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Data Transfer Standard

Enviro Data Version 8D
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Purpose

The purpose of this document is to provide a description of the standard format for laboratories and other data providers to use when creating electronic data deliverables (EDDs) for submitting data to be included in Enviro Data. This format is intended to be flexible enough to accommodate the majority of the analytical and other technical evaluation and monitoring data for projects. At times there may be data that will not fit into this standard. In that case, the organization supplying that data should contact their project manager to discuss how data transfer can be accommodated. The outline for this dialogue is contained in a section below entitled Non-Conforming Data.

A primary design goal of this standard format is that files in this format can be created relatively easily using software tools available to those creating the files. If a data provider anticipates additional costs for providing data in the format presented here, they must provide estimates of these additional costs to their project manager prior to finalization of contract terms, so that this information can be used in the vendor selection process. Additional information on importing data into Enviro Data can be found at https://geotech.com/resources/faq/faq-using-enviro-data/faq-importing.

Database Background Information

Data of concern for this standard includes **Sites** (facilities or projects), **Stations** (observation points), **Samples** (individual observation events), and **Analyses** (specific individual values from an event). The data being transmitted in the format of this standard will generally be placed in two tables in Enviro Data. These tables are **Samples** and **Analyses.** Data from DTS files can optionally be placed in **Sites, Stations** and **Parameters** as well. Some of the data elements to be imported into these tables must have values that match those in other tables, called lookup tables, coded values, or valid value lists. Information on how to match these values is included below, and typical coded entries are listed in Appendix A. Note that for the lookup data, in some cases it is

the value that is reported and in others the code, based on common industry practice. In general, Enviro Data can handle either of those fields. Also note that any lookup values shown in this document are examples only, and client data may vary significantly from these examples. Finally, Enviro Data can fill in missing data using defaults, although this feature must be used with great care.

Laboratories wanting to ensure that the values delivered in the EDD match those in their client's database should obtain the Laboratory Data Checker software from Geotech Computer Systems and compare EDDs against client data prior to issuing the data using the Closed Loop Reference File system.

This document contains the description of the latest and most comprehensive DTS version, Version 8D, because it is the eighth major revision to the software since its introduction in 1998. Data for this version is delivered in an Excel spreadsheet, as described below. Older DTS versions 2012, 2010, 2008, 1.6, 1.4, and 1.2a, and the very basic Simplified Import, are still supported, and contain progressively smaller subsets of the data in Version 8. Clients and data providers should agree on the version and format that best fits data availability and project needs. It is usually best to use the most comprehensive format available that supports Enviro Data's advanced features such as validation assistance, and to be prepared for unanticipated future needs. For laboratories familiar with previous versions of the DTS, the changes made between Versions 1.4, 1.6, 2008, 2010, 2012, 8, and 8D are summarized in Appendix B. These changes involve the inclusion of additional data fields with each new version.

Data Content

This section covers the content of the data being transmitted. The following section covers the format of that data. In this document the content is organized by the target table in the database and by the order of the fields in the file. In the following descriptions, fields are described as "Optional" or "Required". These denote program requirements, usually resulting from relationships with lookup tables. Clients should instruct the laboratories which, if any, of the program "Optional" fields are required for a given project. For fields that are required, but the data is not known to the laboratory, a default value such as "Unknown" or "z" (a code often used for "Unknown") should be used. Which one to use depends on whether the field contains a value or code, as described for each field.

General comments on data content

General note to data providers: This standard defines the structure of the electronic deliverable file and provides guidance on the content. However, the actual content of the lookup tables (also called valid value lists) will vary from client to client. This may be different from other less flexible software that requires compliance with arbitrary lists. Therefore, the lists provided here are for guidance only. Data providers will need to work with their clients to standardize the deliverables to match their list.

Duplicate and *Superseded* : This standard supports imports into the database of duplicate samples and reanalyzed analytical data. Note that these are two different things. The *Duplicate* field is used when more than one physical sample is taken in the field from the

same station on the same date for the same matrix, etc. The preferred sample and analysis should be indicated by entering a "0" (Zero) in the corresponding *Duplicate* and *Superseded* fields respectively or leave them blank and Enviro Data can fill them in based on various criteria selected by the user. Note that the field for duplicates is called *Duplicate* in the lab file, and *DuplicateSample* in the **Samples** table, and different versions of the Data Transfer Standard have used both terms. If the data provider is filling in the *Duplicate* and *Superseded* fields, the following procedure should be used. If more than one duplicate sample is being reported, increment the *Duplicate* field, i.e., 0, 1, 2, etc. and enter the appropriate *QCSampleCode* (See Appendix A). If more than one analysis is being reported for each analyte, increment the *Superseded* field, i.e., 0, 1, 2, etc. and enter the appropriate code in the *ValueCode* field to designate reanalyzed, dilution, reextracted, etc. For a more in depth discussion on this see the FAQ "How are Duplicates and Supersedes handled in Enviro Data?" under Using Enviro Data / General Questions on our website, https:\\geotech.com /resources/faq.

Analytical Flag (AKA Data Qualifiers): Starting with version 2008, *FlagCode*, *ProblemCode*, and *ValidationCode* can be made up of four codes with up to four characters each separated by either a space or comma, such as "J1 J2". Older versions allowed up to four single character flags. Also note that for an entry like "B1 B2 B3" requires an entry in the **AnalyticFlags** lookup table for each of these qualifiers. For a more in depth discussion on this see the FAQ "How does Enviro Data use Analytical Flag Codes?" under Using Enviro Data / General Questions on our website, https:\\geotech.com /resources/faq.

Moisture content should be reported as a separate analytical record, with the units in %. They should be entered on a "by weight" basis, based on total weight.

All dates should include four-character years. Dates can also contain times, for example, 1/17/2010 1:27 PM, if they are available for the data being reported.

In the descriptions below, fields that are required are in ***Bold Italic*** text, *i.e.,* ***SampleTypeCode***. Table names are shown in **Bold** text, *i.e.*, **Stations** table.

For the most part, records in the EDD will contain both sample and analysis information. However, there will be cases where only sample level data will be available. If a sample was attempted unsuccessfully, the sample fields should be filled in, however all fields associated with analyses, including parameter name, CASNumber and AltParamNumber, should be left blank. The system will then import the sample information, but not create any analyses records. See the *SampleResult* field below for more information.

Sites and Stations

SiteName - The name of the site (project, facility, etc.) from which the samples were taken. This field must match a site in the Enviro Data database. Required.

StationName - The name of the well, boring, etc. from which the sample was taken. The entry must match a station name in the client's Enviro Data database for the site name provided. Required.

Samples

A sample is a unique sampling or observation event for a station. Each station can be sampled at various depths (such as with a soil boring), at various dates (such as with a monitoring well), or, less commonly, both.

SampleDate_D - The date on which the sample was taken. Required.

SampleTypeCode - This is a code for the type of sample. Entries are compared to the **SampleTypes** look-up table in the database. If this information is unavailable to the lab, "z" or "Unknown" should be reported. Required.

SampleMatrix - The material that the sample is primarily composed of. Provide the full sample matrix name, such as "Water". Entries are compared to the **SampleMatrix** look-up table in the database. Data provider and consumer should coordinate on terminology, such as whether a sample is "Water" or "Groundwater." Distinctions like this are important for the data user, for example in comparing to regulatory limits. Required.

SampleTop and ***SampleBottom*** - Sample depths or elevations, as instructed by the client. The fields should contain only numeric values. If these fields are not applicable (*e.g.,* surface water samples) or are unknown to the data provider, then they should be populated with zeros, for compatibility with ODBC databases such as SQL Server and Oracle. Required.

DepthUnits - Units for sample top and sample bottom. This field is linked to the *ReportingUnits* lookup table. If this information is unavailable to the lab, "Unknown" should be reported. Required.

Duplicate - This field was discussed above. It should be a zero unless this is a duplicate sample or, it can be left blank. If the data provider fills in this field, then each analysis must have an entry for this field, with multiple QC samples entered as *Duplicate* values incremented from zero. For example, an original sample would be 0, a duplicate 1, a matrix spike 2, and a matrix spike duplicate 3, and so on. Over time different Data Transfer Standard versions have called it *Duplicate* or *DuplicateSample.* It is now called *Duplicate.* If blank, the import process will fill it in. Optional.

FieldSampleID - The client-assigned field ID number for each sample. If this information is not available, enter "Unknown" or "None". Required.

AltSampleID - Another sample identification number if needed. Optional.

CoolerID - Number to identify cooler in which primary samples and QC samples were shipped. Optional.

Sampler - Name or initials of the person taking the sample. Optional.

Description - Description of the sample, such as its condition. Optional.

SampleMethodCode - Coded value for the method used to collect the sample. Entries are compared to the **SamplingMethod** look-up table. The code or the value can be used. Required.

LogCode - Abbreviated value identifying the company collecting samples or performing field tests. Optional.

COCNumber - Chain-of-Custody tracking number. Optional.

DeliveryGroup - Sample delivery group. This field is provided for use as a lab tracking field. It is used to define results for a group of samples reported together. Optional.

AmbientBlankLot - Ambient blank field lot identifier. Optional.

EquipmentBlankLot - Equipment blank field lot identifier. Optional.

TripBlankLot - Trip blank field lot identifier. Optional.

