DATA VALIDATION STANDARD OPERATING PROCEDURES FOR

CONTRACT LABORATORY PROGRAM ROUTINE ANALYTICAL SERVICES

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IV
SCIENCE AND ECOSYSTEM SUPPORT DIVISION
OFFICE OF QUALITY ASSURANCE
ATHENS, GEORGIA 30605-2720

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Region IV QAO

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Introduction

The National Contract Laboratory Program (CLP) supports a major portion of the sample analysis needs of the EPA Superfund Program. Samples are collected by both EPA and contractor personnel and are submitted to an assigned contract laboratory for Routine Analytical Service (RAS) analysis. The laboratory analyzes the samples according to specified analytical protocols, assembles a data package (deliverables are specified by contract), and submits the package to the Science and Ecosystem Support Division, Athens, Georgia. The data package is given a technical quality assurance review (validation) and a report of this review is prepared. The validated data are entered into the Region IV Laboratory Information Management System (R4LIMS) with final data reports being generated by this system.

Purpose

The purpose of this document is to promote uniformity of data review, to help clarify and augment the review guidance of the National Functional Guidelines, to give guidance for areas of data review that require considerable professional judgement, and to specify procedures that are unique to the needs of Region IV.

Data Review - General

1. All data will be reviewed using the National Functional Guidelines for Data Review in conjunction with this SOP. Data review guidance may be amended by Region IV in order to better meet the technical requirements of the Region and/or Agency.

2. Reviews must be documented using the Region IV Data Review Forms (Attachments II and III) with all supporting documentation. Data reviews performed by contractor support personnel shall be transmitted to the Regional Work Assignment Manager with complete documentation as described in section II for Organics and Section III for Inorganics. Organic reviews are conducted separately from inorganic reviews.

3. Each Project requires a separate review. For those instances where one case has several labs, each lab requires a separate review (i.e., a single case with three different contract labs requires three review documents, one for each laboratory).

SECTION II

Organic Data Review

A. INTRODUCTION

Review of organic data is documented by using the organic data review form (Attachment II). Guidance for each of these sections is included in the National Functional Guidelines and/or in these supplemental sections. Data validators must use the national functional guidelines in conjunction with the Region IV Data Validation SOP. Notably, there is no single document that can be generated to cover all possible combinations of data quality decisions. Considerable professional judgement will be required for unique and subjective situations.

B. RECORDING/REPORTING of DATA - General

1. Any TCL analytes reported with a value below 1/10 of the CRQL shall be reported as not detected, i.e., CRQL value plus the U flag. Example: CRQL=10; Amount detected in sample 0.8; report 10U.

2. Unless otherwise specified, units will be ug/l for water and ug/kg for soil/sediments. Waste and tissue (fish) samples are reported in mg/kg.

3. A system of standard remarks and data qualifier flags is used to define and describe data. An explanation and documentation of these are contained in Attachment IV.

4. Reporting of QC data (blanks, spikes, etc) are discussed within their respective sections of this document.

C. HOLDING TIMES

Holding times are evaluated from the perspective of technical or actual holding times. These are determined from the age of the sample from date of sampling until preparation/extraction and analysis. The following guidance is based on the best available information on matrix holding times from 40CFR136 requirements and SW-846 guidance.

1. Pesticides and Semivolatiles - Prior to extraction:

Water

Day 1 thru 7	No flag
Day 8 thru 30	J all
Day 31 and greater	R negative, J positive

Sediments

Day 1 thru 14	No flag
Day 15 thru 30	J all
Day 31 and greater	R negative, J positive

Extracts (water and soil/sediments)

Day 1 thru 40	No flag
Day 41 thru 60	J all
Day 61 and greater	R negative, J positive

2. Volatiles - Water, Soil and Sediment

Day 1 thru 14	No flag
Day 15 thru 30	J all
Day 31 and greater	R negative, J positive

3. Volatiles - Soil analyzed using SW-846 Method 5030/5035

Encore Samples

Greater than 48 hours	J all
Greater than 96 hours	R negative, J positive

Extracts (of Encore Samples)

Day 1 thru 40	No flag
Day 41 thru 60	J all
Day 61 and greater	R negative, J positive

D. BLANKS

The goal of the evaluation of blank results is to determine the existence and magnitude of contamination resulting from laboratory activities. Only blanks associated with laboratory activities, i.e. method blanks, instrument blanks, storage blanks, etc., are evaluated during data validation. Blanks associated with field activities, i.e. trip blanks, equipment blanks, etc., are not evaluated. If more than one blank is associated with a given sample, qualification shall be based upon a comparison with the associated blank having the highest concentration of a contaminant.

