# LIMS QC Manager Data Uploading Instructions for Bench Biology and Microbiology Samples

## 1. INTRODUCTION

1.1. This procedure provides instruction for uploading data after analyzing bench biology samples. The Bench Biology Subsection handles biochemical oxygen demand (BOD), chlorophyll, microbiology, and sediment samples. (LIMS Analysis IDs: BOD-INHB, BOD-UNIN, CHLSUITE-W, CHL-CORR-P CHL-MDFL-W, DW-PLATECT, ECOLI-18QT, EC-18QT-CL, FCOLI-MF, TCOLI-MF, FC-MF-CL, TC-MF-CL, ENT-24-QT, EN24-QT-CL.) Each type of sample data is saved as a raw data file at the end of analysis. The analyst uploads the results using LIMS QC Manager. A raw and review file are created and the data are verified between analysts.

**Note**: Ash-free dry weight sediment data (SDMNT-AFDW) are uploaded using LIMS Sediment Manager, not QC Manager. See SOP BB-15. Periphyton biomass using ash-free dry weight data (ALGAE-AFDW) are calculated on a spreadsheet and uploaded in Results Editor. See SOP BB-034.

## 2. DATA ENTRY

2.1. Log into LIMS and select Laboratory → QC → QC Manager.

2.2. Choose the appropriate Biology Instrument from dropdown menu: *Biology: BOD EZ 1.0.3, Biology: Chlorophyll Lambda UV 35, Biology: Chlorophyll Fluoro TD-700, Biology: Microbial Analysis LogBook Data*, or *Biology: Micro QuantiTray.*

2.3. Select File → Convert Instrument File from the menu. Select and Open file. For sediment samples, highlight all files to be uploaded.

2.4. In the Save To LIMS window, use the run ID to name the .raw data file. For micro samples, use the batch ID. Click OK.

2.4.1. *Chlorophyll samples*: In the **Convert LAMBDA_35 File** (or **Convert TD-700 File**) window, select the analyst and enter the date/time that the samples were extracted. For chlorophyll spectrophotometer samples, change the test ID to CHLSUITE-W. For periphyton samples, change test ID to CHL-CORR-P. For chlorophyll fluorometer samples, do not change the test ID (test ID should be CHL-MDFL-W). Click **Convert**.

2.4.2. *Micro-MF samples*: In the **Convert MICROLOGBK File** window, select the batch ID, then click **Convert**.

2.5. Make any date/time, analyst name corrections as necessary in the Sample Table.

2.6. Highlight all data and select the “Prep Batch” column button and click the **New** button. Select the “Analysis Batch” column button and click the **New** button.

2.6.1. *BOD samples:* Each batch gets a unique Prep Batch ID and Analysis Batch ID.


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2.6.2. *Micro-MF and -QT samples:* Do not change the Analysis Batch ID.

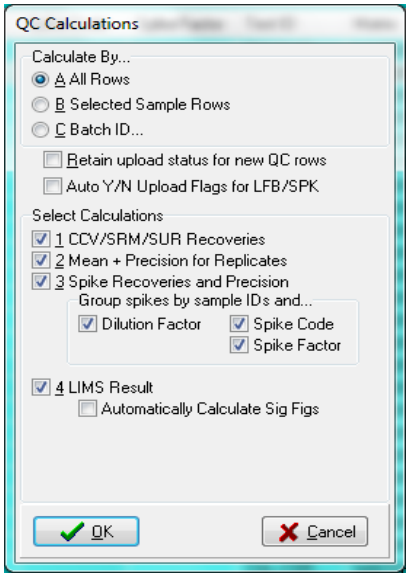
2.7. If QCM has not already recognized duplicates, check Sample IDs. Highlight the lab duplicate samples. Click the "Type" column button and select the type as "REPL". Each duplicate set should have a different replicate ID ("A", "B", "C"…). Click **OK**. If QCM has not recognized method blanks, highlight and change "Type" to "MBLK".

2.7.1. *For chlorophyll*: For samples that are not being uploaded (i.e. re-runs, re-spins, all but the highest concentration blank, etc), change sample type to NONE.