FilteredSample - Filter information at the sample level. Was the sample filtered, and if so, what size filter was used? It could also be used to identify whether the filtering occurred in the field or the lab, although the usual practice is for *FilteredSample* to be used for field filtering and a different field, *FilteredAnalysis*, to be used for lab filtering. Entries are compared to the **Filtered** look-up table in the database. The lab can supply either the code or the Filter description, whichever is most consistent with their system (i.e., TOT vs. total), but must coordinate this with the client. Required.

QCSequenceID - QC sequence identifier. This field is another lab tracking field, used to relate field samples to lab samples. Optional.

QCSampleCode - Code to identify QC samples. It is tied to the **QCCodes** table, which contains codes for both the sample and analysis levels. The lab should supply the code if available, e.g., DUP for duplicate sample, or O for original sample. If this information is not available to the lab, enter "z" for Unknown. The code or the value can be used. Required.

TaskNumber - The administrative task number under which sampling is done. Optional.

PrimarySample - Stores the Field Sample ID of the primary sample to which the QC sample is tied. This field is blank for original samples and may be blank for field QC samples that have been submitted blind to the lab, in which case this number can be entered during import by a data administrator. The import routine converts this to the sample number of the primary sample before storing it in the database. Optional.

SampleResult - The result of the sampling process, such as "Successful", "Dry", or "No access". Its primary use is to indicate that obtaining a sample was attempted unsuccessfully. If not available from the lab, this field can be entered during import by a data administrator. Optional.

Container - Sample container number(s). Optional.

NumContainers - Number of sample containers. Optional.

CoolerTemp - Temperature of cooler upon receipt. Optional.

FieldEquip - Description of equipment used for field sampling. Optional.

GeologicUnitCode - Geologic or hydrologic unit code of the sample. Related to the **GeologicUnits** table. The code or the value can be used. Required.

LithologyCode - Lithology or soil type code of the sample. Related to the **Lithology** table. The code or the value can be used. Required.

Odor - Odor of sample upon receipt. Optional.

Preservation - Sample preservation done in field. Optional.

PumpFault - Was there a pump fault (y/n)? Optional.

Purged - Was the well purged (y/n)? Optional.

QAPlanNumber - QA Plan under which sampling was done. Optional.

SampConcentration - Sample concentration (low, medium, or high). Optional.

SampleCollProc - Sample collection procedure ID

SampleEventName - Text name for the sample event. May optionally tie to the Enviro Data Field Tool feature.

SampleEventID - Numeric tie to **SampleEvents** lookup table. Optional.

SamplePurposeCode - Tie to **SamplePurpose** lookup table. The code or the value can be used. Required.

SampleSource - Source of sample (Field or Lab). Optional.

Witness - Name of person witnessing sampling. Optional.

TaxonSerial - Identifies the taxonomy of an organism. Optional tie to **Taxonomy** lookup table. Note: The taxonomy information can apply at both the **Samples** and **Analyses** levels. Optional.

GenderCode - Identifies the gender of an organism. Optional tie to **Gender** lookup table. Optional.

LifeStageCode - Identifies the life stage of an organism. Optional tie to **LifeStage** lookup table. Note: The life stage information can apply at both the Samples and Analyses levels. Optional.

TissueTypeCode - Identifies the tissue type of a tissue sample. Optional tie to **TissueType** lookup table. Optional.

RPD – Relative Percent Difference. Optional

SampleEndDate_D - Date/time that sample period ended. Optional.

SampleStatusCode - Foreign key to SampleStatus table. Optional.

StationReach - Distance along linear feature. Optional.

Sample_CX - X (easting) coordinate. Optional.

Sample_CY - Y (northing) coordinate. Optional.

Sample_CZ - Z (depth or elevation) coordinate. Optional.

Analyses

An Analysis, as used in this document and in the Enviro Data system, is the observed value of a parameter related to a sample. This term is intended to be interpreted broadly, and not to be limited to chemical analyses. For example, field parameters such as “pH”, “temperature”, and “turbidity” are also considered analyses, as would operating parameters such as “pump strokes per minute”.

ParameterName, *CASNumber, AltParamNumber* - Various combinations of these fields are used to identify the name of the parameter (constituent) analyzed for. *ParameterName* should always be provided. The system compares *ParameterName* to the entries in the **Parameters** and **ParameterAlias** lookup tables. *CASNumber* and *AltParamNumber* are not required, but if possible, should be provided to help ensure the correct parameter name assignment. If *ParameterName* does not match a lookup entry, the system compares either the *CASNumber*, or the *AltParamNumber*, to **Parameter** table entries. Care should be taken that consistent numbers are provided. If *ParameterName* is left blank, but a *CASNumber* or *AltParamNumber* is provided, the system assigns a parameter name from the lookup tables based on a number match. Using only numbers to designate the parameter is not recommended. Required.

STORETCode - Five digit code for the EPA STORET identification number by parameter and matrix. Optional.

Superseded - This field is discussed above. If the data provider fills this in, it should be a zero unless the analysis is superseded by a later value in the same file, in which case the entry should be 1 or higher. This field is used in conjunction with the *ValueCode* field, discussed later in this section. Optional in the lab file, required in Enviro Data.

AnalyticMethod - Method used to perform the analysis. Required.

Value - Measured result of the analysis generally reported in a numerical value. For non-detects, this could be the actual measured result, or one of the detection limits. Parameters such as color or odor that have text values would be the exception, and the CategoricalResult column can be used to store this type of information. In Enviro Data, Value is a number but can, and often should, be text in the DTS file to handle trailing zeros and other issues. Can be up to 50 characters.

ReportingUnits - Units of the analysis. Entries must match a code or name entry in the **ReportingUnits** lookup table in the database. Other related numeric fields, such as detection limits (*Detect*, *Detect2, Detect3, Detect4,* and *Detect5*), *SpikeAmount* and *Error* must be reported in the same units as the value. Required.

FlagCode - One to four coded entries for the analytical flag describing the analysis. Each part of the field must match an entry in the **AnalyticFlags** lookup table in the database. More than one flag can be entered. If the analysis is considered a usable value, and would not otherwise have a qualifier, this field should contain the code for Detected Value (usually a "v"). If the flag is unknown, the field should contain a "z". This has already been discussed in depth earlier. Required.

ProblemCode - Analytic problems are often described in the narrative, and not included in the electronic format. If the data for this field is not provided, the field should contain a "z" for unknown. If the data provider chooses to supply problems in the electronic file, then the codes must match entries in the **AnalyticProblems** table. As with the *FlagCode* field, the entry can consist of from one to four approved codes of up to four characters each. Required.

ValidationCode - One to four flags associated with validation of analyses. The data validation organization usually provides this field, which can contain from one to four of these codes, of up to four characters each. Others should place a "z" for Unknown in this

field. If the data provider chooses to supply validation flags in the electronic file, then the codes must match entries in the **ValidationFlags** table. This has already been discussed in depth earlier. Required.

DetectedResult - Supplied by the lab, this field should contain either "y" for yes, the analyte was detected, "n" for no, the analyte was not detected or, "p" for pending validation. This field overlaps slightly with *FlagCode*. The purpose of this field is to separate the non-detect flag from other lab qualifiers, such as "j" or "b", for statistical, evaluation and validation purposes. If it is left blank in the EDD, a "y" will be used unless the FlagCode indicates it was not detected in which case an "n" is added. Optional.

Detect - First (primary) detection limit for the analysis. Detection limits must be reported in the same units as the value. This field should generally contain the value to be displayed when an analyte is not detected, such as "<0.01," although the user can select to use a different one. Optional.

LimitType - Type of limit contained in the Detect field, such as "MDL", "PQL", "RL", etc. Optional.

Detect2 - A second detection limit. Standards should be set for which type of limit should be entered in each field for a given site, for example: IDL or MDL in the first column, CRDL or PQL in the second. Optional.

LimitType2 - Limit type for second detection limit. Optional.

Detect3 - A third detection limit. Optional.

LimitType3 - Limit type for third detection limit. Optional.

Detect4 - A fourth detection limit. Optional.

LimitType4 - Limit type for fourth detection limit. Optional.

Detect5 - A fifth detection limit. Optional.

LimitType5 - Limit type for fifth detection limit. Optional.

SpikeAmount - Spike amount added to the sample. Should be reported in the same units as the Value. Used only for spiked analyses. Optional.

RetentionTime - Retention time for this analysis. Optional.

Error - Standard error for radioactivity or other measurements. Should be reported in the same units as the Value. Optional.

DilutionFactor - Amount that the sample was diluted prior to analysis. The number one means not diluted. Optional.

Basis - Analyzed wet or dry. Should be "w" for wet or "d" for dry. Can also report "n" for not applicable, or "z" for unknown. Required.

FilteredAnalysis - Filter or measure basis information at the analysis level. Entries are compared to the **Filtered** look-up table in the database. As with the *FilteredSample* field, the lab can supply either the code or the description for this field. Required.

LeachMethod - Method used to leach sample. Entries are compared to the **LeachMethod** lookup table to maintain consistency. The provider should supply the full name of the

method, e.g.: TCLP. If the analysis was not leached, "None" should be reported. Required.

LeachateBatch - Leachate lot. Optional.

LeachDate_D - Date sample was leached. Optional.

PrepMethod - Method used to prepare sample separate from leaching. Optional.

PreparationLot - The batch designator of a group of environmental samples and associated QC samples prepared together. Optional.

