

**Central Plateau Groundwater Protection Project
Technical Document**

**Common Requirements of the Format for
Electronic Analytical Data (FEAD)**

Authors: HEIS Technical Advisory Group (HTAG)

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Common Requirements of the Format for Electronic Analytical Data (FEAD)**TABLE OF CONTENTS**

1.0	PURPOSE AND SCOPE	1
2.0	GENERAL DESCRIPTION OF THE FORMAT FOR ELECTRONIC ANALYTICAL DATA ...	1
2.1	CHARACTER FIELDS	2
2.2	COMMENTS	2
2.3	END-OF-LINE SPECIFICATION	3
2.4	NUMERIC FIELDS	4
2.5	ROUNDING	4
2.6	REPORTING RESULTS FOR UNDETECTED ANALYTES	4
2.7	REPORTING QUALITY CONTROL DATA	5
2.8	DILUTION REPORTING	5
3.0	FIELD DESCRIPTIONS	6
3.1	2-Sigma Counting Error (Form R only)	6
3.2	Action Code	6
3.3	Analysis Batch Number	6
3.4	Analysis Units	6
3.5	Analytical Matrix	6
3.6	Chemical Abstracts Service (CAS) Number	6
3.7	Case Number	7
3.8	Collected Date	7
3.9	Collected Time	7
3.10	Column ID (Form D only)	7
3.11	Column Type (Forms A, B, and D only)	8
3.12	Compound Name (Forms A and B only)	8
3.13	Contract	8
3.14	Date Analyzed	8
3.15	Decanted	8
3.16	Dilution Factor	8
3.17	Distillation Volume (Form R only)	8
3.18	Extraction (Forms B and D only)	9
3.19	Form Number	9
3.20	Form Suffix	9
3.21	Format Type	9
3.22	gel permeation chromatography Cleanup (Forms B and D only)	9
3.23	Lab Code	9
3.24	Lab Code Suffix	9
3.25	LAB COMMENT CODE	10
3.26	Lab Extracted Date (Forms B and D only)	10
3.27	Lab File ID	10
3.28	Lab Qualifier	10
3.29	Lab Received Date	12
3.30	Lab Sample ID	12
3.31	Maximum Control Limit	12
3.32	MDA (Minimum Detectable Activity) (Form R only)	12
3.33	Method Name	12
3.34	Minimum Control Limit	13
3.35	Number of Tentatively Identified Compounds (TICs) Found (Forms A and B only)	13
3.36	Percent Moisture	13

Common Requirements of the Format for Electronic Analytical Data (FEAD)

CP-15383

Published: May 21, 2003

Page ii

3.37	Percent Recovery	13
3.38	Percent Solids.....	13
3.39	QC Type.....	13
3.40	Record Type.....	14
3.41	RELATIVE ERROR RATIO (RER)	14
3.42	RELATIVE ERROR RATIO MAXIMUM (RER Maximum)	14
3.43	Relative Percent Difference (RPD).....	15
3.44	Relative Percent Difference Maximum.....	15
3.45	REPORTING LIMIT	15
3.46	REPORTING LIMIT TYPE	15
3.47	Required detection Limit	16
3.48	Result	16
3.49	Retention Time (TIC Detail Lines Forms A and B only)	16
3.50	Sample Authorization Form Number.....	17
3.51	Sample Number	17
3.52	Special Analytical Services Number.....	17
3.53	Sample Aliquot Size.....	17
3.54	Sample Aliquot Units.....	17
3.55	Sample Date Time On (Form R only).....	17
3.56	Sample Delivery Group (SDG) Number.....	18
3.57	Spike Concentration.....	18
3.58	Time Analyzed.....	18
3.59	TICs Searched For (Forms A and B only)	18
3.60	total propagated Uncertainty (TPU).....	18
3.61	Tracer Yield	18
3.62	Version Number.....	18
4.0	FEAD FORMAT SPECIFICATIONS.....	19
4.1	Volatile Organics – Header Line Format	19
4.2	Volatile Organics – Detail Line Format.....	20
4.3	Volatile Organics – TIC Line Format	21
4.4	Semi-Volatile Organics – Header Line Format	23
4.5	Semi-Volatile Organics – Detail Line Format	24
4.6	Semi-Volatile Organics – TIC Line Format.....	25
4.7	Pesticides – Header Line Format	27
4.8	Pesticides – Detail Line Format	28
4.9	Inorganics – Header Line Format	30
4.10	Inorganics – Detail Line Format	31
4.11	Radiochemistry – Header Line Format	33
4.12	Radiochemistry – Detail Line Format.....	34
4.13	Wet Chemistry – Header Line Format	36
4.14	Wet Chemistry – Detail Line Format.....	37

Common Requirements of the Format for Electronic Analytical Data (FEAD)**ACRONYMS AND ABBREVIATIONS**

2-SIGMA	Two times the standard deviation
ARL	Adjusted Reporting Limit
ASCII	American Standard Code for Information Interchange
BLK	Matrix Blank
BS	Blank Spike
CAS	Chemical Abstracts Service
CD-ROM	Compact Disk – Read-Only Memory
CLP	Contract Laboratory Program
DOE-RL	Department of Energy – Richland Location
DUP	Duplicate
EQL	Estimated Quantitation Limit
FEAD	Format for Electronic Analytical Data
GC	Gas Chromatography
GFAA	Graphite Furnace Atomic Absorption
HEIS	Hanford Environmental Information System
HTAG	HEIS Technical Advisory Group
IDL	Instrument Detection Limit
LCD	Laboratory Control sample Duplicate
LCS	Laboratory Control Sample
MDA	Minimum Detectable Activity
MDL	Method Detection Limit
MS	Mass Spectroscopy or Matrix Spike
MSA	Method of Standard Additions
MSD	Matrix Spike Duplicate
MS-DOS [®]	Microsoft - Disk Operating System [®]
PCB	Polychlorinated Biphenyl
PQL	Practical Quantitation Limit
QC	Quality Control
RDL	Required Detection Limit
RER	Relative Error Ratio
RPD	Relative Percent Difference
SDG	Sample Delivery Group
SDM	Sample Data Management
SOW	Statement of Work
SUR	Surrogate
TIC	Tentatively Identified Compound
TPU	Total Propagated Uncertainty

Common Requirements of the Format for Electronic Analytical Data (FEAD)

CP-15383

Published: May 21, 2003

Page 1

1.0 PURPOSE AND SCOPE

This document describes the format for electronic analytical data (FEAD) deliverables reported by laboratories for loading into the Hanford Environmental Information System (HEIS). The FEAD facilitates responsible and effective use of environmental data. Toward this end, the FEAD supports the electronic transmission of analytical laboratory results as near to real-time as possible, while still considering contractual and laboratory constraints.

This requirements specification establishes the FEAD that will be in support of activities for Hanford Site compliance with the *Comprehensive Environmental Response, Compensation, and Liability Act of 1980*, the *Resource Conservation and Recovery Act of 1976*, the Washington State Hazardous Waste Management Act, Washington State Model Toxics Control Act Cleanup Regulation, other State of Washington regulations, and DOE orders. The electronic data format described by this document evolved out of the U.S. Environmental Protection Agency's Contract Laboratory Program (CLP) format.

Section 2.0 describes the general format of FEAD. Section 3.0 provides definitions of the fields in the FEAD. Revisions to this document are by direction of the HEIS Technical Advisory Group (HTAG). Acceptable analysis units, qualifier codes, analyses method names, and pseudo-Chemical Abstracts Service (CAS) numbers come from the data dictionary of HEIS and are found in the HEIS valid codes, method, and constituent tables. Section 4.0 defines the actual placement of fields in the individual forms and contains the FEAD format specifications.

2.0 GENERAL DESCRIPTION OF THE FORMAT FOR ELECTRONIC ANALYTICAL DATA

This description provides analytical laboratories with the required detail to complete the FEAD. The general record structure is hierarchical, with one header record followed by multiple related detail records. This grouping of one header record and multiple related detail records is called a form. All detail records that are placed between any two header records will be associated with the preceding header record. The format for each type of analysis is provided by the forms in Section 4.0 of this document. Forms include the following:

- Form A Volatile Organics (Sections 4.1 through 4.3)
- Form B Semi-Volatile Organics (Sections 4.4 through 4.6)
- Form D Pesticides (Sections 4.7 through 4.8)
- Form I Inorganics (Sections 4.9 through 4.10)
- Form R Radiochemistry (Sections 4.11 through 4.12)
- Form W Wet Chemistry (Sections 4.13 through 4.14).

Forms A and B include a second type of detail record called a tentatively identified compound (TIC) record. The order and grouping of TIC and detail records on a form are not important; TIC records may be interspersed with regular detail records or reported together at the discretion of the laboratory.

All fields in the FEAD forms are required to be left-justified in their respective column range specified in the formats listed in Section 4.0 of this document. Values that do not fill the column range for the field shall be padded to the right with the space character (i.e., ASCII(32)). Fields that are not marked as "Y" in the "Mandatory?" column may be left blank (space filled) unless they are explicitly called for in the client statement of work (SOW). Refer to the forms presented in Section 4.0 for specific examples.

Multiple form types (e.g., A, B, and I) can be reported in a single file.

Common Requirements of the Format for Electronic Analytical Data (FEAD)

CP-15383

Published: May 21, 2003

Page 2

All electronic deliverables (files) in the FEAD should be submitted by modem, email, or on electronic media (e.g., 3.5" diskettes, zip disks, or read-only memory compact disks (CD-ROM)) to the appropriate Hanford Site client as specified in the analytical services contract. It is recommended that electronic data deliverables submitted on diskettes or CD-ROM meet the following criteria:

- Diskettes should be IBM-compatible, 3.5 inch high-density, 1.44 megabyte diskettes or 100 megabyte Zip[®] disks.
- CD-ROM should be standard 12 centimeter diameter.
- Diskettes should be formatted and recorded using Version 5.0 or higher of the Microsoft Disk Operating System (MS-DOS[®]) or equivalent.

