CEDEN

California Environmental Data Exchange Network

Chemistry Data Submission Guidance Document

Updated January 9, 2012

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Appendices

List of Acronyms

CEDEN	California Environmental Data Exchange Network
LABQA	Laboratory Quality Assurance
RDC	Regional Data Center

List of Terms

Controlled Vocabulary	Controlled vocabulary refers to codes and associated definitions maintained within CEDEN to ensure comparability between and among data sets. Current controlled vocabulary can be found at: http://www.ceden.us/Metadata/ControlledVocab.php
Data Checker	Web-based automated tool that assists data submitters in examining their data sets against the required LookUp lists, formats and business rules. Each RDC maintains its own data checker.
LookUp Lists	Controlled vocabularies are maintained within the CEDEN database as "LookUp Lists" and are managed through individual RDCs to maintain comparability between RDCs and throughout data sets available through CEDEN. Contact your Regional Data Center to add new codes to LookUp lists.
Native Sample	Native sample refers to the environmental sample collected and analyzed. The native sample can be compared to field quality assurance samples (e.g. field duplicate, field blank) and laboratory quality assurance samples (e.g. laboratory duplicate, matrix spike).
Primary Key	Uniquely identifies each row in a table and is comprised of a set of columns. No two distinct rows in a table can have the same combination of column values. Required for record uniqueness.
Data Type	Refers to the type of format required for a specific column heading in CEDEN templates. Data type examples include: integer (whole numbers), text, date and time, and decimal.

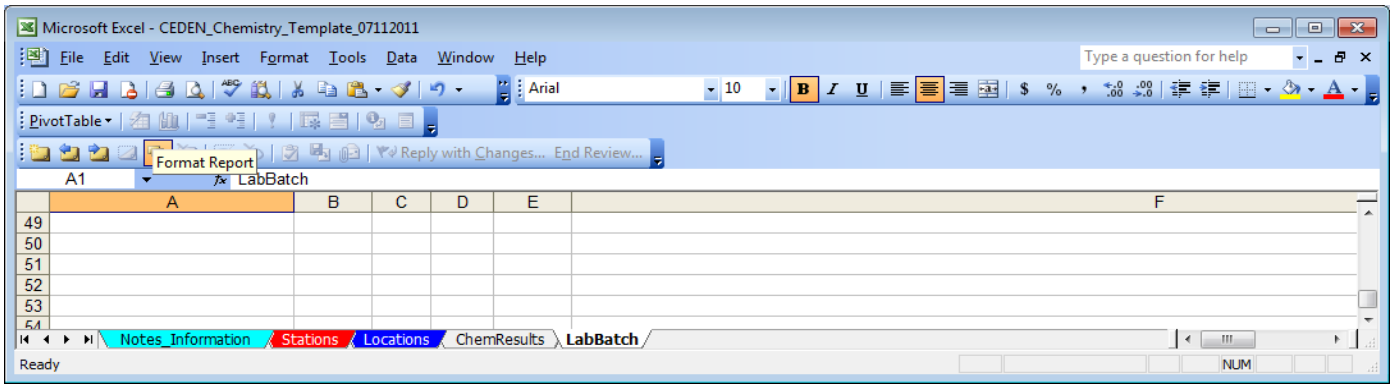
Introduction

This document is designed to provide guidance on the necessary data reporting requirements for electronic data to be entered in the California Environmental Data Exchange Network (CEDEN) templates. Detailed below are definitions of data elements and rules for formatting chemistry data within the CEDEN chemistry template. For information on entering laboratory QA samples and field generated QA samples see Appendix A. If you have any questions regarding these guidelines, please contact your Regional Data Center for help.

Regional Data Center (RDC)	Contact	Phone Number	Email
Central Coast RDC	Mark Pranger	831/241-8178	pranger@mlml.calstate.edu
Central Valley RDC	Melissa Turner	530/756-5200	mturner@mlj-llc.com
San Francisco RDC	Cristina Grosso	510/746-7371	cristina@sfei.org
Southern California RDC	Shelly Moore	714/755-3207	shellym@sccwrp.org

Chemistry Data Submission Steps

To submit water quality chemistry data to CEDEN, start with the CEDEN_Chemistry_Template excel file you received from your Regional Data Center (RDC). In this template you will find the four data tables (each in a separate worksheet) required for submitting chemistry data. This file can be named at the discretion of the user; however, the Excel sheet tabs **MUST** be named **Stations**, **Locations**, **ChemResults**, and **LabBatch** respectively.



CEDEN Chemistry Template Tables

1. Stations
    a. Holds information about sample site and location
    b. Must be submitted prior to submitting chemistry data
    c. Required only for new stations (i.e. not currently in the database)
2. Locations
    a. Holds information about location sampled

    b. Required only if an actual latitude and longitude for each sampling event was recorded
3. ChemResults
    a. Used to record chemistry analysis results
    b. Required and must be submitted with LabBatch table
4. LabBatch
    a. Used to record lab batch information necessary for analyzing the data
    b. Required and must be submitted with ChemResults table

The guidelines in the following sections will assist you in getting your data into the CEDEN Chemistry Template and associated tables. However, if at any time you have questions more specific to your data, (e.g. adding new codes to LookUp lists) please do not hesitate to contact your local Regional Data Center.

Once you have placed your data into the CEDEN Chemistry Template tables, please visit your Regional Data Center's website to check and submit your data. Regional Data Center information can be found at: http://www.ceden.org/data_centers.shtml. The online data submission process includes specific checks on your data to ensure both data integrity and comparability with other data sets. Once your data has passed all of our checks it will be uploaded into the centralized CEDEN database and become available through the CEDEN website (www.ceden.org).

Chemistry Template Data Tables

Stations Table

PURPOSE:

This table contains information about the station/sample site and where it is located. It is important to fill out as much information as possible, as this helps with data analysis and reporting for specific locations. This table is required and must be submitted prior to submitting any chemistry data. Please see the above section for data submission steps.