ReportableResult - Flag for whether the result is to be used in reports. Report "Y" for yes, or "N" for no. This may be supplied by data providers, or selected by project staff, for multiple analyses from a selected sample, such as analyses at multiple dilutions. Optional.

AnalDate_D - Date (and optionally time) when the analysis was performed. Note that the more dates provided the better, for use in things like calculating holding times. Optional.

ExtractDate_D - Date (and optionally time) when the material was extracted for analysis. Optional.

LabReportDate_D - Date (and optionally time) when the lab reported the analysis. Optional.

LabRecvDate_D - Date (and optionally time) when the lab received the sample. Optional.

Lab - Name of the laboratory or other data provider performing the analysis. Optional.

LabComments - Lab comments about this analysis. Optional.

AnalysisLabID - Lab identification number at the analysis level. *LabSampleID* tracks lab analyses at the sample level. This field is for identification numbers at the analysis level. Optional.

AnalyticalBatch - Lab batch identification number. Optional.

ValueCode - Parameter value classification. This field identifies the analytical trail and supplies the reason for a superseded analysis. It is a coded entry enforced by the **ValueCode** lookup table. The lab should report the code, such as "RE" for re-extracted, "DL" for dilution, etc., or "O" for original analysis, or the full terms can be used. Required.

RunCode - Confirmation run identification for gas chromatograph analyses. This is a coded entry enforced by the **RunCode** lookup table. The lab should supply the code, such as "PR" for primary run, "n" for not applicable, or "z" for Unknown, or the full terms can be used. Required.

QCAnalysisCode - QC code at the analysis level. It is tied to the **QCCodes** table, which contains codes for both the sample and analysis levels. The lab should supply the code for this field, such as "TIC" for tentatively identified compound, or "O" for original analysis, or the full terms can be used. Required.

AnalysisGroup - Group of methods for this analysis. Optional.

AnalysisLocationCode - Location (Field or Lab) where analysis was performed. Key to **AnalLocationCodes** table. Required.

BatchTypeCode - Type of batch (Prep, analysis, leach). Key to **BatchTypes** table. Required.

Cleanup - Cleanup method performed by lab. Optional.

DetectorMode - Detector mode. Optional.

DetectorType - Detector type. Optional.

ExpectedValue - Expected value for standard. Optional.

Extracted - Is this an extracted sample (y/n)? Optional

HandlingBatch - Batch identifier for lab handling (extraction, etc.). Optional

HandlingType - Handling of sample prior to analysis. Optional.

InstrumentCalibBy - Instrument calibrated by (name). Optional.

InstrumentCalibDate_D - Date instrument was calibrated. Optional.

InstrumentManufacturer - Manufacturer of the instrument. Optional.

InstrumentModel - Model of instrument. Optional.

InstrumentNum - Serial number of instrument. Optional.

LabMatrixCode - Matrix during lab analysis. Key to **SampleMatrix** table. Required.

LabPrepDate_D - Date sample was prepped at lab. Optional.

LabReportNum - Lab report number. Optional.

LabSampleID - The sample identification number used internally by the laboratory. If this information is not available, enter "Unknown" or "None". Required.

MethodBatch - Batch identifier for analyses by one method. Optional.

NumberDecimals - Number of decimals to be displayed at report time. Optional.

PercentRecovery - Percent recovery for spike or tracer yield. Optional.

PrepBatch - Batch identifier for lab prep. Optional.

PreserveIntact - Was the preservation intact on arrival at lab? Optional.

RunBatch - Batch for run with same initial calibration. Optional.

StatTypeCode - Statistical analysis used (Min., Max., Mean). Key to **StatisticalTypes** table. Required.

StdRefMaterial - Standard reference material for analysis. Optional.

SubcontractLab - Subcontracted lab. Optional.

ValidationComments - Reason for selecting validation code. Optional.

Validator - Person or company name providing validation. Optional.

ValueTypeCode - Type of value (actual, estimated, calculated, etc.). Key to **ValueTypes** table. Required.

WeightVolume - The weight or volume of the sample or analysis aliquot in agreed-upon units, such as liters or kilograms. Optional.

WeightVolUnits - Key to **ReportingUnits** table for the units of weight or volume of sample analyzed. Required.

UpperControlLimit - Upper control limit for validation. Optional.

LowerControlLimit - Lower control limit for validation. Optional.

RejectionControlLimit - Rejection limit for validation. Optional.

RPDLimit - Relative percentage difference limit for validation. Optional.

APDLimit - Absolute percentage difference limit for validation. Optional.

CatResult - Categorical (non-numeric) result. Optional foreign key to **Categorical ResultTypes** table.

AnalysesTaxonSerial - Identifies the taxonomy of organisms identified in a bulk sample such as for population census data. Optional tie to **Taxonomy** lookup table. Note: The taxonomy information can apply at both the Samples and Analyses level. Optional.

AnalysesLifeStageCode - Identifies the life stage of organisms identified in a bulk sample such as for population census data. Optional tie to **LifeStage** lookup table. Note: The life stage information can apply at both the Samples and Analyses level. Optional.

BlankFlagCode - Code to identify results from blanks. There is a matching lookup, **BlankFlags**, but the relationship is not enforced. Optional.

FinalValue - Final value. Optional.

FinalQualifier - Final qualifier. Optional.

RPD – Relative Percent Difference. Optional.

SampleEndData_D – Ending date that sample was taken. Optional.

SampleStatusCode – Status of the sample. Optional.

Sample_CX – Sample X (Easting) coordinate. Optional.

Sample_CY – Sample Y (Northing) coordinate. Optional.

Sample_CZ – Sample Z (Depth) coordinate. Optional.

StationReach - Distance along linear feature. Optional

PercentMoisture – Imported as an analysis. Optional.

ValReason1 - Reason for validation qualifier. Optional.

ValReason2 - Reason for validation qualifier. Optional.*2*

ValReason3 - Reason for validation qualifier. Optional.

ValReason4 - Reason for validation qualifier. Optional.

Acceptable File Format

The Enviro Data spreadsheet format for this standard is Microsoft Excel (.xls or .xlsx). Other brands of spreadsheet programs can save their files in Excel format. The spreadsheet file should contain all the data on the first and only sheet. The first row of the file must contain the field names as listed in the table below and be spelled exactly the same as shown in this document. Each following row should represent one observation (such as the value of a chemical analysis) and each column a data item for that observation. The spreadsheet file must contain the columns listed below and the fields marked as required (bold text) must be populated. Geotech provides a spreadsheet with the software that can be used as a template, as well as an example file containing some data.

Content

The DTS8D Excel files must have the following columns present in the order shown, and the fields marked as required (bold text) must be populated. The file must have the field names in the first row, then results in the subsequent lines.

Field Name	Data Type	Field Size	Description	Table [9]
SiteName[1]	Text	50	Site Name	Sites
StationName	Text	50	Station identifier or name	Stations
SampleDate_D	Date/Time		Date sample was taken	Samples
SampleTypeCode	Text	5	Type of sample	Samples
SampleMatrix	Text	15	Sample matrix	Samples
SampleTop[2]	Number(Sg) [3]		Sample top	Samples
SampleBottom	Number(Sg)		Sample Bottom	Samples
DepthUnits	Text	15	Units for sample top and sample bottom	Samples
Duplicate	Number(Int) [4]		Duplicate samples[7]	Samples
FieldSampleID	Text	40	Client assigned field sample ID	Samples
AltSampleID	Text	40	Alternate sample identification	Samples
CoolerID	Text	40	Cooler ID number - for QA/QC	Samples
Sampler	Text	50	Name of person taking sample	Samples
Description	Text	50	Sample description	Samples
SampleMethodCode	Text	4	Code for method used to collect the sample	Samples
LogCode	Text	4	Company obtaining samples or field results	Samples
COCNumber	Text	40	Chain-of-custody number	Samples
DeliveryGroup	Text	25	Sample delivery group.	Analyses
AmbientBlankLot	Text	8	Ambient blank field lot identifier	Samples
EquipmentBlankLot	Text	8	Equipment blank field lot identifier	Samples
TripBlankLot	Text	8	Trip blank field lot identifier	Samples
FilteredSample	Text	20	Filter size	Samples
QCSequenceID	Text	40	QC sequence identifier	Samples
QCSampleCode	Text	3	QC code for this sample	Samples
TaskNumber	Text	40	Task number under which sampling is done	Samples
PrimarySample	Text	40	Primary sample to which QC sample is tied	Samples
SampleResult	Text	255	Result of attempted sampling	Samples
Container	Text	30	Sample container number(s)	Samples
NumContainers	Number (Int)		Number of sample containers	Samples
CoolerTemp	Number(Sgl)		Cooler temperature upon receipt	Samples
FieldEquip	Text	60	Equipment used for field sampling	Samples
GeologicUnitCode	Text	5	Geologic or Hydrologic unit code	Samples
LithologyCode	Text	5	Lithology or soil type code	Samples
Odor	Text	15	Sample odor upon receipt	Samples
Preservation	Text	20	Sample preservation done in field	Samples
PumpFault	Text	1	PumpFault (y/n)?	Samples
Purged	Text	1	Was well purged (y/n)?	Samples
QAPlanNumber	Text	50	QA Plan under which sampling was done	Samples
SampConcentration	Text	20	Sample concentration (low, medium, high)	Samples