2.8. *Chlorophyll and BOD samples:* Select the standard and click the "Spike Code" column button. Select the appropriate Spike Code. The codes are as follows: GGA for BOD, CSTD for chlorophyll spectrophotometer, and CSTD_mmddyy (where the month, date, and year correspond to the current/used calibration) for chlorophyll fluorometer. Click **Add**, and enter "1" for the Spike Factor. Note: for chlorophyll fluorometer, a new spike code and standard value has to be entered into LIMs after each calibration that corresponds to the recovered concentration of solid standard for the given calibration.

2.9. Select **Tools → Calculate** from the menu. Set QC Calculations as shown in Figure 1 and click **OK**.

**Figure 1**




2.10. Click the **Component Table** tab to switch to the Component Table.

2.11. To select which data are uploaded, highlight samples and click on the "Upload" column button. Select "Y" and click **OK.**

2.11.1. *BOD samples*: Upload all data except seed controls and any dilutions for which there is no result in the BODAvg column on the BOD Worksheet. These dilutions will have been imported into QC Manager with a LIMS


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Result of 0.20 U. For dilutions that are not uploaded, change the "Type" to "NONE" in the **Sample Table**.

2.11.2. *Chlorophyll samples*: For spectrophotometer blanks, upload all components except for the "Chlorophyll/Phaeophytin Ratio" component. Upload only the "Chlorophyll-a, Corrected" component for the standard. Upload all four components for all samples except duplicates. For fluorometer samples, upload all data except duplicates.

2.11.3. *Micro samples*: Upload all data. Select "N" for Micro-MF Blk_B.

2.12. For each duplicate, upload only the average and the RPD data if both duplicate results were above PQL (i.e., neither has a "U" or an "I" remark). If one or both of the results were below PQL (i.e., either has a "U" or an "I" remark), do not upload the average and RPD. Upload the duplicate with the higher LIMS result and report the other duplicate result in the comment: "Laboratory duplicate result is (number and qualifier) for [component]. Precision data is unavailable due to the small amount of analyte in the QC sample." Add any comments to both dups, the average, and the RPD. Add the "Precision data is unavailable due to the small amount of analyte in the QC sample." comment to the rest of the samples in the batch.

2.12.1. *BOD samples*: If both duplicates depleted to less than 1.0 mg/L for the final DO, upload the duplicate with the higher LIMS result and add the duplicate depletion comment: "Duplicate QC sample did not meet minimum DO depletion/residual method criteria. Precision data not available." If only one duplicate depleted to less than 1.0 mg/L for the final DO, upload the duplicate that did not deplete to less than 1.0 mg/L and add the duplicate depletion comment. Add the "Precision data is unavailable due to the high amount of analyte in the QC sample." comment to the rest of the samples in the batch. Refer to Figure 7.1 for a flowchart explanation on uploading BOD duplicates.

2.12.2. *Chlorophyll samples*: For spectrophotometer samples, the duplicate rules apply to each component individually.

2.12.2.1. If the RPD is not uploaded for any component, add the "Precision data is unavailable for at least one component due to the small amount of analyte in the QC sample. Refer to QA report for available precision data." comment to the rest of the samples in the batch. Refer to Figure 7.2 for a flowchart explanation on uploading chlorophyll duplicates.

2.12.3. *Micro-MF samples*: For Micro sample duplicates, upload only the average and the RPD data if both duplicate results were within ideal colony count range (i.e., neither has a "B" or "U" remark). If one or both of the results were not within ideal colony count range (i.e., either has a "B" or "U" remark), upload the result that was within ideal colony count range or the higher LIMS result if neither was within ideal colony count range and report the other duplicate result in the comment: "Laboratory duplicate result is __. Precision data for this duplicate is unavailable due to the colony count falling


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outside of method acceptable range." If no RPD is uploaded in the batch for a particular test, add the "Precision data for QC sample is unavailable due to the colony count falling outside of method acceptable range." comment to the rest of the samples with the same test ID in the batch.

2.12.3.1. If one of the results was >100 (i.e., the LIMS result is 0), add the out of range duplicate comment: "Volume filtered for duplicate yielded results outside of the ideal range. Precision could not be evaluated."

