

EQulS Lab Standard Operating Procedure

Prepared by:



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Purpose: This document provides guidance for generating and submitting the EHS_EQEDD. Many of the errors identified by EQUS Data Processor (EDP) can be resolved by following the instructions in this document. If an identified error cannot be resolved, email Bonnie Stadelmann, Lab Coordinator: bonnie.stadelmann@ehs-support.com and equis@ehs-support.com.

General EDD Specifications

EDD Format: EHS_EQEDD

Format Version: 7.24.1

Download current versions of the EHS_EQEDD format file, EHS Support’s reference value file and EQUS Data Processor (EDP) software here: <https://earthsoft.com/products/edp/edp-format-for-ehs/>.

EDD Zip File Naming convention:

Naming convention for zip files is **XXX.PPP.EHS_EQEDD.zip**, where:

XXX is the Lab SDG

PPP is the EQUS facility code

If submitting a revised EDD, use naming convention **XXXREV**y.PPP.EHS_EQEDD.zip, where y is the number of the revision.

Only submit a complete replacement EDD, never submit a partial EDD.

For the flat file contents, the naming conventions are as follows:

- LabSDG.LabSample_v1
- LabSDG.TestResultsQC_v1
- LabSDG.TestBatch_v1

EQUS Facility Code: contact the EHS Project Manager for the EQUS facility code.

EDD Checker: EQUS Data Processor (EDP) Version 7.24.1

Laboratories must use the EQUS Data Processor (EDP), along with EHS Support’s current Reference Value file (.rvf) and the EHS_EQEDD format file to check EDDs for reference value compliance, errors, and warnings prior to submission. It is imperative that the EDD results match the hard copy results. The laboratories must review all Error Logs provided by EDP and fix any identified errors in the EDDs prior to sending to EHS.

EDD Delivery: Laboratories must submit checked, error-free EDDs along with a copy of the PDF lab report via email to equis@ehs-support.com and the EHS Support Project Manager.

EDDs will be returned to the laboratory for corrections until the files can be successfully imported into the EQUS Project Database and subsequent QC checks can be performed without errors.

Reference/Valid Values: Use EHS Support’s Reference Value file (RVF) to create an EHS_EQEDD that passes the checks in EDP. Contact EHS Support to request a reference value be added or with questions on the correct reference value(s) to use. Do not submit an EDD with reference value errors.



Column Headers: Do not remove the column headers in each file.

Direct all questions to:

Bonnie Stadelmann, Lab Coordinator: bonnie.stadelmann@ehs-support.com
and
ehs@ehs-support.com



LabSample_v1

- `sys_sample_code`: unique sample identifier used throughout the EDD

sys_sample_code convention:

Field Samples – Append the sample date, in YYYYMMDD format, to the end of the sample ID as listed on the COC, separated by an underscore.

sample name_yyyymmdd (sample date); Example: MW01_20190302

Note: you must include leading ZEROS in the MONTH and DAY parts of the date format. For example, March 2, 2019, would be written as 20190302. Do not include the time. Currently EDP will indicate a warning (not an error) which can be disregarded.

QC Samples: In order for the EQuIS Data Qualification Module (DQM) to work correctly, a single `sys_sample_code` cannot be part of more than one SDG. **The Lab must append all laboratory QC samples and the matrix spike and matrix spike duplicate sample IDs in the EDD with the laboratory SDG, separated by an underscore.**

MS - **sample nameMS_labSDG** [No underscore between name and MS; do not include sample date]

MSD - **sample nameMSD_labSDG** [No underscore between name and MSD; do not include sample date]

Examples: MW01MS_labSDG
MW01MSD_labSDG

Email EHS Support Lab Coordinator and equis@ehs-support.com for further instruction if sample naming convention exceeds the `sys_sample_code` 40-character limitation.

- `sample_name`: sample ID as listed on chain of custody (COC)
- `matrix_code`: below are codes for the most common matrices; all available matrix codes are listed in the EHS Support reference values (see `rt_matrix`). Note: The lab matrix code should match the sample matrix code, except in cases of lab-derived leachate analysis.
 - AI = indoor ambient air
 - AO = outdoor ambient air
 - LL = landfill leachate
 - SE = sediment
 - SO = soil
 - Tissue:
 - TA = Animal Tissue
 - TF = Fish tissue
 - TP = Plant tissue
 - TI = Other tissue
 - WG = groundwater



- WL = lab-derived leachate
 - WPO = porewater
 - WS = surface water
 - WST = storm water
 - WW = waste water
 - WQ/SQ/AQ/TQ= water quality/soil quality/air quality/tissue quality
 - Applies to all lab-generated samples and field QC samples (e.g., trip, field and equipment blanks, MS/MSDs)
- sample_type_code: below are the most common sample_type_codes; all available codes are listed in the EHS Support reference values (see rt_sample_type).
 - N = normal field sample
 - FD = field duplicate
 - TB = trip blank
 - EB = equipment blank
 - MS = matrix spike
 - MSD = matrix spike duplicate