2.1 CHARACTER FIELDS

All character fields may contain mixed-case, standard-printing ASCII characters left justified in their respective column specification. Any exceptions to case sensitivity will be explicitly listed in the specific formats.

2.2 COMMENTS

Comments for samples, methods, and/or analytes may be placed within a FEAD file. Comments are entered as a record type "C" and can appear anywhere in the data file except as the first line in the file. The relationship between comment records and other records in the FEAD file is determined by the location of the comment records: If a comment is after a detail line, it is related to the detail line that preceded it. If a comment line is after a header line, it can be related to all or some of the analytes for the sample number, based upon the method name (see below). If a comment will make the resulting record line longer than 250 characters, the comment is truncated (preferably at the end, not in the middle, of a word) and continued on another following comment line.

A comment can appear after a header line or after a detail line in the following format:

XAACZ This is a comment

where "X" is the form number, "AA" is the form suffix, and "Z" is the comment code defined by:

- | | |
|--------------|---|
| A | Comment is after header line and relates to all analytes in this form (under this header record). |
| L | Comment is preceded by a list of comma-delimited analytical method names to which this comment is related, followed by a colon. If the method reports multiple analytes, then all analytes affected must be identified. |
| Blank | No specification; is after a detail line or is a continuation of the previous comment line. |

Examples of comments are provided below:

- After a detail line:
 - B AAD12345-45-3 (and the rest of the detail line)
 - B AAC This analyte was a pain to analyze for.

Common Requirements of the Format for Electronic Analytical Data (FEAD)

CP-15383

Published: May 21, 2003

Page 3

- If the comment were too long, it would continue on the following comment line:

B AAD12345-45-3 (and the rest of the detail line)
B AAC This analyte was a pain to analyze for. Don't ask for it.
B AAC again. But, if you do, please warn us ahead of time.

- After a header line when the comment deals with ALL of the analytes:

B AAHFEAD01B003G3 (and the rest of the line)
B AACA This entire sample was spilled and scraped up off the floor.

- If the comment were too long, it would continue on the following comment line:

B AAHFEAD01B003G3 (and the rest of the line)
B AACA This entire sample was spilled and scraped up off the floor.
B AAC After that we washed it with lye.

- After a header line when the comment deals with some of the method names:

B AAHFEAD01B003G3 (and the rest of the line)
B AACLEPA300.0,EPA9060: These analytes were out of range.

- If the comment were too long, it would continue on the following comment line:

B AAHFEAD01B003G3 (and the rest of the line)
B AACLEPA300.0,EPA9060: These analytes were out of range on the
B AAC instrument but we managed to get it within range by using a
B AAC bigger hammer.

More than one type of comment can cover the same analyte. A comment for all analytes can be followed with a comment for only one method (to be applied to all analytes reported under this method), or a comment after a detail line can apply to just that one unusual analyte.

Comments may not include formatting characters. "Only alphanumeric characters (including punctuation and mathematical symbols) are allowed in comment fields.

2.3 END-OF-LINE SPECIFICATION

The end of every data line (detail line, header line) will contain a carriage return/line feed combination to signify the end of that line of text. Data lines can be longer than the length specified in Section 4.0. However, it is important to understand that any additional data placed after the last specified field on any line are not according to this specification and will not be taken into consideration when issuing future revisions and versions.

Common Requirements of the Format for Electronic Analytical Data (FEAD)

CP-15383

Published: May 21, 2003

Page 4

2.4 NUMERIC FIELDS

There are three types of numeric fields allowed: numeric, fixed numeric, and integer.

Numeric numbers are unrestricted decimal numbers that may be represented in scientific notation. The format for scientific notation is as follows:

$$\text{signed_decimal_mantissa}[e|E][+|-]\text{integer_exponent}$$

with no spaces within the number itself. A negative sign (-) or a plus sign (+) may precede the integer_exponent as indicated by [+|-] in the notation; the plus sign (+) is optional. Additionally, no rules exist concerning the location of the decimal point or left or right justification of the number in the field. Every such number will be specified by the format identifiers (W, S), where “W” is the width of the field and “S” is the suggested number of significant digits. For example, the number 0.135 in (10,3) format is usually reported as 0.135 or .135, but it may be reported in scientific notation as 1.35E-01 or 0.135E-00. If reporting in scientific notation, normalization of the value (i.e., only one digit before the decimal point) is not required. The laboratory is allowed to report fewer significant digits if it is appropriate or otherwise specified; however, this process will be subject to validation. True zero may be reported in any way desired, as long as at least one zero (0) is present in the field and every remaining digit is also zero (0).

If scientific notation is used, report the value as 1.64E+01 (if the result is normalized) or 16.4E+00 (if the result is not normalized).

Fixed numeric has a fixed number of decimal places with no alignment rules. Scientific notation is not allowed. The format identifier (W, D) specifies width and decimal places, respectively. For example, the number 13.452 in (10,2) format is reported as 13.45. True zero is reported to the number of fixed decimal places; for example, in (10,2) format, it is reported as 0.00.

Integer is a fixed numeric with no decimal point. The format identifier (W) specifies the width of the field. For example, the number 12.0 in (8) format is reported as 12 with no decimal after it. True zero is reported as zero; for example, it is reported as 0 in (8) format.

In general, negative numbers are not allowed unless indicated in the format of the specific form. If the format permits, such cases will have the minus sign (-) immediately preceding the number itself. Plus signs (+) are not allowed in positive numbers, with the exception of the exponent in scientific notation format (numeric numbers).

2.5 ROUNDING

Rounding will be to the specified number of decimal places allowed for that field. In a (10,3) field, the value 6.2315 will be rounded to 6.232, and 6.2325 will be rounded to 6.232, provided that the laboratory software supports this rule. This follows the *round up if odd, round down if even* principle, based on the next-to-last digit when the last digit is a 5.

2.6 REPORTING RESULTS FOR UNDETECTED ANALYTES

An analyte is said to be “undetected by a method” if either a result could not be computed or the computed result is less than a method-specific detection limit adjusted on a sample-specific basis. This method-specific detection limit is often called the method detection limit (MDL) or the instrument detection limit (IDL) for organics and inorganics; a radiochemistry limit is often called the minimum

Common Requirements of the Format for Electronic Analytical Data (FEAD)

CP-15383

Published: May 21, 2003

Page 5

detectable activity (MDA). The undetected qualifier flag is "U." It is strictly prohibited to use the "UB" (radiochemistry and/or organics) or "UC" (inorganics and/or wet chemistry) in combination for undetected and possible contamination (see Section 3.28 for laboratory qualifier definitions). Reporting shall be consistent with reporting as found in the associated hard copy reports and as defined in accordance with the client contract SOW.

For all undetected analytes, report the detection limits as defined by the client contract SOW or otherwise specified by the client (corrected for percent solids, aliquot size, and dilution factor as appropriate for the sample media) as the result with a "U" qualifier.

For all analytes for which no result could be computed, space (ASCII(32)) fill the result field. Similarly, if the 2-sigma counting error and total propagated uncertainty values cannot be computed, space fill these fields. In either case, report a "U" qualifier with the MDA value in the MDA field. This rule is expected to specifically apply to gamma analyses. The MDA will be in the units of the sample results.

Results with negative values shall be reported in accordance with the client contract SOW.

2.7 REPORTING QUALITY CONTROL DATA

Laboratory quality control (QC) samples (e.g., blanks and matrix spikes) are to be reported electronically using the QC TYPE field described in Section 3.39.

2.8 DILUTION REPORTING

Ideally, only one result should be reported for the same sample, CAS number, and method name, regardless of sample dilutions. Some laboratories, however, may not be able to report a single result when multiple dilution runs are required to ensure that all constituent results are within instrument-calibration ranges. If more than one set of results is reported, the primary (normally, dilution factor of 1.0) dilution analysis run for a given sample number and method name shall be reported first with any secondary dilution runs immediately following in the EDD. Each dilution shall have its own header line when multiple result sets are reported for the same sample, CAS number, and method name. At a minimum, the set of primary dilution results shall include all non-detected results and all detected results not exceeding the instrument calibration range. Results for CAS numbers exceeding the instrument calibration range (and any other results included in the secondary dilution runs) shall not be reported unless flagged with the appropriate qualifier as appropriate for the method. Moreover, all reported results at a dilution other than the primary dilution shall be flagged with the appropriate qualifier.

If multiple dilution yields two results for a given CAS number, both of which are within the calibration range, report the value associated with the lowest dilution factor (normally the primary dilution). The laboratory may choose to report the result at a higher dilution factor if technical evaluation indicates that this is the result more likely to represent actual concentration in the sample. In that case the laboratory shall insert a comment in the EDD associated with that result indicating that an alternate value was chosen with a brief description as to why that value was chosen.

Common Requirements of the Format for Electronic Analytical Data (FEAD)

CP-15383

Published: May 21, 2003

Page 6

3.0 FIELD DESCRIPTIONS

3.1 2-SIGMA COUNTING ERROR (FORM R ONLY)

Due to the random nature of radionuclide decay, there is random variability associated with any measured count of these decay events. Typically, counts are modeled as a Poisson distribution where count variability is related to the number of counts obtained. The variability of the measurement (error) is indicated by the standard deviation (σ - sigma) of the total number of counts. 2-Sigma counting error is reported as two times the standard deviation in the same units as the result value for the associated analyte. 2-Sigma is a convenience value which slightly exceeds the 95% confidence limit (1.96σ) associated with the result. The 2-sigma error serves as a lower bound for the total uncertainty of the measurement. For total uranium analyses, report only the total propagated error value in the "Total Propagated Error" field. Counting error should never be reported for non-counting analyses of total uranium.

3.2 ACTION CODE

The action code is a one-character code of "I" or "R." The action code represents the type of record being reported; "I" is the initial result, and "R" is a replacement result intended to replace a previously reported record. A result record with an action code of "I" must be reported before any record with an action code of "R" is reported for the same sample number, CAS number, and analysis method name.