2.13. Handling Control Failures (An "F" in the P/F column of Component Table. See method SOPs for quality control acceptance limits)

2.13.1. Determine cause of failure and if appropriate, qualify data as shown below.

2.13.1.1. Method Blank Failures: All samples within the batch that are above MDL should be "V" qualified. Add a comment stating that the sample/component result is V-qualified due to blank failure. Specify which components are affected, if necessary.

2.13.1.1.1. *BOD samples*: Blank results > 0.50 mg/L require a comment and "V" qualifier on all samples in that batch above MDL. Blank results > 0.20 mg/L but ≤ 0.50 mg/L need a comment only.

2.13.1.1.2. *Chlorophyll spectrophotometer samples*: Only "V" qualify the components corresponding to the blank components that failed. If the component result is greater than 10 times the blank, no qualifier is needed, just a comment that there was a laboratory blank failure but the result is > 10 times the blank result.

2.13.1.1.3. *Chlorophyll fluorometer samples*: If sample/component result is greater than 10 times the blank, no qualifier is needed, just a comment that there was a laboratory blank failure but the result is > 10 times the blank result.

2.13.1.2. Lab Sample replicate failures: Report sample replicate average result with a "J" qualifier and comment: "Result is J-qualified due to a laboratory duplicate RPD failure." Refer to Figure 7.3 for a flowchart explanation on handling lab sample replicate failures.

2.13.1.2.1. *Chlorophyll spectrophotometer samples*: Specify which components are "J" qualified in the comment and add the comment to both dups, the average, and the RPD.

2.13.1.2.2. *Micro samples*: Check the precision in the control chart. If the precision passes, add the "Precision is within criteria limits." comment to the dup, average, and RPD. Also add this comment to all of the samples with the same test ID in the batch if there is no other passing RPD for that test ID. If the precision fails in the control chart, J-qualify as in 2.16.1.2 above.


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2.13.1.3. Control Sample failures (GGA for BOD samples, spinach for chlorophyll spectrophotometer samples, and solid standard for chlorophyll fluorometer samples): Report all samples within the batch with a "J" qualifier. Add the comment, "Refer to QA report for QC exceeding limits."

2.14. *BOD samples*: Check the BOD Worksheet printout for samples that depleted to less than 1.0 mg/L. Add a "J" qualifier to those samples and add the comment: "Sample depleted to less than 1.0 mg/L for final D.O. measurement. Result is an estimate and may be higher than result reported."

2.15. *Micro-MF samples*: Add a "Z" qualifier to any sample result that is too numerous to count. If it is a result from typical growth, report result as a calculated value using the upper limit of the ideal range and the lowest filtration volume analyzed with a "Z" qualifier. If it is a result from atypical growth, report as "No result" with a "Z" qualifier in Results Editor.

2.16. *Micro-QT samples*: If the result is 2419.6 and all wells are positive, add a "J" qualifier and the comment "All Quanti-Tray wells were positive. Result may be higher than reported." to the corresponding sample.

2.17. Highlight all samples. Select **Tools → Show NCRs for selected samples** from the menu. Add a comment and/or appropriate qualifier to any sample/result that has an NCR related to the test/analysis. Attach a copy of any relevant NCR to the end of the packet.

2.17.1. If samples were received outside temperature limits, add a "Y" qualifier to results and a comment that references the NCR.

2.17.1.1. *For BOD and Chlorophyll samples*: Samples must be received at temperature ≤ 6ºC.

2.17.1.2. *For Micro Samples*: Samples must be received at a temperature ≤ 10ºC.

2.18. Save the data as a review file by selecting **File → Save** in the menu.

2.19. Select **File → Print**. Select **Report → Template → Open** to open the appropriate template. A template may be selected under a different analyst, and then saved as your own. Type the file name (run ID for chlorophyll) in the "Report Title" text box.

2.20. Go to **Report → Print.** In next screen, select **Print.**

2.21. Exit the QC Manager.

3. COMPILATION OF DATA

3.1. Stamp the last page of the QC Manager Results printout with the verification stamp and sign your initials and date the **Data Entry** line.

