Version

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STATE HYGIENIC LABORATORY AT THE UNIVERSITY OF IOWA

OpenELIS Manual

STATE HYGIENIC LABORATORY AT THE UNIVERSITY OF IOWA

OPENELIS MANUAL

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OpenELIS

OpenELIS is a robust Enterprise Laboratory Information System built around an extensible and scalable framework. OpenELIS is designed and developed through the collaborative efforts of Public Health Laboratories to accommodate business processes that are common to all public health laboratories; encompassing clinical, environmental, newborn screening, and animal testing.

The goal of the OpenELIS team is to develop a state of the art system that is economically sustainable by reducing both initial investment and ongoing maintenance costs. By using an open source approach, we ensure that the project will continue to evolve and meet the changing needs of the community.

CHAPTER 1 ACCESSING OPENELIS

This manual is organized into two main sections: (1) basic components of the OpenELIS database for new users, such as login, logout, screen elements (fields, buttons, icons, etc.), and how to do a general query, and (2) chapters about specific screens for data entry and analysts. It is recommended that new users first familiarize themselves with the screens relevant to their duties, using the beginning chapter on screen elements as a resource and reference.

We predict this manual will serve two main audiences: new users who need a general overview of the OpenELIS database to supplement their section-specific training and users who need to refer to specific tasks or terms in the manual.

1.1 LOGIN AND LOGOUT

OpenELIS is an application that is accessed through a secure web page. To login to OpenELIS open a compliant browser (see supportive browsers in Section _) and type in the following url: https://www.shl.uiowa.edu/openelis/OpenELIS.html

The following screen should appear in the browser. This is the login screen. Enter your username and password to login to the application. Click on Sign In or press the Enter key.

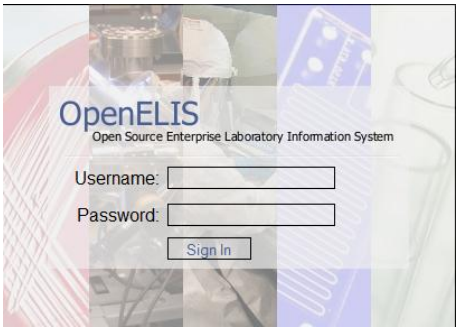


Figure 1 Login Screen

Once you are logged in to the application you will see the Main Screen, or home screen, with a main menu at the top and the capability to expand the Favorites Sidebar on the left.

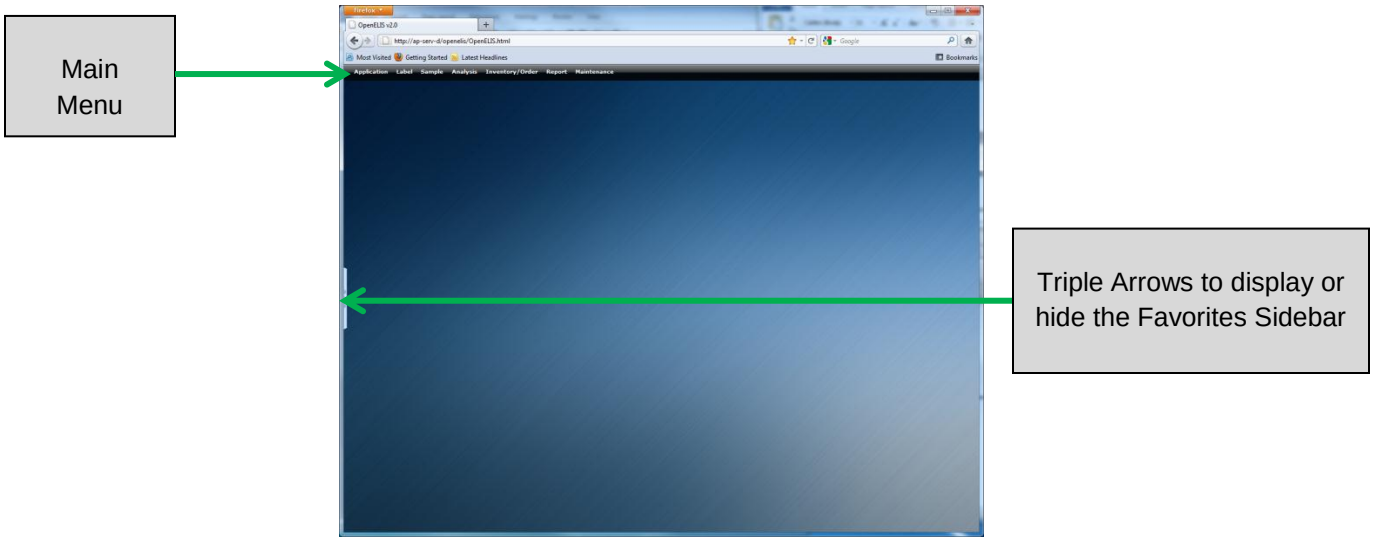


Figure 2 Main Screen

It is important to logout of the OpenELIS database after each use, due to patient/client confidentiality. The Logout option is found at the bottom of the Application Menu.

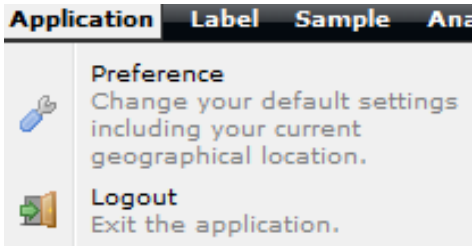


Figure 3 Application Menu

1.2 MAIN MENU

The Main Menu bar can be found at the top of the home screen. The major sections of the main menu consist of Application, Label, Sample, Analysis, Inventory/Order, Report, and Maintenance menus. Use the Main Menu to access all of the modules by expanding each section and clicking on the desired one.

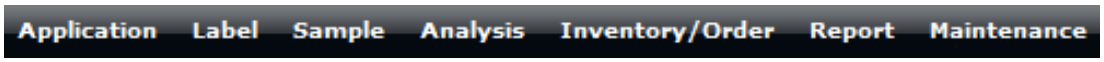


Figure 4 Main Menu

1.3 PREFERENCES

The Preference screen under the Application Menu allows the user to change her default settings including her current geographical location. The user's default printer, default bar code printer, and location (Ankeny, Iowa City, or Lakeside) can be set on this screen. There are dropdown lists for each of these settings. The user needs to first click the **Update** button to initially select or modify these default settings, and then click the **Commit** button to confirm these selections.

