EQUIS LAB STANDARD OPERATING PROCEDURE

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SOP Version ConTROL

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| 9.1 | 04/04/2017 | - | Updated format style | PJF |
| 9.2 | 09/26/2017 | - | Updates to reflect staff changes | PJF |
| 9.3 | 12/19/2018 | 16, 17 | Radiological analysis requirements | PJF |
| 9.4 | 12/21/2018 | 29 | Add link to Arcadis’ EQuIS website. | PJF |

Approval Signatures

Prepared by: Date:

Reviewed by: Date:
(Technical Expert)

# Introduction

Arcadis manages and verifies/validates analytical data generated by commercial analytical laboratories in the EQuIS database (product of Earthsoft, Inc.). All laboratories contracted by Arcadis or their clients, on a site-by-site basis, may be required to submit electronic data deliverables (EDDs) in addition to the hard copy report. This Standard Operating Procedure (SOP) describes the structure, format, and submission requirements for EDDs in the EQuIS EFWEDD (Sample, Test, Result, Batch) format.

This document is a general guidance for preparation of the required electronic data and associated quality control information. The structure of the EDD as defined in this document will remain constant unless EarthSoft modifies the database structure. Reference values and requirements for population of additional fields with specific information will not change from project to project.

Modification to reference value lists may NOT be made by the laboratory without authorization from Arcadis.

Section I provides Arcadis contact information and the procedure to submit electronic deliverables directly via e-mail. However, all EDDs will be required to be submitted in a final CD compilation for each specific sampling event or as directed by the Arcadis Project Manager (PM).

Section II outlines the table structures and general requirements of the EDDs. The EDD structure is based on EarthSoft's EFWEDD EDD format. EarthSoft's EDD format has not been changed; however, some 'optional' fields identified in the EarthSoft EDD have been modified to be 'required' in this EDD format. Additional information regarding the EarthSoft products can be found at [http://www.earthsoft.com/.](http://www.earthsoft.com/%29.)

Section III presents some additional explanation and requirements for populating the table structure and population set forth in Section II.

Section IV summarizes the use of the EDP. Each laboratory **MUST** use EDP to check each EDD file set prior to submission to Arcadis. The EDP Error Report must be submitted with the EDD. ***All errors identified by the EDP routine must be corrected prior to forwarding the files for entry into the EQuIS database. Or approval for submittal with errors must be authorized by ARCADIS.***

# I. CONTACT INFORMATION

Laboratories should contact the Arcadis National Program Lab Managers with questions regarding this document. The contact info is as follows:

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**ELECTRONIC LABORATORY DATA CHECKER EDP**

Prior to submitting an EDD to Arcadis, the EarthSoft EDP must be run to check and verify the EDD structure, format and reference value compliance. The EDP report must be submitted for each file with each EDD set. The Data Checker error report, which demonstrates that the EDD files were successfully checked, must be electronically submitted with the four EDD files to Arcadis.

**REFERENCE VALUES**

**A specific set of values is required to be utilized in populating certain key fields of the EDD.** The Reference Value Lists for the EDP will be provided for each Arcadis subcontracted laboratory. The Reference Value Lists must be utilized as provided. Alterations or additions to the Reference Values are **NOT** allowed **without prior** written authorization by the Arcadis Data Manager. Electronic mail may be considered written authorization.

**ELECTRONIC DATA DELIVERABLE (EDD) SUBMISSION**

Prior to submission to Arcadis, each data file must also be reviewed by the laboratory to ensure that the sample IDs, dates, times and other inter-related information is consistent between all four (4) files and the EDD is complete. All parameters that are subcontracted to other laboratories must be included in the EDD for a specific SDG or Laboratory Project Number. It is not acceptable to submit separate EDDs for subcontract parameters. Manual review of the files may be necessary to complete this review.

It is **IMPERATIVE** that the EDD results match the hard copy results. If the results do not match the lab will correct the error ASAP at no additional charge. This includes issues involving various rounding routines for different electronic data management programs within the laboratory (i.e. LIMS vs. EPA CLP). Significant figures must also match hard copy and be consistent from one sampling event to the next. Reporting limits must be consistent between events as well and must be in compliance with the Laboratory Task Order or Project Statement of Work. There may be instances where diluted surrogates and unrecovered spike compounds will require population of the EDD with numeric values in lieu of data flags in the hard copy report. The Arcadis Data Manager will provide project specific guidance for these conditions. Adherence to the SOP requirements for population of spike/surrogate recovery and RPD fields is required to allow electronic validation of the data.

The EDP Reports for each file must be submitted with the 4 files of the actual EDD.

Laboratories must submit EDDs via e-mail for verification of compatibility and completeness to the assigned Arcadis Data Manager for the project.

**The subject line of this e-mail must include the following text:**

***[Facility-Code] [Laboratory Project/Log/SDG Number] - EDD Submission***

The e-mail should also include the laboratory contact name and phone number.

EDDs must be submitted via e-mail prior to or at the same time the final hard copy document is delivered. Arcadis may review the EDDs prior to requesting final submittal on CD. EDDs will be returned to the laboratory for modifications until the files can be successfully imported into the EQuIS Project Database and Electronic Data Validation can be performed without field population errors. Any revisions to the EDD will be required within 24 hours of notification to the laboratory regarding observed problems with the EDD. When the EDD is acceptable to the Arcadis Data Manager and Project Manager, a CD containing all final versions of the EDD should be submitted to Arcadis for archiving.

Invoices for analytical work will not be approved for payment until the final EDD revisions are acceptable.

# II. ELECTRONIC DELIVERABLE DATA FORMAT

This section identifies the structure and format requirements for EQuIS EFWEDD EDDs submitted by all laboratories to Arcadis. Specific field definitions are presented for each of the four files. Laboratories should review the unique requirements for these fields. The format population and adherence to the criteria are mandatory. Data are electronically validated and errors are quickly identifiable if the EDD is incorrect.

**GENERAL FORMAT REQUIREMENTS**

All laboratory data must be saved as an ASCII file format using the following standard format. Each subcontracting laboratory’s data must be incorporated into the primary laboratory’s EDD.

Each data field must be either separated by tabs or enclosed in double quotes (") and separated by commas. Data fields that do not contain information may be represented by two commas. Maximum length of text fields is indicated in the parentheses. If the input information is less than the maximum field length, **DO NOT ADD** spaces to account for the difference.

Each record must be terminated with a carriage return/line feed (i.e., standard DOS text file). The file can be produced using any software with the capability to create ASCII files.

**THE LABORATORY SHALL LEAVE THE HEADERS IN EACH ASCII FILE TO ASSIST IN REVIEW AND RESOLUTION OF ERRORS.**

Four files are required for each SDG or Laboratory Project Number: one each for samples, tests, results, and batches. Each file must be saved as a Tab Delimited or Comma Separated file.

Enterprise EDD File Naming Conventions

EDD packages must be named using a specific naming convention.  An EDD Package consists of a .zip file containing the text (.txt) EDDs and a User Certificate. The zip file and text file names must contain the specific elements listed below under file naming conventions, separated by a period.  A User Certificate file will be supplied to the lab by Arcadis for inclusion in the zip file.  Please include in the subject line of emailed EDD submissions the facility code and Sample Delivery Group (SDG) number.