COLUMN REQUIREMENTS:

Within this table only a minimal amount of columns are actually required to submit data into CEDEN. The additional columns are desired and can increase the usability of the data by CEDEN users or are not required but are used for additional information and completeness purposes. Individual column requirements are listed below:

Required Columns:

StationSource
StationCode
StationName
CoordinateNumber
TargetLatitude
TargetLongitude

Desired Columns:

Datum
LocalWatershed
LocalWaterbody
State
Counties_2004_County
SWRCBWatTypeCode
CalWater_2004_RB

Not Required Columns:

StationDescr	UpstreamArea
StationComments	HBASA2_1995_NHCODE
GeometryShape	NHD24k_GNIS_Name
DirectionsToStation	NHD24k_ReachCode
AddDate	NHD24k_HUC12
CoordinateSource	NHD24k_Hu_12_Name
Elevation	NHD_100k_GNIS_Name
UnitElevation	NHD_100k_ReachCode
StationDetailVerBy	Ecoregion_1987_Level3*
StationDetailVerDate	IBI_NorthCoast_2005_WithinPolygon*
StationDetailComments	IBI_SoCal_2005_WithinPolygon*
CalWater_2004_CALWNUM	StationGISVerBy
CalWater_2004_HUNAME	StationGISVerDate
CalWater_2004_SWRCBNUM21	StationGISVerComments
HydrologicUnit	StationGISVerComments
GageStationID	

* Not required unless station has accompanying bioassessment data

STATIONS TABLE STRUCTURE:

CHEMISTRY TEMPLATE HEADER	DATA TYPE	REQUIRED	SIZE	LOOKUP LIST	DEFINITION
StationSource*	Text	Yes	50		Agency or project that created the station.
StationCode*	Text	Yes	25	Station LookUp	Represents a unique sampling site in a sampling design. A single waterbody may have multiple stations. StationCodes and station information must be submitted to the CEDEN system via the Stations table before chemistry and lab batch data can be submitted.
StationName	Text	Yes	100		Name of the StationCode. Must be unique for all stations.
StationDescr	Text	No	255		Description of the StationCode.
StationComments	Text	No	255		Any pertinent comments regarding the station and/or station visit.
GeometryShape	Text	No	50		Physical shape of the location. Example values are Line, Point, or Polygon.
DirectionsToStation	Text	No	255		A general description of how to get to the station using streets, landmarks, etc.
AddDate	Date/ Time	No			Date the StationCode was added.
CoordinateNumber	Integer	Yes			Number of the coordinate recorded at a Location; e.g. 1 for Points (target and actual coordinates), 1 and 2 for Lines.
TargetLatitude	Decimal	Yes			Represents the targeted latitude for the sample site in decimal degrees with 5 decimal places.
TargetLongitude	Decimal	Yes			Represents the targeted longitude for the sample site in decimal degrees with 5 decimal places (must be negative).
Datum	Text	Desired	10		The Datum field records the datum that was used on the GPS Device to record the GPS measurements.
CoordinateSource	Text	No	50		Describes how the coordinate was measured. For example, if measurement was taken from a map or GPS.
Elevation	Decimal	No			Elevation at which the sample was taken.
UnitElevation	Text	No	2		Unit of the Elevation measurement.
StationDetailVerBy	Text	No	100		Agency or person who performed the verification of the station detail information.
StationDetailVerDate	Date/ Time	No			Date the station detail information was verified.
StationDetailComments	Text	No	255		Comments related to the station detail information.
LocalWatershed	Text	Desired	50		Local watershed of the station as supplied by data user.
LocalWaterbody	Text	Desired	50		Local waterbody of the station as supplied by data user.

CHEMISTRY TEMPLATE HEADER	DATA TYPE	REQUIRED	SIZE	LOOKUP LIST	DEFINITION
State	Text	Desired	2		State in which the station was surveyed. Default = CA
Counties_2004_County	Text	Desired	50		County in which the station was surveyed.
SWRCBWatTypeCode	Text	Desired	10	WBType LookUp	Unique code assigned by the state for the appropriate waterbody type.
CalWater_2004_RB	Integer	Desired	1		Regional Board ID Number from the CalWater 2.2.1 2004 GIS layer. This layer can be retrieved from: https://projects.atlas.ca.gov/frs/download.php/676/calw221_e00.zip
CalWater_2004_ CALWNUM	Text	No	12		Watershed ID Number from the CalWater 2.2.1 2004 GIS layer.
CalWater_2004_ HUNAME	Text	No	35		Hydrologic Unit Name from the CalWater 2.2.1 2004 GIS layer.
CalWater_2004_ SWRCBNUM21	Text	No	6		State Water Resources Control Board (SWRCB) ID Number from the CalWater 2.2.1 2004 GIS layer.
HydrologicUnit	Text	No	50		Name of hydrologic unit from the CalWater 2.2.1 2004 GIS layer.
GageStationID	Text	No	50		Identifier for USGS Gage station located at the Station location.
UpstreamArea	Decimal	No			Area (measured in km2) upstream that drains to the sampling point.
HBASA2_1995_ NHCODE	Text	No	6		NHDCODE from Teale HBASA watershed GIS layer. This layer can be retrieved from: https://projects.atlas.ca.gov/frs/download.php/389/hbasa2-1997_shp.zip
NHD24k_ GNIS_Name	Text	No	65		Official federal Geographic Names Information System (GNIS) name of stream from the NHD high-resolution GIS layer. This layer can be retrieved from: http://nhd.usgs.gov/data.html
NHD24k_ ReachCode	Text	No	14		14-digit ReachCode ID Number for streams from NHD high-resolution GIS layer.
NHD24k_HUC12	Text	No	12		12-digit Hydrologic Unit ID for NHD watershed polygon (WBD) from NHD high-resolution GIS layer.
NHD24k_ Hu_12_Name	Text	No	120		Name of 12-digit Hydrologic Unit for NHD watershed polygon (WBD) from NHD high-resolution GIS layer.
NHD_100k_GNIS_Name	Text	No	120		Official federal Geographic Names Information System (GNIS) name of stream from the NHD medium-resolution GIS layer. This layer can be retrieved from: http://nhd.usgs.gov/data.html
NHD_100k_ReachCode	Text	No	14		14-digit ReachCode ID Number for streams from NHD medium-resolution GIS layer.

