The source for news and tips of interest to users of MSC-LIMS, an affordable laboratory information management system for small labs.

Issue No. 17

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Welcome

Welcome to MSC-LIMS Insights.

This newsletter will help current MSC-LIMS users get the most out of their software, and will complement the product literature and downloadable demo that prospective users can find on our web site at <u>www.msc-lims.com</u>.



Join our mailing list for more information. Sign up at <u>www.msc-lims.com/lims/maillist.html</u>.

This newsletter is for and about MSC-LIMS users. We welcome your comments, and your suggestions for topics you would like to see addressed in upcoming issues. Please send your thoughts to <u>newsletter@msc-lims.com</u>.

Poor Microsoft Access Performance on Windows 7: Update

In the previous issue of *Insights* we described a serious performance problem with Microsoft Access on Windows 7 systems (see "Microsoft Acknowledges Poor Access Performance on Windows 7" in <u>MSC-LIMS</u> <u>Insights No. 16</u>). Microsoft confirmed that queries that are fast on Windows XP systems were erratic and slow on Windows 7.

Since we are also working with Access 2010 for our next major release, MSC-LIMS 4.0, we were disappointed to learn that the problem is present for all versions of Access on Windows 7. We tested a private hotfix provided by Microsoft for Access 2010, which successfully solved the problem but only for Access 2010. When we asked about a fix for the Jet 4.0 database engine used by Access 2002/2003, we received the following reply from Microsoft's Senior Support Escalation Engineer:

I am pleased to hear that the private release solves the slow query performance with Access 2010. I will pass this feedback along to the developers so they can work on a final release of the fix, scheduled for late August, early September. Unfortunately, there will be no fix provided for Jet 4.0 as it is out of main stream support.

Regrettably, the poor query performance with some larger MSC-LIMS 3.x databases remains a problem on Windows 7 systems. If you are considering migrating to Windows 7, please keep this in mind. One workaround is to run MSC-LIMS 3.x in XP Mode in Windows 7, which is a virtual Windows XP machine running within Windows 7.

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From the Developer

Throughout the 30 years that I've been developing software professionally, it has been a privilege to observe the fundamentals of other trades, industries and businesses. Developing and supporting MSC-LIMS continues to provide me that agreeable opportunity. Within just the last couple of years, MSC-LIMS has been implemented in a vast array of analytical labs, ranging from environmental, food, wine and beverage, to transformer oil, radiation measurement, medical cannabis, seed and animal feed, specialty chemical and materials testing services.

A successful software application requires collaboration between the developers and the experts in the field the application will serve. Our users are the experts, and they always impart some new knowledge or insight when installing our software in their lab. Thanks to all MSC-LIMS users for making our product better and for sharing details of their businesses.

Of course, there are drawbacks to the technology business. Our recent dealings with Microsoft are a case in point. See "Poor Microsoft Access Performance on Windows 7: Update" for the latest.

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Understanding the LimsCode Size Warning

Have you seen either of these warnings? A version of these messages originated with MSC-LIMS 2.0 in 1999, when personal computers had far less random access memory (RAM) than today's typical workstation. However, these messages still serve a useful purpose.



The file LimsCode3.mde (LimsCode), which is the front-end database located on each LIMS workstation, contains the MSC-LIMS software, screens, and reports. LimsCode also includes many tables that temporarily maintain the results of data queried from LimsData and other data used by screens and report setup dialogs. With use, LimsCode will gradually increase in size as the system adds and later deletes data from its temporary records tables. A decade ago, such bloat could have a significant performance impact on less powerful PCs with little RAM. On today's machines, the size of LimsCode will rarely have a noticeable effect.

Although the LimsCode size warning is harmless, you can control it by adjusting settings on the Workstation Configuration screen. First, enable both the "Compact LIMSCode at exit" and "Delete temporary records at exit" options at each LIMS workstation. These settings are enabled by default at installation but may have been disabled in the meantime.

MSC-LIMS Workstation Configuration	x
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Populate Sample List: Six Months	
Check sample schedules at startup	
Check sample warnings at startup Prompt to print labels at sample login	
Prompt to print sample summary at completion Suppress 'Not Compiled' startup warning	
Show 'Compact' startup warning when LIMSCode exceeds 15 MB Compact LIMSCode at exit	
Delete temporary records at exit	
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You can also suppress the workstation's LimsCode size warning by disabling the "Show 'Compact' startup warning" option. Alternatively, simply increase the setting's default 15 MB warning threshold to 20 MB, for example, to minimize the warnings. With all three options enabled, persistent LimsCode size warnings may identify a problem with the workstation's LimsCode file, which you can solve by simply replacing LimsCode with a fresh copy from the Setup folder.

