RT_I - RT_S}{RT_I} \times 100 \qquad (1)$$

where

RT_I = absolute retention time of surrogate in the initial standard (Evaluation Standard Mix A)

RT_s = absolute retention time of surrogate in the subsequent analyses.

B. Evaluation Procedure

1. Check raw data to verify that the retention time windows are reported on Form IX, and that all standards are within the established retention time windows.

2. Check raw data to verify that the percent difference in retention time for the surrogate in all standards and samples is $\leq$2.0% for packed column analysis, $\leq$0.3% for capillary column analysis, and $\leq$1.5% for wide-bore capillary column analysis on Form VIII.

C. Action

1. Retention Time Windows

Retention time windows are used for qualitative identification of target compounds. Sample results should be carefully evaluated if the associated standards do not fall within the retention time windows. All samples injected after the last in-control standard are potentially affected.

a. Check to see if the chromatograms of the affected samples contain any peaks within an expanded window surrounding the expected retention time window of the compound of interest. There is usually no effect on the data if no peaks are present either within or close to the retention time window of the deviant target compound therefore non-detected values can be considered valid.

b. The reviewer has two options for determining the extent of the effect on the data if the affected sample chromatograms contain peaks that may be of concern [i.e., above the Required Quantitation Limit (RQL) and either close to or within the expected retention time window of the target analyte of interest].

1) In some cases, additional effort is warranted by the reviewer (e.g., if the data are needed on a priority basis and if the peak(s) present might represent a level of concern for that particular compound). In these situations, the reviewer may undertake the following additional efforts to determine a usable retention time window for affected samples:

   (a) The reviewer should examine the data package for the presence of three or more standards containing the compound of interest that were run within the period during which the sample was analyzed.

   (b) If three or more such standards are present, the mean and standard deviation of the retention time window can be reevaluated.

   (c) The valid positive or negative sample results can be determined using the reevaluated window if all standards and matrix spikes fall within the revised retention time window. Flag all positive results and quantitation limits as unusable (R) if all standards and matrix spikes do not fall within the revised retention time window. The final report should emphasize the possibility of either false negatives or false positives, as appropriate.

   (d) The narrative should identify the additional efforts taken by the reviewer and the resultant impact on data usability. In addition, the support documentation should contain all calculations and comparisons generated by the reviewer.

2) Flag all positive results and quantitation limits as unusable (R) if no additional effort is warranted by the reviewer. The final report should emphasize the possibility of either false negatives or false positives, as appropriate.

2. Retention Time Check

   a. If the retention time shift for the surrogate is >2.0% for packed column, >0.3% for narrow-bore capillary column, or >1.5% for wide-bore capillary column, the analysis shall be flagged unusable for that sample(s) (R).

b. The retention time shift cannot be evaluated in the absence of the surrogate or if the surrogate cannot be seen because of dilution. State in the L&V report that no evaluation of instrument performance based on surrogate recovery can be made in the absence of the surrogate compound and that the impact on data usability is unknown.

III. CALIBRATION

A. Criteria

1. Initial Calibration Linearity Check

The percent relative standard deviation (%RSD) of calibration factors for all target compounds and surrogates must not exceed 10%. The calibration factor is calculated using the following equation:

$$\text{Calibration Factor} = \frac{\text{Total Area of Peak}}{\text{Mass Injected (ng)}}. \quad (2)$$

The %RSD is calculated using Equations (3) and (4).

$$\sigma = \sqrt{\sum_{i=1}^{n} \frac{(x_i - \bar{x})^2}{(n-1)}} \quad (3)$$

$$\%RSD = \frac{\sigma}{CF} \cdot 100 \quad (4)$$

where

σ = standard deviation

CF = calibration factor

NOTE: The 10% RSD linearity check is required only for columns that are used for quantitative determinations. Quantitation of the surrogate requires the use of a column shown to meet the 10% linearity criterion. Columns used only to provide qualitative confirmation are not required to meet the 10% linearity criterion.

2. Analytical Sequence

a. Primary Analysis

All standards must be analyzed at the beginning of each analytical sequence.

b. Confirmation Analysis

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

2) Only the standards containing the compound(s) to be confirmed are required. These standards must be repeated after every five samples.

3) Evaluation Standard Mix B is required after every ten samples.

3. Continuing Calibration

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

B. Evaluation Procedure

1. Initial Calibration

a. Inspect the appropriate evaluation standards summary (Form VIII) and verify agreement with the raw GC data (chromatograms and data system printouts).

b. Check the raw data and recalculate some of the calibration factors and the %RSD for the target compounds and surrogates at the three calibration concentrations.

c. Verify that the %RSD for the calibration factor of each specific compound is less than or equal to 10% for each analytical sequence.

d. Perform a more comprehensive recalculation if calculation errors are detected.

2. Verify that all standards were analyzed as specified in the method.

3. Continuing Calibration

a. Review the compound sample data to verify whether the standard was used as a quantitation standard or as a confirmation standard.

b. For the quantitation standards, check the raw data to verify the percent difference (%D), using the following formula, for approximately 10% of the reported values by recalculation.

$$\%D = \frac{R_1 - R_2}{R_1} \quad (5)$$

where

R_1 = calibration factor from first analysis

R_2 = calibration factor from second analysis.

C. Action

1. Initial Calibration

Flag all associated quantitative results as estimated (J) if criteria for linearity are not met.

2. Analytical Sequence

Data may be affected if the proper standards have not been analyzed. The data reviewer must use professional judgment to determine severity of the effect and to qualify the data accordingly.

3. Continuing Calibration

a. Flag all associated positive quantitative results as estimated (J) if the percent difference between calibration factors is >15% for the compound(s) being quantitated (20% for compounds being confirmed).

IV. BLANKS

A. Criteria

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

B. Evaluation Procedure

1. Review the results of all associated blank(s), Form(s) I, and raw data (chromatograms, quantitation reports, or data system printouts).

2. Verify that the method blank analysis(es) contain(s) less than the RQL of any compound or interfering peak.

3. Verify that method blank analyses have been reported per matrix, per concentration level, for each GC system used to analyze samples and for each extraction batch.

C. Action

Action in the case of unsuitable blank results depends on the circumstances and the origin of the blank. No positive sample results should be reported unless the concentration of the analyte in the sample exceeds five times the amount in the blank. In instances where more than one blank is associated with a given sample, qualification should be based on a comparison with the associated blank having the highest concentration of a contaminant. The results must not be corrected by subtracting the blank value. Specific actions are as follows:

1. If a target compound is found in the blank but not found in the sample(s), no action is taken.

2. Any target compound detected in the sample and also detected in any associated blank must be qualified when the sample concentration is less than five times the blank concentration.

   The reviewer should note that the blank analyses may not involve the same weights, volumes, or dilution factors as the associated samples. These factors must be taken into consideration when applying the five times criteria, such that a comparison of the total amount of contamination is actually made.

   Additionally, there may be instances where little or no contamination was present in the associated blanks, but qualification of the sample was deemed necessary. Contamination introduced through dilution solvent is one example. Although it is not always possible to determine, instances of this occurring can be detected when contaminants are found in the diluted sample result but are absent in the undiluted sample result. Since both results are not routinely reported, it may be impossible to verify this source of contamination. The reviewer should qualify the data when it is determined that the contamination is from a source other than the sample. In this case, the five times rule does not apply; the sample value should be reported as a non-detect.

3. The following are examples of applying the blank qualification guidelines.

Case 1: Sample result is greater than the RQL but less than the required amount (5x) from the blank result.

	5x
Blank result	1.0
RQL	0.5
Sample result	4.0
Qualified sample result	4.0U

In this case, sample results less than 5.0 (or 5 x 1.0) would be qualified as non-detects.

Case 2: Sample result is greater than the required amount (5x) from the blank result.

	5x
Blank result	1.0
RQL	0.5
Sample result	6.0
Qualified sample result	6.0

V. SURROGATE RECOVERY

A. Criteria

Sample and blank recoveries of surrogate compounds must be within the limits indicated in the analytical method (Form II).

B. Evaluation Procedure

1. Check the raw data (e.g., chromatograms, quantitation list) to verify the recoveries on the surrogate recovery form (Form II).

2. Check the raw data for possible interferences that may have affected surrogate recoveries if surrogate recoveries are not within the required recovery limits.

C. Action

The following guidance is suggested if surrogate recoveries are outside of advisory windows:

1. Flag associated positive results and quantitation limits as estimated (J) if low recoveries are obtained.

2. Use professional judgment to determine appropriate action if high recoveries are obtained. A high bias may be due to coeluting interferences.

3. If zero surrogate recovery is reported, the reviewer should examine the sample chromatogram to determine if the surrogate may be present but slightly outside its retention time window. If this is the case, in addition to assessing surrogate recovery for quantitative bias, the overriding consideration is to investigate the qualitative validity of the analysis. If the surrogate is not present, flag all negative results as unusable (R).

VI. MATRIX SPIKE/MATRIX SPIKE DUPLICATE

A. Criteria

1. Advisory limits are established for spike recovery limits in the analytical method and on Form III.

2. Advisory limits are established for the RPD between MS/MSD recoveries in the analytical method and on Form III.

B. Evaluation Procedure

1. Inspect results for the MS/MSD recovery (Form III).

2. Verify transcriptions from the raw data and verify calculations.

C. Action

No action is taken on MS/MSD data alone to qualify an entire SDG. However the data reviewer may use MS/MSD results in conjunction with other QC criteria and determine the need for some qualification of the data.

The data reviewer should first try to determine to what extent the results of the MS/MSD affect the associated data. This determination should be made with regard to the MS/MSD sample itself as well as specific analytes for all samples associated with the MS/MSD. All qualification of data based on MS/MSD results should be documented in detail in the Limitations and Validation (L&V) report.

VII. FIELD DUPLICATES

A. Criteria

There are no specific review criteria for field duplicate analyses comparability.

B. Evaluation Procedures

Field duplicates should be identified using EG&G Idaho COC forms or sample field logbooks. The reviewer should compare the positive results reported for each sample and calculate the Relative Percent Differences

(RPD). The final L&V report should mention incidences of one sample of a duplicate pair having a positive result and the other sample of the duplicate pair having non-detect results (whether due to different dilution or not).

C. Action

Report the RPD between field duplicates in the L&V report. Evaluation of the field duplicate data will be made by the appropriate EG&G Idaho ERP project management personnel.

VIII. COMPOUND IDENTIFICATION

A. Criteria

Retention times of reported compounds must fall within the calculated retention time windows for the two chromatographic columns.

B. Evaluation Procedure

1. Review Form I, the associated raw data (chromatograms and data system printouts), and the appropriate compound identification summary (Form X). Confirm reported positive results, using appropriate retention times and retention time windows, and verify that the compounds listed as "not detected" are correct.

2. Verify that positive identifications have dissimilar column analysis.

C. Action

All reported positive results should be considered non-detects if the qualitative criteria for two-column confirmation were not met. The reviewer should use professional judgment to assign an appropriate quantitation limit using the following guidance:

1. The RQL can be reported and flagged as non-detect "U" if the misidentified peak was sufficiently outside the target compound retention time window.

2. The reported value should be considered and flagged as having an estimated quantitation limit (UJ) if the misidentified peak poses an interference with potential detection of a target peak, .

IX. QUANTITATION AND REPORTED DETECTION LIMITS

A. Criteria

Quantitation, as well as the adjustment of the RQL, must be calculated according to the analytical method.

B. Evaluation Procedure

1. Raw data should be examined to verify the correct calculation of all sample results reported by the laboratory. Quantitation reports, chromatograms, and sample preparation logsheets should be compared to the reported positive sample results and quantitation limits.

2. Verify that the RQLs have been adjusted to reflect all sample dilutions, concentrations, splits, cleanup activities, and dry-weight factors that are not accounted for by the method.

C. Action

Quantitation limits affected by large, off-scale peaks should be flagged as unusable (R). The reviewer can provide an estimated quantitation limit (UJ) for each affected compound if the interference is on-scale.

NOTE: Results can be checked for rough agreement between quantitative results obtained on the two GC columns. The reviewer should use professional judgment to decide whether a much larger concentration obtained on one column versus the other indicates the presence of an interfering compound. The lower of the two values should be reported and qualified as presumptively present at an estimated quantity (NJ) if an interfering compound is indicated. This necessitates a determination of an estimated concentration on the confirmation column. The L&V report should indicate that the presence of interferences has obscured the attempt at a second-column confirmation.

X. OVERALL ASSESSMENT OF DATA FOR AN SDG

It is appropriate for the data reviewer to make professional judgments to and express concerns and comments on the validity and the overall usability of the data contained in an SDG. This is particularly appropriate for SDGs in which there are several QC criteria out of specification. The additive nature of QC factors out of specification is difficult to assess in an objective manner, but the reviewer has a responsibility to inform users concerning data quality and data limitations to assist the user in avoiding inappropriate use of the data, while not precluding any consideration of the data at all.

GLOSSARY A

DATA QUALIFIER DEFINITIONS

For the purposes of this document, the following code letters and associated definitions are provided.

U - The material was analyzed for but was not detected. The associated numerical value is the sample quantitation limit.

J - The analyte was positively identified in the sample, but the associated numerical value may not be an accurate representation of the amount actually present in the environmental sample. The data should be seriously considered for decision-making and are usable for many purposes.

A subscript may be added to the "J" flag to indicate which of the following quality control criteria were not met:

J_1) Blank contamination: indicates high bias and/or false positives

J_2) Calibration range exceeded: indicates possible low bias.

J_3) Holding times not met: indicates results are biased low.

J_4) Other QC outside control limits: indicates that bias is not readily determined.

R - The data are unusable (may or may not be present). Resampling and reanalysis are necessary for verification.

N - Presumptive evidence of the presence of the material.

NJ - Presumptive evidence of the presence of the material at an estimated quantity.

UJ - The material was analyzed for but was not detected. The sample quantitation limit is an estimated quantity.

The reviewer must explain and thoroughly document the use of any qualifiers other than the ones listed above.

Appendix O, Part 3
SOP for Inorganic Data Validation

SMO-SOP-12.1.5

STANDARD OPERATING PROCEDURE

FOR

INORGANIC DATA VALIDATION

September 1991

Environmental Restoration Program
Idaho National Engineering Laboratory
EG&G Idaho, Inc.
Idaho Falls, Idaho 83415

STANDARD OPERATING PROCEDURE

FOR

INORGANIC DATA VALIDATION

NO. SMO-SOP-12.1.5

EG&G Idaho, Inc.
Environmental Restoration Program

Sample Management Office

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STANDARD OPERATING PROCEDURE
FOR
INORGANIC DATA VALIDATION

1. PURPOSE AND SCOPE

This document[1] is designed to offer guidance in laboratory data validation. Data validation is the process of evaluating the quality and reliability of data from laboratory analysis. Due to the complexities and uniqueness of data relative to specific samples and/or different types of analyses, some areas of this standard operating procedure (SOP) are only able to offer general guidance rather than step-by-step procedures. Various generally accepted good laboratory practices (GLP) for inorganic tests will provide the data validator with much of the criteria needed to validate data from nonroutine inorganic analyses.

Those areas where specific step-by-step procedures are possible are primarily areas in which definitive performance requirements are established. These requirements are concerned with specifications that are not sample dependent; they specify performance requirements on matters that should be fully under a laboratory's control. These specific areas include blanks, calibration standards, calibration verification standards, laboratory control standards, and interference check standards.

This document is intended mainly for technical review; however, contract compliance must also be addressed because many areas of the technical review naturally overlap with contract compliance criteria. The inorganic Contract Laboratory Program (CLP) statement of work (SOW) is the quintessence of the establishment of definitive performance requirements. The CLP SOW is the only inorganic document that has a set of validation guidelines[2] that are accepted and used on a nationwide scale for validating laboratory data. CLP data validation is based on identifying degrees of variance from established norms.[3] Although these norms might, at times, seem arbitrary, their intention is to set some analytical quality control (QC) limit that, if exceeded, may

compromise the quality of the data. Many of the CLP performance requirements are routinely used as criteria for validating non-CLP analytical data.

A contract laboratory submitting data that are out of specification may be required to rerun or resubmit data, even if the previously submitted data have been used because of urgent program needs; data that do not meet specified requirements are never fully acceptable. The only exception to this requirement is in the area of requirements for individual sample analysis; if the nature of the sample itself limits the attainment of specifications, appropriate allowances must be made.

2. ACRONYMS/DEFINITIONS

AA	atomic absorption spectrometry
accuracy	Accuracy measures the bias in a measurement system; it is difficult to measure for the entire data collection activity. Sources of error are the sampling process, field contamination, preservation, handling, sample matrix, sample preparation, and analysis techniques. Sampling accuracy may be assessed by evaluating the results of field/trip blanks; analytical accuracy may be assessed through use of known and unknown QC samples and matrix spikes.
analyte	The element, ion, compound, or aggregate property of a sample an analysis seeks to determine.
analytical curve	Synonymous with calibration curve.
analytical spike	The furnace post-digestion spike. The addition of a known amount of analyte after digestion.
associated samples	Any sample related to a particular QC analysis. For example: - For ICV, all samples run under the same calibration curve. - For duplicate RPD, all SDG samples digested/distilled of the same matrix.

calibration curve	A plot of instrument response versus concentration of standards.
case	A finite, usually predetermined number of samples collected in a given time period for a particular site. A case consists of one or more sample delivery groups.
CCB	continuing calibration blank - A deionized water sample (preserved like the calibration standards) run every 10 samples; designed to detect any carryover contamination.
CCS	contract compliance screening - A process in which SMO inspects analytical data for contractual compliance.
CCV	continuing calibration verification - A standard run every 10 samples; designed to test instrument performance.
CLP	Contract Laboratory Program
COC	chain of custody
completeness	The percentage of measurements made that are judged to be valid measurements.
CRDL	contract required detection limit
CTR	contract and technical review
CV	coefficient of variation

data package	A collection of information that includes data for analysis of all samples in one SDG, including field and analytical samples, reanalyses, blanks, spikes, duplicates, and laboratory control samples.
data validation	The process of evaluating the quality and reliability of data from laboratory analysis.
DQO	data quality objective
EMSL/LV	Environmental Monitoring System Laboratory/Las Vegas (P.O. Box 15027, Las Vegas, Nevada 89114)
EPA	Environmental Protection Agency
ERP	Environmental Restoration Program (EG&G Idaho, Inc.)
field blank	Field blanks are intended to identify contaminants that may have been introduced in the field. Examples are trip blanks, travel blanks, rinsate blanks, and decontamination blanks.
field duplicate	A duplicate sample generated in the field, not in the laboratory.
finding	A deficiency in the data that requires one or more parameters to be given a validation qualifying flag.
GLP	good laboratory practice

holding time	The time from sample collection to laboratory analysis. For some analyses, the time from sample collection to sample preparation must also be considered.
ICB	initial calibration blank - First blank standard run to confirm the calibration curve.
ICP	inductively coupled plasma atomic emission spectrometry
ICS	interference check sample
ICV	initial calibration verification - First standard run to confirm the calibration curve. (NOTE: The ICV is made from a source that is independent from the source used to make the calibration standards.)
IDL	instrument detection limit
initial calibration	The establishment of a calibration curve with the appropriate number of standards and concentration range. The calibration curve plots instrument response versus concentration of standards.
IRDA	inorganic regional data assessment
laboratory qualifying flag	A letter or symbol that represents a particular meaning, and is assigned to an individual data point by the laboratory in order to alert data users to either the method employed, concentration range achieved, or a potential or real problem associated with the reported value.

For example:

P - The sample was analyzed by ICP.

B - The reported value was obtained from a reading < CRDL but ≥ IDL.

U - The analyte was analyzed for but not detected.

E - The reported value is estimated because of the presence of interference.

M - Duplicate injection precision was not met.

N - Spiked sample recovery was not within control limits.

S - The reported value was determined by MSA.

W - The analytical spike is outside the control limits (85 to 115%), while sample absorbance is less than 50% of spike absorbance.

* - Duplicate analysis is not within control limits.

+ - Correlation coefficient for the MSA is less than 0.995.

LCS laboratory control sample

L&V	data limitations and validation (L&V) report - Report written by an analytical chemist or other technical expert performing method validation. The report documents any deficiencies in the data identified during the data validation process. The report also indicates the analytical level at which the data were obtained and the level of validation performed on the data.
matrix	The predominant material of which the sample to be analyzed is composed. Matrix is not synonymous with phase (liquid or solid).
MS	matrix spike - Introduction of a known concentration of an analyte into a sample to provide information about the effect of the sample matrix on the digestion and measurement methodology.
MSA	method of standard addition
observation	A deficiency in the data that requires no validation qualifying flags but, if corrected, would improve the product.
post digestion spike	The addition of a known amount of analyte after digestion. (Also identified as analytical spike, or spike for furnace analyses.)
precision	Precision measures the reproducibility of measurements under a given set of conditions. Specifically, it is a quantitative measure of the variability of a group of measurements compared to their average value. Precision is

	usually stated in terms of standard deviation but other estimates, such as the coefficient of variation (relative standard deviation), range (maximum value minus minimum value), and relative range, are common.
professional judgement	Intuition that is a cumulative result of scientific and technical training, experience in analytical testing and reporting, and a good understanding of specific method-required QA/QC procedures.
QA/QC	quality assurance/quality control
RAS	routine analytical services
raw data	Data that are needed to complete all data package reporting forms and contract requirements. (instrument printouts, standard sources and preparation dates, sample preparation and digestion, distillation logs, chain-of-custody forms, etc.)
RPD	relative percent difference
RSD	relative standard deviation
SAP	sampling and analysis plan
SAS	special analytical services
SDG	sample delivery group - Defined by one of the following, whichever occurs first: - Case of field samples

- Each 20 field samples in a case

- Each 14-day calendar period during which field samples in a case are received, beginning with receipt of the first sample in the SDG.

serial dilution	A sample run at a specific dilution to determine whether any significant chemical or physical interferences exist due to sample matrix effects.
SMO	Sample Management Office
SOP	standard operating procedure
SOW	statement of work
TAL	target analyte list
validation qualifier flag	A letter or letters, that represent a particular meaning and that are assigned to an individual data point by the data validator in order to alert data users to a potential or real problem associated with the reported value. For example:

U - The material was analyzed for, but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.

J - The analyte was analyzed for and was positively identified, but the associated

numerical value may not be consistent with the amount actually present in the environmental sample.

R - The data are unusable. (NOTE: Analyte may or may not be present.)

UJ - The material was analyzed for, but was not detected. The associated value is an estimate and may not accurately reflect the IDL in the sample matrix. (NOTE: See Reference 4 for definitions of data qualifier flags.)

3. DESCRIPTION

In order to use this document effectively, the reviewer should have a general overview of the case at hand. The exact number of samples, their assigned numbers, their matrix, and the number of laboratories involved in their analysis are essential information. Background information on the site is helpful, but often this information is very difficult to locate. The site project officer is the best source for answers or further direction.

Contract compliance screening (CCS) is a source of a large quantity of summarized information. It can be used to alert the reviewer of problems in the case or what may be sample-specific problems. This information may be used for data validation. If CCS is unavailable, those criteria affecting data validity must be addressed by the data reviewer.

Cases routinely have unique samples that require special attention when reviewed. Field blanks, field duplicates, and performance audit samples need to be identified for the validator if they are to be considered in the validation report. The sampling records should provide:

- Project officer for site
- Complete list of samples with notations on:
  - Sample matrix
  - Blanks[a]
  - Field duplicates[a]
  - Field spikes[a]

a. If applicable.

- QC audit sample[a]
- Shipping dates
- Laboratories involved.

The chain-of-custody record includes sample descriptions and date of sampling. Although sampling date is not addressed by contract requirements, the reviewer must take into account lag time between sampling and shipping while assessing sample holding times.

a. If applicable.

4. PRECAUTIONS/LIMITATIONS

Within a given level of analytical support, there may be differences in the way individual laboratories or field operations approach internal QA/QC. For CLP routine analytical services (RAS) the procedures are standardized and contract-specific. When evaluating laboratory QA/QC, it is important for the reviewer to keep the requested level of analytical support in perspective. These levels produce data of different quality and documentation, and should be reviewed with this in mind. For example, it would be inappropriate to hold a screening laboratory to CLP RAS standards, or expect a field screening operation to have as rigorous QA/QC as a laboratory. Expectations such as these would be inconsistent with the concept of classifying analytical support by the quality of the data needed. Data quality objectives (DQOs)[5] are a vital starting point for time- and cost-effective project design.