CHEMISTRY TEMPLATE HEADER	DATA TYPE	REQUIRED	SIZE	LOOKUP LIST	DEFINITION
Ecoregion_1987_ Level3	Text	No	5		EPA Ecoregion Level III name (US_L3NAME). This layer can be retrieved from: ftp://ftp.epa.gov/wed/ecoregions/ca/
IBI_NorthCoast_ 2005_WithinPolygon	TRUE/ FALSE	No			True if the Station is located within the IBI North Coast 2005 polygon. False if otherwise.
IBI_SoCal_ 2005_WithinPolygon	TRUE/ FALSE	No			True if the Station is located within the IBI Southern California 2005 polygon. False if otherwise.
StationGISVerBy	Text	No	100		Agency or person who performed the verification of the GIS station information.
StationGISVerDate	Date/ Time	No			Date the GIS station information was verified.
StationGISVer Comments	Text	No	255		Comments related to the GIS station information verification.

* Primary Key, required for record uniqueness.

Locations Table

PURPOSE:

This table contains specific information about the locations sampled. Actual latitudes and longitudes are recorded here for each sampling event. In the event that only target latitudes and longitudes were recorded, it is sufficient to fill out the Stations table only.

COLUMN REQUIREMENTS:

Within this table only a minimal amount of columns are actually required to submit data into CEDEN. The additional columns are desired and can increase the usability of the data by CEDEN users or are not required but are used for additional information and completeness purposes. Individual column requirements are listed below:

Required Columns:

StationCode
SampleDate
ProjectCode
CoordinateNumber
ActualLatitude
ActualLongitude
Datum

Desired Columns:

ProtocolCode
AgencyCode
LocationCode

Not Required Columns:

EventCode
SampleComments
GeometryShape
CoordinateSource
Elevation
UnitElevation
StationDetailVerBy
StationDetailVerDate
StationDetailComments

LOCATIONS TABLE STRUCTURE:

CHEMISTRY TEMPLATE HEADER	DATA TYPE	REQUIRED	SIZE	LOOKUP LIST	DEFINITION
StationCode*	Text	Yes	25	Stations LookUp	Represents a unique sampling site in a sampling design. A single waterbody may have multiple stations. StationCodes and station information must be submitted to the CEDEN system via the Stations table before lab data can be submitted.
SampleDate*	Date/ Time	Yes	20		Refers to the date the sample was collected in the field. Formatted as dd/mmm/yyyy.
ProjectCode*	Text	Yes	25	Project LookUp	References the project that is associated with the sample.
EventCode	Text	No	20	Event LookUp	Represents the primary reason, i.e. water quality, tissue or bioassessment sampling, of the sampling event at a particular station and date.
ProtocolCode	Text	Desired	50	Protocol LookUp	Represents the sampling protocol used, which includes the set of methods, methodology and/or specifications, such as MPSL-DFG_Field_v1.0. Established protocols may be used or Regions may document their own sampling protocols.
AgencyCode	Text	Desired	20	Agency LookUp	Refers to the organization or agency that collected the sample.
SampleComments	Text	No	255		Comments related to the GIS station information verification.
LocationCode	Text	Desired	50	Location LookUp	Describes the physical location in the waterbody where the sample was collected. One sampling event may have a single or multiple locations.
GeometryShape	Text	No	50	Geometry Shape LookUp	Physical shape of the location. Example values are Line, Point, or Polygon.
CoordinateNumber	Integer	Yes			Number of the coordinate recorded at a Location; e.g. 1 for Points (target and actual coordinates), 1 and 2 for Lines.
ActualLatitude	Decimal	Yes			Represents the actual latitude for the sample site in decimal degrees with 5 decimal places.
ActualLongitude	Decimal	Yes			Represents the actual longitude for the sample site in decimal degrees with 5 decimal places (must be negative).
Datum	Text	Yes	10		The Datum field records the datum that was used on the GPS Device to record the GPS measurements. Example = NAD83
CoordinateSource	Text	No	50		Describes how the coordinate was measured. For example, if measurement was taken from a map or GPS.
Elevation	Decimal	No			Elevation at which the sample was taken. Example = 1

CHEMISTRY TEMPLATE HEADER	DATA TYPE	REQUIRED	SIZE	LOOKUP LIST	DEFINITION
UnitElevation	Text	No	2		Unit of the Elevation measurement. Example = m
StationDetailVerBy	Text	No	100		Agency or person who performed the verification of the station detail information.
StationDetailVerDate	Date/ Time	No			Date the station detail information was verified.
StationDetailComments	Text	No	255		Comments related to the station detail information.

* Primary Key, required for record uniqueness.

Chemistry LabBatch Table

PURPOSE:

This table contains information about lab batches. A batch is defined as all the samples (including QA samples) processed by a single lab, on a single date, using a single preparation and analytical method. In some cases, a batch may include analyses for several analytes (as with most metals); in other cases, only a single analyte is included within a batch (as with Hardness as CaCO3). If your project requires QA samples these are expected to be submitted with each batch.

COLUMN REQUIREMENTS:

Within this table only a minimal amount of columns are actually required to submit data into CEDEN. The additional columns are desired and can increase the usability of the data by CEDEN users or are not required but are used for additional information and completeness purposes. Individual column requirements are listed below:

Required Columns:

LabBatch

Desired Columns:

LabAgencyCode
LabSubmissionCode
BatchVerificationCode

Not Required Columns:

SubmittingAgencyCode
LabBatchComments

LABBATCH TABLE STRUCTURE:

CHEMISTRY TEMPLATE HEADER	DATA TYPE	REQUIRED	SIZE	LOOKUP LIST	DEFINITION
LabBatch*	Text	Yes	35		The LabBatch is a unique code, provided by the laboratory, which represents a group of samples processed together. It groups all environmental samples with their supporting QC samples and will be used to verify completeness. A unique identifier for each batch, generated by the lab. This field is the primary key to ensure record uniqueness. To ensure uniqueness in the CEDEN system, the LabAgencyCode may be appended to this value when loaded to CEDEN. Please use a standard format to construct a composite Lab Batch. Format as LabBatch a dash – and the AgencyCode. Example: Batch1-SCCWRP.
LabAgencyCode*	Text	Desired	20	Agency LookUp	LabAgencyCode refers to the organization, agency or laboratory that performed the analysis on the sample.
LabSubmissionCode	Text	Desired	10	Lab Submission Lookup	The LabSubmissionCode is a unique batch qualifier code assigned to the LabBatch as a whole by the analyzing laboratory which references the quality of the data in the LabBatch. The LabSubmissionCode should be reviewed by the Project Manager or other appropriate person to ensure that the code has been applied based on project specific data quality objectives and criteria.
BatchVerificationCode	Text	Desired	10	Batch Verification Lookup	Unique code referencing the Verification of a Batch. If the Batch Verification used is not found in the lookup list please contact your Regional Data Center for assistance.
SubmittingAgencyCode	Text	No	20	Agency LookUp	Organization or agency that is responsible for submission of the data to the database. This agency may be different from LabAgencyCode if the analytical data were subcontracted to another agency.
LabBatchComments	Text	No	255		LabBatchComments records any comments relating to the LabBatch as a whole. Comments should explain any irregularities in sample processing.

