FINAL
ENVIRONMENTAL SAMPLING, ANALYSIS AND RESULTS: ANALYSIS AND RESULTS

Standard No.: EX000005.2

February 4, 2010

Approved on February 4, 2010 by the
Exchange Network Leadership Council
for use on the Environmental
Information Exchange Network

Approved on February 4, 2010 by the
Chief Information Officer of the
U. S. Environmental Protection Agency
for use within U.S. EPA

This consensus standard was developed in collaboration by State, Tribal, and U. S. EPA representatives under the guidance of the Exchange Network Leadership Council and its predecessor organization, the Environmental Data Standards Council.

Foreword

The Exchange Network Leadership Council (ENLC) is a partnership among US EPA, States and Tribal partners to develop and agree upon data standards for environmental information collection and exchange. The Council seeks to promote efficient sharing of environmental information between State, US EPA and Tribal partners through the development of data standards. Access to this data standard, as well as further information about data standards is available at www.exchangenetwork.net and www.epa.gov/datastandards.

1.0 INTRODUCTION

Environmental information is a key tool in the effective management of our environmental resources and human health conditions. As a result, much effort goes into data acquisition, management, maintenance, exchange, and oversight. Greater access is the goal of many data consumers, and data managers. Providers invest significant resources meeting their requirements. In response, many data providers are improving access as they post usable copies of their environmental information on the web. These efforts are a vast improvement over previous conditions; however, there is a growing desire and need to both provide and receive data in a clearly defined and a uniform way. Data from multiple sources can then be aggregated and used without the inherent variations that exist between data sets across agencies.

1.1 Scope

This standard provides and describes elements and data groupings that are used to catalogue and exchange information about sample analysis and results.

1.2 Revision History

Date	Version	Description
January 6, 2006	EX000005.1	Initial Environmental Data Standards Council Adoption
February 4, 2010	EX000005.2	Modification of data standard to incorporate additional water quality and biological data elements.

1.3 References to Other Data Standards

This standard relies on other standards to make it complete and provide the necessary support. As such users should consider the references to other data standards noted below as integral to the ESAR: Analysis and Results Data Standard. These include:

- Biological Taxonomy [EX000018.2] Data Standard
- Chemical Identification [EX000016.2] Data Standard
- Contact Information [EX000019.2] Data Standard
- Attached Binary Object [EX000006.1] Data Standard
- Compositing [EX000008. 1] Data Standard
- Equipment [EX000009.1] Data Standard
- Measure [EX000010.1] Data Standard
- Method [EX000011.1] Data Standard
- Sample Handling [EX000014.1] Data Standard
- Representation of Date and Time [EX000013.1] Data Standard

1.4 Terms and Definitions

For the purposes of this document, the following terms and definitions apply.

Term	Definition
Laboratory	A mobile or fixed facility equipped for testing and analysis.
Laboratory Analysis	Analytical results that are generated in the field from continuous or discrete observation /monitoring and/or from mobile or fixed laboratory facilities.

1.5 Implementation

Users are encouraged to use the XML registry housed on the Exchange Network Web site to download schema components for the construction of XML schema flows (http://www.exchangenetwork.net).

1.6 Document Structure

The structure of this document is briefly described below:

a. Section 2.0 ESAR: Analysis and Results Diagram illustrates the principal data groupings contained within this standard.

b. Section 3.0 ESAR: Analysis and Results Table provides information on the high level, intermediate and elemental Analysis and Results data groupings. Where applicable, for each level of this data standard, a definition, XML tag, note(s), example list of values and format are provided. The format column may include “A” to specify alphanumeric, “N” to designate numeric, “G” to denote a grouping, and “D” for time and date formats referenced in the Representation of Date and Time Data Standard.

c. Data Element Numbering: For purposes of clarity and to enhance understanding of data standard hierarchy and relationships, each data group is numerically classified from the primary to the elemental level.

d. Code and Identifier Metadata: Metadata, defined here as data about data or data elements, includes their descriptions and/or any needed context setting information required to identify the origin, conditions of use, interpretation, or understanding the information being exchanged or transferred. (Adapted from ISO/IEC 2382-17:1999 Information Technology Vocabulary—Part 17: Databases 17.06.05 metadata). Based on the business need, additional metadata may be required to sufficiently describe an identifier or a code. A note regarding this additional metadata is included in the notes column for identifier and code elements. Additional metadata for identifiers may include:

   - Code List Identifier, which is a standardized reference to the context or source of the set of codes