Creating a Basic Excel Import Template

This is the third in a series of *Insights* articles designed to provide a better understanding of the macros used in Excel templates. In our first two installments (see "Introduction to MSC-LIMS' Excel VBA Macros" in <u>MSC-LIMS Insights No. 15</u> and "Creating a Basic Excel Export Template" in <u>MSC-LIMS Insights No. 16</u>) we explored the location and names of the required macros in both MSC-LIMS export and import templates and we created a simple export template. In this article we will present the required macros for an import template.

MSC-LIMS allows users to import analysis results directly from Excel. When importing results for the same analyte across many samples, use the Results by Analyte screen; when importing results for multiple analytes for the same sample, use the Results by Sample screen. Any analyte that requires calculations to obtain a final result in the Results by Analyte screen is a good candidate for its own import template

For our example, let's assume our lab always uses the average of two pH meter readings to determine a pH result. We can create an import template specifically for pH, which we will use to calculate and import the average.

Begin by opening a new blank workbook in Excel, then change the name of the first worksheet from "Sheet1" to "pH" and the second from "Sheet2" to "LIMSData".

Use File | Save, set the Save as type to "Template (*.xlt)" and the file name to "pH Worksheet"; now save the file in your Excel import templates folder (see the Workstation Configuration screen for the folder location).

Modify the layout of the pH worksheet to resemble the example below. Use cell shading to identify the cells used for data entry (white in this example). We will return to add cell formulas later.

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8	<u>F</u> ile <u>E</u> dit <u>V</u> ie	w <u>I</u> nsert F <u>o</u>	ormat <u>T</u> ools <u>D</u> ata <u>W</u> i	ndow <u>H</u> el	р	- 6	9 ×
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2	SampleID	Collected	Location	pН	pH Dup.	LIMS Result	
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As we learned in previous *Insights* articles, every import template used with MSC-LIMS must have a

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LIMSData worksheet with macros

BeforeTransferFromLIMS, AfterTransferFromLIMS, BeforeTransferToLIMS, and AfterTransferToLIMS. As their names imply, MSC-LIMS runs the macro before and after transferring the results entry screen's data to the LIMSData sheet and before and after importing results.

When importing results by analyte, the workbook must include the anlayses' LIMS sampleID and you will likely need to display other sample characteristics to distinguish each analysis. For this reason, an import template's AfterTransferFromLIMS macro functions much like that of an export template. However, instead of receiving the data from a report, an import template's LIMSData worksheet is populated with the results entry screen's data.

Now, back in our example pH worksheet, use Tools | Macros | Visual Basic Editor to open the VBA Editor. If the Project Explorer and Properties windows are not visible on the left side of the VBA screen, use View | Project Explorer and View | Properties to display. Select Sheet2 in the project explorer and change its Name property in the Properties window to "LIMSData". For consistency, you can also change Sheet1's name to "pH". Since our macros must be stored with the LIMSData worksheet, double-click the LIMSData sheet in the project explorer to open the LIMSData sheet's VBA code window. Enter the VBA statements shown in the code window below to create the required macros.

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WBAProject (pH Worksheet.xlt) Microsoft Excel Objects	Public Sub BeforeTransf	erFromLIMS()	
LIMSData (LIMSData)	End Sub		
PH (pH)	Public Sub AfterTransfe	rFromLIMS()	
	End Sub		
	Public Sub BeforeTransf	erToLIMS()	
	2.5.2.2		
	End Sub		
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Properties - LIMSData			
LIMSData Worksheet			
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DisplayRightToLeft False			
EnableAutoFilter False			
EnableCalculation True			
EnableOutlining False			

The code window above shows the four empty LIMSData worksheet macros that are required by all import templates used with MSC-LIMS. As in an export template, MSC-LIMS runs macro

BeforeTransferFromLIMS before writing data to the

LIMSData sheet and macro AfterTransferFromLIMS after the data transfer. However, with an import template like our pH example, the data behind the results entry screen is transferred. For each analysis displayed, one row of data is added to the LIMSData sheet. We can use the AfterTransferFromLIMS macro to redisplay sample characteristics on our pH sheet like building a report with the same macro in an export template.

