

UCD IMPROVE Technical Information #251E

Entering Log Sheets and Simple Problem Diagnosis

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Air Quality Research Center
University of California, Davis*

*July 15, 2022
Version 3.0*

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DOCUMENT HISTORY

Date Modified	Initials	Section/s Modified	Brief Description of Modifications
02/08/2022	SRS	All	Previously anthologized version separated into individual TIs.
3/18/2022	GRM	All	Updated wording and reformatted sections to accommodate new procedure.

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1. PURPOSE AND APPLICABILITY

This TI describes the procedures used to review flow rates, download flashcard information, diagnose simple sampling problems, and review log sheet data. These procedures are applicable to all routine IMPROVE sites.

2. SUMMARY OF THE METHOD

Potential issues are detected by reviewing and examining flow rates and log sheets. Any significant problems are directed toward the field maintenance team through JIRA and Microsoft Teams. Log sheet data is then reviewed and automatically updated to an application called Improve Filter Processing, which writes the information to the SQL database.

3. CAUTIONS

Examine log sheet values and flow data carefully. Missing a substantial problem could lead to losing a site for the year. If unsure about whether or not something is a problem, err on the side of caution and contact the field supervisor group.

Report equipment problems to the field maintenance team immediately. Not doing so could result in further sample loss.

Pay careful attention to the name of the site when reviewing log sheets. Some site names are very similar, and the correct site name must be typed in when entering the log sheets. Typing in the wrong site name could result in significant confusion later in the process.

4. PERSONNEL QUALIFICATIONS

Only trained lead laboratory technicians and members of the field maintenance team can perform the operations described in this TI.

5. EQUIPMENT AND SUPPLIES

- Flashcard reader
- Desktop computer (PC—for reading flashcards) with lab application
- Computer with network access
- Log sheets from sites
- Access to Flow Rates page (<https://shiny.aqrc.ucdavis.edu/FlowRates/>)

6. PROCEDURAL STEPS

6.1 Using Improve Data Management Web Application Flow Graphs

The Improve Data Management Web Application Flow Graphs are used to fully review

and evaluate the flow data received on flashcards. If there are any problems with the web app see the software data management group for help.

To use, go to <https://shiny.aqrc.ucdavis.edu/FlowRates/>. Adjust the date range to be viewed, usually encompassing the three weeks of the box cycle plus one or two weeks prior, then select the site from the drop-down menu. After selecting the site, the page will automatically refresh.

The first view will be a zoomed-out view of all modules, to zoom in select a portion of the graph and double click. This zoomed-in view will stay until the graph is double-clicked again, however the date range function may not work properly when zoomed in. Simply zoom out to change the date, then zoom in again. When **All** is selected in the Plot drop-down, multiple modules and their CYC and/or ORI / Pressure values can be viewed at once. To view individual modules select them from the Plot drop-down menu.

Each graph shows the transducer values recorded on the flashcard in the form of a graph. The graphs provide a guide for appropriate values by placing range lines showing $\pm 5\%$ of the nominal values rate, determined at calibration. If Flow Rate is selected the $\pm 5\%$ range applies to nominal flow, which should be 23.0 lpm for modules 1A-3C and 16.9 lpm for 4D. Use these indicator lines to help determine transducer or flow value shifts due to equipment replacement or problems, swapped cartridges, double/single filters loaded for the C MOD, etc. Absence of transducer values indicates that there is no flashcard data for that time period.

6.2 Reading the Improve Data Management Web Application Filter Readings

In addition to the Flow Graphs, the electronic flow data is displayed in a table format in the Improve Data Management Web Application. The Filter Readings page is located under the primary tab “Operations” followed by the secondary tab “Filter Readings”. The search options are built to categorize by sampler and installment date. The table displays the Sampler, Date Recorded, Check Type, Module Title, Filter Date, Cyclone Reading, Orifice Reading, Max Vacuum, ET (minutes), Op Initials, and Filter. The “Date Recorded” is the date the operator ran the controller to collect either initial or final readings. The “Check Type” refers to the readings when the cartridge was installed, initial, or when the cartridge was removed ‘final’. The “Filter Date” refers to the sampling date. Note that Max Vacuum is only taken at initial readings. The moveable o-ring position will have two readings, one for each week it was installed in. The Filter Readings page can be a user-friendly alternative to the flashcard files. The Filter Readings are only uploaded when there is active network connection to the site. If the connection fails the alternative options would be the flashcard files and physical log sheets.