SampleCollProc	Text	8	Sample collection procedure ID	Samples
SampleEventName	Text	50	Text name for the sample event	Samples
SampleEventID	Number(Lng)		Tie to SampleEvents table	Samples
SamplePurposeCode	Text	2	Key to SamplePurpose table	Samples
SampleSource	Text	5	Sample source (field, lab)	Samples
Witness	Text	30	Name of person witnessing sampling	Samples
TaxonSerial	Text	6	Taxonomy of an organism	Samples
GenderCode	Text	12	Gender of an organism	Samples
LifeStageCode	Text	12	Life stage of an organism	Samples
TissueTypeCode	Text	12	Tissue type of a tissue sample	Samples
ParameterName	Text	620	Name of material analyzed for	Analyses
CASNumber	Text	20	CAS number of material analyzed for	Analyses
AltParamNumber	Text	20	Alternative number for parameter	Analyses
STORETCode	Text	5	Five digit EPA STORET ID	ParameterUnits
Superseded	Number(Int)		Analysis superseded by re-analysis? [8]	Analyses
AnalyticMethod	Text	40	Method for performing analysis	Analyses
Value	Text[10]	25	Value measured during analysis	Analyses
ReportingUnits	Text	15	Units of the analysis	Analyses
FlagCode	Text	20	Data qualifier	Analyses
ProblemCode	Text	20	Problems encountered during analysis	Analyses
ValidationCode	Text	20	Code from data validation	Analyses
DetectedResult	Text	1	Was analyte detected (y/n)?	Analyses
Detect	Number(Sg)		Detection limit	Analyses
LimitType	Text	4	Detection limit type	Analyses
Detect2	Number(Sg)		2nd detection limit	Analyses
LimitType2	Text	4	2nd detection limit type	Analyses
Detect3	Number(Sg)		3rd detection limit	Analyses
LimitType3	Text	4	3rd detection limit type	Analyses
Detect4	Number(Sg)		4th detection limit	Analyses
LimitType4	Text	4	4th detection limit type	Analyses
Detect5	Number(Sg)		5th detection limit	Analyses
LimitType5	Text	4	5th detection limit type	Analyses
SpikeAmount	Number(Sg)		Spike amount added to the sample	Analyses
RetentionTime	Number(Sg)		Retention time for this analysis	Analyses
Error	Number(Sg)		Error range for this analysis	Analyses
DilutionFactor	Number(Sg)		Dilution factor	Analyses
Basis	Text	1	Analyzed wet or dry	Analyses
FilteredAnalysis	Text	20	Filtered status at analytical level	Analyses
LeachMethod	Text	20	Leaching method	Analyses
LeachateBatch	Text	12	Leachate batch	Analyses
LeachDate_D	Date/Time		Date sample was leached	Analyses
PrepMethod	Text	40	Lab preparation method	Analyses
PreparationLot	Text	10	Batch designator for samples and assoc. QC	Analyses
ReportableResult	Text	1	Is this a reportable result (y/n)?	Analyses
AnalDate_D	Date/Time		Date the analysis was performed	Analyses
ExtractDate_D	Date/Time		Date the extraction was performed	Analyses
LabReportDate_D	Date/Time		Lab analysis reporting date	Analyses
LabRecvDate_D	Date/Time		Date the lab received the sample	Samples
Lab	Text	20	Name of lab conducting analysis	Analyses
LabComments	Text	50	Lab comments about this analysis	Analyses
AnalysisLabID	Text	40	Lab identification number for analysis	Analyses
AnalyticalBatch	Text	40	Lab batch ID number	Analyses
ValueCode	Text	6	Differentiates between different results	Analyses
RunCode	Text	5	Run code for GC analyses	Analyses
QCAnalysisCode	Text	3	QC code for this analysis	Analyses
AnalysisGroup	Text	20	Group of methods for this analysis	Analyses
AnalysisLocationCode	Text	2	Where the analysis was done	Analyses
BatchTypeCode	Text	2	Type of batch	Analyses
Cleanup	Text	50	Cleanup method performed by lab	Analyses
DetectorMode	Text	50	Detector mode	Analyses
DetectorType	Text	50	Detector type	Analyses
ExpectedValue	Number(Db)		Expected value for standard	Analyses
Extracted	Text	1	Is this an extracted sample?	Analyses
HandlingBatch	Text	12	Batch identifier for lab handling (extracted, etc.)	Analyses
HandlingType	Text	50	Handling of sample prior to analysis	Analyses
InstrumentCalibBy	Text	50	Instrument calibrated by (name)	Analyses

InstrumentCalibDate_D	Date/Time		Date instrument was calibrated	Analyses
InstrumentManufacturer	Text	50	Manufacturer of instrument	Analyses
InstrumentModel	Text	50	Model of instrument	Analyses
InstrumentNum	Text	20	Serial number of instrument	Analyses
LabMatrixCode	Text	2	Matrix as analyzed in lab	Analyses
LabPrepDate_D	Date/Time		Date sample was prepped at lab	Analyses
LabReportNum	Text	20	Lab Report Number	Analyses
LabSampleID	Text	40	Lab sample ID	Analyses
MethodBatch	Text	12	Batch identifier for analyses by one method	Analyses
NumberDecimals	Number(Int)		Num. of decimal places displayed on reports	Analyses
PercentRecovery	Number(Sg)		Percent recovery for spike or tracer yield	Analyses
PrepBatch	Text	12	Batch identifier for lab prep	Analyses
PreserveIntact	Text	1	Was the preservation intact on arrival at lab?	Analyses
RunBatch	Text	12	Batch for run with same initial calibration	Analyses
StatTypeCode	Text	2	Key to **StatisticalTypes** (Min, Max, Mean)	Analyses
StdRefMaterial	Text	8	Standard reference material for analysis	Analyses
SubcontractLab	Text	20	Subcontracted lab	Analyses
ValidationComments	Text	50	Reason for selecting validation code	Analyses
Validator	Text	20	Person or company name providing validation	Analyses
ValueTypeCode	Text	2	Key to **ValueTypes** (Actual, estimated, etc.)	Analyses
WeightVolume	Number(Db)		Weight or volume of sample. Moved from samples	Analyses
WeightVolUnits	Text	4	Key to **ReportingUnits** for weight or vol. of samp. analyzed	Analyses
UpperControlLimit	Number(Sg)		Upper control limit for validation	Analyses
LowerControlLimit	Number(Sg)		Lower control limit for validation	Analyses
RejectionControlLimit	Number(Sg)		Rejection limit for validation	Analyses
RPDLimit	Number(Int)		Relative percentage difference limit for validation	Analyses
APDLimit	Number(Int)		Absolute percentage difference limit for validation	Analyses
CatResult	Text	20	Categorical (non-numeric) result	Analyses
AnalysesTaxonSerial	Text	6	Taxonomy of organisms in a bulk sample	Analyses
AnalysesLifeStageCode	Text	12	Life stage of organisms in a bulk sample	Analyses
BlankFlagCode	Text	12	Flag to identify results from blanks	Analyses
FinalValue	Number(Db)		Final value	Analyses
FinalQualifier	Number(Db)		Final qualifier	Analyses
RPD	Number(Sg)		Relative percent difference	Samples
SampleEndDate_D	Date/Time		Date/time that sample period ended	Samples
SampleStatusCode	Text	10	Foreign key to SampleStatus table	Samples
Sample_X	Number(Db)		X (easting) coordinate	Samples
Sample_Y	Number(Db)		Y (northing) coordinate	Samples
Sample_Z	Number(Db)		Z (depth or elevation) coordinate	Samples
StationReach	Number(Db)		Distance along linear feature	Samples
PercentMoisture	Number(Db)		Imported as an analysis	Analyses
ValReason1	Text	255	Reason for validation qualifier	Analyses
ValReason2	Text	255	Reason for validation qualifier	Analyses
ValReason3	Text	255	Reason for validation qualifier	Analyses
ValReason4	Text	255	Reason for validation qualifier	Analyses

[1] Field names in **bold** are required fields. The others may be blank.
[2] SampleTop and SampleBottom are required. Numbers for depth or elevation should be entered for soil analyses; they should be zero if not applicable.
[3] (Sg) Single-precision floating point numbers. A Single variable is stored as a 32-bit (4-byte) number that can be reported with up to 7 significant figures.
[4] (Int) A number ranging from -32,768 to 32,767.
[5] (Lg) Stores numbers from -2,147,483,648 to 2,147,483,647 (no fractions).
[6] Character width for text fields. Does not apply directly to numbers.
[7] Numbered values for duplicate samples, with 0 for preferred sample, increasing by one for each additional value. Must fill in all duplicates or none.
[8] Numbered values for superseded analyses, with 0 for current analysis, increasing by one for each older value.
[9] Database table to receive data, either directly or after conversion using a lookup table.
[10] The value is a number in Enviro Data, but can, and often should, be text in the DTS file to handle trailing zeros and other issues.

Submittal Requirements

File Names

Files submitted for import into Enviro Data should be given names that describe the contents and format of the file, such as "Rad Industries Sampling March 2013.xls". Ideally, the name should include a site name, supplied by the project manager or their consultant, and the date the file is issued. Another option is to use the sample delivery

group number. The .xls or .xlsx file extension should be used for the spreadsheet file format. When the data is submitted, documentation about the data content and format of each file should accompany the submitted disk or file, such as on the disk label or in the accompanying email.