DQOs should be clearly identified in the sampling and analysis plan (SAP).[6] The Environmental Restoration Program (ERP) SOW[7] that the laboratory is asked to use should be written such that the project's DQOs can be easily attained. If the requested and/or produced level of analytical support is insufficient to obtain the project's required DQOs, validation of the data will only document that the project's needs were not satisfied.

Data validation is only intended to evaluate the quality and reliability of data from laboratory analysis. Validation of the data does not take into account such things as project design and field sampling techniques.

Many EPA-approved inorganic analytical procedures are vague and open to individual interpretations. Analytical support levels other than level IV do not have any generally accepted data validation guidelines.

In order to be an effective data validator, one must be knowledgeable with analytical laboratory techniques and EPA QA/QC programs.

5. PREREQUISITES

The validator must have a copy of the laboratory data package, complete with reporting forms, chain-of-custody (COC) forms, and all raw data pages. The analytical SOW, copies of all pertinent method procedures, and validation guideline documentation must also be accessible to the data validator.

6. CALIBRATION/STANDARDIZATION

The CLP functional guidelines[2] will form the skeleton for the standardized inorganic data validation procedure. The CLP SOW is very descriptive with clearly outlined QA/QC requirements. Data validation for CLP-requested data is an extensive process, but the process is very routine and reproducible. Task-specific SOWs, general concepts from the CLP functional guidelines, and the data reviewer's analytical and validation experience are used for validating nonroutine and non-CLP data packages. Although nonroutine and non-CLP type data validation is usually more subjective and less reproducible than CLP type data validation, the data limitations and validation (L&V) report should explain the validator's reasoning for adding validation qualifier flags to the data and categorizing the data according to analytical levels.[7]

7. MATERIALS/EQUIPMENT

The data validator should have access to all required reference materials (e.g., inorganic CLP SOW, EPA SW-846, and standard methods), task-specific SOWs, computer with software capability for word processing and data unit conversions, calculator, office space, and office supplies.

8. INSTALLATION

Not applicable.

9. PROCEDURE

The CCS process can easily be performed concurrently with the technical validation if the data validator is intrinsically familiar with the ERP-mandated SOW used by the laboratory. Contractual and technical criteria are usually closely entwined; therefore, the data validator should report both contractual and technical anomalies observed during the validation process.

NOTE: Validation criteria is structured after the CLP functional guidelines.[2] Although these guidelines are based on requirements imposed by the CLP SOW on analytes from the CLP target analyte list (TAL), many of the guidelines also pertain to analytes not contained on the TAL. The validator must become familiar with the individual methods associated with any special analytical services (SAS) before SAS data can be properly validated.

Whenever applicable, the following requirements must be checked for compliance during the data validation process:

I. Holding Times

II. Calibration

- Initial

- Initial and Continuing Calibration Verification

III. Blanks

IV. ICP Interference Check Sample

V. Laboratory Control Sample

VI. Duplicate Sample

VII. Matrix Spike Sample

VIII. Furnace Atomic Absorption QC

IX. ICP Serial Dilution

X. Sample Result Verification

IX. Field Duplicates

XII. Overall Assessment of Data for a Case

I. HOLDING TIMES

A. Objective

The objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of analysis. For some analyses, the time from sample collection to sample preparation must also be considered.

NOTE: The holding time is based on the date of collection, rather than verified time of sample receipt, and date of digestion/distillation. It is a technical evaluation rather than a contractual requirement.

B. Criteria

Technical requirements for sample holding times have only been established for water matrices. The following holding time and preservation requirements were established under 40 CFR 136 (Clean Water Act) and are found in Volume 49, Number 209 of the Federal Register, page 43260, issued on October 26, 1984.

Metals: 6 months; preserved to pH < 2

Mercury: 28 days; preserved to pH < 2

Cyanide: 14 days; preserved to pH > 12

SAS: See requirements for EPA-approved methods.

C. Evaluation Procedure

Actual holding times are established by comparing the sampling date on the ERP COC forms with the dates of analysis found in the laboratory raw data (digestion logs and instrument run logs). Examine the digestion and/or distillation logs to determine if samples were preserved at the proper pH.

Analyte Holding Time (Days) = Analysis Date - Sampling Date.

NOTE: For some analyses, the time from sample collection to sample preparation must also be considered.

D. Action

1. If 40 CFR 136 criteria for holding times and preservation are not met, qualify all results greater than the (>) instrument detection limit (IDL) as estimated (J) and results less than the (<) IDL as estimated (UJ).

2. If holding times are exceeded by a factor of two or more, qualify the results as unusable (R).

3. The same validation qualifying criteria that is used for water sample holding times will also be used for soil samples.

II. CALIBRATION

A. Objective

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable quantitative data. Initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of the analysis run, and continuing calibration verification demonstrates that the initial calibration is still valid.

B. Criteria

1. Initial Calibration

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

a. ICP Analysis

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

b. Atomic Absorption Analysis (AA)

1) A blank and at least three standards, one of which must be at the contract required detection limit (CRDL), must be used in establishing the analytical curve.

2) The correlation coefficient must be $\geq$ 0.995.

NOTE: The correlation coefficient of 0.995 is a technical criterion and not contractual.

c. Mercury Analysis

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

2) The correlation coefficient must be $\geq$ 0.995.

d. Cyanide Analysis

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

2) A midrange standard must be distilled.

3) A correlation coefficient $\geq$ 0.995 is required for photometric determination.

e. SAS Analysis

1) A blank and at least four standards must be used in establishing the analytical curve unless stated otherwise in the task-specific SOW.

2) If applicable, a midrange standard must be distilled unless stated otherwise in the task-specific SOW.

2) The correlation coefficient must be $\geq$ 0.995 unless stated otherwise in the task-specific SOW.

2. Initial and Continuing Calibration Verification (ICV and CCV)

a. Analysis results must fall within the control limits of 90 to 110 percent Recovery (%R) of the true value for all analytes except mercury and cyanide.

b. Analysis results for mercury must fall within the control limits of 80 to 120 %R.

c. Analysis results for cyanide must fall within the control limits of 85 to 115 %R.

d. SAS analysis results must fall within the control limits of 90 to 110 %R of the true value unless stated otherwise in the task-specific SOW.

C. Evaluation Procedure

1. Verify that the instrument was calibrated daily and each time the instrument was set up using the correct number of standards and blanks.

2. Verify that the correlation coefficient is ≥ 0.995

3. Check the distillation log and verify that a midrange standard was distilled for cyanide (CN) and any applicable SAS analyte.

4. Review the results reported on the ICV and CCV summary report form [Form II - (part 1) for CLP analysis] as well as the raw data (ICP printouts, strip charts, printer tapes, bench sheets, etc.) for all ICVs and CCVs and verify that the results were accurately reported.

5. Recalculate all of the ICV and CCV %Rs using the following equation and verify that the recalculated value agrees with the laboratory reported values [Form II - (part 1) for CLP analysis]. Due to possible rounding discrepancies, allow results to fall within 1% of the contract windows (e.g., 89 to 111%).

$$\%R = \frac{\text{Found}}{\text{True}} \times 100$$

where

Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution

True = concentration (in ug/L) of each analyte in the ICV or CCV source

D. Action

1. If the minimum number of standards as defined in Section B were not used for initial calibration, or if the instrument was not calibrated daily and each time the instrument was set up, qualify the data as unusable (R).

2. If the correlation coefficient is < 0.995, qualify results > IDL as estimated (J), and results < IDL as estimated (UJ).

   NOTE: For critical samples, further evaluation of the calibration curve may be warranted to determine if qualification is necessary.

3. If the midrange standard for CN or applicable SAS analytes were not distilled, qualify results > IDL as estimated (J), and results < IDL as estimated (UJ).

4. If the ICV or CCV %R falls outside the acceptance windows, qualify all associated data as follows:

   a. If the ICV or CCV %R falls outside the acceptance windows, but within the ranges of 75 to 89% or 111 to 125% (CN, 70 to 84% or 116 to 130%; Hg, 65 to 79% or 121 to 135%), qualify results > IDL as estimated (J).

   b. If the ICV or CCV %R is within the range of 111 to 125% (CN, 116 to 130%; Hg, 121 to 135%), results < IDL are acceptable.

c. If the ICV or CCV %R is 75 to 89% (CN, 70 to 84%; Hg, 65 to 79%), qualify results < IDL as estimated (UJ).

d. If the ICV or CCV %R is < 75%, (CN, < 70%; Hg, < 65%), qualify all results as unusable (R).

e. If the ICV or CCV %R is > 125%, (CN > 130%; Hg > 135%), qualify results > IDL as unusable (R); results < IDL are acceptable.

III. BLANKS

A. Objective

The assessment of blank analysis results is to determine the existence and magnitude of contamination problems. The criteria for evaluation of blanks applies to any blank associated with the samples. If problems with any blank exist, all data associated with the case must be carefully evaluated to determine whether or not there is an inherent variability in the data for the case, or if the problem is an isolated occurrence not affecting other data.

B. Criteria

No contaminants should be in the blank(s).

C. Evaluation Procedures

Review the results reported on the blank summary report form (Form III for CLP analysis) and the raw data (ICP printouts, strip charts, printer tapes, bench sheets, etc.) for all blanks and verify that the results were accurately reported.

D. Action

1. Sample results > IDL but < five times (5x) the highest positive amount in any blank should be qualified as (U).

2. If any blank associated with the samples has a negative result whose absolute value is > two times (2x) the IDL proceed as follows:

   a. If the sample value is < the IDL qualify the results as estimated (UJ).

   b. If the sample value is > the IDL but < five times (5x) the highest absolute value of any negative blank qualify the results as estimated (J).

   c. Sample values ≥ 5x the highest absolute value of any negative blank are acceptable.

3. If any sample result is negative and has an absolute value > two times (2x) the IDL qualify the results as estimated (UJ).

NOTE: The blank analyses may not involve the same weights, volumes, or dilution factors as the associated samples. In particular, soil sample results reported on CLP Form I will not be on the same basis (units, dilution) as the calibration blank data reported on CLP Form III. The reviewer may find it easier to work from the raw data when applying 5X criteria to soil sample data/calibration blank data.

In instances where more than one blank is associated with a given sample, qualification should be based upon a comparison with the associated blank having the highest concentration of a contaminant. The results must not be corrected by subtracting any blank value unless specifically outlined in the SAS method.

IV. ICP INTERFERENCE CHECK SAMPLE (ICS)

A. Objective

The ICP interference check sample (ICS) verifies the laboratory's interelement and background correction factors.

B. Criteria

1. An ICS must be run at the beginning and end of each sample analysis run (or a minimum of twice per 8-hour working shift, whichever is more frequent).

2. Results for the ICS solution AB analysis must fall within the control limits of ± 20% of the true value.

C. Evaluation Procedure

1. Recalculate from the raw data (ICP printout) all of the recoveries using the following equation (%R) and verify that the recalculated values agree with the laboratory reported values (Form IV for CLP analysis).

$$\text{ICS \%R} = \frac{\text{Found Solution AB}}{\text{True Solution AB}} \times 100$$

where

Found Solution AB = concentration (in ug/L) of each analyte measured in the analysis of solution AB

True Solution AB = concentration (in ug/L) of each analyte in solution AB

2. Check ICS raw data for results with an absolute value > IDL for those analytes that are not present in the ICS solution.

D. Action

1. For samples with concentrations of Al, Ca, Fe, and Mg that are comparable to or greater than their respective levels in the ICS:

   a. If the ICS recovery for an element is > 120% and the sample results are < IDL, these data are acceptable for use.

   b. If the ICS recovery for an element is > 120% and the sample results are > IDL, qualify the affected data as estimated (J).

   c. If the ICS recovery for an element falls between 50 and 79% and the sample results are > IDL, qualify the affected data as estimated (J).

   d. If sample results are < IDL and the ICS recovery for that analyte falls within the range of 50 to 79%, the possibility of false negatives may exist. Qualify the data for these samples as estimated (UJ).

   e. If ICS recovery results for an element fall < 50%, qualify the affected data as unusable (R).

2. If results > IDL are observed for elements that are not present in the EPA-provided ICS solution, the possibility of false positives exists. An evaluation of the associated sample data for the affected elements should be made. For samples with comparable or higher levels of interferents and with analyte concentrations that approximate those levels found in the ICS (false positives), qualify sample results > IDL as estimated (J).

3. If negative results are observed for elements that are not present in the EPA ICS solutions, and their absolute value is > IDL, the possibility of false negatives in the samples may exist. If the absolute value of the negative results is > IDL, an evaluation of the associated sample data should be made. For samples with comparable or higher levels of interferents, qualify results for the affected analytes < IDL as estimated (UJ).

4. In general, the sample data can be accepted if the concentrations of Al, Ca, Fe, and Mg in the sample are found to be less than or equal to their respective concentrations in the ICS. If these elements are present at concentrations greater than the level in the ICS, or other elements are present in the sample at > 100 mg/L, the reviewer should investigate the possibility of other interference effects by using Table 2 given on page D-30 of the March 1990 SOW. These analyte concentration equivalents presented in the table should be considered only as estimated values, since the exact value of any analytical system is instrument-specific. Therefore, estimate the concentration produced by an interfering element. If the estimate is > 2X CRDL and also greater than 10% of the reported concentration of the affected element, qualify the affected results as estimated (J).

V. LABORATORY CONTROL SAMPLE (LCS)

A. Objective

The laboratory control sample (LCS) serves as a monitor of the overall performance of all steps in the analysis, including the sample preparation.

B. Criteria

1. All aqueous LCS results must fall within the control limits of 80 to 120 %R, except Sb and Ag, which have no control limits.

2. All solid LCS results must fall within the control limits established by the EPA. This information is available from EMSL/LV. (NOTE: If an EPA LCS is unavailable to the laboratory, a commercial product may be substituted provided that the control limits are documented.)

C. Evaluation Procedure

1. Review the LCS report summary form (Form VII for CLP analysis) and verify that results fall within the control limits.

2. Check the raw data (ICP printout, strip charts, bench sheets, etc.) to verify the reported recoveries on the LCS report summary form (Form VII for CLP analysis). Recalculate all of the recoveries (%R) using the following equation:

$$\text{LCS \%R} = \frac{\text{LCS FOUND}}{\text{LCS True}} \times 100$$

where

LCS Found = concentration (in ug/L for aqueous; mg/kg for solid) of each analyte measured in the analysis of LCS solution

LCS True = concentration (in ug/L for aqueous; mg/kg for solid) of each analyte in the LCS source.

D. Action

1. Aqueous LCS

a. If the LCS recovery for any analyte falls within the range of 50 to 79% or > 120% but < 150%, qualify results > IDL as estimated (J).

b. If results are < IDL and the LCS recovery is > 120%, the data are acceptable.

c. If results are < IDL and the LCS recovery falls within the range of 50 to 79%, qualify the data for the affected analytes as estimated (UJ).

d. If LCS recovery results are < 50% or > 150%, qualify the data for these samples as unusable (R).

2. Solid LCS

a. If the solid LCS recovery for any analyte falls outside the documented control limits, qualify all sample results > IDL as estimated (J).

b. If the LCS results are higher than the control limits and the sample results are < IDL, the data are acceptable.

c. If the LCS results are lower than the control limits, qualify all sample results < IDL as estimated (UJ).

VI. DUPLICATE SAMPLE ANALYSIS

A. Objective

Duplicate analyses are indicators of laboratory precision based on each sample matrix.

B. Criteria

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

2. A control limit of ± 20% (35% for soil) for the relative percent difference (RPD) shall be used for sample values > 5X CRDL.

3. A control limit of ± CRDL (± 2X CRDL for soil) shall be used for sample values < 5X CRDL, including the case when only <u>one</u> of the duplicate sample values is < 5X CRDL.

C. Evaluation Procedure

1. Review the duplicate summary form (Form VI for CLP analysis) and verify that results fall within the control limits.

2. Check the raw data and recalculate all RPDs using the following equation to verify that results have been correctly reported on the duplicate summary form (Form VI for CLP analysis).

$$RPD = \frac{[S-D]}{(S+D)/2} \times 100$$

where

S = first sample value (original)
D = second sample value (duplicate).

3. If possible, verify that the field blank was not used for duplicate analysis.

D. Action

1. If duplicate analysis results for a particular analyte fall outside the appropriate control windows, qualify the results for that analyte in all associated samples of the same matrix as estimated (J).

2. If the field blank was used for duplicate analysis, all other QC data must be carefully checked and professional judgement exercised when evaluating the data.

NOTE: This information must be included on the inorganic regional data assessment (IRDA) form.

VII. MATRIX SPIKE SAMPLE ANALYSIS

A. Objective

The matrix spike sample analysis provides information about the effect of each sample matrix on the digestion and measurement methodology.

B. Criteria

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

2. Spike recovery (%R) must be within the limits of 75 to 125%. However, spike recovery limits do not apply when sample concentration exceeds the spike concentration by a factor of four or more.

C. Evaluation Procedure

1. Review the spike summary forms (Form V for CLP analysis) and verify that results fall within the specified limits.

2. Check raw data and recalculate all of the %Rs using the following equation to verify that results were correctly reported on the spike summary forms (Form V for CLP analysis).

$$\%R = \frac{(SSR-SR)}{SA} \times 100$$

where

SSR = spiked sample result
SR = sample result
SA = spike added.

3. If possible, verify that the field blank was not used for spike analysis.

D. Action

1. If the spike recovery is > 125% and the reported sample results are < IDL, the data are acceptable for use.

2. If the spike recovery is > 125% and ≤ 170% or < 75% and the sample results are > IDL, qualify the data for these samples as estimated (J).

3. If the spike recovery falls within the range of 30 to 74% and the sample results are < IDL, qualify the data for these samples as estimated (UJ).

4. If spike recovery results are < 30% and the sample results are < IDL, qualify the data for these samples as unusable (R).

5. If spike recovery results are > 170% and the sample results are > IDL, qualify the data for these samples as unusable (R).

6. If the field blank was used for matrix spike analysis, all other QC data must be carefully checked and professional judgement exercised when evaluating the data.

NOTE: This information must be included on the IRDA form.

NOTE: If the matrix spike recovery does not meet criteria (except for Ag and Hg), a post-digestion spike is required for all methods except furnace, but these data are not used to qualify sample results. However, this information must be included in the IRDA report.

VIII. FURNACE ATOMIC ABSORPTION QC

A. Objective

Duplicate injections and furnace analytical spikes establish the precision and accuracy of the individual instrument determinations.

B. Criteria

1. For sample concentrations > CRDL, duplicate injections must agree within ± 20% RSD, [or coefficient of variation (CV)], otherwise the sample must be rerun once (at least two additional injections).

2. Analytical spike recovery must be ≥ 85% and ≤ 115%.

3. The furnace atomic absorption scheme must be followed as described in the March 1990 SOW, p. E-24.

C. Evaluation Procedure

1. Check raw data to verify that duplicate injections agree within ± 20% RSD (or CV) for sample concentrations > CRDL.

2. Review furnace AA raw data to verify that the furnace atomic absorption scheme has been followed.

D. Action

1. If duplicate injections are outside the ± 20% RSD (or CV) limits and the sample has not been rerun once as required, qualify the data as estimated (J).

2. If the rerun sample results do not agree within ± 20% RSD (or CV), qualify the data as estimated (J).

3. If the analytical spike recovery is < 40%, for analyses within the calibration range, for both the original and repeated analysis, qualify results as unusable (R).

4. If the analytical spike recovery is ≥ 40% and the sample absorbance is < 50% of the analytical spike absorbance, proceed as follows:

   a. If the results are < IDL and the analytical spike recovery is ≥ 115%, the data are acceptable.

   b. If the analytical spike recovery is ≥ 40% but < 80%, qualify results < IDL as estimated (UJ).

   c. If the analytical spike recovery is ≥ 40% and < 80%, or > 120% and ≤ 160%, qualify results > IDL as estimated (J).

   d. If the analytical spike recovery is > 160%, qualify results > IDL as unusable (R).

5. If the method of standard additions (MSA) is required but has not been done, qualify the data as estimated (J).

6. If any of the samples run by MSA have not been spiked at the appropriate levels, qualify the data as estimated (J).

7. If the MSA correlation coefficient is < 0.995, qualify the data as estimated (J).

IX. ICP SERIAL DILUTION

A. Objective

The serial dilution determines whether significant physical or chemical interferences exist due to sample matrix.

B. Criteria

If the analyte concentration is sufficiently high (concentration in the original sample is minimally a factor of 50 above the IDL), an analysis of a five-fold dilution must agree within 10% Difference (%D) of the original results.

C. Evaluation Procedures

1. Check the raw data and recalculate the %Ds using the following equation to verify that the dilution analysis results agree with results reported on the serial dilution summary forms (Form IX for CLP analysis).

$$\%D = \frac{[I-S]}{I} \times 100$$

where

I = initial sample result
S = serial dilution result (instrument reading x 5).

2. Check the raw data for evidence of negative interference, e.g., results of the diluted sample are significantly higher than the original sample.

D. Action

1. If the analyte concentration is sufficiently high (concentration in the original sample is minimally a factor of 50 above the IDL) and the %D is > 10% but ≤ 40%, qualify the associated data as estimated (J).

2. If the analyte concentration is sufficiently high (concentration in the original sample is minimally a factor of 50 above the IDL) and the %D is > 40%, qualify the associated data as unusable (R).

3. If evidence of negative interference is found, use professional judgement to qualify the data.

X. SAMPLE RESULT VERIFICATION

A. Objective

The objective is to ensure that the reported quantitation results are accurate.

B. Criteria

Analyte quantitation must be calculated according to the appropriate SOW.

C. Evaluation Procedures

The raw data should be examined to verify the correct calculation of sample results reported by the laboratory. Digestion and distillation logs, instrument printouts, strip charts, etc., should be compared to the reported sample results.

1. Examine the raw data for any anomalies (baseline shifts, negative absorbances, omissions, legibility, etc.).

2. Verify that there are no transcription or reduction errors (e.g., dilutions, percent solids, sample weights) on any of the samples.

3. Verify that results fall within the linear range of the ICP (Form XIII for CLP analysis) and within the calibrated range for any non-ICP parameters.

4. Verify that sample results are > 5X ICP IDL, if ICP analysis results are used for As, Tl, Se, Pb, or any other analyte that does not meet the required detection limit.

NOTE: When the laboratory provides both ICP and furnace results for an analyte in a sample and the concentration is > ICP IDL, the results can assist in identifying quantitation problems.

D. Action

If there are any discrepancies found, the laboratory may be contacted by the designated representative to obtain additional information that could resolve any differences. If a discrepancy remains unresolved, the reviewer may determine that qualification of the data is warranted.

XI. FIELD DUPLICATES

A. Objective

Field duplicate samples may be taken and analyzed as an indication of overall precision. These analyses measure both field and laboratory precision; therefore, the results may have more variability than laboratory duplicates, which measure only laboratory performance. It is also expected that soil duplicate results will have a greater variance than water matrices because of difficulties associated with collecting identical field samples.

B. Criteria

There are no review criteria for field duplicate analyses comparability.

C. Evaluation Procedures

If field duplicates have been identified for the validator, the RPD should be calculated.

D. Action

Any evaluation of the field duplicates should be provided with the reviewer's comments.

XII. OVERALL ASSESSMENT OF DATA FOR A CASE

It is appropriate for the data reviewer to make professional judgements and express concerns and comments on the validity of the overall data for a case. This is particularly appropriate when there are several QC criteria out of specification. The additive nature of QC factors out of specification is difficult to assess in an objective manner, but the reviewer has a responsibility to inform the user concerning data quality and data limitations in order to assist that user in avoiding inappropriate use of the data, while not precluding any consideration of the data at all. If qualifiers other than those used in this document are necessary to describe or qualify the data, it is necessary to thoroughly document/explain the additional qualifiers used. The data reviewer would be greatly assisted in this endeavor if the DQOs were provided. The IRDA form and supplementary documentation must be included with the review.

10. CALCULATIONS

All calculations must be checked for accuracy if the validation is to be considered complete. The RAS calculation procedures that are used to determine such things as MSA values, duplicate RPDs, serial dilution percent differences, and percent recoveries for ICVs, CCVs, CRDL standards, ICSs, spikes, and LCSs, will be outlined in the inorganic CLP SOW. Calculation procedures for producing data for SAS analyses will be outlined in standard analytical methods and/or task-specific SOWs. Calculation errors should only be rectified by resubmission of corrected data sheets by the laboratory that originally generated the data.