The following are conventions that apply to evaluating blanks:

1. An analyte found in a blank and also found in an associated sample shall be considered for reporting when present at a ratio of at least 5/1, sample to blank.

2. Target compounds below the 5/1 ratio shall be reported in samples as follows:

   If the sample result is less than the CRQL, report not detected at the sample CRQL:

   Example: blank = 12
   sample = 6
   CRQL = 10U
   report = 10U

   If the sample result is greater than CRQL, add the U flag:

   Example: blank = 12
   sample = 23
   CRQL = 10U
   report = 23U

3. Some analytes are more frequently found as contaminants and are considered to be common laboratory contaminants. A common laboratory contaminant found in a blank and also found in an associated sample shall be considered for reporting when present at a ratio of at least 10/1, sample to blank. The common laboratory contaminants are:

   VOA: Methylene chloride, acetone, and 2-butanone.
   SV: Phthalates.
   PEST: There are no common pesticide contaminants.

4. Blank values are never subtracted from reportable values.

E. PERFORMANCE EVALUATION SAMPLES

Most Region IV projects will include a single-blind performance evaluation sample (PES). These PESs are obtained from an outside source. The analytical results reported for the PES are evaluated through a PC-based software application called PeacTOOLS. The PeacTOOLS user's guide, associated with the latest version, shall be followed for entering data and scoring results. PeacTOOLS compares the laboratory reported results to the PES acceptance windows, which have been established through multi-laboratory studies or are based on historical method performance data. PeacTOOLS will evaluate the following categories: TCL Hits, TCL Misses, TCL Contaminants, TIC Hits, TIC Misses, TIC Contaminants and Not Scored.

Organic spike evaluations are not matrix specific and water PE samples are used to evaluate sediment, soil and water samples. All data quality decisions based on the blind spike shall be thoroughly explained in the narrative of the data review document.

1. Any analyte rated by PeacTOOLS as "Action Low": All negative results for that analyte shall be rejected and assigned the R flag. Any positive results shall be considered to be estimated and assigned the J flag.

2. Any analyte rated by PeacTOOLS as "Warning Low": All results, both negative and positive, shall be considered to be estimated and assigned the J flag.

3. Any analyte rated by PeacTOOLS as "In Window": No qualification required.

4. Any analyte rated by PeacTOOLS as "Warning High" or "Action High": All positive results shall be considered to be estimated and assigned the J flag. Negative (non-detect) results will not require qualification.

5. Any analyte rated by PeacTOOLS as a "TCL Miss": Negative (non-detect) results of analytes that are incorrectly identified or not identified by the laboratory in the PES shall be rejected and assigned the R flag. Positive results of analytes that are incorrectly identified or not identified by the laboratory in the PES shall be considered to be estimated and assigned the J flag. These incorrect identifications are usually associated with isomers of TCL compounds that are distinguishable only by retention time. Professional judgement is required to determine the overall effect on the data.

6. Reporting of Region IV PES Data: PES results are recorded in two places.

   (a) The PEACTools report shall be included in the Project file with the Data Review documentation.

(b) PESs shall be logged into R4LIMS and reported as production samples. The following conventions apply for entering results into R4LIMS:

1) Report all results regardless of comparison to any associated blanks. Report actual values of spiked compounds.

2) Do not report any flags added by the contract lab, except for J or C.

3) QC flags that are indicated for the actual samples are not required for the PES results.

4) Since these data are for internal Quality Control, the PES results are removed from the production data packages and kept only in the SESD file copy.

F. TENTATIVE IDENTIFICATIONS

The contract Statement of Work (SOW) requires that the laboratories attempt to identify chromatographic peaks that are not target analytes, surrogates, or internal standards. These are commonly referred to as tentatively identified compounds (TICs). These TIC peaks are qualitatively identified by a mass spectral library search and the identifications assessed by a qualified mass spectroscopist.

