Data Quality Assessment Elements for Identification of Impaired Surface Waters

DEP EAS 01-01

The Department relies on environmental data from a variety of sources to carry out its mission. Those data must satisfy the needs for which they were collected, comply with applicable standards, specifications and statutory requirements, and reflect a consideration of cost and economics. Careful project planning, and routine project and data reviews, are essential to ensure that the data collected are relevant to the decisions being made.

Many aspects of a project affect data quality. Sampling design, selection of parameters, sampling technique, analytical methodologies and data management activities are a few such aspects, whether the data are being collected for a compliance program, or for research activities. The level of quality of each of those elements will affect the final management decisions that are based on a project's outcome. Data quality assessment is one activity that is instrumental in ensuring that data collected are relevant and appropriate for the decisions being made.

Depending on the needs of the project, the intended use of the final data and the degree of confidence required in the quality of the results, data quality assessment can be conducted at many levels. For the purposes of identification of impaired surface waters, the level of data quality assessment to be conducted (Table 1) requires providing the appropriate data elements (Table 2).

If the data and applicable data elements are in an electronic format, data quality assessments can be performed automatically on large volumes of data using software tools, without significant impact to staffing. Department programs can realize significant improvement in environmental protection without additional process using these types of reviews routinely.

Table 1: Recommended Quality Assessment Checks

Quality Test
Review to determine if analyses were conducted within holding times
Review for qualifiers indicative of problems
Screen comments for keywords indicative of problems
Review laboratory certification status for particular analyte at the time analysis was performed
Review data to determine if parts are significantly greater than the whole (e.g., ortho-P > total phosphorus, or NH_3 > TKN, dissolved metal > total metal)
Screen data for realistic ranges (e.g., is pH<14?)
Review detection limits and quantitation limits against Department criteria and program action levels to ensure adequate sensitivity
Review for blank contamination

Table 2: Data Elements Related to Quality Assessment

ID	Element	Description
1	Sample ID	Unique Field Sample Identifier
2	Parameter Name	Name of the parameter measured
3	Analytical Result	Result for the analytical measurement
4	Result Units	Units in which measurement is reported
5	DEP Qualifiers	Qualifier code describing specific QA conditions as reported by the data provider
6	Result Comments	Free-form text where data provider relates information they consider relevant to the result
7	Date (Time) of sample collection	
8	Date (Time) of sample preparation	
9	Date (Time) of sample analysis	
10	Analytical Method	Method number used for sample analysis
11	Prep Method	Method number used for sample preparation prior to analysis
12	Sample Matrix	Was the sample a surface water or groundwater sample, a freshwater or saltwater sample
13	DOH Certificate Number/Laboratory ID	Certificate number issued by the Department of Health's lab certification program
14	Preservatives Added	Description of the preservatives added to the sample after collection
15	MDL	Method detection limit for a particular result
16	PQL	Practical quantitation limit for a particular result
17	Sample Type	Field identifying sample nature (i.e., environmental sample, trip blank, field blank, matrix spike, etc.
18	Batch ID	Unambiguous reference linking samples prepared or analyzed together (e.g., trip, preparation, analysis batch Ids)
19	Field, Lab Blank Results	Results for field/laboratory blank analysis required by the methods
20	CAS Number	CAS registry number of the parameter measured