6.3 Reviewing the Log Sheets

Log sheets are reviewed to spot issues that need to be examined more closely using flashcard data. There are several things in particular to look out for:

6.3.1 Elapsed Time (ET)

A run day typically consists of 1425 to 1440 minutes. The exception to this is the moveable position filter. This filter is running if the operator performs the sample change on the day designated on the log sheet. The operator must interrupt the sample to change out the cartridges and to transfer moveable position cassettes to the next week's cartridge. Thus, the ET will typically be somewhat shorter on this day. A value of $ET \geq 1410$ is accepted; anything less than that should be reviewed for equipment issues, bad installation power interrupts, or other problems.

NOTE: Occasionally one of the ETs for the moveable position may read 0. The ET for the moveable position is recorded twice: once before it is moved over to a new cartridge and again when that "new" cartridge is uninstalled the next week. If one ET reads zero, check the other. Typically when this occurs, the operator performed the sample change before or after the moveable position run day. In this case, the other ET listed should be 1440.

If ETs are scrambled, very high, or very low, it may be easier to confirm real ETs by examining flashcard data through the web app or through the flashcard file. ETs are usually not over 1440 unless the controller has scrambled ETs due to a lightning strike. However, a rare and special case with version 7.0N is if a sample change is missed for a moveable position day and the next sample change is not performed until 3 weeks later on another moveable position day. In this case, the controller will log the full run time of the first sample and append the time for the later sample, thus possibly exceeding 1440 minutes.

6.3.2 Sample Change Dates

Sample changes should be performed on Tuesdays. If a sample change is not performed on a Tuesday, it is important to note when it was performed and if it affected any sample ETs. Each log sheet shows the sample days for its corresponding week. In order to have valid samples for the entire week, the sample change must not be performed later than 6.0 hours after the start of the sample day (with the exception of the moveable position). If any sample has an $ET < 1080$ due to a late sample change, that sample needs to be assigned a status of NS (no sample). This status can be confirmed by reviewing flashcard data or flow graph data. This will be discussed further in the "Simple Problems" section.

If a log sheet is blank, the filters may not have sampled. Check the install dates on the other log sheets and look for notes from the operator indicating a missed sample change. As described above, filters that do not sample due to a late sample

change receive a status of NS. Confirm a missed sample change by using flashcard data or flow graph data.

6.3.3 Max ORI / VAC Values

V2 Controller: There are four MxORI values on each log sheet, one for each module. For Controller version 70.N, the highest value is 40. Acceptable ranges are from 35-40. If one or more of these values is significantly below this, contact the field maintenance team. An exception to this is if the site is a high elevation site, which can cause MxORI values to run 30-35. In this case, report anything that is under 30. If unsure about whether the site is high elevation or not, ask a maintenance team member.

6.3.4 ORI / Pressure and CYC / Flow Values

V4 Controller: On the V4 Controller, these values are called Vac values. Acceptable ranges are from 0-5, with stronger vacuum readings reading closer to zero. If a Vac value reads 5-15 on the V4 Controller, this can indicate that the pump is malfunctioning and/or is not turning on. Check the flashcard data to confirm whether the pump was running. See the below sections on flashcard data reviewing and simple problems for more information.

The ORI / Pressure and CYC / Flow values listed on log sheets are a real-time snapshot of what the transducer / flow rate values were when the operator was at the site for the sample change. These values are taken both when cartridges are installed and when they are uninstalled.

6.4 Reading Flashcards

Note that a flashcard only needs to be read if the flow data is not available or reliable in the Improve Data Management web application flow graphs. To read flashcards, use flashcard reader. Plug in the flashcard reader if it is not already prepared.

Insert a flashcard into the reader.

The number of files will vary depending on the program version running the controller at the site. There are two different Controller versions currently out in the field. Note all sites except for one have the V4 Controller version.

6.4.1 Controller Version 7.0N

There will typically be two to four files for sites running on 7.0N. There will be a file already labeled with UCID and the month and day of the first install date. Note that initial readings taken for week 1 of the next box may be in a separate, smaller .TXT file labeled with the month and date of the first install date for the next box. There should also be two log files. The log files will be named "logMMDD.TXT," with MMDD being the month and date of first install for the current box cycle under review.

NOTE: If a flashcard is blank or corrupt, run the recovery command located in U:\IMPROVE\FlashTXT. If nothing can be recovered, write “CFLSH blank/corrupt” at the bottom of the first log sheet.