QC sample	sample_source	sample_matrix_code	sample_type_code
Equipment Blank	FIELD	WQ	EB
Trip Blank	FIELD	WQ	TB
Field Duplicate	FIELD	SO, SE, WG, WS	FD
Parent sample of MS/MSD	FIELD	SO, SE, WG, WS,	N
Matrix Spike	LAB	WQ, SQ, TQ, AQ	MS
Matrix Spike Duplicate	LAB	WQ, SQ, TQ, AQ	MSD

- parent_sample_code: reference the sys_sample_code of the parent sample (not the sample_name of the parent).
 - For relevant flags to accurately appear on the parent sample of the MS and MSD, assign the parent_sample_code in this manner:
 - MS: reference the sys_sample_code of the parent sample
 - MSD: reference the **sys_sample_code of the MS**
- chain_of_custody: the COC ID or number. If COC ID or number is not provided on COC, use the lab SDG. The “field_sdg” column has been renamed to “chain_of_custody.”
- sys_loc_code: do not populate unless specifically instructed to do so by EHS Support.
- lab_name_code: for subcontracted samples, use the use the lab_name_code of the lab that originally received the samples. Acceptable codes are listed in the EHS Support reference values (see rt_company). Contact the EHS Support Lab Coordinator if a new lab_name_code needs to be added.



- `sampling_company_code` is a required field. The `sampling_company_code` for field samples is EHS, or another consultant as listed on COC. Lab QC samples should be assigned to the lab company name, not EHS (or applicable consultant). Acceptable codes are listed in the EHS Support reference values (see `rt_company`). Contact the EHS Support Lab Coordinator if a new `sampling_company_code` needs to be added.



TestResultsQC_v1

- Reporting Surrogates, Grain Size, pH, etc.: (do not have method detection or reporting limits; excluding Flashpoint and Ignitability): populate the method_detection_limit and/or the reporting_detection_limit field with zero. They cannot both be NULL.
- Reporting Flashpoint and Ignitability:
 - a. If sample does not flash:
 - i. Populate both the reporting_detection_limit and method_detection_limit fields with the numeric portion of the result reported in the lab report PDF
 1. Example: lab report PDF lists result as >200 degrees, method detection limit is listed as 140 degrees. Use the higher temperature to populate all limit fields (200, in this example).
 - ii. Result_value will be NULL
 - iii. Lab_qualifier will be “U”
 - iv. Detect_flag will be “N”
 - b. If the sample DOES flash:
 - i. Populate the reporting_detection_limit and method_detection_limits with the appropriate laboratory limits
 - ii. Result value is the temperature at which the sample flashed
 - iii. Detect_flag will be “Y”
- Reporting Reactive Cyanide and Sulfide: reference the analytical method used to analyze the sample and the corresponding prep method. Use cas_rn “CREAC” for Reactive Cyanide and “SREAC” for Sulfide Reactive.
- Reporting Paint Filter Results: if sample contains no free liquid the result_value will be NULL, lab_qualifier will be “U”, and detect_flag will be “N” and reporting_detection_limit should be zero. If a sample does contain free liquid, set the result_value to 9999, detect_flag will be “Y”, reporting_detection_limit should be zero and add result_comment ‘Contains Free Liquid’
- Reporting Biological Oxygen Demand (BOD): when reporting BOD toxicity/sliding BODs, report the highest BOD determined from any of the dilutions and add “>” in qualifier field (lab_qualifier and interpreted_qualifier).
- Reporting Total Organic Carbon: report the average TOC result using cas_rn = TOC. Do not report individual burns unless specifically requested by EHS Support. If reporting individual burns, use cas_rns TOC_Rep 1, TOC_Rep 2, TOC_Rep 3 or TOC_Rep 4 in addition to the average TOC result.
- Reporting Tissue: unless otherwise directed by EHS Support, report tissues on wet weight (as received) basis.



- **Reporting Silica Treated Results:** represent silica gel treated results by appending “SG” to end of the CAS number. Example: C10-C28 SG. EHS Support reference values contain specific CAS numbers (see `rt_analyte`).
- **Reporting AVS/SEM Results:** EHS Support created specific `analytic_method` reference values to represent AVS/SEM analytical data. Use the following analytic, prep methods and CAS numbers. Report in `umol/g` units.