So that we can also use LIMS field names in formulas on our pH sheet to display sample data, our AfterTransferFromLIMS will begin by creating named ranges for the data on the LIMSData sheet using the row one labels for the names. Add the following lines to the AfterTransferFromLIMS macro:

' Create named ranges for the LIMS data
With Worksheets("LIMSData")
.Select
.UsedRange.CreateNames Top:=True, Left:=False, _
Bottom:=False, Right:=False
End With

The code above uses a With block, to perform multiple statements on the Worksheets("LIMSData") object without repeating the object name. For example, between the With and End With statements, the .Select statement is equivalent to Worksheets("LIMSData").Select. This code selects the LIMSData worksheet, then uses the CreateNames method on the worksheet's used range to create names using the labels in the top row.

As in our previous *Insights* export template example, our macro will copy a named range of formulas on the pH sheet just once for each analysis exported; therefore we do not have to copy formulas in advance anticipating the maximum number of pH analyses we query on the Results by Analyte screen. We will add the "OneSample" named range in a moment.

Add the following lines to the AfterTransferFromLIMS macro below the lines just added:

' Copy the OneSample named range on the first ' worksheet to rows below once for each sample. Worksheets(1).Select With Worksheets(1).Range("OneSample") .Copy .Resize(Worksheets("LIMSData") _ .Range("SampleID").Rows.Count) _ .PasteSpecial Paste:=xlPasteAll End With

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The code above simply copies the OneSample named range on the first worksheet, then pastes it to the range temporarily resized so its number of rows matches the number of samples on the LIMSData sheet. Finally, add the following lines of code to the macro to turn off Excel's copy mode and select cell D3, the first data entry cell:

' Clean up Application.CutCopyMode = False Worksheets(1).Range("D3").Select

The screen below shows the updated

AfterTransferFromLIMS macro. Use Debug | Compile VBA Project to check for errors. If there are no errors, close the VBA editor and return to the template.



Resuming our example pH worksheet above, select cells A3 through Z3, use Insert | Name | Define, enter the name "OneSample" without spaces then click the [OK] button. Although our example only uses cells A3 through F3, creating our named range through column Z allows us to add additional columns later without having to remember to update the named range. Enter the following pH sheet cell formulas:

A3:	=INDEX(SampleID,	ROW()	-	ROW(OneSample)	+	1)

- B3: =INDEX(CollectedDate, ROW() ROW(OneSample)
 + 1)
- C3: =INDEX(Location.Name, ROW() ROW(OneSample) + 1)

The formulas in cells A3:C3 retrieve sample characteristics by their LIMS field name from the LIMSData sheet using the named ranges created by our AfterTransferFromLIMS macro. Once you have used the template you can review the available field names on the first row of the LIMSData sheet and use any field in these and additional cell formulas. The expression "ROW() - ROW(OneSample) + 1" in each formula returns a value of 1 on row 3, 2 on row 4, etc., so that row 3 displays data for the first sample, row 4 for the second sample, etc. Note that the formulas in cells A3:C3 will result in a #NAME? error in the template, which we expect because the named ranges for the LIMS fields do not yet exist and will only be created after our macro runs.

Finally, the formula in F3 calculates the final result that will be imported into the LIMS. If cells D3 and E3 are a number, the formula calculates the average of the two rounded to two decimal places, otherwise it displays an empty string. The rounding in the formula is important because MSC-LIMS will import the cell's actual contents, which may include more digits than displayed via the cell's formatting. Save and close the pH Worksheet template.

Before employing our new template for pH data entry, we must first configure the Excel interface for the analyte. The interface ties the template to the analyte and shows the LIMS where to find results to import. Open the analysis setup screen in the LIMS, switch to edit mode and select pH. Configure the Excel interface as shown below, then close the screen.

Specifications Result	ts Entry QC S	pecifications	Excel Interface	Notes
Workbook Templ	ate: pH Work	sheet.xlt		
Default Fol	der: C:\MSC-L	.IMS\Examples	Excel Import Ter	mplates
Results				
Worksheet:	pH			
_	Start Cell	Direction	Offset	
Result:	F3	Column	• 1	
Sample ID:	A3			

To test the template, query and display several incomplete pH analyses in the Results by Analyte screen. Use Spreadsheet | New and you should see your analyses listed in a new workbook created from the template. Enter the two pH values for each analysis to calculate the average, then return to the

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LIMS and use Spreadsheet | Import Results to import the averages.