3.3 ANALYSIS BATCH NUMBER

The laboratory-specific analysis batch identifier is used for internal tracking of samples. This information must be provided when laboratory QC data are reported. The analysis batch number must uniquely identify the laboratory QC samples run in the same batch as the customer samples. No specific format (beyond maximum field length) is currently required; however, the laboratory must provide their proposed format for review prior to the date submitted to ensure that the format does not duplicate any existing format.

3.4 ANALYSIS UNITS

The analysis units are the associated units for the concentration or activity value in the result field. For radiological analyses, these units also pertain to the 2-sigma counting error, MDA, and total propagated uncertainty. Use units found in the HEIS valid_codes table and as defined in the client contract SOW.

3.5 ANALYTICAL MATRIX

The analytical matrix is the predominant material of which the sample to be analyzed is composed. Acceptable values are "WATER", "SOIL", "GASEOUS", "OTHERSOLID", and "OTHERLIQ".

3.6 CHEMICAL ABSTRACTS SERVICE (CAS) NUMBER

The CAS number is a unique, numeric identifier for a specific chemical, compound, radioactive isotope, or physical property. If a CAS number does not exist, use the appropriate pseudo-CAS number (i.e., identifiers containing characters other than digits and dashes) from the HEIS constituent table.

Common Requirements of the Format for Electronic Analytical Data (FEAD)

CP-15383

Published: May 21, 2003

Page 7

NOTE:

- Report total uranium with the CAS number for uranium (7440-61-1).
- Report gross alpha with the CAS number 12587-46-1.
- Report gross beta with the CAS number 12587-47-2.
- Report total organic halides with the CAS number 59473-04-0.

Rules for assigning CAS numbers for record type T and Forms A (volatile organics) and B (semi-volatile organics): If a TIC is determined to be a particular compound that has a CAS number, enter the CAS number of that compound with its regular description/compound name into the detail record. However, if only a *group* of compounds is determined (e.g., hydrocarbons), **leave the CAS number field blank (space filled)** and enter the word “unknown” in front of the compound description in the compound name field (e.g., “unknown hydrocarbon”).

3.7 CASE NUMBER

The case number is a number assigned by the sample management office (of the requestor) to a finite, usually predetermined number of samples collected over a given time period from a particular site. A case consists of one or more SDGs. This field is generally left blank (space filled).

3.8 COLLECTED DATE

The collected date is the date on which sample collection occurred, if provided by the customer.

3.9 COLLECTED TIME

The collected time is the time at which sample collection occurred, if provided by the customer.

3.10 COLUMN ID (FORM D ONLY)

The column identification number is a unique analytical laboratory-generated identifier for the gas chromatograph (GC) column and stationary phase used in the analysis for this analyte. Report only the results from the column used for quantitation; the secondary column results will be addressed in a future version. The following would be acceptable entries in this field:

<u>Column Type</u>	<u>Column ID</u>
CAP or WIDE	DB-1707, DB-608, DB-05
PACKED	SP-2100, SP-2250, OV-1

Common Requirements of the Format for Electronic Analytical Data (FEAD)

CP-15383

Published: May 21, 2003

Page 8

3.11 COLUMN TYPE (FORMS A, B, AND D ONLY)

The column type indicates the type of GC column (a glass or metal tube containing sample material) used in the analysis. Accepted values are as follows:

<u>Column Type</u>	<u>Column ID</u>
PACK	Packed column
CAP	Narrow-bore capillary column
WIDE	Wide-bore capillary column

3.12 COMPOUND NAME (FORMS A AND B ONLY)

The compound name is the long name for this analyte. This field is used only in Form A and B TIC formats.

3.13 CONTRACT

The contract field contains the contract number under which the analysis was performed.

3.14 DATE ANALYZED

The date analyzed indicates the date when the sample analysis began in the laboratory.

3.15 DECANTED

The decanted field states whether the soil/sediment sample was decanted before the analysis was performed. This field is required for solid samples only (if decanted, enter "Y" in the field; if NOT decanted, enter "N" in the field); this field is not required (space fill) for liquid samples.

3.16 DILUTION FACTOR

The dilution factor is a value representing the amount the sample was diluted by (D) to determine the amount of the analyte (R) in the sample. It is nominally 1.0 but can change based on measurement processes. The dilution accounts for all nonstandard scaling between the instrument measurement (V) and the reported result. These values combined with the aliquot (A), after adjustment for method-specific parameters (K), provide the true result value. If final results are corrected for percent solids (%S), the correction for percent solids is not to be included in the dilution factor. The following generic formulas are provided for conceptual purposes and assume a simplified world with no units:

$$\frac{V \times D}{A \times K} = R \quad \text{or} \quad \frac{V \times D}{\%S \times A \times K} = R.$$

3.17 DISTILLATION VOLUME (FORM R ONLY)

The distillation volume is the total volume of water, in milliliters, distilled from the media (e.g., silica gel, vegetation, or tissue) for analysis (e.g., tritium).

Common Requirements of the Format for Electronic Analytical Data (FEAD)

CP-15383

Published: May 21, 2003

Page 9

3.18 EXTRACTION (FORMS B AND D ONLY)

The extraction field indicates the method of extracting the compound from the sample matrix that was amenable to GC. Accepted values are listed below:

- **SEPF** Separatory funnel (liquids only)
- **CONT** Continuous liquid (liquids only)
- **SONC** Sonication (solids only)
- **SOXH** Soxhlet (solids only)
- **WSTD** Waste dilution (non-aqueous)
- **OTHR** Any method other than the methods listed above.

3.19 FORM NUMBER

The form number is a two-character field identifying the current form.

3.20 FORM SUFFIX

The form suffix is a two-character form identifier (AA through ZZ) unique to the type of form (e.g., Form A or Form B) for each set of records that corresponds to one unique header record. For example, the form suffix of records for the first occurrence in the file of a Form B must be "AA", the second occurrence must be "AB" and so on, and the twenty-seventh must be "BA." The general record structure is hierarchical, with one header record followed by multiple related detail records. All detail records between any two header records are associated with and have the same form suffix as the preceding header record. Each header record within a file has a different form suffix assigned to it.

3.21 FORMAT TYPE

The format type is the format of the data file. The value is "FEAD."

3.22 GEL PERMEATION CHROMATOGRAPHY CLEANUP (FORMS B AND D ONLY)

This field is a flag field stating whether or not gel permeation chromatography cleanup was performed. Accepted values are "Y" or "N."

3.23 LAB CODE

The laboratory code is the unique code for the laboratory performing the analyses and is provided to the laboratory by the DOE-RL client consortium.

3.24 LAB CODE SUFFIX

The laboratory code suffix is the room number of the laboratory, if more than one laboratory is located in the same building. This field is used by onsite laboratories only; offsite laboratories leave this field blank (space filled).

Common Requirements of the Format for Electronic Analytical Data (FEAD)

CP-15383

Published: May 21, 2003

Page 10

3.25 LAB COMMENT CODE

The lab comment code contains codes reported by the analytical laboratories. These codes translate to reoccurring comments regarding result records. Multiple codes may be reported in this field if they are delineated by the ampersand (&) character.

3.26 LAB EXTRACTED DATE (FORMS B AND D ONLY)

The laboratory extracted date is the date that the sample aliquot was extracted for analysis from the sample.

3.27 LAB FILE ID

The lab file ID is a laboratory-generated identifier used for internal tracking of data files. This field will enable the laboratories to more efficiently retrieve the data requested.

3.28 LAB QUALIFIER

The laboratory qualifier is a laboratory-generated character string containing characters in combinations that qualify the associated result. Different forms have different permitted combinations of valid qualifiers; however, "B" and "U" are mutually exclusive qualifiers on all forms. If the analysis result requires no qualification then the lab qualifier must be space filled.

Most qualifiers are based on Contract Laboratory Program rules. If a laboratory encounters a method and/or condition that needs a qualifier but does not match any qualifier listed, the laboratory is not required to use a qualifier. However, in this situation the laboratory must contact its customer representative and explain the condition/reason so the client's sample data management (SDM) organization can determine if another qualifier is needed in the future for this type of situation.

LABORATORY QUALIFIER CODES AND THEIR TRANSLATIONS

CODE TRANSLATION

CODE	TRANSLATION
*	INORGANICS - Duplicate analysis not within control limits.
+	INORGANICS - Correlation coefficient for Method of Standard Additions (MSA) is < 0.995.
>	WETCHEM - Result greater than quantifiable range or greater than upper limit of the analysis range.
A	ORGANICS - Valid for TICs only: The TIC is a suspected aldol-condensation product.
B	INORGANICS and WETCHEM - The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate). ORGANICS - The analyte was detected in both the associated QC blank and in the sample.
	RADIONUCLIDES - The associated QC sample blank has a result $\geq 2X$ the MDA and, after corrections, result is \geq MDA for this sample.

Common Requirements of the Format for Electronic Analytical Data (FEAD)

CP-15383

Published: May 21, 2003

Page 11

- C INORGANICS/WETCHEM - The analyte was detected in both the sample and the associated QC blank, and the sample concentration was $\leq 5X$ the blank concentration.
- ORGANICS (PESTICIDE only) - The identification of a pesticide confirmed by gas chromatograph/mass spectrometer (GC/MS).
- D ORGANICS/WETCHEM - Analyte was identified in an analysis at a secondary dilution factor (i.e., dilution factor different than 1.0).
- E INORGANICS - Reported value is estimated because of interference. See comment on cover page, hardcopy case narrative, or specific FORM I.
- ORGANICS - Concentration exceeds the calibration range of the GC/MS.
- J ORGANICS - Estimated value; (1) constituent detected at a level less than the RDL or PQL and greater than or equal to the MDL, (2) estimated concentration for tentatively identified compounds (TICs).
- M INORGANICS - Duplicate precision criteria not met.
- N ALL (except GC/MS based analysis) - Spike sample recovery is outside control limits.
ORGANICS (GC/MS only) - Presumptive evidence of compound based on mass spectral library search.
- P ORGANICS (PCB only) - Aroclor target analyte with greater than 25% difference between column analyses.
- Q ORGANICS (Dioxins only) - Estimated maximum concentration. Used if one of the qualitative identification criteria is not met (e.g., Cl isotopic ratios outside theoretical range.)
- S INORGANICS - Reported value determined by the Method of Standard Additions (MSA).
- U ALL - Analyzed for but not detected above limiting criteria. NOTE: Limiting criteria may be any of the following: value reported < 0 ; value reported $<$ counting error; value reported $<$ total analytical error; value_rptd \leq contract MDL/IDL/MDA/PQL.
- W INORGANICS - Post-digestion spike recovery for GFAA out of control limit. Sample absorbency $< 50\%$ of spike absorbency.
- X ALL - The result-specific translation of this qualifier code is provided in the hardcopy data report and/or case narrative. Additional result-specific translation information may also be found in the RESULT_COMMENT field for this record.
- Y Same as X if more than one flag is required.
- Z Same as X and Y if more than two flags are required.

