CEDEN 2.0 Quick Reference:

Key Data Reporting Changes in New System

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Version 1.0

CEDEN 2.0
CALIFORNIA ENVIRONMENTAL DATA EXCHANGE NETWORK

CALIFORNIA Water Boards

Contents

Introduction

There are several significant differences in reporting requirements for chemistry and microbiological data between the CEDEN data system and the CEDEN 2.0 data system. This document is a quick reference guide that describes the key differences in reporting requirements between the two data systems but is not a comprehensive data submittal guidance document. Some of the changes will need to be implemented by analytical laboratories because they are changes in how samples are analyzed, not simply changes in how data are reported.

Comprehensive guidance on populating the CEDEN 2.0 Chemistry Template can be found in the CEDEN 2.0 Chemistry Data Submission Guidance document.

Implementing these highlighted changes to data reporting may require updates to laboratory information management systems (LIMS) or other data systems that data managers use to store and export data to CEDEN.

Key Reporting Differences

Updated Database Controlled Vocabulary

Controlled vocabulary in CEDEN 2.0 has been updated to follow standardized naming conventions, consolidate duplicate vocabulary, and remove outdated vocabulary. The most notable controlled vocabulary updates were applied to Sample Type, Matrix, and Methods. For example, in CEDEN 2.0, the method names for all Standard Methods and ASTM methods were updated to include a year, which is consistent with current Environmental Laboratory Accreditation Program (ELAP) naming convention for these methods.

CEDEN 2.0 controlled vocabulary will be available in the CEDEN 2.0 web portal when the system is open to the public, as they are continuously updated. Prior to public launch, static vocabulary lists will be shared on the CEDEN website.

Laboratories and data managers are advised to review the controlled vocabulary in their systems to ensure they are consistent with updated controlled vocabulary in CEDEN 2.0 prior to attempting to submit data.

New Fields with Controlled Vocabulary

There are two new fields in the CEDEN 2.0 Chemistry format that include controlled vocabulary: Result Type and Test Type. These fields are further described in the

CEDEN 2.0 Chemistry Data Submission Guidance document. They are defined as follows:

- **Test Type:** The type of test performed on the sample, including Initial, Reanalysis, Re-extract, Dilution, etc.
- **Result Type**: The type of analyte for which the result is reported, the most common Result Types are Target (TRG), Surrogate (SUR), Isotope Dilution Analogue (IDA), and Calculated (CAL).

Batch Completeness – Recommended Quality Control Samples

The CEDEN 2.0 system includes a check for batch completeness. This check compares the quality control (QC) samples submitted within an analytical batch to the recommended QC samples that should be included based on the analyte and/or analytical method.

Incomplete batch QC will not prevent data from being submitted to the system. However, data from analytical batches that do not include all the recommended QC samples will be flagged by the system for incomplete QC, which may impact the usability of the data for Water Boards purposes.

The default batch completeness expectations for different analyte or analytical method categories will be shared so that laboratories are aware of the recommended QC samples per test.

If additional QC samples are analyzed that are not included in the batch completeness recommendations, they may also be submitted without being flagged by the system.

Allowable Parent Samples for Laboratory Quality Control Samples

The purpose of field QC samples is to inform the quality of the sample collection process, and similarly the purpose of laboratory QC samples is to inform the quality of the laboratory analytical process. These two types of QC samples should not be combined because then they no longer serve the intended data quality indicator purpose.

In the CEDEN 2.0 system, field QC samples CANNOT be used to generate matrix spikes or laboratory duplicates. The system will not be able to identify the parent and child samples in this scenario, and an error will be triggered that prevents the data from being submitted.

Environmental samples with a SampleType of Grab, Integrated, or Core MUST be used to generate matrix spikes and laboratory duplicates. Field quality control sample types that cannot be used as parent samples include:

- Field Blanks: BlindFieldBlank, BottleBlank, EquipmentBlank, FieldBlank, FilterBlank, TravelBlank
- Field Replicates: BlindFieldDuplicate, FieldDuplicate, FieldTriplicate.

Laboratories should be able to identify these sample types and exclude these samples from use in generating laboratory QC. The only exception to this is if the field QC was anonymized (Blind Field Blanks and Blind Field Duplicates).

If a Blind Field Blank is used to generate matrix spikes and/or a laboratory duplicate, it will not inform the effects of the environmental matrix on accuracy or precision, so it does not serve the data quality indicator purpose and should not be reported. If this occurs, these QC samples must be removed from the dataset for the remaining data to be submitted. The laboratory batch would have incomplete QC because environmental samples were not used and thus do not serve the intended purpose of these sample types. In this case, the dataset will be flagged by the system for incomplete QC, which may impact the usability of the data for Water Boards purposes.