Consistency of Content

It is especially important for data submitters to submit consistent data. Data elements must be entered exactly the same way from submittal to submittal. For example, if a well was called "MW-1" in a previous submittal, then it must be called "MW-1" in all subsequent submittals, not "MW 1" or "Mw-01". Data items such as station names are often used to associate the data from the current submittal with data previously submitted. If the spelling is changed, the association will not be successful. In this example, if the data provider suspects that the sampler may have inadvertently misnamed a well (e.g., Mw-01 or MW 1 instead of MW-1), the data provider should contact the sampler or project manager and correct the data before issuing the data set.

Another example of consistency of content is the spelling of chemical analytical compounds (parameter names). Data elements must be entered the same way from submittal to submittal. If the spelling is changed without instructions from or notification to the client, the association on import will not be successful. For example, "Lead" is not the same as "Lead (Pb)" or "Lead - total." A standardized list of parameter names should be provided by the data administrator to the entity supplying data, and these are the names that should be used. This can be easily checked by the data provider with Enviro Data using the reference file system, and the data provider can use the Enviro Data checker version to check for consistency prior to issuing the EDD.

This system is also designed to promote consistency between the different data providers and projects, however, if for project reasons the names cannot be kept consistent, the data user is able to alias station and parameter names. This list can also be supplied to the data provider.

Coded Entries

To foster consistency in the database, a number of data elements in the database tables are Coded. This means that each of these data items must contain one of a list of values. Examples of coded entries that are supplied by the data provider include *Analyses.ProblemCode*, *Analyses.FlagCode*, and *Analyses.ValidationCode*. These codes describe problems encountered during the analysis, the data qualifier, and the validation data qualifier, respectively. There are a limited number of analytical problems and flags describing an analysis, so codes are used to represent each choice. Example lists of the codes to be used are attached in Appendix A, but this information can be expected to change over time, from client to client, and from project to project.

Non-Conforming Data

The purpose of this DTS is to facilitate the accurate transfer of data by providing a standard format for data delivery. It is our intention that this format be flexible enough to accommodate the majority of the analytical data for most projects. There may at times be

data that will not fit into this standard. In that case, the organization providing the data should contact their project manager to begin a dialogue about how that data can be accommodated. The outline for this dialogue is contained in this section.

When data is identified that does not appear to easily conform to this DTS, there is a four-step process that should be followed to determine how to handle this data:

1. **Determine whether the data is truly non-conforming.** This DTS was designed to accommodate a wide variety of different types of analytical and other data. Someone knowledgeable about the data to be transferred and someone knowledgeable about the Enviro Data database management system should jointly try to fit the data to the transfer standard. The effort expended in this dialogue should be commensurate with the value of the data to the project. Any decisions made about necessary compromises, or other changes to make the data fit the standard, should be made with great concern for preserving the quality and integrity of the data.
2. **If the data is found to be non-conforming, determine how important it is to have it in the database.** If the data is significant to the management of the project and must be viewed in relationship to other project data or to data in other projects, then it should be placed in the data management system. If the data is of a supporting nature but will not be used in combination with other data, then it should be archived in the format provided and effort should not be expended in fitting it into the database system. Often the answer to these questions will not be a simple “yes” or “no”. In that case, the decision on whether to integrate the data into the database will need to take into consideration the cost of integrating the data.
3. **Determine the cost to integrate the data.** Adding data to the data management system that does not fit into the structure of the existing tables can be costly, depending on the functionality required to support the use of that data. Tasks which must be performed for the integration to be successful include analysis of the data, modification of the data model, creation of editing screens, queries and reports, and modification of the menu system and other user interface components. These modifications can, in some cases, adversely affect other users.
4. **Modify the data management system, as necessary.** If the value of the data to be integrated (or, more precisely, the value of the use of the data in the data management system) exceeds the cost to integrate it, then resources should be allocated to perform the integration, and modifications to the software should be made.

Appendix A - Coded Entries

This section contains example lists of data values for use in transferring data into the Enviro Data database. In the EDD, some values should match a code while others can match the data value. Each of the following lists contains the data values and/or the codes that represent them. The coded fields are typically indicated with "Code" at the end of the field name. The example entries for each field are given below. The values for each data field are based on industry practice. There will be times when values required by the system will not be known to the data provider. We have attempted to standardize codes for these values, with the 'z' code referring to Unknown, and the 'n' code referring to "None" or "Not Applicable", to use in these situations.

Database users should make an effort to have the lookup tables contain an extensive list of the codes that will be used in connection with the data. Data providers should request approved codes from their clients, or a Lab Reference File (aka Lookups Report), which can be created using the Enviro Data software. Data submitters and database users should use these codes whenever possible. Where it is not possible to use an existing code because a different value is needed, this information should be provided to the client representative or data administrator before the data is provided. The decision to add a new code should not be taken lightly. This must be balanced with the need to accurately represent what actually happened in the database in.

These entries are shown in the order that they appear in the list of fields above and in the template Excel file. In some cases, a lookup table will be used at different data levels. For example, the **ReportingUnits** and **Filtered** tables are related to more than one table and field. In that case, the lookup is listed in the first (highest) level.

SiteName - This is not a coded value and must match the list provided by the client.

StationName - This is not a coded value and must match the list provided by the client.

SampleTypeCode - Type of sample, compared to the **SampleTypes** lookup table:

Sample Type Code	Sample Type
c	Composite
d	Disturbed
g	Grab

Sample Type Code	Sample Type
s	Discrete
u	Undisturbed
z	Unknown

SampleMatrix - Matrix of sample, compared to the **SampleMatrix** lookup table:

Sample Matrix Code	Sample Matrix
AIR	Air
BIOT	Biota
BM	Blender mice
DNAP	DNAPL
GAS	Gas
GW	Groundwater

Sample Matrix Code	Sample Matrix
L	Leachate
LNAP	LNAPL
O	Other
P	Petroleum
R	Reagent
SD	Sediment

Sample Matrix Code	Sample Matrix
SL	Sludge
S	Soil
SW	Surface Water
Z	Unknown
WST	Waste
W	Water

DepthUnits, ReportingUnits, and other unit's fields - link to the **ReportingUnits** lookup table. Units of measure for depths, analyses, or other numeric fields.

Unit code	Reporting units
a	s.u.
at	Atm
b	umhos/cm
bbl	bbl
bblm	bblm
c	Deg C
cm	Centimeters
d	Days
f	Deg F
ft	ft
g	fmsl
gl	g/L
gr	grams
h	Hours
in	in
kg	kilograms
l	ppb
lt	liters

Unit code	Reporting units
m	ppm
mcf	mcf
mcfm	mcfm
mgm	mg/m3
mk	mg/kg
ml	mg/l
mlt	milliliters
mo	Months
ms	ms/cm
mt	meters
mv	mv
n	None
ng/L	ng/L
nt	NTUs
o	Other
oc	kohm.cm
pc	%
pf	pCi/filter

Unit code	Reporting units
pg	pCi/g
pi	pg/l
pl	pCi/l
PSI	PSI
pt	ppt
s	mmhos/m
ub	um/cm
ug	ug/g
uk	ug/kg
ul	ug/l
us	uS/cm
w	mg/filter
wk	Weeks
wt %	% Weight
x	ug/filter
z	Unknown

SampleMethodCode - The way the sample was taken, compared to the **SampleMethod** table:

Sample Method Code	Sample Method
as	Automatic sampler
ba	Bailer
bp	Bladder Pump
Gb	Grab
Pe	Peristaltic Pump
sp	Spigot
Ss	Stainless steel bucket
Su	Submersible Pump
z	Unknown

FilteredSample and ***FilteredAnalysis*** link to the **Filtered** lookup table.

FilteredCode	FilteredDescrip
DIS	Dissolved
F1	Field - unknown
F45u	Field 0.45u
FIL	Filtered
L1	Lab - unknown
L45u	Lab 0.45u
TOT	Total
TRC	Total Recoverable
z	Unknown

QCSampleCode and ***QCAnalysisCode*** link to the **QCCodes** lookup table, which contains codes for both the sample and analysis levels.

QC Code	QC Type	QC Scope Code
B	Blank	Not applicable
BS	Blank spike	Samples
BDS	Blind sample	Samples
CB	Calibration blank	Samples
CCV	Calibration Control Verification	Samples
CS	Check sample	Samples
DB	Dynamic blank	Samples
FB	Field blank	Samples
FD	Field Duplicate	Unknown
DUP	Field duplicates	Data Entry
FS	Field sample spikes	Samples
IB	Instrument carryover blank	Samples
IS	Internal standard	Samples
LCSD	Lab Control Sample Duplicate	Samples
LCS	Laboratory Control Sample	Samples
LD	Laboratory duplicates	Samples
MS	Matrix spike	Samples
MSD	Matrix spike duplicate	Samples
MB	Method blank	Samples
N	None	Not applicable
NQ	Normal Quarterly	Analyses
O	Original data	Data Entry
RD	Referee duplicates	Samples
RB	Rinsate blank	Samples
SP	Split samples	Samples
SPD	Split-Duplicates	Samples
SB	Storage blank	Samples
SUR	Surrogate spikes	Analyses

QC Code	QC Type	QC Scope Code
SS	Synthetic sample	Samples
TAR	Target Compound	Analyses
TIC	Tentatively identified compound	Analyses
TB	Trip blank	Stations
Z	Unknown	Not applicable

Geologic Units - Geologic units associated with samples. Note that these are examples only and will vary from project to project.

