

# **FINAL QUALITY ASSURANCE and QUALITY CONTROL DATA STANDARD**

**Standard No.: EX000012.2**

**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 <http://www.exchangenetwork.net> and [www.epa.gov/datastandards](http://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 data elements and describes quantitative statistics and qualitative descriptors that are used to interpret the degree of acceptability or utility of data to the user.

### 1.2 Revision History

Date	Version	Description
January 6, 2006	EX000012.1	Initial Environmental Data Standards Council Adoption
February 4, 2010	EX000012.2	Modification of data standard to incorporate additional water quality and biological related data elements.

### 1.3 References to Other Data Standards

None.

## 1.4 Terms and Definitions

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

<b><u>Term</u></b>	<b><u>Definition</u></b>
Quality Assurance (QA)	The system implemented by an organization which assures outside bodies that the data generated is of proven and known quality and meets the needs of the end user. This assurance relies heavily on documentation of processes, procedures, capabilities, and monitoring of such.
Quality Control (QC)	Those operations undertaken in the laboratory or field to ensure that the data produced are within known measures of accuracy and precision. These operations may include calibration, method blanks, matrix spikes, blank spikes, surrogates, duplicates, system checks, as well as others.

## 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 Quality Assurance and Quality Control Diagram, illustrates the principal data groupings contained within this standard.
- b. Section 3.0 Quality Assurance and Quality Control Data Standard Table, provides information on the high level, intermediate and elemental Quality Control and Quality Assurance 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 the number of characters for the associated data element, where "A" specifies alphanumeric, "N" designates numeric, and "G" and "D" are used for grouping and date respectively.
- 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

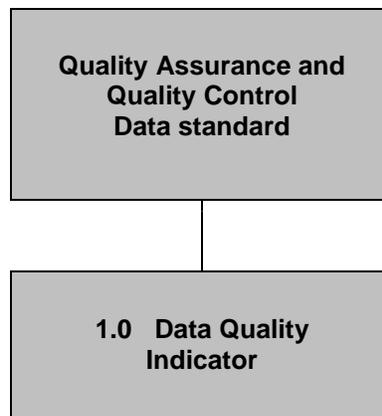
Additional metadata for codes may include:

- 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, Quality Assurance and Quality Control Data Standard Structure Diagram illustrates the hierarchical classification of the QA/QC 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 Quality Assurance and Quality Control Data Standard.

## 2.0 QUALITY ASSURANCE AND QUALITY CONTROL DATA STANDARD DIAGRAM

This diagram specifies the major data groups that may be used to identify the characteristics and/or to catalog quality assurance and quality control.



### 3.0 QUALITY ASSURANCE AND QUALITY CONTROL DATA STANDARD TABLE

#### 1.0 Data Quality Indicator

Definition: The quantitative statistics and qualitative descriptors that are used to interpret the degree of acceptability or utility of data to the user.

Relationships: None.

Notes: None.

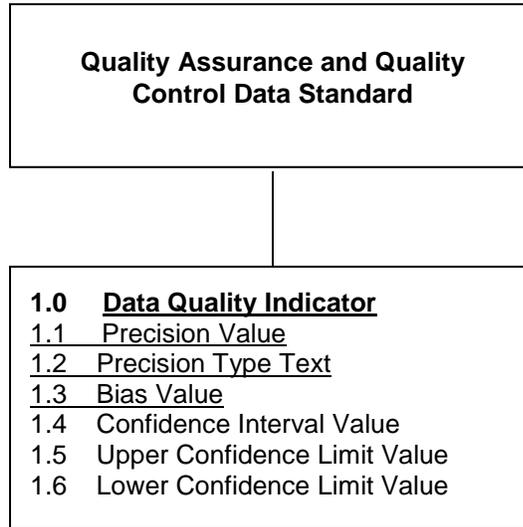
XML Tag: DataQualityIndicator

Data Element Name	Data Element Definitions	Notes	Format	XML Tags
1.1 Precision Value	A measure of mutual agreement among individual measurements of the same property usually under prescribed similar conditions.	<p><i>Note:</i> This measure is the random component of error.</p> <p>Example: Relative Percent Difference (RPD or <math>d_i</math>), where X is the primary value and Y is the duplicate:</p> $d_i = \frac{Y_i - X_i}{(Y_i + X_i)/2} \times 100$	N	PrecisionValue
1.2 Precision Type Text	Classifies the type of precision measurement as either intratest or intertest.	<p>Permissible Values List:</p> <ul style="list-style-type: none"> <li>• Intratest</li> <li>• Intertest</li> </ul>	A	PrecisionTypeText
1.3 Bias Value	The systematic or persistent distortion of a measurement process which causes error in one direction.	<p><i>Note:</i> Bias will be determined by estimating the positive and negative deviation from the true value as a percentage of the true value.</p> <p>Example: Percent Difference, where X is the known or spiked amount, and Y is the measured concentration:</p> $d_i = \frac{Y_i - X_i}{X_i} \times 100$	N	BiasValue

Data Element Name	Data Element Definitions	Notes	Format	XML Tags
1.4 Confidence Interval Value	A range of values constructed so that this range has a specified probability of including the true population mean.	<p><i>Note:</i> This range is symmetric about the sample mean, the specified probability is called the confidence level, and the end points of the confidence interval are called the upper and lower confidence limits.</p> <p>Confidence limit may be calculated as:</p> $\bar{X} \pm (t\_value * stdev / \sqrt{n})$	N	ConfidenceIntervalValue
1.5 Upper Confidence Limit Value	Value of the upper end of the confidence interval.	See 1.3 Confidence Interval	N	UpperConfidenceLimitValue
1.6 Lower Confidence Limit Value	Value of the lower end of the confidence interval.	See 1.3 Confidence Interval	N	LowerConfidenceLimitValue

## Appendix A

### Quality Assurance and Quality Control Data Standard Structure Diagram



## **Appendix B References**

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