11. DATA REDUCTIONS

All data reductions must be checked for accuracy if the validation is to be considered complete. Digestion weights, percent solids, digestate volumes, and sample dilutions must all be accounted for when reducing data directly from instrumentation printouts. Unit conversions must be checked for accuracy during the validation process. Anomalies between the raw data and the reported results must be noted by the validator. Mistakes, such as unit conversion and transcription errors, should only be rectified by resubmission of corrected data sheets by the laboratory that originally generated the data.

12. DATA REPORTING

An L&V report must be written for every data package that is validated. [NOTE: A data package will consist of only one sample delivery group (SDG) unless specifically requested otherwise by the customer that solicits data validation.] The L&V report will conform to the following format:

A. TITLE

The title of the report will be: INORGANIC DATA LIMITATIONS and VALIDATION REPORT. Also included in the title name will be the name of the project site, sample type, analysis type, and SDG identification number.

B. INTRODUCTION

The introduction section of the report should describe the analytical and validation schemes that were used for the project.

C. CONTRACT AND TECHNICAL REVIEW

The first part of the Contract and Technical Review (CTR) section must list the site location, type of analyses, SDG number, laboratory name, and field and laboratory identification numbers for all samples contained in the SDG. The second part of the CTR section must contain numerically listed comments that describe all observations and findings that the validator concludes are in need of being brought to the attention of the project manager, end data users, and/or the data producing laboratory personnel. The reasons behind any sample receiving validation qualifying flags must be contained in the CTR comments section. (See Appendix A for example).

D. DATA LIMITATION OVERVIEW

This section of the report will describe the quality of data based on sample matrix interferences and the laboratory's adherence to good laboratory practice and QC measures. The Data Limitation Overview will be subdivided into the following four sections:

a. Summary of Qualified Data

This section must list all samples and their respective analytes that were given validation qualifying flags. A reference must also be made to all CTR comment numbers that pertain to a value being flagged.

b. Inorganic Regional Data Assessment

The IRDA form contained in Reference 2, or one of similar content, must be filled in to describe the data assessment as accurately as possible. If mandatory actions are required, they should be specifically noted on this form. In addition, this form is to be used to summarize overall deficiencies requiring attention, as well as general laboratory performance and any discernible trends in the quality of the data. This form is not a replacement for the data review. Sufficient supplementary documentation must accompany the form to clearly identify the problems associated with the data. (See Appendix B for example.)

c. Data Validation Flag Table

A table, listing all the field identification numbers and all of the analytes tested for, must be filled in with all the qualifying flags introduced by the data validator. (See Appendix C for example.)

d. Summary of Data Usability

The percentage of completeness of the data and the associated level of usability as described in Reference 5 must be listed in this summary.

E. LABORATORY APPRAISAL

This section is reserved for laboratory performance evaluation. Any noteworthy attributes or deficiencies should be listed here.

F. REFERENCES

All reference material that was used to validate the data should be listed here.

13. METHOD PERFORMANCE

Individual validators that are intrinsically familiar with CLP protocol and who have an understanding of good laboratory practices should be able to produce comparable L&V report for RAS analyses. Although SAS analyses will usually produce more subjective L&V reports, knowledgeable validators should be able to prevent bad data from being unqualified during the validation process.

14. REFERENCES

1. EG&G Idaho, Inc., Environmental Restoration Program, Program Directive 5.11, "Preparation and Use of DOPs and SOPs."

2. *Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses*, compiled by Ruth Bleyler, Sample Management Office, Viar & Company, prepared by the USEPA Data Review Work Group, July 1, 1988.

3. Margaret A. Hellmann and Richard A. Cheatham, *Data Validation, Its Importance in Health Risk Assessments*; ES&T, vol 23. No. 6, 1989.

4. EG&G Idaho, Inc., Environmental Restoration Program, Program Directive 5.8, "Control of Nonconforming Analytical Data."

5. *Data Quality Objectives for Remedial Response Activities*, EPA/540/G-87/003, March 1987.

6. EG&G Idaho, Inc., Environmental Restoration Program, Program Directive 5.2, "Preparation of Sampling and Analysis Plans."

7. EG&G Idaho, Inc., Environmental Restoration Program, Program Directive 5.5, "Obtaining Laboratory Services."

APPENDIX A

CONTRACT AND TECHNICAL REVIEW

APPENDIX A

CONTRACT and TECHNICAL REVIEW

Site: BJS Industrial Waste Pond
Type: Metals
SDG No.: EG001010HU
Laboratory: AceLabs

Sample Identification:

FIELD ID	LAB ID
EG001010HU	91000465
EG002010HF	91000467
EG003010HU	91000494
EG004010HF	91000495
EG005010HF	91000519
EG006010HU	91000520
EG007010HF	91000605
EG008010HU	91000606
EG009010HFS	91000615
EG010010HUS	91000616
EG011010HF	91000621
EG012010HU	91000622
EG013010HF	91000623
EG014010HU	91000624
EG015010HF1	91000631
EG016010HU1	91000632
EG017010HF	91000636
EG018010HU	91000638
EG01910HFS	91000674
EG020010HFS	91000675

COMMENTS:

1) Some of the data on the instrument printouts were crossed out without being dated and initialed (e.g., see raw data pages 138 and 312).

2) The selenium matrix spike recovery of 59.7% was substantially below the lower control limit of 75%. All selenium results will therefore be flagged at a minimum with either a "J" or "UJ" validation qualifying flag.

APPENDIX B

INORGANIC REGIONAL DATA ASSESSMENT

APPENDIX B

Region _____

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. _____ SITE _____
LABORATORY _____ NO. OF SAMPLES/
MATRIX _____

SDG# _____ REVIEWER (IF NOT ESD) _____

SOW# _____ REVIEWER'S NAME _____

DPO: ACTION _____ FYI _____ COMPLETION DATE _____

DATA ASSESSMENT SUMMARY

		ICP	AA	Hg	CYANIDE
1.	HOLDING TIMES				
2.	CALIBRATIONS				
3.	BLANKS				
4.	ICS				
5.	LCS				
6.	DUPLICATE ANALYSIS				
7.	MATRIX SPIKE				
8.	MSA				
9.	SERIAL DILUTION				
10.	SAMPLE VERIFICATION				
11.	OTHER QC				
12.	OVERALL ASSESSMENT				

O = Data had no problems/or qualified due to minor problems.
M = Data qualified due to major problems.
Z = Data unacceptable.
X = Problems, but do not affect data.

ACTION ITEMS: _____

_____

AREAS OF CONCERN: _____

_____

NOTABLE PERFORMANCE: _____

_____

APPENDIX C

DATA VALIDATION FLAG TABLE

APPENDIX C

DATA VALIDATION FLAG TABLE
(SDG# EG001010HU)

	PARAMETERS																					
FIELD ID	Al	Sb	As	Ba	Be	Cd	Ca	Cr	Co	Cu	Fe	Pb	Mg	Mn	Hg	Ni	K	Se	Ag	Na	Tl	V	Zn
EG001010HU		J	J															J	J	R			
EG002010HF		UJ	J									UJ						UJ	J				
EG003010HU		J	J															R			J		
EG004010HF		UJ	J									UJ						J	J				
EG005010HF		UJ																UJ					
EG006010HU		UJ																UJ					
EG007010HF		UJ																UJ					
)08010HU		UJ																UJ					
EG009010HFS		UJ																UJ					
EG010010HUS		UJ																UJ					
EG011010HF		J																UJ					
EG012010HU																		UJ					
EG013010HF		UJ																UJ					
EG014010HU		UJ																UJ	UJ				
EG015010HF1																		UJ					
EG016010HU1							R											UJ	UJ				
EG017010HF																		J					
EG018010HU																		J					
EG019010HFS		J								R								J					
EG020010HFS																		J			R		

APPENDIX C (continued)

U - The material was analyzed for, but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.

J - The analyte was analyzed for and was positively identified, but the associated numerical value may not be consistent with the amount actually present in the environmental sample.

R - The data are unusable.

UJ - The material was analyzed for, but was not detected. The associated value is an estimate and may not accurately reflect the IDL in the sample matrix.

Appendix P
Soil Moisture
Procedures

APPENDIX P

Procedures for Soil Moisture Measurements

Hand Auger Installation of Neutron Tubes

Purpose:

This procedure describes the installation of neutron access tubes in sediments. It does not cover access tube installation within buried waste material. Soil samples will be collected at 6-in., 12-in., and 12-in. intervals thereafter, to the bottom of the hole on a typical neutron access tube installation. Sediment sampling will be performed in selected wells as determined by the field team leader (FTL). It is recommended that twice as many tubing extensions be on hand than needed to finish the hole so that one set of extensions can be dedicated for auguring and another for sampling.

This procedure will ensure QC and will provide instructions to samplers performing the work.

Materials:

- 2-in. sand auger bucket
- 2-in. planer auger
- One cross handle
- 250 ft of tubing extension
- Hammer attachment
- 6-in. retaining cylinders, two for each sampling depth
- 4-in.-diameter plastic caps for retaining cylinders
- Pipe wrenches or 2-7/8-in. open end wrenches
- Neutron access tube (carbon steel pipe, Schedule 40, 1-1/2 in., 20 ft random lengths, INEL stores stock number 07-04549, 1.61 ID, 1.900 OD)
- Pipe driver for neutron access tube
- Dummy neutron probe
- Gloves
- Thread lubricant
- Brush or rags
- Electrical tape, approximately 3/4-in. wide
- Measuring tape
- Ladder
- Knife
- Pipe cutter
- File
- Pipe reamer (optional)
- No. 6, one-hole rubber stopper with copper vent pipe, cap, or locking cap
- Metal identification tags, stamped with tube identification numbers.

Soil Auguring and Sampling

NOTE: Steps involving collection of samples for moisture and bulk density will only be collected from selected wells. Those steps will be omitted in wells not designated for calibration purposes.

1. Auger to 3 in. above the 6-in. sampling depth with the 2-in.-diameter auger bucket.

2. Have a health physicist technician (HPT) survey cuttings the for radioactivity. Using a portable GC, survey the soil for total organic vapors.

3. Place the cuttings in a container for disposal or use to backfill the well during instrumentation.

4. If undisturbed samples are not required, a grab sample of the sediment will be collected and described by a geologist every 2 ft or when the lithology changes. (NOTE: the first auger hole will be recorded by a geologist every foot to estimate an overall predicted lithology for the remainder of the holes.) Samples will be at least 100 g and be retained in a plastic or glass container.

5. Clean the bottom of the hole with the auger.

6. Assemble the core sampler with retaining cylinders and drive it 5 in.

7. Withdraw the sample and have an HPT survey the sample for radioactivity. Using a portable GC, survey the soil for total organic vapors.

8. Disassemble the soil sampler carefully to minimize further disturbance of the samples.

9. Examine the core samples to see if the soil has filled the sampler to the top of the upper cylinder. Trim the bottom sample so that the sample is even with the top and bottom of the cylinder. Place plastic caps on the cylinder and seal with electrical tape to preserve original moisture content.

10. Record the sample date, depth, and hole number on top of the plastic cap.

11. Save the samples for laboratory analysis to determine moisture content and dry bulk density. Laboratory analysis will be performed in-house using ASTM 2937-83, "Density of Soil in Place by the Drive Cylinder Method" (ASTM 1991) and ASTM D2216-80, "Laboratory Determination of Water (Moisture) Content of Soil, Rock and Soil-Aggregate Mixtures" (ASTM 1991).

12. Repeat Steps 1 through 11 for the 12-in. sampling depth.

13. Repeat Steps 1 through 11 and sample the remainder of the hole at 12-in. intervals (2 ft, 3 ft, 4 ft, etc.) or when the lithology changes. Record a geologic description (gravel, sand, silt, clay, etc.) for the borehole.

14. Do not auger into basalt. Use the auger to clean the hole if basalt is encountered prior to reaching the 18-ft depth.

15. Visually check the straightness of the hole with a mirror. The auger may need to be run up and down the hole a few times to clear any possible obstructions.

Installation of Neutron Access Tube

1. Measure the depth of the hole and choose a steel pipe at least 3.2 ft longer than the depth of the hole. This extra length will give the neutron probe a place to rest off the ground during readings, prevent surface water from entering the tubing, and give a uniform reference point for each access tube. The tubing will be cut to length in a later step. If the pipe is too short, contact EG&G Idaho Crafts to weld the pipe for the required length.

2. Run the dummy neutron probe down the tubing to ensure that it will fit without binding. Mark the outside of the tubing to indicate the depth it should be driven.

3. Place the tubing in the hole. A person standing on the ladder can help keep the pipe vertical so that the amount of dirt scraped off the sidewalls is minimized. Typically, the weight of the pipe helps the pipe move down the first 10 ft easily.

4. The remaining portion of the tubing will need to be driven into the ground until it can be driven no further. Try not to expand the pipe while driving it down.

5. Cut the pipe with the pipe cutter so that the tubing extends 3 ft above land surface.

6. The pipe cutter will reduce the size of the opening, so check to see that the dummy probe will fit into this opening. The hole may need to be expanded, reamed, or filled to accommodate the probe.

7. Measure to the bottom of the hole to determine the amount of soil that fell to the bottom. If this is greater than 1 ft or it makes it so

the lower-most reading cannot be taken, an auger may need to be used to remove the soil in the bottom of the hole.

8. Pour soil, removed from the uppermost portion of the hole, down into the annular space. Tamp the cuttings into a small mound around the tubing.

9. Attach a stamped metal identification tag to the tubing.

10. Run the dummy neutron probe down and up the hole.

11. Using the actual neutron probe, and procedures defined in the manufacturer's operating and maintenance manual (CPN 1985), take three readings at the same depths that the undisturbed soil samples were collected. These data will be used for calibration purposes.

12. Place a cap or stopper on top of the hole after readings have been taken.

Soil Moisture Readings

Soil moisture will be determined with the neutron probe using the procedures in the manufacturer's operating and maintenance manual (CPN 1985).

2.5.3. Decontamination. Decontamination procedures are outlined in Appendix G, (ETSOP-47) and in the *EG&G Idaho Radiological Controls Manual*, Chapter 4, Section 3.6.

Appendix Q
Vapor Concentration
Conversion Calculations

APPENDIX Q

Conversion Calculations for Vapor Concentrations

CONVERSION CALCULATIONS FOR VAPOR CONCENTRATIONS[a]
(MW = molecular weight of contaminant)

$$ppm = \frac{(24.45 \times mg/m^3)}{MW} \qquad mg/m^3 = \frac{(ppm \times MW)}{24.45}$$

Example: for CCl_4, MW = 153.8. Therefore:

1.0 ppm = 6.29 mg/m^3 = 6.29 lg/l = 6290 lg/m^3

0.159 ppm = 1.0 mg/m^3 = 1.0 lg/l = 1000 lg/m^3

$1.59*10^{-4}$ppm = $1.0*10^{-3}$ mg/m^3 = $1.0*10^{-3}$ lg/l = 1.0 lg/m^3

a. At 25°C, 760 mmHG

Appendix R
Waste Minimization Plan

APPENDIX R

Waste Minimization Plan

WASTE MINIMIZATION PLAN
1992

Site Waste Area Group 7 - RWMC Contractor EG&G Idaho, Inc.

Department Environmental Restoration Program Buried Waste Programs

Facility WAG 7 Manager Lee Norland

Waste Minimization Coordinator Tim Leininger, (Acting)

Phone 6-6188 MS 3920

Building(s) covered by this Plan:

This Plan covers WAG 7 Operable Units as opposed to building(s) at the INEL. The Plan is applicable to all Environmental Restoration Operable Units at the Radioactive Waste Management Complex (RWMC) as part of remediation activities designated in the INEL Federal Facility Agreement and Compliance Order (FFA/CO).

WAG 7 Operable Units:	OU 7-01	SDA Soil Vaults
	OU 7-02	SDA Acid Pit
	OU 7-03	Non-TRU Contaminated Pits/Trenches
	OU 7-04	Air Pathways
	OU 7-05	Surface Water Pathways & Surficial Sediments
	OU 7-06	Groundwater Pathway
	OU 7-07	Vadose Zone (Rad./Metals)
	OU 7-08	Organic Contamination in the Vadose Zone
	OU 7-09	TSA Releases
	OU 7-10	Pit 9 Comprehensive
	OU 7-11	Septic Tanks
	OU 7-12	Pad A RI/FS
	OU 7-13	TRU-Contaminated Pits/Trenches
	OU 7-14	WAG 7 Comprehensive RI/FS

Organization Number(s) covered by this Plan:

7950

Management Commitment Statement

CERTIFICATION: "I have read and understand my pollution prevention responsibilities contained in the DOE-ID Waste Minimization and Pollution Prevention Awareness Plan and this Waste Minimization Plan specific to my facility or program. I will take all appropriate actions to ensure adequate authority, funding, materials, personnel, and training are available on a continuing basis to meet the objectives and goals of this Waste Minimization Plan."

Management Signature Date

Pollution Prevention Approval Date

1. Operations Description, General

1.1 Describe the purpose of your operation, with emphasis on waste generating processes.

Waste Area Group (WAG) 7 is a Unit of the Buried Waste Program within the Environmental Restoration Department of EG&G Idaho, Inc. The WAG 7 Unit is tasked with remedial activities identified within the FFA/CO for the RWMC at the INEL. As the implementing organization, WAG 7 is responsible for cost, schedule, and scope of all Interagency Agreement (IAG) activities at the RWMC under WAG 7 control, whether performed by WAG 7, an EG&G matrix organization or a subcontracted company. WAG 7 operations include site characterization, remedial investigations and feasibility studies, selected remedial actions, interim remedial actions, and preparation and approval of other IAG deliverables.

1.2 Briefly describe each process within your operation. Number each process to correspond with Section 2.1.

WAG 7 activities include characterization (Process 1) of the designated sites, treatability studies of potential remedial technologies (Process 2), community relations, preparation of required documents, risk assessment and remedy selection, and remediation of the waste site. In addition, WAG 7 will perform verification sampling and monitoring of remediated sites.

Characterization activities include, but are not limited to, collection and analysis of environmental media (air, soil, sediment, surface water, and groundwater), and waste samples (drum sampling, solid waste encountered, drill cuttings, etc). Collection of samples is likely to involve the drilling of bore-holes and wells into the vadose zone, excavation of soil or other necessary activities to access the sample medium. Bench-scale treatability studies may be performed in an on-site laboratory and involve the treatment of sample media in small quantities using physical or chemical technologies. Pilot scale treatability

studies are an *in situ* demonstration of technologies and involve relatively moderate to large quantities of materials.

Post-Record of Decision verification sampling and monitoring activities will be similar in nature to characterization activities, although there is significantly less likelihood of drilling or excavation activities.

1.3 List the types of materials used in your operation.

Materials used in WAG 7 operations include sampling materials (sample containers, sampling devices, fixing solutions, etc.), drilling and excavation equipment, materials for decontamination and personnel protection, laboratory equipment, supplies, reagents, environmental media and waste samples used in analysis activities, and filter media from pollution abatement equipment.

1.4 Briefly describe the products of your operation.

The final product of the characterization process is analytical data of the site or media to be remediated. This data is used in conceptual models, risk assessments, feasibility studies, remedial designs and actions. The final product of the treatability study process is sufficient site or media specific information to implement a remedial technology. The product of remedial actions, verification sampling and monitoring is to de-list RWMC sites from the National Priorities List by abating potential pollution problems at former waste sites that pose unacceptable risks to the public, workers, or the environment.

1.5 Briefly describe the waste types generated in your operation.

Municipal wastes, such as paper and plastic trash, are generated during the characterization process and treatability studies processes. Other types of municipal wastes, or residual wastes, such as scrap metal, masonry, concrete, and road material may be produced, depending on the site. Because hazardous waste is one of the waste forms to be remediated, the operation will result in the generation of some

hazardous contaminated waste. These wastes may include plastic and paper used for contamination control and personnel protection, disposable or damaged sampling, decontamination or testing equipment, and soil samples and containers. At sites where radioactive contamination is present, low-level and/or transuranic (TRU) contaminated wastes will be produced. These wastes will be generated by contamination control and personnel protection, disposable or damaged sampling media, laboratory equipment, sample materials and containers, and laboratory wastes produced in the analytical process and treatability studies. Remedial wastes will be site specific and may include municipal, hazardous, mixed low-level, mixed TRU or low-level wastes.

2. PROCESS CHARACTERIZATION

Repeat Section 2 as often as necessary to describe each process.

2.1.1 Process Characterization (Section 1.2).

2.2.1 Describe the work process in detail.
Note: A flow chart may be used to complete Sections 2.2 through 2.4.

Typically, in a characterization process, required documents are prepared and necessary materials are acquired prior to field work. The field work generally involves drilling or limited excavation, and collecting samples. Derived materials are containerized and characterized to determine appropriate disposal options. During and after sampling, equipment is decontaminated, and the decontamination fluids are containerized and sampled. At the completion of field work, the site is cleaned and equipment disposed of or stored for future use. Samples taken during the investigation are analyzed at on- and off-site laboratories. Following delivery of analytical results, the unused sample portions or resulting laboratory wastes are disposed of by the laboratory or returned to the INEL for deposition. Only samples and materials that may be radiologically contaminated are returned from the laboratory.

2.3.1 List the input materials that become part of or otherwise influence the waste stream.

Input materials that become part of the characterization process waste stream include used paper and plastic from contamination control and personnel protection, items generated during field activities and sample analysis; sampling, drilling, excavating, laboratory and decontamination equipment that is either disposable or exceeds usefulness during the process due to fixed contamination or damage; sample material and containers; packing material used to ship sample material back to the INEL from laboratories; and laboratory materials including contaminated glassware and spent reagents.

2.4.1 Describe the output of the process, excluding wastes.

The output of the characterization process is primarily hard and/or electronic copy data and reports containing the results of the laboratories' sample analyzes. Additional outputs include data collected during the field work including and field measurements recorded in logbooks, survey data of sampling locations, radiation survey data, etc. The ultimate outputs of the process include graphical and written presentations and interpretations of the data collected and IAG deliverables.

2. Check appropriate boxes and complete the matrix to describe each waste stream. Repeat this section as often as necessary to detail all waste streams from the process. Include historical data and future waste generation projections, and indicate unit of measurement. Cleanup wastes are considered non-routinely generated wastes.

[X] Existing [ ] New

[ ] Routinely generated [X] Non-routinely generated

[X] Hazardous [X] Radioactive [X] Mixed [X] Municipal [ ] Other _____

Waste Description, Type or Class	RCRA Code or Curie Content (if applicable)	CY-89	CY-90	CY-91	CY-92	CY-93
Municipal	N/A	None	.4m^3 landfill	.4m^3 landfill 350.0m^3 reuse	.4m^3 landfill	N/A
Low-level mixed - personal protection equipment	N/A	None	None	None	.2m^3 MWSF	.4m^3 MWSF
Mixed Low-level, - sampling equipment	F002	None	None	None	.2m^3 MWSF	N/A
Mixed Low-level, low-level rad - soil	F002	None	None	None	.2m^3 MWSF 15.6m^3 return to hole	N/A
Hazardous - water from sampling	F002	None	None	None	16,046 L Off-site TSD facility	N/A

2.6.1 Indicate the disposition for each waste type (e.g. compactible low level waste sent to WERF). This information may be placed in the matrix with the waste volume, if desired.

See matrix above.

2.7.1 Indicate and briefly describe all implemented waste reduction activities, and the effects on waste generation as compared to historical data.

- [X] Source Reduction
  - [X] Housekeeping/Inventory Control
  - [ ] Material Substitution
  - [X] Process/Equipment Modification
  - [X] Waste Segregation
- [X] Recycling/Reuse/Reclamation
  - [X] Onsite
  - [ ] Offsite
- [X] Other
- [ ] None

During the 1990 field season wastes segregation was performed in the field. Careful segregation of low-level wastes and non-radioactive wastes reduced the volumes of contaminated waste to be disposed of and facilitate the reuse of the materials. Characterization of wastes rather than extrapolation from total analysis resulted in better segregation of waste streams and reduction in volume. The majority of the unaltered radioactive soil samples returned from the laboratory following sampling analysis were not disposed of but were stored for additional characterization data. Some of the augers that had fixed contamination due to drilling in radioactively contaminated areas were stored for use in pending drilling programs. Process and equipment modification included the use of a sonic drilling rig resulting in much less cuttings, and no water or mud. Other activities include a waste reduction element in evaluating and selecting subcontractors for work, and waste reduction efforts as part of evaluation the work performed by subcontractors.