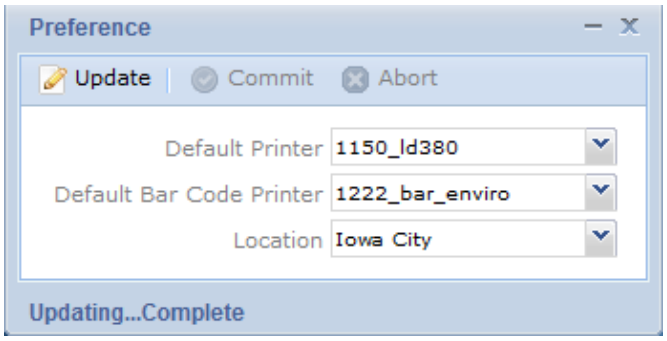


Figure 5 Preference Screen

1.4 FAVORITES SIDEBAR

The Favorites menu found in the sidebar allows the user to proceed immediately to frequently used modules. Click on the triple arrows on the left-hand side of the Main Screen each time in order to display or hide the Favorites sidebar. Initially, the Favorites sidebar is empty. Click on the toggle button in the top right corner of the Favorites to display all available modules. Select the modules to appear in the personalized Favorites by checking the corresponding boxes. Click on the toggle button again to display the selected modules. They are now active and clicking on the desired name will open up that module.

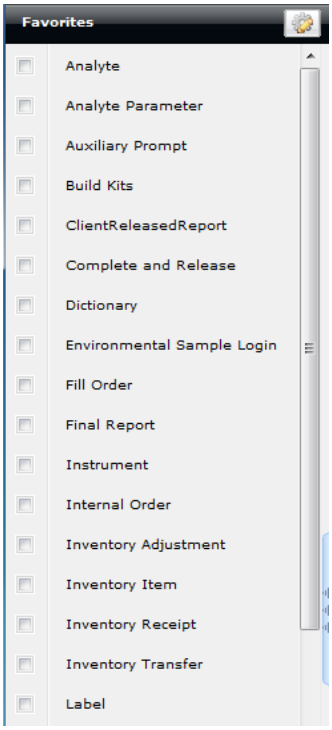


Figure 6 Available Favorites

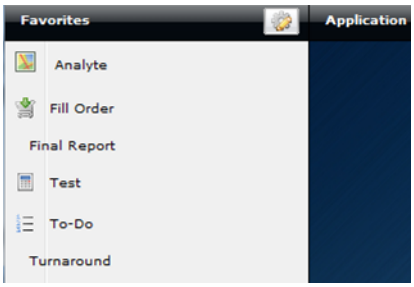


Figure 7 Personalized Favorites

CHAPTER 2 GENERAL FUNCTIONALITY

2.1 SCREEN ELEMENTS

The following are elements of a typical OpenELIS screen. This section discusses formats, fields, buttons, screen functions, and shortcuts.

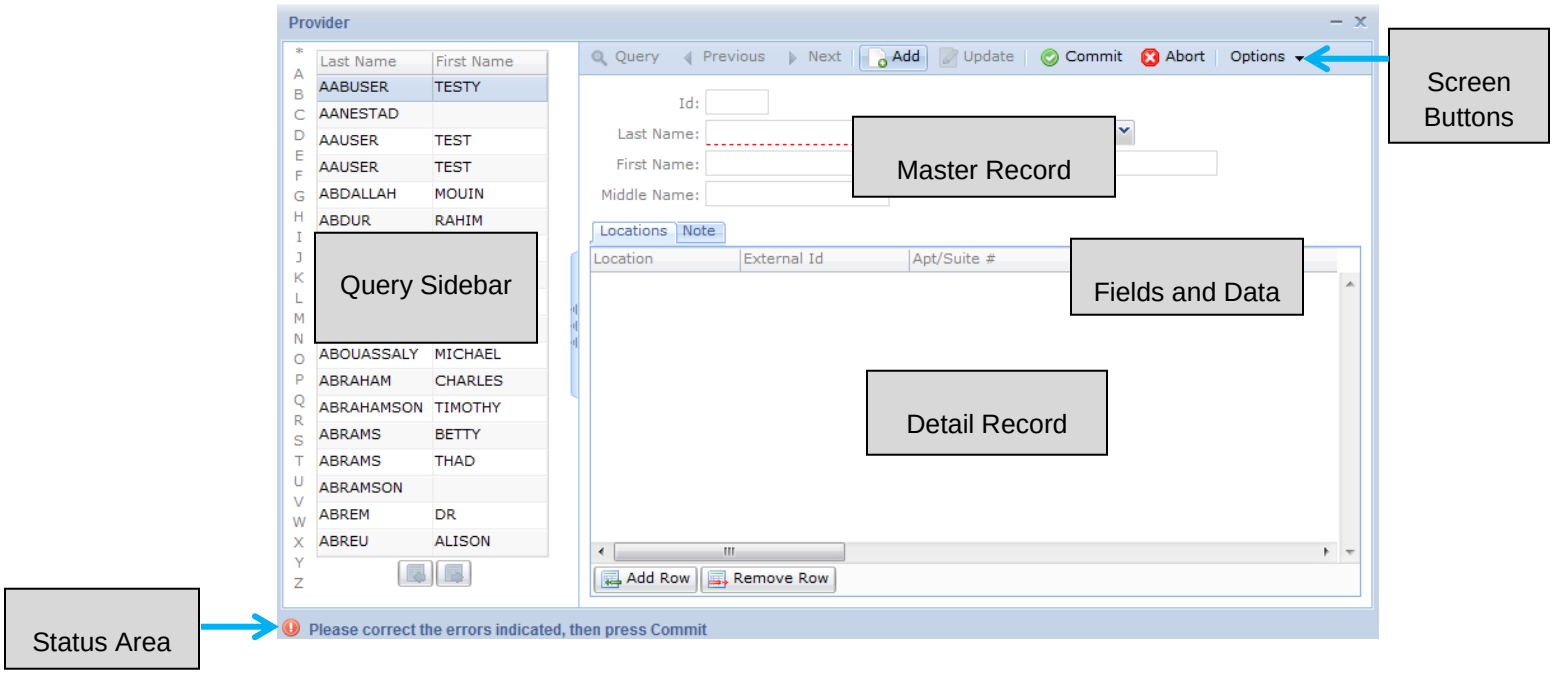


Figure 8 Screen Elements

The **Query Sidebar** that is found on some screens shows a list of the queried results. The result list can be paged forward or backwards by using the arrow buttons located at the bottom of the sidebar. For additional information, see QUERY SIDEBAR.

The **Screen Buttons** are located at the top of the screen. **Query**, **Add**, **Update**, **Commit**, and **Abort** are common to a majority of the screens.

The major white space in a screen is comprised of **Fields** and **Data**. The user can add information in these fields to query for existing records, add a new record, or update an existing record.