Geol. Unit Code	Geologic Unit	Site Number	Age Code	Enabled	Pattern	Fill Pen	Line Pen
A	A-datum	1		No			
AF	Alluvial fill	1		Yes			
B	B-datum	1		No			
BED	Bedrock	1		No			
FRLD	Fruitland	4	604	Yes			
FRLDC	Fruitland Coal	4	604	Yes			
SNJS	San Jose	4	652	Yes			
Y	Y-Stratum	1		No			
Z	Unknown	0		No			

LithologyCode - Lithologies associated with samples. Note that these are examples only and may vary from project to project. Linked to the **Lithology** table:

Lith. Code	Lithology	Pattern	Pattern X Scale	Pattern Y Scale	Fill_ Pen	Line_ Pen	Site Number	Picture C	Picture BW
ANH	Anhydrite						0		
ASH	Ash/tuff						0		
GC	Gravel, clayey						0		
GL	Gravel, silty						0		
SG	Sand and gravel						0		
SX	Sand, coarse						0		
V	Volcanic						0		
z	Unknown						0		

SamplePurposeCode - Project stage and purpose associated with samples. Linked to the **SamplePurpose** table:

Purp. Code	Stage	Purpose
ac	Assessment	Confirmation
ai	Assessment	Investigatory
ar	Assessment	Routine
cm	Corrective action	Monitoring to a limit
db	Detection	Background
dr	Detection	Regulated
n	NPDES	Monitoring to a limit
s	Special	Special
u	Due diligence	Due diligence
v	Verification	Detection
wd	Assessment	Disposal
wr	Assessment	Routine
z	Unknown	Unknown

TaxonSerial - Identifies the taxonomy of an organism. Optional link to the **Taxonomy** lookup table. **Taxonomy** is also linked to the *AnalysesTaxonSerial* field at the analyses level.

Taxon-omy ID	TaxonCode	Taxon Serial	TaxonName	TaxonCommonName	Taxon Rank	Taxon Abbrev
465	860301	159697	Petromyzonidae	Unidentified lamprey	FAM	PETROM
466	8603010206	159708	Lampetra appendix	American brook lamprey	SPE	BROOKL
467	8603010402	159725	Ichthyomyzon castaneus	Chestnut lamprey	SPE	CHESTL
468	8732010101	161094	Lepisosteus osseus	Longnose gar	SPE	LONGAR
469	8732010102	161095	Lepisosteus oculatus	Spotted gar	SPE	SPOGAR
470	8734010101	161104	Amia calva	Bowfin	SPE	BOWFIN
471	8747010105	161706	Alosa pseudoharengus	Alewife	SPE	ALEWIF
472	8747010106	161707	Alosa chrysochloris	Skipjack	SPE	SKIPJK
473	8747010501	161737	Dorosoma cepedianum	Gizzard shad	SPE	GIZZRD
474	8747010502	161738	Dorosoma petenense	Threadfin shad	SPE	THREAD
475	8751010102	161906	Hiodon tergisus	Mooneye	SPE	MOONEY
476	8755010211	161989	Oncorhynchus mykiss	Rainbow trout	SPE	RAINBO
477	8755010306	161997	Salmo trutta	Brown trout	SPE	BROWNT

GenderCode - Identifies the gender of an organism. Optional link to the **Gender** lookup table:

GenderCode	Gender
F	Female
H	Hermaphrodite
I	Indeterminate
M	Male
U	Unknown

LifeStageCode - Identifies the life stage of an organism. Optional link to the **LifeStage** lookup table. **LifeStage** is also linked to the *AnalysesLifeStage* field at the analyses level.

LifeStageCode	LifeStage
a	Adult
j	Juvenile
z	Unknown

TissueTypeCode - Identifies the tissue type of a tissue sample. Optional link to the **TissueType** lookup table:

TissueTypeCode	TissueType
BONE	Bone
FILT	Filet
LIVR	Liver
MUSC	Muscle
OVAR	Ovaries
PRTA	Partial animal
WHOA	Whole animal
WHOL	Whole body
z	Unknown

ParameterName, CASNumber, AltParamNumber - *AltParamNumbers* may be other codes decided on between the data provider and the client. These are contained in the **Parameters** table. Contact your project manager for a current project parameters list. Do <u>not</u> make up CAS numbers for parameters where CAS does not provide them. Due to the large number of possible values and from project to project, the following list contains just a few examples only.

Parameter Name	CAS Number
1,1,1,2-Tetrachloroethane	630-20-6
1,1-Biphenyl, Dimethyl-	
1,2,4-Trichlorobenzene	120-82-1
2,3,7,8-TCDD C13 (surrogate)	
2,4,5-T	93-76-5
2-Hexanone	591-78-6
4,4'-DDD	72-54-8
4,6-Dinitro-2-methylphenol	534-52-1
Acenaphthene	83-32-9
Acenaphthylene	208-96-8
Acidity	
Aldrin	309-00-2
Alkalinity (as CaCO3)	
Aluminum	7429-90-5
Ammonia	
Aramite	140-57-8
Aroclor-1016	12674-11-2
Arsenic	7440-38-2
Barium	7440-39-3
Benz(a)anthracene	56-55-3
Benzene	71-43-2
Benzene, Trimethyl-	25551-13-7
Bicarbonate	
Biochemical oxygen demand	
Chemical oxygen demand	
Chloride	
Chlorinated Hydrocarbons	
Chromium	7440-47-3
Corrosivity PH	I50-50-5
Cyanide	
Endosulfan I	959-98-8
Field Conductivity	
Field pH	

Parameter Name	CAS Number
Field turbidity	
Floaters	
Gross Alpha	
Groundwater Elevation	
Hardness (as CaCO3)	
Iron	7439-89-6
Laboratory pH	
Lead	7439-92-1
Nitrate	
Nitrate/Nitrite	7727-37-9
Nitrite	
No. 6 Fuel Oil C12-C24	
Oil and grease	
Ortho-Phosphate	
Other Gamma	
Pb-210 - insoluble	
Pb-210 - soluble	
Percent moisture	
Pet. Hydrocarb.	
Phenol	108-95-2
Phenol-D5 (surrogate)	4165-62-2
Pyridine	110-86-1
Quinoline	91-22-5
Ra-224 - insoluble	
Ra-224 - soluble	
Ra-224 - Total	
Reactive Cyanide	
Reactive Sulfide	
Temperature	
Total Dissolved Solids	
Total Organic Carbon	
Total phenols	
Zinc	7440-66-6

FlagCode - This field can contain up to four coded entries with a maximum of four characters each for the flag describing the analysis. See comments earlier. It is tied to the **AnalyticFlags** table.

Flag Code	Flag
*	Surrogate outside QC limits
a	Not available
b	Analyte detected in blank and sample
c	Coelute
d	Diluted
e	Exceeds calibration range
f	Calculated from higher dilution
i	Insufficient sample
j	Est value: concentration <quantitative limit
m	Matrix interference
q	Uncertain value
s	Surrogate
u	Not detected
v	Detected value

z	Unknown

ProblemCode - This field can contain up to four coded entries of up to four characters each for problems relating to the analysis. It is tied to the **AnalyticProblems** table.

Problem Code	Analytic Problem
a	Exceeds holding time
b	< cont lim, > inst lim
d	Percent RPD criteria not met
e	Exceeds extraction holding time
g	Cooler above 10°C
h	Cooler above 4°C
I	Interference
k	Bottle broke; resample value
m	Matrix effect
n	No problems
o	Spike not in control limit
p	Zero headspace not achieved
r	Re-extracted
s	Method of standard additions
t	Diluted
v	Est because of interference
z	Unknown

ValidationFlags - This field can contain up to four coded entries with up to maximum of four characters each for data validation results. These are tied to the **ValidationFlags** table.

Validation Code	Flag
a	Anomalous data
j	Estimated data, useable value
r	Rejected data
u	Not detected due to contamination
z	None

Basis - Analyzed wet or dry. Should be “w” for wet or “d” for dry. Can also report “n” for not applicable, or “z” for unknown. Required.

Basis	BasisDescription
d	Dry
f	Filtered
n	None
w	Wet
z	Unknown

LeachMethod - Method used to leach the sample. This is linked to the **LeachMethod** table.

LeachMethodCode	LeachMethod
N	None (default)
T	TCLP
S	SPLP
Z	Unknown

ValueCode - Reason for a second or more results. This is linked to the **ValueCode** table.

ValueCode	Explanation
RA	Re-analyzed

RE	Re-extracted and re-analyzed
RE2	Second re-extraction and re-analysis
DL	Dilution run
DL2	Second dilution run
REDL	Re-extraction of a diluted sample
N	None
O	Original analysis
Z	Unknown

RunCode - Confirmation run identification. This is linked to the **RunCode** table.

RunCode	Explanation
OR	Original run
PR	Primary run result. For GC tests where the first and second columns are combined to produce this primary set of results
1C	First column result
2C	Second column result
N	None
Z	Unknown

AnalLocationCode - Location (Field or Lab) where analysis was performed. This is linked to the **AnalLocationCodes** table.

AnalLocationCode	AnalLocation
FL	Field
LB	Lab
z	Unknown

BatchTypeCode - Type of batch. This is linked to the **BatchTypes** table.