* Primary Key, required for record uniqueness.

Chemistry Results Table

PURPOSE:

The purpose of the chemistry results table is to document the analysis results for water chemistry and algae biomass. Each record represents a result from a specific analysis for a single analyte in a single sample. This table will also contain all supporting QA sample results.

COLUMN REQUIREMENTS:

Within this table specific columns are required to submit data into CEDEN. The additional columns are desired and can increase the usability of the data by CEDEN users or are not required but are used for additional information and completeness purposes. Individual column requirements are listed below:

Required Columns:

StationCode	**UnitCollectionDepth**	**LabReplicate**
SampleDate	**LabBatch**	**Result**
ProjectCode	**AnalysisDate**	**ResQualCode**
CollectionTime	**MatrixName**	**MDL**
CollectionMethodCode	**MethodName**	**RL**
SampleTypeCode	**AnalyteName**	**QACode**
Replicate	**FractionName**	
CollectionDepth	**UnitName**	

Desired Columns:

ProtocolCode	**ExpectedValue**
AgencyCode	**PrepPreservationName**
LocationCode	**PrepPreservationDate**
CollectionDeviceName	**DigestExtractMethod**
ComplianceCode	**DigestExtractDate**
DilutionFactor	

Not Required Columns:

EventCode
SampleComments
GeometryShape
PositionWaterColumn
LabCollectionComments
SampleID
LabSampleID
LabResultComments

RESULTS TABLE STRUCTURE:

CHEMISTRY TEMPLATE HEADER	DATA TYPE	REQUIRED	SIZE	LOOKUP LIST	DEFINITION
StationCode*	Text	Yes	25	Station LookUp	Represents a unique sampling site in a sampling design. A single waterbody may have multiple stations. StationCodes and station information must be submitted to the CEDEN system via the Stations table before lab data can be submitted.
SampleDate*	Date/ Time	Yes			Refers to the date the sample was collected in the field. Formatted as dd/mmm/yyyy.
ProjectCode	Text	Yes	25	Project LookUp	References the project that is associated with the sample.
EventCode	Text	No	20	Event LookUp	Represents the primary reason, i.e. water quality, tissue or bioassessment sampling, of the sampling event at a particular station and date.
ProtocolCode	Text	Desired	50	Protocol LookUp	Represents the sampling protocol used, which includes the set of methods, methodology and/or specifications, such as MPSL-DFG_Field_v1.0. Established protocols may be used or Regions may document their own sampling protocols.
AgencyCode	Text	Desired	20	Agency LookUp	Refers to the organization or agency that collected the sample. This should be listed on the Chain of Custody (COC) document that accompanies the samples from the field.
SampleComments	Text	No	255		The comments field should be used for any notes or comments specifically related to the sample collection.
LocationCode	Text	Desired	50	Location LookUp	Describes the physical location in the waterbody where the sample was collected. One sampling event may have a single or multiple locations.
GeometryShape	Text	No	50		Physical shape of the location. Example values are Line, Point, or Polygon.
CollectionTime*	Date/ Time	Yes	20		Refers to the time when the first sample of a sampling event at a specific station was collected in the field.
CollectionMethod Code	Text	Yes	50		Refers to the general method of collection such as Sed_Grab, Sed_Core, Water_Grab, Autosampler24h, Autosampler7d.
SampleTypeCode*	Text	Yes	20	Sample Type LookUp	Refers to the type of sample collected or analyzed.

CHEMISTRY TEMPLATE HEADER	DATA TYPE	REQUIRED	SIZE	LOOKUP LIST	DEFINITION
Replicate*	Integer	Yes			Used to distinguish between replicates created at a single collection in the field. Default value is 1. Replicate samples are collected at the same station and date. Therefore, samples collected on different dates from the same station should both have a value of 1 for FieldReplicate.
CollectionDevice Name	Text	Desired	50		Unique name of the CollectionDevice.
CollectionDepth	Decimal	Yes			Records the level, from the surface in the water or sediment column, at which the sample was collected.
UnitCollection Depth	Text	Yes	50		Refers to the units used in the CollectionDepth including cm (centimeters) and m (meters).
PositionWaterColumn	Text	No	20		Position in water column where sample was taken.
LabCollection Comments	Text	No	255		Comments related to the LabCollection
LabBatch*	Text	Yes	35		The LabBatch is a unique code, provided by the laboratory, which represents a group of samples processed together. It groups all environmental samples with their supporting QC samples and will be used to verify completeness. A unique identifier for each batch, generated by the lab. This field is the primary key to ensure record uniqueness. To ensure uniqueness in the CEDEN system, the LabAgencyCode may be appended to this value when loaded to CEDEN. Please use a standard format to construct a composite Lab Batch. Format as LabBatch a dash – and the AgencyCode. Example: Batch1-SCCWRP.
AnalysisDate	Date/ Time	Yes			Date and time the sample was processed on the analytical instrument. Formatted as dd/mmm/yyyy hh:mm.
MatrixName*	Text	Yes	50	Matrix LookUp	Refers to the sample matrix, e.g. samplewater.
MethodName*	Text	Yes	50	Method LookUp	Refers to the analysis method used by the laboratory to analyze the sample.
AnalyteName*	Text	Yes	100	Analyte LookUp	Name of the analyte or parameter for which the analysis is conducted and result is reported. The LookUp list includes the acceptable abbreviation or name of the variable used by the database, enabling consistency across reporting.
FractionName*	Text	Yes	50	Fraction LookUp	Specific descriptor of the Analyte. For example, metals are often expressed as total or dissolved and therefore this description should be used within the fraction field.
UnitName*	Text	Yes	50	Unit LookUp	Refers to how the chemistry result is measured or expressed.

