OFFICE OF WATER QUALITY TECHNICAL MEMORANDUM 2017.05

SUBJECT: Policy and guidance on making changes to laboratory results in the QWDATA Subsystem (QWDATA) of the National Water Information System (NWIS)

Purpose:

This memorandum reiterates the U.S. Geological Survey (USGS) and Office of Water Quality (OWQ) policies, practices, and procedures that data reviewers and approvers in USGS Water Science Centers (Centers) should follow in reviewing and changing laboratory results in QWDATA. These rules are important because NWISWeb, the publicly available version of NWIS, does not fully track changes made by USGS in QWDATA. These policies help protect public users of NWISWeb from retrieving different versions of laboratory data with minimal explanation as to why the changes were made.

Policy

OWQ Technical Memorandum (TM) 2008.05 requires that original scientific data be stored in NWIS for archival and other purposes. Follow USGS and OWQ policies and procedures on data management when laboratory results are reviewed for quality-control purposes prior to approval in QWDATA. Follow OWQ TM 2017.03 on documenting data revisions and changes applied after data have been approved.

By definition, the results from a synthesis of non-interpretive data are interpretive data when new findings are reached (Survey Manual, SM 502.8). QWDATA is a USGS approved database and should contain only non-interpretive scientific data. USGS Fundamental Science Practices provide definitions of non-interpretive and interpretive data and the appropriate outlets for their publication, respectively (SM 205.18).

1. Laboratory results stored in QWDATA should not be changed by data reviewers and approvers in Centers based on interpretation of laboratory and/or field quality-control results collected over time, but should remain as non-interpretive scientific data. Regardless of the outlet used for release of interpreted data, the laboratory data upon which they are based should be stored as appropriate in QWDATA, where they should appear as originally reported by the laboratory in almost all circumstances.

For example, data reviewers and approvers may seek to change laboratory results in QWDATA based on analysis of laboratory and field quality-control data sets collected over
time. The changes would address concerns that public users of NWISWeb may retrieve results that are either at or below the method reporting level (RL) for selected methods. USGS reporting conventions allow for reporting laboratory results below the RL if data are created using information-rich laboratory methods (as defined in Childress and others, 1999). As a remedy for these concerns, some Centers have sought to add a less than remark code (<) and/or to raise the concentration value to the laboratory RL (for example changing E0.1 to <0.1 or <1). Both changes would alter the original laboratory result in QWDATA.

The recommended approach to report interpreted data as described in the preceding example should be in data-series reports, open-file reports, supplemental materials, data releases, and other approved information products with appropriate supporting analyses and metadata (SM 1100.3, Appendix A).

2. The specific circumstances under which a data reviewer or approver in a USGS Center may change result-level laboratory data in QWDATA are identified in two OWQ technical memoranda. Only under the following conditions should data reviewers and approvers in USGS Centers make changes to result-level laboratory data and metadata in QWDATA.

In the event that any of these conditions warrant a change to QWDATA, the Center must investigate the source of the problem and take corrective action so that changes to laboratory results in QWDATA are rare.

a. OWQ TM 1997.08 identifies the case of systematic or incidental field contamination. Use a “V” remark code with a laboratory result when there is documented evidence that sample results are directly affected by field contamination. However, the associated concentration (value) should not be changed in QWDATA. V-coded data are released to the public in NWISWeb.

In practice, a V remark code indicates that the sample result can be used with caution for some purposes. For example, a V-coded result that is well below that of a water-quality criterion may still be useful for comparison to the criterion even though the sample result may not meet the original objectives of the project for which it was collected and analyzed.

b. OWQ TM 2002.15 describes “poor-quality” results that are misleading about environmental conditions. In this case, the result would lead to incorrect data interpretations in all cases. These results may necessitate use of the Data Quality Indicator (DQI) code “Q” in QWDATA. All results identified as “poor quality” using the Q code need to have additional information stored with the results in QWDATA describing why the quality was considered poor. The Q code indicates that the results have been reviewed and rejected. Q-coded results are not released to the public in NWISWeb.

For example, the Q code is used when a dilution error at the laboratory is suspected because results are outside what was expected but a rerun of the laboratory analysis is not possible. If a sample container was compromised in shipment and noted as such when received at the laboratory, the Q code can be used. Strong evidence of a laboratory or field mix-up due to sample labeling errors also may indicate an appropriate use of the Q code. This is indicated by anomalous results showing that the expected sample type was not received by the laboratory.
Guidance

Techniques and Methods Book 4, Chapter C4 (TM4-C4) “Design, Analysis, and Interpretation of Field Quality-Control Data for Water-Sampling Projects” provides guidance on how to analyze and report quality-control data and associated water-quality results. TM4-C4 stresses the importance of not changing sample results in QWDATA based on analysis of field blanks and other types of quality-control data (Mueller and others, 2015, p. 19, 45). This report provides several examples of how field blank contamination, for example, can be described in a data-series report.

Other Remedies

To help public users understand the reporting conventions used with data produced at the NWQL and other laboratories, the following italicized statement will be added to the NWISWeb Water-Quality Data help system for public data retrievals:

Prior to 2010, the USGS reported sample values below the reporting level (RL) from selected information-rich laboratory methods with the “E” or “estimated” remark code. The E remark code was assigned to sample values because even though the identification criterion was met, the quantitation was estimated. Since 2010, reported values below the RL are remarked with an “n” value qualifier code indicating that the value is below the RL but at or above the detection level. A “t” value qualifier code indicates that the value is below the detection level. The t value qualifier code is reported only for selected information-rich methods. Concentrations reported below the RL have an increased risk (>1 percent) of being a false positive, even for information-rich methods that provide enhanced analyte identification capabilities. Additional information on RL procedures are available from the USGS in Office of Water Quality Technical Memorandum 2010.07 and National Water Quality Laboratory Technical Memorandum 2015.02.

Future modernization of QWDATA and NWISWeb may provide for versioning and tracking of changes to laboratory results in QWDATA. Until that time, the policy and guidelines outlined in this OWQ TM will remain in effect.

If you have questions or concerns about this policy or know of data that have been changed in QWDATA, please contact the OWQ through the representative of the Water-Quality User Group (pmruhl@usgs.gov) or the Water Science Field Team (Callie Oblinger, obliner@usgs.gov; Tim Oden, toden@usgs.gov; Michael Rosen, mrosen@usgs.gov; or Lisa Olsen, ldolsen@usgs.gov).

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Distribution: All WMA Employees
References:


Fundamental Science Practices - Distinctions between New Research or Interpretive Information Products, Previously Published or Noninterpretive Information Products, and Scientific Data. This Web page provides definitions of non-interpretive and interpretive scientific data used by the Bureau. Available at https://www2.usgs.gov/fsp/interpretive_definitions_and_examples.asp


Office of Water Quality Technical Memorandum 2008.05. Appropriate Data Storage in the National Water Information System (NWIS). Available at https://water.usgs.gov/admin/memo/QW/qw08.05.html


Survey Manual 1100.3 - U.S. Geological Survey Publication Series. The purpose of this chapter is to define general policies and requirements governing the use of the U.S. Geological Survey (USGS) publication series. Available at https://www2.usgs.gov/usgs-manual/1100/1100-3.html

Survey Manual 205.18 – Authority to Approve Information Products. This policy makes a distinction related to approval authority between New Research or Interpretive Information Products and Previously Published or Noninterpretive Information Products. Available at https://www2.usgs.gov/usgs-manual/200/205-18.html