2.8.1 Indicate and briefly describe all planned waste reduction activities, and hypothesize on the effects on future waste generation rates.

- [X] Source Reduction
  - [X] Housekeeping/Inventory Control
  - [ ] Material Substitution
  - [ ] Process/Equipment Modification
  - [X] Waste Segregation
- [X] Recycling/Reuse/Reclamation
  - [X] Onsite
  - [ ] Offsite
- [ ] Other
- [ ] None

Soil cuttings produced during drilling and excavation for sampling will be returned to the area of contamination following characterization activities whenever possible. The reduces the necessity of putting radioactively contaminated soil into the RWMC for disposal. It is anticipated that this may reduce this waste stream by 75% to 100% of the total volume produced. Waste segregation will be applied in the analytical laboratory. Pit 9 is currently examining the possibility of leasing a laboratory for on-site use in order to expedite the analyses. This laboratory coula potentially be used for all WAG 7 activities. Careful segregation of low-level and

non radioactive wastes in the analytical laboratory will reduce the quantities of low-level or mixed wastes returned for disposal. In the past the lab has returned wastes as radioactively contaminated based on the fact that the materials were used in the analysis of radioactive samples rather than actually measuring the levels of radioactivity present to determine waste disposal options. This waste segregation is expected to reduce wastes from this source from 50 to 75%. Waste segregation and waste characterization will be done in the field to reduce the volumes of hazardous and low-level wastes produced. The level of waste reduction is difficult to quantify since it is very project specific. However, an estimate of 10% may be reasonable since this is approximately what was accomplished in 1990. Unused analytical samples returned from the laboratory; drilling, sampling and decontamination equipment; and contaminated soils not returned to the area of contamination will be reused in the manner described in Section 2.7.1, and by other means, as opportunities are discovered. These practices could realize a reduction of 40% to 50% of the equipment and sample material disposed of and effectively eliminate the remaining soil cutting waste stream.

2.9.1 Waste Reduction Goals. Complete all appropriate sections of the following matrix, including interim and long range goals. Goals must be projected for each waste category that your facility or program produces. Use 1990 as a baseline year, unless otherwise indicated (e.g., you want to use 1989 data because significant waste reduction occurred in 1990). Waste reduction goals should be rigorous, yet realistic and achievable, and should reflect the effect of above-mentioned waste reduction techniques.

Percent Reduction over 1990 Data[1]

	Hazardous	Radioactive	Mixed	Municipal
CY-92 Goal	10	10	10	10
CY-93 Goal	20	20	10	10
CY-94 Goal	20	20	10	10
CY-95 Goal	20	20	10	10
CY-96 Goal	20	20	10	10
CY-97 Goal	20	20	10	10
CY-98 Goal	20	20	10	10

[1] The percent reduction goal is an absolute goal; actual waste reduction over the 1990 figures will be relative to the amount of wastes produced each year. Comparisons of quantities of wastes each year are insignificant, since quantities may vary dramatically year-to-year depending on sites being characterized.

2.10.1 Provide an explanation of how the program will achieve these goals.

Waste reduction goals will be achieved primarily by rigorously implementing the reduction techniques discussed in Sections 2.8.1 and 2.9.1.

2.1.2 Process Treatability Studies (Section 1.2).

2.2.2 Describe the work process in detail.
Note: A flow chart may be used to complete Sections 2.2 through 2.4.

Treatability studies are typically conducted in two phases; bench scale and pilot scale. During bench scale studies small quantities of the media to be remediated are tested in the laboratory to determine baseline conditions and the effects of remedial agents on the media. During pilot scale studies, pilot remedial plants are operated in the field. The pilot plant mimics the full scale remedial plant to be operated. Remedial technologies may range from physical separation, chemical extraction, solidification or stabilization, to bio-remediation, or capping. Treatment technologies to be tested are highly site specific and difficult to identify prior to site characterization.

2.3.2 List the input materials that become part of or otherwise influence the waste stream.

Input materials to the treatability process are similar to those used in the characterization process discussed in Section 2.3.1. Other materials are as defined by the technology to be tested.

2.4.2 Describe the output of the process, excluding wastes.

Output of the process is site-specific media treated to risk based standards. Other outputs include site-specific and remedial technology data that can be used to develop a full-scale treatment process.

2.5.2 Check appropriate boxes and complete the matrix to describe each waste stream. Repeat this section as often as necessary to detail all waste streams from the process. Include historical data and future waste generation projections, and indicate unit of measurement. Cleanup wastes are considered non-routinely generated wastes.

[X] Existing [ ] New

[ ] Routinely generated [X] Non-routinely generated

[X] Hazardous [X] Radioactive [X] Mixed [X] Municipal [ ] Other _____

Waste Description, Type or Class	RCRA Code or Curie Content (if applicable)	CY-89	CY-90	CY-91	CY-92	CY-93
Municipal, type 1	N/A	.2m^3	.2m^3	None	.6m^3 landfill 100.0m^3 reuse	.6m^3 landfill 100.0m^3 reuse
Low-level mixed waste - personal protection equipment	N/A	None	None	None	.4m^3 MWSF	.2m^3 ~~MWSFF~~
Mixed low-level, low-level rad - sampling equipment	F002	None	None	None	None	.2m^3 MWSF
Mixed low-level, - soil	F002	None	None	None	None	.6m^3 MWSF
Hazardous - water from sampling	F002	None	None	None	None	16,046 L Off-site TSD facility
Hazardous - volatile organic compounds	F002	71 kg Off-site TSD facility	563 kg Off-site TSD facility	None	N/A	N/A

2.6.2 Indicate the disposition for each waste type (e.g. compactible low level waste sent to WERF). This information may be placed in the matrix with the waste volume, if desired.

See matrix above

2.7.2 Indicate and briefly describe all implemented waste reduction activities, and the effects on waste generation as compared to historical data.

- [X] Source Reduction
  - [X] Housekeeping/Inventory Control
  - [ ] Material Substitution
  - [ ] Process/Equipment Modification
  - [X] Waste Segregation
- [X] Recycling/Reuse/Reclamation
  - [X] Onsite
  - [ ] Offsite
- [X] Other
- [ ] None

Segregation will be performed in the field. Careful segregation of low-level wastes and non-radioactive wastes will reduce the volumes of contaminated waste to be disposed of and facilitate the reuse of the materials. The majority of the unaltered radioactive soil samples returned from the laboratory following sampling analysis will not be disposed of but will be stored for additional characterization data. Other activities include a waste reduction element in evaluating and selecting subcontractors for work, and waste reduction efforts as part of evaluation the work performed by subcontractors.

2.8.2 Indicate and briefly describe all planned waste reduction activities, and hypothesize on the effects on future waste generation rates.

- [X] Source Reduction
  - [X] Housekeeping/Inventory Control
  - [ ] Material Substitution
  - [X] Process/Equipment Modification
  - [X] Waste Segregation
- [X] Recycling/Reuse/Reclamation
  - [X] Onsite
  - [ ] Offsite
- [ ] Other
- [ ] None

In the CERCLA process, treatments which minimize off-site land disposal of wastes are preferred. All treatment technologies will be tested and designed to minimize waste produced requiring disposal. Source reduction is being designed and built into WAG 7 pilots in as much as they are being designed to return the maximum amount of material to the remediated site. Waste segregation and characterization procedures discussed in Sections 2.7.1 and 2.8.1 will also be implemented in both the laboratory and the field. Equipment modifications for recycling/reuse/reclamation include a catalytic converter or other preferred technology system for on-site regeneration of carbon beds from the Vapor Vacuum Extraction process.

2.9.2 Waste Reduction Goals. Complete all appropriate sections of the following matrix, including interim and long range goals. Goals must be projected for each waste category that your facility or program produces. Use 1990 as a baseline year, unless otherwise indicated (e.g. you want to use 1989 data because significant waste reduction occurred in 1990). Waste reduction goals should be rigorous, yet realistic and achievable, and should reflect the effect of above mentioned waste reduction techniques.

Percent Reduction over 1990 Data[1]

	Hazardous	Radioactive	Mixed	Municipal
CY-92 Goal	10	10	10	10
CY-93 Goal	20	20	10	10
CY-94 Goal	20	20	10	10
CY-95 Goal	20	20	10	10
CY-96 Goal	20	20	10	10
CY-97 Goal	20	20	10	10
CY-98 Goal	20	20	10	10

[1] The percent reduction goal is an absolute goal; actual waste reduction over the 1990 figures will be relative to the amount of wastes produced each year. Comparisons of quantities of wastes each year are insignificant, since quantities may vary dramatically year-to-year depending on treatability studies being conducted for each site.

2.10.2 Provide an explanation of how the program will achieve these goals.

Waste reduction goals will be achieved primarily by rigorously implementing the reduction techniques discussed in Sections 2.8.2 and 2.9.2.

3. Pollution Prevention Strategy

3.1 Describe activities related to performance of a Process Waste Assessment for your program. Include a schedule or potential schedule of activities.

Performance of a Process Waste Assessment (PWA) for WAG 7 will be an ongoing process which will be conducted during project planning stages. Informal PWAs will be performed during the preparation of sampling and analysis plans for site characterization activities and during pilot scale designs. More formal PWAs will be conducted for the Track 2 investigations to be undertaken for the Operable Units with WAG 7. Following completion of bench-scale testing, and informal PWA will be

conducted for each pilot scale design. The results of these informal PWAs will be documented in written communications to the Pollution Prevention Unit.

3.2 Describe current and planned Pollution Prevention training activities for your program. Training available through Pollution Prevention includes employee orientation to Pollution Prevention for all employees, and job specific training.

In addition to Company mandated training, WAG 7 pollution prevention training will be conducted on a one-on-one basis with project personnel as needed. Planned project PWAs are to be utilized to instruct the project personnel with their waste minimization responsibilities. These responsibilities include incorporation of waste minimization techniques in work plans and implementation of the techniques during field work.

3.3 Describe activities and methodology to track material and waste inventory within your program. Indicate areas of deficiency within or outside of your system, and provide recommendations on improvement to existing systems.

Within WAG 7, material and waste inventories are tracked informally. When waste is shipped to RWMC, the RWMIS database is utilized. A formal ERP waste tracking system is currently being implemented and will be utilized.

3.4 Describe how your program accounts for the costs associated with waste generation, storage and disposal. If possible, indicate your programs annual budget for waste management, and how these costs are accrued.

The tasks associated with waste generation, storage, treatment, or disposal are inherent within the WAG 7 remediation activities, and are a major contributor to each projects' cost account. It would be insignificant to try and separate out "waste management" costs from the remediation process since they do not equate with the waste management costs of other standard activities that do not deal primarily with the transfer and disposal of existing waste derived from inactive waste sites. However, as remediation technologies are identified and implemented, redemiation subcontractors will be required, by contract, to implement waste minimization and pollution prevention strategies and plans as part of their work. Subcontractors will also be required to separately budget and track waste management costs.

Appendix S
QA/QC for Gamma Spectroscopy

APPENDIX S

Quality Assurance/Quality Control Program of the Radiation Measurements Laboratory for Gamma Spectroscopy and Direct Gross Alpha/Beta Counting

TABLE OF CONTENTS

APPENDICES

QUALITY ASSURANCE/QUALITY CONTROL PROGRAM FOR GAMMA SPECTROSCOPY AND DIRECT GROSS ALPHA/BETA COUNTING

1.0 INTRODUCTION

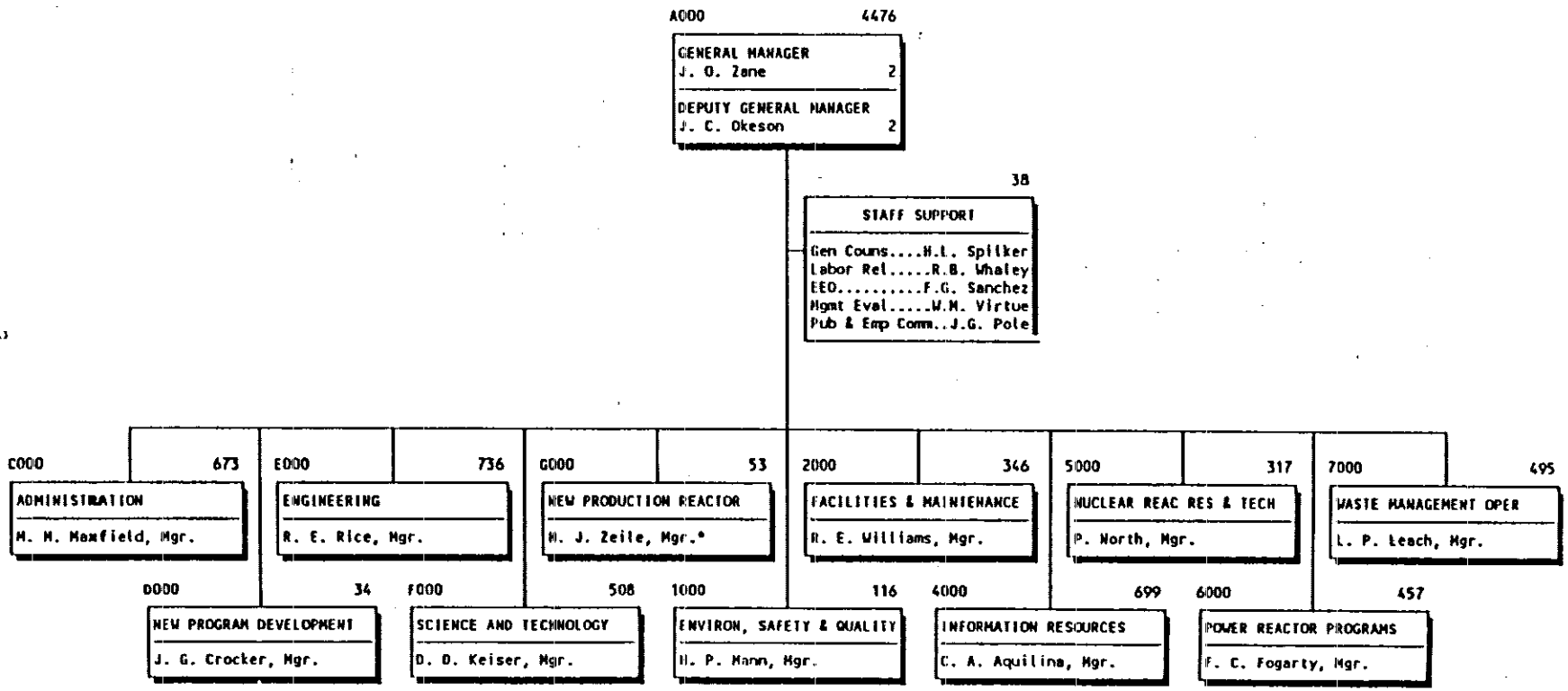
The Radiation Measurements Laboratory (RML) or its predecessors have been in existence since 1951 at the Idaho National Engineering Laboratory (INEL) and is operated for the Department of Energy (DOE) by EG&G Idaho, Inc. In addition to conducting research and development, the RML provides nuclear science support and services to many INEL facilities and programs. The RML specializes in quantitative and qualitative ionizing radiation measurements and neutron dosimetry. It is a goal of the RML to advance the state-of-the-art in ionizing radiation measurements, radiation instrumentation and analysis methods.

The RML, which is part of the RML/Radiochemistry Unit, is comprised of Operations, Data Management, Radiation Instrumentation, Software Development, and the technical staff. Inclusion of each of these disciplines within the Unit allows the RML to provide services and support for gamma-ray and gross alpha/beta measurements, neutron dosimetry, electronic design/development and software engineering. The RML/Radiochemistry Unit is also comprised of the Radiochemistry and Operational Dosimetry Sections which provide support to the RML and other organizations. This document does not address the QA/QC programs of Radiochemistry or Operational Dosimetry, as they are described elsewhere.

The purpose of this manual is to describe the quality control (QC) and quality assurance (QA) programs used by the RML to assure a quality product in the field of gamma-ray spectroscopy and direct gross alpha/beta counting. As a result of new DOE Orders resulting from national laws and government regulations, there has been increased emphasis on the verification of the quality of a laboratory's analytical results through a formal quality program. To demonstrate and document the quality of the data reported to our customers, the RML has developed a formalized QA/QC program. This program will result in improved operations, improved data quality and more defendable results. Quality Assurance and Control is a major thrust of the RML in its quest for excellence in radiation measurements.

2.0 ORGANIZATION STRUCTURE

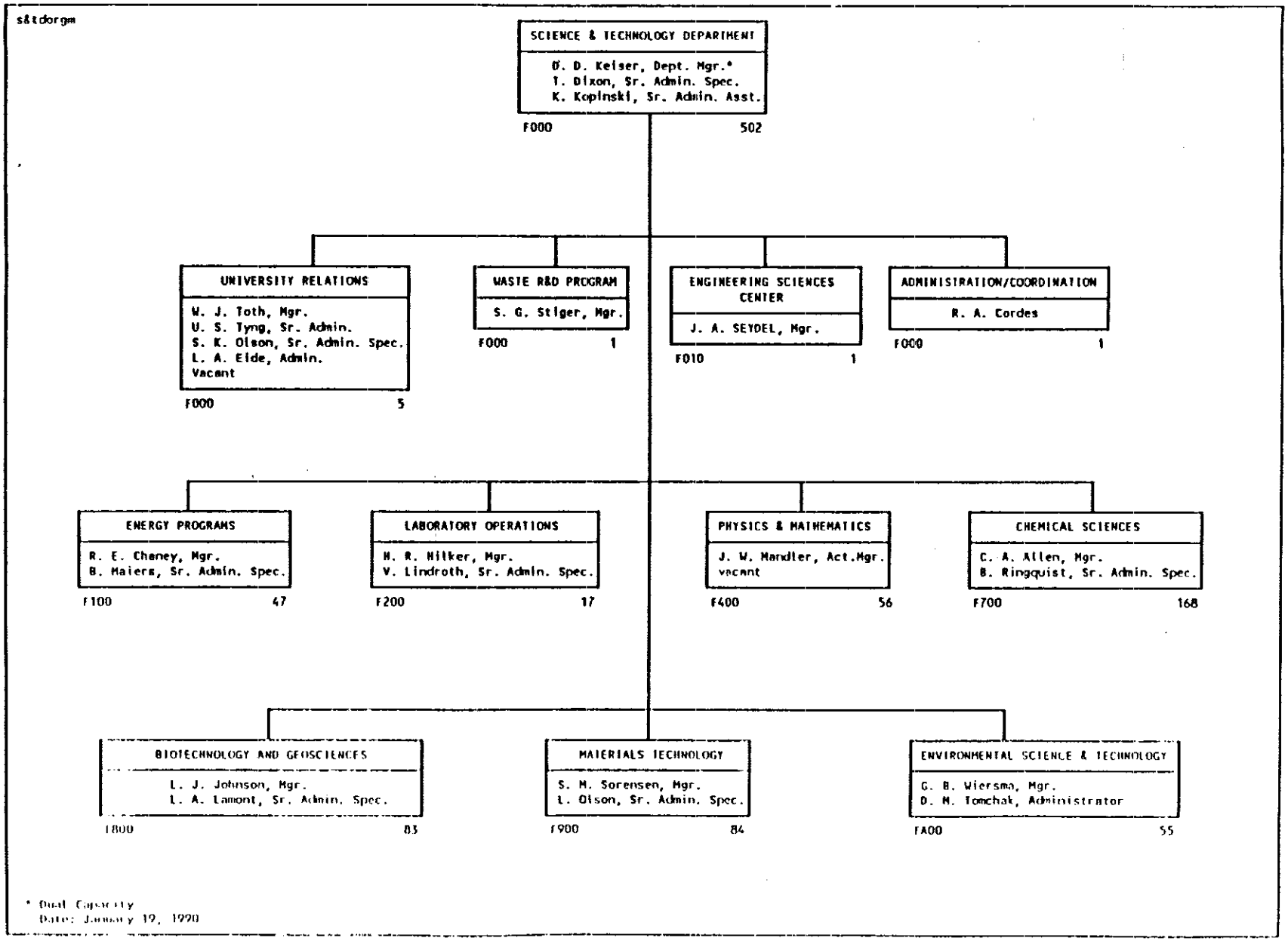
The following flow charts show the Company (EG&G Idaho, Inc.) structure, the Department (Science & Technology) structure, the Group (Chemical Sciences) structure, and the Unit (RML/Radiochemistry) structure.



*Dual Capacity

Contractor.....EG&G Idaho, Inc.
Location.....Idaho Falls, Idaho 83415
Operations Office...DOE-Idaho Falls, Idaho 83401
Contract Number.....DE-AC07-761D01570

Approved J. O. Zane
Total Employees.....4476
Effective Date.....January 1990


s&tdorgm
SCIENCE & TECHNOLOGY DEPARTMENT
D. D. Keiser, Dept. Mgr.*
T. Dixon, Sr. Admin. Spec.
K. Kopinski, Sr. Admin. Asst.
F000
502
UNIVERSITY RELATIONS
W. J. Toth, Mgr.
U. S. Tyng, Sr. Admin.
S. K. Olson, Sr. Admin. Spec.
L. A. Elde, Admin.
Vacant
F000
5
WASTE R&D PROGRAM
S. G. Stiger, Mgr.
F000
1
ENGINEERING SCIENCES CENTER
J. A. SEYDEL, Mgr.
F010
1
ADMINISTRATION/COORDINATION
R. A. Cordes
F000
1
ENERGY PROGRAMS
R. E. Chaney, Mgr.
B. Haiers, Sr. Admin. Spec.
F100
47
LABORATORY OPERATIONS
H. R. Hilker, Mgr.
V. Lindroth, Sr. Admin. Spec.
F200
17
PHYSICS & MATHEMATICS
J. W. Mandler, Act.Mgr.
vacant
F400
56
CHEMICAL SCIENCES
C. A. Allen, Mgr.
B. Ringquist, Sr. Admin. Spec.
F700
168
BIOTECHNOLOGY AND GEOSCIENCES
L. J. Johnson, Mgr.
L. A. Lamont, Sr. Admin. Spec.
1800
83
MATERIALS TECHNOLOGY
S. M. Sorensen, Mgr.
L. Olson, Sr. Admin. Spec.
F900
84
ENVIRONMENTAL SCIENCE & TECHNOLOGY
G. B. Wiersma, Mgr.
D. M. Tomchak, Administrator
FA00
55
* Dual Capacity
Date: January 19, 1990

stdorg700a

* Vacants Not Counted in Total
\# Part Time
** Outplant
DC Document Control
PD Post Doctorate

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Cole, T. J. (#) SAA

F700 168

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Bell, M. L.
Braun, A. W. (#)
Crezee, D.L.(#)
Gianotto, A. K.
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Lowrey, D. L.
Marler, C. F. TL
McNew, E. B.
Messick, K.
Owens, J. W. TL
Patterson, D. D.
Rae, C.
Ringe, B. L.
Senn, M. A.
Sterling, R. J.
Theisen, L. M.
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Hoggan, J. M.
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Hutchens, B. J.
Johnson, L. O.
Killian, E. W. PI
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Laurence, R. S. TL
Loftus, G. A.
Meikrantz, D. H. TL
Mincher, B. J.
Murray, R. K.
Nakamura, D. A. (#)
Osloond, J. H.
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Scarr, P. M.
Sill, C. W. PI

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Beaver, R. D.
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Bush, F. A.
Chapman, A. D. (#)
Christiansen, M. A.
Connolly, J.
Connolly, M. J.
Crowder, C. A.
Daley, J. A.
Deming, K. A.
Dismuke, A. M.
Evans, R. E.
Garcia, E. L.
Gratson, G. K.
Gresham, G. L.
Izbicki, K. L.
Jackson, J. D.
Jones, R. L.
Lazzarotto, P. A. WL
Murphy, R. J. TL
Naranjo, A. M.
Olsen, P. K. DC
Perez, K. L.
Roberts, N.
Ross, V. A.