The **Master Record** is found in the upper part of some screens. The fields in the master record display the major items of information associated with the record.

The **Detail Records** are located in the lower part of some screens. The fields in the detail records display detailed information that is associated with the master record at the top.

The **Status Area** displays errors and warnings relevant to the last action that was performed by the user. For more information, see STATUS AREA.

2.1.1 SCREEN BUTTONS

There are three states for each button.

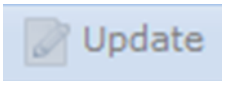
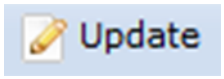
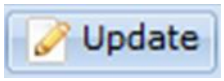
Screenshot of Button	State	Description
	Disabled	The button cannot be clicked if it is not appropriate to the current mode. The button will be grayed out.
	Enabled	The button can be clicked because it is appropriate to the current mode. The button's name will be in black text. The mouse cursor changes from an arrow to a pointing finger.
	Active	The screen is currently in that mode. For example, the button depicted in this example shows the screen to be in the Update mode. It will have a visible rectangular-shaped border.

Figure 9 Screen Button States

Below are the major buttons that are found on most screens along with a brief description of their function. The button must be clicked on most screens before the action can be taken. For example, click the **Query** button first, enter the information next, and then click the **Commit** or **Abort** button.

Button	Description

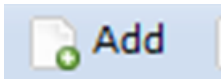
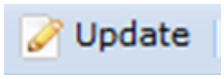
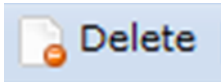
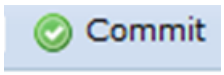
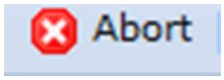
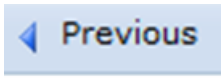
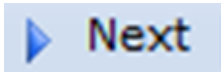
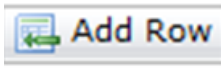
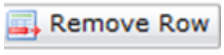
	Allows for the search of existing records within the database.
	Allows for the addition of a new record into the database.
	Allows for a change to be made to the current record.
	Allows for the deletion of the current record.
	Enables any action to be committed. This function does not work unless Query, Add, Update, etc. is clicked first, and data is entered in the correct format.
	Cancels the current operation that is running.
	Displays the record listed prior to the one currently visible on the screen.
	Skips to the next record or listing.
	Allows for the addition of a row to a table.
	Allows for the deletion of a row from a table.

Figure 10 Screen Button Descriptions

2.1.2 QUERY SIDEBAR

The **Query Sidebar** shows the results for a query in alphabetical or numerical order. It can be displayed by clicking on the triple arrows on the left side of many screens. The user can click on a letter or number to show the query matches that begin with that letter or number. The query results list can be paged forward or backward by using the arrow buttons located at the bottom of the sidebar. Clicking on the ***** displays all of the results for the query. Click on the **Next** or **Previous** buttons at the top of the screen to display the records one by one. Select an entry in the query results list to display that record in the right-hand pane.

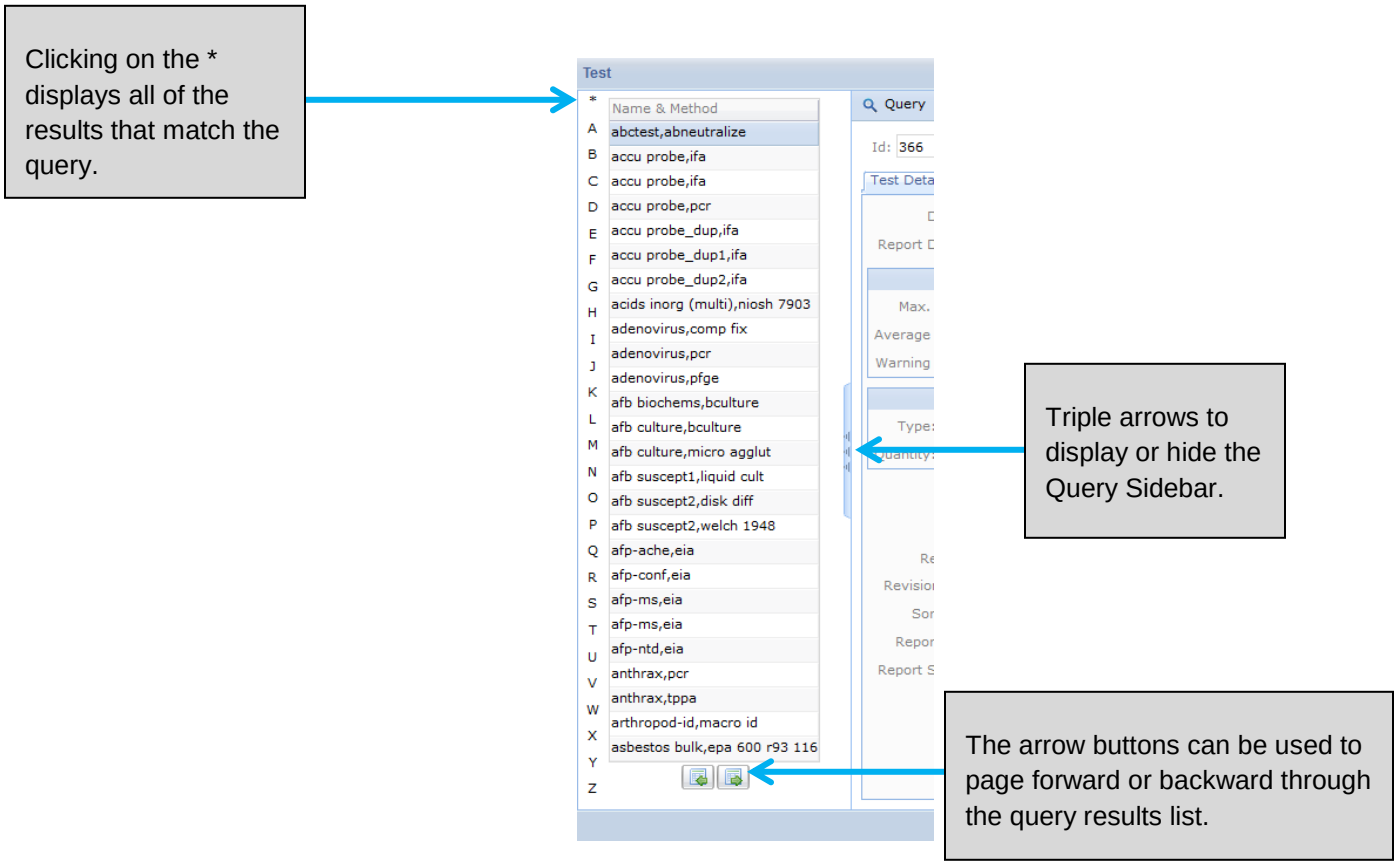


Figure 11 Query Sidebar

2.1.3 TYPES OF FIELDS

The following section describes the functionality of the different field types that are utilized in OpenELIS.