All TIC peaks will be reported with the identification provided by the CLP Laboratory. Laboratory assigned data qualifier flags will be removed and the "JN" data qualifier flag will be assigned to all TIC identifications. The following disclaimer will be added to each CLP TIC report:

"The TIC data was provided on an 'as reported' basis from the contract laboratory and all qualified with a "JN" flag. The "JN" flag is defined in the National Functional Guidelines for Organic Data Review (NFG) as "The analysis indicates the presence of an analyte that has been 'tentatively identified' and the associated numerical value represents its approximate concentration".

G. SPECIAL REQUIREMENTS - PESTICIDES QUALITATIVE DECISIONS

Single component pesticides are routinely analyzed on two dissimilar GC columns. Quantitation values are calculated on both GC columns and the percent difference of the two values is then

calculated. The contract laboratory reports the lower of these two quantitation values. If the percent difference exceeds 25%, the laboratory assigns the P data qualifier flag.

The reviewer should use professional judgement and the provided guidance when evaluating pesticide analytes reported with a percent difference that exceeds 25%. The following guidance is provided: Pesticide analytes reported with a percent difference that is greater than 25% but less than 70% shall be assigned the N flag during data validation. Pesticide analytes reported with a percent difference that is greater than 70% shall be reported as undetected; the reported value shall be reported with the U qualifier flag.

H. SUMMARY OF DOCUMENTATION FOR DATA VALIDATIONS

Data reviews performed for Region IV shall be documented by including the following:

1. A cover memo to Regional Work Assignment Manager summarizing the major findings of the data review.

2. An organic Data Review Document (Attachment II).

3. A PeacTOOLS Reporting Sheet.

4. A QC Flag Summary Sheet - This sheet is used to compile the data qualifier flags that would be assigned to the data as a result of the review of the associated QC data.

5. Data Qualifier Report (Attachment V), a copy of which is placed with each fraction of the final production data.

6. Whenever possible, problems that occur with the data shall be documented with examples (copies) from the data package.

SECTION III

Inorganic Data Review

A. INTRODUCTION

Routine Analytical Services (RAS) inorganic data review is documented using the data review form (Attachment III). This form is intended to be a checklist to remind the data reviewer of key areas to check in the data package. While it is comprehensive in nature, it shall be used only in conjunction with the Inorganic National Functional Guidelines and this SOP. In addition to the completed review document, data reviewers shall also submit a brief cover letter outlining pertinent information related to the case along with a summary of findings of the review. Any questions arising during the data review process which are not covered in the National Guidelines or the Regional SOP shall be addressed to the appropriate EPA senior data reviewer.

B. RECORDING/REPORTING OF DATA - GENERAL

1. No values shall be reported below the level of the lowest calibration standard for mercury, cyanide, and any analytes analyzed by atomic absorption methods.

2. All values reported as positive at the same value as the IDL must be checked against the raw data to ensure that the U data qualifier flag has not been omitted during data reduction.

3. The CLP reports all routine analytical service (RAS) inorganic parameters in ug/L units for waters and mg/kg for soils. The R4LIMS data management system is also set up to report the RAS target analytes in ug/L or mg/kg units. SAS data may be reported in ppm or ppb units. Make certain that SAS values entered into R4LIMS are in the same units used by R4LIMS.

4. During data review, data qualifiers will be added to the laboratory's data as required by National Functional Guidelines and the Region 4 SOP. The data qualifiers consist of one character or a combination of characters and are added immediately after the numerical concentration. A complete listing and explanation of the data qualifiers are included in Attachment III. Certain data qualifiers added by the laboratory as required by the SOW, for example N, S, W, *, shall be deleted by the data reviewer before the data is entered into R4ILMS.

C. HOLDING TIMES

The holding time is based on the time of collection and is referred to as the technical holding time. The technical holding time is calculated by subtracting the date of sample collection from the time of the sample analysis. This differs from the contractual holding time which runs from the date of sample receipt until the date of sample analysis. A laboratory may meet the contractual holding time and still exceed the technical holding time. The national functional guidelines contain instructions for qualifying water samples based on technical holding times.