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PHYSICAL CHEMISTRY AND DYNAMICS

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Adams, N. (PD/AWU)
Appelhans, A. D.
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Banerjee, A.
Beck, S. (AWU)
Cummings, D. G.
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Davies, J. P.
Delmore, J. E. TL
Femec, D. A.
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Orme, C. J. (#)
Pickett, T. J. (PD)
Propp, W. A. PI
Reavill, D. A.
Richman, K. W. (AWU)
Samsel, E. G.
Shirts, R. B.
Simpson, B. M.
Stone, M. L.
Wright, R. B.

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CHEMICAL PROCESSING

Suciu, D. F., Manager
Gilbert, S. M. AS

Argyle, M. D.
Chavez, A. A.
Cowan, R. L. (AWU)
Delezene-Briggs, K. M.
Espinosa, J. M.
Fox, R. V.
Gilbert, H. K. **
Harris, T. L.
Hotz, M. J.
Hudman, G. L. (#)
Hulet, G. A. **
Janikowski, S. K.
Larsen, D. J.
Lebron, L. R.
Martin, W. K.
Martinez, R. S. **
McAtee, R. E.
Mommens, E. J.
Neal, C. A.
Prescott, D. S.
Reuter, B. S.
Rowley, D. J.
Scherling, T. E.
Schober, R. K. **
Schutte, W. C.
Smith, D. L. **

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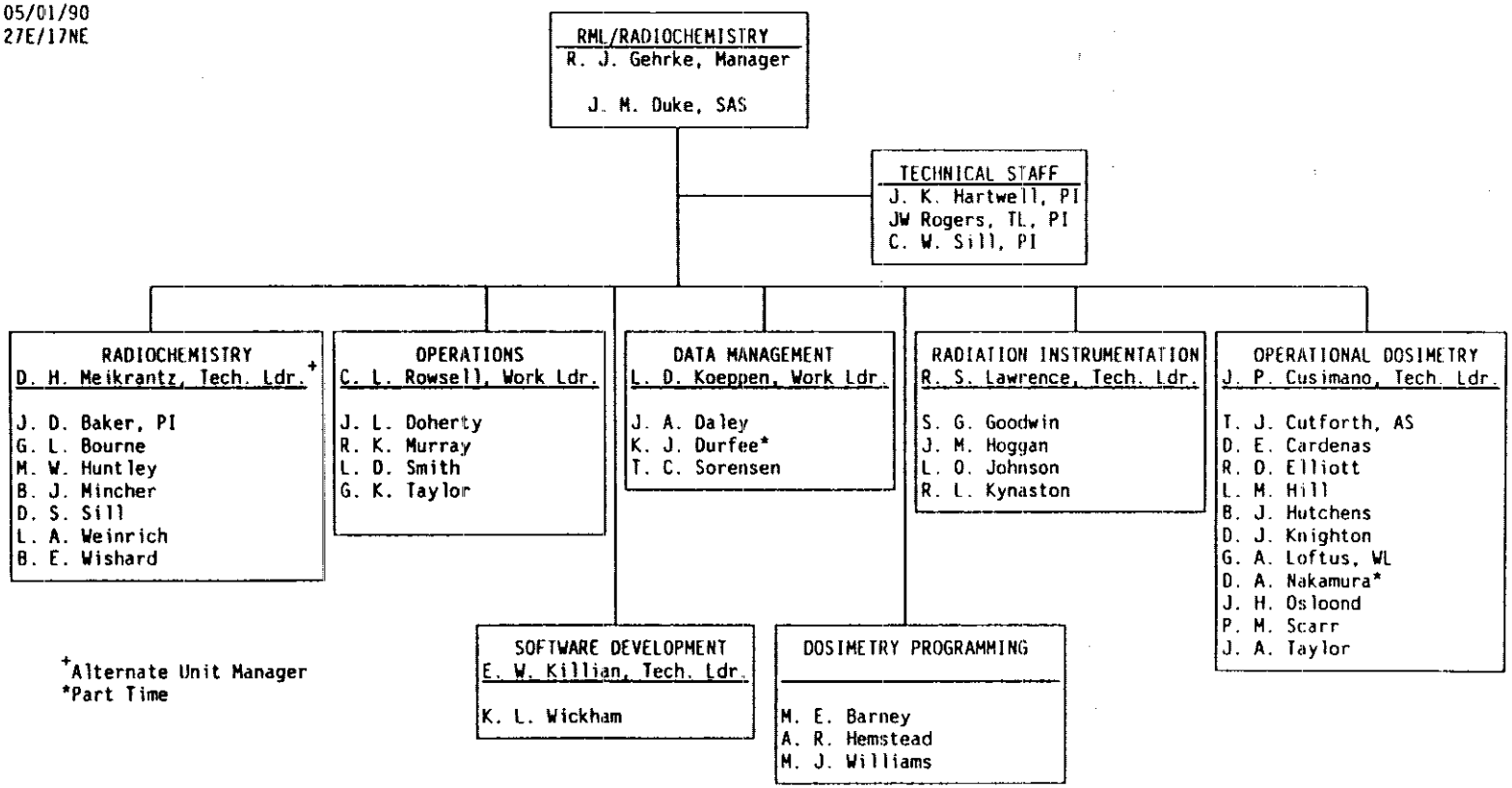


+Alternate Unit Manager
*Part Time

3.0 RML ORGANIZATIONAL PERSONNEL

Personnel	Title	Responsibilities	Years Experience	Degree Attained
R.J.Gehrke	Unit Manager	Manager	23	M.S.Physics
R.S.Lawrence	Eng.Spec.	Tech. Ldr.-Rad. Inst.	32	B.S.EE
JW Rogers	Sci.Spec.	Principal Investigator	31	B.S.Physics
R.L.Kynaston	Sr.Eng.	Rad. Instrumentation	30	None
C.L.Rowsell	Sr.Sci.	Work Leader-Operations	28	Industrial B.S.Tech.
E.W.Killian	Sci.Spec.	Tech.Ldr.-Software Dev.	21	M.S.Math
J.K.Hartwell	Sci.Spec.	Principal Investigator	20	M.S.Nuclear Chem.
J.M.Hoggan	Sr.Eng.	Rad. Instrumentation	19	Assoc.
S.G.Goodwin	Sr.Eng.	Rad. Instrumentation	19	Assoc.
L.D.Koeppen	Scientist	Work Ldr.-Data Mgmt	15	None
D.N.Thompson	Assoc.Sci.	Operations	9	B.S.Biology
K.J.Durfee	Sr.Op.Tech.	Data Management	6	None
D.W.McBride	Assoc.Sci.	Operations	5	None
B.E.Oates	Sr.Tech.	Operations	5	None
R.K.Murray	Sr.Tech.	Operations	3	Assoc.
T.C.Sorensen	Sr.Tech.	Operations	3	B.S.Communications
K.L.Wickham	Scientist	Software Development	1	B.S.Physics
C.Casey	Assoc.Sci.	Data Management	1	M.S.Nuclear Chem.

The RML has 271 years of combined experience related directly or indirectly to radiation measurements. Staff members have attained their experience through radiation measurement related research and/or routine counting and analysis. Senior staff members are active in the measurement and/or the evaluation of basic nuclear decay data and maintain a high level of competence through their scientific activities, their professional contacts, and their membership and active participation in technical societies, visiting other laboratories and surveying the literature. Seminars, group training, individual on-the-job training, literature and close communication between staff members keeps RML personnel abreast of the state-of-the-art in radiation measurements. RML Operations personnel are strongly encouraged to complete a comprehensive on-the-job training and certification program (Appendix A) which is intended to demonstrate an in-depth understanding of the radiation measurements being performed with an appreciation for the importance of high quality results. Only certified operators or trainees under the direction of a certified operator are authorized to count and analyze samples for radionuclide content. RML Operations and Data Management personnel follow documented procedures during the counting/analysis and reporting process.

The RML section is organized into three functional sections: (1) Operations, (2) Data Management, and (3) Technical Staff. The Operations section is responsible for the accumulation of high quality data, the analysis performed by the RML computers and a review of the results, especially those which do not require a formal QA review (this review is performed by the work leader or his designated alternate). The Data Management section is responsible for compiling, evaluating, verifying,

reporting and archiving of data and results of analyses that require formal quality assurance and reporting methods (e.g., effluent and environmental samples). The Technical Staff is consulted when any analyses results are questionable and cannot be properly verified and/or evaluated by Operations or Data Management. A senior staff member or a designated alternate performs the final review of all formally reported data and signs the approved section on the report.

4.0 DEFINITIONS

The following definitions are given to convey the precise meaning of certain terms used in this manual which may have other meanings outside this context.

Quality Assurance. A network of activities that assures that the customer's needs are met (i.e., conformance to requirements) and that the results of analyses are correct within the associated uncertainties. These activities include evaluating the customer's needs, designing these needs into the service rendered, monitoring the quality of results by inspection and by the injection of QC samples and certifying that the personnel performing the service are qualified. This is accomplished through a planned and systematic set of actions, training, controls and documentation so as to provide confidence and reliability in the official results issued to the customer.

Quality Control. Quality control is determined from a sample prepared by an independent party, from material that is traceable to the National Institute of Standards and Technology (NIST). This QC sample shall be treated as any other routine sample submitted for analysis. Upon receipt of the RML QC results, the independent party determines whether the measured values and their uncertainties are within the acceptance criteria of the actual known values. When this is the case the analyzing laboratory is "in control" and when this is not the case it is "out of control".

Standard. A radioactive source whose activity is accurately known. It is either a National Institute of Standards and Technology (NIST) Standard Reference Material (SRM) (i.e., primary standard) or one whose activity was determined by a direct comparison with a NIST SRM (i.e., secondary standard). Whenever the matrix of a standard has been changed or a standardization transferred, the steps involved must be clearly delineated and the uncertainties associated with each step propagated with that in the original standard to assure traceability to a primary standard. Each additional step weakens the traceability link and increases the uncertainty assigned to the standard.

Calibration/Standardization. Often the terms standardization and calibration are used interchangeably without distinguishing the subtle differences. It is a method of setting up an instrument with or without the use of standards and the determination of a set of conditions, materials, equipment, procedures, etc. that are used to obtain a qualitative or quantitative determination of radioactivity.

Limit of Detection (L_D). [Also referred to as the lower limit of detection (LLD).] The minimum level at which a given analytical procedure may be relied upon to produce a detection with a certain measure of confidence. The RML has adopted L. A. Currie's method of defining detection limits (L_D). Currie's method of reporting a detection limit is that level at which there is 95 percent confidence that an activity will be detected above the background level. The detection limit (L_D) is expressed by Currie as follows:

$$L_D = k^2 + 2L_C = 2.71 + 4.65\sqrt{B}$$

where:

k = 1.645, the value of the standard normal deviate (95% confidence level),

L_C = $k\sqrt{2}\sqrt{B}$ the net number of counts which must be exceeded before a sample can be said to contain any activity above the background level (critical level),

B = background counts.

Precision. The term precision refers to a measure of the variability of the data presented (also called reproducibility or repeatability). Precision for gamma spectroscopy is determined by the length of time the sample is counted and the measured intensity of the photopeaks including the associated uncertainties (Poisson counting statistics and how well the photopeak was fit to a gaussian function).

Precision can be determined by making multiple measurements of a sample under the same counting and analysis conditions. Precision is then the mutual agreement among individual measurements and is expressed as a standard deviation as follows:

$$\sigma_{n-1} = \sqrt{\frac{\Sigma(x-\bar{x})^2}{n-1}}$$

where:

n = number of measurements
x = measured value
$\bar{x}$ = measured mean value.

Accuracy. Accuracy is the degree of agreement of a measurement with accurately known standard reference materials from NIST (primary standard) or NIST traceable activity (secondary standard).

Blank Sample. A sample prepared in the same matrix and physical form as unknown samples but with no added activity. This sample is often used to determine detector system background and can also be used as a QC sample.

Official Results. Those results which have been thoroughly evaluated, verified and completely QA'd by the analyst. The results are reported and transmitted to the customer by Interoffice Correspondence (letter), Internal Technical Reports or formal computer generated reports. The official results are QA checked and signed by the analyst compiling the report and approved and signed by a senior staff member or a designated alternate.

Preliminary Results. Those results which are transmitted to the customer with or without a cover letter and are stamped or designated "Preliminary". These results have been partially or completely analyzed but have not been completely evaluated, verified, QA'd or formally approved and are subject to change. Preliminary results are only transmitted to a customer when there is a customer need for quick results to help investigate a problem or to help meet customer time constraints.

Summary Results. Results for which only the computer analysis summary printout has been requested by the customer. These data are generally checked, edited, and signed by the analyst. The summary data, depending on the sensitivity, may also be evaluated, verified and approved by the Data Management Section. These data will normally not have an attached cover letter and will normally be provided only to customers who have demonstrated their ability to RML personnel to correctly understand the data. The RML will not be responsible for misidentification or misinterpretation of the summary results.

5.0 RML QUALITY ASSURANCE PROGRAM

The RML successfully participates in five routine quality control programs listed below:

1. RML internal quality control program
2. Environmental Monitoring Programs - EG&G Idaho, Inc.
3. Environmental Monitoring Systems Laboratory Program - EMSL-Las Vegas, EPA
4. Radiological Environmental Sciences Laboratory - DOE, INEL
5. Neutron Fluence Standards Program - NIST (NBS)

The above listed programs routinely send radioactive sources of known but undisclosed values to the RML for qualification and quantification. At the conclusion of any QC exercise the RML receives documentation from the program stating the calibration values, the RML submitted values and

whether the comparison agreed or disagreed within limits established by the individual program.

The purpose of the quality program is to assure that quality data is produced and to demonstrate the competence and reliability of the RML and the skill of its staff.

5.1 RML Internal QC Program

The RML performs both QA and QC checks routinely to verify proper operation and calibration of equipment and analysis programs. The QC and background checks performed are as follows:

QC Check Performed	Required Frequency
1. Gamma-ray energy calibration for Ge detectors	Daily
2. Calibration source check for Ge detectors	Monthly
3. Instrument/ambient background checks on Ge detectors	Monthly and/or before and after each set of environmental samples
4. Calibration source check for alpha/beta counter	Weekly
5. Instrument/ambient backgrounds checks on alpha/beta counters	Biweekly and before and after each environmental sample and before and after each set of effluent samples

The above listed QC and background checks performed are evaluated, recorded, archived and formally reported in the RML annual QA report. Whenever problems are encountered that place a counting system out of control they shall be investigated and corrected before results from that counting system are reported. In certain circumstances it is permissible to report results from a system found out of control when the uncertainties on the results have been increased to reflect the level of accuracy achieved with the counting system. Under these circumstances the customer should be made aware of the fact that the accuracy of the results have been degraded.

5.1.1 Gamma-ray Energy Calibration for Ge Detectors

The gamma-ray spectrum data analyses slots are energy calibrated daily to determine the relationship between photopeak channel positions and actual photopeak energies. A ^{228}Th (or ^{232}U parent) source spectrum is used to establish an energy calibration which produces

values of the coefficients (A, B, C) for a quadratic energy equation, $E = A + B(x) + C(x^2)$, and the coefficients (Z,Y) for a peak width equation, $(W = Z + Y(x))$. The computerized process finds the location of the 2614 keV γ-ray and from its position calculates the gain. With this gain, the calibration program locates four other full energy gamma-ray peaks and measures the peak position for all five photopeaks and performs a least-squares fit of the resulting channel positions to their known energies to obtain the energy equation coefficients. The same least-squares fitting process is repeated using channel positions and the full width at half maximum (the peak position and width results from fitting the spectral data with a Gaussian function) to determine the coefficients of the width equation. A printed table (Appendix B) is produced which shows the values for the coefficients and the difference between the known values and the values calculated with the fitted equation. The printed energy calibration results are recorded and archived for one year. The energy and width calibration coefficients are automatically stored with each analyzed sample spectrum. Each sample spectrum with its associated calibration information is stored on computer disk and ultimately archived on magnetic tape.

5.1.2 Calibration Source Check for Ge Detectors

The performance of each RML Ge or Ge(Li) gamma-ray spectrometer is checked monthly to verify the full-energy-peak efficiency reproducibility and the energy resolution at low, medium and high energies using a ^{152}Eu "point" source standard.

At present, the RML uses a ^{152}Eu source (PTB 397-76) to perform the checks. The ^{152}Eu ($T_{1/2}$ = 13.4 yr.) source emits strong gamma rays ranging from 122 keV to 1408 keV. The standard is counted in a point source geometry for a duration which will produce peak areas with uncertainties of <2%. The accumulated spectrum is analyzed with the RML "GAP" computer analysis program with activity results printed in disintegrations/second (DPS). The results of the weighted average (mean) ^{152}Eu activity and the 122 keV, 779 keV and 1408 keV photopeaks are evaluated to verify that they are within three estimated standard deviations of the known value. The RML is considered "IN CONTROL" if the measured weighted average (mean) activity is $\leq$2 estimated standard deviations from the known value, and "IN CONTROL - WARNING" if the mean activity is >2 estimated standard deviations but <3 estimated standard deviations from the known value, and "OUT OF CONTROL" if the mean activity is $\geq$3 estimated standard deviations from the known value (Appendix C). The same criteria (<2 std. dev. and 3 std. dev.) is applied to the 122 keV, 779 keV and 1408 keV measured gamma-ray peaks to evaluate the low, medium and high energy regions (Appendix C). However, the RML is not considered completely out of control if only one of these gamma-rays is out of agreement with the known value. The out of agreement energy region will be investigated and corrected in a timely manner.

The results of the monthly ^{152}Eu measurements for all detectors are recorded, plotted, archived and formally reported in the RML annual QA report.

5.1.3 Instrument/Ambient Background Checks on Ge Detectors

Instrument or blank sample background counts, typically of 16 hour counting duration, are accumulated on each Ge gamma-ray spectrometer monthly and/or before and after each set of environmental samples. Background photopeaks and their associated counting rates are evaluated to determine the level of stability of the background radiation and to assure that no low-level contamination of the detector system has occurred.

Each background spectrum is stored on the VAX 750 computer disk and also on magnetic tape.

Subtraction of background photopeak counting rates from the sample spectral data can be accomplished in a variety of ways depending on the application. With each background correction, the net peak area counting rates of the most current stored background spectrum are subtracted from those counting rates associated with each corresponding photopeak found in the sample spectrum. If the energy of a photopeak found in the sample spectrum agrees within 1 keV of the photopeak found in the background spectrum, then the background area counting rate is subtracted from the area counting rate of the corresponding photopeak in the sample spectrum.

It is also possible, at the discretion of the analyst, to apply a concurrent background subtraction method. This method is particularly useful for very weak radioactive samples for which the differentiation of sample activity from ambient background "equivalent activity" is very difficult. This method applies the channel and background fitting parameters (expressed in energy units) used for the photopeak(s) analyzed in the sample spectrum to the same exact energy region (converted to channels) of the background spectrum. This technique is actually an overlay or a mapping of the background spectrum regions to the corresponding regions of the sample spectrum. Normally, an average of the four most current background spectra are used when this method is chosen for sample analysis.

Environmental samples, which are in large sets, are processed in a batch analysis mode which uses the concurrent background subtraction method. In the batch mode, the analyst selects the background spectra to use. Typically the analyst chooses the two background spectra that were counted immediately before and after the set of environmental samples, plus two to four previous background spectra. The analysis program uses the weighted average peak area counting rates of the background results with any outliers removed.

Background spectral results are recorded, archived and formally reported in the RML annual QA report.

5.1.4 Calibration Source Check for Low Background Alpha/Beta Counter

The Tennelec low-background gas-proportional alpha-beta counter is performance checked weekly to verify its proper operation and calibration.

The RML uses both a ^{90}Sr (IPL-119-07-3) and a ^{137}Cs (IPL-119-07-4) source to verify the proper response for the beta channel and a ^{241}Am source (RML #1) for the alpha channel. The sources are each counted for 10 minutes and the resulting counting rates are recorded in an RML logbook.

The ^{137}Cs check source shall be counted at the end of each bimonthly set of environmental air filters to verify that the proper calibration was maintained during the sample counting period. The ^{137}Cs source counts/10 minutes are entered into an RML PC program after each set of air filters and the counts (decay corrected) are evaluated by the PC program to verify that they are within two statistical standard deviations of the running average. Values greater than $\pm$ 2 standard deviations from the running average are flagged and investigated.

The ^{137}Cs check source results are recorded (Appendix D), archived and formally reported in the annual RML QA report.

5.1.5 Instrument (Blank Sample) Background Checks on the Alpha/Beta Counter

Alpha and beta background counting rates (counts/10 minutes) shall be determined biweekly and before and after each individual environmental air sample. Empty sample planchets are used when measuring the background counting rates. The biweekly background results are recorded in an RML logbook. The alpha and beta background counting rates determined before and after each individual environmental air sample are entered into an RML PC program that evaluates and verifies that the average is within two statistical standard deviations of the running average. Background averages greater than $\pm$ 2 standard deviations from the running average are flagged and investigated.

The alpha and beta background results are recorded (Appendix D), archived and formally reported in the RML annual QA report.

5.2 Environmental Monitoring QC Program

The RML supports many EG&G Idaho waste management programs, including environmental monitoring efforts. Samples of water, soil, air, vegetation and small mammals are routinely collected by Environmental Monitoring Program (EMP) personnel and counted/analyzed by the RML. To assure the accuracy, precision and stated limits of detection (Appendix N), the EMP submits quality control (QC) samples at least once yearly with a set of routine samples.

The QC samples are counted, analyzed and reported in the same manner as the routine samples. The measured QC results reported by the RML are evaluated by the EMP and also by an independent party. The results are then made known to the RML Unit Manager and the RML Data Management Section (an example of the QC results are in Appendix E). The results of the QC check are also evaluated by the RML to verify that the results, within stated uncertainties, agree with the known value in order to determine "IN CONTROL" or "OUT OF CONTROL" status (Appendix F). The RML evaluation also checks for ongoing biases or changes in the accuracy of the reported results. Any measurements outside of stated uncertainties are promptly investigated to determine the cause and corrected in a timely manner. When QC measurement results are outside stated uncertainties, no sample results will be reported to the customer until either the problem has been identified and corrected or appropriately increased uncertainties are assigned and so indicated to the customer.

The QC results are recorded, archived and formally reported in the RML annual QA report.

5.3 Environmental Monitoring Systems Laboratory (EMSL) Intercomparison Program - EPA

The RML has participated in the Environmental Protection Agency (EPA) Las Vegas cross-check program since 1985. The EMSL routinely sends samples of various geometries to the RML for counting and analysis (Appendix G). Each sample is counted and analyzed three separate times and the results of each analysis are reported to EPA via mail or the computer phone-in program.

The measured QC results reported by the RML are evaluated by EMSL and a tabulation of results of all participating laboratories is later issued to the RML.

The results of the EPA QC checks are evaluated by the RML upon receipt, and any measurement results that did not meet EPA requirements (flagged) are investigated and corrected.

The QC results are recorded (Appendix H), archived and formally reported in the RML annual QA report.

5.4 INEL-RESL Interlaboratory Comparison Program

The RML participates in the Department of Energy (DOE) INEL Intercomparison Program administered by the Radiological Environmental Sciences Laboratory (RESL). RESL sends samples of various geometries to the RML for counting and analysis. The results of each analysis are reported to RESL via letter or the phone-in program after completion.

The measured QC results reported by the RML are evaluated by RESL and a tabulation of results are issued to the RML. The results of the QC checks are carefully evaluated by the RML and any measurements that were not within quoted RML accuracies are investigated and corrected.

The QC results are recorded (Appendix I), archived and formally reported in the RML annual QA report.

5.5 NIST (NBS) - Neutron Fluence Standards Program

The National institute of Standards and Technology (NIST) produces neutron fluence standards which are available to laboratories which determine neutron fluences by measuring the radioactivity of neutron monitors irradiated in neutron fields. The neutron fluence standards consist of NIST standardized neutron dosimeters which are irradiated in standardized neutron fields at NIST to a known neutron fluence. After irradiation the fluence standard is sent to a laboratory (RML) to have the induced radioactivity measured. The measuring laboratory then reports its observed activity to NIST. The results from the measuring laboratory are then reduced to reaction cross sections for the reactions based on the NIST known fluence rate. Finally the deduced cross sections from the measuring laboratory are compared with the NIST measured cross sections for the standard neutron field in which they were irradiated (Appendix O). The RML has measured NIST fluence standards for $^{58}Ni(n,p)$, $^{54}Fe(n,p)$, $^{46}Ti(n,p)$ and $^{238}U(n,f)$ reactions. The RML participates in this program based on customer requirements.