Common Requirements of the Format for Electronic Analytical Data (FEAD)

CP-15383

Published: May 21, 2003

Page 12

3.29 LAB RECEIVED DATE

The laboratory received date indicates the date that the sample was received at the laboratory.

When QC data are required to be reported:

- Duplicate (DUP), matrix spike (MS), matrix spike duplicate (MSD), and surrogate (SUR): The date that the source sample was received by the laboratory.
- Matrix blank (BLK) and blank spike/laboratory control sample (BS/LCS): The date that the QC sample was prepared in the laboratory.

3.30 LAB SAMPLE ID

The lab sample ID is the laboratory-specified identifier for internal tracking of samples and must be unique for each customer sample.

3.31 MAXIMUM CONTROL LIMIT

This maximum control limit field applies only to laboratory QC data and must be reported with one of the QC type codes specified below and defined in Section 3.39 of this document.

The maximum control limit is the highest percent recovery difference that is considered acceptable for the associated laboratory QC parameter. The method for establishing maximum control limits should be specified in the analytical contract. For example, the limits may be determined empirically by the laboratory, defined by the analytical method, or specified by the laboratory client.

BS/LCS, LCD, MS, MSD, and SUR: Maximum control limit for percent recovery.

BLK and DUP: Space fill.

3.32 MDA (MINIMUM DETECTABLE ACTIVITY) (FORM R ONLY)

The minimum detectable activity is assumed to be a sample-dependent estimate, typically dependent on the measured instrument background and sample yield, reported in the same units as the result value for the current analyte. Generally, the MDA depends on the actual aliquot, count time, yield, efficiency, decay correction, and some measurement of the background. The background might be from associated instrument blanks, reagent blanks, baseline information for the sample, or some combination of these. The MDA calculation will be based on the equations defined in the client SOW.

3.33 METHOD NAME

The method name is a unique identifier that is available from the HEIS method_name table. This name is an alias for standards such as the U.S. Environmental Protection Agency, American Society for Testing Materials, or laboratory-generated method names and/or procedures. Any method names that are not listed in the HEIS method_name table must be approved/assigned by the HTAG and then the client's SDM organization before the names can be used.

Common Requirements of the Format for Electronic Analytical Data (FEAD)

CP-15383

Published: May 21, 2003

Page 13

3.34 MINIMUM CONTROL LIMIT

The minimum control limit field applies only to laboratory QC data and must be reported with one of the QC type codes specified below and defined in Section 3.39 of this document.

The minimum control limit is the lowest percent recovery that is considered acceptable for the associated laboratory QC parameter. The method for establishing minimum control limits should be specified in the analytical contract. For example, the limits may be determined empirically by the laboratory, defined by the analytical method, or specified by the laboratory client.

BS/LCS, LCD, MS, MSD, and SUR: Minimum control limit for percent recovery.

BLK and DUP: Space fill.

3.35 NUMBER OF TENTATIVELY IDENTIFIED COMPOUNDS (TICs) FOUND (FORMS A AND B ONLY)

The number of TICs found for the sample is reported in this field.

3.36 PERCENT MOISTURE

The percent moisture is the approximation of the proportion of moisture in a biota or soil/sediment sample determined by drying an aliquot of the sample per client contract SOW requirements. This information is required for some biota or soil/sediment samples as directed by the client contract SOW, but it is not required (space fill) for liquid samples.

3.37 PERCENT RECOVERY

The percent recovery field applies only to laboratory QC data and must be reported with one of the QC type codes specified below and defined in Section 3.39 of this document.

BS/LCS, LCD, MS, MSD, and SUR: The measured concentration divided by the spike concentration multiplied by 100.

BLK and DUP: Space fill.

3.38 PERCENT SOLIDS

The percent solids is the approximation of the proportion of solid in a biota or soil/sediment sample determined by drying an aliquot of the sample per client contract SOW requirements. This information is required for some biota and solid/sediment samples, but it is not required (space fill) for liquid samples.

3.39 QC TYPE

The QC type is a three-character field indicating the type of laboratory QC performed. Accepted values are as follows:

- Matrix blank (BLK) – A sample created by the laboratory that contains pure water or clean sand. Used to determine if contamination was introduced during analysis.

Common Requirements of the Format for Electronic Analytical Data (FEAD)

CP-15383

Published: May 21, 2003

Page 14

- Duplicate (DUP) – A second aliquot of the customer’s sample that is processed through the analysis with the original. Used to determine precision of the analysis.
- Blank spike (BS) or laboratory control sample (LCS) – A sample created by the laboratory that contains a known concentration of one or more target compounds. Used to determine accuracy of the analysis.
- Laboratory control sample duplicate (LCD) – A duplicate laboratory control sample. Used to determine accuracy and precision of the analysis.
- Matrix spike (MS) – An aliquot of the customer’s sample to which a known concentration of one or more target compounds has been added. Used to determine the suitability of the analysis for the given matrix.
- Matrix spike duplicate (MSD) – A duplicate of the matrix spike. Used to determine precision of the matrix spike.
- Surrogate (SUR) – An aliquot of the customer’s sample to which a known concentration of one or more non-target compounds has been added. Used to determine efficiency of recovery.

3.40 RECORD TYPE

The record type is the one-character field indicating if the current record is a comment (C), header (H), detail (D), or a TIC (T) record.

3.41 RELATIVE ERROR RATIO (RER)

This relative error ratio applies only to radiochemical analyses.

The error values in the RER calculation are the total propagated errors. This calculation is only applicable to radiochemical duplicate analyses.

$$\text{RER} = \frac{|\text{Result1} - \text{Result2}|}{\sqrt{(\text{Error1})^2 + (\text{Error2})^2}}$$

3.42 RELATIVE ERROR RATIO MAXIMUM (RER MAXIMUM)

The relative error ratio maximum applies only to radiochemical analyses.

This is the control limit for RER evaluations of duplicate analyses.

Common Requirements of the Format for Electronic Analytical Data (FEAD)

CP-15383

Published: May 21, 2003

Page 15

3.43 RELATIVE PERCENT DIFFERENCE (RPD)

The relative percent difference applies only to laboratory QC data and must be reported with one of the QC type codes specified below and defined in Section 3.39 of this document.

DUP: The relative percent difference between the measured concentrations of the original sample (S) and the duplicate sample (D). The formula is:

$$RPD = 100 * |S - D| / ((S + D) / 2)$$

MSD: The relative percent difference between the measured concentrations of the matrix spike (MS) and the matrix spike duplicate (MSD). The formula is:

$$RPD = 100 * |MS - MSD| / ((MS + MSD) / 2)$$

LCD: The relative percent difference between the measured concentrations of the original laboratory control sample (LCS) and the duplicate laboratory control sample (LCD). The formula is:

$$RPD = 100 * |LCS - LCD| / ((LCS + LCD) / 2)$$

BLK, BS/LCS, MS, and SUR: Space fill.

3.44 RELATIVE PERCENT DIFFERENCE MAXIMUM

This relative percent difference maximum applies only to laboratory QC data and must be reported with one of the QC type codes specified below and defined in Section 3.39 of this document.

The relative percent difference maximum is the largest relative percent difference that is considered acceptable for the associated laboratory QC parameter. The method for establishing the relative percent difference maximum should be specified in the analytical contract. For example, the maximum may be determined empirically by the laboratory, defined by the analytical method, or specified by the laboratory client.

DUP, LCD, and MSD: The absolute value of the RPD control limit for duplicates.

BLK, BS/LCS, MS, and SUR: Space fill.

3.45 REPORTING LIMIT

The reporting limit is the lowest concentration of an analyte reported by the laboratory, corrected for the particular analysis conditions used with the sample. The reporting limit is typically the value reported for non-detected results. Several types of reporting limits exist (see below); the laboratory contract will normally stipulate which type should be used.

3.46 REPORTING LIMIT TYPE

The reporting limit type is the type of limit used in the reporting limit field. Accepted values and their standard definitions are listed below:

Common Requirements of the Format for Electronic Analytical Data (FEAD)

CP-15383

Published: May 21, 2003

Page 16

<u>Reporting Limit Type</u>	<u>Definition</u>
ARL	Adjusted Reporting Limit. Adjusted for the total sample size (mass or volume) or sample dilutions.
EQL	Estimated Quantitation Limit. The lowest concentration that can be reliably measured within specified limits of accuracy and precision under routine laboratory operating conditions. The EQL is specified by the laboratory and is typically 5-10 times greater than the method detection limit. In some cases, the EQL is equal to the concentration of the lowest calibration standard.
IDL	Instrument Detection Limit. Analyte concentration that corresponds to the minimum instrument signal that can be distinguished from instrument background noise with 99% confidence. The IDL is typically determined by measuring a standard solution containing the analytes of interest at concentrations 3-5 times the IDL 7 consecutive times on 3 non-consecutive days and multiplying the standard deviation of the measurements by 3.
MDL	Method Detection Limit. Minimum analyte concentration that can be distinguished from the method blank with a 99% probability. The MDL is typically determined by measuring a standard solution containing the analytes of interest at concentrations 3-5 times the MDL 7 times and multiplying the standard deviation of the measurements by 3.14.
PQL	Practical Quantitation Limit. Same as the EQL.
RDL	Required Detection Limit. Minimum level of detection required by the laboratory contract.