If there is no flashcard for a box, write no flashcard at bottom of first log sheet.

6.4.2 V4 Controller

V4 Controller data should sync with the AQRC on-site servers every morning at 1 a.m. Do not clear data from any flashcard until after log sheet review and entry.

6.5 Ingesting the Flashcard

- 1) Open the lab app and select **Admin**.
- 2) Select the **Flashcard Upload** button.
- 3) Under file selection change the path to “This PC” then the flashcard reader.
- 4) Confirm that both the Archive Files and Archive All files in folder checkboxes are selected as needed.
- 5) Click **Load File(s)**
- 6) Use the arrow buttons to review data and make changes as necessary from this page.
- 7) If the data is valid click **Save Data**, this will save the files to the site’s flashtxt folder. When the data is saved, a text box pops up that must be confirmed before moving on.
- 8) To check a new card, insert the new card and click refresh under file selection.
- 9) Do not clear data from any flash card until after log sheet review and entry.

6.6 Reading Flashcard Files

Check the ORI/Pressure and CYC/Flow values for each module across weeks. These values should be fairly stable across the three weeks.

On the V2 Controller’s software version 7.0N, each reading shows UCID, start time of the interval, end time of the interval (interval is typically fifteen minutes), GMT offset, whether the controller is sampling or not (OFF or ON), transducer values for all MODs, temperature (in mV), running ET of the sample if it is a sample day, operator initials, and version type. Readings are taken in intervals of fifteen minutes. V4 Controllers contain individual files for each day, with data logs for each piece of equipment.

Version 7.0N also contains a log file. Log files show the UCID, controller ID, and details of time/date/GMT offset changes, sample changes, etc. The log files are used for advanced troubleshooting.

6.7 Input Log Sheets

If all values appear to be in range and appropriate for the site, it is time to enter the log sheets.

A shortcut for the current version of Improve Filter Processing application should be available on the desktop. If a shortcut is not available then check the start menu, create a shortcut from the following directory:

U:\Improve_Software_Production\FilterProcessingProduction, or talk to IT.

Click on the shortcut to open the application, select **Admin** then click on **Input Log Sheets**. Enter user initials. Type in the full site code for the log sheets being entered or click on the correct site in the queue. The program will display all three weeks of the box. Operator initials, start and end dates, start and end times, ETs, sample dates, and some other columns are all already filled in. If all values are in range, next to “Controller Initial Readings” and “Controller Final Readings” click **LOAD**. If multiple filter readings were taken, the date time stamp will be displayed in green.

From the drop-down menu select the valid date and time recording. If both readings are valid select the most recent one. The readings are taken directly from the imported data that occurs daily for each site with connection at 1 a.m. If any values are not updated, manually update the values presented in the log sheets.

Note the LabApp does not support any non-alphanumeric values. If there are any dashes uploaded, remove them prior to continuing.

If values are not within appropriate range or flashcard data was not received, then log sheet values must be entered manually. Sample dates are set, but other pre-filled fields can be modified if necessary. Use the **Tab** or **Enter** key to move forward to the next field, and **Shift + Tab** to move back to the previous field. Enter the initials of the operator who performed finals for week 1. If the field on the log sheet is blank, find the information in the flow table of IMPROVE flow or the flashcard .TXT file. Enter in the times that initials and finals were taken. Make sure to use 24-hour time format, as “am” and “pm” options are not available. Make sure the sample change dates are correct; the lab app automatically fills in the Tuesday installation date. If the operator performed the sample change on an alternate date, modify the date.

The rest of the fields are entered by going down the columns, instead of going across rows. Fill in the MxORI / Vac values for all of the modules, from 1A through 4D, if there is a 5th module it will immediately follow the 4D on the log sheets. If two or more values in a row are the same, type in the first value to start with and then press the “+” key on the number pad to copy the same value. This is the preferred method for entering repeating values, as it reduces the chance of typing errors. V4 Controller values are given with another decimal place. The lab app does not support this, so the decimals must be truncated when inputting log sheets.

Next, enter in the initial ORI / Pressure values for each sample date and module, followed by the initial CYC / Flow values. Then, enter the final ORI / Pressure and CYC / Flow values. For 3-2'-2 boxes, there will be 3 entries for week 1 initials and only 2 for finals. The final value for the third position, or moveable, will be added in the second week. 2-3-2' will have this set-up in weeks 2 and 3.