1. Holding time criteria have only been established for water samples. However, once a soil sample has been digested, it is then considered to be a water sample. The holding time criteria are then applicable to analysis of the digested sample.

2. Sample pH criteria have been established for proper preservation of water samples. If the laboratory does not note the sample pH on the preparation logs, note this in the review document but no qualification is necessary. If the sample pH is outside of criteria, i.e. >2 for metals and mercury or <12 for cyanide, all non-detected and positive values are considered to be estimated and the J data qualifier flag shall be applied.

D. BLANKS

The goal of the evaluation of blank results is to determine the existence and magnitude of contamination resulting from laboratory activities. Only blanks associated with laboratory activities, i.e. initial calibration blank, preparation blank, etc., are evaluated during data validation. Blanks associated with field activities, i.e. field blanks, equipment blanks, etc., are not evaluated. If more than one blank is associated with a given sample, qualification shall be based upon a comparison with the associated blank having the highest concentration of a contaminant.

The following are conventions that apply to evaluating blanks:

1. If the analyte in question is found in any other blank, including calibration blanks, at a concentration greater than IDL, and is also found in the sample at a concentration greater than IDL, the sample value shall be considered reportable only when present at a ratio of 5:1 sample:blank.

   Example: Zinc is found in a blank at 50 ug/L. It becomes reportable in the samples when it exceeds a concentration of 250 ug/L (50 ug/L x 5 = 250 ug/L).

   NOTE: Certain situations may indicate that sample values above 5x the blank contaminant

level are uncertain. Professional judgement may be used in these case to raise quantitation limits even higher than 5x the contaminant level or to report such concentrations as estimated.

2. If an analyte is found in the blank but not in the sample, report the normal IDL for the sample.

3. If an analyte is found in the sample at a concentration which is less than 5x the concentration found in the associated blank, add the "U" flag.

   Example: In the example above, Zn is reported in the blank at 50 ug/L and in an associated sample at 62 ug/L. Report the zinc concentration for the sample as 62U ug/L.

4. If an analyte is found in a particular blank at a concentration >IDL but <CRQL, then the possibility exists that the result may be due to baseline fluctuation (noise) rather than contamination. In the case where baseline fluctuation exists, raise the sample reporting level to a concentration above the suspected noise level and report this level. The existence of baseline fluctuation suspends the 5x rule for the analyte in question unless it is found in other blanks at concentrations >CRQL. Attributing a positive result in a blank to baseline fluctuation rather than contamination requires greater use of professional judgement than using the 5x criteria for contamination. Baseline fluctuation occurs primarily in ICP data where the calculated IDLs for elements may be unrealistically low and the CRQL is a more reasonable approximation of the IDL. Positive results in a blank or sample in such cases may be due to noise rather than a true positive result.

   When attempting to assess baseline fluctuation, examine all blanks and samples; usually the concentrations will be relatively uniform. Also consider the analyte in question, contamination with antimony and beryllium, for example, is relatively rare because these elements themselves are so rare in the environment. When these types of elements appear in blanks and samples at levels >IDL but <CRQL, baseline fluctuation shall be considered as a possibility.

   Example: Be IDL = 1 ug/L
   Be CRQL = 5 ug/L
   Blank levels = 2,3 ug/L
   Sample levels = 1,3,4 ug/L

   Raise reporting level to 5 ug/L and report all positives < 5 ug/L as 5U.

   The advantage of accurately determining when baseline fluctuation is occurring is that true

positives may now be reported. Suppose that one sample in the example above has a Be result of 25 ug/L. If the blank values in the example had been attributed to contamination, the Be result would have been reported as 25U. If baseline fluctuation is assessed, the value of 25 would be reported.

If any doubt exists on the part of the data reviewer as to whether positives in the blanks are due to contamination or baseline fluctuation, treat positive results as contamination and use the 5x rule.