File Naming Conventions:

ZIP File Name = Unique ID.Facility Code.Format Name.zip

Text File EDDs Name = Unique ID.EDD Section Name.txt

Unique ID = SDG number.

Facility Code = The facility code (i.e., Site Name from ENFOS)

Format Name = The EQuIS EDD format name (e.g., ESBasic, EFWEDD, etc.).

EDD Section Name = The name of the section within the EDD (e.g. EFW2FSample, EFW2LabTST, etc.).

For example, ZIP File Name = "2009001.BP-99999.EFWEDD.zip" will contain the following files: "2009001.EFW2FSample.txt", "2009001.EFW2LabTST.txt", “2009001.EFW2LabRES.txt", '2009001.EFW2LabBCH.txt' and "pfoos.usr".

Package re-submittal

In order to re-submit corrected EDDs, the .zip file and text (.txt) EDDs must each be renamed.  If the example EDD package above were to be re-submitted it would have ZIP File Name = "2009001B.BP-99999.EFWEDD.zip" containing "2009001B.EFW2FSample.txt", "2009001B.EFW2LabTST.txt", “2009001B.EFW2LabRES.txt", '2009001B.EFW2LabBCH.txt' and "pfoos.usr".  Note that a “B” has been appended to the SDG name in both the zip file name and each of the text file names.  A subsequent re-submittal of the same SDG would require that a C be appended and so on.

Referential integrity is enforced between tables (e.g. sys\_sample\_code present in the result, batch,and testtables must also be present in the sampletable). For example, a data record with a specific sys\_sample\_code found in the resulttable, but not in the sampletable, will cause and error in the Data Import Module and the file will not be allowed to be entered into the database. Dates and times associated with each test must match in the “Test” and “Result” files or the database will not allow entry of the entire file.

Reference values must be adhered to for a variety of fields as identified in the Reference Value list and described in the following table format requirements.

**FORMAT DETAILS**

The following four sections provide a detailed summary and the specific layout for each field required in each of the four (4) tables of the EDD. The Arcadis EDD has been derived from the EarthSoft EFWEDD EDD.

Date is reported as MM/DD/YY (month/day/year) and time as HH:MM (hour:minute). Time must be reported in 24-hour (military) format (3:30 p.m. = 15:30 and 8:30 AM = 08:30 not 8:30). **NOTE:** Make certain that the LIMS systems format the date and time the same way for all files.

**The columns in the following 4 tables relate to:**

**“Number”** Column in Tables = Column of EDD table

**“Attribute Name”** = Column Name

 PK after attribute indicates this is a primary key within Access for the table.

**“Column Data”** Type = Text or Numeric values required. Parenthetical number indicates total allowable number of characters in the field.

**“Required”** Column:

The column titled 'Required' will contain the text 'Yes' if the field is required to be populated by the laboratory. In addition, a “condition” is added to indicate additional information applying to population of the associated field. The first number of the condition relates to the table in which the condition applies, i.e. 1 is the Sample File, 2 is the Test File, 3 is the Result File, and 4 is the Batch File. Conditions apply as follows:

|  |  |  |
| --- | --- | --- |
| **Condition** | **Table** | *Description* |
| 0 | ALL | Field always required |
| 1-1 | SAMPLE | Field required for field samples only not required for laboratory samples |
| 1-2 | SAMPLE | Field required (parent\_sample\_code) for **laboratory** QC samples that have 'parents' |
| 1-3 | SAMPLE | Field not required for field samples |
| 2-1 | TEST | Field required if applicable for specific test |
| 3-1 | RESULT | Field required (result\_value) for detected analytes only (TRG or TICs). Must be NULL if non-detect or surrogates, internal standards or spiked compounds |
| 3-2 | RESULT | Field required if available or appropriate for result |
| 3-3 | RESULT | Field required for matrix spikes or matrix spike duplicates (NOT required for surrogate compounds or LCS samples where the original concentration is assumed to be zero). |
| 3-4 | RESULT | Field required for surrogate compounds, LCS, Blank Spikes, Matrix Spikes, and Internal Standards. |
| 3-5 | RESULT | Field required for LCS duplicates, Blank Spike Duplicates, Matrix Spike Duplicates, Lab Replicates |
| 3-6 | RESULT | Field required for LCSD, BSD, MSD, and Lab duplicate samples  |
| 3-7 | RESULT | Field required for surrogates and spike compounds |
| 4-1 | BATCH | Field required if available or appropriate for result |

**“REQUIRED”:**

“YES” = Required data if applicable

“NO” = Optional information unless otherwise directed by Arcadis Data Manager or preferred for insertion by lab except where lab is specifically directed to leave the field Null.

**Parent Sample Definition**

Parent Samples are base samples for duplicates or spikes. i.e. original field samples used for matrix spikes or field sample used for Lab Duplicate/Replicate. A Matrix Spike is not the Parent Sample of the Matrix Spike Duplicate.

POPULATING SPIKE FIELDS

SURROGATES**: surrogate recoveries are to be populated in qc\_spike\_added,**

**qc\_spike\_measure, and qc\_spike\_recovery fields. Surrogates are analyte type = SUR. Control limits for surrogate recoveries must also be populated.**

INTERNAL STANDARDS**: internal standard values are to be populated in qc\_spike\_added, qc\_spike\_measure, and qc\_spike\_recovery fields. Internal Standards are analyte type = IS.**

LCS, BS, and MS COMPOUNDS**: recoveries are to be populated in qc\_spike\_added, qc\_spike\_measured, and qc\_spike\_recovery fields. Compounds spiked to evaluate method accuracy are analyte type = SC. Control limits for spike recoveries must also be populated.**

LCSD, BD, AND MSD COMPOUNDS**: recoveries are to be populated in qc\_dup\_spike\_added, qc\_dup\_spike\_measured, and qc\_dup\_spike\_recovery fields. The Compounds spiked to evaluate method accuracy are analyte type = SC. Control limits for spike recoveries must also be populated. Additionally, the qc\_rpd and qc\_rpd\_cl fields must be populated for these samples.**

LAB REPLICATE SAMPLE DATA**: values for lab duplicates/replicates are to be populated in qc\_dup\_spike\_measured field. The qc\_rpd and qc\_rpd\_cl fields must be populated for these samples.**