2.1.3.1 TEXT FIELDS

Text fields allow the user to enter partial or complete text to add or update a record or to perform a query. Text can also be cut from, and copied and pasted into a text field. The OpenELIS program automatically displays the text as uppercase or lowercase depending upon the field. When the user clicks on a text field to activate it, the border of the text box turns green and a blinking cursor appears inside of it.

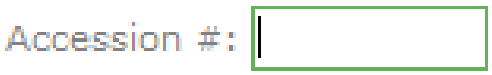


Figure 12 Active Text Box

There are required data formats for certain text fields. These are illustrated below.

Data Type	Format	Example
Date	YYYY-MM-DD	2006-05-09
Date/Time	YYYY-MM-DD HH:MM	2006-05-09 13:59
Zip Code	#####-####	52242-5002
Phone # with Extension	###/###-####.####	319/555-1212.3467

Figure 13 Data Formats

2.1.3.2 DROPDOWN LISTS

Dropdown lists allow the user to select from a prepared list of choices. The up and down arrows allow the user to move through the list one choice at a time. The scroll bar allows the user to move up or down through the list more rapidly. Click on the desired choice to enter it into the field. If the wrong item is selected, it can be deleted with the **Backspace** key and the correct selection can be made.

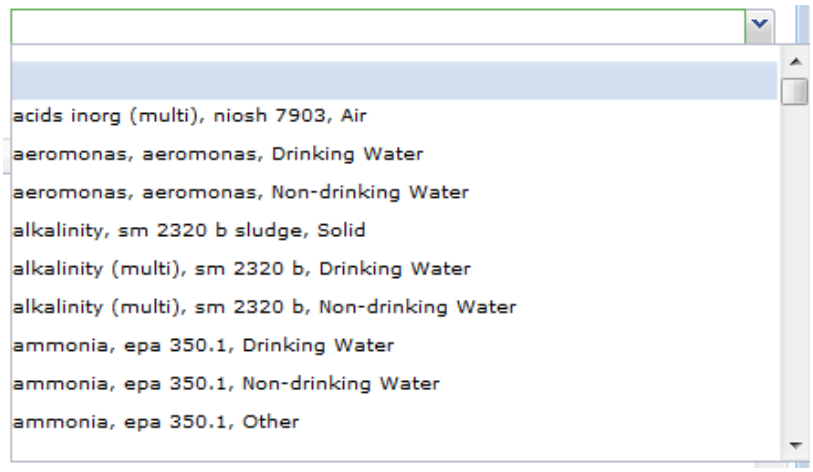


Figure 14 Dropdown List

2.1.3.3 AUTOCOMPLETE

Text fields also have an autocomplete capability. When the user types one or more characters in a text box while in Query Mode, a dropdown list appears. If there is one or more matches to the characters that have been entered, the first match will be highlighted and it can be selected via mouse click or by pressing the **Tab** key on the keyboard.

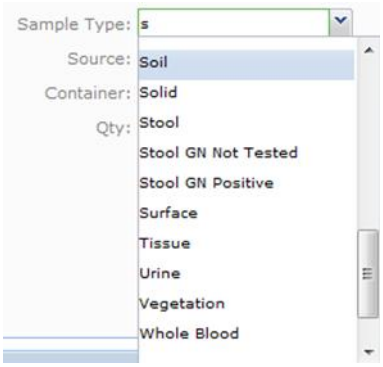


Figure 15 Autocomplete

2.1.3.4 CHECKBOXES

Checking the box next to a description will note that the condition is true. An unchecked box next to a description notes that the condition is false. In the following example, the sample is noted as being hazardous.

Figure 16 Checkbox

2.1.3.5 TABLES

Tables contain information that is characterized by rows and columns. Each row represents a detailed record of information (e.g., an individual test result, storage information item, QA event). Each column is a different field category. Fields in tables may be text fields, drop-down lists, or checkboxes.

Acc #	Domain	Section	Test	Method	Collected	Received	Overrid
1	E	enviro_micro-ic	wnv igm	eia	2009-04-27 14:00	2009-04-27 14:00	
1	E	enviro_micro-ank	wnv igg	eia	2009-04-27 14:00	2009-04-27 14:00	
1	E	bacteriology-ank	wnv igg	ifa	2009-04-27 14:00	2009-04-27 14:00	
1	E	airquality-ic	chl-gc	sda	2009-04-27 14:00	2009-04-27 14:00	
1	E	airquality-ic	chl-gc	sda	2009-04-27 14:00	2009-04-27 14:00	
1	E	airquality-ic	wnv igm	eia	2009-04-27 14:00	2009-04-27 14:00	
1	E	airquality-ic	wnv igg	eia	2009-04-27 14:00	2009-04-27 14:00	
1	E	airquality-ic	wnv igg	ifa	2009-04-27 14:00	2009-04-27 14:00	
1	E	airquality-ic	qftg stim	eia	2009-04-27 14:00	2009-04-27 14:00	
1	E	airquality-ic	sle igm	eia	2009-04-27 14:00	2009-04-27 14:00	
1	E	airquality-ic	sle igg	eia	2009-04-27 14:00	2009-04-27 14:00	
1	E	airquality-ic	sle igm	ifa	2009-04-27 14:00	2009-04-27 14:00	
1	E	airquality-ic	sle igg	ifa	2009-04-27 14:00	2009-04-27 14:00	
1	E	airquality-ic	lac igm	eia	2009-04-27 14:00	2009-04-27 14:00	

Figure 17 Table

2.1.3.6 TABS

Many of the OpenELIS screens have tabs in the Detail Record. Each tab contains fields or tables that are grouped by function. Click on the desired tab to see its member fields.