5. Blank values are never subtracted from reportable values.

E. PERFORMANCE EVALUATION SAMPLES

Most Region 4 projects will include a single-blind performance evaluation sample (PES). These PESs are obtained from an outside source. The analytical results reported for the PES are evaluated through a PC-based software application called PEACTOOLS. The PEACTOOLS user's guide, associated with the latest version, shall be followed for entering data and scoring results. PEACTOOLS compares the laboratory reported results to the PES acceptance windows, which have been established through multi-laboratory studies or are based on historical method performance data. PEACTOOLS will evaluate the following categories: TCL Hits, TCL Misses, TCL Contaminants, TIC Hits, TIC Misses, TIC Contaminants and Not Scored.

Spike evaluations shall be matrix specific, i.e., do not use the soil/sediment spike to evaluate water samples. All data quality decisions based on the blind spike shall be thoroughly explained in the narrative of the data review.

1. Any analyte rated by PEACTOOLS as "Action Low": All negative results for that analyte shall be rejected and assigned the R flag. Any positive results shall be considered to be estimated and assigned the J flag.

2. Any analyte rated by PEACTOOLS as "Warning Low": All results, both negative and positive, shall be considered to be estimated and assigned the J flag.

3. Any analyte rated by PEACTOOLS as "In Window": No qualification required.

4. Any analyte rated by PEACTOOLS as "Warning High" or "Action High": All positive results shall be considered to be estimated and assigned the J flag. Negative (non-detect) results will not require qualification.

5. Any analyte rated by PEACTOOLS as a "TCL Miss": Negative (non-detect) results shall be rejected and assigned the R flag. All positive results shall be considered to be estimated and assigned the J flag. Professional judgement is required to determine the overall effect on the data.

6. Reporting of Region 4 PES Data: PES results are recorded in two places.

   (a) The PEACTOOLS report shall be included in the Project file with the Data Review documentation.

   (b) PESs shall be logged into R4LIMS and reported as production samples. The following conventions apply for entering results into R4LIMS:

   1) Report all results regardless of comparison to any associated blanks. Report actual values of spiked compounds.

   2) Do not report any flags added by the contract lab, except for J or C.

   3) QC flags that are indicated for the actual samples are not required for the PES results.

   4) Since these data are for internal Quality Control, the PES results are removed from the production data packages and kept only in the SESD file copy.

F. ICP INTERFERENCE CHECK SAMPLES

ICP analyses are subject to interferences caused by background emissions and/or overlap of elemental emission lines. The method used to correct these interferences is based on the type of instrument used. Simultaneous ICPs have emission monitoring wavelengths set by the factory and these are not easily altered. Therefore, a simultaneous ICP uses a mathematical ratio (interelement correction factor) to correct the contribution from an interfering element. A sequential ICP may be interelement corrected by selection of different background correction points or selection of an alternate wavelength which is not subject to the interference.

The interference check sample (ICS) is used to verify the interelement and background correction factors. The ICS consists of two solutions: solution A and solution AB. Considerable professional judgement is required when evaluating ICS results.

NOTE: These instructions differ in some instances from the National Functional Data Review Guidelines.

1. If results above the CRQL are reported for analytes which are not present in the ICS solution, false positives may have been reported. The affected analytes in the associated samples should be evaluated. False positives may have been reported in samples with comparable or higher amounts of interferents and comparable analyte concentrations. Those analytes that are comparable to the levels in the ICS should be regarded as having been tentatively identified with estimated amounts and assigned the JN qualifier flags.

2. If negative results are reported for analytes not present in the ICS solutions but their absolute value is greater than the CRQL, the possibility of false negatives in the sample exists. If the absolute value of the negative results is greater than the CRQL, an evaluation of the associated sample data shall be made. All sample results, both positive and negative, in all associated samples with comparable or higher interferant levels shall be considered to be estimated and assigned the J qualifier flag.

3. The associated sample data are considered to be acceptable if the concentrations of Al, Ca, Fe and Mg in the sample are less than or equal to the concentrations in the ICS and no interferences are observed in the ICS solution. However, if these elements are present in the sample in concentrations greater than in the associated ICS, or if other elements are present in the sample in amounts greater than 10 mg/L, the possibility of other interference effects shall be investigated. These interferences must be estimated, since the exact value of interferences is instrument specific.