AVS/SEM Analyte	EHS analytic_method Reference Value	EHS prep_method Reference Value	EHS cas_rn Reference Value
Sulfides	9034 AVS/SEM	821-R-91-100	18496-25-8
Cadmium	6010C AVS/SEM or 6010D AVS/SEM	821-R-91-100	7440-43-9
Copper	6010C AVS/SEM or 6010D AVS/SEM	821-R-91-100	7440-50-8
Lead	6010C AVS/SEM or 6010D AVS/SEM	821-R-91-100	7439-92-1
Mercury	7470A AVS/SEM	821-R-91-100	7439-97-6
Nickel	6010C AVS/SEM or 6010D AVS/SEM	821-R-91-100	7440-02-0
Zinc	6010C AVS/SEM or 6010D AVS/SEM	821-R-91-100	7440-66-6
SEM/AVS Ratio	SEM	NA	SEM/AVS

- **Reporting Air Data:** EHS created specific `analytic_method` reference values that must be used when reporting air results. Use the `analytic_method` with “_vol” appended at the end of the analytical method for reporting results in `ppmV`. Use the standard `analytic_method` for reporting results in `ug/m3`. EHS requires lab report analytical results in both `ppmV` and `ug/m3`.

Analytic method TO-15 example:

- For reporting unit `ppmV`, use `analytic_method TO15_vol`; `preferred_name TO15`
- For reporting unit `ug/m3`, use `analytic_method TO15`; `preferred_name TO15`

- **Reporting Dilutions:** report dilutions using the **same `sys_sample_code`** as the original analysis. The results associated with the dilution are differentiated using the `dilution_factor` and `test_type` (INITIAL vs DILUTION) fields.
- **Reporting Two Sets of Results:** when reporting two sets of analytical results in the EDD (i.e., analyte required a dilution due to high concentrations or reanalysis out of hold), one of the results must be set to `reportable_result = “N”` (not reportable).
 - In the case of overrange results necessitating dilution, the overrange result(s) should be set to `reportable_result = “N”` and results for those compounds should be set to `reportable_result = “Y”` in diluted analytical run. Results for remaining



- compounds (i.e., results that were within the calibrated range in the undiluted analysis) should be set as reportable_result = “Y” from the undiluted run.
- When possible, EDDs should include results from both columns for dual column analyses including 8081, 8082, and 8151. Again, only one result for a given sample/analytical method/lab matrix/fraction/analyte may be set to reportable_result = “Y”.
 - Results from a reanalysis that is performed outside the holding time will typically be set to reportable_result = “N”.
- Reporting TICs: if requested to report TICs for the project, **report only detected TICs in the EDD**.
 - Populate tic_retention_time
 - TICs will be reported in groups by their general classification (VOC, SVOC, etc.)
 - A maximum of 15 TICs per groups/per sample can be reported
 - TICs are named using the following convention:
 - If the TIC matches a standard constituent with a valid CAS number, then it should be named using the valid conventions but still designated as a TIC (via result_type_code)
 - If the TIC is an unknown compound, it should be named accordingly:
UnkXXXYY
 - Where XXX = the group designation and YY is a number in numeric order:
 - VOA for Volatile Organic Compounds (Example: UnkVOA01, UnkVOA02)
 - SV for Semi-Volatile Organic Compounds (Example: UnkSV01, UnkSV02)
 - Reporting High Resolution Data (Dioxins/Furans, PFAS, EPA 1699):
 - method_detection_limit: whenever an EDL can be calculated, the EDL should go in the method_detection_limit field. When no EDL can be calculated, MDL should be used.
 - reporting_detection_limit: populate with the reporting limit. This is the concentration under which results must be “J” flagged. It is often the lowest point on the calibration curve.
 - quantitation_limit:
 - a) If the reported concentration is a ‘real’ result, not an EMPC, the quantitation_limit field should contain the same number that appears in the method_detection_limit field or reporting_detection_limit field depending on the project requirements (whether project is reporting non-detects to the MDL or to the RDL).
 - b) The EMPC value will populate this field **if**:
 1. No real result is attainable and reported concentration is an EMPC (single analyte),
or
 2. A real result, for which peaks meet all criteria, is attained and an EMPC is also calculated (for totals).
 - result_value:



- a) No interference: when there is only a result and no EMPC, the `result_value` field is populated with the numeric result and the `quantitation_limit` is the same as the concentration in the MDL or RDL field.
- b) When the result is an EMPC (for single analytes):
 1. The EMPC concentration will populate the `quantitation_limit` column
 2. The `result_value` field will be NULL
 3. The detect flag will be "N"
 4. The `lab_qualifier` will include "U" as well as the flag that indicates the value is an EMPC; flag may be "EMPC", or whichever qualifier has that definition.
- c) When there is a separate result and EMPC (for totals):
 1. The `result_value` field will contain the numeric result
 2. The EMPC will populate the `quantitation_limit` field. Do not apply an "EMPC" qualifier in this case because qualifiers are associated with reported results and, in these cases, the reported results are not EMPCs. The fact that the quantitation limit is an EMPC should be presented in the laboratory report pdf.