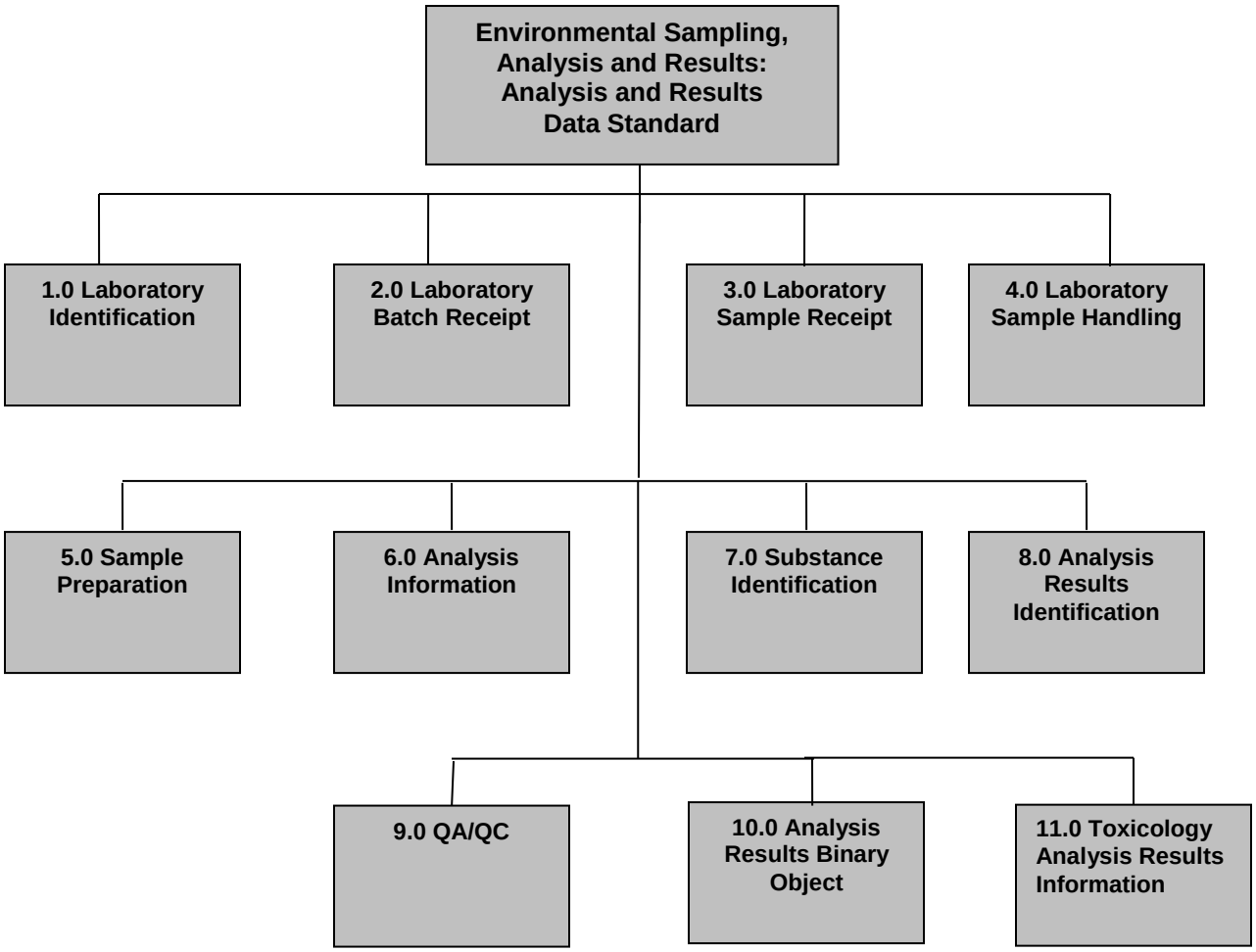
   Additional metadata for codes may include:

   - Code List Identifier, which is a standardized reference to the context or source of the set of codes
   - Code List Version Identifier, which identifies the particular version of the set of codes.
   - Code List Version Agency Identifier, which identifies the agency responsible for maintaining the set of codes
   - Code List Name, which describes the corresponding name for which the code represents

e. Appendix A, ESAR: Analysis and Results Structure Diagram, illustrates the hierarchical classification of the data standard. This diagram enables business and technical users of this standard to quickly understand its general content and complexity. Appendix B, lists the references for the ESAR Analysis and Results Data Standard.

2.0 ENVIRONMENTAL SAMPLING, ANLYSIS AND RESULTS: ANALYSIS AND RESULTS DIAGRAM

This diagram specifies the major data groups that may be used to identify the characteristics and/or to catalog ESAR: Analysis and Results.



3.0 ENVIRONMENTAL SAMPLING, ANALYSIS AND RESULTS: ANALYSIS AND RESULTS DATA STANDARD TABLE

1.0 Laboratory Identification

Definition: Identifying information of the entity or person responsible for the analysis.
Relationships: None.
Notes: None.
XML Tag: LaboratoryIdentification

Data Element Name	Data Element Definitions	Notes	Format	XML Tags
1.1 Laboratory Identifier	A designator used to uniquely identify the laboratory doing the analysis.	*Note:* Based on the business need, additional metadata may be required to sufficiently describe an identifier. This additional metadata is described in the Introduction section 1.6.d.	A	LaboratoryIdentifier
1.2 Laboratory Organization Contact	The principal organization to contact with questions about this laboratory analysis data.	Refer to the **Contact Information [EX000019.2] Data Standard**. The following items may be needed: Individual Full Name Organization Formal Name Affiliation Type Mailing Address Supplemental Address Text Mailing Address City Name Mailing Address State Name Mailing Address State Code Mailing Address Country Name, Mailing Address Country Code Mailing Address Zip Code/International Postal Code Telephone Number Telephone Number Type name Electronic Address Text Electronic Address Type Name	G	LaboratoryOrganizationContact

Data Element Name	Data Element Definitions	Notes	Format	XML Tags
1.3 Laboratory Type Text	The classification of the laboratory.	Example List of Values: • Continuous monitoring • Field • Mobile • Fixed	A	LaboratoryTypeText
1.4 Laboratory Accreditation Authority Name	An outside accreditation authority identifier.	Example List of Values: • NELAP • A2LA • Nebraska DEQ	A	LaboratoryAccreditationAuthorityName
1.5 Laboratory Accreditation Identifier	The number given to the laboratory by the accreditation authority.	Example List of Values: • Certificate No. 1234-01 • US100002-001	A	LaboratoryAccreditationIdentifier

2.0 Laboratory Batch Receipt

Definition: Information concerning the arrival of a batch of samples to the lab.
Relationships: None.
Notes: None.
XML Tag: LaboratoryBatchReceipt