The next column is for ETs. It is already populated with 1440 ETs; if this is correct, go ahead and Tab through to the status column. If any of the ETs are not 1440, modify them as necessary.

Next, enter in the status code for each sample. The default status is “SO”, if the samples are normal, the code to use is “NM.” Other codes are described in section 6.8. Fill in the status boxes. Note the status code has to be manually updated for all sites.

The next column is called “FlwSrc”. If flashcard information is available for the dates being entered, leave this column as default, which is prefilled with “MC.” If there is no flashcard data or flow graph data, change the MCs to “LC, LO or NF”. More on this can be found in section 6.8.5.

The following column is “TmpSrc”. Temperature is listed on the log sheet above the “Finals” values. Type it in the first box. Press + to add the values to the addition cell(s). The final column should be left as default (M) unless there are no flashcard data or unreliable temperature values. In that case, change the value to “L” or “N”.

If a comment needs to be entered, there are filter specific comment buttons, and sample day comment buttons. If an issue applies to only one sample, make sure to note it only in the box with the appropriate date and filter. If an issue applies to the whole week, leave a comment for each sample date. Most comments that can be used are found in the comments drop-down boxes on the lab app, special or newer comments can be found in the comments database can be located in U:\IMPROVE\Logs>StatusFlags\2018 Comment Database.xls.

Repeat these steps for the remaining weeks.

6.8 Simple Problems

6.8.1 Power Interrupt/Power Outage

Some IMPROVE sites are in remote locations or have frequent severe weather, leading to power interrupts or outages. When the power is off, all equipment shuts down including the controller unless the controller has backup power. However, if a site has a backup UPS, only the controller will remain functional and the sampling will halt if it is a sample day.

If there is a short ET on the log sheet and flashcard data indicate a data gap (complete absence of any data lines on the chart, several hours or days between readings in the .TXT file), then it is likely a power issue. Look for comments from the operator on the log sheets regarding loss of power at the site.

If loss of power causes a sample to have an ET of less than 1440 but more than 1080, it is considered to be a “power interrupt.” There is a comment for this in the comment database that should be entered for the appropriate sample date(s) while entering the log sheet. As long as there are no other issues with the sample(s), the status (s) should remain NM.

If loss of power causes a sample ET to be less than 1080, the sample is terminal and is considered a “power outage.” Add the appropriate comment found in the

comments database or drop-down box for the appropriate day(s), and status the sample(s) as PO (for Power Outage).

6.8.2 Simple Pump Malfunctions

There are several things on the log sheets and in the flashcard data that can indicate a pump issue. MxORI / Vac is listed for each module on every log sheet. The typical acceptable range for MxORI is from 35-40, while Vac values range from 0-5. Sometimes MxORI values are lower, or VAC values are higher depending on elevation. However, if any pump's MxORI is below 30 or Vac greater than 5, contact the field maintenance team and let them know, as they may want to replace the pump.

A dead pump will not turn on at all, and the MxORI will read 10 or the Vac will read ambient pressure readings, which is the resting value when the pump is not functioning. Initial and/or Final ORI / Pressure readings for that module may also be at resting transducer values. Use flashcard data to determine when the pump failed and how many samples were affected. If the pump failed for less than six hours in a run day, use the appropriate comment but keep the status as NM. If the pump failed for more than six hours on a run day (valid ET<1080), the sample will receive a status of EP (Equipment Problem) and the appropriate pump failure comment should be used. Make sure for either situation to indicate in the comment which module had the failure. Review the Flow Rate data if available, if the pump died the flow rate and pressure readings will be similar to a non-sampling date.

Note that as long as the controller is on and functioning, the controller will think that the pump is on and provide an ET for a full run day as long as there are no other issues. To calculate the real ET, examine the flashcard or flow rate values and find the length in time that the pump was down, and then subtract it from the 1440 ET.

Notify the field maintenance team immediately so that they can troubleshoot the issue with the operators, especially if two or more pumps fail simultaneously. If there is already a notice in the metadata, the field group will have already created a JIRA issue and is working on troubleshooting the issue. State the JIRA issue within the comments section of the filter if the filter is impacted with an invalid filter status. While this situation is likely merely a dead pump, other factors could be at play to cause similar symptoms and must be evaluated as soon as possible.

6.8.3 Late Sample Change

As mentioned previously, operators install filters every week on a designated day (usually Tuesday). If an operator is late performing this change, sample loss is possible. The log sheet should have the dates of sample changes written on them.