6.0 LABORATORY FACILITIES AND EQUIPMENT

The RML counting laboratory is a modern fully equipped radiation measurements laboratory with Ge, Si(Li) and NaI(Tl) x-ray and gamma-ray spectrometers, gamma ionization chambers, and alpha/beta proportional counters. The radioanalytical chemists in the RML/Radiochemistry Unit supplement the RML radioanalysis capabilities and have alpha spectrometers, alpha/beta proportional counters and liquid scintillation counting and analyzer systems. The instrumentation is primarily located in the RML, but some systems are located in other laboratories located nearby.

The RML is air conditioned to provide an evenly controlled temperature between 68° and 72° to maintain instrument stability. A positive pressure is maintained inside the RML, with respect to the rest of the building, to reduce the entry of natural radioactive gases and aerosols. The walls have been treated with a paint impermeable to gas to reduce the release of naturally occurring radon gases from the cinder block and cement surfaces. The RML laboratory is monitored by Health Physics weekly for possible contamination and/or direct radiation problems. Samples brought into the RML counting laboratory are kept behind shields before and after counting. Environmental samples are prepared and stored in separate facilities (outside the RML) designated for low activity samples. After

samples have been counted they are returned to the customers, discarded, or removed to one of the designated storage areas.

The gamma-ray spectral analyses are performed on the RML VAX computer, which has 8 megabyte memory, two 456 megabyte hard disks, a plotter, two line printers, one laser printer and two magnetic tape drives. The computer and instrumentation electrical power is regulated and conditioned to maintain stability. The RML laboratory and equipment is protected by a Halon fire protection system. The following is a list of the radiation detection instrumentation used by the RML:

1. Ten Germanium spectrometers (2-40% Ge).
2. One automatic sample changer (Ge).
3. Four in-field (remote) Ge spectrometers.
4. One Si(Li) x-ray detector.
5. Three thin window coax Germanium detectors.
6. One NaI(Tl) detector.
7. One guard-ring low-background alpha/beta gas proportional counter.
8. Four end window proportional counters.
9. Two gamma ionization chambers.
10. One high range gamma Victoreen R-meter.
11. One 2π proportional counter.

7.0 GERMANIUM GAMMA-RAY SPECTROMETER SYSTEM CALIBRATIONS

The RML Ge detectors and associated electronics are setup and calibrated in accordance with the applicable requirements stated in the American National Standards Institute (ANSI) standard N42.14, "Calibration and Use of Germanium Detectors for Measurements of Gamma-ray Emission of Radionuclides".

The gamma-ray full energy peak efficiency curves and tables are measured from the emission rates of gamma-rays from standards obtained from reputable metrology laboratories (e.g., NIST, Analytics, Amersham, etc.). The standards are of the same type and geometry as the samples. RML efficiency curves typically span a useable energy range from 60 keV to 3000 keV and are established for a wide variety of geometries. The efficiency curves are normally determined interactively by a specialized VAX computer program that analyzes the Reference Standard spectrum, generates a table of experimental results from the analysis, fits a basic polynomial curve to the experimental efficiency data, allows interactive editing and refinement of the curve (efficiency versus energy) by displaying the curve on the work-station monitor screen (i.e., Megatek) in three different formats. The formats are displayed as a full scale log/log plot of efficiency vs. energy, linear plot of the low energy region (<400 keV) of efficiency correction factor vs. energy, and a linear plot that displays the energy region above 200 keV in the form of efficiency times energy (function $Y = EFF(ENERGY^{-slope})$ vs. energy.

This latter efficiency plot allows a more sensitive view of the efficiency curve as a function of energy and can be interactively edited to refine the final efficiency curve. A complete description of this utility program can be found in "An Operator's Guide to VAXGAP". RML Procedure DM-12: "Efficiency Curve Generation on the RML VAX-11/750" describes the computerized methods of generating efficiency curves and tables. Appendix J presents a typical computer generated efficiency curve showing the three formats.

The option to generate efficiency curves by hand also exists; however, this method shall be used only by senior radiation measurements experts. Data points used to form an efficiency table are taken from a hand-drawn curve and manually entered into the VAX computer. The VAX displays the curve determined by the manually entered values. The curve can be edited and refined by adding, deleting or changing data point values until the analyst is satisfied with the curve shape and results. In no case shall a curve be arbitrarily changed in such a way as to ignore the measured efficiency values. The curve and a computer-generated table are saved on the VAX computer.

The RML has calibrations for the following standardized geometries:

1. Water - 60 ml and 540 ml poly bottles, 1 liter and 4 liter Marinelli beakers.
2. Air - 2" and 4" dia. particulate filters, charcoal and AgX cartridges.
3. Gas - 15200 cc pressurized sample container for noble gases.
4. Soil - 100 cm^3 and 500 cm^3 plastic vials and squat jars.
5. Vegetation - 500 cm^3 plastic squat jars.
6. Small Mammals - 500 cm^3 squat jars.
7. Point Source - Sample size depends on intensity and source-to-detector distance.
8. Others - Special arrangements can be made.

8.0 RML GROSS ALPHA/BETA DETECTION SYSTEM CALIBRATION

The RML Tennelec low-background gas proportional alpha/beta detection system was initially set up and tested by the manufacturer. The detector operating voltages are determined by running a plateau of counts/minute versus high voltage on both alpha and beta modes annually. The detector efficiency for alpha was established with a ^{241}Am reference standard and the beta efficiency was established with a ^{137}Cs reference standard. A description of the calibration and operating procedure can be found in RML Procedure RML-5: "RML Gross Alpha-Beta Counting System". Efficiencies for air filters and dried liquids have also been determined from standards prepared by Radiochemistry.

9.0 RML SAMPLE ANALYSES REQUEST, CUSTODY AND TRACKING

Samples to be analyzed by the RML/Radiochemistry Unit should be accompanied by a "RML/Radiochemistry Analyses Request/Custody Form" (see Appendix K). This is a dual purpose form that informs the RML what type of analyses is to be performed, including all the pertinent information necessary to analyze the sample, and serves as a sample custody/tracking device. A copy of the form will be available to each section performing analyses. Customers that have their own unique request, custody and tracking forms must have them reviewed by the RML prior to sending samples, to verify that it can be satisfactorily used in the RML system. The facility requesting analyses should assign a unique ID to its sample ($\leq$ 12 characters), which carries through each analyses process. In addition, the RML records the sample and tracking information on their "Sample and Counting Information" log (Appendix L). These RML logsheets contain all the sample information used in the gamma-ray analysis, the unique RML ID assigned, the sample tracking ID and who the sample was forwarded to for additional analyses.

Radioactive samples above 10CFR20 Appendix C delivered to the RML shall have a radiation/contamination label on the sample as well as the activity levels stated on the request/custody form. Radioactive samples should be coordinated with RML Operations, Data Management or technical staff personnel prior to collection and delivery so that proper standardized geometries can be utilized and to determine methods for sample handling and to identify where samples should be stored. Radioactive samples arriving from areas outside TRA are delivered to the MTR HP office unless the sample activity is below levels requiring shipment papers. These latter samples can be delivered directly to RML personnel. Samples of higher activity that are sent with shipment papers need to be checked at the MTR HP office for direct radiation and also for external contamination.

The RML will not accept samples for routine analysis that have a gamma radiation reading >200 mr/hr at 6 inches and/or any external contamination present. Samples that exceed these requirements require that special arrangements be made with RML Operations personnel prior to delivery for handling and analysis.

The custody of a sample is transferred to the RML after it has been accepted by a member of the RML Operations Section. It is recorded on the accompanying Sample Analyses Request/Custody Form. The analyses request section of the form is reviewed by RML Operations personnel to verify that all required information associated with the sample is provided. The RML reserves the right to return a sample to the customer if the proper information is not provided.

When a sample is ready to be counted/analyzed, the appropriate sample information from the Analyses Request/Custody Form is transcribed on the RML Sample and Counting Information Log Sheet. The RML assigns a unique identification number and records the unique sample identification number assigned by the customer. The Sample and Counting Information Log also contains the sample name, collection date/time, counting date/time, spectrometer system used, sample volume/weight, source-to-detector distance used, efficiency table number, analyses requested, etc. When the RML has completed the gamma analyses, the gamma analysis section on the Analyses Request/Custody Form is signed/dated as completed. The sample and a copy of the Analyses Request/Custody Form are forwarded to the appropriate radiochemist if further analyses are requested. The name of the radiochemist and the date the sample is forwarded is recorded on the Analyses Request/Custody Form to aid in sample tracking.

10.0 RML MEASUREMENT, ANALYSIS, REPORTING PROCEDURES AND METHODS

The RML counts and analyzes approximately 800-1000 samples for gamma-ray emitting radionuclides per month in a variety of geometries and matrices. The different types of samples counted, analyzed, QA'd and reported by the RML are done in accordance with documented procedures. A list of these procedures is shown in Appendix M. All procedures for RML Operations, RML Data Management, and miscellaneous documents are kept in the Document Control Center in the Data Management office. Procedures are reviewed annually.

Gamma-ray spectral analyses are generally performed with computer analysis programs on the VAX-11/750 computer. The analysis program used is generally dictated by the sample type and/or the analysis required or requested. The analysis method (program) utilized by the analyst is normally stated in the RML procedure that is being used to analyze a particular sample. All computer analysis routines have been thoroughly tested and QA checked to insure that they give the correct results. Available computer analysis programs are described in "An Operator's Guide to VAXGAP: A Gamma-Ray Spectrum Analysis Package for a VAX Computer" or in specific procedures. A description of the analytical models and algorithms for gamma-ray spectrometry can be found in "VAXGAP: A Code for the Routine Analysis of Gamma-Ray Pulse-Height Spectra on a VAX Computer". The computer libraries used for a gamma-ray analysis are normally stated in the specific procedures. The libraries perform the functions of identification of radionuclides, gamma-ray interference corrections and directing peak fitting to specific gamma-ray energies of interest.

Sample counting, analysis and reporting are typically handled in a four-step process. First, sample and analysis information is verified on the Analyses Request/Custody Form and recorded in the Sample and Counting Information Log by the Operations Section. Second, the sample is counted in the proper geometry and analyzed by the Operations Section. Third, computer spectral analysis results requiring a formal QA of the data and results are carefully re-examined and verified by the Data Management Section. Large sets of samples (e.g., environmental and some effluent samples) that require computer generated reports are batch analyzed, examined and evaluated by the Data Management Section. Analysis results are checked to verify the correctness of the input parameters and to scrutinize questionable spectral results. Questionable results are those results that do not satisfy requirements in RML Procedure "DM-1: Evaluation and Verification of Data for Radionuclide Identification/Selection", or that of the analyst. Individual photopeak fits can be re-examined and evaluated with the aid of computer spectral graphics techniques. Sample analysis results are checked against the quoted RML detection limits (Appendix N). Gamma-ray summary results and routine reports are computer generated and are reported by either the Operations or Data Management Section depending on the sample origin. Normally, routine reactor support analysis results are reported by the Operations Section. Effluent, environmental, QA/QC data and many non-routine sample results are reported by the Data Management Section. Results transmitted to most customers are sent in the form of a letter, Internal Technical Report or formal computer-generated reports. All results reported by letter, Internal Technical Report or formal computer-generated reports are approved by a senior staff member or a designated alternate (radiation measurements expert).

The criteria for examining, evaluating and verifying the correctness of the counting, analysis and reporting of data is either described in the procedures specific to the sample type and the operation performed or is based on the experience of the senior staff. The criteria for the final approval is primarily based on the experience, knowledge and insight of the senior staff.

The uncertainties reported by the RML are expressed as one estimated standard deviation unless otherwise specified. Summary results that originate directly from the computer analysis (VAXGAP) show only the uncertainties in the determination of the photopeak parameters (i.e., peak position, area and width). A description of how the photopeak fitting process determines the uncertainties associated with the peak parameters can be found in "VAXGAP: A Code for the Routine Analysis of Gamma-Ray Pulse-Height Spectra on a VAX Computer" (EG&G-2533). Environmental data and sample data of non-routine nature are reported with a total uncertainty. The total uncertainty reported by the RML typically includes the uncertainty in the peak parameters defining the net area, sample geometry and detector efficiency. These uncertainties are propagated in quadrature and are expressed as one estimated standard deviation. If and when other uncertainties are identified and quantified, they will be included in the calculation of the total uncertainty. The process used to

define and propagate the uncertainties is stated in the data report or letter. The following equation describes how the total uncertainty is propagated:

$$\sigma_T = \sqrt{\sigma_p^2 + \sigma_E^2 + \sigma_G^2 \ldots + \sigma_n^2}$$

where

σ_T = Total uncertainty - one estimated standard deviation (sigma).

σ_p = Uncertainty associated with peak parameters defining net area.

σ_E = Uncertainty associated with peak efficiency.

σ_G = Uncertainty associated with sample geometry/matrix.

σ_n = Uncertainties of any other identified/quantified parameters (e.g., flow rate measurements).

The number of significant figures quoted for the measured values in the data report is determined by the uncertainty. If the first digit of the standard deviation is a "one", then two digits in the standard deviation are reported. The measured activity value must reflect the same number of decimal places as the standard deviation [e.g., (3.11 $\pm$ .13)E-10 or (4.7 $\pm$ 1.4)E-10]. If the first digit of the standard deviation is "other than a one", then one digit in the standard deviation is reported. The measured activity value must reflect the same number of decimal places as the standard deviation [e.g., (1.7 $\pm$ .4)E-10 or (7 $\pm$ 3)E-10]. This technique is not applied to computer-generated reports at this time. Only reports manually generated include this method.

11.0 COMPUTER SECURITY

In order to ensure that appropriate administrative, technical, physical and personnel safeguards and procedures are maintained on the RML computer systems when processing sensitive unclassified information an Assistant Computer Protection Program Manager (ACPPM) has been appointed by the Safeguards and Security Division's Computer Protection Program Manager. Presently, the ACPPM for the RML computers is C. L. Rowsell. The responsibilities of the ACPPM are described in the Computer Protection Program Procedures Manual and include, but are not limited to, implementation of a Contingency Plan for use during disaster recovery situations. This plan is presently under development.

APPENDIX A

RML QUALIFICATION CHECKLIST

NAME _____ DATE _____

Section	Initials
I. RECEIVING SAMPLES	
A. Is familiar with and understands the use of RML "analyses request" forms.	_____
B. Is familiar with the radiological checks that are necessary prior to receiving samples in the RML.	_____
C. Understands storage locations for incoming samples.	_____
II. SAMPLE PREPARATION and HANDLING	
A. Is familiar with radiological control procedures.	_____
B. Knows how sample information and data is recorded and saved.	_____
C. Knows how to prepare standard liquid samples for counting.	_____
D. Knows how to prepare various point-source type samples for counting.	_____
E. Knows how to prepare Continuous Air Monitor (CAM), High Volume (HV) and charcoal air filters for counting.	_____
F. Knows how to prepare gas samples for counting.	_____
G. Knows how to prepare soil samples for counting.	_____
H. Knows how to use the RML analytical balances.	_____
I. Knows how to store and/or dispose of various sample types after counting/analyses.	_____

Section

III. OPERATION OF RML COUNTING and ANALYSES EQUIPMENT

A. Gamma Spectrometers:

1. Knows how to operate all RML Ge(Li) detector systems. ___ ___

2. Knows how to operate the NaI(Tl) system. ___ ___

3. Knows how to operate the Hot Cell/RML gamma scanner system (Not required for general qualification). ___ ___

4. Knows how to operate the ILF/RML-east environmental counting/ analysis system (Not required for general qualification). ___ ___

5. Knows how to operate the portable germanium detector multi-channel analyzer system (Not required for general qualification). ___ ___

6. Knows how to set up and operate the remote "real time" on line monitors (STACK, RBHT, PCS). ___ ___

B. Miscellaneous Counting Equipment:

1. Knows how to operate the Gas-Proportional Alpha-Beta thin window smear counter. ___ ___

2. Knows how to operate the Four-Channel Gas Proportional Alpha-Beta thin window automatic counter. ___ ___

3. Knows how to operate the Flux Monitor Wire Scanners. ___ ___

4. Knows how to operate the Liquid Scintillation Spectrometer. ___ ___

5. Knows how to operate the TENNELEC low background Alpha-Beta counting system. ___ ___

6. Knows how to operate the High Pressure Ionization Chamber. ___ ___

7. Knows how to operate the Hi-range Gamma Ionization Chamber. ___ ___

8. Knows how to operate the X-ray Fluorescence system (Not required for general qualification). ___ ___

9. Knows how to operate the Alpha Spectrometer System (Not required for general qualification). ___ ___

10. Knows how to operate the KAPL Hydride Foil Counting System. ____

C. DATA ACQUISITION and COMPUTER ANALYSES EQUIPMENT:

1. Knows how to operate various data acquisition equipment _____

2. Knows how to operate various RML computer systems. _____

D. SAMPLE DATA

1. Knows how to interpret the results of the analysis. ____

2. Knows how to properly report the data. ____

APPENDIX B

THORIUM CALIBRATION-RML VAX-750 29-MAR-1989 08:26:54.47

DETECTOR SYSTEM: A1

ZERO= -1.6114
ENERGY= 0.1390+ 0.37052(X)+ 1.42138E-08(X)**2

WIDTH= 2.613+ 7.1446E-04(X)

ERROR MATRIX: 9.825920E-06 1.205314E-11 2.518408E-19 -9.992973E-09 1.285765E-12 -1.633035E-15

CHANNEL	ENERGY	CAL. ENG	D-ENG	WIDTH
645.240	238.624	238.624	0.000	3.10
1575.057	583.174	583.173	0.001	3.83
2323.525	860.530	860.539	-0.009	4.27
4374.605	1620.700	1620.708	-0.008	5.47
7055.493	2614.476	2614.475	0.001	7.79

APPENDIX C

RML QUALITY CONTROL DATA SHEET

GAMMA MEASUREMENTS
(EU-152 PTB-397/76)

RML INTERNAL QA PROGRAM

MARCH

DETECTOR SYSTEM	RML SAMPLE ID	SAMPLE COUNT DATE	Eu-152 (keV)	KNOWN ACTIVITY (DPS)	RML ACTIVITY (DPS)	% ERR (stat)	RML UNCERTAINTY (DPS)	RML/KNOWN RATIO	QC RESULTS	COMMENTS
A1 (PG-8)	031489019	3/14/89	MEAN	2.79E+05	2.82E+05	0.25	6.35E+03	1.01	I	NONE
			122	2.79E+05	2.82E+05	0.53	6.48E+03	1.01	I	NONE
			779	2.79E+05	2.73E+05	0.60	6.32E+03	0.98	I	NONE
			1408	2.79E+05	2.88E+05	1.12	7.20E+03	1.03	I	NONE

RML UNCERTAINTY is the total uncertainty resulting from the statistical, sample geometry(1%) and detector efficiency(2%). These uncertainties have been propagated in quadrature and are expressed as one estimated standard deviation.

NOTE QC RESULTS I = "IN CONTROL" (< or = 2 standard deviations from the known).
Iw = "IN CONTROL-warning" (>2 std.dev., <3 std.dev. from the known).
O = "OUT-OF CONTROL" (> or = 3 standard deviations from the known).

Criteria of + or - 3 standard deviations is from the Conference on Quality Assurance for Environmental Measurements sponsored by the ASTM, EPA and NBS - 1985. Proceedings ("Quality Assurance for Environmental Measurements") by Taylor/Stanley pg 400.

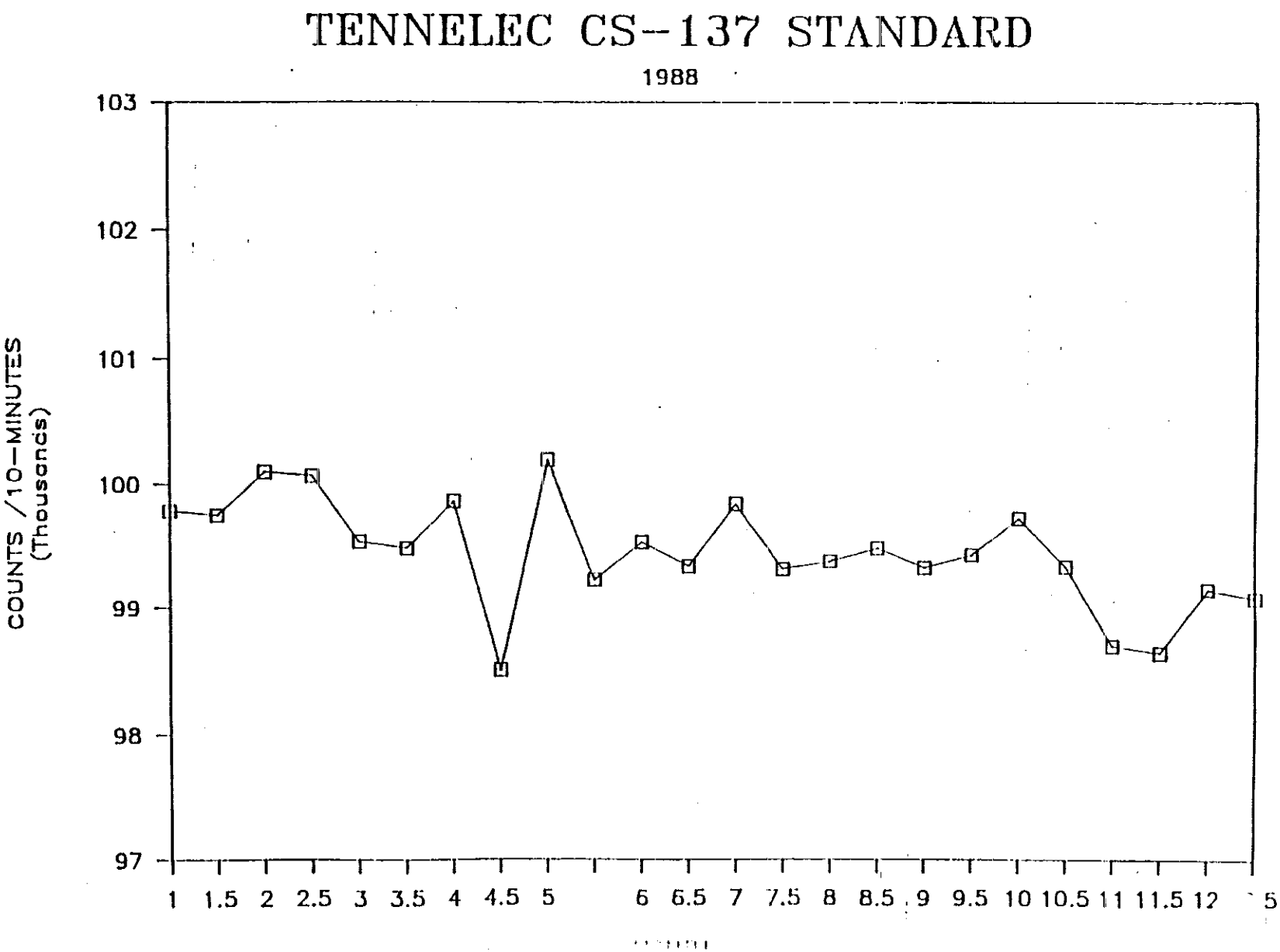
APPENDIX D

TENNELEC BACKGROUND AND QA CHECK
1988
10-MINUTE COUNTS

	AVERAGE			STANDARD DEVIATION			RUNNING AVERAGE		
	ALPHA	BETA	CS-137 STD	ALPHA	BETA	CS-137	ALPHA	BETA	CS-137
1ST JAN	4.5	29.0	99785	1.2	5.7		4.5	29.0	99785
2ND JAN	3.3	28.6	99752	1.3	7.2	17	3.9	28.8	99769
1ST FEB	4.1	32.2	100098	1.6	8.5	156	4.0	29.9	99878
2ND FEB	4.6	27.3	100066	1.5	7.8	158	4.1	29.2	99925
1ST MAR	3.6	27.3	99538	1.7	5.8	209	3.9	28.8	99848
2ND MAR	3.5	29.4	99484	1.3	4.9	234	4.0	29.1	99787
1ST APR	4.4	29.6	99865	2.1	4.2	219	4.0	28.9	99798
2ND APR	3.2	27.8	98511 *	0.7	8.5	472	3.9	28.7	99637
1ST MAY	3.3	25.8	100194	1.6	3.6	478	3.8	28.5	99699
2ND MAY	2.3	25.4	99231	1.3	4.5	475	3.7	28.2	99652
1ST JUN	2.5	26.3	99535	0.8	6.8	454	3.6	28.0	99642
2ND JUN	1.9	26.7	99339	0.9	3.8	443	3.4	27.9	99617
1ST JUL	3.8	27.8	99840	2.0	8.7	422	3.4	27.8	99611
2ND JUL	3.2	26.4	99319	1.2	4.5	433	3.4	27.8	99594
1ST AUG	3.6	22.5	99384	1.4	3.4	411	3.5	27.5	99596
2ND AUG	3.6	24.8	99492	1.4	5.9	399	3.5	27.3	99590
1ST SEP	4.0	32.0	99334	1.7	21.2	392	3.5	27.6	99575
2ND SEP	3.1	32.4	99436	1.4	14.9	382	3.5	27.8	99567
1ST OCT	3.3	29.9	99729	1.2	12.3	374	3.5	27.9	99575
2ND OCT	3.3	28.3	99344	1.2	10.3	368	3.5	28.0	99564
1ST NOV	4.6	27.1	98703 *	1.8	4.7	403	3.5	27.9	99523
2ND NOV	3.6	27.2	98646 *	1.5	6.6	434	3.5	27.9	99483
1ST DEC	3.8	25.6	99160	1.3	6.0	430	3.5	27.8	99469
2ND DEC	3.8	25.0	99089	1.2	5.5	427	3.5	27.7	99453
RUN AVG	3.5	27.7	99453	1.4	7.3	356	3.7	28.2	99652
STD DEV	0.7	2.3	427						