# III. ADDITIONAL REQUIREMENTS

| **SAMPLE TABLE** |
| --- |
| **Num** | **Attribute Name** | **Column Data Type** | **Required** | **Attribute Definition** |
| 1 | sys\_sample\_code | Text(40) | Yes (0) | Unique sample identifier (COC Sample ID). Each sample must have a unique value, including spikes and duplicates. Unique sample identifiers **throughout** the database are an **ABSOLUTE** restriction enforced by EQuIS Chemistry. This unique identifier also carries through to each subsequent sampling event where the samples IDs must be unique for EVERY event of the project (continuing years). Laboratory QC samples must also have unique identifiers between sampling event and from 1 year to the next and between laboratories in the event subcontractors are used. For Matrix Spike, Matrix Spike Duplicate, and Laboratory Duplicates of Field Samples, add the suffix **MS, MSD, and LR**, respectively to create unique identifiers for these types of Lab QC samples. |
| 2 | sample\_name | Text(30) | No | Additional sample identification information as necessary. Is not required to be unique (i.e., duplicates are OK). |
| 3 | sample\_matrix\_code | Text(10) | Yes (0) | Code, which distinguishes between different types of sample matrix. **Examples**: Soil samples =“SO” , groundwater samples = “WG”. Field Blanks, Trip Blanks, and Rinsate Blanks = “WQ”. Water Method Blanks and liquid matrix spikes = “WQ” Soil Method Blanks and soil/sludge/sediment matrix spikes = “SQ’ This field refers to the sample matrix not the matrix after preparation or extraction. See rt\_matrix for the list of valid values.  |
| 4 | sample\_type\_code | Text(10) | Yes (0) | Code that distinguishes between different types of samples. **For example**, normal field samples = “N” and laboratory method blank =“LB”. Field QC sample types are Field Duplicates = “FD”, Field Blanks = “FB”, Trip Blanks = “TB”. Lab QC sample types are LCS or Blank Spikes = “BS”, LCSD or BS Duplicates = “BD” and Matrix Spikes = “MS” and Matrix Spike Duplicates = “SD”. See rt\_sample\_type in Reference Values list of valid values. |
| 5 | sample\_source | Text(10) | Yes (0) | Must be either "Field" for field samples **or** "Lab" for laboratory QC samples. No other values are allowed. Matrix spikes and lab duplicate/replicate are "Lab" samples, even though the parent is a "Field" and the base sample came from the field. The spiking or splitting for duplication is done in the lab. Field duplicates as submitted to the lab by field sampling teams are “Field” |
| 6 | parent\_sample\_code | Text(40) | Yes (1-2) | The value in the "sys\_sample\_code" that identifies the sample that was the source of this sample. *For example*, the Matrix Spike and the Matrix Spike Duplicate or Lab Replicates parent\_sample\_code is the sys\_sample\_code for the originating field sample that is spiked to generate the MS/MSD or split by the lab for use as the laboratory duplicate. This field is only required in the EDD for laboratory "clone" samples (e.g., matrix spikes and duplicates). Field duplicates are submitted blind to the laboratory, so this field cannot be completed by the laboratory. This field must be blank for samples that have no parent (e.g., normal field samples, method blanks, etc.). |
| 7 | sample\_delivery\_group | Text(10) | Yes (0) | Sample delivery group or laboratory Project/Log Number. All deliverables must reference the SDG or Lab Log-in Number. **This field MUST BE POPULATED** |
| 8 | sample\_date | Date | Yes (1-1) | Date of sample collection in **MM/DD/YY** format including trip blanks. Must be blank for laboratory samples. |
| 9 | sample\_time | Time | Yes (1-1) | Time of sample collection in 24-hour (military) **HH:MM** format. 8:45 AM = 08:45 and 3:30 PM = 15:30. Must be blank for laboratory samples. |
| 10 | sys\_loc\_code | Text(20) | No | Sample collection location. To be populated by Arcadis unless otherwise directed at project initiation.  |
| 11 | start\_depth | Double | No | Beginning depth (top) of soil sample. To be populated by Arcadis unless otherwise directed at project initiation.  |
| 12 | end\_depth | Double | No | Ending depth (bottom) of soil sample. To be populated by Arcadis unless otherwise directed at project initiation.  |
| 13 | depth\_unit | Text(15) | No | Unit of measurement for the sample begin and end depths. IRPIMS-style unit of measurement codes (see table X03) are recognized by Chem; other codes may be allowed by the Chem project manager. To be populated by Arcadis unless otherwise directed at project initiation.  |
| 14 | chain\_of\_custody | Text(15) | Yes (1-1) | Chain of custody identifier or number. A single sample may be assigned to only one chain of custody. The COC identifier will be provided by the field sampling team based on conventions established for a specific project. |
| 15 | sent\_to\_lab\_date | Date | No | Date sample was sent to lab (in MM/DD/YY format for EDD). |
| 16 | sample\_receipt\_date | Date | Yes (1-1) | Date that sample was received at laboratory in **MM/DD/YY** format. Must be blank for laboratory samples. |
| 17 | sampler | Text(30) | No | Name or initials of sampler. |
| 18 | sampling\_company\_code | Text(10) | Yes (1-1) | Name or initials of sampling company (no controlled vocabulary). “Arcadis” should be entered into this field unless otherwise directed at project initiation. |
| 19 | sampling\_reason | Text(30) | No | Optional reason for sampling. No controlled vocabulary is enforced. |
| 20 | sampling\_technique | Text(40) | No (1-1) | To be populated by Arcadis unless otherwise directed at project initiation. Sampling technique. **For example**, low flow, bailing, MIP, etc… Must be blank for laboratory samples.  |
| 21 | task\_code | Text(10) | No | Code used to identify the task under which the field sample was retrieved. |
| 22 | collection\_quarter | Text(5) | No | Quarter of the year sample was collected (e.g., "1Q96")  |
| 23 | composite\_yn | Text(1) | No | Boolean field used to indicate whether a sample is a composite sample. |
| 24 | composite\_desc | Text(255) | No | Description of composite sample (if composite\_yn is YES). |
| 25 | sample\_class | Text(10) | No | Navy sample class code. |
| 26 | custom\_field\_1 | Text(255) | No | Custom sample field |
| 27 | custom\_field\_2 | Text(255) | No | Custom sample field |
| 28 | custom\_field\_3 | Text(255) | No | Custom sample field |
| 29 | comment | Text(255) | Yes (0) | Field required to contain the full sample ID code. |
| 30 | sample\_receipt\_time | Text(5) | Yes (1-1) | Time of sample receipt by laboratory in 24-hour (military) **HH:MM** format. 8:45 AM = 08:45 and 3:30 PM = 15:30 |