CHEMISTRY TEMPLATE HEADER	DATA TYPE	REQUIRED	SIZE	LOOKUP LIST	DEFINITION
LabReplicate*	Integer	Yes			Used to distinguish between replicates created in the laboratory. It differentiates the original field sample that was analyzed from all subsequent laboratory duplicates. Default is 1.
Result	Text	Yes	50		Final numeric result of a given analyte, stored as text to retain trailing zeros. The result should be reported with the appropriate number of significant figures.
ResQualCode	Text	Yes	10	ResQual LookUp	Qualifies the analytical result of the sample.
MDL	Decimal	Yes			The MDL (method detection limit) is the lowest possible calculated detection limit associated with a given method and analyte. The MDL should be reported on the lab summary sheet with the associated measured result. If an MDL is not listed on the lab summary sheet, then the default value should be '-88' with a QACode of 'NMDL'.
RL	Decimal	Yes			Minimum value below which data are documented as non-quantifiable. It is the reporting limit for the sample analyzed, as determined by the laboratory.
QACode*	Text	Yes	30	QA LookUp	Applied to the result to describe any special conditions, situations or outliers that occurred during or prior to the analysis to achieve the result. The default code, indicating no special conditions, is "None". If more than one code should be applied to a record, the convention is to list them in alphabetical order separated by commas and no spaces.
ComplianceCode	Text	Desired		Compliance LookUp	Unique code referencing the Compliance with the associated QAPP.
DilutionFactor	Integer	Desired			Factor by which a sample was diluted and is reported as a whole number. It is equal to the final volume divided by the initial volume of solution, or DF = Vf ÷ Vi. If no dilution was performed, the default value is "1".
ExpectedValue	Decimal	Desired			Concentration of the analyte in a reference standard, laboratory control sample or matrix spike sample or the value expected to obtain from analysis of the QC Sample. This consists of the native sample result concentration plus the spike amount. For surrogate samples, the expected value should be 100, representing 100%.
PrepPreservation Name	Text	Desired	50		References the preparation or preservation method performed on the samples prior to analysis.

CHEMISTRY TEMPLATE HEADER	DATA TYPE	REQUIRED	SIZE	LOOKUP LIST	DEFINITION
PrepPreservation Date	Date Time	Desired			Date and time the preparation or preservation was started.
DigestExtract Method	Text	Desired	50		References the digestion or extraction method performed on the sample prior to analysis.
DigestExtractDate	Date Time	Desired			Date and time the digestion or extraction was started.
SampleID	Text	No	40		Unique identifier supplied by the organization directing the sampling or sampling agency and is used to track the sample throughout the sampling and analysis processes. This field can be used to tie a result to the sample.
LabSampleID	Text	No	35	Agency LookUp	Recommended field intended to provide lab specific identification for an analyzed sample.
LabResult Comments	Text	No	130		Holds any comments related to the lab result or analysis of the sample.

* Primary Key, required for record uniqueness.

Appendix A: Specific Entry for Laboratory and Field Generated QA Samples

INTRODUCTION

Appendix A has been created to give additional guidance regarding business rules and formatting of quality assurance data generated in the laboratory or in the field. The following sections on Laboratory QA Samples and Field Generated QA Samples list example values that can be used to ensure comparability with other QA samples generated with different projects. The example values are listed for a subset of the Chemistry Template columns and are associated with descriptions and business rules to further guide the data generator in how to format quality assurance data. The examples only reference a subset of the columns in the Chemistry Template; the Chemistry Data Submission Guidance Document main body should be used as a reference for definitions and associated lookup lists for how to populate the additional columns not addressed in the examples.

1. LABORATORY QA SAMPLES

The sections below provide examples for entering the following types of data into the chemistry templates:

1.1. Samples that are generated or created by a laboratory (LABQA)
1.2. Environmental samples that are modified by a laboratory for QA purposes (e.g. matrix spikes)

1.1 LABORATORY GENERATED QA SAMPLES (LABQA)

All samples generated from within the laboratory, such as a LabBlank, Laboratory Control Spike (LCS), or Certified Reference Material (CRM), are entered into the chemistry template according to specific business rules. Table 1 is an example of the values that should be entered for laboratory generated QA (LABQA) samples within the chemistry template columns. Descriptions are included in Table 1 (Description & Business Rules) to further address formatting specifications, give additional details and note business rules. Specific business rules may vary by project and RDC; please check with your RDC to ensure appropriate business rules are being followed and/or any changes are appropriately documented.

Table 1. Example values to be used for laboratory generated QA samples (LABQA) for a subset of chemistry template columns.

Chemistry Template Header	Value	Description & Business Rules
StationCode	LABQA	LABQA is used as the station code for any sample generated in the laboratory including LabBlank, LCS and CRMs.
SampleDate		SampleDate of LABQA reflects the date that the sample was created within the laboratory. SampleDate must be equal to or before AnalysisDate and expressed as dd/mmm/yyyy.
ProjectCode	Not Applicable	LABQA samples are associated with a batch rather than a project and therefore 'Not Applicable' is used for ProjectCode.
EventCode	WQ	For water and sediment chemistry use 'WQ'. See the EventCode LookUp list for additional EventCodes and associated definitions. The EventCode should be consistent with the environmental samples in the same batch.