3.47 REQUIRED DETECTION LIMIT

The required detection limit is the minimum level of detection required by the laboratory contract.

3.48 RESULT

The result is the measured concentration or activity value obtained by the analysis (not percent recovery for QC samples).

3.49 RETENTION TIME (TIC DETAIL LINES FORMS A AND B ONLY)

The retention time is the time, in decimal minutes, from the introduction of the sample into the laboratory instrument until the maximum peak response of the analyte is detected.

Common Requirements of the Format for Electronic Analytical Data (FEAD)

CP-15383

Published: May 21, 2003

Page 17

3.50 SAMPLE AUTHORIZATION FORM NUMBER

The sample authorization number assigned by the SDM organization uniquely identifies a sampling event or group of sampling events for a single project. This number is provided on the sample analysis request form that accompanies the samples if provided.

3.51 SAMPLE NUMBER

The sample number is a unique alphanumeric identifier of a physical sample. This number is usually six-characters long. **This number must not be modified in any manner from the way it is displayed on the original sample label unless specifically directed by the client's SDM organization.** Suffixes (e.g., RE and DL) are not to be appended to this number to report dilutions and re-analyses. Instead, use the "Action Code" field to properly report these results.

If confusion arises during data entry due to difficulty in reading the number, the following rules apply for most sample numbers: the sample number begins with an alphabetic character, ends with a numeric character, and contains any combination of alphabetic and numeric characters between the beginning and ending characters. **Exceptions:** Vowels, spaces, and dashes are not allowed in the identifiers (e.g., be sure to use zero, not the letter "O"). Example: "B06M61" (numeric zero) is a valid sample number; "BO6IKF" is not a valid sample number.

When QC data are required to be reported:

- Use the customer sample number if the QC TYPE is: DUP, MS, MSD, or SUR
- Fill with "NA" if the QC TYPE is BLK, BS/LCS, or LCD.

3.52 SPECIAL ANALYTICAL SERVICES NUMBER

A special analytical services number may be used if other than routine analytical services is requested. If a non-routine analytical service is requested, the correct number will be sent with the physical sample authorization report form and is to be entered in this field. Otherwise, space fill the field.

3.53 SAMPLE ALIQUOT SIZE

The sample aliquot size is the amount of the sample analyzed. For composited air and water samples, this is the total volume of water or air through the medium/substrate of all composite fractions.

3.54 SAMPLE ALIQUOT UNITS

The sample aliquot units are the associated units for the value in the sample aliquot size field. Accepted values are "mL", "L", "g", "kg", "sample", and "m3".

3.55 SAMPLE DATE TIME ON (FORM R ONLY)

For samples collected over a period of time, the "sample date time on" field contains the earliest date and local time that sampling was started, if provided by the customer.

Common Requirements of the Format for Electronic Analytical Data (FEAD)

CP-15383

Published: May 21, 2003

Page 18

3.56 SAMPLE DELIVERY GROUP (SDG) NUMBER

The SDG number is the unit within a single case (see case number definition) used to identify a group of samples for delivery. A SDG is a group of 20 or fewer field samples within a case and is received over a contractually specified time period. Analytical results from all samples in a SDG are due concurrently.

A SDG is defined by one of the following:

- Each 20 field samples within a case
- Each seven-calendar-day period during which samples within a project are received
- When designated by the SDM organization.

3.57 SPIKE CONCENTRATION

The spike concentration field applies only to laboratory QC data and must be reported with one of the QC type codes specified below and defined in Section 3.39 of this document.

BS/LCS, LCD, MS, MSD, and SUR: The concentration of the spike compound in the same units as the reported result.

BLK and DUP: Space fill.

3.58 TIME ANALYZED

The time analyzed field indicates the time the analysis was started in the laboratory.

3.59 TICs SEARCHED FOR (FORMS A AND B ONLY)

The TICs searched for field is a flag field indicating if TICs were searched for. Appropriate responses for this field are "Y" or "N."

3.60 TOTAL PROPAGATED UNCERTAINTY (TPU)

The TPU field is a combination of errors and uncertainties dependent on the chosen analysis methods, representing sample-specific error (at 2-sigma) that could possibly be introduced into the sample while at the analytical laboratory, reported in the same units as the result value for the current analyte. For radiochemical analyses the total propagated uncertainty has the counting uncertainty included.

3.61 TRACER YIELD

The tracer/recovery yield for radiochemistry data is listed in this field.

3.62 VERSION NUMBER

The version number of the FEAD document and all associated forms is indicated in this field. Use the version as defined by the client contract SOW.

Common Requirements of the Format for Electronic Analytical Data (FEAD)

CP-15383

Published: May 21, 2003

Page 19

4.0 FEAD FORMAT SPECIFICATIONS

4.1 VOLATILE ORGANICS – HEADER LINE FORMAT

Table 4-1. Volatile Organics – Header Line Format.

Column(s)	Field Name	Mandatory?	Type	Format/Contents
1-2	Form Number	Y	Character (2)	“A”
3-4	Form Suffix	Y	Character (2)	“AA”-“ZZ” (see format descriptions)
5	Record Type	Y	Character (1)	“H” (header)
6-9	Format Type	Y	Character (4)	“FEAD” – specifies data format
10-11	Version Number	Y	Character (2)	The version number of the FEAD document and all associated forms
12-23	Sample Number	Y	Character (12)	Supplied with sample (see format descriptions)
24-43	Contract		Character (20)	Contract number under which the analysis was performed
44-49	Lab Code	Y	Character (6)	Abbreviated laboratory name (see format descriptions)
50-55	Lab Code Suffix		Character (6)	Used by laboratories at the Hanford Site to specify room number (see format descriptions)
56-65	Case Number		Character (10)	(See format descriptions)
66-71	SAS Number		Character (6)	Special analytical services number (see format descriptions)
72-83	SDG Number		Character (12)	Sample delivery group number (see format descriptions)
84-93	Analytical Matrix		Character (10)	“WATER”, “SOIL”, “GASEOUS”, “OTHERLIQ”, or “OTHERSOLID”
94-103	Lab Received Date		Character (10)	MM/DD/YYYY (see format descriptions)
104-113	Collected Date		Character (10)	MM/DD/YYYY (see format descriptions)
114-118	Percent Solids		Number (5,1)	Analysis method and media-dependent (see format descriptions)
119	Decanted		Character (1)	“Y”, “N”, or space; analysis method and media-dependent (see format descriptions)
120-131	Lab Sample ID		Character (12)	Laboratory sample identifier (see format descriptions)
132-145	Lab File ID		Character (14)	Laboratory file identifier (see format descriptions)
146-155	SAF Number		Character (10)	Sample authorization form number (see format descriptions)
156-165	Column Type		Character (10)	“PACK”, “CAP”, or “WIDE” (see format descriptions)
166	TICs Searched for		Character (1)	Were TICs searched for? “Y” or “N”
167-168	Number of TICs Found		Integer (2)	(See format descriptions)

Common Requirements of the Format for Electronic Analytical Data (FEAD)

CP-15383

Published: May 21, 2003

Page 20

Table 4-1. Volatile Organics – Header Line Format.

Column(s)	Field Name	Mandatory?	Type	Format/Contents
169-173	Percent Moisture		Number (5,1)	Analysis method and media-dependent (see format descriptions)

4.2 VOLATILE ORGANICS – DETAIL LINE FORMAT

Table 4-2. Volatile Organics – Detail Line Format. (2 Pages)

Column(s)	Field Name	Mandatory?	Type	Format/Contents
1-2	Form Number	Y	Character (2)	“A”
3-4	Form Suffix	Y	Character (2)	“AA”-“ZZ” (see format descriptions)
5	Record Type	Y	Character (1)	“D” (detail)
6-20	CAS Number	Y	Character (15)	(See format descriptions)
21-33	Result		Number (13,3)	The result associated with the analysis for this analyte
34-43	Analysis Units		Character (10)	Analysis units for result
44	Action Code	Y	Character (1)	“I” (insert) or “R” (reanalysis) (see format descriptions)
45-64	Method Name	Y	Character (20)	(See format descriptions)
65-74	Sample Aliquot Size (Wt/Vol)		Number (10,3)	(See format descriptions)
75-84	Sample Aliquot Units (Wt/Vol)		Character (10)	(See format descriptions)
85-90	Lab Qualifier		Character (6)	(See format descriptions)
91-100	Dilution Factor		Number (10,3)	(See format descriptions)
101-110	Date Analyzed	Y	Character (10)	MM/DD/YYYY
111-115	Time Analyzed		Character (5)	HH:MM (24 hour)
116-127	Analysis Batch Number		Character (12)	(See format descriptions)
128-130	QC Type		Character (3)	(See format descriptions)
131-140	Spike Concentration		Number (10,3)	(See format descriptions)
141-150	Percent Recovery		Number (10,3)	(See format descriptions)
151-160	RPD		Number (10,3)	(See format descriptions)
161-170	RPD Maximum		Number (10,3)	(See format descriptions)
171-180	Minimum Control Limit		Number (10,3)	(See format descriptions)

Common Requirements of the Format for Electronic Analytical Data (FEAD)

CP-15383

Published: May 21, 2003

Page 21

Table 4-2. Volatile Organics – Detail Line Format. (2 Pages)

Column(s)	Field Name	Mandatory?	Type	Format/Contents
181-190	Maximum Control Limit		Number (10,3)	(See format descriptions)
191-200	Required Detection Limit		Number(10,2)	Contractually required detection limit (see format descriptions)
201-210	Reporting Limit		Number (10,2)	(See format descriptions)
211-213	Reporting Limit Type		Character (3)	(See format descriptions)
214-237	Lab Comment Code		Character(24)	A laboratory reported code that translates to a comment about the result record.

4.3 VOLATILE ORGANICS – TIC LINE FORMAT

Table 4-3. Volatile Organics – TIC Line Format.