| *TEST TABLE* |
| --- |
| **Num** | **Attribute Name** | **Column Data Type** | **Required** | *Attribute Definition* |
| 1 | sys\_sample\_code(PK) | Text (40) | Yes (0) | SAME AS #1 IN SAMPLE TABLE. This value is used in enforcing referential integrity between tables. Must match sys\_sample\_code in Sample Table. |
| 2 | lab\_anl\_method\_name(PK) | Text (35) | Yes (0) | Laboratory analytic method name or description. See rt\_analytic\_method in reference value tables for list of valid values. |
| 3 | analysis\_date(PK) | Date/Time | Yes (0) | Date of sample analysis in MM/DD/YY format. Refers to initiation of the analysis not prep method date. |
| 4 | analysis\_time(PK) | Text (5) | Yes (0) | Time of sample analysis in 24-hour (military) HH:MM format. Note that this field, combined with the "analysis\_date" field is used to distinguish between reextractions, reanalyses, and dilutions. Please ensure that retests have "analysis\_date" and/or analysis\_time" different from the original test event (and complete test\_type field as appropriate). |
| 5 | total\_or\_dissolved(PK) | Text (1) | Yes (0) | "T" for total metal organic carbon concentration, "D" for dissolved or filtered metal or organic carbon concentration ONLY. USE "N" for organic (or other) constituents for which neither "total" nor "dissolved" is applicable including TDS. |
| 6 | column\_number(PK) | Text (2) | Yes (2-1) | Applicable for GC or HPLC methods. "1C" for first column analyses, "2C" for second column analyses, or "NA" for analyses where not applicable. If any "2C" tests are listed, then there must be corresponding "1C" tests present also. Laboratories must indicate which of the two columns is to be considered "primary" by entering “Y” in the "reportable\_result" field of the result table for the result presented in hard copy reports. It is NOT acceptable to identify both “1C” and “2C” reportable\_result as “Y:; one must be “N” if” “1C” and “2C” are provided in the EDD. |
| 7 | test\_type(PK) | Text (10) | Yes (0) | Type of test. Valid values include "initial", "reextract", and "reanalysis", “dilution” are acceptable. See rt\_test\_type for al valid values. |
| 8 | lab\_matrix\_code | Text (10) | Yes (0) | Code that distinguishes between different types of matrix analyzed. Soil = “SO”; groundwater = “GW” and TCLP = TCLP as a lab matrix. See rt\_matrix for valid values |
| 9 | analysis\_location | Text (2) | Yes (0) | "LB" for fixed-based laboratory analysis, "FI" for field instrument, "FL" for mobile field laboratory analysis, or. |
| 10 | basis | Text (10) | Yes (0) | "Wet" for wet-weight basis; or "Dry" for dry-weight basis. For tests for which this distinction is not applicable use Wet |
| 11 | container\_id | Text (30) | No | Sample container identifier. |
| 12 | dilution\_factor | Single | Yes (0) | Test or analytical run dilution factor. **Must** be “1’” if no dilution. |
| 13 | Prep\_method | Text (35) | Yes (2-1) | Laboratory sample preparation method name. See rt\_std\_prep\_method for valid values. |
| 14 | prep\_date | Date/Time | Yes (2-1) | Date of sample preparation in MM/DD/YY format. |
| 15 | prep\_time | Text (5) | Yes (2-1) | Time of sample preparation in 24-hour (military) HH:MM format |
| 16 | leachate\_method | Text (15) | Yes (2-1) | Method name, e.g., SW1311 or SW1312. See rt\_analytic\_method for valid values. |
| 17 | leachate\_date | Date/Time | Yes (2-1) | Date of leachate preparation in MM/DD/YY format. |
| 18 | leachate\_time | Text (5) | Yes (2-1) | Time of leachate preparation in 24-hour (military) HH:MM format. |
| 19 | lab\_name\_code | Text (10) | Yes (0) | Unique identifier of the laboratory reporting results. See rt\_subcontractor for valid values. |
| 20 | qc\_level | Text (10) | NO | Not populated by Lab. |
| 21 | lab\_sample\_ id | Text (20) | Yes (0) | Laboratory sample identifier. A field sample may have more than one laboratory lab\_sample\_id; however it is limited to only ONE lab\_sample\_id per method). |
| 22 | percent\_moisture | Text (5) | Yes (2-1) | Percent moisture of the sample portion used in the specific lab\_anl\_methd\_name test; this value may vary from test to test for any sample. The value must be NUMERIC as "NN.MM", e.g., 70.1% could be reported as "70.1" but not as 70.1%". The database assumes that the number is a “%” and units of measure are not necessary**. NOTE: This field MUST be populated for all soil, sludge, and sediment samples whether or not the value is reported in the hard copy. Use “0” for lab soil QC samples.** |
| 23 | subsample\_amount | Text (14) | Yes 0) | Amount of sample used for the test. THIS FIELD MUST BE POPULATED |
| 24 | subsample\_amount\_unit | Text (15) | Yes (0) | Unit of measurement for subsample amount. See rt\_unit for valid values. |
| 25 | analyst\_name | Text (30) | Yes (0) | Name or initials of laboratory analyst. |
| 26 | instrument\_lab | Text (50) | Yes (0) | Instrument identifier. |
| 27 | comment | Text (255) | NO | Comments about the test as necessary (Optional). |
| 28 | preservative | Text (50) | Yes (2-1) | Indicate preservative or leave blank, if none. **THIS FIELD MUST BE POPULATED IF A PRESERVATIVE WAS IN THE SAMPLE AS RECEIVED FROM THE FIELD OR IF THE SAMPLE WAS PRESERVED BY THE LABORATORY BEFORE PREPARATION AND ANALYSIS.** |
| 29 | final\_volume | Text (15) | Yes (2-1) | Final amount of extract or digestate. |
| 30 | final\_volume\_unit | Text (15) | Yes (2-1) | Unit of measure for final\_volume. See rt\_unit for valid values. |