3.2. Compile printouts in order shown below. Attach with a paperclip.

3.2.1. BOD:


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- BOD Worksheet
- Final results stamped QCM page

3.2.2. Chlorophyll:

- Photocopy *Chlorophyll Run Log* page
- Perkin Elmer Sample Table printout or TD-700
- Final results stamped QCM page

3.2.3. Micro:

- LIMS Lab logbook verification printout or verified Excel QT data sheet
- Final results stamped QCM page

4. VERIFICATION (Follow SOP BG-01)

4.1. Verification requires two analysts: a reader and a verifier. The reader should not be the person who entered the data.

4.2. Verify that the correct analyst, analysis date and time from the logbook copy are on the QCM printout.

4.2.1. *Chlorophyll samples*: The reader calls out the Sample #, Filter vol (mL), and Extract vol (mL) columns from the *Chlorophyll Run Log* copy, while the verifier follows along using the sample table printout and makes corrections as needed. Calculations for dilutions and p-numbers should be checked by a different person than the one who originally calculated them.

4.2.2. *BOD samples*: The reader calls out the sample # from the sample label, sample volume from the DIL/LD (mL) column from the *BOD prep worksheet*, and test ID, while the verifier follows along using the BOD Worksheet printout and makes corrections as needed.

4.2.3. *Sediment samples*: For the AFDW Sediment Manager printout, check the Crucible Weight, %Dry Weight, and % Ashed Weight columns against the bench sheet.

4.2.4. *Micro-MF samples:* Before uploading, the reader calls out sample #, dilution, and result from petri dishes, while the verifier follows along using the LIMS lab logbook verification printout. The verifier checks the LIMS lab logbook for any samples that had two dilutions within the acceptable range and calculates the result. The reader verifies the recalculated result.

4.2.5. *Micro-QT samples*: Print the Excel QT data sheet. Verify the date and analyst (from Prep Worksheet Manager), Sample ID, # positive large wells, and # positive small wells.

4.3. Verify that the correct data sets for the duplicates have been uploaded.

4.4. Checkmark and initial any errors that have been corrected in QCM.


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4.5. After verification is completed, both analysts should sign and date the **Verified** line on the stamped final results printout.

## 5. DATA UPLOAD

5.1. Select **Tools → Upload → By Upload Flag**.

5.2. Note: If the message "Warning! You are uploading a spike RPD without its corresponding recoveries." appears in the QC Manager & Results Upload window, click OK.

5.3. Check the Error Log for corrections to be made. For chlorophyll samples, ignore errors associated with the upload of the Chlorophyll/Phaeophytin Ratio component.