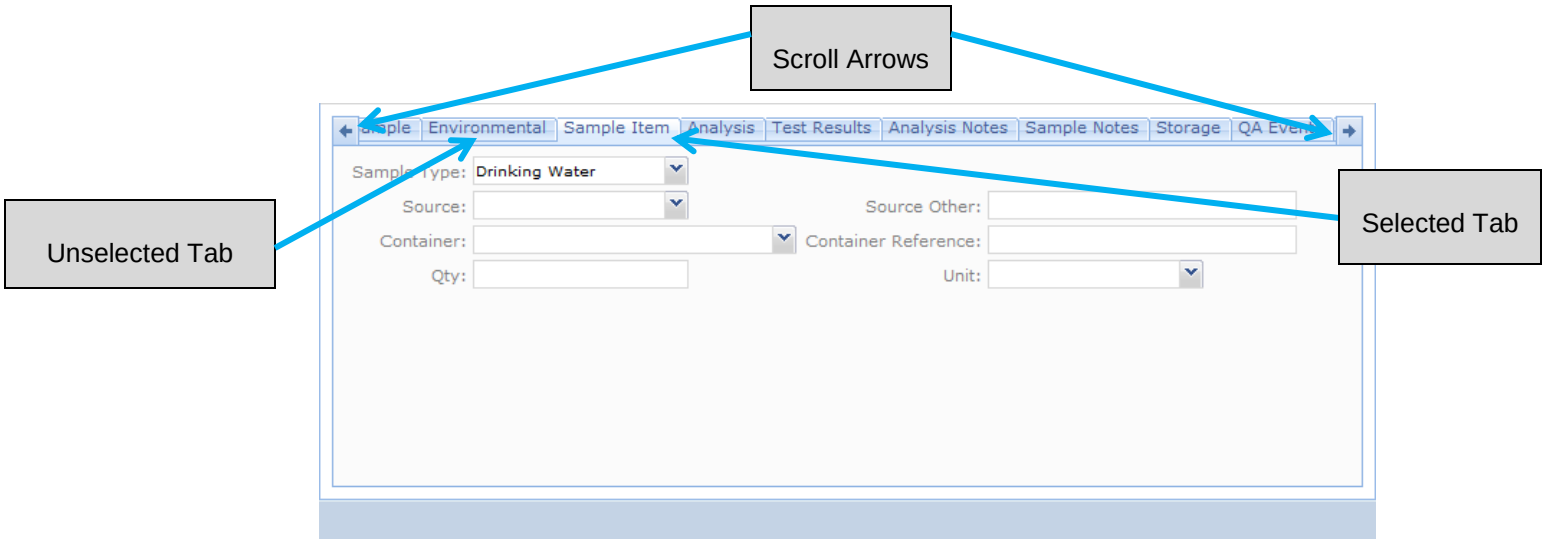


Figure 18 Tabs

2.1.3.7 TREES

Some fields utilize a tree hierarchy. These trees allow the user to expand or collapse the tree directory by clicking on the drill-down arrows.

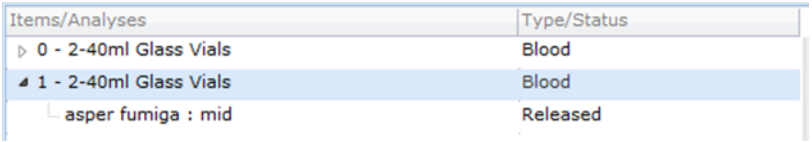


Figure 19 Tree Hierarchy

2.1.4 STATUS AREA

The Status Area displays errors and warnings relevant to the last action that was performed by the user. Many of the error messages will inform the user to correct the indicated errors.

Figure 20 Error Message

Red dashes will be displayed in text fields that are required to have information entered.

Figure 21 Required Field Notification

Multiple errors can also be displayed in the Status Area. The error messages will pop up when the user hovers the mouse on the symbol.

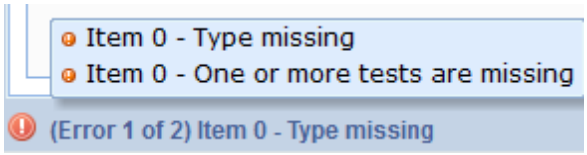


Figure 22 Multiple Errors Message

Sometimes when the record is committed a screen will popup displaying warnings. An example is provided here.

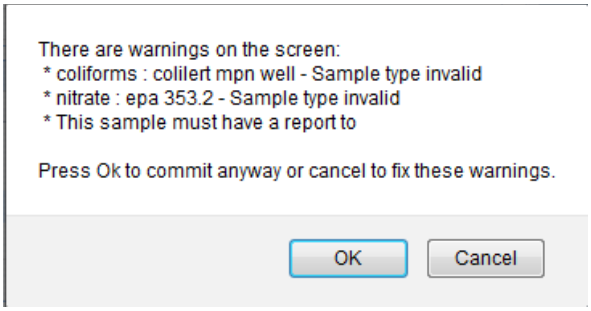


Figure 23 Warning Popup Screen

2.1.5 NAVIGATING THE SCREEN/KEYBOARD SHORTCUTS

The user can navigate through the screen in two ways:

1. By mouse click
2. By moving from field to field by using the **Tab** key

Ctrl Key: Multiple selections from a dropdown list can be performed by clicking on each desired selection while holding down the **Ctrl** key.

Shift Key: A continuous range of selections can be performed by clicking on the first and last desired selections in the range while holding down the **Shift** key.

Keyboard Shortcuts

The following key combinations can be used as shortcuts for the corresponding actions.

Key Combination	Action
Ctrl Q	Query
Ctrl P	Previous
Ctrl N	Next
Ctrl A	Add
Ctrl U	Update
Ctrl M	Commit
Ctrl O	Abort
Ctrl C	Copy
Ctrl V	Paste
Ctrl X	Cut

Figure 24 Keyboard Shortcuts

2.2 QUERY FUNCTION

OpenELIS screens are designed to allow *query by form*. A query by form allows the user to input data into one or more fields on a screen form. This data specifies the records that should be retrieved from the database. What makes this feature so powerful are the relational, range, alternations, and wildcard symbols that a user can include in a query.

2.2.1 GENERAL QUERY BY FORM CAPABILITIES

Begin a query by form by clicking on the **Query** button. Enter information into any field that you wish to query by. You may use appropriate wildcards to expand or limit your search. Increasing the number of fields that you enter information into will increasingly narrow your search. Begin your query by clicking on the **Commit** button. At this point, the screen will display the first matched record, or you will be informed in an error message in the Status Area that no record matched your query.

2.2.1.1 "AND" OPERATION

The "and" operation is used **between** fields when querying by form. The OpenELIS database is searched for all records that possess **all** of the values entered into the multiple fields.

Example 1: Entering SMITH into the Last Name field and ROBERT into the First Name field during a Provider query will display all records of providers with the name Robert Smith.

Example 2: Selecting "Released" in the Status field and entering 2011-11-11 in the Collected field and CEDAR RAPIDS in the City field during a Private Well Water Sample Login query will display all records for private well water samples from Cedar Rapids that were collected on November 11, 2011 and have been released.