Data Element Name	Data Element Definitions	Notes	Format	XML Tags
2.1 Batch Receipt Identifier	A designator assigned by the laboratory used to identify a group of samples received by the laboratory that will allow the batch to be linked with the applicable sample, monitoring location, project, and result.	*Note:* Based on the business need, additional metadata may be required to sufficiently describe an identifier. This additional metadata is described in the Introduction section 1.6.d.	A	BatchReceiptIdentifier

Data Element Name	Data Element Definitions	Notes	Format	XML Tags
2.2 Batch Recipient	An identifier or name of the person accepting the batch.	Refer to the **Contact Information [EX000019.2] Data Standard**. The following items may be needed: Individual Full Name Organization Formal Name Affiliation Type Mailing Address Supplemental Address Text Mailing Address City Name Mailing Address State Name Mailing Address State Code Mailing Address Country Name, Mailing Address Country Code Mailing Address Zip Code/International Postal Code Telephone Number Telephone Number Type name Electronic Address Text Electronic Address Type Name	G	BatchRecipient
2.3 Batch Received Date	The calendar date when the batch was accepted at the laboratory.	Reported as 4-digit year, 2-digit month, and 2-digit day. The **Representation of Date and Time [EX000013.1] Data Standard** will apply anytime a date is reported.	D	BatchReceivedDate
2.4 Batch Received Time	The local time when the batch was accepted at the laboratory.	The **Representation of Date and Time [EX000013.1] Data Standard** will apply anytime a date is reported.	D	BatchReceivedTime
2.5 Number of Shipping Containers Received	The quantity of shipping containers received within a batch.		N	NumberShippingContainersReceivedNumeric

Data Element Name	Data Element Definitions	Notes	Format	XML Tags
2.6 Sample Count Received in Batch Text	The quantity of samples in the batch (each with a unique Sample Identifier from Field Activity 7.1) received by the laboratory.	Example List of Values: • 10 amber jars	A	SamplesCountReceivedInBatchText
2.7 Batch Receipt Exception Indicator	A flag indicating an exception to the condition or expected batch receipt procedures that might affect analytical results.	Permitted List of Values: • Y - yes • N - no	A	BatchReceiptExceptionIndicator
2.8 Batch Receipt Comment Text	Text describing the reason for the "Batch Receipt Exception Indicator" being set to Y, or other characteristics of the batch that should be noted if the "Batch Receipt Exception Indicator" being set to N.	This will be required if the "Batch Receipt Exception Indicator" data element is "Y". Example List of Values: Cooler seals broken upon arrival	A	BatchReceiptCommentText

3.0 Laboratory Sample Receipt

Definition: Information concerning the receipt and condition of sample(s) in a batch by the laboratory.
Relationships: None.
Notes: None.
XML Tag: LaboratorySampleReceipt

Data Element Name	Data Element Definitions	Notes	Format	XML Tags
3.1 Laboratory Sample Identifier	A designator assigned to a sample by the laboratory that will ensure that each received sample can be linked with the applicable monitoring location, project and result.	*Note:* Sample Identifier from Field Activity 7.1, must be linked to this element. *Note:* Based on the business need, additional metadata may be required to sufficiently describe an identifier. This additional metadata is described in the Introduction section 1.6.d.	A	LaboratorySampleIdentifier

3.2 Sample Receipt Condition

Definition: Identifying information on the acceptability of sample condition and preservation upon receipt at laboratory.

Relationships: None.

Notes: None.

XML Tag: SampleReceiptCondition

Data Element Name	Data Element Definitions	Notes	Format	XML Tags
3.2.1 Condition Measured Text	Identifies observations or measurements noted for the sample when received.	Example List of Values: • Temperature • pH • Chlorine residual	A	ConditionMeasuredText
3.2.2 Condition Measurement	Quantitative measurement of the condition being determined.	Refer to the **Measure [EX000010.1] Data Standard.** The following items may be needed: Measure Value, Measure Unit Code, Measure Qualifier Code Measure QA/QC	G	ConditionMeasurement
3.2.3 Container Receipt Condition Comment Text	Text that describes any observable problems with the sample's condition as received by the laboratory.	Example List of Values: • Sample jar was cracked from partial thaw in cooler	A	ContainerReceiptConditionCommentText

4.0 Laboratory Sample Handling

Definition: Identifying information on the sample handling procedures performed in the laboratory prior to preparing a sample for analysis

Relationships: None.

Notes: *Note 1:* Multiple treatments may be identified. Example treatment types include: freezing, homogenization, centrifugation, filtration or chemical surrogate addition.

Note 2: Sample handling is distinct from sample preparation.

Note 3: Reference the Sample Handling [EX000014.1] Data Standard

The following items may be needed:

Sample Handling Method
Sample Handling Amount
Sample Handling Date/Time
Chemical Preservative Used
Thermal Preservative Used

Note 4: When laboratory sample handling procedures involve sample compositing, additional data tracking may be required to fully capture the field composite activities and composite components. Please refer to the Compositing [EX000008.1] Data Standard for these additional data elements.