5.4. Click on the shortcut button to Upload Data: . When upload is complete, click OK.

5.5. Sign and date the **Uploaded** line on the stamped final results printout.

5.6. Place data in the appropriate "Data Packets" folder.

## 6. REFERENCES

6.1. DEP SOP BB-15, *Sediment Percent Organic Determination Using Ash-Free Dry Weight*

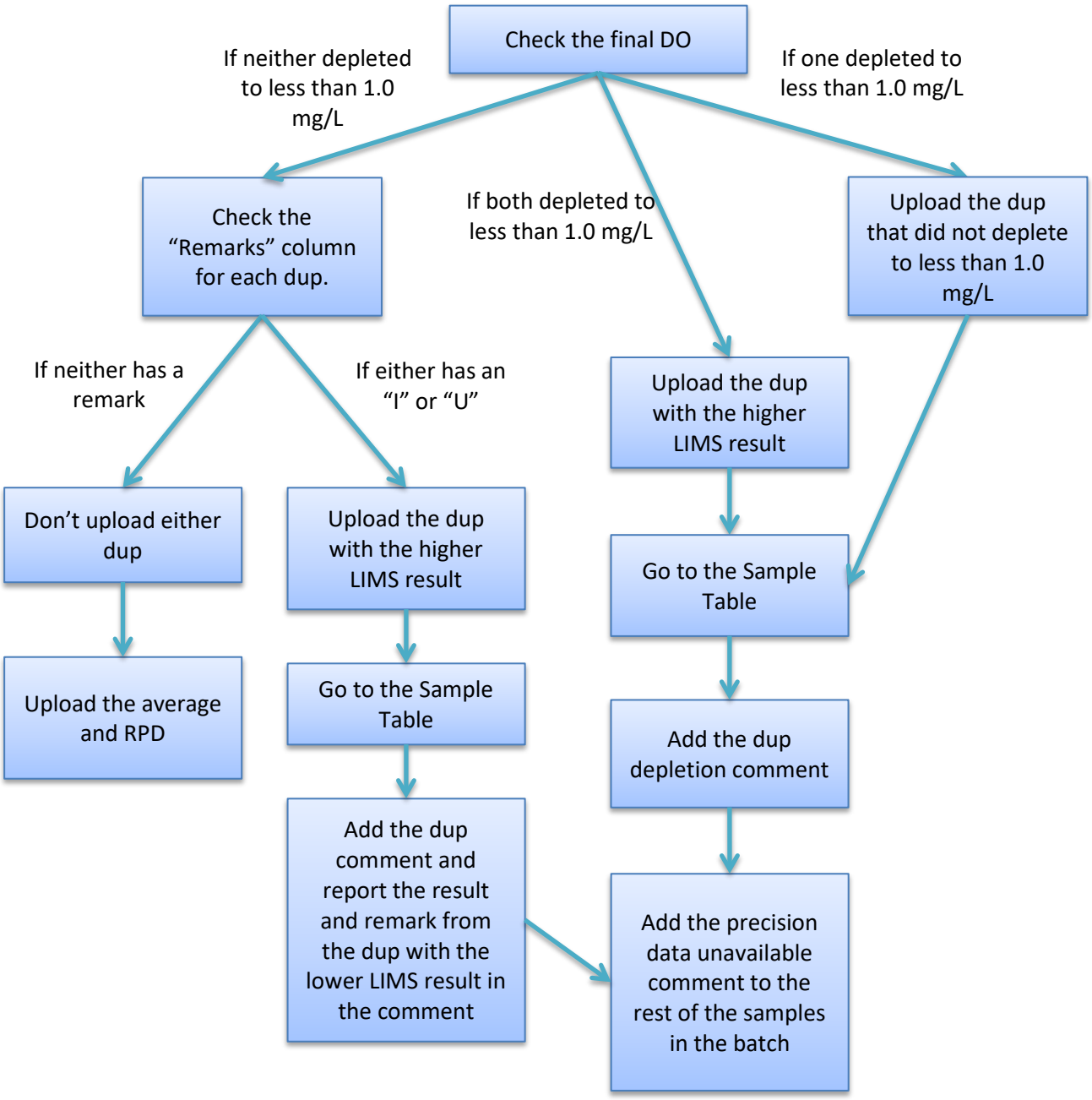
6.2. DEP SOP BB-034, *Periphyton Biomass Using Ash-Free Dry Weight*