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	A	B	С	D	E	F	
1			pH Worksheet				
2	SamploID	Collected	Location	-		LIMS	
2	120203P001	2/1/2012	Influent	7.58	7.65	7 62	
4	120203P002	2/1/2012	Primary Effluent	1.00		1.02	
5	120203P003	2/1/2012	Secondary Effluent				
6	120203P004	2/2/2012	Site 3				
7	120203P005	2/2/2012	Site 4				
8							
9							
11							-
H + H pH LIMSData							
Rea	dy						

In this simple example import template, we added the four required LIMSData sheet macros and added code only to the AfterTransferFromLIMS macro. The macro created named ranges for the LIMSData sheet's data then copied our pH sheet's OneSample named range of formulas for the number of analyses exported, generating the worksheet above. Although we added no code to the template's other macros, you may find them useful. For example, code could be added to the AfterTransferToLIMS macro to automatically save a copy of the workbook to a server folder whenever results are imported into the LIMS.

Copy and use this simple working example as the basis for additional templates. Explore and copy code excerpts from MSC-LIMS' example templates to add new capabilities to your templates. Use Excel import templates to calculate and import results and eliminate duplicate data entry.

Notes from Technical Support

Organizing Analyses

A user logging samples with many analyses recently asked:

I was wondering if there was a way in [MSC-]LIMS to make a sub-folder within a batch of analyses? I'm looking for an easier way to organize so I can find all my metals and/or sugars from one batch quickly versus looking through all the other results to pick out each metal/sugar. Is this possible?

Yes! Two techniques exist to organize your sample's analyses. First, "requirements" are the closest analogy to the subfolders you describe. A requirement is a named list of analyses. Use the Requirements setup screen and, for example, add your metals analyses to a "Metals" requirement. You can then add that requirement to projects and samples to add all of its analyses. You will then see your metals analyses grouped under the Metals requirement name in the Results by Sample screen and on the Sample Summary report. Second, you can add your own numeric sort order to individual analyses and to requirements, so that analyses appear on screen and on reports in an assigned rather than alphabetic order. Use the [Analysis Sorting] button on the Analyses setup screen and the [Requirement Sorting] button on the Requirements setup screen to define your sort order. The numeric Sort Order field accepts values up to 32767. If you use this feature, remember to leave numeric gaps between the values you enter so you can easily add new analyses later. For example, if you want your metals analyses to appear before sugar analyses, you might assign sort orders for metals in the 1000s and sugars in the 2000s.

Project vs. Analysis Costs

A new MSC-LIMS user needed help configuring analysis costs:

How do we get to invoice properly if we charge more for all tests individually? For instance, our water package includes over 10 individual tests. How do we

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set the price for the whole package as right now it appears to be summing up the individual tests. We charge more for individual tests than if they are in packages due to sample handling.

Assign the costs you charge for an individual test in the analysis setup screen. When you charge a different cost for analyses performed as a group such as your water package, first add an auto-complete internal data cost "analyte" with the appropriate cost for the group. Next, add the cost analyte to either a requirement or a project along with the individual analyses, but set the individual analysis costs to zero using the Cost tab of either the project or the requirement setup screen.

Database Size Metrics

We frequently receive both pre-sales and post-sales technical support questions regarding the sample processing volume guidelines listed in the Frequently Asked Questions on our web site.

Our 75,000 samples per year or 300,000 tests per year numbers are just a rule-of-thumb that dates back to MSC-LIMS version 1.0. These numbers approximate a

practical performance limit, although an Access database allows far more samples and tests.

Users easily surpass these numbers when running a single-user license with the database and software on the same workstation. Also, a multi-user installation under Citrix or Terminal Services allows larger databases without performance degradation; since both the software and database reside on the same server, network traffic for data access is eliminated.

Sample Documents

A user recently submitted this question:

What is the "Document" section for in MSC-LIMS that is beneath the "Notes" section in sample login and results by sample? It has a picture of a globe and a link - could you give me a couple of examples of how this is used? And does the attached document or link get sent with the results when a summary report is created?

Use the Document field to link any external document to the sample. The document is intended for lab use only and is not sent or automatically attached to any final report. Some sites use the field to link a chromatogram, instrument data file, or outside lab report to the sample.

For Customers Only

This section of *MSC-LIMS Insights* is devoted to current users of MSC-LIMS. Here we briefly introduce only the most recent additions to MSC-LIMS.com Customers Only pages. Use your login name and password to log on to the Customers Only section of our website.

Knowledge Base

Timed Shutdown of MSC-LIMS Messaging

Summary: MSC-LIMS Messaging maintains a connection to the production LimsData database while it is active. Not all backup software can successfully back up files that are open and in use. If you need to close Messaging to ensure proper back up of the LimsData database, this article shows you how to use a VB script to shut down MSC-LIMS Messaging.

Contact Us

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