Data-Entry Verification

1. SCOPE AND APPLICATION

1.1 All data of any type that is entered by staff into a computer or transcribed from one place to another for the Laboratory Information Management System (LIMS), Statewide Biological Database (SBIO), report writing, or similar uses must undergo entry verification. Data collected electronically do not need verification, except any parts entered “by hand”.

1.2 Experience has shown that even the best effort by single conscientious staff to verify data entry will result in errors during data entry transcription to the computer file. Repeating this single-person verification with a different person will improve accuracy but can still result in errors..

1.3 Properly performed, the two-person verification described here should result in error-free data files.

2. SUMMARY OF METHOD

2.1 A person who **did not** enter the data reads the data from the original data source (spreadsheet, bench sheet, etc.).

2.2 A second person follows along in the data repository (database, report, spreadsheet, etc.) and checks for errors as the data are read.

2.3 Any errors in data entry are corrected in the data repository. Any errors in the original data source are corrected by marking through with one line in black ink, initialing, dating, and including a comment if necessary.

3. APPARATUS AND EQUIPMENT

3.1 Bench sheets or data sheets from which data were entered into computer.

3.2 Printout of data from computer or same data displayed on computer screen.

3.3 Computer with SBIO or LIMS programing.

4. PROCEDURE

4.1 Person A reads the data aloud from the bench sheet or data sheet from which it was entered.

4.1.1 Person A must **not** have entered the original data. Thishelps detect misinterpretations of entries on the raw-data sheet due to poor handwriting. Two different people are less likely to misread an entry the same way.

4.1.2 There are two reasons **not** to read from the computer data printout or computer screen. Reading aloud from the computer data is less likely to catch data that may have been entered incorrectly during data entry, and less likely to catch anything that may have been misinterpreted during data entry.

4.1.3 The data may be read very rapidly during verification. If verifying with someone unfamiliar with the data, a slower reading speed or incorrect taxonomic pronunciation may slow the verification process. This should not, however, cause errors from data entry to be overlooked, so any department staff can participate in verification.

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4.2 Person B follows along on the computer data printout or computer screen as Person A reads from the raw data sheet.

4.2.1 Person B may have entered the raw data. Person A must not have entered the original data.

4.2.2 It is often useful for both people to hold a piece of paper, ruler, or other straight edge under the line being read. Some highlight data as it is verified. These and similar techniques help keep one from losing one's place. Lines were added to the data screen in SBIO so that names and counts are easier to follow if verifying from the screen.

4.3 Verify sample information and everything that was entered or transcribed. This includes analyst names, dates, sample location, STORET number, analysis results, data qualifiers, etc.

Note: For taxonomy data, check that the number of individuals in SBIO matches the number of individuals written on the bench sheet by the taxonomist. For invertebrate samples, also check that the number of taxa generated from SBIO matches the number of taxa (for SCI data, the number of taxa in Rep 2 should match) in LIMS. For Hester-Dendy data, the number of taxa must be counted on each bench sheet since SBIO generates the number of taxa for the replicates combined. Resolve any discrepancies and make necessary corrections following step 4.5 (e.g. taxa number in LIMS).

Note: For quantitative phytoplankton samples, the total number of taxa will be number of wet taxa plus 1 more for Bacillariophyta as written on the bench sheet. Bacillariophyta is entered as part of the taxon list for wet algae in SBIO. Check that the number of diatom frustules is entered as the number of units and number of cells for Bacillariophyta. (While the Bacillariophyceae are not incorporated into the total wet taxa number on the bench sheet, they are considered when entered into LIMS and SBIO.)

Note: For qualitative algal analyses, check the comment box for spelling, punctuation and proper grammar use. For quantitative analysis verify that values for *grids, sample volume, dilution factor* and *concentrated sample volume* match values on the bench sheet.

Note: For microbiology analyses, verify that the results and sample ID match what is recorded on the associated printout. Verify method, dilution factors, date received/read, analyst, and whether the sample is a duplicate. For chlorophyll analyses, first verify the run ID, sample IDs, filtration, and extraction volumes prior to conversion in QCM. After converting the file, but before uploading, verify that the date, time and analyst matches the extraction date, time and analyst on the chlorophyll spec run log.

4.4 If the data contained on the computer data printout or computer screen differs in any way from what is being read out loud from the bench sheet or data sheet, Person B should stop reading, confirm the suspected error, and correct it if necessary.

4.5 Promptly correct any errors identified in verification in the computer file or databases. When making corrections to a printed bench sheet or data sheet, draw a line through the error, initial and date the correction, and leave a comment of the correction as necessary.

4.6 Initial and date the original data sheet as proof of verification. If a data sheet does not already have designated data entry and verification lines, write in the type of verification performed then enter initials and date as proof of verification.

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4.7 If SBIO data were verified, the Visit ID should be authorized. In SBIO, click on the Administrative tab and then "Authorize Data" in SBIO. Select the correct metrics for authorization and choose the appropriate Visit ID. Click the "Authorize" button. Only **one** Visit ID should be authorized at a time.

5. QUALITY CONTROL AND DOCUMENTATION

5.1 Use pen with black ink for all corrections.

5.2 To correct raw data entries, place a single line through the incorrect entry, write the corrected entry near the error, initial and date the correction. If the correction requires an explanation, write a comment.

Appendix of Changes

10/05/2009	Reformatted the layout following SOP LB-001.
09/28/2010	Added taxonomy note to step 4.3. Clarified steps 4.5 and 4.6.
09/28/2015	Formatted for 508 compliance.
01/30/2019	Edited note in step 4.3 regarding verification of number of taxa
01/15/2020	Clarified Section 4.3 note.
12/28/2020	Added information regarding taxa entry of Hester-Dendys
12/14/2021	No changes.
11/22/2022	Change SBIO2 to SBIO. Added note in 4.3 for verification of qualitative and quantitative analysis. Added equipment *Computer with SBIO and LIMS.*
12/02/2022	Added note in 4.3 for verification of microbiology and chlorophyll analyses.
11/08/2023	Edited note in 4.3 for quantitative data entry in SBIO for Bacillariophyta information.
05/30/2024	Added section 4.7.
05/29/2026	Minor re-phrasing throughout the SOP. No procedural changes.

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