Batch Type Code	Batch Type
a	Analysis
l	Leach
p	Prep
z	Unknown

StatTypeCode - Statistical analysis used (Min., Max., Mean). This is linked to the **StatisticalTypes** table.

StatCode	Statistical Type
a	Minimum
b	Maximum
c	Mean
l	Log
n	Nominal
o	Ordinal
r	Regular
z	Unknown

ValueTypeCode - Type of value. This is linked to the **ValueTypes** table.

Value Type Code	Value Type
a	Actual
c	Calculated
e	Estimated
z	Unknown

CatResult - Categorical (non-numeric) result. Optional foreign key to **CategoricalResultTypes** table.

CatResultID	ParameterNumber	CatResult	CatResultMeaning
1	237	br	Brown
2	237	bl	Black

BlankFlagCode - Code to identify results from blanks. There is a matching lookup, **BlankFlags**, but the relationship is not enforced.

BlankFlagCode	BlankFlag
Y	Yes
N	No
z	Unknown

Appendix B - Changes from previous versions of the Data Transfer Standard

The following changes were made in versions 1.4, 1.6, 2008, 2010, 2012, and 8. The version where the change was most recently introduced is shown. These changes were of three types, increase in field width, new fields, and removed fields.

Analyses table - Revised

Change	Field Name	Type	Type of change	Version
Revised	ReportingUnitsCode	Text - 4	Change from Text - 2	1.6
Revised	AnalyticMethod	Text - 40	Change from Text - 25	1.6
Revised	Lab	Text - 20	Change from Text - 10	1.6
Revised	AnalysisLabID	Text - 40	Change from Text - 20	1.6
Revised	PrepMethod	Text - 40	Change from Text - 20	1.6
New Field	Detect3	Num, Single	3rd detection limit for this analysis	1.6
New Field	LimitType3	Text - 4	Type of 3rd detection limit	1.6
New Field	RetentionTime	Num, Single	Retention time for this Analysis	1.6
New Field	PreparationLot	Text - 10	Batch designator of an autonomous group of environmental samples and associated QC samples prepared together	1.6
New Field	AnalysisGroup	Text - 20	Group of methods for this Analysis	1.6
New Field	SpikeAmount	Num, Single	Spike amount added to the sample	1.6
New Field	STORETCode	Text - 5	Five digit EPA STORET Id	2008
New Field	**AnalysisLocationCode**	Text - 2	Key to **AnalLocationCodes** table	2008
New Field	**BatchTypeCode**	Text - 2	Key to **BatchTypes** table	2008
New Field	Cleanup	Text - 50	Cleanup method performed by lab	2008
Revised	DeliveryGroup	Text - 25	Sample delivery group (Moved from **Samples**)	2008
New Field	DetectorMode	Text - 50	Detector mode	2008
New Field	DetectorType	Text - 50	Detector type	2008
New Field	ExpectedValue	Num. Double	Expected value for standard	2008
Revised	Extracted	Text - 1	Is this an extracted sample? (Moved from **Samples**	2008
New Field	HandlingBatch	Text - 12	Batch identifier for lab handling (extracted, etc.)	2008
New Field	HandlingType	Text - 50	Handling of sample prior to analysis	2008
New Field	InstrumentCalibBy	Text - 50	Instrument calibrated by (name)	2008
New Field	InstrumentCalibDate_D	Date/Time	Date instrument was calibrated	2008
New Field	InstrumentManufacturer	Text - 50	Manufacturer of instrument	2008
New Field	InstrumentModel	Text - 50	Model of instrument	2008
New Field	InstrumentNum	Text - 20	Serial number of instrument	2008
New Field	**LabMatrixCode**	Text - 2	Key to **SampleMatrix** table	2008
New Field	LabPrepDate_D	Date/Time	Date sample was prepped at lab	2008
New Field	LabReportNum	Text - 20	Lab report number	2008
New Field	LeachateBatch	Text - 12	Leachate lot	2008
New Field	LeachDate_D	Date/Time	Date sample was leached	2008
New Field	MethodBatch	Text - 12	Batch identifier for analyses by one method	2008
New Field	NumberDecimals	Num. Int	Number of decimal places displayed at report time	2008
New Field	PercentRecovery	Num. Sgl	Percent recovery for spike or tracer yield	2008
New Field	PrepBatch	Text - 12	Batch identifier for lab prep	2008
New Field	PreserveIntact	Text - 1	Was preservation intact on arrival at lab	2008
New Field	RunBatch	Text - 12	Batch for run with same initial calibration	2008
New Field	**StatTypeCode**	Text - 2	Key to **StatisticalTypes** table	2008

New Field	StdRefMaterial	Text - 8	Standard reference material for analysis	2008
New Field	SubcontractLab	Text - 20	Subcontracted lab	2008
New Field	ValidationComments	Text - 50	Reason for selecting validation code	2008
New Field	Validator	Text - 20	Person or company name providing validation	2008
New Field	**ValueTypeCode**	Text - 2	Key to **ValueTypes** table	2008
Revised	WeightVolume	Num. Dbl	Weight or volume of samples Moved from **Samples**	2008
New Field	**WeightVolUnits**	Text -4	Key to **ReportingUnits** table for weight or volume of sample analyzed	2008
Removed	**AnalLabSampleID**	Text - 40	Redundant Lab sample ID	2010
New Field	Detect4	Num. Sgl	4th detection limit	2010
New Field	LimitType4	Text -4	4th detection limit type	2010
New Field	Detect5	Num. Sgl	5th detection limit	2010
New Field	LimitType5	Text -4	5th detection limit type	2010
New Field	UpperControlLimit	Num. Sgl	Upper control limit for validation	2010
New Field	LowerControlLimit	Num. Sgl	Lower control limit for validation	2010
New Field	RejectionControlLimit	Num. Sgl	Rejection limit for validation	2010
New Field	RPDLimit	Num. Int	Relative percentage difference limit for validation	2010
New Field	APDLimit	Num. Int	Absolute percentage difference limit for validation	2010
New Field	CatResult	Text - 20	Categorical (non-numeric) result	2012
New Field	AnalysesTaxonSerial	Text - 6	Taxonomy of organisms identified in a bulk sample	2012
New Field	AnalysesLifeStageCode	Text - 12	Life stage of organisms identified in a bulk sample	2012
New Field	BlankFlagCode	Text - 12	Code to identify results from blanks	2012
Revised	Value	Can now be text, up to 50, or a number		2012
New Field	FinalValue	Num. Sgl	Final value	8
New Field	FinalQualifier	Text-25	Final qualifier	8

Samples table - Revised

Revised	**SampleMatrixCode**	Text - 4	Change from Text - 1	1.6
Revised	**SampleTypeCode**	Text - 5	Change from Text - 4	1.6
Revised	**LabSampleID**	Text - 40	Change from Text - 20	1.6
Revised	AltSampleID	Text - 40	Change from Text - 20	1.6
Revised	**FieldSampleID**	Text - 40	Change from Text - 20	1.6
Revised	**DepthUnitsCode**	Text - 4	Change from Text - 2	1.6
Revised	**Duplicate**	Num, Int	Name changed from DuplicateSample, now changed back (see below)	2008
Revised	Description	Text - 50	Change from Text - 25	1.6
Revised	CoolerID	Text - 40	Change from Text - 20	1.6
Revised	DeliveryGroup	Text - 25	Change from Text - 10	1.6
Revised	QCSequenceID	Text - 40	Change from Text - 15	1.6
Revised	COCNumber	Text - 40	Change from Text - 20	1.6
Revised	TaskNumber	Text - 40	Change from Text - 20	1.6
Revised	PrimarySample	Text - 40	Change from Text - 20	1.6
New Field	LabRecvDate_D	Date/Time	Date lab received sample	1.6
New Field	WeightVolume	Num, Double	Weight or volume of sample	1.6
New Field	Extracted	Text - 1	Is this an extracted sample?	1.6
New Field	**SampleMethodCode**	Text - 4	Link to the **SampleMethod** table	1.6
New Field	LogCode	Text - 4	Coded value identifying the company collecting samples or performing field tests	1.6
New Field	AmbientBlankLot	Text - 8	Ambient Blank Field Lot Identifier	1.6
New Field	EquipmentBlankLot	Text - 8	Equipment Blank Field Lot Identifier	1.6
New Field	TripBlankLot	Text - 8	Trip Blank Field Lot Identifier	1.6
New Field	Container	Text - 30	Sample container number(s)	2008