Column(s)	Field Name	Mandatory?	Type	Format/Contents
1-2	Form Number	Y	Character (2)	“A”
3-4	Form Suffix	Y	Character (2)	“AA”-“ZZ” (see format descriptions)
5	Record Type	Y	Character (1)	“T” (TIC)
6-20	CAS Number	Y	Character (15)	(See format descriptions for CAS number, record type “T”)
21-33	Result		Number (13,3)	The estimated concentration value obtained by the analysis of this analyte
34-43	Analysis Units		Character (10)	Analysis units for result
44	Action Code	Y	Character (1)	“I” (insert) or “R” (reanalysis) (see format descriptions)
45-64	Method Name	Y	Character (20)	(See format descriptions)
65-74	Sample Aliquot Size (Wt/Vol)		Number (10,3)	(See format descriptions)
75-84	Sample Aliquot Units (Wt/Vol)		Character (10)	(See format descriptions)
85-90	Lab Qualifier		Character (6)	(See format descriptions)
91-100	Dilution Factor		Number (10,3)	(See format descriptions)
101-110	Date Analyzed	Y	Character (10)	MM/DD/YYYY
111-115	Time Analyzed		Character (5)	HH:MM (24 hour)

Common Requirements of the Format for Electronic Analytical Data (FEAD)

CP-15383

Published: May 21, 2003

Page 22

Table 4-3. Volatile Organics – TIC Line Format.

Column(s)	Field Name	Mandatory?	Type	Format/Contents
116-175	Compound Name		Character (60)	The long name for this analyte
176-181	Retention Time		Number (6,2)	The time in decimal minutes from the introduction of the sample into the laboratory instrument until the maximum peak response of the analyte is detected

Common Requirements of the Format for Electronic Analytical Data (FEAD)

CP-15383

Published: May 21, 2003

Page 23

4.4 SEMI-VOLATILE ORGANICS – HEADER LINE FORMAT

Table 4-4. Semi-Volatile Organics – Header Line Format. (2 Pages)

Column(s)	Field Name	Mandatory?	Type	Format/Contents
1-2	Form Number	Y	Character (2)	“B”
3-4	Form Suffix	Y	Character (2)	“AA”-“ZZ” (see format descriptions)
5	Record Type	Y	Character (1)	“H” (header)
6-9	Format Type	Y	Character (4)	“FEAD” – specifies data format
10-11	Version Number	Y	Character (2)	The version number of the FEAD document and all associated forms
12-23	Sample Number	Y	Character (12)	Supplied with sample (see format descriptions)
24-43	Contract		Character (20)	Contract number under which the analysis was performed.
44-49	Lab Code	Y	Character (6)	Abbreviated laboratory name (see format descriptions)
50-55	Lab Code Suffix		Character (6)	Used by laboratories at the Hanford Site to specify room number (see format descriptions)
56-65	Case Number		Character (10)	(See format descriptions)
66-71	SAS Number		Character (6)	Special analytical services number (see format descriptions)
72-83	SDG Number		Character (12)	Sample delivery group number (see format descriptions)
84-93	Analytical Matrix		Character (10)	“WATER”, “SOIL”, “GASEOUS”, “OTHERLIQ”, or “OTHERSOLID”
94-103	Lab Received Date		Character (10)	MM/DD/YYYY (see format descriptions)
104-113	Collected Date		Character (10)	MM/DD/YYYY (see format descriptions)
114-118	Percent Solids		Number (5,1)	Analysis method and media-dependent (see format descriptions)
119	Decanted		Character (1)	“Y”, “N”, or space; analysis method and media-dependent (see format descriptions).
120-131	Lab Sample ID		Character (12)	Laboratory sample identifier (see format descriptions)
132-145	Lab File ID		Character (14)	Laboratory file identifier (see format descriptions)
146-155	SAF Number		Character (10)	Sample authorization form number (see format descriptions)
156-165	Column Type		Character (10)	“PACK”, “CAP”, or “WIDE” (see format descriptions)
166	TICs Searched for		Character (1)	Were TICs searched for? “Y” or “N”

Common Requirements of the Format for Electronic Analytical Data (FEAD)

CP-15383

Published: May 21, 2003

Page 24

Table 4-4. Semi-Volatile Organics – Header Line Format. (2 Pages)

Column(s)	Field Name	Mandatory?	Type	Format/Contents
167-168	Number of TICs Found		Integer (2)	(See format descriptions)
169	GPC Cleanup		Character (1)	Was gel permeation chromatography cleanup performed? “Y” or “N”
170-174	Percent Moisture		Number (5,1)	Analysis method and media-dependent (see format descriptions)

4.5 SEMI-VOLATILE ORGANICS – DETAIL LINE FORMAT

Table 4-5. Semi-Volatile Organics – Detail Line Format. (2 Pages)

Column(s)	Field Name	Mandatory?	Type	Format/Contents
1-2	Form Number	Y	Character (2)	“B”
3-4	Form Suffix	Y	Character (2)	“AA”-“ZZ” (see format descriptions)
5	Record Type	Y	Character (1)	“D” (detail)
6-20	CAS Number	Y	Character (15)	(See format descriptions)
21-33	Result		Number (13,3)	The result associated with the analysis for this analyte
34-43	Analysis Units		Character (10)	Analysis units for result
44	Action Code	Y	Character (1)	“I” (insert) or “R” (reanalysis) (see format descriptions)
45-64	Method Name	Y	Character (20)	(See format descriptions)
65-74	Sample Aliquot Size (Wt/Vol)		Number (10,3)	(See format descriptions)
75-84	Sample Aliquot Units (Wt/Vol)		Character (10)	(See format descriptions)
85-90	Lab Qualifier		Character (6)	(See format descriptions)
91-100	Dilution Factor		Number (10,3)	(See format descriptions)
101-110	Date Analyzed	Y	Character (10)	MM/DD/YYYY
111-115	Time Analyzed		Character (5)	HH:MM (24 hour)
116-119	Extraction		Character (4)	Method of extraction (see format descriptions)
120-129	Lab Extracted Date		Character (10)	MM/DD/YYYY (see format descriptions)
130-141	Analysis Batch Number		Character (12)	(See format descriptions)
142-144	QC Type		Character (3)	(See format descriptions)
145-154	Spike Concentration		Number (10,3)	(See format descriptions)

Common Requirements of the Format for Electronic Analytical Data (FEAD)

CP-15383

Published: May 21, 2003

Page 25

Table 4-5. Semi-Volatile Organics – Detail Line Format. (2 Pages)

Column(s)	Field Name	Mandatory?	Type	Format/Contents
155-164	Percent Recovery		Number (10,3)	(See format descriptions)
165-174	RPD		Number (10,3)	(See format descriptions)
175-184	RPD Maximum		Number (10,3)	(See format descriptions)
185-194	Minimum Control Limit		Number (10,3)	(See format descriptions)
195-204	Maximum Control Limit		Number (10,3)	(See format descriptions)
205-214	Required Detection Limit		Number (10,2)	Contractually required detection limit (see format descriptions)
215-224	Reporting Limit		Number (10,2)	(See format descriptions)
225-227	Reporting Limit Type		Character (3)	(See format descriptions)
228-251	Lab Comment Code		Character(24)	A laboratory reported code that translates to a comment about the result record.

4.6 SEMI-VOLATILE ORGANICS – TIC LINE FORMAT

Table 4-6. Semi-Volatile Organics – TIC Line Format. (2 Pages)

Column(s)	Field Name	Mandatory?	Type	Format/Contents
1-2	Form Number	Y	Character (2)	“B”
3-4	Form Suffix	Y	Character (2)	“AA”-“ZZ” (see format descriptions)
5	Record Type	Y	Character (1)	“T” (TIC)
6-20	CAS Number	Y	Character (15)	(See format descriptions for CAS number, record type “T”)
21-33	Result		Number (13,3)	The estimated concentration value obtained by the analysis for this analyte
34-43	Analysis Units		Character (10)	Analysis units for result
44	Action Code	Y	Character (1)	“I” (insert) or “R” (reanalysis) (see format descriptions)
45-64	Method Name	Y	Character (20)	(See format descriptions)
65-74	Sample Aliquot Size (Wt/Vol)		Number (10,3)	(See format descriptions)
75-84	Sample Aliquot Units (Wt/Vol)		Character (10)	(See format descriptions)
85-90	Lab Qualifier		Character (6)	(See format descriptions)
91-100	Dilution Factor		Number (10,3)	(See format descriptions)

Common Requirements of the Format for Electronic Analytical Data (FEAD)

CP-15383

Published: May 21, 2003

Page 26

Table 4-6. Semi-Volatile Organics – TIC Line Format. (2 Pages)

Column(s)	Field Name	Mandatory?	Type	Format/Contents
101-110	Date Analyzed	Y	Character (10)	MM/DD/YYYY
111-115	Time Analyzed		Character (5)	HH:MM (24 hour)
116-175	Compound Name		Character (60)	The long name for this analyte
176-181	Retention Time		Number (6,2)	The time in decimal minutes from the introduction of the sample into the laboratory instrument until the maximum peak response of the analyte is detected
182-185	Extraction		Character (4)	Method of extraction (see format descriptions)
186-195	Lab Extracted Date		Character (10)	MM/DD/YYYY (see format descriptions)

Common Requirements of the Format for Electronic Analytical Data (FEAD)

CP-15383

Published: May 21, 2003

Page 27

4.7 PESTICIDES – HEADER LINE FORMAT

Table 4-7. Pesticides – Header Line Format. (2 Pages)