G. SUMMARY OF DOCUMENTATION FOR DATA VALIDATIONS

Data reviews performed for Region 4 shall be documented by including the following:

1. A cover memo to Regional Work Assignment Manager summarizing the major findings of the data review.

2. An inorganic Data Review Document (Attachment III).

3. A PEACTOOLS Reporting Sheet.

4. A QC Flag Summary Sheet - This sheet is used to compile the data qualifier flags that would be assigned to the data as a result of the review of the associated QC data.

5. Data Qualifier Report (Attachment V), a copy of which is placed with each fraction of the final production data.

6. Whenever possible, problems that occur with the data shall be documented with examples (copies) from the data package.

ATTACHMENT I
ACRONYMS

AOC - Analytical Operations Center - has responsibility for management of CLP at the national level

CLP - Contract Laboratory Program

SOW - Statement of Work

IFB - Invitation for Bid (contains SOW)

APO - Administrative Project Officer (located in Wash., D.C. in AOC)

TPO - Technical Project Officer (located within each Region)

VOA - Volatile Organic Analysis (also called Purgeable organics)

SV - Semivolatile Analysis

SAS - Special Analytical Services

RAS - Routine Analytical Services

TCL - Target Substances List (Analytes included in RAS, includes VOAs, SV, and Pesticides/PCBs)

CRQL - Contract Required Quantitation Limit

PNA - Polynuclear Aromatic (compounds) also known as PAH, polycyclic aromatic hydrocarbon (compounds)

CAS - Chemical Abstract Service

IDL - Instrument Detection Limit

ICS - Interference Check Sample

SESD - Science and Ecosystem Support Division

ATTACHMENT II

United States Environmental Protection Agency
Region IV
Science and Ecosystem Support Division
980 College Station Road, Athens, GA 30605

Date:

Subject: Review of Organic Data: Case No.___ SAS No.___
Contract Lab Name:_____
Region IV Project No.: _____
SMO Traffic Nos.:_____
_____
Region IV SAD Nos.:_____
_____

Level: Low__ Med. __ High __

Matrix types: Water __ Soil/Sed.__ Waste__

Reviewed by:

I. SUMMARY OF PROBLEMS/COMMENTS

II. ACTUAL SAMPLE HOLDING TIME

VOA	No. Samples	No. Late
Water	_____	____
Soil/Sed.	_____	____
Waste:	_____	____

BNA	No. Samples	No. Late
Water	_____	____
Soil/Sed.	_____	____
Waste	_____	____

Pest	No. Samples	No. Late
Water	_____	____
Soil/Sed.	_____	____
Waste	_____	____

REMARKS:

III. GC/MS TUNING AND PERFORMANCE (FORM V)

VOA (BFB)___ BNA (DFTPP) ___

A - Acceptable: All criteria met.
P - Provisional: All Criteria not met; Data not seriously impacted; data usable
U - Unacceptable: Criteria not met, spectra of poor quality; data not usable

REMARKS:

IV. INITIAL AND CONTINUING CALIBRATION CHECK

VOA_____ B/N____ ACID____ PEST___

A - Acceptable - All criteria met.
P - Provisional - Some criteria not met; Data usable, see remarks
U - Unacceptable - Criteria not met; data unusable; see remarks

REMARKS:

V. BLANK ANALYSIS

Water: VOA___ B/N___ ACID___ PEST___
Soil/Sed.: VOA___ B/N___ ACID___ PEST___
Waste: VOA___ B/N___ ACID___ PEST___

A - Acceptable - No contaminants above minimum detection limits; no interference with sample results.
P - Provisional - Contaminants present but minimal interference with sample results.
U - Unacceptable - Gross contamination, too much interference to use data for certain components or the entire fraction.

REMARKS: Method blanks were contaminated as shown below:

VI. SURROGATE SPIKE RESULTS (Form II)

		No. Samples	No. Samples J	No. Samples R
VOA	Water:	_____	_____	_____
	Soil/Sed:	_____	_____	_____
	Waste:	_____	_____	_____
BNA	Water:	_____	_____	_____
	Soil/Sed:	_____	_____	_____
	Waste:	_____	_____	_____
Pest	Water:	_____	_____	_____
	Soil/Sed:	_____	_____	_____
	Waste:	_____	_____	_____

Individual sample flagging criteria
NONE - All original or re-analyzed surrogates meet criteria
J - Two or more surrogates are out if BNA; one if VOA
R - Any surrogates with <10% recovery (J positive;R negative)