| **RESULT TABLE** |
| --- |
| **Num** | **Attribute Name** | **Column Data Type** | **Required** | **Attribute Definition** |
| 1 | sys\_sample\_code(PK) | Text (40) | Yes (0) | SAME AS #1 IN SAMPLE & TEST TABLES. This value is used in enforcing referential integrity between tables.  |
| 2 | lab\_anl\_method\_name(PK) | Text (35) | Yes (0) | Laboratory analytic method name. Must be same as lab\_anl\_method\_name in Test File. See rt \_analytic\_method for valid values. |
| 3 | analysis\_date(PK) | Date/Time | Yes (0) | Must be the SAME AS #3 IN THE TEST TABLE. This value is used in enforcing referential integrity between tables. Date of sample analysis in MM/DD/YY format.  |
| 4 | analysis\_time(PK) | Text (5) | Yes (0) | Must be the SAME AS #4 IN THE TEST TABLE. This value is used in enforcing referential integrity between tables.  |
| 5 | total\_or\_dissolved\_(PK) | Text (1) | Yes (0) | Must be the SAME AS #5 IN THE TEST FILE.  |
| 6 | column\_number(PK) | Text (2) | Yes (3-2) | Must be the SAME AS #6 IN THE TEST FILE  |
| 7 | test\_type(PK) | Text (10) | Yes (0) | Must be the SAME AS #7 IN THE TEST FILE |
| 8 | cas\_rn(PK) | Text (15) | Yes (0) | Chemical Abstracts Number for the parameter if available. This must be the true CAS # and “not made up”. Where CAS #s are not available, i.e. wet chem. Parameters, identifiers will be provided by Arcadis project requirements. See notes at end of section for TIC management. See rt\_analyte for valid values. The lab is not authorized to add internally developed “CAS #s” for general chemistry parameters, surrogates, internal standards, TICs. CAS#s used for TICs must be available through an outside source such as “Chemfinder”. |
| 9 | chemical\_name | Text (60) | Yes (0) | Chemical name associated with CAS # in #8. The cas\_rn field is the only chemical identifier information actually imported in EQuIS Chemistry.  |
| 10 | result\_value | Text (20) | Yes (3-1) | Analytical result reported for **“TRG” or “TIC”** result\_type **ONLY**.  Appropriate and consistent number of significant digits must be entered. **MUST BE BLANK FOR NON-DETECTS EXCEPT FOR RADIOLOGICAL DATA. ALL RADIOLOGICAL DATA MUST HAVE A RESULT VALUE.**   “SUR”, “IS”, and “SC” results do **NOT** populate this field (populate the QC fields). |
| 11 | result\_error\_delta | Text (20) | Yes (3-2) [Radiochem) | The uncertainty (UC) of the counting error as listed by standard deviation where “1-sigma” represents one standard deviation and “2-sigma” represents two standard deviations. |
| 12 | result\_type\_code | Text (10) | Yes (0) | Must be either "TRG" for a target or regular results, "TIC" for tentatively identified compounds, "SUR" for surrogates, "IS" for internal standards, or "SC" for spiked compounds.[**LCS, LCSD, MS, MSD, BS, BSD]** |
| 13 | reportable\_result | Text (10) | Yes (0) | Must be either "**Yes**" for results, which are considered to be reportable, **or** "**No**" for other results. Used to distinguish between multiple results where a sample is retested after dilution or to indicate which of the first or second column result should be considered primary. For re-analyses and dilutions all results must be entered into the database if hard copy data is provided **BUT only one result for each compound/analyte MAY be flagged as reportable**. |
| 14 | detect\_flag | Text (2) | Yes (0) | Either "Y" for detected analytes or "N" for non-detects**.  MUST be “N” for NON-DETECTS EXCEPT FOR RADIOLOGICAL DATA. ALL RADIOLOGICAL DATA MUST HAVE A DETECT\_FLAG = “Y”** |
| 15 | lab\_qualifiers | Text (7) | Yes (3-2) | Qualifier flags assigned by the laboratory. See rt\_qualifier for valid qualifiers that may be used. |
| 16 | Organic\_ yn | Yes/No | Yes (0) | Must be either "Y" for organic constituents or "N" for inorganic constituents. |
| 17 | method\_detection\_ limit | Text (20) | Yes (0) | Laboratory determined MDL per 40 CFR Part 136, adjusted for dilutions and percent moisture (if it applies).  |
| 18 | reporting\_detection\_ limit | Text (20) | Yes (0) | Detection limit that reflects sample analysis conditions including analysis volumes and dilution factors.  This should be the laboratory PQL or standard reporting limits. For radiological data the maximum detectable concentrations (MDC) is stored here. |
| 19 | quantitation\_limit | Text (20) | No | NOT Currently used unless specifically defined for the project. |
| 20 | Result\_unit | Text (15) | Yes (0) | Units of measure relates to **ALL** results including result\_value, qc\_original\_concentration, qc\_spike added, qc\_spike\_measured, qc\_dup\_orginal\_conc, qc\_dup\_spike\_added, qc\_dup\_spike\_measured. See rt\_unit for valid values. |
| 21 | detection\_limit\_unit | Text (15) | Yes (0) | Units of measure for detection limit(s). See rt\_unit for valid values. |
| 22 | tic\_retention\_time | Text (8) | Yes (3-2) | Retention time in minutes for tentatively identified compounds (TICs). Populated only for TIC result\_type |
| 23 | result\_comment | Text (255) | NO | MUST BE LEFT BLANK BY THE LAB, unless a project-specific definition for quantitation\_limit has been specified (such as “limit of detection”). If the quantitation\_limit has been set for the project,please add a comment defining the contents, such as “Quantitation\_limit contains the limit of detection”. |
| 24 | qc\_original\_conc | Text (14) | Yes (3-3) | The concentration of the analyte in the original (unspiked) sample. Populated for matrix spike samples. Not populated where original concentration is assumed to be zero, i.e. LCS or BS samples. |
| 25 | qc\_spike\_added | Text (14) | Yes (3-4) | The concentration of the analyte added to the original sample. Populated for **ALL** Surrogates, and LCS, BS, and MS samples |
| 26 | qc\_spike\_measured | Text (14) | Yes (3-4) | The measured concentration of the analyte. Use zero for spiked compounds that were not detected in the sample. **MUST BE NUMBERIC** even if diluted out or not recovered (use “0” if diluted, matrix interference, elevated concentrations of target compounds, etc.) Populated for **ALL** Surrogates, and LCS, BS, and MS samples |
| 27 | qc\_spike\_recovery | Text (14) | Yes (3-4) | The percent recovery for “SUR” and “SC” results. **MUST BE NUMERIC** even if diluted out or not recovered (use “0” if diluted, matrix interference, elevated concentrations of target compounds, etc.) Report as percentage (e.g., report "120%" as "120"); DO NOT include “%” sign in field. Populated for **ALL** Surrogates, and LCS, BS, and MS samples |
| 28 | qc\_dup\_original conc | Text (14) | Yes (3-5) | The concentration of the analyte in the original (unspiked) sample. Populated for matrix spike duplicate samples. Not populated where original concentration is assumed to be zero, i.e. LCSD or BSD samples. |
| 29 | qc\_dup\_spike\_added | Text (14) | Yes (3-5) | The concentration of the analyte added to the original sample. Populated for **ALL** LCSD, BSD, and MSD samples.  |
| 30 | qc\_dup\_spike\_measured | Text (14) | Yes (3-5) | The measured concentration of the analyte in the duplicate. Populated for **ALL** LCSD, BSD, and MSD samples. MUST be NUMERIC. Use zero for spiked compounds that were not recovered due to dilution, matrix interference, elevated concentrations of target compounds, etc..  |
| 31 | qc\_dup\_spike\_recovery | Text (14) | Yes (3-5) | The duplicate percent recovery. Populated for **ALL** LCSD, BSD, and MSD samples.  **MUST be NUMERIC.** Use zero for spiked compounds that were not recovered due to dilution, matrix interference, elevated concentrations of target compounds, etc Report as percentage (e.g., report "120%" as "120"). |
| 32 | qc\_rpd | Text (8) | Yes (3-6) | The relative percent difference between MS and MSD, LCS and LCSD, BS and BSD, & primary field sample result and Lab Replicate. Populated for **ALL** LCSD, BSD, MSD, and LR samples. **MUST be NUMERIC**. Use zero for RPDs that were not calculated due to elevated concentrations of target compounds, dilution, matrix interference, etc Report as percentage (e.g., report "120%" as 120"). |
| 33 | qc\_spike\_lcl | Text (8) | Yes (3-7) | Lower control limit for spike recovery. Required for spikes, spike duplicates, surrogate compounds, LCS and any spiked sample. Report as percentage (e.g., report "120%" as "120").  |
| 34 | qc\_spike\_ucl | Text (8) | Yes (3-7) | Upper control limit for spike recovery. Required for spikes, spike duplicates, surrogate compounds, LCS and any spiked sample. Report as percentage (e.g., report "120%" as "120"). |
| 35 | qc\_rpd\_cl | Text (8) | Yes (3-6) | Relative percent difference control limit. Required for any duplicated sample. Report as percentage (e.g., report "120%" as "120"). |
| 36 | qc\_spike\_status | Text (10) | Yes (3-4) | Used to indicate whether the spike recovery was within control limits. Use the "+" character to indicate failure, otherwise leave blank. |
| 37 | qc\_dup\_spike\_status | Text (10) | Yes (3-5) | Used to indicate whether the duplicate spike recovery was within control limits. Use the "+" character to indicate failure, otherwise leave blank. |
| 38 | qc\_rpd\_status | Text (10) | Yes (3-6) | Used to indicate whether the relative percent difference was within control limits. Use the "+" character to indicate failure, otherwise leave blank. Required for any duplicated sample. |