XML Tag: LaboratorySampleHandling

5.0 Sample Preparation

Definition: Information related to the preparation of the sample for analysis.
Relationships: None.
Notes: None.
XML Tag: SamplePreparation

Data Element Name	Data Element Definitions	Notes	Format	XML Tags
5.1 Preparation Contact	The name or code representing the person who can be contacted for information concerning the preparation of the sample.	Refer to the **Contact Information [EX000019.2] Data Standard**. The following items may be needed: Individual Full Name Organization Formal Name Affiliation Type Mailing Address Supplemental Address Text Mailing Address City Name Mailing Address State Name Mailing Address State Code Mailing Address Country Name, Mailing Address Country Code Mailing Address Zip Code/International Postal Code Telephone Number Telephone Number Type name Electronic Address Text Electronic Address Type Name	G	PreparationContact

Data Element Name	Data Element Definitions	Notes	Format	XML Tags
5.2 Preparation Type Text	A client defined code or name used to define the type of preparation.	*Note:* This code is used to identify the specific preparation procedure used. Example List of Values: • Extraction • Digestion • Clean-up	A	PreparationTypeText
5.3 Sample Preparation Method	Identifying information about the method(s) followed to prepare a sample for analysis.	Refer to the **Method [EX000011.1] Data Standard**. The following items may be needed: Method Identifier Method Name Method Description Text Method Deviation Method Reference	G	SamplePreparationMethod
5.4 Preparation Batch Identifier	A designator assigned by the laboratory to uniquely identify a batch of samples that are prepared together for analysis by one method.	Example List of Values: • MB-VOA-20031115 *Note:* Together it can imply similarity of time, place or manner of preparation. The identifier will ensure that each received sample and subsequent results will be related to the monitoring location and project if applicable. *Note:* Based on the business need, additional metadata may be required to sufficiently describe an identifier. This additional metadata is described in the Introduction section 1.6.d.	A	PreparationBatchIdentifier

Data Element Name	Data Element Definitions	Notes	Format	XML Tags
5.5 Preparation Start Date	The calendar date of the preparation/extraction of the sample for analysis began.	*Note:* If the sample was prepared over a range of dates, this is the start date. Reported as 4-digit year, 2-digit month, and 2-digit day. The **Representation of Date and Time [EX000013.1] Data Standard** will apply anytime a date is reported.	D	PreparationStartDate
5.6 Preparation Start Time	The local time when the preparation/extraction of the sample for analysis began.	*Note:* If the sample was prepared over a range of time, this is the start time. The **Representation of Date and Time [EX000013.1] Data Standard** will apply anytime a date is reported.	D	PreparationStartTime
5.7 Preparation End Date	The calendar date when the preparation/extraction of the sample for analysis was finished.	*Note:* If the sample was prepared/extracted over a range of dates, this is the end date. Reported as 4-digit year, 2-digit month and 2-digit day. The **Representation of Date and Time [EX000013.1] Data Standard** will apply anytime a date is reported.	D	PreparationEndDate
5.8 Preparation End Time	The local time when the preparation/extraction of the sample for analysis was finished.	*Note:* If the sample was prepared/extracted over a range of times, this is the end time. The **Representation of Date and Time [EX000013.1] Data Standard** will apply anytime a date is reported.	D	PreparationEndTime
5.9 Sample Preparation Initial Amount	The initial amount (weight or volume) of sample subjected to preparation.	Refer to the **Measure [EX000010.1] Data Standard.** The following items may be needed: Measure Value Measure Unit Code Measure Qualifier Code Measure QA/QC	G	SamplePreparationInitialAmount

Data Element Name	Data Element Definitions	Notes	Format	XML Tags
5.10 Sample Preparation Final Amount	The final amount (weight or volume) of sample remaining as the result of preparation step(s).	Refer to the **Measure [EX000010.1] Data Standard.** The following items may be needed: Measure Value Measure Unit Code Measure Qualifier Code Measure QA/QC	G	SamplePreparationFinalAmount

6.0 Analysis Information

Definition: Identifying information on the analysis method and procedures for a specific sample or group of samples.
Relationships: None.
Notes: None.
XML Tag: AnalysisInformation

Data Element Name	Data Element Definitions	Notes	Format	XML Tags
6.1 Analysis Contact	The name or code representing the person who can be contacted concerning information related to the analysis results.	Refer to the **Contact Information [EX000019.2] Data Standard**. The following items may be needed: Individual Full Name Organization Formal Name Affiliation Type Mailing Address Supplemental Address Text Mailing Address City Name Mailing Address State Name Mailing Address State Code Mailing Address Country Name, Mailing Address Country Code Mailing Address Zip Code/International Postal Code Telephone Number Telephone Number Type name Electronic Address Text Electronic Address Type Name *Note:* Based on the business need, additional metadata may be required to sufficiently describe an identifier. This additional metadata is described in the Introduction section 1.6.d.	G	AnalysisContact

Data Element Name	Data Element Definitions	Notes	Format	XML Tags
6.2 Analysis Batch Identifier	A designator assigned by the laboratory used to uniquely identify a batch of analyses performed on one instrument associated with the level of detail at which the instrument is checked to be in control.	Example List of Values: • 26C030598 *Note:* A workgroup ID for analyses QC'd by the same continuing calibration, continuing calibration verification, or similar instrument QC. If multiple batches are analyzed in a continuous sequence, this represents the start of any given analysis batch. The identifier will ensure that each received sample and subsequent results will be related to the monitoring location and project if applicable. *Note:* Based on the business need, additional metadata may be required to sufficiently describe an identifier. This additional metadata is described in the Introduction section 1.6.d.	A	AnalysisBatchIdentifier
6.3 Sample Analytical Method	Identifying information on the sample analysis method procedures.	Reference the **Method [EX000011.1] Data Standard.** The following items may be needed: Method Identifier Method Name Method Description Text Method Deviation Method Reference	G	SampleAnalyticalMethod