Any samples that occurred between the appropriate installation date and the date the operator did the sample change will likely have an ET of zero unless it was a late sample change on a sample day. Confirm this by examining the flow rate values, filter readings table, or flashcard data through the .TXT / Excel file or through the web app; the controller should have locked out after the designated day and the transducer readings for sample days after that day should read resting values. The final readings' ET should also read "0". These samples should be designated with a status of "NS". If a late sample change occurs during a sample day (not the 3rd position), the sample is only valid if the final ET is above 1080 minutes. Anything less is an "NS". If a week is missed completely (usually indicated by a blank log sheet), all of the samples for that week are "NS". Make sure to use the appropriate comment for each scenario using the comments database.

Occasionally, a late sample change is due to late shipment of a blue box. In this case, missed samples are still considered an "NS", but receive the comment that indicates the late sample change was due to the blue box and not the operator. An alternate reason for a late sample change may be inaccessibility due to weather. If the operator notes on the log sheets they were unable to access the site due to weather, the missed samples are still considered 'NS' but receive the comment that indicates the late sample change was due to severe weather.

6.8.4 C MOD Filter Issues

IMPROVE no longer has double-C FIL sites, in the past two C filters were loaded instead of one for each sampling position. Double-C FIL positions have higher ORI values than single C FIL modules due to the increase in resistance because of the two filters.

Sometimes a mistake occurs during the filter processing and a single C cassette is loaded as a double-C (quartz filters sometimes stick together, and it can be difficult to tell that two are sandwiched together). When double-C filters are loaded instead of a single C, the ORI / Vac values will deviate further from resting values, and the CYC / Flow value drops points due to the increase in resistance. If a double-C filter is suspected, physically check the cassette to determine for sure that two filters were loaded. If so, assign the sample a status of "QD" and enter the appropriate comment in the lab app. The extra 3C filter should be placed in a Petri, labeled with the site, date and 'double C not in DB', then handoff to a Lead Lab Tech to review.

6.8.5 Flashcard Issues

Sometimes operators forget to return flashcards. The laboratory technician or student assistant who opens the box at the Box Receiving Station should add a comment stating that the flashcard is missing. Do a quick check of the week

bags to be sure that there is no flashcard. If the flashcard is indeed missing and flow rates data is unavailable or unreliable, assign a status of “NM” to all of the filters and change the “FlwSrc” and “TmpSrc” flags from “MC/MO” to “LC/LO or NF.” For every week that is missing flashcard data set flags, click on “Use Log Sheet Data” located above “Final Readings” to change the flags from “MC/MO” to “LC/LO”. Also add the appropriate comment from the database. Explanations for source codes are at the end of this section.

Email the operator to track down the flashcard and have it sent back. When it arrives, check the data. If the data are complete, change the “FlwSrc” and “TmpSrc” flags back to “MC/MO” and assign statuses as needed. Comment “CFLSH recovered”.

Sometimes flashcards fail during a box. If there is only partial flashcard data (not the full three weeks), follow the steps above for any samples that do not have corresponding flashcard data

Flow Source Codes:

- MC: The Memory Cyclone
 - Used for A, B, C modules when there is a flashcard or flow graph data.
- MO: The Memory Orifice
 - Used for D modules when there is flashcard or flow graph data.
- LC: Cyclone values from log sheet
 - For A, B, C modules when there is no flashcard or flow graph data.
- LO: Orifice values from log sheet
 - For D module when there is no flashcard or flow graph data.
- NF/N: Nominal Flow/Nominal Temp
 - For A, B, C, D modules and Temperature when the flashcard, flow graph, and log sheet values are unusable.

6.8.6 4D Cartridge Upside Down

The 4D cartridge is the only cartridge that is installed with the cassettes pointing towards the bottom of the module. Because of this, operators sometimes install it the same way as the 1A-3C cartridges, which for the 4D cartridge is incorrect. If the 4D cartridge samples in the wrong orientation, the first position ORI / Pressure values (and possibly the second if it is a 3-filter cartridge) will be very close to MxVac / Vac values and the CYC will be close to resting values because the first (and second if applicable) will run on a paper position. The filters also may be blown out. Any deposit on the filters will be on the incorrect side. When this occurs, the filters in that cartridge should be assigned a status of BI (for Bad Install) and the appropriate comment should be used.