Chemistry Template Header	Value	Description & Business Rules
ProtocolCode	Not Applicable	LABQA samples are generated in the laboratory and therefore there is associated with the ProtocolCode 'Not Applicable'.
AgencyCode		Organization or agency that analyzed the sample. Select from Agency LookUp list.
LocationCode	Not Applicable	LABQA samples are generated in the laboratory and therefore are associated with a LocationCode of 'Not Applicable'.
GeometryShape		Leave blank
CollectionTime	00:00	LABQA are associated with 00:00 time for collection since they are generated in the laboratory. BR: There are situations within a batch when two identical sample types are used for QA reasons and the only way to differentiate between them is to give them each a different CollectionTime. For example, when more than one LabBlank, CRM, or LCS is digested, extracted, or analyzed in the same batch on the same day but are not replicates of each other, one CollectionTime should be 0:00 and the other 0:15, increasing the time by 15 minutes for each additional sample.
CollectionMethodCode	Not Applicable	LABQA samples are generated in the laboratory and therefore are not associated with a sample LocationCode.
SampleTypeCode	LabBlank, LCS or CRM	Select from SampleTypeLookUp List – LabBlank, LCS and CRM are listed as the most common LABQA sample types.
Replicate	1	
CollectionDeviceName		Leave blank; there is no CollectionDeviceName associated with LABQA and this field does not need to be populated.
CollectionDepth	-88	'-88' is used as a null value for LABQA samples. This field must be populated with a number and cannot be left blank.
UnitCollectionDepth	m	For water use 'm' for meter.
	cm	For sediment use 'cm' for centimeter.
PositionWaterColumn	Not Applicable	LABQA samples are generated in the laboratory and therefore there is associated with the PositionWaterColumn value of 'Not Applicable'.
Matrix	labwater	Labwater is used for LABQA samples created with laboratory tap water.
	blankwater	Blankwater is used for LABQA samples created with laboratory Type II water.
	blankmatrix	Blankmatrix is used for LABQA sediment samples created with a commercially generated product.
	sediment	Sediment is used for LABQA sediment samples created with naturally occurring sediment from a known 'clean' source.
LabReplicate	1	LabReplicate '1' is associated with the original LABQA sample.
	2	LabReplicate '2' is associated with a duplicate LABQA sample.

BR: Business Rule

1.2 LABORATORY MODIFIED QA SAMPLES

There are several types of samples discussed in this section that are generated or modified within the laboratory. The first is a matrix spike, which is a modified, or analyte-spiked, field sample. The second is a laboratory generated duplicate of a field sample. At times, laboratories use samples not generated through the data generator's project to satisfy project specific batch QA requirements. This third type is a non-project sample.

1.2.1 MATRIX SPIKE AND LABORATORY DUPLICATE SAMPLES

For matrix spike samples (collected by the project) and laboratory duplicate samples performed on project sample (native field sample), all fields describing the sample (StationCode, EventCode, ProtocolCode, LocationCode, SampleDate, CollectionTime, CollectionMethodCode, CollectionDepth, UnitCollectionDepth, ProjectCode, AgencyCode) remain the same as the native sample. For matrix spike samples, the only fields that are different than the native field sample are SampleTypeCode and potentially the Replicate. For laboratory generated duplicate samples, the only field that is different than the native field sample is the LabReplicate. Table 2 lists the column headers in the chemistry template that describe the sample and give example values and associated descriptions/business rules to aid the data generator in populating those fields for their own data.

Table 2. Example values to be used for matrix spike and laboratory duplicate samples created from project specific samples (native field sample).

Chemistry Template Header	Value	Description & Business Rules
StationCode		Same as native field sample
SampleDate		Same as native field sample
ProjectCode		Same as native field sample
EventCode		Same as native field sample
ProtocolCode		Same as native field sample
AgencyCode		Same as native field sample
LocationCode		Same as native field sample
GeometryShape		Same as native field sample
CollectionTime		Same as native field sample
CollectionMethodCode		Same as native field sample
SampleTypeCode		For laboratory generated duplicates this is the same the SampleTypeCode is the same as the native field sample.
	MS1	Matrix Spike performed on a Grab or Integrated sample
	MS2	Matrix Spike performed on a field duplicate sample (native field sample will have a SampleTypeCode of Grab or Integrated with a Replicate of 2).
	MSBLDup	Matrix Spike performed on a a field blind duplicate (FieldBLDup).

Chemistry Template Header	Value	Description & Business Rules
		BR: There are situations when a Matrix Spike was unintentionally performed on a blank sample such as a FieldBlank, TravelBlank, EquipBlank, DIBlank or FilterBlank. A batch may include two or more of these types of native samples where the only difference between them is the environmental sample's SampleTypeCode. The only way to differentiate between them is to give each a different CollectionTime. For example, when a batch contains both a DIBlank and an EquipBlank (both with an original time of 0:00) and a Matrix Spike was performed on the EquipBlank, one CollectionTime should be 0:00 and the other 0:15. Then the associated native sample CollectionTime should correspond to the MS1 sample times. For example, the EquipBlank would have a native sample time of 00:00 and an MS1 time of 00:00 and the DIBlank would have a native sample time of 00:15 (updated from 00:00).
Replicate	1	
CollectionDeviceName		Same as native field sample
CollectionDepth		Same as native field sample
UnitCollectionDepth		Same as native field sample
Matrix		Same as native field sample
LabReplicate	1	Native field sample or Matrix Spike
	2	Laboratory generated duplicate or Matrix Spike duplicate

BR = Business Rule

1.2.1.1 Matrix Spike Samples performed on Field Duplicates

Table 3 describes the way to format matrix spike samples performed on field duplicates (Replicate = 2), field blind duplicates (FieldBLDup), and composite blind duplicates (CompBLDup) in CEDEN as well as coding duplicate samples.

Table 3. Formatting field duplicates and matrix spikes.

	Descriptions	Chemistry Template Header		
		Sample Type Code	Replicate	Lab Replicate
1	**One environmental sample: sampled or split in triplicate**			
	Single environmental sample	Grab	1	1
	Field duplicate of single environmental sample	Grab	2	1
	Second field duplicate of single environmental sample	Grab	3	1
2	**One environmental sample: sampled or split in triplicate and submitted to the laboratory blind (unknown to the laboratory)**			
	Single environmental sample	Grab	1	1