Column(s)	Field Name	Mandatory?	Type	Format/Contents
1-2	Form Number	Y	Character (2)	“D”
3-4	Form Suffix	Y	Character (2)	“AA”-“ZZ” (see format descriptions)
5	Record Type	Y	Character (1)	“H” (header)
6-9	Format Type	Y	Character (4)	“FEAD” – specifies data format
10-11	Version Number	Y	Character (2)	The version number of the FEAD document and all associated forms
12-23	Sample Number	Y	Character (12)	Supplied with sample (see format descriptions)
24-43	Contract		Character (20)	Contract number under which the analysis was performed
44-49	Lab Code	Y	Character (6)	Abbreviated laboratory name (see format descriptions)
50-55	Lab Code Suffix		Character (6)	Used by laboratories at the Hanford Site to specify room number (see format descriptions)
56-65	Case Number		Character (10)	(See format descriptions)
66-71	SAS Number		Character (6)	Special analytical services number (see format descriptions)
72-83	SDG Number		Character (12)	Sample delivery group number (see format descriptions)
84-93	Analytical Matrix		Character (10)	“WATER”, “SOIL”, “GASEOUS” “OTHERLIQ”, or “OTHERSOLID”
94-103	Lab Received Date		Character (10)	MM/DD/YYYY (see format descriptions)
104-113	Collected Date		Character (10)	MM/DD/YYYY (see format descriptions)
114-118	Percent Solids		Number (5,1)	Analysis method and media-dependent (see format descriptions)
119	Decanted		Character (1)	“Y”, “N”, or space. Analysis method and media-dependent (see format descriptions)
120-131	Lab Sample ID		Character (12)	Laboratory sample identifier (see format descriptions)
132-145	Lab File ID		Character (14)	Laboratory file identifier (see format descriptions)
146-155	SAF Number		Character (10)	Sample authorization form number (see format descriptions)

Common Requirements of the Format for Electronic Analytical Data (FEAD)

CP-15383

Published: May 21, 2003

Page 28

Table 4-7. Pesticides – Header Line Format. (2 Pages)

Column(s)	Field Name	Mandatory?	Type	Format/Contents
156	GPC Cleanup		Character (1)	Was gel permeation chromatography cleanup performed? “Y” or “N”
157-161	Percent Moisture		Number (5,1)	Analysis method and media-dependent (see format descriptions)

4.8 PESTICIDES – DETAIL LINE FORMAT

Table 4-8. Pesticides – Detail Line Format. (2 Pages)

Column(s)	Field Name	Mandatory?	Type	Format/Contents
1-2	Form Number	Y	Character (2)	“D”
3-4	Form Suffix	Y	Character (2)	“AA”-“ZZ” (see format descriptions)
5	Record Type	Y	Character (1)	“D” (detail)
6-20	CAS Number	Y	Character (15)	(See format descriptions)
21-33	Result		Number (13,3)	The result associated with the analysis for this analyte.
34-43	Analysis Units		Character (10)	Analysis units for result
44	Action Code	Y	Character (1)	“I” (insert) or “R” (reanalysis) (see format descriptions)
45-64	Method Name	Y	Character (20)	(See format descriptions)
65-74	Sample Aliquot Size (Wt/Vol)		Number (10,3)	(See format descriptions)
75-84	Sample Aliquot Units (Wt/Vol)		Character (10)	(See format descriptions)
85-90	Lab Qualifier		Character (6)	(See format descriptions)
91-100	Dilution Factor		Number (10,3)	(See format descriptions)
101-110	Date Analyzed	Y	Character (10)	MM/DD/YYYY
111-115	Time Analyzed		Character (5)	HH:MM (24 hour)
116-119	Extraction		Character (4)	Method of extraction (see format descriptions)
120-129	Lab Extracted Date		Character (10)	MM/DD/YYYY (see format descriptions)
130-139	Column Type		Character (10)	“PACK”, “CAP”, or “WIDE” (see format descriptions)
140-149	Column ID		Character (10)	(See format descriptions)
150-161	Analysis Batch Number		Character (12)	(See format descriptions)
162-164	QC Type		Character (3)	(See format descriptions)
165-174	Spike Concentration		Number (10,3)	(See format descriptions)

Common Requirements of the Format for Electronic Analytical Data (FEAD)

CP-15383

Published: May 21, 2003

Page 29

Table 4-8. Pesticides – Detail Line Format. (2 Pages)

Column(s)	Field Name	Mandatory?	Type	Format/Contents
175-184	Percent Recovery		Number (10,3)	(See format descriptions)
185-194	RPD		Number (10,3)	(See format descriptions)
195-204	RPD Maximum		Number (10,3)	(See format descriptions)
205-214	Minimum Control Limit		Number (10,3)	(See format descriptions)
215-224	Maximum Control Limit		Number (10,3)	(See format descriptions)
225-234	Required Detection Limit		Number(10,2)	Contractually required detection limit (see format descriptions)
235-244	Reporting Limit		Number (10,2)	(See format descriptions)
245-247	Reporting Limit Type		Character (3)	(See format descriptions)
248-271	Lab Comment Code		Character(24)	A laboratory reported code that translates to a comment about the result record.

Common Requirements of the Format for Electronic Analytical Data (FEAD)

CP-15383

Published: May 21, 2003

Page 30

4.9 INORGANICS – HEADER LINE FORMAT

Table 4-9. Inorganics – Header Line Format. (2 Pages)

Column(s)	Field Name	Mandatory?	Type	Format/Contents
1-2	Form Number	Y	Character (2)	“I” (inorganics)
3-4	Form Suffix	Y	Character (2)	“AA”-“ZZ” (see format descriptions)
5	Record Type	Y	Character (1)	“H” (header)
6-9	Format Type	Y	Character (4)	“FEAD” – specifies data format
10-11	Version Number	Y	Character (2)	The version number of the FEAD document and all associated forms
12-23	Sample Number	Y	Character (12)	Supplied with sample (see format descriptions)
24-43	Contract		Character (20)	Contract number under which the analysis was performed
44-49	Lab Code	Y	Character (6)	Abbreviated laboratory name (see format descriptions)
50-55	Lab Code Suffix		Character (6)	Used by laboratories at the Hanford Site to specify room number (see format descriptions)
56-65	Case Number		Character (10)	(See format descriptions)
66-71	SAS Number		Character (6)	Special analytical services number (see format descriptions)
72-83	SDG Number		Character (12)	Sample delivery group number (see format descriptions)
84-93	Analytical Matrix		Character (10)	“WATER”, “SOIL”, “GASEOUS”, “OTHERLIQ”, or “OTHERSOLID”
94-103	Lab Received Date		Character (10)	MM/DD/YYYY (see format descriptions)
104-113	Collected Date		Character (10)	MM/DD/YYYY (see format descriptions)
114-118	Percent Solids		Number (5,1)	Method and media-dependent (see format descriptions)
119	Decanted		Character (1)	“Y”, “N”, or space; method and media-dependent (see format descriptions)
120-131	Lab Sample ID		Character (12)	Laboratory sample identifier (see format descriptions)
132-145	Lab File ID		Character (14)	Laboratory file identifier (see format descriptions)
146-155	SAF Number		Character (10)	Sample authorization form number (see format descriptions)
156-160	Percent Moisture		Number (5,1)	Analysis method and media-dependent (see format descriptions)

Common Requirements of the Format for Electronic Analytical Data (FEAD)

CP-15383

Published: May 21, 2003

Page 31

4.10 INORGANICS – DETAIL LINE FORMAT

Table 4-10. Inorganics – Detail Line Format. (2 Pages)

Column(s)	Field Name	Mandatory?	Type	Format/Contents
1-2	Form Number	Y	Character (2)	“I” (inorganic)
3-4	Form Suffix	Y	Character (2)	“AA”-”ZZ” (see format descriptions)
5	Record Type	Y	Character (1)	“D” (detail)
6-20	CAS Number	Y	Character (15)	(See format descriptions)
21-33	Result		Number (13,3)	The result associated with the analysis for this analyte
34-43	Analysis Units		Character (10)	Analysis units for result
44	Action Code	Y	Character (1)	“I” (insert) or “R” (reanalysis) (see format descriptions)
45-64	Method Name	Y	Character (20)	(See format descriptions)
65-74	Sample Aliquot Size (Wt/Vol)		Number (10,3)	(See format descriptions)
75-84	Sample Aliquot Units (Wt/Vol)		Character (10)	(See format descriptions)
85-90	Lab Qualifier		Character (6)	(See format descriptions)
91-100	Dilution Factor		Number (10,3)	(See format descriptions)
101-110	Date Analyzed	Y	Character (10)	MM/DD/YYYY
111-115	Time Analyzed		Character (5)	HH:MM (24 hour)
116-127	Analysis Batch Number		Character (12)	(See format descriptions)
128-130	QC Type		Character (3)	(See format descriptions)
131-140	Spike Concentration		Number (10,3)	(See format descriptions)
141-150	Percent Recovery		Number (10,3)	(See format descriptions)
151-160	RPD		Number (10,3)	(See format descriptions)
161-170	RPD Maximum		Number (10,3)	(See format descriptions)
171-180	Minimum Control Limit		Number (10,3)	(See format descriptions)
181-190	Maximum Control Limit		Number (10,3)	(See format descriptions)
191-200	Required Detection Limit		Number (10,2)	Contractually required detection limit (see format descriptions)
201-210	Reporting Limit		Number (10,2)	(See format descriptions)
211-213	Reporting Limit Type		Character (3)	(See format descriptions)

Common Requirements of the Format for Electronic Analytical Data (FEAD)

CP-15383

Published: May 21, 2003

Page 32

Table 4-10. Inorganics – Detail Line Format. (2 Pages)

Column(s)	Field Name	Mandatory?	Type	Format/Contents
214-237	Lab Comment Code		Character(24)	A laboratory reported code that translates to a comment about the result record.