If a Blind Field Duplicate is used to generate matrix spikes and/or a laboratory duplicate, the data submitter will have two options. The data submitter can eliminate the QC samples from the analytical batch and have the batch flagged by the system for incomplete QC (same as above for Blind Field Blank). Alternatively, the data submitter or laboratory can change the Sample Type of the Blind Field Duplicate to a Grab, Integrated, or Core sample, as appropriate, and then change the Sample Type of the corresponding parent sample of the Blind Field Duplicate sample to a Field Duplicate. The system will now recognize the distinct field and laboratory QC samples.

Accuracy and Precision Statistics

The CEDEN 2.0 Data Checker re-calculates the reported accuracy and precision statistics of percent recovery (PR), relative percent difference (RPD), and relative standard deviation (RSD) based on the data submitted by the laboratory. In order for the system to re-calculate these statistics, the parent sample results must be reported for all QC samples.

Non-project parent samples for QC

The CEDEN 2.0 system requires that the parent sample is reported for all QC samples, even when the parent sample is from a different project not being reported to CEDEN,

that is, a non-project sample. This applies to matrix spikes and laboratory duplicates, or any other QC samples for which accuracy or precision statistics are reported.

If parent samples are not reported, an error will be triggered that prevents data from being submitted. To resolve the error and submit the data, either the record for the parent sample must be added to the dataset, or the QC results must be removed, in which case the data will be flagged by the system for incomplete QC.

Guidance on how to report non-project samples is given in the CEDEN 2.0 Chemistry Data Submission Guidance document. Default values are used for Station, Project, Sample Agency, and Collection Depth to anonymize the samples, as those fields are not necessary for evaluating the QC sample results.

Variance in Accuracy and Precision Statistics

If the difference between the reported value and the re-calculated value of a given statistic is greater than the allowable variance, an error is triggered that prevents the data from being submitted.

- PR allowable variance: 2
- RPD and RSD allowable variance: 1

Some laboratories have been using raw instrument values to calculate PR, RPD, and RSD. Raw instrument values typically include more significant figures than the reported results.

Reported results should reflect the resolution and sensitivity of the entire analytical method, not just the instrument, so they typically include fewer significant figures.

As such, accuracy and precision statistics should be calculated using reported results, not with raw instrument values, because the statistics should also reflect the resolution of the analytical method.

The additional significant figures of raw instrument values can result in accuracy and precision statistics that are not within the allowable variance when compared to re-calculated statistics using the reported results. This occurs frequently for precision statistics (RPD and RSD) when the results are at low levels (<1).

For laboratories currently using raw instrument values for accuracy and precision calculations, these are typically programmed in the LIMS and may require a significant commitment of resources to make the appropriate updates.

If the calculations are not updated in the LIMS, then data submitters may encounter errors that can only be overcome by updating the reported accuracy and precision statistics or by removing the results from the dataset, and submitting the dataset with incomplete QC sample results, in which case the dataset will be flagged by the system for incomplete QC.

Reporting Down to the Method Detection Limit

For all methods where a Method Detection Limit (MDL) can be calculated, the CEDEN 2.0 system requires that the MDL and Minimum Reporting Limit (MRL) are both reported and that MDL $\leq$ MRL. Reporting the MDL was not required in CEDEN and if MDL was reported it was not required to be lower than the Reporting Limit.

There are several methods where calculating an MDL is not possible, such as alkalinity, indicator bacteria, grain size analysis, solids analysis (e.g., total suspended solids), and in those cases the MDL is reported as a default value of -88. These exceptions are programmed into the CEDEN 2.0 system based on the Method Name.

ELAP accreditation and the 2016 TNI Standard, on which ELAP accreditation is based, requires MDL determination for all methods that the laboratory performs where MDL can be determined. Therefore, reporting results down to the MDL was established as a requirement of the database, whether the client requested this level of reporting on the laboratory report or not.

Results between the MDL and MRL are considered estimated and are required to have a qualifier of “DNQ” (detected, not quantified). The laboratory or data submitter may also apply a J qualifier or other qualifiers that the laboratory deems necessary to inform the uncertainty of the measurement.

Reporting Changes Planned for the Future

There are some changes in reporting requirements of CEDEN 2.0 that will be implemented in the future that are described below so that laboratories can make plans for implementing them in their respective reporting system.

Reporting results for spiked analytes

In CEDEN, many spiked analytes are reported solely on a percent recovery basis. These include:

- Surrogates (SUR)

- Isotope Dilution Analogues (IDA)

The CEDEN 2.0 data system does not currently require that these results are reported as concentrations in addition to the percent recovery. However, this will become a requirement within the first year that CEDEN 2.0 is accepting data.

When this change occurs, all spiked analytes will be required to be reported on a concentration basis in the Results field, and the percent recovery will be reported in the Percent Recovery field. If concentrations and/or percent recovery are not reported, then an error will be triggered, and data cannot be submitted to the system.