2.2.1.2 "OR" OPERATION

The "or" operation is used **within** fields when querying by form. The OpenELIS database is searched for all records that possess **any** of the values entered into the individual field. The **|** keystroke (Shift \) is used to represent "or".

Example 1: Entering SMITH|RAMIREZ into the Last Name field during a Provider query will display all records of providers with the last name Smith **or** Ramirez.

Example 2: Entering WAVERLY|KNOXVILLE into the City field during a Private Well Water Sample Login query will display all records for private well water samples from Waverly **or** Knoxville.

2.2.2 FIELD TYPE BEHAVIOR IN QUERY MODE

Certain types of fields behave differently in Query Mode than they do in Add or Update modes. These behavior differences are outlined in this section.

2.2.2.1 DROPDOWN LISTS ALLOW MULTIPLE SELECTIONS

Multiple selections from a dropdown list can be chosen by clicking on each desired selection while holding down the **Ctrl** key. A continuous range of selections can be chosen by clicking on the first and last desired selections in the range while holding down the **Shift** key.

Example: Selecting “Completed” and “Released” in the Status field during an Environmental Sample Login query will display all environmental samples that have been completed **or** released.

2.2.2.2 AUTOCOMPLETE

Autocomplete doesn’t work the same way in Query Mode that it does in Add Mode. This allows the “or” operator to be utilized.

Example: Entering j*|m* in the Collector field during a SDWIS Sample Login query will display all records for SDWIS samples collected by people whose names start with a “j” **or** “m”.

2.2.2.3 CHECKBOXES

Checkboxes can have three states in Query Mode.

Screenshot	State	Description
	"Yes"	All records will be displayed where the designated condition is true.
	"No"	All records will be displayed where the designated condition is false.
	"Indifferent"	The designated condition will be ignored in the query.

Figure 25 Checkbox States in Query Mode

2.2.2.4 PICTURES ARE NOT ENFORCED

Pictures are not enforced in Query Mode.

Example 1: Extended zip codes (5 integers + 4 integers) are not enforced. 5digit zip codes may be entered in the Zip Code field while in Query Mode.

Example 2: Date fields (YYYY-MM-DD) are not enforced. Dates can also be entered in the formats of YYYY/MM/DD, MM-DD-YYYY, or MM/DD/YYYY. Leading zeroes in the month or day parts of the date field do not need to be entered.

2.2.3 QUERY CAPABILITY USING WILDCARDS, RANGES, EMPTY AND NON-EMPTY FIELDS

The use of wildcards, ranges, empty and non-empty fields increase the functionality of queries. These capabilities are described below.

2.2.3.1 WILDCARD CHARACTER

The asterisk (*****) is used as a wildcard character in queries to substitute for any other character or characters in a string.

Example 1: Entering s* in the Collector field of an Environmental Sample Login query will display all records by a collector whose name begins with the letter “s”.

Example 2: Entering *CO in the Name field of an Organization query will display all records of organizations whose names end with the letters “CO” (e.g., LOUISA CO or ACME MINING CO).

Example 3: Entering *f*1* in the Address field of an Organization query will display all records of organizations that have an “f” **and** a “1” anywhere in the address.

Example 4: Entering *2*|*5* in the Address field of an Organization query will display all records of organizations that have a “2” **or** a “5” anywhere in the address.

2.2.3.2 RANGES

Ranges can be specified in Query Mode by using the **..** characters.

Example 1: Entering 200..500 in the Id field of an Organization query will display all records of organizations that have an Id in the range of 200 to 500.

Example 2: Entering 2011-12-03 00:00..2011-12-03 23:59 in the Received field of a SDWIS Sample Login query will display all records of SDWIS samples that were received during that 24-hour period.

2.2.3.3 EMPTY FIELDS

Queries can be performed for text fields that are empty by inserting the **=** at the beginning of the field.

Example: Entering = in the beginning of the Location field of a Private Well Water Sample Login query will display all records of private well water samples that have that field empty.

2.2.3.4 NON-EMPTY FIELDS

Queries can be performed for text fields that are not empty by inserting the **!=** at the beginning of the field.

Example: Entering != in the beginning of the Location field of a Private Well Water Sample Login query will display all records of private well water samples in which that field is **not** empty.

2.3 ADD FUNCTION

The Add Function allows for the addition of a new entry into the database after clicking the **Add** button. Most screens require some information to be imputed. Some screens check for duplication of information (eg., Analyte), and will display a warning message that a record with that value already exists in the database.

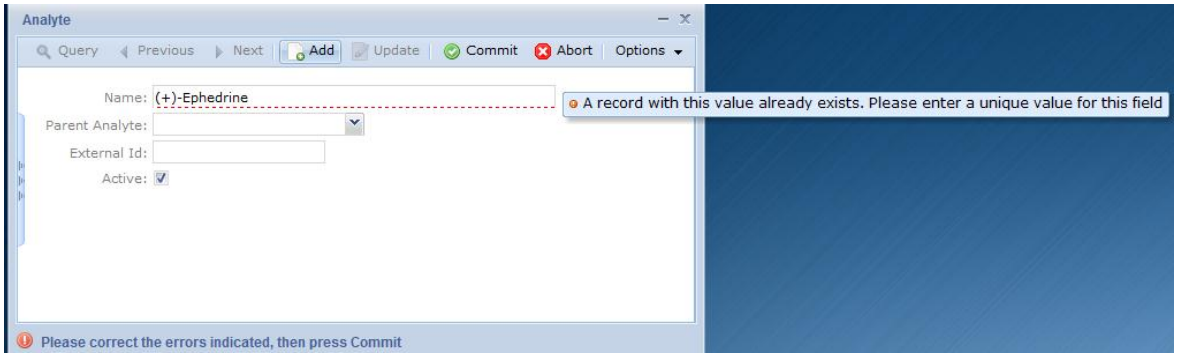


Figure 26 Add Function: Duplicate Record Warning

2.4 UPDATE FUNCTION

The Update Function permits the modification of an entry after clicking the **Update** button. When **Update** is selected the latest version of the record is fetched from the database and it is locked for modification. This guarantees that other users cannot change the record during the duration of the lock (15 minutes). If another user attempts to update or delete the record during the duration of the lock, a message pops up detailing the username of the person who possesses the lock and the expiration date and time of the lock.