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## 7. TABLES AND DIAGRAMS

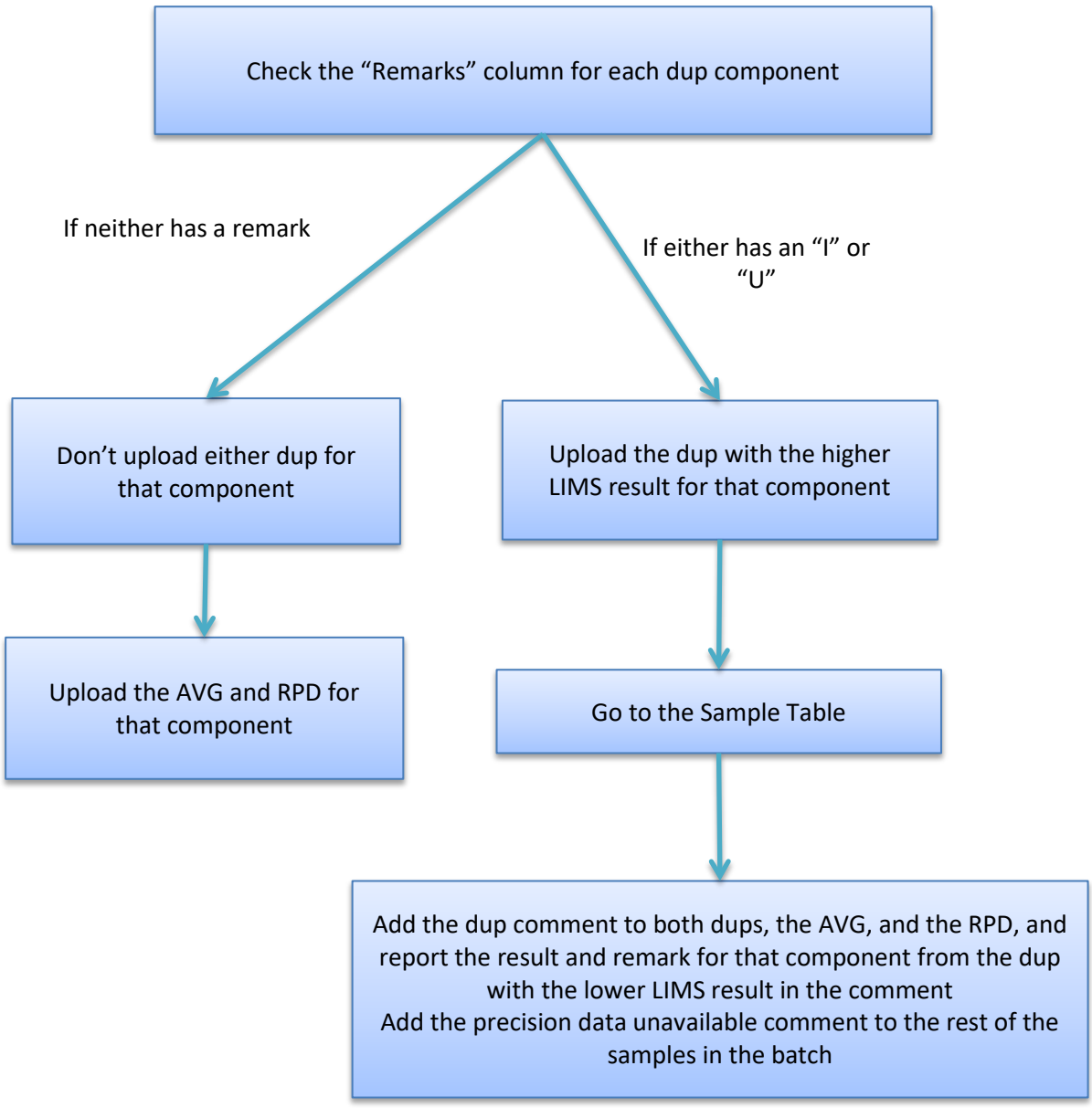
**Figure 7.1** Uploading BOD duplicates





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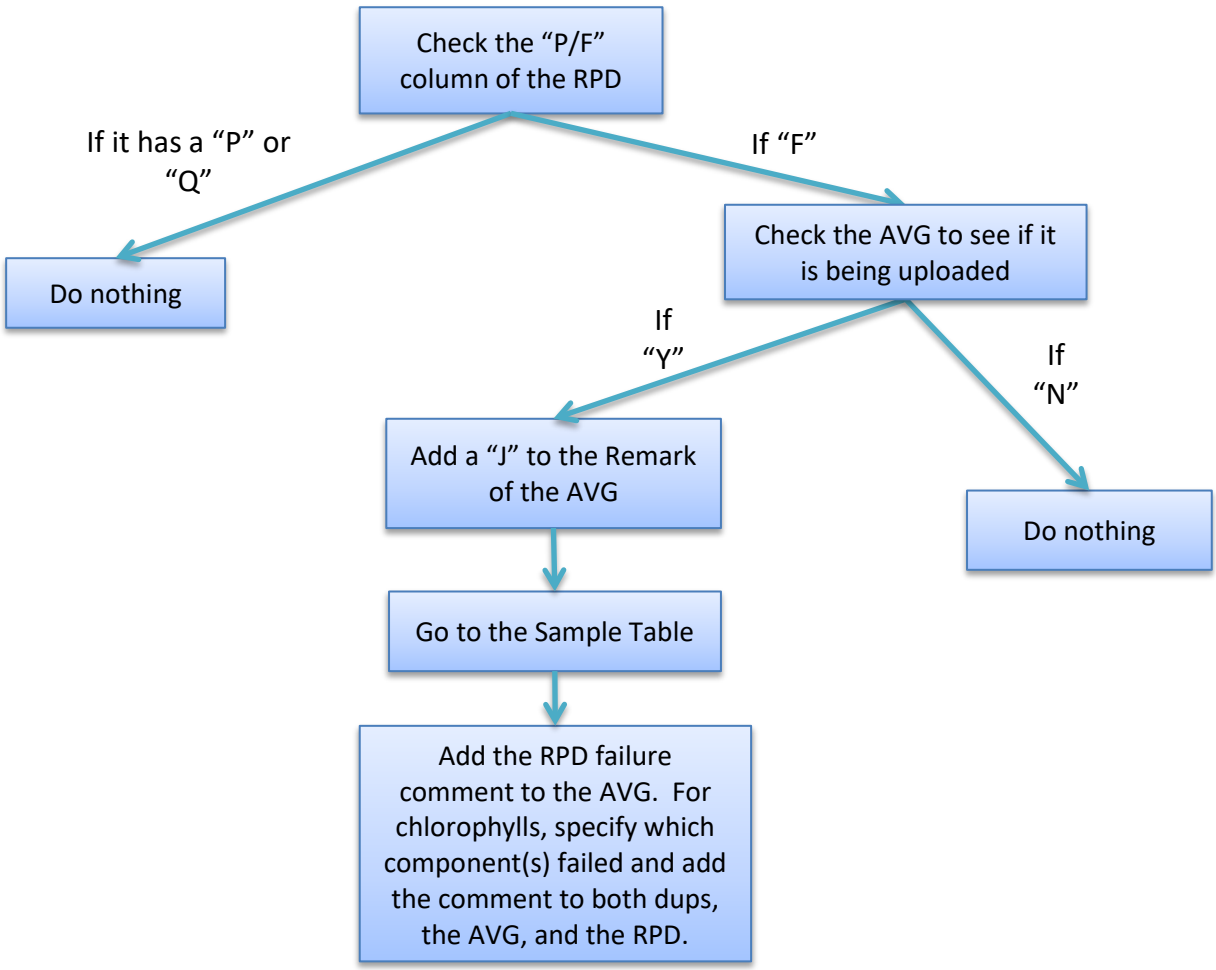
**Figure 7.2** Uploading chlorophyll duplicates





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**Figure 7.3** Handling lab sample replicate failures




## APPENDIX OF CHANGES

06/22/2009 SOP reviewed and edited to update according to current procedures. Changes made to reporting replicate RPD data in Section 2.13.

07/20/2010 SOP reviewed and edited to update according to current procedures. Added flowcharts in Section 6.

06/16/2011 SOP reviewed and edited to update according to current procedures. Changes made to chlorophyll duplicate uploading and qualifying procedures.

06/05/2012 Added instructions to change the analyst, date, and time for sediments. Moved directions for "K" qualifying sediments to occur before the dup directions and included directions for uploading dups with "K" qualifiers.

04/29/2013 Added "Prep Worksheet" to Section 3.2.3. Added step for using spike codes.

07/17/2014 Added more test IDs to Section 1. Differentiated between Micro-MF and Micro-QT. Removed Show NCR step from the beginning of Section 2. There was


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| | |
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| | already a step for that later in the same section. Added 0.1% for the sediment laser limit. |
| 01/22/2015 | Formatted for 508 compliance. |
| 03/02/2015 | Added instructions for BOD dilutions that are not uploaded and batches of any samples that do not have the RPD uploaded. Removed instructions for L-qualifier. Added uploading step. |
| 05/07/2015 | Updated blank failure and BOD duplicate uploading instructions. |
| 12/26/2016 | Updated chlorophyll information to reflect the upload of all components, corrected chlorophyll dup upload, updated chlorophyll dup uploading flowchart, clarified micro precision failure instructions, and added micro dup verification step. |
| 12/14/2017 | Revised information in sections 2.18, 5.3 and 5.6. |
| 01/07/2019 | Revised information in section 2 and in Tables and Diagrams. |
| 12/30/2019 | Updated information pertaining to chlorophyll uploads, made small clarification edits throughout and removed references to Sediment Particle Size analysis. |


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