| **BATCH TABLE** |
| --- |
| **Num** | **Attribute Name** | **Column Datatype** | **Required** | **Attribute Definition** |
| 1 | sys\_sample\_code(PK) | Text (40) | Yes (0) | SAME AS #1 IN SAMPLE , TEST TABLE. This value is used in enforcing referential integrity between tables.  |
| 2 | lab\_anl\_method\_name(PK) | Text (35) | Yes (0) | SAME AS #2 IN TEST TABLE. See rt \_analytic\_method for valid values. |
| 3 | analysis\_date(PK) | Date | Yes (0) | SAME AS #3 IN TEST TABLE. This value is used in enforcing referential integrity between tables. Date of sample analysis in MM/DD/YY format. May refer to either beginning or end of the analysis as required by EQuIS Chemistry project manager. |
| 4 | analysis\_time(PK) | Text (5) | Yes (0) | SAME AS #4 IN TEST, AND RESULT TABLES. This value is used in enforcing referential integrity between tables.  |
| 5 | total\_or\_dissolved(PK) | Text (1) | Yes (0) | SAME AS #5 IN TEST TABLE. This value is used in enforcing referential integrity between tables.  |
| 6 | column\_number(PK) | Text (2) | Yes (4-1) |  SAME AS #6 IN TEST TABLE. This value is used in enforcing referential integrity between tables.  |
| 7 | test\_type(PK) | Text (10) | Yes (0) | SAME AS #7 IN TEST TABLE. This value is used in enforcing referential integrity between tables.  |
| 8 | test\_batch\_type(PK) | Text (10) | Yes (0) | Lab batch type. Valid values include "Prep", "Analysis", and "Leach". Additional valid values may optionally be provided by the EQuIS Chemistry project manager. This is a required field for all batches. |
| 9 | test\_batch\_id | Text (20) | Yes (0) | Unique identifier for all and each lab batches. Must be unique within EQuIS Chemistry database. For example, the same identifier cannot be used for a prep batch and an analysis batch and the values must be different from one sampling event to another. This identifier cannot be used from one year to the next. |

**ADDITIONAL INFORMATION FOR PREPARING THE 4-FILE EDD**

SAMPLE FILE AND SYS\_SAMPLE\_CODE

1. The sys\_sample\_code is the unique sample ID as supplied on the Chain of Custody form with the same spacing as identified on the COC or on a supplemental Sample ID list submitted to the laboratory with the Laboratory Task Order or prior to submission of samples.

2. In order to uniquely identify MS/MSD, laboratory duplicates, TCLP, and SPLP samples, the laboratory shall add a suffix to the original sample ID listed on the chain of custody:

Matrix Spike Sample = xxxxx MS

Matrix Spike Duplicate Sample = xxxxx MSD

Lab Duplicate/Replicate = xxxxx LR

TCLP Extract Sample = xxxxx TCLP

SPLP Extract Sample = xxxxx SPLP

These are the only characters that are allowed to be amended to ANY sample ID as listed on the COC or the sample ID list referred to above.

The parent\_sample\_code shall be entered into the parent\_sample\_code field of the Sample File.

3. If the sample\_name field is provided it must contain the full sample ID from the chain of custody.

4. Sample\_Type\_Code must be appropriately applied as follows:

 “N” = normal field samples

 “FD” = field duplicates samples submitted blind to the laboratory

 “TB” = trip blanks

 “FB” = field blanks

 “EB” = rinsate or equipment blanks

 “BS” = laboratory control samples or blank spikes

 “BD” = laboratory control sample duplicates or blank spike duplicates

 “MS” = matrix spikes

 “SD” = matrix spike duplicates

 “LR” = laboratory duplicates or laboratory replicates

5. The following “**matrix\_type**” codes must be used (“**SQ**” = soil QC sample and “**WQ”** = water QC sample):

Method Blank = “SQ” or “WQ”

MS/MSDs = “SQ” or “WQ”

LCS/LCSDs = “SQ” or “WQ”

BS/BSDs = “SQ” or “WQ”

6. SDG Numbers or laboratory Log Numbers (per Arcadis PM direction) **MUST** be populated in “**sample\_delivery\_group**” field of the **Sample File.**

**Quality Control Samples and Data**

7. The source of Lab Duplicates, Lab Replicates, Matrix Spikes, and Matrix Spike Duplicates is the Lab not the Field even if the MS/MSD are identified on the COC by the field sampling team. The samples are spiked in the laboratory not in the field.

8. Laboratory QC data, which span more than one SDG may be submitted with each appropriate SDG.

9. Laboratory LCS and LCSD should be reported as two separate samples.

**10. Matrix Spike and Matrix Spike Duplicate recoveries must be reported as “0” if the value is not calculated due to concentrations of the spiked analyte in the sample at concentrations above the 4X factor.**

**11. All laboratory method performance site-specific and batch Quality Control sample results (i.e. Method Blanks, LCS/LCSDs, Blank Spikes, Leachate Blanks as method appropriate) must be included in the EDD.** For most projects, this does **NOT** include **non-site-specific** matrix spikes and laboratory duplicates/replicates.

12. Laboratory batch sample duplicate/replicate and MS/MSD results from **non-project specific** samples (i.e. batch QC samples) shall **NOT** be included in the EDD.

13. Surrogates populate the qc\_spike fields not qc\_dup\_spike fields or the result\_value field even if the surrogates are reported for MSD, BSD, or LCSD samples.

14. QC\_Spike\_Added values for Spike, IS and Surrogate compounds are REQUIRED.

15. QC\_Spike\_Measured values for Spike, IS and Surrogate compounds are REQUIRED.

16. RPDs for LCSDs, BSDs, MSDs, and Laboratory Duplicates must be populated in the “**qc\_rpd”** field. A value of “0” or “100” must be reported, as appropriate, if the RPD is not calculated due to excessive concentrations or interference present in the sample. The “**qc\_rpd**” must be a numeric entry.

17. The RPD control limit must be listed in the “**rpd\_cl”** field for all parameters where an RPD is reported. This includes lab duplicate/replicate samples.

SAMPLE FILE

18. The following “**matrix\_type**” codes must be used for QC samples (“**SQ**” = soil QC sample and “**WQ”** = water QC sample):

Method Blank = “SQ” of “WQ”

MS/MSDs = “SQ” or “WQ”

LCS/LCSDs = “SQ” or “WQ”

BS/BSDs = “SQ” or “WQ”

19. SDG or Laboratory Project numbers must be populated in “sample\_delivery\_group” field.

**TEST FILE**

20. Percent moisture must be reported in the “**percent\_moisture**” field in the **Test File** for all solid samples (i.e., soil, sediment, and sludge).