		Chemistry Template Header		
	Descriptions	**Sample Type Code**	**Replicate**	**Lab Replicate**
	Field blind duplicate of single environmental sample	FieldBLDup or CompBLDup	1	1
	Second field blind duplicate of single environmental sample	FieldBLDup or CompBLDup	2	1
3	**One pair of MS/MSD: associated to one grab**			
	Single environmental sample	Grab	1	1
	Matrix spike of single environmental sample	MS1	1	1
	Matrix spike duplicate of single environmental sample	MS1	1	2
4	**One pair of MS/MSD: associated to one grab with field duplicate present**			
	Single environmental sample	Grab	1	1
	Field duplicate of single environmental sample	Grab	2	1
	Matrix spike of single environmental sample	MS1	1	1
	Matrix spike duplicate of single environmental sample	MS1	1	2
5	**One pair of MS/MSD: associated to one field duplicate**			
	Single environmental sample	Grab	1	1
	Field duplicate of single environmental sample	Grab	2	1
	Matrix spike of field duplicate sample	MS2	1	1
	Matrix spike duplicate of field duplicate sample	MS2	1	2
6	**One pair of MS/MSD: associated to one field blind duplicate**			
	Single environmental sample	Grab	1	1
	Field blind duplicate of single environmental sample	FieldBLDup or CompBLDup	1	1
	Matrix spike of field blind duplicate sample	MSBLDup	1	1
	Matrix spike duplicate of field blind duplicate sample	MSBLDup	1	2
7	**Two pairs of MS/MSD: one associated to the grab and one associated to the field duplicate**			
	Single environmental sample	Grab	1	1
	Field duplicate of single environmental sample	Grab	2	1
	Matrix spike of single environmental sample	MS1	1	1
	Matrix spike duplicate of single environmental sample	MS1	1	2
	Matrix spike of field duplicate sample	MS2	1	1
	Matrix spike duplicate of field duplicate sample	MS2	1	2

1.2.2 NON-PROJECT MATRIX SPIKE AND DUPLICATE SAMPLES (000NONPJ)

At times, laboratories use samples not generated through the project to satisfy batch QA requirements. These samples have different formatting rules, which are displayed in Table 4. In most cases, non-project samples have no sample collection information since they are used only to satisfy batch QA requirements. Please contact your RDC if the formatting rules in Table 4 are not applicable to non-project data for your data set.

Table 4. Example values to be used with non-project (000NONPJ) matrix spike and duplicates samples and associated business rules.

Chemistry Template Header	Value	Description & Business Rules
StationCode	000NONPJ	'000NONPJ' is the StationCode associated with an environmental sample that was collected by a different project but used for laboratory quality assurance purposes (i.e. duplicate or matrix spike).
SampleDate		SampleDate must be equal to or before AnalysisDate and expressed as dd/mmm/yyyy.
		BR: The SampleDate does not reflect the date the sample was actually collected but rather the date that the laboratory manipulated the sample for laboratory control purposes (i.e. created laboratory duplicate or spiked with a known amount of the analyte).
ProjectCode	Not Applicable	000NONPJ samples are not associated with the project for which the environmental samples in the batch are analyzed and therefore are associated with a ProjectCode of 'Not Applicable'.
EventCode	WQ	For water and sediment chemistry use 'WQ'. See the EventCode LookUp list for additional EventCodes and associated definitions. The EventCode should be consistent with the environmental samples in the same batch.
ProtocolCode	Not Applicable	000NONPJ samples are not associated with the project for which the environmental samples in the batch are analyzed and therefore are associated with a ProtocolCode of 'Not Applicable'.
AgencyCode	Not Recorded	000NONPJ samples are not associated with the project for which the environmental samples in the batch are analyzed and therefore are associated with an AgencyCode of 'Not Recorded'.
LocationCode	Not Recorded	000NONPJ samples are not associated with the project for which the environmental samples in the batch are analyzed and therefore are associated with an AgencyCode of 'Not Recorded'.
Geometry Shape		Leave blank.
CollectionTime	0:00	000NONPJ samples are associated with 00:00 time for collection since they are being used for laboratory quality assurance purposes.
		BR: There are situations within a batch when two identical sample types are used for QA reasons and the only way to differentiate between them is to give them each a different CollectionTime. For example, when more than one LabBlank, CRM, or LCS is digested, extracted, or analyzed in the same batch on the same day but are not replicates of each other, one CollectionTime should be 0:00 and the other 0:15, increasing the time by 15 minutes for each additional sample.

Chemistry Template Header	Value	Description & Business Rules
CollectionMethodCode	Not Recorded	000NONPJ samples are not associated with the project for which the environmental samples in the batch are analyzed and therefore are associated with a CollectionMethodCode of 'Not Recorded'.
SampleTypeCode	Not Recorded	'Not Recorded' is used for laboratory duplicates created with 000NONPJ samples.
	MS1	'MS1' is used for laboratory matrix spikes created with 000NONPJ samples. See Table 3: Formatting field duplicated and matrix spikes for additional business rules regarding matrix spikes.
Replicate	1	
CollectionDeviceName		Leave blank. There is no CollectionDeviceName associated with 000NONPJ samples and this field does not need to be populated.
CollectionDepth	-88	'-88' is used as a null value for 000NONPJ samples. This field must be populated with a number and cannot be left blank.
UnitCollectionDepth	m cm	For water use 'm' for meter. For sediment use 'cm' for centimeter.
PositionWaterColumn	Not Applicable	000NONPJ samples are not associated with the project for which the environmental samples in the batch are analyzed and therefore are associated with a PositionWaterColumn of 'Not Applicable'.
Matrix	samplewater sediment	000NONPJ water samples are associated with the Matrix 'samplewater'. 000NONPJ sediment samples are associated with the Matrix 'sediment'.
QACode	QAX None	QAX is associated with 000NONPJ samples when the native sample is not included in the batch reported; If the batch includes the native 000NONPJ sample result as well as the laboratory quality assurance 000NONPJ sample, 'None' or appropriate QACode to indicate recoveries outside criteria or other QA issues (see QACode Lookup list).
Preparation Preservation		Actual preparation or preservation performed. This should be the same as the other samples in the batch.
Preparation Preservation Date		Actual preparation or preservation date and time expressed as dd/mmm/yyyy hh:mm
LabReplicate	1 2	Original 000NONPJ samples and original 000NONPJ matrix spike samples are associated with a LabReplicate of '1'. Matrix spike duplicates and laboratory duplicates are associated with a LabReplicate of '2'.
SampleID		The *LabSampleID* or *Source ID* can be used here as the *SampleID* as an indicator to identify the native sample. This column may be left blank.
LabSampleID		Recommended - provide lab specific identification for an analyzed sample. It is preferable to add -Dup, -MS, -MSD to the end of the Lab ID to help confirm the SampleTypeCode and the LabSampleID of the native sample. The can be left blank.