REMARKS:

VII. MATRIX SPIKE RESULTS (Form III% REC)

		No. Compounds	No. Outside Criteria	No. <10% Recovery
VOA	Water:	_____	_____	_____
	Soil/Sed:	_____	_____	_____
	Waste:	_____	_____	_____
BNA	Water:	_____	_____	_____
	Soil/Sed:	_____	_____	_____
	Waste:	_____	_____	_____
Pest	Water:	_____	_____	_____
	Soil/Sed:	_____	_____	_____
	Waste:	_____	_____	_____

REMARKS:

VIII. MATRIX SPIKE DUPLICATE RESULTS (Form III % RPD)

		No. Compounds	No. Outside Criteria
VOA	Water:	_____	_____
	Soil/Sed:	_____	_____
	Waste:	_____	_____
BNA	Water:	_____	_____
	Soil/Sed:	_____	_____
	Waste:	_____	_____
Pest	Water:	_____	_____
	Soil/Sed:	_____	_____
	Waste:	_____	_____

REMARKS:

IX. BLIND SPIKE RESULTS

Water: VOA___ B/N__ ACID__ PEST__
Soil/Sed: VOA___ B/N__ ACID__ PEST__

No Spike submitted _____ Spike submitted - see attached _____

A - Acceptable - All compounds reported and results within criteria.

P - Provisional - Some Criteria not met; Data usable

U - Unacceptable - As received, data was unacceptable; Usable data was gleaned by data reviewer.

R - Rejected - No useful data could be obtained. Entire fraction rejected.

REMARKS:

X. INTERNAL STANDARD PERFORMANCE

A. Area Counts

	No. Samples	No. Outside Criteria
VOA: Water:	_____	_____
Soil/Sed:	_____	_____
Waste:	_____	_____
BNA: Water:	_____	_____
Soil/Sed:	_____	_____
Waste:	_____	_____

X. INTERNAL STANDARD PERFORMANCE (Cont.)

B. Retention Times

	No. Samples	No. Outside Criteria
VOA: Water:	_____	_____
Soil/Sed:	_____	_____
Waste:	_____	_____
BNA: Water:	_____	_____
Soil/Sed:	_____	_____
Waste:	_____	_____

NOTE: Samples are flagged on an individual basis; See Section XIV for affected samples and for the flags that were assigned.

REMARKS:

XI. TENTATIVELY IDENTIFIED COMPOUNDS

Water: VOA___ SEMI-VOLATILES___
Soil/Sed: VOA___ SEMI-VOLATILES___
Waste: VOA___ SEMI-VOLATILES___

A - Acceptable - All TICs correctly reported.
P - Provisional - Some improper identifications made; data usable
U - Unacceptable - As received, data was unacceptable; Usable data was gleaned by data reviewer.
R - Rejected - No useful data could be obtained. Data rejected.

REMARKS: Some laboratory identifications were modified. Results of library searches performed on these samples may be found on the miscellaneous volatile and extractable data sheets.

XIII. SPLIT SAMPLE RESULTS

Water: VOA___ B/N__ ACID__ PEST__
Soil/Sed: VOA___ B/N__ ACID__ PEST__
Waste: VOA___ B/N__ ACID__ PEST__

No split sample _____ Split sample - see attached _____

A - Acceptable - the same compounds were identified by the contract and the regional lab with minor differences in concentration

P - Provisional - the same compounds were identified by the contract and the regional lab with major differences in concentration. These discrepancies could cause the data to be useful only for limited purposes.

U - Unacceptable - differences were found in compound identifications by the contract lab and the regional lab. These discrepancies could cause the results for this fraction to be used for limited purposes or be considered unusable

REMARKS:

XIV. FLAG SUMMARY

Based on a review of all the quality control information the following is a summary of qualifiers used by Region IV in reporting the data. The R flag takes precedence over any other flags on the same compound.