21. Subsample weights and final volumes must be listed for all parameters as appropriate.

### RESULTS FILE

22. Result\_value is only populated with data for “TRG” and “TIC” detections. All other data is entered in the “qc\_” fields. The field must be “NULL” for non-detects and other analyte\_types. The Reporting Limit must not be entered in this field.

23. Non-detected data shall have a lab\_qualifier of "U" in addition to other qualifiers deemed applicable. The Detect\_Flag shall be “N” and the Result\_value field shall be blank.

24. The Reporting Limit must be provided for all parameters. The RL MUST be adjusted for dilutions made during analysis.

25. Surrogate recoveries MUST BE REPORTED in the qc\_spike\_measured and qc\_spike\_recovery fields, even if the surrogate had been diluted out. List “0” as the measured and recovered amount. Control Limits must also be entered for surrogates. Surrogates are “SUR” analyte\_type not “TRG”.

26. Surrogate, LCS, LCSD, BS, BSD, MS, and MSD detected concentrations, and percent recoveries must be populated with a numeric value. A value of “0” **must** be entered if the Spiked Compound is diluted out or not recovered. An “+” is unacceptable as this is a numeric field.

27. “**QC\_original\_concentration**” must be populated for matrix spikes and matrix spike duplicates

28. Valid entries for the reportable\_result field are "Yes" or "No” only.

29. ONLY report compounds of interest for any method blank, sample, and sample duplicate, trip blank.

30. Laboratory Qualifier designation must be consistent. For an estimated concentration with blank contamination “BJ” must be used. Note that “JB”, “B J” or “J B” cannot be used.

31. Explanation of Duplicate Qualifiers:

B Analyte found in associated blank Organic Analysis

B <CRDL but >= Instrument Detection Limit Inorganic Analysis

N Presumptive evidence of a compound Organic Analysis

N Sample recovery not within control limits Inorganic Analysis

It is preferred by Arcadis that the laboratory not qualifiers with multiple explanations. **Any qualifiers utilized in the hard copy report or the electronic report must be defined in the hard copy report. There is no exception to this requirement for explanation of qualifiers applied to electronic data.**

32. Nomenclature for tentatively identified compounds (TIC):

Use the CAS # if it is available and **REAL (outside verifiable source)** for TICs and enter the chemical name in the chemical\_name field.

For UNKNOWN TICs follow the following protocol:

#####  cas\_rn for unkown VOA TIC = VTIC 1 through VTIC 10

 cas\_rn for unkown SVOA TIC = SVTIC 1 through SVTIC 20

Enter “UNKNOWN”, “UNKNOWN Hydrocarbon”, “UNKNOWN Aliphatic”, or other identifier as appropriate or applicable in “chemical\_name” field.

TICs will produce errors in the ELDC/EDDP that cannot be corrected by the laboratory. These are the only acceptable errors in the data checker report unless otherwise authorized by Arcadis.

33. TCLP or SPLP results must be submitted in units of mg/L or appropriate liquid units. **(Make sure that moisture correction is not automatically enforced).**

BATCH FILE

34. The laboratory must use unique Batch File Names for each analytical department/method and for continuing years. Electronic validation utilizes Batch IDs to link field samples with quality control data. Overlapping Batch IDs are not acceptable.

GENERAL ISSUES

35. Incomplete chain-of-custody (C-O-C) forms must be immediately communicated to the project manager. Some of the C-O-C information is used for completion of the Sample\_Matrix\_Code and Sample\_Delivery\_Group. These discrepancies must be rectified upon receipt of samples at the laboratory prior to log in.

36. **Duplicate sample IDs are not acceptable within the EQuIS database. It is imperative that samples including field blanks, trip blanks, equipment blanks, field duplicates have unique sample IDs for projects including ongoing sampling events such as quarterly groundwater monitoring.**

**SUBCONTRACTED PARAMETERS**

37. The EDD must be populated with **ALL** appropriate and applicable fields, including **ALL** QC data for any subcontracted parameters.

**PLEASE CONTACT THE ARCADIS PROJECT CHEMIST, DATA MANAGER or PROJECT MANAGER IF THERE ARE ANY QUESTIONS REGARDING PREPARATION OR GENERATION OF THE EDD.**

### EXAMPLE EDD REPORTS

The following subsections provide examples of how the EQuIS EDD should be populated for QC data.

**RESULT FILE FIELDS FOR A NORMAL FIELD SAMPLE, TRG AND TIC RESULTS**

**The table below shows some of the fields in the Result File for a normal field sample (i.e., Sample\_type\_code = N, TB, FD, etc.) and “TRG” or “TIC” analyte\_type\_code. NOTE: all QC fields are blank.**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **cas\_rn** | **result value** | **qc original conc** | **qc spike added** | **qc spike measured** | **qc spike recovery** | **qc dup. original conc** | **qc dupl. spike added** | **qc dup. spike measured** | **qc dup. spike recovery** |
| 93-76-594-75-794-82-6 | 3.171.562.31 |   |  |  |  |  |  |  |  |

### RESULT FILE FIELDS FOR A NORMAL FIELD SAMPLE WITH SURROGATES

The following table shows some of the fields in the result file for a normal field sample (i.e., Sample\_type\_code = N, TB, etc.). Note that QC fields are blank except on surrogate

Rows.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **cas**\_**rn** | **result value** | **result unit** | **result type code** | **qc original conc** | **qc spike added** | **qc spike measured** | **qc spike recovery** |
| 93-76-5  | 1.56  | mg/L  | TRG |  |  |  |  |
| 94-75-7 | 3.17  | mg/L  | TRG |  |  |  |  |
| PHEN2F  |  | mg/L |  SUR  |  | 12.5  | 12.9  | 103 |

**RESULT FILE FIELDS FOR A MATRIX SPIKE**

The following table shows some of the fields in the result file for a matrix spike sample (i.e., Sample\_type\_code = MS). Note that all "dup" QC fields are blank, and that the result\_value field is NULL. Also, the qc\_rpd field would be blank for these rows. The parent\_sample\_code must contain the contents of the sys\_sample\_code of the original (parent) sample.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **cas**\_**rn** | **result value** | **qc original conc** | **qc spike added** | **qc spike measured** | **qc spike recovery** | **qc dup. original conc** | **qc dupl. Spike added** | **qc dup. spike measured** | **qc dup. spike recovery** |
| 93-76-5 |  | 1.56 |  4.18  | 5.36  | 90.9 |  |  |  |  |
| 94-75-7  |  | 3.17  | 4.18  | 7.15  | 95.2 |  |  |  |  |
| 94-82-6  |  | 2.31  | 4.22  | 5.66  | 79.3 |  |  |  |  |