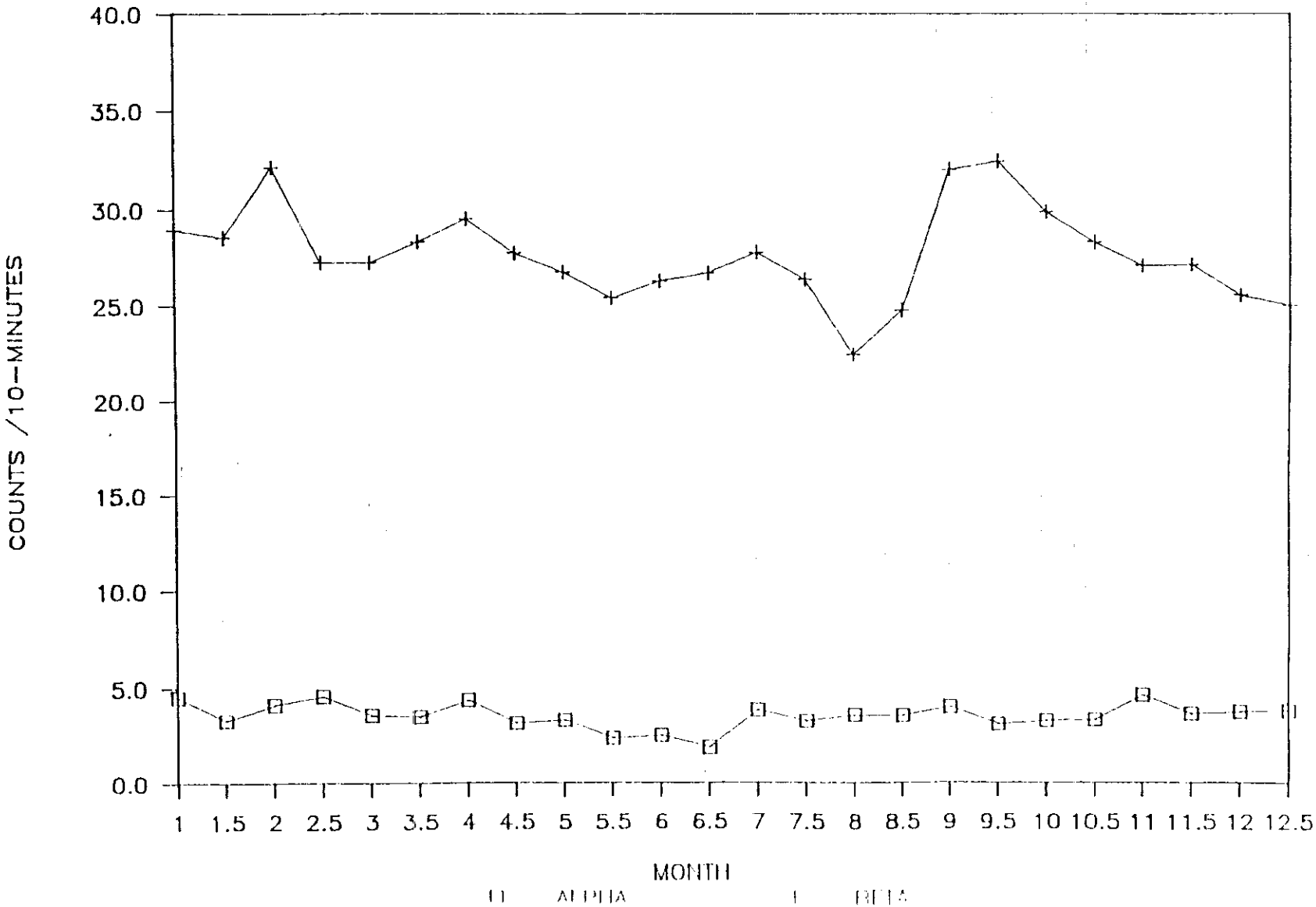
NOTE: * INDICATES A VALUE OUT OF STATISTICAL RANGE (2 sig) OF AVG RUNNING AVG.

CS-137 STD. DECAY CORRECTED TO REFERENCE DATE 4/1/85.


TENNELEC CS-137 STANDARD
1988
COUNTS /10-MINUTES
(Thousands)
103
102
101
100
99
98
97
1 1.5 2 2.5 3 3.5 4 4.5 5 6 6.5 7 7.5 8 8.5 9 9.5 10 10.5 11 11.5 12 5

TENNELEC BACKGROUND DATA

1988



APPENDIX E

ENVIRONMENTAL MONITORING QC PROGRAM

SAMPLE PREPARATION DATE	SAMPLE ID	RADIO NUCLIDE	NUMBER PREVIOUS AGREEMENTS	NUMBER PREVIOUS DISAGREEMENT	STD CONC. (uCi/G)	LAB MEAS. (uCi/G)	LAB 1 SIGMA (uCi/G)	LAB RESOL.	RATIO LAB/STD	AGREEMENT CRITERIA LOWER	AGREEMENT CRITERIA UPPER	ACCUMULATIVE NUMBER TIMES AGREE	ACCUMULATIVE NUMBER TIMES DISAGREE
2/2/89	B8R08502	Mn-54			1.65E-05	1.55E-05	1.1E-06	14	0.94	0.60	1.66	1	0
		Co-60			1.244E-05	1.12E-05	8E-07	14	0.90	0.60	1.66	1	0
		Cs-137			2.03E-05	1.86E-05	1.3E-06	14	0.92	0.60	1.66	1	0
		Ce-144			1.73E-04	1.52E-04	1.1E-05	14	0.88	0.60	1.66	1	0
		Am-241			1.110E-04	9.91E-05	7.4E-06	13	0.89	0.60	1.66	1	0
2/2/89	B8R08501	Mn-54			1.15E-06	1.06E-06	9E-08	12	0.92	0.60	1.66	1	0
		Co-60			8.98E-07	7.70E-07	6.9E-08	11	0.86	0.60	1.66	1	0
		Cs-137			9.33E-07	7.96E-07	7.3E-08	11	0.85	0.60	1.66	1	0
		Ce-144			4.9E-06	4.60E-06	3.7E-07	12	0.94	0.60	1.66	1	0
		Am-241			5.56E-06	5.27E-06	4.1E-07	13	0.95	0.60	1.66	1	0

Appendix F

RML QUALITY CONTROL DATA SHEET

GAMMA MEASUREMENTS

ENVIRONMENTAL MONITORING PROGRAM

----------(SOIL)----------

ESPID	RML SAMPLE ID	SAMPLE PREP. DATE	RADIO-NUCLIDE	KNOWN ACTIVITY (uCi/gm)	RML ACTIVITY (uCi/gm)	RML UNCERTAINTY (uCi/gm)	RML/KNOWN RATIO	QC RESULTS	COMMENTS
88R08S01	A5020789012	02/02/89	Mn-54	1.15E-06	1.06E-06	8.00E-08	0.92	I	NONE
			Co-60	8.98E-07	7.70E-07	6.90E-08	0.86	I	
			Cs-137	9.33E-07	7.96E-07	7.30E 08	0.85	I	
			Ce-144	4.90E-06	4.60E-06	3.70E-07	0.94	I	
			Am-241	5.56E-06	5.27E-06	4.10E-07	0.95	I	
88R08S02	A6020789013	02/02/89	Mn-54	1.65E-05	1.55E-05	1.10E-06	0.94	I	NONE
			Co-60	1.24E-05	1.12E-05	8.00E-07	0.90	I	
			Cs-137	2.03E-05	1.86E-05	1.30E-06	0.92	I	
			Ce-144	1.73E-04	1.52E-04	1.10E-05	0.88	I	
			Am-241	1.11E-04	9.91E-05	7.40E-06	0.89	I	
88R08S03	A5020789024	02/02/89	None	BLANK	ND	ND			

RML UNCERTAINTY is the total uncertainty resulting from the statistical, sample geometry(5%) and detector efficiency(5%). These uncertainties have been propagated in quadrature and are expressed as one estimated standard deviation.

NOTE QC RESULTS I = "IN CONTROL" (< or = 2 standard deviations from the known).
Iw = "IN CONTROL-warning" (>2 std.dev., <3 std.dev. from the known).
O = "OUT OF-CONTROL" (> or = 3 standard deviations from the known).

Criteria of + or - 3 standard deviations is from the Conference on Quality Assurance for Environmental Measurements sponsored by the ASTM, EPA and NBS - 1985. Proceedings ("Quality Assurance for Environmental Measurements") by Taylor/Stanley pg.400.

To: U.S. Environmental Protection Agency
Environmental Monitoring Systems Laboratory
Nuclear Radiation Assessment Division
Radioanalysis Branch
Quality Assurance Group
P.O. Box 93478
Las Vegas, Nevada 89193-3478

APPENDIX G

2/13/89

Please include our laboratory in the cross-check studies we have indicated below. All samples are to be shipped to:

Contact Person: Robert J. Gehrke

Title: Unit manager

Laboratory: Radiation Measurements Laboratory / EG&G Idaho Inc.

Address: Idaho National Engineering Laboratory

Address(cont.): P.O. Box 1625; Idaho Falls, Idaho 83415

Telephone No.: (208) 526-4155

NRC License and/or State License: Type(s): Government National Lab.

Number(s): DE-AC07-76ID01570

Note: When requesting participation in a study containing either nuclear by-products or special nuclear materials, a copy of the NRC license(s) must accompany the request.

Please indicate the desired frequency of participation.

Please make the following changes for us. We are Lab-ID # ØA

WATER:	Triannually	Semiannually	Annually
Gamma	[X]	[ ]	[ ]
Iodine-131		[X]	[ ]
Gross Alpha, Gross Beta	[X]	[ ]	[ ]
Tritium	[X]	[ ]	[ ]
Radium-226, Radium-228	[ ]	[ ]	[ ]
Plutonium-239		[X]	[ ]
Strontium-89, Strontium-90	[X]	[ ]	[ ]
Natural Uranium	[ ]	[X]	[ ]

WATER: (continued)	Semiannually	Annually
Mixed Alpha, Beta, Gamma (Blind Performance Sample)	[ ]	[ ]
MILK:		
Strontium, Gamma	[ ]	[ ]
AIR FILTER:		
Gross Alpha, Gross Beta, Cesium-137, Strontium-90	[X]	[ ]

I certify this Laboratory is authorized to receive the samples requested.

Signature: Robert J. Gehrke Date: 2/3/89

Title: unit manager

APPENDIX H

EMSL-LV INTERCOMPARISON TEST RESULTS
LABORATORY DA
1988

EXPERIMENTAL SIGMA = standard deviation of the three laboratory results.
PRECISION = expected laboratory precision (1S, 1 determination).
GR-PC = guard ring proportional counter.
GE-SP = germanium gamma-ray spectrometer.
S-SI = surface barrier silicon alpha spectrometer.
LSC = liquid scintillation counter.

NOTE: * indicates possible laboratory control problem.

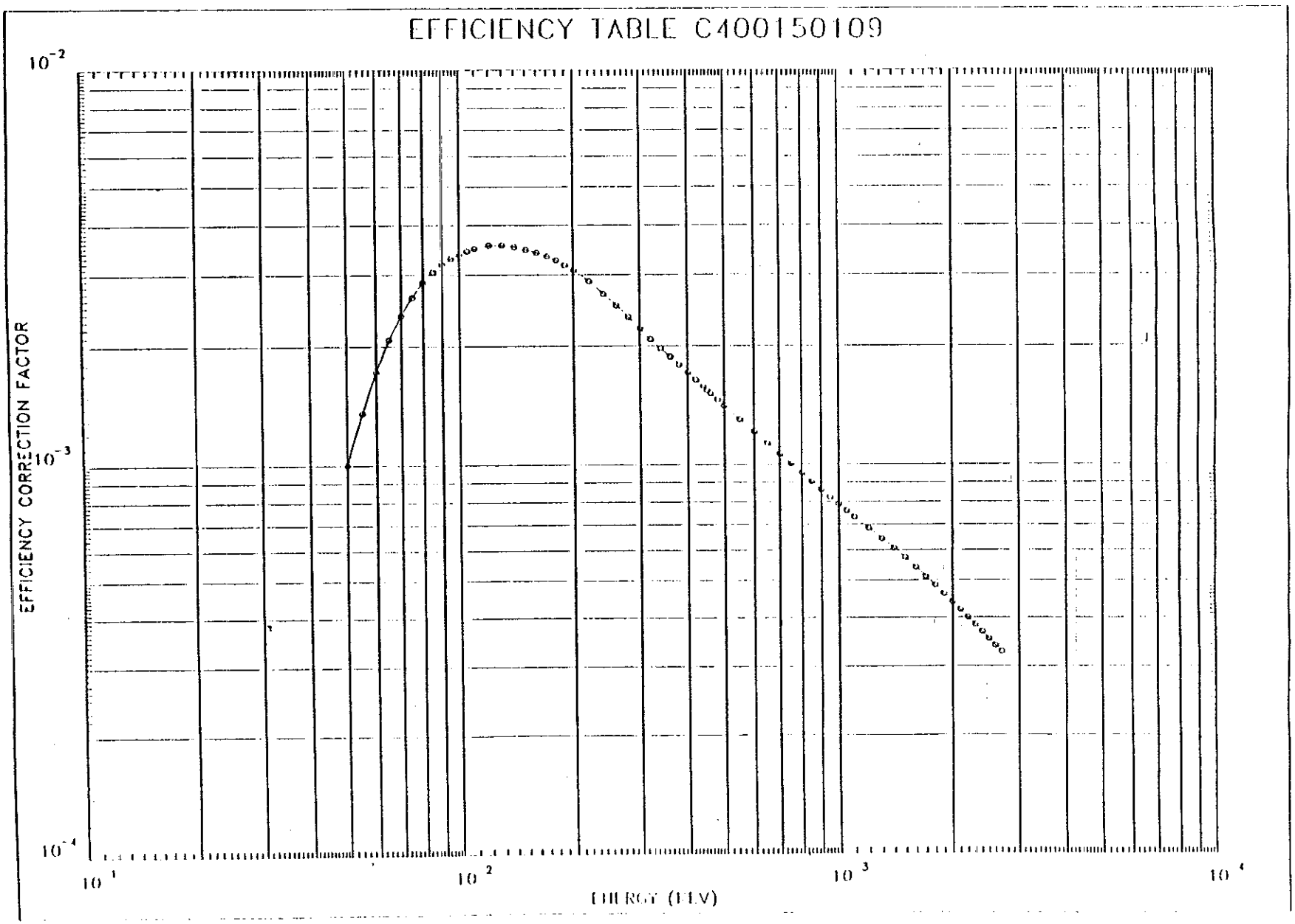
LAB DATA		SAMPLE DATA		TEST DATA	NUCLIDE	RML RESULT	EXPERIMENTAL SIGMA	AVERAGE
DETECTOR:	GR-PC	TEST DATE:	010888	KNOWN VALUE: 30.00	Sr-89	NO DATA PROVIDED		
CHEMISTRY:	YES	SAMPLE:	LIQUID	PRECISION: 5.00				
ANALYST:	CHEM	VOLUME:	2 l	UNITS: pCi/l				
				KNOWN VALUE: 15.00	Sr-90	14.0		
				PRECISION: 1.50		15.0		
				UNITS: pCi/l		17.0	1.53	15.33
DETECTOR:	GR-PC	TEST DATE:	010888	KNOWN VALUE: 4.00	GROSS ALPHA	1.0		
CHEMISTRY:	NO	SAMPLE:	LIQUID	PRECISION: 5.00		2.0		
ANALYST:	CHEM	VOLUME:	700 ml	UNITS: pCi/l		2.0	0.58	1.67
				KNOWN VALUE: 8.00	GROSS BETA	2.0		
				PRECISION: 5.00		4.0		
				UNITS: pCi/l		3.0	1.00	3.00
DETECTOR:	GE-SP	TEST DATE:	020588	KNOWN VALUE: 69.00	Co-60	68.0		
CHEMISTRY:	NO	SAMPLE:	LIQUID	PRECISION: 5.00		71.0		
ANALYST:	RML	VOLUME:	4 l	UNITS: pCi/l		69.0	1.53	69.33
				KNOWN VALUE: 94.00	Zn-65	97.0		
				PRECISION: 9.40		99.0		
				UNITS: pCi/l		95.0	2.00	97.00
				KNOWN VALUE: 105.00	Ru-106	102.0		
				PRECISION: 10.50		96.0		
				UNITS: pCi/l		109.0	6.81	102.33
				KNOWN VALUE: 64.00	Cs-134	59.0		
				PRECISION: 5.00		61.0		
				UNITS: pCi/l		61.0	1.15	60.33
				KNOWN VALUE: 94.00	Cs-137	96.0		
				PRECISION: 5.00		97.0		
				UNITS: pCi/l		96.0	0.58	96.33

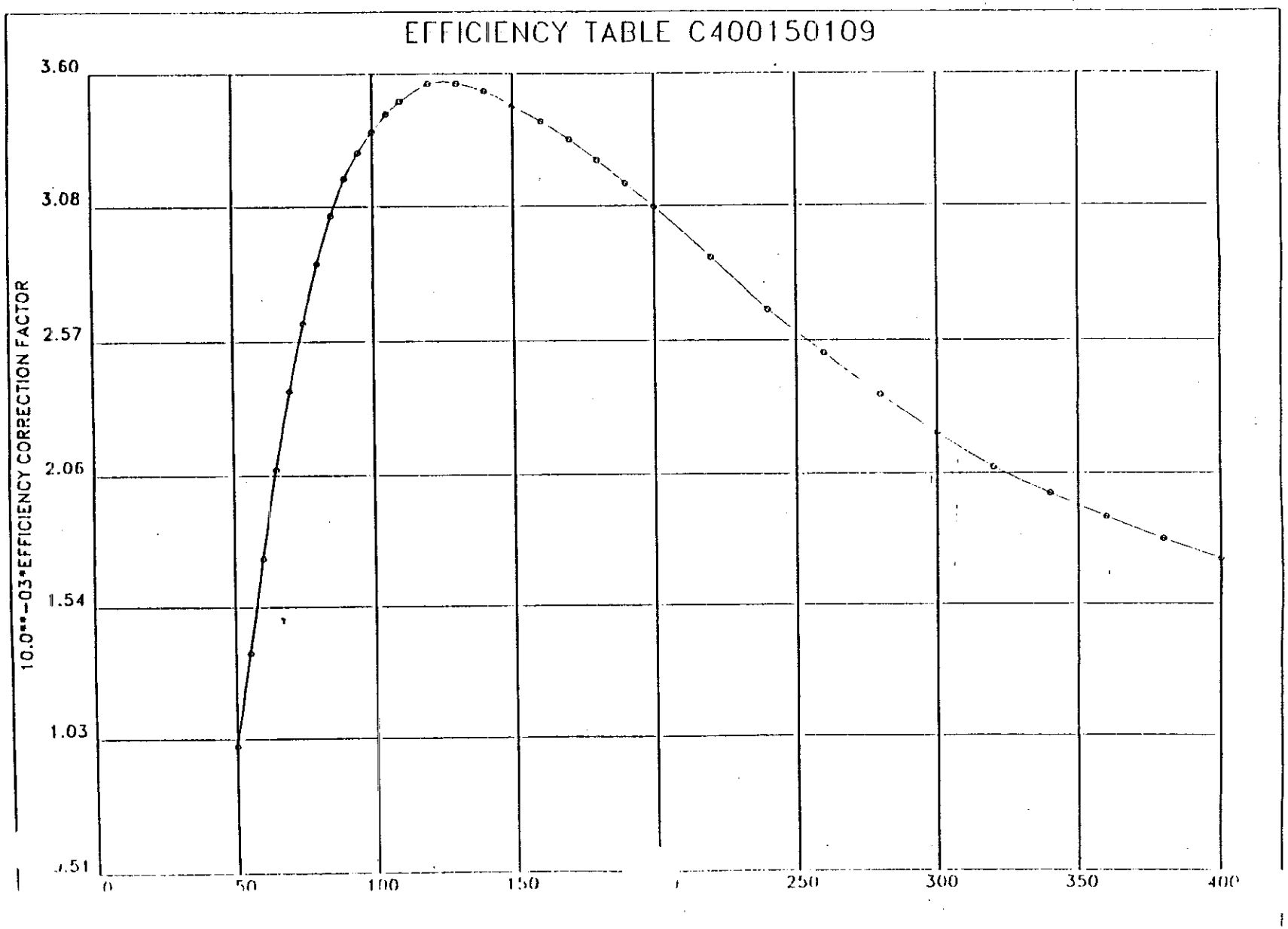
APPENDIX I

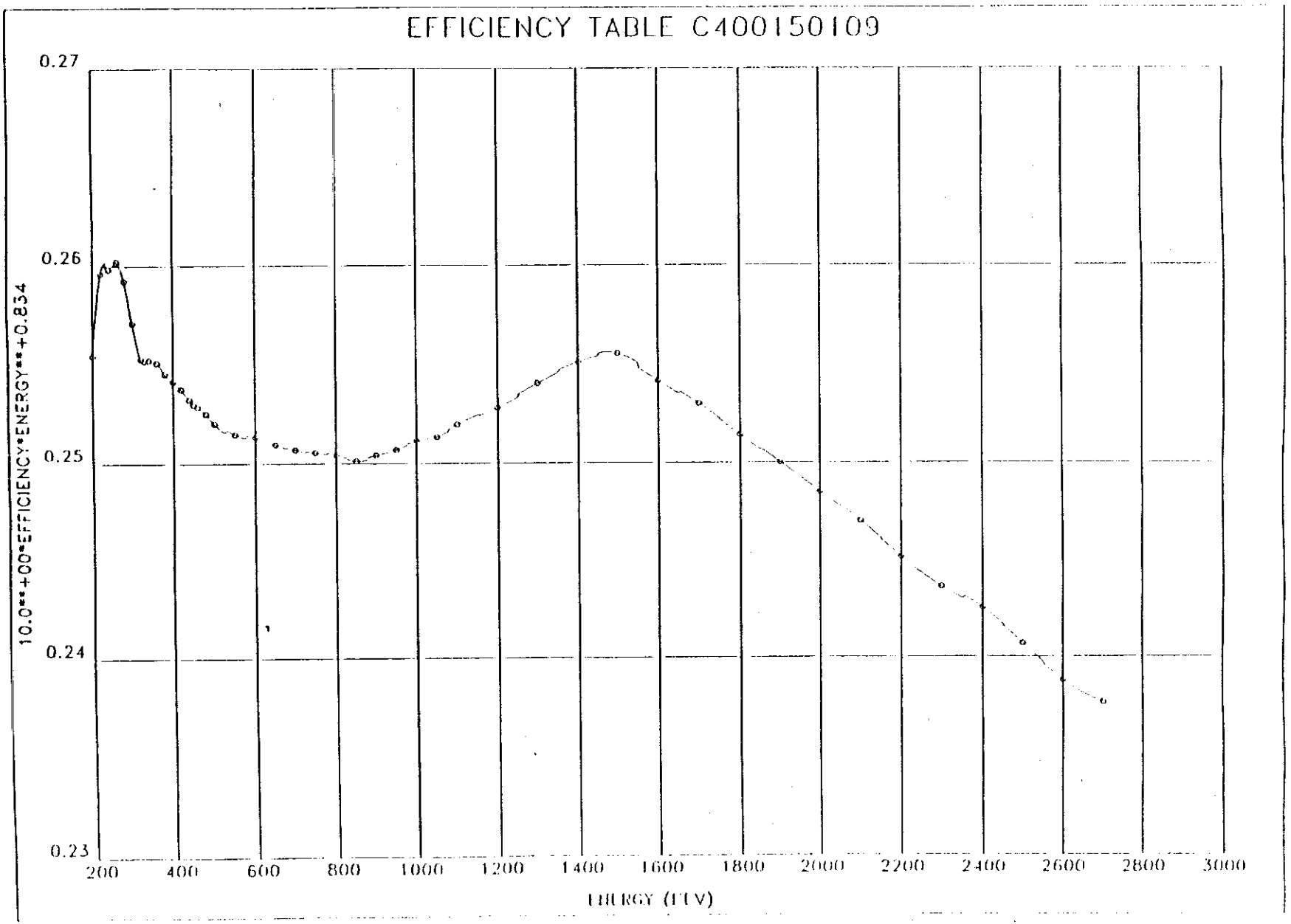
RESL
INELGA INTERCOMPARISON TEST RESULTS
CYBER ANALYSIS

NOTE: Ratio of LAB/KNOWN results for "KNOWN" activity equals 1.000.