No. Samples	No. Samples	No. Samples
Water:	Soil/Sed.	Waste:
VOA ___	VOA ___	VOA ___
B/N ___	B/N ___	B/N ___
ACID___	ACID___	ACID___
PEST___	PEST___	PEST___

Affected Samples	Compound or Fraction	Flag Used	Reason
_____	_____	__	_____
_____	_____	__	_____
_____	_____	__	_____

Attachment III

INORGANIC DATA REVIEW DOCUMENT

United States Environmental Protection Agency
Region IV
Science and Ecosystem Support Division
980 College Station Road, Athens, GA 30605

DATE:

SUBJECT: Review of Inorganic Contract Data
Case No. ____ SAS No. ____
Contract Lab Name: _____SOW No._____
Region IV Project No. : _____
SMO Traffic Nos.:_____
_____
Region IV SAD Nos.:_____
_____
Matrix types: Water ___ Soil/Sed. ____ Waste _____

Review performed by: _____

Review Codes

A - Acceptable: All QC criteria met. No data qualified based on theses items.

P - Provisional: Some QC criteria were exceeded resulting in data qualifiers being assigned based on these items.

U - Unacceptable: The QC criteria were exceeded to such an extent that the associated data was rejected based upon these items.

N/A - Not Applicable: This item does not apply to the case being reviewed.

I. Sample Holding Times and Preservation (Technical holding times; waters only)

Metals (6 mos.) _____
Mercury (28 days) _____
Cyanide (14 days) _____

Remarks:

II. Calibration

	ICP	Furnace	Mercury	CN
Initial Calib.	___	_____	_____	___
Init. Cal. Verif.	___	_____	_____	___
Cont. Cal. Verif.	___	_____	_____	___

Remarks:

III. Blanks

Calib. Blanks(CB) _____
Preparation Blanks (PB)_____
Blind Blanks (BB) _____

Remarks:

IV. ICP Interference Check Sample

False Positives _____
False Negatives _____

Remarks:

V. Spiked Sample Results

	Water	Soil
Matrix Spike	___	___
Blind Spike	___	___

Remarks:

VI. Other QC

Matrix Duplicate ____
LCS ____
Serial Dilution Results ____
Linear Range Check (2XCRDL) ____

Remarks:

VII. Deliverables

Cover Page ____
Form I ____
QC Summaries ____
Raw Data ____
Traffic Reports ____
Digestion Logs ____
Preparation Logs____
Run Logs ____

Remarks:

VIII. Contact with Contract Lab required during data review?

Yes____ No____

Remarks:

IX. Data Qualifiers Summary

Element	Flag	Samples Affected	Reason

ATTACHMENT IV

DATA QUALIFIERS (FLAGS) and REMARKS - Organics and Inorganics

Data qualifier flags are used as an effort to best describe the quality of each piece of data to the data user. These flags are letter codes appended to the numeric data (or in some instances used alone). In addition, a series of standard remarks is used to give a more detailed explanation of the data.

STANDARD REMARKS - To use standard remarks simply choose the appropriate number of the remark and place it on the data sheet. It is not necessary to write the verbiage.

DEFINITIONS OF DATA QUALIFIERS:

U - The analyte was analyzed for but not detected. The value preceding the U is the Contract Required quantitation Limit (CRQL).

J - The Identification of the analyte is acceptable, but quality assurance criteria indicate that the quantitative values may be outside the normal expected range of precision ,i.e., the quantitative value is considered estimated.

N - There is presumptive evidence that the analyte is present, but it has not been confirmed. The analyte is "tentatively identified". There is an indication that the reported analyte is present, however, all quality control requirements necessary for confirmation were not met.

R - Data is considered to be rejected and shall not be used. This flag denotes the failure of quality control criteria such that it can not be determined if the analyte is present or absent from the sample. Resampling and analysis are necessary to confirm or deny the presence of the analyte.

C - This flag is most often used in conjunction with pesticides/PCB data. The analyte is determined to be present and the presence has been confirmed by GC/MS.

UJ - This is a combination of the U and J flags. The analyte is not present. The reported value is considered to be an estimated CRQL.

JN - A combination of the J and N flags. The analyte is tentatively identified and the value preceding the JN is estimated.

ATTACHMENT V

DATA QUALIFIER REPORT

Case No._____ Project No._____ SAS No._____

Site Name/Location_____

Affected Samples	Compound/ Fraction	Flag Used	Reason