BR = Business Rule

2. FIELD GENERATED QA SAMPLES

There are two types of blank samples discussed in this section that are generated as field quality assurance samples. The first is when a field generated QA sample is created at a specific station and that station information is important to record. For example, some projects may allow a certain amount to be detected in the blank provided it is less than five times the native (environmental) sample. For those situations it would be important to have similar sample information between the blank and the native sample to evaluate quality assurance criteria. The second example is when a field generated QA sample is created for a sampling trip or if the station information is not recorded.

Field duplicate samples should be associated with a station and that information should be the same as the native sample such that the sample collection information is identical between the field duplicate and native sample except that the field duplicate is associated with a Replicate of '2'. Therefore, the following section is specific to field generated blanks.

2.1 FIELD GENERATED BLANK SAMPLES – STATION SPECIFIC

For analyses that require an EquipBlank, TravelBlank, FieldBlank, or FilterBlank to accompany a sampling event and where it is important to record the station information, the data are entered into CEDEN in the same manner as the native samples collected at that station. Table 5 lists the chemistry template column headers and associated descriptions and business rules for guidance.

Table 5. Example values to be used for field generated blank samples associated with station specific details.

Chemistry Template Header	Value	Description & Business Rules
StationCode		Same as native sample
		BR: For EquipBlanks, TravelBlanks or FilterBlanks that may be created at a laboratory or agency prior to sampling, a StationCode may still be applied to the sample if it serves the purpose of the project to associate all field and laboratory QA samples together (i.e. via the same sample entry information).
SampleDate		Same as native sample
ProjectCode		Same as native sample
EventCode	WQ	Same as native sample. For water and sediment chemistry use 'WQ'.
ProtocolCode		Same as native sample.
AgencyCode		Same as native sample.
LocationCode		Same as native sample.
GeometryShape		Same as native sample.
CollectionTime		Time sample was created (same as native sample time) or 00:00
		There are situations within a batch when two identical sample types are used for QA reasons and the only way to differentiate between them is to give them each a different *CollectionTime*. For example, when more than one EquipBlank, FieldBlank, or FilterBlank is created on the same day but are not replicates of each other, one *CollectionTime* should be 00:00 and the other 00:15, increasing the time by 15 minutes for each additional sample.
CollectionMethodCode	Not Applicable	Field generated blanks are associated with the CollectionMethodCode of 'Not Applicable'.
SampleTypeCode	EquipBlank, TravelBlank, FieldBlank or FilterBlank	See the SampleTypeCode lookup list for definitions of the various field generated QA SampleTypeCodes.
Replicate	1	Field generated blanks should have a replicate of '1'.
CollectionDeviceName	Not Applicable	Field generated blanks are associated with the CollectionDeviceName of 'Not Applicable'.
CollectionDepth	-88	Field generated blanks are not generated using environmental water and therefore are associated with a null value (-88) for CollectionDepth.
UnitCollectionDepth	m	For water use 'm' for meter.
LabCollection Comments		It is recommended that when an equipment blank (EquipBlank) is generated, a comment is recorded that lists the type of equipment cleaned and location (lab or field). A value is not required for this field and can be left blank.
Matrix	Labwater or blankwater	See MatrixLookup for definitions.
LabSampleID		Recommended - provide lab specific identification for an analyzed sample.

BR = Business Rule

2.2 FIELD GENERATED BLANK SAMPLES (FIELDQA) – NON STATION SPECIFIC

For analyses that require an EquipBlank, FieldBlank, FilterBlank, TravelBlank or DIBlank to accompany a sampling event and it is not important to record the station information, the data are not associated with specific sample collection information. Table 6 lists example values that are to be used for generic blank samples generated in the field and associated description and business rules that can be used for guidance for data entry.

Table 6. Example of values to be used for field generated blank samples that are not associated with station specific details (FIELDQA).

Chemistry Template Header	Value	Description & Business Rules
StationCode	FIELDQA	Field generated blanks not associated with a specific station are associated with the StationCode 'FIELDQA'.
SampleDate		Date that the sample was created. BR: TravelBlank should be entered as the date the TravelBlank becomes part of the sample group (i.e., leaves the lab for the sampling event).
ProjectCode		Project associated with the sample.
EventCode	WQ	Same as native sample. For water and sediment chemistry use 'WQ'.
ProtocolCode		Protocol used or 'Not Recorded'.
AgencyCode		Organization or agency that created the sample.
LocationCode	Not Applicable	Since the FIELDQA blank sample is not associated with a specific station, the LocationCode is 'Not Applicable'.
GeometryShape	Not Applicable	Since the FIELDQA blank sample is not associated with a specific station, the GeometryShape is 'Not Applicable'.
CollectionTime		Time sample was created or 00:00 There are situations within a batch when two identical sample types are used for QA reasons and the only way to differentiate between them is to give them each a different *CollectionTime*. For example, when more than one EquipBlank, FieldBlank, or FilterBlank is created on the same day but are not replicates of each other, one *CollectionTime* should be 00:00 and the other 00:15, increasing the time by 15 minutes for each additional sample.
CollectionMethodCode	Not Applicable	Field generated blanks including FIELDQA are associated with the CollectionMethodCode of 'Not Applicable'.
SampleTypeCode	EquipBlank, TravelBlank, FieldBlank, FilterBlank or DIBlank	See the SampleTypeCode lookup list for definitions of the various field generated QA SampleTypeCodes.
Replicate	1	Field generated blanks including FIELDQA should have a replicate of '1'.

Chemistry Template Header	Value	Description & Business Rules
CollectionDeviceName	Not Applicable	Field generated blanks including FIELDQA are associated with the CollectionDeviceName of 'Not Applicable'.
CollectionDepth	-88	Field generated blanks including FIELDQA are not generated using environmental water and therefore are associated with a null value (-88) for CollectionDepth.
UnitCollectionDepth	m	For water use 'm' for meter.
LabCollection Comments		It is recommended that when an equipment blank (EquipBlank) is generated, a comment is recorded that lists the type of equipment cleaned and location (lab or field). A value is not required for this field and can be left blank.
Matrix	Labwater or blankwater	See MatrixLookup for definitions.
LabSampleID		Recommended - provide lab specific identification for an analyzed sample.

BR = Business Rule