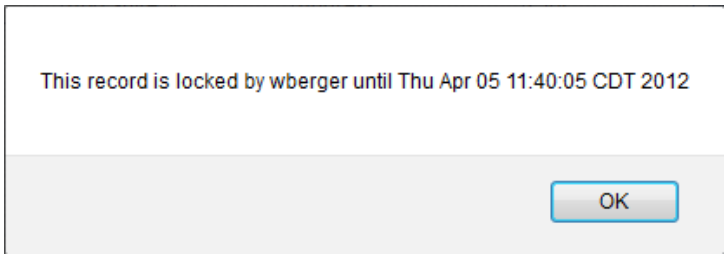


Figure 27 Locked Record

If the user who has acquired the lock on the record fails to update it during the allotted time, a different user can acquire the lock in her place. When the initial user tries to commit her changes, an error message pops up explaining that her lock has expired, and she must abort and start over.

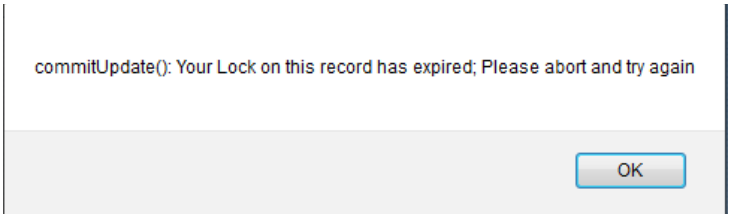


Figure 28 Expired Lock Message

The **Commit** button must be clicked in order to send all modifications back to the database to be recorded. Conversely, the **Abort** button may be clicked to stop the entire operation. If entry errors occur, error messages will be displayed. These errors will need to be fixed, and the **Commit** button clicked again.

2.5 DELETE FUNCTION

Not many screens allow the user to delete records. Clicking the **Delete** button fetches the latest version of the record and locks it. The user should review the data and make sure that he wants to delete the record. He will then need to click **Commit** to confirm the deletion or **Abort** to cancel it.

2.6 OPTIONS MENU

The Options Menu is found on many screens. It allows for the utilization of additional features such as duplicating records, previewing a Final Report, and reviewing history information on the currently displayed entry.

2.6.1 DUPLICATE

The Duplicate function places the screen into the Add mode and copies the previous displayed record into the current form with the exception of unique identifiers. An example of the Duplicate option would be to copy an internal or send-out order record. In this case, all of the fields are copied except for the Order #, which would be assigned automatically by the system when the record is committed.

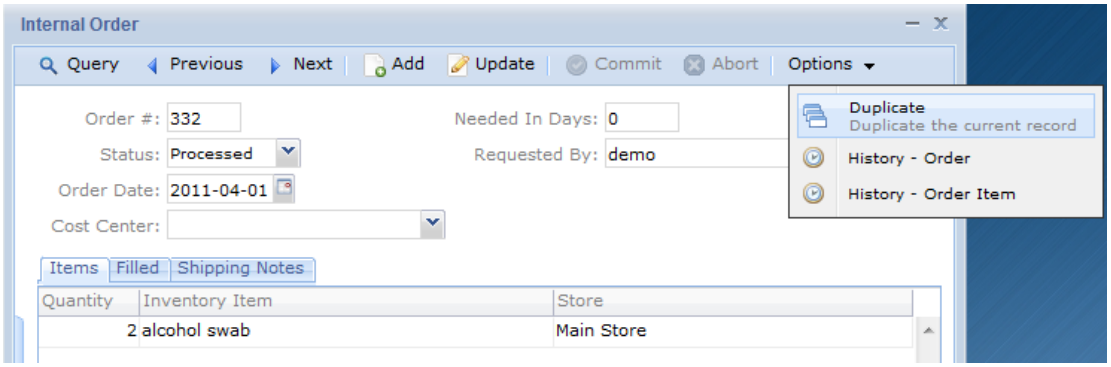


Figure 29 Duplicating a Record

2.6.2 HISTORY

The History feature on various screens gives detailed information about the current record and how it has changed over time at the field level. For screens that display a variety of records, the user will need to select different History options to view the details.

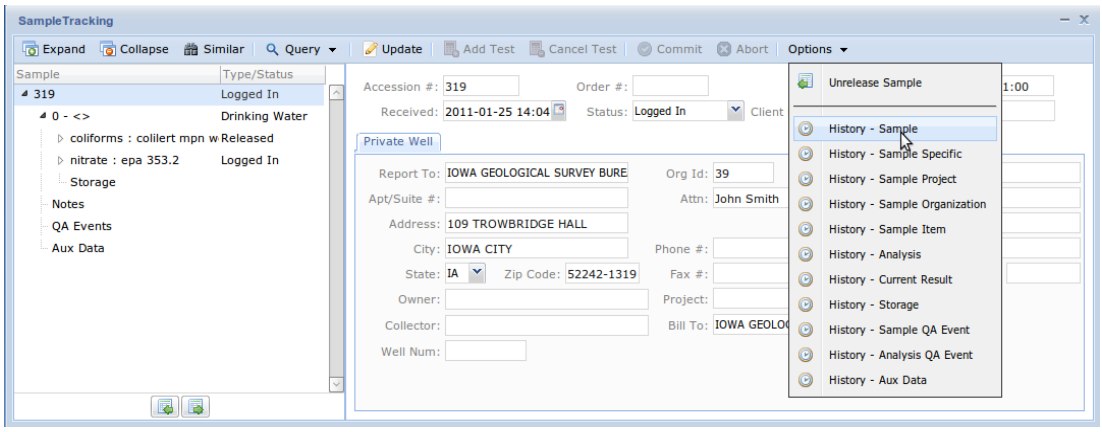


Figure 30 History Option

The History pop-up window allows you to view the operations that were performed on the currently displayed record, when, and by whom. The details can be viewed by clicking and expanding on the drill-down arrows. It lists the Name/Date & Time, User Name, and the Operation taken by that user for that particular record. The primary operations include Add, Update, and Delete.

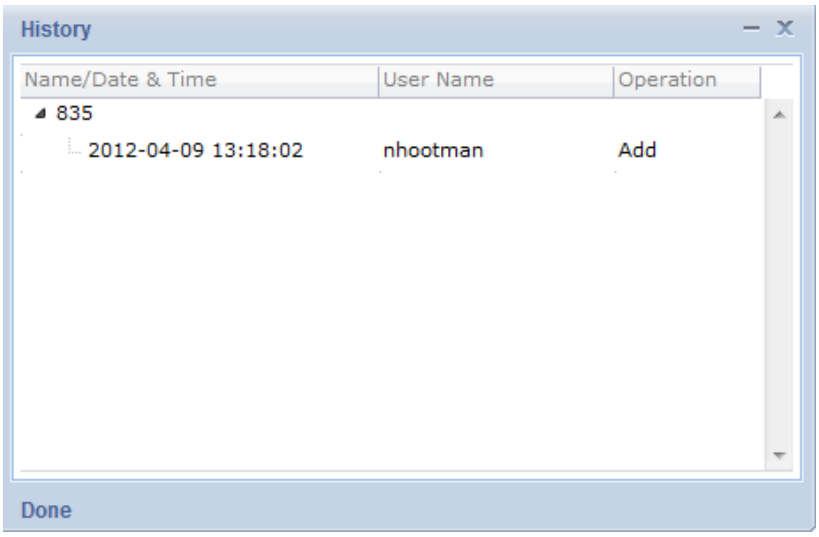


Figure 31 “Add” Sample History

All records in LIMS start with an “Add” operation. For example, in the History screen above, nhootman added sample accession # 835 to the LIMS at 1:18 PM on April 9,