Data Element Name	Data Element Definitions	Notes	Format	XML Tags
6.4 Analysis Equipment	Lab defined identifier or description of the instrument or equipment used for analysis.	Refer to the **Equipment [EX000009.1] Data Standard.** The following items may be needed: Equipment Identifier Equipment Name Equipment Description Equipment Type Equipment Characteristics Equipment Calibration Example List of Values: • ICP • GC/MS-Lab 1	G	AnalysisEquipment
6.5 Analysis Group Type Text	Name for a group of parameters commonly reported together either for a programmatic, administrative, or chemical relationships.	Also potentially called “Group Test Code” or “Test Identifier Text”. Example List of Values: • VOA • RCRA 8 metals • Nutrients	A	AnalysisGroupTypeText
6.6 Analysis Matrix Text	Name, code, or description of the matrix of the sample analyzed.	Example List of Values: • Liquid • Solid • Gaseous • Biota • Tissue	A	AnalysisMatrixText

Data Element Name	Data Element Definitions	Notes	Format	XML Tags
6.7 Sample Analyzed Amount	The amount (weight or volume) of a prepared extract that is used for analysis.	Refer to the **Measure [EX000010.1] Data Standard.** The following items may be needed: Measure Value Measure Unit Code Measure Qualifier Code Measure QA/QC	G	SampleAnalyzedAmount
6.8 Analysis Start Date	The calendar date when the analysis began.	Reported as 4-digit year, 2-digit month, and 2-digit day. The **Representation of Date and Time [EX000013.1] Data Standard** will apply anytime a date is reported.	D	AnalysisStartDate
6.9 Analysis Start Time	The local time when the analysis began.	The **Representation of Date and Time [EX000013.1] Data Standard** will apply anytime a date is reported.	D	AnalysisStartTime
6.10 Analysis End Date	The calendar date when the analysis was finished.	Reported as 4-digit year, 2-digit month, and 2-digit day. The **Representation of Date and Time [EX000013.1] Data Standard** will apply anytime a date is reported.	D	AnalysisEndDate
6.11 Analysis End Time	The local time when the analysis was finished.	The **Representation of Date and Time [EX000013.1] Data Standard** will apply anytime a date is reported.	D	AnalysisEndTime
6.12 Analysis Comments Text	General comments for the analysis, not necessarily related to a particular substance.	Example List of Values: • Noticed sample darkened in color after sitting for 18 hours	A	AnalysisCommentsText

7.0 Substance Identification

Definition: Identification information for a chemical, biological, or radiological substance or other entity included in the analysis.

Relationships: None.

Notes: Multiple values may be allowed.

For additional detailed data tracking needs specific to a chemical or biological substance, refer to the **Chemical Identification [EX000016.2] Data Standard** and **Biological Taxonomy [EX000018.2] Data Standard**.

XML Tag: SubstanceIdentification

Data Element Name	Data Element Definitions	Notes	Format	XML Tags
7.1 Substance Identifier	A designator used to uniquely identify a substance.	Example List of Values: • 71-43-2 • 7440-38-2 *Note:* Refer to the Chemical Identification Data Standard and the Biological Identification Data Standard *Note:* Based on the business need, additional metadata may be required to sufficiently describe an identifier. This additional metadata is described in the Introduction section 1.6.d.	A	SubstanceIdentifier
7.2 Substance Name	The name assigned to a chemical, biological or radiological substance or feature that describes it in terms of its molecular composition, taxonomic nomenclature or other characteristic.	Example List of Values: • Benzene • Arsenic *Note:* Refer to the **Chemical Identification [EX000016.2] Data Standard** and **Biological Taxonomy [EX000018.2] Data Standard**.	G	SubstanceName

8.0 Analysis Results Identification

Definition: The report of the results of the laboratory analysis.

Relationships: None.

Notes: None.

XML Tag: AnalysisResultsIdentification

Data Element Name	Data Element Definitions	Notes	Format	XML Tags
8.1 Test Result Type	Indicator of the kind of test result being reported.	Example List of Values: • Analytical target • Analytical surrogate • Field • Tentatively Identified Compounds • Derived data • Positive Control	A	TestResultType
8.2 Result Value Measure	The reportable measure of the result for the chemical, microbiological or other characteristic being analyzed.	Reference the **Measure [EX000010.1] Data Standard.** The following items may be needed: Measure Value Measure Unit Code Measure Qualifier Code Measure QA/QC	G	ResultValueMeasure
8.3 Result Basis Category	Type of result basis.	Example List of Values: • Fraction • Particle Size • Weight *Note:* Multiples of Result Basis Category and Result Basis Name may be allowed.	A	ResultBasisCategoryType
8.4 Result Basis Name	The basis upon which the results were calculated, within the Result Basis Category.	Example List of Values: • Wet • Dry • Total • Dissolved *Note:* Multiples of Result Basis Category and Result Basis Name may be allowed.	A	ResultBasisName

Data Element Name	Data Element Definitions	Notes	Format	XML Tags
8.5 Result Status Identifier	Indicates the acceptability of the result with respect to QA/QC criteria.	Example List of Values: • Accepted • Validated • Rejected • Preliminary • Unvalidated	A	ResultStatusIdentifier
8.6 Result Status Authority Name	The person who indicates the acceptability of the data.		A	ResultStatusAuthorityName
8.7 Result Status Authority Type	The title or classification of a person who indicates the acceptability of the data.	Example List of Values: • QA Officer • Laboratory Manager • Independent Reviewer • Customer Reviewer	A	ResultStatusAuthorityType
8.8 Result Status Date	The date on which the person indicated the acceptability of the data.	The **Representation of Date and Time [EX000013.1] Data Standard** will apply anytime a date is reported	D	ResultStatusDate
8.9 Result Status Reason Text	Text description of the result status, potentially indicating why the result was rejected or accepted.	Example List of Values: • Analyzed beyond holding time.	A	ResultStatusReasonText