New Field	NumContainers	Num. Int.	Number of sample containers	2008
New Field	CoolerTemp	Num, Single	Cooler temperature upon receipt	2008
New Field	FieldEquip	Text - 60	Equipment used for field sampling	2008
New Field	**GeologicUnitCode**	Text - 5	Geologic or hydrologic unit code	2008
New Field	**LithologyCode**	Text - 5	Lithology or soil type code	2008
New Field	Odor	Text - 15	Sample odor upon receipt	2008
New Field	PumpFault	Text - 1	Pump fault	2008
New Field	Purged	Text - 1	Was well purged?	2008
New Field	Preservation	Text - 20	Preservation done in field	2008
New Field	QAPlanNumber	Text - 50	QA plan # under which sampling done	2008
New Field	SampConcentration	Text - 20	Sample concentration (low, medium, high)	2008
New Field	SampleCollProc	Text - 8	Sample collection procedure ID	2008
New Field	SampleEventID	Num. Long	Tie to SampleEvents Table	2008
New Field	**SamplePurposeCode**	Text - 2	Key to SamplePurpose table	2008
New Field	SampleSource	Text - 5	Source of sample (Field, lab)	2008
New Field	Witness	Text - 30	Name of sampling witness	2008
Revised	Duplicate	Num, Int	Changed back from DuplicateSample, no longer required	2010
New Field	TaxonSerial	Text - 6	Identifies the taxonomy of an organism	2012
New Field	GenderCode	Text - 12	Identifies the gender of an organism	2012
New Field	LifeStageCode	Text - 12	Identifies the life stage of an organism	2012
New Field	TissueTypeCode	Text - 12	Identifies the type of a tissue sample	2012
New Field	SampleEndDate_D	Date/Time	Date/time that sample period ended	8
New Field	SampleStatusCode	Text - 10	Foreign key to SampleStatus table	8
New Field	SampleC_X	Num, Double	X (easting) coordinate	8
New Field	Sample_CY	Num, Double	Y (northing) coordinate	8
New Field	Sample_CZ	Num, Double	Z (depth or elevation) coordinate	8
New Field	StationReach	Num, Double	Distance along linear feature	8
New Field	RPD	Num, Single	Relative Percent Difference	8D
New Field	PercentMoisture	Num, Single	Mover to Value	8D
New Field	ValReason1	Text, 255	Validation Comments	8D
New Field	ValReason2	Text, 255	Validation Comments	8D
New Field	ValReason3	Text, 255	Validation Comments	8D
New Field	ValReason4	Text, 255	Validation Comments	8D

History of Changes to DTS Format

The following is a table summarizing the data elements in each version, marked with an X. They are shown in the order of DTS 8D.

Field Name	1	1.2a	1.4	1.6	2008	2010	2012	8	8D
SiteName	X	X	X	X	X	X	X	X	X
StationName	X	X	X	X	X	X	X	X	X
SampleDate_D	X	X	X	X	X	X	X	X	X
SampleTypeCode				X	X	X	X	X	X
SampleMatrix	X	X	X	X	X	X	X	X	X
SampleTop	X	X	X	X	X	X	X	X	X
SampleBottom	X	X	X	X	X	X	X	X	X
DepthUnits			X	X	X	X	X	X	X
Duplicate (Sample)		X	X	X	X	X	X	X	X
FieldSampleID			X	X	X	X	X	X	X
AltSampleID		X	X	X	X	X	X	X	X

Field Name	1	1.2a	1.4	1.6	2008	2010	2012	8	8D
CoolerID			X	X	X	X	X	X	X
Sampler			X	X	X	X	X	X	X
Description			X	X	X	X	X	X	X
SampleMethodCode				**X**	**X**	**X**	**X**	**X**	**X**
LogCode				X	X	X	X	X	X
COCNumber			X	X	X	X	X	X	X
DeliveryGroup			X	X	X	X	X	X	X
AmbientBlankLot				X	X	X	X	X	X
EquipmentBlankLot				X	X	X	X	X	X
TripBlankLot				X	X	X	X	X	X
FilteredSample			**X**	**X**	**X**	**X**	**X**	**X**	**X**
QCSequenceID			X	X	X	X	X	X	X
QCSampleCode			**X**	**X**	**X**	**X**	**X**	**X**	**X**
TaskNumber			X	X	X	X	X	X	X
PrimarySample			X	X	X	X	X	X	X
SampleResult			X	X	X	X	X	X	X
Container					X	X	X	X	X
NumContainers					X	X	X	X	X
CoolerTemp					X	X	X	X	X
FieldEquip					X	X	X	X	X
GeologicUnitCode					**X**	**X**	**X**	**X**	**X**
LithologyCode					**X**	**X**	**X**	**X**	**X**
Odor					X	X	X	X	X
Preservation					X	X	X	X	X
PumpFault					X	X	X	X	X
Purged					X	X	X	X	X
QAPlanNumber					X	X	X	X	X
SampConcentration					X	X	X	X	X
SampleCollProc					X	X	X	X	X
SampleEventName					X	X	X	X	X
SampleEventID					X	X	X	X	X
SamplePurposeCode					**X**	**X**	**X**	**X**	**X**
SampleSource					X	X	X	X	X
Witness					X	X	X	X	X
TaxonSerial							X	X	X
GenderCode							X	X	X
LifeStageCode							X	X	X
TissueTypeCode							X	X	X
ParameterName	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**
CASNumber	X	X	X	X	X	X	X	X	X
AltParamNumber			X	X	X	X	X	X	X

Field Name	1	1.2a	1.4	1.6	2008	2010	2012	8	8D
STORETCode					X	X	X	X	X
Superseded	**X**	**X**	**X**	**X**	**X**	**X**	X	X	X
AnalyticMethod	X	X	X	X	X	X	X	X	X
Value	X	X	X	X	X	X	X	X	X
ReportingUnits	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**
FlagCode	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**
ProblemCode	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**
ValidationCode		**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**
DetectedResult			X	X	X	X	X	X	X
Detect	X	X	X	X	X	X	X	X	X
LimitType	X	X	X	X	X	X	X	X	X
Detect2			X	X	X	X	X	X	X
LimitType2			X	X	X	X	X	X	X
Detect3				X	X	X	X	X	X
LimitType3				X	X	X	X	X	X
Detect4						X	X	X	X
LimitType4						X	X	X	X
Detect5						X	X	X	X
LimitType5						X	X	X	X
SpikeAmount				X	X	X	X	X	X
RetentionTime				X	X	X	X	X	X
Error	X	X	X	X	X	X	X	X	X
DilutionFactor		X	X	X	X	X	X	X	X
Basis			**X**	**X**	**X**	**X**	**X**	**X**	**X**
FilteredAnalysis			**X**	**X**	**X**	**X**	**X**	**X**	**X**
LeachMethod			**X**	**X**	**X**	**X**	**X**	**X**	**X**
LeachateBatch					X	X	X	X	X
LeachDate_D					X	X	X	X	X
PrepMethod			X	X	X	X	X	X	X
PreparationLot				X	X	X	X	X	X
ReportableResult			X	X	X	X	X	X	X
AnalDate_D	X	X	X	X	X	X	X	X	X
ExtractDate_D	X	X	X	X	X	X	X	X	X
LabReportDate_D			X	X	X	X	X	X	X
LabRecvDate_D				X	X	X	X	X	X
Lab	X	X	X	X	X	X	X	X	X
LabComments			X	X	X	X	X	X	X
AnalysisLabID			X	X	X	X	X	X	X
AnalyticalBatch			X	X	X	X	X	X	X
ValueCode			**X**	**X**	**X**	**X**	**X**	**X**	**X**
RunCode			**X**	**X**	**X**	**X**	**X**	**X**	**X**

Field Name	1	1.2a	1.4	1.6	2008	2010	2012	8	8D
QCAnalysisCode			**X**	**X**	**X**	**X**	**X**	**X**	**X**
AnalysisGroup				X	X	X	X	X	X
AnalLabSampleID					X				
AnalysisLocationCode					**X**	**X**	**X**	**X**	**X**
BatchTypeCode					**X**	**X**	**X**	**X**	**X**
Cleanup					X	X	X	X	X
DetectorMode					X	X	X	X	X
DetectorType					X	X	X	X	X
ExpectedValue					X	X	X	X	X
Extracted				X	X	X	X	X	X
HandlingBatch					X	X	X	X	X
HandlingType					X	X	X	X	X
InstrumentCalibBy					X	X	X	X	X
InstrumentCalibDate_D					X	X	X	X	X
InstrumentManufacturer					X	X	X	X	X
InstrumentModel					X	X	X	X	X
InstrumentNum					X	X	X	X	X
LabMatrixCode					**X**	**X**	**X**	**X**	**X**
LabPrepDate_D					X	X	X	X	X
LabReportNum					X	X	X	X	X
LabSampleID	X	X	X	**X**	**X**	**X**	**X**	**X**	**X**
MethodBatch					X	X	X	X	X
NumberDecimals					X	X	X	X	X
PercentRecovery					X	X	X	X	X
PrepBatch					X	X	X	X	X
PreserveIntact					X	X	X	X	X
RunBatch					X	X	X	X	X
StatTypeCode					**X**	**X**	**X**	**X**	**X**
StdRefMaterial					X	X	X	X	X
SubcontractLab					X	X	X	X	X
ValidationComments					X	X	X	X	X
Validator					X	X	X	X	X
ValueTypeCode					**X**	**X**	**X**	**X**	**X**
WeightVolume				X	X	X	X	X	X
WeightVolUnits					**X**	**X**	**X**	**X**	**X**
UpperControlLimit						X	X	X	X
LowerControlLimit						X	X	X	X
RejectionControlLimit						X	X	X	X
RPDLimit						X	X	X	X
APDLimit						X	X	X	X
CatResult							X	X	X

Field Name	1	1.2a	1.4	1.6	2008	2010	2012	8	8D
AnalysesTaxonSerial							X	X	X
AnalysesLifeStageCode							X	X	X
BlankFlagCode							X	X	X
FinalValue								X	X
FinalQualifier								X	X
							X		
SampleEndDate_D								X	X
SampleStatusCode								X	X
Sample_CX								X	X
Sample_CY								X	X
Sample_CZ								X	X
StationReach								X	X
PercentMoisture									X
ValReason1									X
ValReason2									X
ValReason3									X
ValReason4									X