**RESULT FILE FIELDS FOR A MATRIX SPIKE DUPLICATE**

The following table shows some of the fields in the result file for a matrix spike/matrix spike duplicate considered as a single sample (i.e., Sample\_type\_code = MSD). Note that all QC fields are completed, and that the result\_value field is not needed. Also, the qc\_rpd field would be completed for these rows. The parent\_sample\_code must contain the contents of the sys\_sample\_code of the original (parent) sample.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **cas**\_**rn** | **result value** | **qc original conc** | **qc spike added** | **qc spike measured** | **qc spike recovery** | **qc dup original conc** | **qc dup. spike added** | **qc dup spike measured** | **qc dup spike recovery** |
| 93-76-5  |  |  |  |  |  | 1.56 | 4.23 | 5.70  | 97.8 |
| 94-75-7  |  |  |  |  |  | 3.17  | 4.23 | 7.62  | 105 |
| 94-82-6  |  |  |  |  |  | 2.31  | 4.13 | 5.33  | 73.1 |

**RESULT FILE FIELDS FOR A LCS or BS \**

The following table shows some of the fields in the result file for an LCS sample (i.e., laboratory control sample, blank spike, Sample\_type\_code = BS). The qc\_rpd field is left blank for these rows.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **cas**\_**rn** | **result value** | **qc original conc** | **qc spike added** | **qc spike measured** | **qc spike recovery** | **qc dup original conc** | **qc dup spike added** | **qc dup spike measured** | **qc dup spike recovery** |
| 93-76-5  |  | 1.5  | 5.00  | 5.26  | 105 |  |  |  |  |
| 94-75-7  |  | 10.2  | 1.00  | 1.02  | 102 |  |  |  |  |
| 94-82-6  |  | 3.4  | 12.5  | 12.9  | 103 |  |  |  |  |

**RESULT FILE FIELDS FOR A LCS DUPLICATE OR BS DUPLICATE**

The following table shows some of the fields in the result file for a laboratory control sample duplicate (i.e., Sample\_type\_code = BD). Note that the result\_value field is not required. Also, the qc\_rpd field must be completed for these rows.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **cas**\_**rn** | **result value** | **qc original conc** | **qc spike added** | **qc spike measured** | **qc spike recovery** | **qc dup original conc** | **qc dup spike added** | **qc dup spike measured** | **qc dup spike recovery** | **qc\_rpd** |
| 93-76-5 |  |  |  |  |  |  | 5.00 | 4.92 | 98 | 2.0 |
| 94-75-7 |  |  |  |  |  |  | 1.00  | 0.95  | 95 | 6.6 |
| 94-82-6 |  |  |  |  |  |  | 12.5  | 11.8  | 94 | 12.3 |

**REANALYSES, REEXTRACTIONS, DILUTIONS**

The following table shows how to report retests for three different circumstances. The first example, the sample was retested (for 75-25-2) because the initial result required reanalysis due to QC failure. For the second example, the initial sample result (for 95-95-4) required dilution. The third example (for 67-66-3) required both reanalysis and dilution (reanalysis supercedes dilution). The fourth example (87-86-5) shows an initial result that require re-extraction due to QC failure or elevated concentrations that could not be diluted based on the original extraction. The other results are "turned off" by setting the reportable\_result field to "No".

|  |  |  |  |
| --- | --- | --- | --- |
| **test\_type** | **cas\_rn** | **result\_value** | **reportable\_result** |
| initial | 75-25-2 | 1.2 | No |
| reanalysis | 75-25-2 | 1.1 | Yes |
| initial | 95-95-4 | 250E | No |
| dilution | 95-95-4 | 328 | Yes |
| initial | 67-66-3 | 3.4 | No |
| reanalysis | 67-66-3 | 3.3 | Yes |
| initial | 87-86-5 | 980E | No |
| reextraction | 87-86-5 | 1500 | Yes |

**ANALYSES REQUIRING SECOND COLUMN CONFIRMATION**

Analyte identification requiring confirmation by a second analytical technique is required by certain gas chromatography (GC) methods. A common technique used to confirm the identity of an analyte is to analyze the sample using a second GC column that is dissimilar from the GC column used for the first analysis. This confirmation technique is used routinely when analyzing samples for pesticides, herbicides, and certain volatile organic compounds (e.g., BTEX), and the two analyses often are performed simultaneously using an instrument equipped with dual GC columns connected to common injection port.

The method for reporting data from dual column GC analyses is not standard throughout the environmental laboratory industry. Arcadis recommends that laboratories use the method described in SW-846 Method 8000B, unless project-specific requirements or the method used for analysis dictate otherwise. The following table illustrates the proper format to be used to report first and second column results. The results for the first and third constituents (75-25-2 and 95-95-4) are being reported from column 1, and the result for the second constituent (67-66-3) is being reported from column 2. The other results are "turned off" by setting the reportable\_result field to "No".

|  |  |  |  |
| --- | --- | --- | --- |
| **column\_number** | **cas\_rn** | **result\_value** | **reportable\_result** |
| 1C | 75-25-2 | 6.2 | Yes |
| 1C | 67-66-3 | 3.4 | No |
| 1C | 95-95-4 | 5.6 | Yes |
| 2C | 75-25-2 | 1.3 | No |
| 2C | 67-66-3 | 33.7 | Yes |
| 2C | 95-95-4 | 5.4 | No |

**REFERENCE TABLES**

A number of fields in each of the EDD files must be entered to correspond exactly with reference values standardized by Arcadis. These reference values will be updated from time to time. Each laboratory will be supplied a copy of the updated document. It is the laboratory’s responsibility to submit EDDs using the most current reference tables as defined by a specific project.

The following table summarizes the EDD fields where standard reference values must be used:

|  |  |  |
| --- | --- | --- |
| **EDD File** | **EDD Field** | **Reference Table** |
| Sample  | sample\_type\_code  | rt\_sample\_type |
|  | sample\_matrix\_code  | rt\_matrix |
| Test  | lab\_anl\_method\_name  | rt\_anl\_mthd |
|  | lab\_matrix\_code  | rt\_matrix |
|  | prep\_method  | rt\_std\_prep\_mthd |
|  | subsample\_amount\_unit  | rt\_unit |
|  | final\_volume\_unit  | rt\_unit |
| Result  | lab\_anl\_method\_name  | rt\_anl\_mthd |
|  | cas\_rn  | rt\_analyte |
|  | chemical\_name | rt\_analyte |
|  | result\_type\_code  | rt\_result\_type |
|  | lab\_qualifier  | rt\_qualifier |
|  | result\_unit  | rt\_unit |
|  | detection\_limit\_unit  | rt\_unit |
| Batch  | lab\_anl\_method\_name  | rt\_anl\_mthd |

# IV. EDP

The EDP data checker assists the **LABORATORY** in checking EDD files to ensure that they are error-free prior to submission to Arcadis. All laboratories providing data to Arcadis **must use** the EDP program to verify that EDDs are without error. The EDP error reports for each file **must be** submitted with each EDD.

The use of the EDP helps to solve common data population problems including duplicate data, incorrectly populated fields, and incorrect methods, CAS #s, and other acceptable reference values. If an EDD is received by Arcadis containing errors it will be rejected until the EDD report is acceptable for import into the EQuIS database. Invoice payment will not be made until the EDD is acceptable.

The EDP is a desktop application that works in conjunction with a format file. The format file provides the EDP with Arcadis specifications. The most up to date version of the EDP and format file may be downloaded here: <https://earthsoft.com/products/edp/edp-format-for-arcadis_us/>

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