Data Element Name	Data Element Definitions	Notes	Format	XML Tags
8.10 Statistical Base Code	Identifier or code for the method used to calculate derived results.	Example List of Values: • ToxStat • Annual Average • 90th Percentile • Mean • Quarterly Basis • N/A *Note:* Based on the business need, additional metadata may be required to sufficiently describe an identifier. This additional metadata is described in the Introduction section 1.6.d.	A	StatisticalBaseCode
8.11 Substance Dilution Factor Numeric	The overall dilution of the substance subjected to this analysis.	*Note:* A value of one corresponds to nominal conditions for the method. Values greater than one correspond to dilutions. Values less than one correspond to concentrations. Example List of Values: • 10 • 0.10	N	SubstanceDilutionFactorNumeric
8.12 Substance Analysis Comments Text	Comments related to the analysis of a particular substance.	Example List of Values: • TKN analysis run beyond hold time per client request	A	SubstanceAnalysisCommentsText
8.13 Detection Limit	Constituent concentration that produces a signal sufficiently greater than the blank and can be detected within specified levels by good laboratories during routine operating conditions.	Refer to the **Measure [EX000010.1] Data Standard.** The following items may be needed: Measure Value Measure Unit Code Measure Qualifier Code Measure QA/QC	G	DetectionLimit

Data Element Name	Data Element Definitions	Notes	Format	XML Tags
8.14 Detection Limit Type	One of a list of client, regulation, or organization defined acronyms or statistic methodologies that specify the type of detection limit used for analysis.	Example List of Values: • Instrument Detection Level (IDL) • Method Detection Level (MDL) • Estimated Detection Level • Limit of Detection • Long-term Method Detection Level • Other Entries as Applicable *Note:* Based on the business need, additional metadata may be required to sufficiently describe a detection limit. This additional metadata is described in the Introduction section 1.6.d.	A	DetectionLimitType
8.15 Reporting Limit	Constituent concentration that, when processed through the complete method, produces a signal that is statistically different from a blank.	Reference the **Measure [EX000010.1] Data Standard.** The following items may be needed: Measure Value Measure Unit Code Measure Qualifier Code Measure QA/QC	G	ReportingLimit
8.16 Reporting Limit Type	One of a list of client, regulation, or organization defined acronyms or statistical methodologies that specify the type of reporting limit.	Example List of Values: • PQL • SQL • MRL *Note:* Based on the business need, additional metadata may be required to sufficiently describe a reporting limit. This additional metadata is described in the Introduction section 1.6.d.	A	ReportingLimitType

9.0 QA/QC

Definition: Technical, assessment, and reporting activities that ensure the results meet the user's defined standard of quality.

Relationships: None.

Notes: None.

XML Tag: QAQC

9.1 Batch QC

Definition: Quality control samples associated with a batch of samples.

Relationships: None.

Notes: None.

XML Tag: BatchQC

Data Element Name	Data Element Definitions	Notes	Format	XML Tags
9.1.1 Batch QC Type	Method defined name for QC related to a batch of samples.	Example List of Values: • Initial Calibration • Lab Reagent Blank • BFB Tune • Continuing Calibration • Verification • Digestion Blank • Matrix Spike • Matrix Spike Duplicate	A	BatchQCType

Data Element Name	Data Element Definitions	Notes	Format	XML Tags
9.1.2 Batch QC Identifier	A designator assigned by the laboratory used to uniquely identify the QC samples associated with the batch.	The identifier will ensure that the QC can be related back to each associated sample in a batch of samples. This should be linked to the 3.1 Laboratory Sample Identifier. Example List of Values: • An instrument generated data file name such as: 11200301 • A lab assigned code such as: ICP112003-01MS, or ICP112003-01MSD *Note:* Based on the business need, additional metadata may be required to sufficiently describe a reporting limit. This additional metadata is described in the Introduction section 1.6.d.	A	BatchQCIdentifier

9.2 QA/QC Analysis Results

Definition: The QA/QC related field pertaining to a particular substance determination within a sample.

Relationships: None.

Notes: None.

XML Tag: QAQCAnalysisResults

Data Element Name	Data Element Definitions	Notes	Format	XML Tags
9.2.1 Spike Amount or Dose Added	Amount of spike material added for a specific substance of interest to a sample to determine substance recovery from a matrix.	Units for spike amount or dose added should be the same as those of the result value. Reference the **Measure [EX000010.1] Data Standard.** The following items may be needed: Measure Value Measure Unit Code Measure Qualifier Code Measure QA/QC	G	SpikeAmountDoseAdded

Data Element Name	Data Element Definitions	Notes	Format	XML Tags
9.2.2 Original Sample Identifier	A designator used to uniquely identify the original sample that was selected to be the matrix spike or matrix spike duplicate so that its result value(s) can be linked to those of the spiked sample.	*Note:* Based on the business need, additional metadata may be required to sufficiently describe an identifier. This additional metadata is described in the Introduction section 1.6.d.	A	OriginalSampleIdentifier
9.2.3 QC Batch Exception Indicator	A flag indicating an exception to the quality control results.	List of Permitted Values: • Y – yes • N – no	A	QCBatchExceptionIndicator
9.2.4 QC Batch Exception Comments Text	Explanation of any QC anomalies.	Example List of Values: • Low MS recovery due to matrix interference	A	QCBatchExceptionCommentsText