Individual Field Definitions:

- `total_or_dissolved`: must be either "D" for dissolved or filtered concentration, "T" for total or undissolved.
- `column_number`: cannot be "NA" when `lab_anl_method_name` is 8151, 8081, 8082, or other method that is a dual-column analysis, i.e., column number is required for any dual column analyses. The acceptable values include either "1C" for first column results or "2C" for second column results. When possible, laboratories will report one result from column 1C and one result from column 2C. The result that includes a "Y" value in the `reportable_result` field will typically be the one from the primary column – unless laboratory staff decide that the result from the confirmation column should be reportable based on associated QC results. In all cases, one of these results must be designated reportable, and the other not-reportable based on the values in the `reportable_result` field.
- `test_type`: identify type of test. The most common `test_type` codes are presented below; all available codes are listed in the EHS Support reference values (see `rt_test_type`).
 - INITIAL
 - REEXTRACT1
 - CONFIRM
 - CONFIRM1
 - REANALYSIS
 - DILUTION1
 - DILUTION2
- `lab_matrix_code`: should match the sample `matrix_code` except in cases of lab-derived leachate analysis. Use "WL" as the `lab_matrix_code` for lab-derived leachate analysis; use LL for landfill leachate. All available matrix codes are listed in the EHS Support reference values (see `rt_matrix`).



- Basis: must be either “WET” for wet weight basis reporting, “DRY” for dry weight basis reporting, or “NA” for tests for which this distinction is not applicable. The EPA prefers that results are reported on the basis of dry weight where applicable.
- prep_method: required for all results. If there is no prep_method, or this is not applicable, enter “NONE.” Use “NONE” only when appropriate; this is not appropriate for results from methods such as 6010 or 8270, for which samples have undergone specific preparations before analysis. METHOD is not a valid EHS Support reference value. All valid prep_methods are listed in the EHS Support reference values (see rt_prep_method).
- prep_date: beginning date and time of sample preparation. This field should be NULL only if the prep_method is “NONE.”
- leachate_method and leachate_date: report TCLP, SPLP or other lab leachate samples with a lab_matrix_code of “WL” and populate leachate_method and leachate_date. TCLP, SPLP, and any other leachate results must be submitted in units appropriate for liquids, such as mg/L.
- Ensure all applicable fields are populated - dilution_factor, subsample_amount, subsample_unit, analyst_name, instrument_id, preservative, final_volume, final_volume_unit, etc.
- percent_moisture: percent moisture must be reported in the percent_moisture field in TestResultsQC_v1 for all solid samples (i.e., soil, sediment, and sludge) reported as dry weight; it must be presented as a numeric value, e.g., “82.8.” Subsample weights and final volumes must be included for all parameters. It is understood that percent moisture varies between sample aliquots; the value reported represents the aliquot used in the percent moisture analysis and may not exactly represent the percent moisture of any aliquot used in other analyses.
- result_value: must be NULL for all non-detects
- result_type_code: Must be either “TRG” for a target or regular result, “TIC” for tentatively identified compounds, “SUR” for surrogates, “IS” for internal standards, or “SC” for spiked compounds.
- detect_flag: must be either “Y” for detected analytes or “N” for non-detects
- lab_qualifiers: **for non-detect results, lab_qualifier must contain “U”** in addition to other qualifiers deemed applicable. If reporting more than one lab qualifier, do not separate by a space or comma.
 - Example: J, B entered as “JB”
- interpreted_qualifiers: must match the lab_qualifiers.
- method_detection_limit and reporting_detection_limit fields on the TestResultsQC_v1 table need to accurately reflect the analysis limits in the lab report.
 - method_detection_limit: MDL as defined by the USEPA.
 - reporting_detection_limit: populate with the lab reporting limit (RL). The RL is the concentration under which results must be “J” flagged. It is often the lowest point on the calibration curve.



- For all results, either the `method_detection_limit` or the `reporting_detection_limit` must be populated. They cannot BOTH be NULL.
- `quantitation_limit`: set equal to the `method_detection_limit` field unless otherwise instructed by EHS Support. Our default policy is if the lab is evaluating the data to the MDL and reporting J flagged detections, set the QL=MDL. If lab is reporting down to the RL only, set the QL=RL. It is project specific.
 - If state-specific reporting requirements differ from EHS Support’s preferred reporting, notify EHS PM and EHS Lab Coordinator immediately.
- `lab_sdg`: populate with the lab sample delivery group (SDG)
- `validated_yn`: should be “N” for all records.

TestBatch_v1

EHS Support utilizes the EQuIS Data Qualification Module (DQM) to validate data. For all data to appear accurately in DQM, each `lab_anl_method_name` entry **must** include an entry in `TestBatch_v1` where the `test_batch_type` = “ANALYSIS.” Do not assign only batch type “PREP” to an analytical method or that data will not be captured by DQM.