	TEST DATA	NUCLIDE OR ENERGY	RML RESULT	RML TOT UNC.	RATIO RML/KNOWN	"RML" RATIO UNC.	KNOWN ACTIVITY	KNOWN TOT UNC.	"KNOWN" RATIO UNC.
TEST NO.:	23	Cr-51	1.16E-01	4.00E-03	0.984	0.046	1.18E-01	4.00E-03	0.048
SAMPLE:	LIQUID	Mn-54	5.96E-03	1.90E-04	0.986	0.055	6.05E-03	2.80E-04	0.065
ORIGIN:	RESL	Co-58	1.28E-02	4.00E-04	0.986	0.049	1.30E-02	5.00E-04	0.054
REF. DATE:	111887	Fe-59	2.52E-02	8.00E-04	0.987	0.057	2.55E-02	1.20E-03	0.067
UNITS:	uCi/g	Co-60	1.07E-02	3.00E-04	0.987	0.041	1.08E-02	3.00E-04	0.039
		Zn-65	3.24E-02	1.00E-03	0.977	0.047	3.32E-02	1.20E-03	0.051
		Cs-134	2.50E-02	8.00E-04	1.022	0.057	2.45E-02	1.10E-03	0.063
		Cs-137	2.04E-02	6.00E-04	0.992	0.042	2.06E-02	6.00E-04	0.041
		Ce-141	2.04E-02	6.00E-04	0.945	0.049	2.16E-02	9.00E-04	0.059
		Ce-144	1.76E-02	6.00E-04	0.960	0.050	1.83E-02	7.00E-04	0.054


EFFICIENCY TABLE C400150109
EFFICIENCY CORRECTION FACTOR
10^{-2}
10^{-3}
10^{-4}
10^{1}
10^{2}
10^{3}
10^{4}
ENERGY (KEV)


EFFICIENCY TABLE C400150109
10.0**-03*EFFICIENCY CORRECTION FACTOR
3.60
3.08
2.57
2.06
1.54
1.03
.51
0
50
100
150
250
300
350
400


EFFICIENCY TABLE C400150109
0.27
0.26
0.25
0.24
0.23
10.0**+00*EFFICIENCY*ENERGY**+0.834
200
400
600
800
1000
1200
1400
1600
1800
2000
2200
2400
2600
2800
3000
ENERGY (EV)

APPENDIX K

RML/RADIOCHEMISTRY ANALYSIS REQUEST/CUSTODY FORM
PHONE: 6-4177 / 6-4182

ONE SAMPLE PER SHEET!

SAMPLE NAME OR DESCRIPTION: _____

FACILITY/AREA SAMPLE ID #: _____ - _____

REQUESTING FACILITY: _____ SEND RESULTS TO: _____

SUBMITTED BY: _____ EXT.: _____

REQUESTOR, PLEASE CHECK TYPE OF ANALYSES DESIRED:

____ Isotopic gamma scan
____ Gross alpha/beta
____ Strontium beta
____ Tritium
____ Actinide
____ Other _____

RML/CHEMISTRY ONLY

DATE RECEIVED: _____
INITIAL: _____

DATE COMPLETED		INITIAL
_____	Gamma	_____
_____	A/Beta	_____
_____	Sr-90	_____
_____	H-3	_____
_____	Actinide	_____
_____	Other	_____

FORWARDED TO: _____
DATE: _____

REQUESTOR, PLEASE FILL IN APPROPRIATE INFORMATION BELOW:

Activity (mr/hr): _____

Sample On (time & date): _____

Sample Off (time & date): _____

Collection time (hrs): _____

No. of cams in envelope: _____

Stack flow (cfm): _____

Filter flow (cfm): _____

Filter fraction (%): (Area used) _____

Effluent volume (gal.): (Total gal. discharged) _____

REMARKS: _____

EG&G Idaho, Inc.

FORM EG&G-1490
(Rev. 12-87)

RADIATION MEASUREMENTS LABORATORY - SAMPLE AND COUNTING INFORMATION

Sample: NAME _____ Transferred ☐ Analyzed ☐
ESPID or S.T. # ID _____ ID _____ CODE _____
Sample/Filter (In Time) _____ Date _____ Irradiation Time (HRS) _____
Sample Count Started: Time _____ Date _____ Count Time (MIN) _____
Detector # _____ Distance (cm) _____ Sample Volume _____ Volume Units _____
Eff. Corr. Factor _____ Efficiency Table _____ Analyst _____

	Additional Analyses Requested:	Remarks:
No. of CAMS _____	___ None	
Stack Flow (CFM) _____	___ Gross Alpha	
Filter Flow (CFM) _____	___ Gross Beta	
Coll. Time (HRS) _____	___ Sr	
Filter Frac. (%) _____	___ H-3	
Reactor Power (MW) _____	___ _____	
Effluent Volume (GAL) _____	___ Stored	
Date Received _____	___ Dumped or Disposed of	

Sample Forwarded to _____ Date _____

Sample: NAME _____ Transferred ☐ Analyzed ☐
ESPID or S.T. # ID _____ ID _____ CODE _____
Sample/Filter (In Time) _____ Date _____ Irradiation Time (HRS) _____
Sample Count Started: Time _____ Date _____ Count Time (MIN) _____
Detector # _____ Distance (cm) _____ Sample Volume _____ Volume Units _____
Eff. Corr. Factor _____ Efficiency Table _____ Analyst _____

	Additional Analyses Requested:	Remarks:
No. of CAMS _____	___ None	
Stack Flow (CFM) _____	___ Gross Alpha	
Filter Flow (CFM) _____	___ Gross Beta	
Coll. Time (HRS) _____	___ Sr	
Filter Frac. (%) _____	___ H-3	
Reactor Power (MW) _____	___ _____	
Effluent Volume (GAL) _____	___ Stored	
Date Received _____	___ Dumped or Disposed of	

Sample Forwarded to _____ Date _____

Sample: NAME _____ Transferred ☐ Analyzed ☐
ESPID or S.T. # ID _____ ID _____ CODE _____
Sample/Filter (In Time) _____ Date _____ Irradiation Time (HRS) _____
Sample Count Started: Time _____ Date _____ Count Time (MIN) _____
Detector # _____ Distance (cm) _____ Sample Volume _____ Volume Units _____
Eff. Corr. Factor _____ Efficiency Table _____ Analyst _____

	Additional Analyses Requested:	Remarks:
No. of CAMS _____	___ None	
Stack Flow (CFM) _____	___ Gross Alpha	
Filter Flow (CFM) _____	___ Gross Beta	
Coll. Time (HRS) _____	___ Sr	
Filter Frac. (%) _____	___ H-3	
Reactor Power (MW) _____	___ _____	
Effluent Volume (GAL) _____	___ Stored	
Date Received _____	___ Dumped or Disposed of	

Sample Forwarded to _____ Date _____

APPENDIX M

****
* R M L P R O C E D U R E S *
****

RML - OPERATIONS

PROCEDURE TITLE	NUMBER	VERSION	ISSUE DATE	DISTRIBUTION
ATR LOOP RADIONUCLIDE ANALYSIS.	RML-1	1	05/02/88	RML, DM
SUBSURFACE SOIL RADIOANALYTICAL MEASUREMENTS AT IRC-LABC6.	RML-2	1	06/10/88	IRC, DM
SOIL, VEGETATION AND MAMMAL SAMPLE MEASUREMENTS.	RML-3	1	10/14/88	RML, DM
AIR MONITOR FILTER SAMPLE MEASUREMENTS.	RML-4	1	10/20/88	RML, DM
GROSS ALPHA-BETA COUNTING.	RML-5	1	10/25/88	RML, DM
RML LIQUID SAMPLE COUNTING/ANALYSIS.	RML-6	1	10/25/88	RML, DM
EBERLINE PING-2A CALIBRATION.	RML-7	1	10/25/88	RML, DM
RML FOUR-CHANNEL ALPHA-BETA COUNTING AND ANALYSIS SYSTEM.	RML-8	1	10/25/88	RML, DM
RML ANALYSIS OF X-RAY EMITTING RADIO-NUCLIDE IN ATR STACK EFFLUENT GAS SAMPLE.	RML-9	2	11/21/88	RML, DM
RADIATION MEASUREMENTS LABORATORY TRAINING.	RML-10	1	10/25/88	RML, DM
PREPARATATION OF STANDARD SOURCE AND CALIBRATION OF FULL ENERGY PEAK EFFICIENCY FOR AIR FILTERS.	RML-11	1	03/28/89	RML, DM

****
* RML PROCEDURES *
****

RML - DATA MANAGEMENT

PROCEDURE TITLE	NUMBER	VERSION	ISSUE DATE	DISTRIBUTION
EVALUATION AND VERIFICATION OF DATA FOR RADIONUCLIDE IDENTIFICATION/SELECTION.	DM-1	2	04/19/89	RML,DM
RWMIS AIRBORNE EFFLUENT REPORT.	DM-2	2	04/27/89	DM
ATR STACK EFFLUENT REPORT.	DM-3	2	04/21/89	DM
RWMIS LIQUID EFFLUENT REPORT.	DM-4	2	04/27/89	DM
TRA RSHT EFFLUENT REPORT.	DM-5	2	04/20/89	DM
ATR OPERATIONAL HISTORY INFORMATION.	DM-6	1	06/15/89	DM
ENVIRONMENTAL AIR SAMPLE ANALYSIS AND REPORT.	DM-7	1	03/01/88	DM
GROSS ALPHA-BETA AIR SAMPLE ANALYSIS AND REPORT.	DM-8	1	09/01/88	DM
SOIL, VEGETATION AND MAMMAL SAMPLE ANALYSIS AND REPORT.	DM-9	1	09/09/88	DM
RML AND SPING-3A ACTIVITY COMPARISON QA CHECKS.	DM-10	2	10/07/88	DM
WATER AND ASSOCIATED FILTERED MATERIAL ANALYSIS AND REPORT.	DM-11	1	10/14/88	DM
EFFICIENCY CURVE GENERATION	DM-12	1	03/06/89	DM

****
* MISCELLANEOUS RML DOCUMENTS *
****

DOCUMENT TITLE	NUMBER	VERSION	DATE	DISTRIBUTION
CONTINGENCY PLAN FOR BACKUP OF THE VAX 750	GEH-44-87	N/A	07/01/87	DM
VAXGAP: A CODE FOR THE ROUTINE ANALYSES OF GAMMA-RAY PULSE-HEIGHT SPECTRA ON A VAX COMPUTER.	EG&G-2533	N/A	05/xx/88	RML, DM
BIMONTHLY STATUS OF AUDIT FINDINGS FROM OUTSIDE ORGANIZATIONS	LPL-68-88	N/A	08/29/88	DM
OPERATORS GUIDE TO "VAXGAP": A GAMMA-RAY SPECTRAM ANALYSIS SPECTRUM ANALYSIS	ST-CS-027-88	N/A	09/12/88	RML, DM
CALIBRATION AND USE OF GERMANIUM DETECTORS FOR MEASUREMENTS OF GAMMA-RAY EMISSION OF RADIONUCLIDES.	ANSI N42.14	N/A	09/25/88	DM
CLOSURE OF DOE ID EFFLUENT AND ENVIRONMENTAL AUDIT	GEH-95-88	N/A	10/26/88	DM
RECORDS MANAGEMENT PLAN (DOE 1324.2A)	DOE 1324.2A	N/A	01/06/89	DM
RML QUALIFICATION CHECKLIST	N/A	N/A	01/26/89	DM
RML GROSS ALPHA AND GROSS BETA DETECTION LIMITS FOR ENVIRONMENTAL MONITORING	LDK-16-89	N/A	03/01/89	DM

OLD PROCEDURES

RML SOIL SAMPLE ANALYSIS ROUTINES	SOIL-1	N/A	05/18/82	RML, DM
RML AIR FILTER SAMPLE ANALYSIS ROUTINES	AIR-1	N/A	05/18/82	RML, DM
RML LIQUID SAMPLE ANALYSIS ROUTINES	LIQ-1	N/A	07/07/83	RML, DM
RML PDP-11/44 SYSTEM TRA HOTCELL SCANNER REMOTE SYSTEM	11/44-9	N/A	08/06/84	RML, DM
RML PDP-11/44 TRA RETENTION BASIN REMOTE SYSTEM	11/44-8	N/A	08/06/84	RML, DM
RML PDP-11/44 SYSTEM DISK ASSIGNMENTS AND BACKUP	11/44-7	N/A	08/06/84	RML, DM

3-23-86

From RJG

APPENDIX N

Estimated RML Detection Limits for Environmental Surveillance Program Samples[a]

	16hr. count time Air Filters[b] ↓				16hr. count time Surface Water[c]				2hr. count time Soil		16hr. count time Dry Veget. ↓		16hr. count time Veg. or Mammal in Water	
	High Vol.		Low Vol.		Filtrate		Filtered		450ml Jar		450ml Jar		450ml Jar	
Nuclide	pCi/cc	pCi	pCi/cc	pCi	pCi/cc	pCi	pCi/cc	pCi	pCi/g	pCi	pCi/cc	pCi	pCi/cc	pCi
Sc-46	5E-10	12	5E-10	3	0.006	25	4E-4	1.5	0.3	210	0.07	30	0.07	30
Cr-51	80E-10	200	100E-10	60	0.06	250	80E-4	30	3.0	2100	0.7	300	0.7	300
Mn-54	5E-10	12	5E-10	3	0.006	25	4E-4	1.5	0.3	210	0.07	30	0.07	30
Co-57	8E-10	20	16E-10	10	0.03	120	13E-4	5	0.9	600	0.2	90	0.3	140
Co-58	5E-10	12	5E-10	3	0.006	25	4E-4	1.5	0.3	210	0.07	30	0.07	30
Fe-59	8E-10	20	8E-10	5	0.01	40	6E-4	2.5	0.6	400	0.15	60	0.15	60
Co-60	8E-10	20	10E-10	6	0.006	25	8E-4	3	0.3	210	0.09	40	0.09	40
Zn-65	16E-10	40	20E-10	12	0.012	50	15E-4	6	0.6	400	0.2	80	0.20	80
Nb-94	5E-10	12	5E-10	3	0.006	25	4E-4	1.5	0.3	210	0.07	30	0.07	30
Nb-95	5E-10	12	5E-10	3	0.006	25	4E-4	1.5	0.3	210	0.07	30	0.07	30
Zr-95	12E-10	30	10E-10	7	0.010	40	10E-4	4	0.6	400	0.15	60	0.15	60
Ru-103	6E-10	16	6E-10	4	0.006	25	5E-4	2	0.3	210	0.07	30	0.07	30
Ru-106	80E-10	200	100E-10	60	0.06	250	80E-4	30	2.0	1400	0.7	300	0.7	300
Ag-110m	5E-10	12	5E-10	3	0.008	30	4E-4	1.5	0.3	210	0.07	30	0.07	30
Sb-124	12E-10	30	10E-10	7	0.016	60	10E-4	4	2.0	1400	0.4	150	0.2	90
Sb-125	8E-10	20	10E-10	6	0.010	40	8E-4	3	0.6	400	0.15	60	0.15	60
Cs-134	5E-10	12	5E-10	3	0.006	25	4E-4	1.5	0.3	210	0.07	30	0.07	30
Cs-137	8E-10	20	8E-10	5	0.008	30	6E-4	2.5	0.3	210	0.09	40	0.09	40
Ce-141	5E-10	12	6E-10	4	0.008	30	5E-4	2	0.3	210	0.07	30	0.07	30
Ce-144	30E-10	80	30E-10	20	0.06	240	25E-4	10	1.5	1100	0.4	150	0.4	150
Eu-152	12E-10	30	15E-10	8	0.015	60	10E-4	4	1.5	1100	0.4	150	0.2	90
Eu-154	6E-10	16	6E-10	4	0.015	60	5E-4	2	0.6	400	0.15	60	0.15	60
Eu-155	24E-10	60	25E-10	15	0.030	120	20E-4	8	2.0	1400	0.4	150	0.5	200
Hf-181	5E-10	12	5E-10	3	0.006	25	4E-4	1.5	0.3	210	0.07	30	0.07	30
Ta-182	16E-10	40	16E-10	10	0.014	60	13E-4	5	0.9	600	0.2	90	0.2	90
Hg-203	5E-10	12	5E-10	3	0.005	20	4E-4	1.5	0.3	210	0.07	30	0.07	30
Am-241	30E-10	80	30E-10	20	0.040	160	25E-4	10	2.0	1400	0.3	140	0.3	140
Gross Alpha ——→			3.3E-9	1.9										
Gross Beta ——→			9.5E-9	5.3										

- Updated March 1989 (LDK-16-89)

R. J. Gehrke
April 7, 1989
LDK-27-89
Attachment

TABLE I

ESTIMATED RML DETECTION LIMITS FOR SUBSURFACE SOIL SAMPLES

Radionuclide	Subsurface Soil (70 cm^3) (pCi/g)
Sc-46	0.4
Cr-51	4.0
Mn-54	0.4
Co-58	0.4
Fe-59	0.8
Co-60	0.4
Zn-65	0.8
Nb-94	0.4
Nb-95	0.4
Zr-95	0.8
Ru-103	0.4
Ru-106	3.0
Ag-110m	0.4
Sb-124	3.0
Sb-125	0.8
Cs-134	0.4
Cs-137	0.4
Ce-141	0.4
Ce-144	2.0
Eu-152	2.0
Eu-154	0.8
Eu-155	3.0
Hf-181	0.4
Ta-182	1.5
Hg-203	0.4
Am-241	3.0

APPENDIX O

RESULTS OF NEUTRON FLUENCE STANDARD COUNTING BASED ON REDUCTION TO MEASURED CROSS SECTION

Reporting Laboratory: Idaho Nuclear Engineering Laboratory (INEL)

A. Measured Activity at EOI and Derivation of Average Reaction Rate

I.D.		Dosimetry Reaction	Observed Activity @EOI		Number of Nuclei × Yield[c] NY	Decay Constant $\lambda(s^{-1})$	Decay Correction Factor[d] C	Average Reaction Rate[e] <R>
Fluence Standard	Irrad.		Reported Format[a]	Standard Format A[b]				
Fe-Ni-A	Ti/Fe-2	$^{54}Fe(n,p)^{54}Mn$	4.407E+00	2.222E+03	2.000E+20	2.567E-08	0.9957	1.282E-15
Fe-Ni-A	Ti/Fe-2	$^{58}Ni(n,p)^{58}Co$	1.630E-02	8.22 E-04	1.260E+21	1.133E-07	0.9810	1.731E-15
Ni-C	U/Fe-1	$^{58}Ni(n,p)^{58}Co$	5.209E-02	1.495E-05	1.98 E+21	1.133E-07	0.9810	1.994E-15
Ti-B	U/Fe-1	$^{46}Ti(n,p)^{46}Sc$	6.362E+00	1.944E+03	3.07 E+20	9.570E-08	0.9839	1.974E-16
UN-51	U/Fe-3	$^{238}U(n,f)^{103}Ru$	9.141E+01	7.49 E-04	1.34 E+20	2.035E-07	0.9474	5.40 E-15
UN-51	U/Fe-3	$^{238}U(n,f)^{95}Zr$	4.664E+01	2.82 E-04	1.10 E+20	1.252E-07	0.9672	5.35 E-15
UN-51	U/Fe-3	$^{238}U(n,f)^{140}Ba$	2.344E+02	1.92 E-05	1.27 E+20	6.273E-07	0.8492	5.29 E-15
UN-51	U/Fe-3	$^{238}U(n,f)Ba-La$	2.341E-02	1.92 E+05	1.27 E+20	6.273E-07	0.8492	5.28 E-15
UN-51	U/Fe-3	$^{238}U(n,f)^{137}Cs$	3.311E+01	2.71 E-02	1.27 E+20	7.160E-10	0.9998	5.56 E-15

B. Derivation of Observed Cross Section and Comparisons with Published Experimental Values, and with Calculated Values for Neutron Dosimetry Standardization.

I.D.		NBS Average Fluence Rate $\langle\phi\rangle=\phi/T$	Cross Section Deduced from Reported Data $\langle R\rangle/\langle\phi\rangle$	Experimental Value (NBS Compendium)	Ratio: Deduced / Experiment	Calculated Cross Section[f]	Ratio: Deduced / Calculated
Fluence Standard	Reaction						
Fe-Ni-A	$^{54}Fe(n,p)$	1.553E+10	82.5 mb	81.7 mb	1.010	81.0	1.019
Fe-Ni-A	$^{58}Ni(n,p)$	1.553E+10	111.4	111	1.004	105.0	1.060
Ni-C	$^{58}Ni(n,p)$	1.798E+10	110.9	111	0.999	105.0	1.056
Ti-B	$^{46}Ti(n,p)$	1.713E+10	11.5	11.8	0.975	11.2	1.027
UN-51	$^{238}U(n,f)Ru$	1.712E+10	314.5	312	1.008	305.2	1.030
UN-51	$^{238}U(n,f)Zr$	1.712E+10	312.2	312	1.001	305.2	1.023
UN-51	$^{238}U(n,f)Ba$	1.712E+10	308.5	312	0.989	305.2	1.011
UN-51	$^{238}U(n,f)Ba-La$	1.712E+10	308.4	312	0.988	305.2	1.010
UN-51	$^{238}U(n,f)Cs$	1.712E+10	324.8	312	1.041	305.2	1.064

(a) Quantity reported (with gamma attenuation correction included): observed dps of reaction product at EOI per mg of foil.

(b) Free-field dps of reaction product at EOI = (Reported Format) × (foil mass)/$(1+u_{sc})$. The scattering correction, $(1+u_{sc})$, is given in the test report. A ^{235}U fission correction (2.2%) is included for the ^{238}U fluence standard (UN-51).

(c) Number of reaction isotope atoms in foil × fission yield when appropriate.

(d) Specified in the test report. For an uninterrupted irradiation of length T at a constant fluence rate, C is equal to $[(1 - \exp(-\lambda T))/\lambda T]$.

(e) Average reaction rate: $\langle R\rangle = \sigma\langle\phi\rangle = A/(\lambda C T N Y)$, where $\langle\phi\rangle$ is the NBS certified fluence divided by the length of the irradiation T as specified in the test report. As a measured quantity, $\langle R\rangle$ may be identified with the "saturation activity" per nucleus as employed in most ASTM standards, notably E261.

(f) Value calculated with ^{235}U fission spectrum shape and dosimetry cross sections from ENDF/B-V.