10.0 Analysis Results Binary Object

Definition: Refer to documents, images, maps, photos, laboratory materials, geospatial coverages, and other objects within the data submission that pertain to the laboratory analyses.
Relationships: None.
Notes: Refer to the **Attached Binary Object [EX00006.1] Data Standard**.
Multiple objects may be attached to data submission for the analyses included in the submission. Where a binary object is attached, both the type code and the title of the file must be provided. Attached Binary Object descriptors will adhere to the specified technical standards.
XML Tag: AnalyticsResultsBinaryObject

11.0 Toxicology Analysis Results Identification

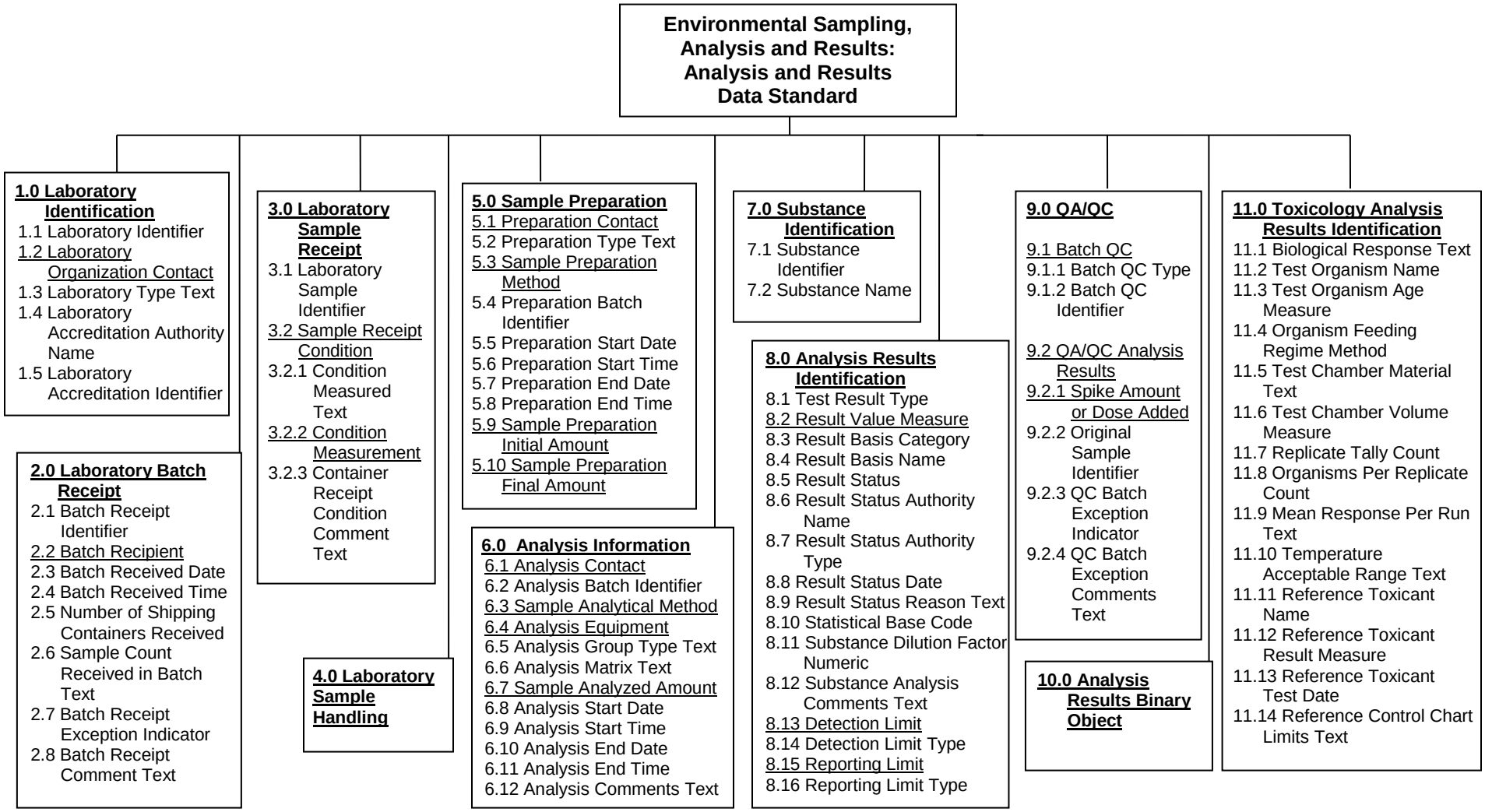
Definition: The report of the results of toxicology analysis.
Relationships: None.
Notes: None.
XML Tag: ToxicologyAnalysisResultsIdentification

Data Element Name	Data Element Definitions	Notes	Format	XML Tags
11.1 Biological Response Text	Type of organism response measured in the test, e.g., survival, reproduction, growth (e.g., dry weight), fertilization.		A	BiologicalResponseText
11.2 Test Organism Name	Taxonomic name of organism(s) to which a stressor is applied for toxicity analysis.	*Note:* Refer to the **Biological Taxonomy [EX000018.2] Data Standard**.	G	TestOrganismName
11.3 Test Organism Age Measure	Age of organisms at test initiation.	Reference the **Measure [EX000010.1] Data Standard.** The following items may be needed: Measure Value Measure Unit Code Measure Qualifier Code Measure QA/QC	G	TestOrganismAgeMeasure
11.4 Organism Feeding Regime Method	Text specifying type and rate of feeding and whether organisms were fed as per cited protocol.	Reference the **Method [EX000011.1] Data Standard.** The following items may be needed: Method Identifier Method Name Method Description Text Method Deviation Method Reference	G	OrganismFeedingRegimeMethod
11.5 Test Chamber Material Text	Text indicating type of material with which test chambers made.	Example List of Values: • HDPE plastic • stainless steel • Teflon • glass	A	TestChamberMaterialText