Sometimes an operator will catch the mistake during filter readings. If the initial readings look abnormal but the final readings are correct, the operator may have

fixed the issue. Inspect the cartridges to confirm that the filters are intact, and the sample is on the correct side. Also check flashcard data to confirm good run day values. Rule out any other equipment issue (like a “sticky” solenoid) by talking to the field maintenance supervisor. If everything checks out, assign the filters a status of “NM” and note in the comments field that the D MOD ran fine, as the initial values will look incorrect.

6.8.7 Missing Screens

The 1A, 3C, and 4D cartridges are loaded with loose screens. While extremely rare, a cartridge may be sent out without loaded loose screens. The danger in this is that the filters will tear, and the loose material may cause the valve to clog. If there are cassettes with missing loose screens but no filter tears, the ORI values should be low and the CYC values should be high due to reduced resistance. Examine the physical cartridges to confirm that a missing loose screen is the cause for the reduced resistance. Samples that do not have loose screens but are not torn are given a status of “QD” until all further analyses have been completed. If both ORI / Pressure readings are close to resting values and CYC / Flow values for samples of a module are lower than normal (which would occur if flow is reduced due to a clogged valve), check the physical cartridges to see if loose screens were loaded for all samples and that all filters are intact.

If there is a filter that is torn and a screen that is missing in any cassette, contact the field maintenance team immediately. Samples that are torn due to missing loose screens are given the status “XX” (which implies that the lab was at fault for the terminal issue). If a clog in the valve exists due to a torn filter, discuss the situation with the field maintenance supervisor to determine whether or not the reduced flow is low enough for subsequent samples to be given terminal statuses.

6.8.8 Bad Temperature

A temperature probe is located in the 3C module and its values are recorded on the same interval as transducer values. When temperature probes malfunction for the V2 Controller, the values typically read around “4095”. V4 Controllers will show Celsius temperatures that are out of range and unreasonable. If a trend like this is noticed, notify field maintenance. Also, if temperatures seem abnormally low or high for a site, talk to the field maintenance team to determine whether the temperature offset may have been set incorrectly (version 6.02 controllers) or whether some other issue is occurring.

6.8.9 Other Issues

Many other problems may occur with IMPROVE equipment; this TI is only meant to discuss the simpler problems that may occur. If values do not look correct and the problems listed above are not applicable, contact the field

maintenance supervisor or an experienced lab or development technician to help determine the source of the problem.

7. DATA AND RECORDS MANAGEMENT

Field Controller Readings are ingested into the SQL database Filter Readings table. Log sheet data is then uploaded through the lab application from the Filter Readings table.

The corresponding flashcard data are uploaded to a SQL database through the use of the lab app, under the Admin section. A data connection to the SQL database through the web app is used to graph the flow data to help the diagnosis of log sheets. Finally, an Excel file called the Comments Database is used to store standardized comments for use in entering log sheets, if the comment needed is not already found in the lab app.

The flow plotter can be found at: <https://shiny.aqrc.ucdavis.edu/FlowRates/>, or it can be navigated to through the web app: <http://improve.aqrc.ucdavis.edu/Flows>, by going to the Samplers button then clicking the Flows tab.

7.1 Input Log Sheets

The Improve Filter Processing application (lab app) is used to record data from the field log sheets for exposed filters into the various tables in SQL database. Through this program, temperature, pump vacuum readings, orifice / pressure and cyclone / flow values, elapsed sampling time, and filter status are recorded for each filter. A shortcut for the application will be located on the desktop. The software developers and IT department coordinate application updates and will automatically set up a shortcut on the desktop. Contact IT or developers if any issues.

7.2 Flow Rates

Flow Rates is an application (located at <https://shiny.aqrc.ucdavis.edu/FlowRates/>) used by the lab and other IMPROVE personnel to graph flow data for any site in the network. Users have the ability to view each module separately with the acceptable range of values displayed on the screen, providing users with a quick and easy way to determine if flow values are too high or too low. Users may also view all modules' flow data in the same graph. Finally, temperature values are also graphed for the user's convenience.

7.3 Comment Database

The Comment Database is an Excel file located in U:\IMPROVE\LogStatusFlags\2018 Comment Database.xls. It contains standardized comments to use in Input Log Sheets, the comments have been uploaded to the Improve Filter Processing Application. The comments are grouped according to common issues/problems. Each comment also indicates what status code to use for the samples the comment applies to; the lab app does not include the associated status code with the comments.