Common Requirements of the Format for Electronic Analytical Data (FEAD)

CP-15383

Published: May 21, 2003

Page 33

4.11 RADIOCHEMISTRY – HEADER LINE FORMAT

Table 4-11. Radiochemistry – Header Line Format. (2 Pages)

Column(s)	Field Name	Mandatory?	Type	Format/Contents
1-2	Form Number	Y	Character (2)	“R” (radchem)
3-4	Form Suffix	Y	Character (2)	“AA”-“ZZ” (see format descriptions)
5	Record Type	Y	Character (1)	“H” (header)
6-9	Format Type	Y	Character (4)	“FEAD” – specifies data format
10-11	Version Number	Y	Character (2)	The version number of the FEAD document and all associated forms
12-23	Sample Number	Y	Character (12)	Supplied with sample (see format descriptions)
24-43	Contract		Character (20)	Contract number
44-49	Lab Code	Y	Character (6)	Abbreviated laboratory name (see format descriptions)
50-55	Lab Code Suffix		Character (6)	Used by laboratories at the Hanford Site to specify room number (see format descriptions)
56-65	Case Number		Character (10)	(See format descriptions)
66-71	SAS Number		Character (6)	Special analytical services number (see format descriptions)
72-83	SDG Number		Character (12)	Sample delivery group number (see format descriptions)
84-93	Analytical Matrix		Character (10)	“WATER”, “SOIL”, “GASEOUS”, “OTHERLIQ”, or “OTHERSOLID”
94-103	Lab Received Date		Character (10)	MM/DD/YYYY (see format descriptions)
104-113	Collected Date		Character (10)	MM/DD/YYYY (see format descriptions)
114-118	Percent Solids		Number (5,1)	Method and media-dependent (see format descriptions)
119	Decanted		Character (1)	“Y”, “N”, or space; method and media-dependent (see format descriptions)
120-131	Lab Sample ID		Character (12)	Laboratory sample identifier (see format descriptions)
132-145	Lab File ID		Character (14)	Laboratory file identifier (see format descriptions)
146-155	SAF Number		Character (10)	Sample authorization form number (see format descriptions)
156-160	Collected Time		Character (5)	HH:MM (24 hour) (see format descriptions)

Common Requirements of the Format for Electronic Analytical Data (FEAD)

CP-15383

Published: May 21, 2003

Page 34

Table 4-11. Radiochemistry – Header Line Format. (2 Pages)

Column(s)	Field Name	Mandatory?	Type	Format/Contents
161-165	Percent Moisture		Number (5,1)	Analysis method and media dependent (see format descriptions)
166-181	Sample Date Time On		Character (16)	MM/DD/YYYY HH:MM (24 hour) (see format descriptions)
182-186	Distillation Volume		Number (5,1)	Analysis method and media-dependent (see format descriptions)

4.12 RADIOCHEMISTRY – DETAIL LINE FORMAT

Table 4-12. Radiochemistry – Detail Line Format. (2 Pages)

Column(s)	Field Name	Mandatory?	Type	Format/Contents
1-2	Form Number	Y	Character (2)	“R” (radchem)
3-4	Form Suffix	Y	Character (2)	“AA”-“ZZ” (see format descriptions)
5	Record Type	Y	Character (1)	“D” (detail)
6-20	CAS Number	Y	Character (15)	(See format descriptions)
21-33	Result		Number (13,3)	The result associated with the analysis for this analyte, negative values are allowed
34-43	Analysis Units		Character (10)	Analysis units for result
44-53	2-Sigma Counting Error		Number (10,2)	(See format descriptions)
54	Action Code	Y	Character (1)	“I” (insert) or “R” (reanalysis) (see format descriptions)
55-67	Total Propagated Uncertainty		Number (13,2)	(See format descriptions)
68-87	Method Name	Y	Character (20)	(See format descriptions)
88-97	Sample Aliquot Size (Wt/Vol)		Number (10,3)	(See format descriptions)
98-107	Sample Aliquot Units (Wt/Vol)		Character (10)	(See format descriptions)
108-117	MDA		Number (10,2)	A sample-dependent estimate of the detection limit (see format descriptions)
118-123	Lab Qualifier		Character (6)	(See format descriptions)
124-133	Dilution Factor		Number (10,3)	(See format descriptions)
134-143	Date Analyzed	Y	Character(10)	MM/DD/YYYY
144-148	Time Analyzed		Character(5)	HH:MM (24 hour)
149-160	Analysis Batch Number		Character(12)	(See format descriptions)

Common Requirements of the Format for Electronic Analytical Data (FEAD)

CP-15383

Published: May 21, 2003

Page 35

Table 4-12. Radiochemistry – Detail Line Format. (2 Pages)

161-163	QC Type		Character (3)	(See format descriptions)
164-173	Spike Concentration		Number (10,3)	(See format descriptions)
174-183	Percent Recovery		Number (10,3)	(See format descriptions)
184-193	RPD		Number (10,3)	(See format descriptions)
194-203	RPD Maximum		Number (10,3)	(See format descriptions)
204-213	Minimum Control Limit		Number (10,3)	(See format descriptions)
214-223	Maximum Control Limit		Number (10,3)	(See format descriptions)
224-233	Tracer Yield		Number (10,2)	(See format descriptions)
234-243	Required Detection Limit		Number (10,2)	Contractually required detection limit (see format descriptions)
244-253	Reporting Limit		Number (10,2)	(See format descriptions)
254-256	Reporting Limit Type		Character (3)	(See format descriptions)
257-280	Lab Comment Code		Character(24)	A laboratory reported code that translates to a comment about the result record.
281-290	RER		Number(10,3)	(See format descriptions)
291-300	RER Maximum		Number(10,3)	(See format descriptions)

Common Requirements of the Format for Electronic Analytical Data (FEAD)

CP-15383

Published: May 21, 2003

Page 36

4.13 WET CHEMISTRY – HEADER LINE FORMAT

Table 4-13. Wet Chemistry – Header Line Format.

Column(s)	Field Name	Mandatory?	Type	Format/Contents
1-2	Form Number	Y	Character (2)	“W” (wetchem)
3-4	Form Suffix	Y	Character (2)	“AA”-”ZZ” (see format descriptions)
5	Record Type	Y	Character (1)	“H” (header)
6-9	Format Type	Y	Character (4)	“FEAD” – specifies data format
10-11	Version Number	Y	Character (2)	The version number of the FEAD document and all associated forms
12-23	Sample Number	Y	Character (12)	Supplied with sample (see format descriptions)
24-43	Contract		Character (20)	Contract number
44-49	Lab Code	Y	Character (6)	Abbreviated laboratory name (see format descriptions)
50-55	Lab Code Suffix		Character (6)	Used by laboratories at the Hanford Site to specify room number (see format descriptions)
56-65	Case Number		Character (10)	(See format descriptions)
66-71	SAS Number		Character (6)	Special analytical services number (see format descriptions)
72-83	SDG Number		Character (12)	Sample delivery group number (see format descriptions)
84-93	Analytical Matrix		Character (10)	“WATER”, “SOIL”, “GASEOUS”, “OTHERLIQ”, or “OTHERSOLID”
94-103	Lab Received Date		Character (10)	MM/DD/YYYY (see format descriptions)
104-113	Collected Date		Character (10)	MM/DD/YYYY (see format descriptions)
114-118	Percent Solids		Number (5,1)	Method and media-dependent (see format descriptions)
119	Decanted		Character (1)	“Y”, “N”, or space; method and media-dependent (see format descriptions)
120-131	Lab Sample ID		Character (12)	Laboratory sample identifier (see format descriptions)
132-145	Lab File ID		Character (14)	Laboratory file identifier (see format descriptions)

Common Requirements of the Format for Electronic Analytical Data (FEAD)

CP-15383

Published: May 21, 2003

Page 37

Table 4-13. Wet Chemistry – Header Line Format.

Column(s)	Field Name	Mandatory?	Type	Format/Contents
146-155	SAF Number		Character (10)	Sample authorization form number (see format descriptions)
156-160	Collected Time		Character (5)	HH:MM (24 hour) (see format descriptions)
161-165	Percent Moisture		Number (5,1)	Analysis method and media-dependent (see format descriptions)

4.14 WET CHEMISTRY – DETAIL LINE FORMAT

Table 4-14. Wet Chemistry – Detail Line Format.

Column(s)	Field Name	Mandatory?	Type	Format/Contents
1-2	Form Number	Y	Character (2)	“W” (wetchem)
3-4	Form Suffix	Y	Character (2)	“AA”-“ZZ” (see format descriptions)
5	Record Type	Y	Character (1)	“D” (detail)
6-20	CAS Number	Y	Character (15)	(See format descriptions)
21-33	Result		Number (13,3)	The result associated with the analysis for this analyte (see “Reporting Results for Undetected Analytes,” Section 2.6)
34-43	Analysis Units		Character (10)	Analysis units for result
44	Action Code	Y	Character (1)	“I” (insert) or “R” (reanalysis) (see format descriptions)
45-64	Method Name	Y	Character (20)	(See format descriptions)
65-74	Sample Aliquot Size (Wt/Vol)		Number (10,3)	(See format descriptions)
75-84	Sample Aliquot Units (Wt/Vol)		Character (10)	(See format descriptions)
85-90	Lab Qualifier		Character (6)	(See format descriptions)
91-100	Dilution Factor		Number (10,3)	(See format descriptions)
101-110	Date Analyzed	Y	Character (10)	MM/DD/YYYY
111-115	Time Analyzed		Character (5)	HH:MM (24 hour)
116-127	Analysis Batch Number		Character (12)	(See format descriptions)
128-130	QC Type		Character (3)	(See format descriptions)
131-140	Spike Concentration		Number (10,3)	(See format descriptions)
141-150	Percent Recovery		Number (10,3)	(See format descriptions)
151-160	RPD		Number (10,3)	(See format descriptions)
161-170	RPD Maximum		Number (10,3)	(See format descriptions)
171-180	Minimum Control Limit		Number (10,3)	(See format descriptions)

Common Requirements of the Format for Electronic Analytical Data (FEAD)

CP-15383

Published: May 21, 2003

Page 38

Table 4-14. Wet Chemistry – Detail Line Format.

Column(s)	Field Name	Mandatory?	Type	Format/Contents
181-190	Maximum Control Limit		Number (10,3)	(See format descriptions)
191-200	Required Detection Limit		Number (10,2)	Contractually required detection limit (see format descriptions)
201-210	Reporting Limit		Number (10,2)	(See format descriptions)
211-213	Reporting Limit Type		Character (3)	(See format descriptions)
214-237	Lab Comment Code		Character(24)	A laboratory reported code that translates to a comment about the result record.