Data Element Name	Data Element Definitions	Notes	Format	XML Tags
11.6 Test Chamber Volume Measure	Volume of solution or sediment/ soil that the test chamber can hold.	Reference the **Measure [EX000010.1] Data Standard.** The following items may be needed: Measure Value Measure Unit Code Measure Qualifier Code Measure QA/QC	G	TestChamberVolumeMeasure
11.7 Replicate Tally Count	Total number of separate replicates tested for each test concentration or sample.		N	ReplicateTallyCount
11.8 Organisms Per Replicate Count	Number of test organisms exposed to material in each test chamber.		N	OrganismsPerReplicateCount
11.9 Mean Response Per Run Text	Description of the mean response for each replicate and treatment in the test to which the result value applies.		A	MeanResponsePerRunText
11.10 Temperature Acceptable Range Text	Description of the target temperature value and acceptable range.		A	TemperatureAcceptableRangeText
11.11 Reference Toxicant Name	Text indicating material used in reference toxicant testing.		A	ReferenceToxicantName
11.12 Reference Toxicant Result Measure	Endpoint or result for corresponding reference toxicant test.	Reference the **Measure [EX000010.1] Data Standard.** The following items may be needed: Measure Value Measure Unit Code Measure Qualifier Code Measure QA/QC	G	ReferenceToxicantResultMeasure
11.13 Reference Toxicant Test Date	Date on which the associated reference toxicant test was initiated.	The **Representation of Date and Time [EX000013.1] Data Standard** will apply anytime a date is reported	D	ReferenceToxicantTestDate

Data Element Name	Data Element Definitions	Notes	Format	XML Tags
11.14 Reference Control Chart Limits Text	Description of the 95% confidence interval for Reference Toxicant Result Measure.		A	ReferenceControlChartLimitsText

Appendix A
Environmental Sampling, Analysis and Results: Analysis and Results Structure Diagram


Environmental Sampling, Analysis and Results: Analysis and Results Data Standard
1.0 Laboratory Identification
1.1 Laboratory Identifier
1.2 Laboratory Organization Contact
1.3 Laboratory Type Text
1.4 Laboratory Accreditation Authority Name
1.5 Laboratory Accreditation Identifier
2.0 Laboratory Batch Receipt
2.1 Batch Receipt Identifier
2.2 Batch Recipient
2.3 Batch Received Date
2.4 Batch Received Time
2.5 Number of Shipping Containers Received
2.6 Sample Count Received in Batch Text
2.7 Batch Receipt Exception Indicator
2.8 Batch Receipt Comment Text
3.0 Laboratory Sample Receipt
3.1 Laboratory Sample Identifier
3.2 Sample Receipt Condition
3.2.1 Condition Measured Text
3.2.2 Condition Measurement
3.2.3 Container Receipt Condition Comment Text
4.0 Laboratory Sample Handling
5.0 Sample Preparation
5.1 Preparation Contact
5.2 Preparation Type Text
5.3 Sample Preparation Method
5.4 Preparation Batch Identifier
5.5 Preparation Start Date
5.6 Preparation Start Time
5.7 Preparation End Date
5.8 Preparation End Time
5.9 Sample Preparation Initial Amount
5.10 Sample Preparation Final Amount
6.0 Analysis Information
6.1 Analysis Contact
6.2 Analysis Batch Identifier
6.3 Sample Analytical Method
6.4 Analysis Equipment
6.5 Analysis Group Type Text
6.6 Analysis Matrix Text
6.7 Sample Analyzed Amount
6.8 Analysis Start Date
6.9 Analysis Start Time
6.10 Analysis End Date
6.11 Analysis End Time
6.12 Analysis Comments Text
7.0 Substance Identification
7.1 Substance Identifier
7.2 Substance Name
8.0 Analysis Results Identification
8.1 Test Result Type
8.2 Result Value Measure
8.3 Result Basis Category
8.4 Result Basis Name
8.5 Result Status
8.6 Result Status Authority Name
8.7 Result Status Authority Type
8.8 Result Status Date
8.9 Result Status Reason Text
8.10 Statistical Base Code
8.11 Substance Dilution Factor Numeric
8.12 Substance Analysis Comments Text
8.13 Detection Limit
8.14 Detection Limit Type
8.15 Reporting Limit
8.16 Reporting Limit Type
9.0 QA/QC
9.1 Batch QC
9.1.1 Batch QC Type
9.1.2 Batch QC Identifier
9.2 QA/QC Analysis Results
9.2.1 Spike Amount or Dose Added
9.2.2 Original Sample Identifier
9.2.3 QC Batch Exception Indicator
9.2.4 QC Batch Exception Comments Text
10.0 Analysis Results Binary Object
11.0 Toxicology Analysis Results Identification
11.1 Biological Response Text
11.2 Test Organism Name
11.3 Test Organism Age Measure
11.4 Organism Feeding Regime Method
11.5 Test Chamber Material Text
11.6 Test Chamber Volume Measure
11.7 Replicate Tally Count
11.8 Organisms Per Replicate Count
11.9 Mean Response Per Run Text
11.10 Temperature Acceptable Range Text
11.11 Reference Toxicant Name
11.12 Reference Toxicant Result Measure
11.13 Reference Toxicant Test Date
11.14 Reference Control Chart Limits Text

Appendix B
References

i. *ISO/IEC 2382-17:1999 Information Technology Vocabulary—Part 17: Databases 17.06.*