2012. Since the “Add” operation does not modify any previous record, there aren’t any field changes to display.

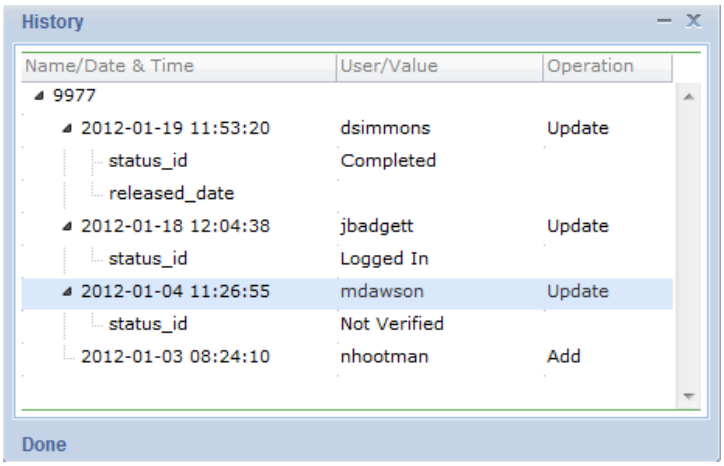


Figure 32 "Update" Sample History

The “Update” operation on a history screen displays the field level information before it was modified. Entries in the History screen should be read from bottom to top with the most recent changes at the top. In the example in Figure 32, nhootman added the sample record to the LIMS with an accession number of 9977 at 8:24 AM on January 3, 2012. The sample record was then updated by mdawson at 11:26 AM on January 4, 2012. The variable, status_id, was changed from sample Not Verified to sample Logged In, which is found in the entry above it. Next, at 12:04 PM on January 18, 2012, jbadgett updated the status_id variable from sample Logged In to sample Completed, which is found in the entry above it. Finally, dsimmons updated the status_id variable from sample Completed to its current value (sample Released) at 11:53 AM on January 19, 2012. The “Released” sample status is displayed in the Status field of the current version of the sample record. The sample released_date variable was also updated at this time from an empty field to the released date and time found on the current version of the sample record.

OpenELIS displays the following names or labels in its history screens instead of the Id of the record: dictionary, test, analyte, inventory item, method, organization, project, QA event, sample item, and section.

The history of “Delete” operations are also maintained by the LIMS, including information for every field of that record. However, the user cannot display the history of these records.

CHAPTER 3 MANAGING SAMPLES

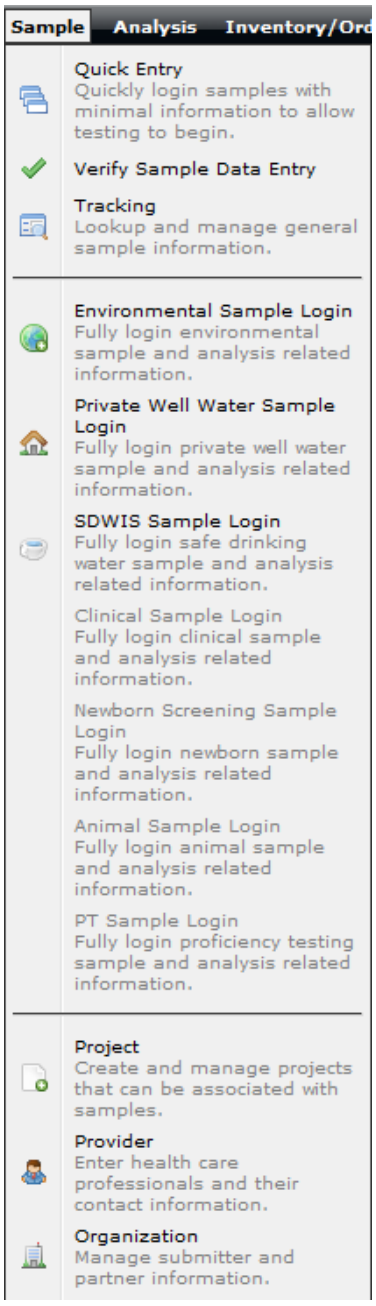


Figure 33 Sample Menu

One of the key features of a Laboratory Information Management System (LIMS) is its ability to help laboratories store, retrieve, and manage samples.

The life cycle of a sample includes the following basic processes:

1. Samples are received at the laboratory
2. Samples are labeled
3. Samples are entered into the system
    - Quick Entry
    - Full Login
4. Analyses are added to the container(s)
5. Analysts schedule work by creating worksheets
6. Analysts complete analyses using worksheets
7. Second reviewer verifies and releases results
8. Final Reports become available
    - Printed and sent
    - Faxed
    - Displayed through the web portal

The Sample Menu provides access to the various domain-specific login modules, as well as, additional utility modules (Project, Provider, and Organization). Sample modules are mainly designed for data entry personnel. Please note that users can have different screens open at the same time (e.g., Tracking and Organization).

3.1 SAMPLE LABELS

Laboratories routinely label all of their incoming samples using a unique id called accession number. The Label Menu contains two modules that allow users to print sample labels. Login

Barcode Labels is used to generate new accession numbers for initial sample login. Additional Login Barcode Labels Module is used to print additional container labels or replacement labels (for paperwork or containers).

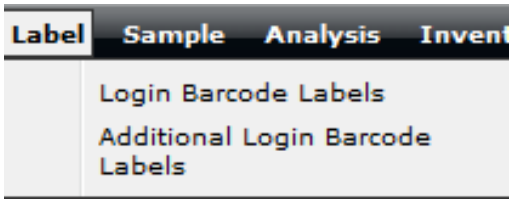


Figure 34 Label Menu

To print new accession labels, use the Login Barcode Labels screen and enter the # of Samples that need to be accessioned. Accession numbers are sequentially assigned by the LIMS and cannot be duplicated.

For each accessioned sample, the module will print one paper work label and one or more container labels specified by # of Containers. For example, to accession two samples each having three containers, enter 2 in the # of Samples field and 3 in the # of Containers field. In this case, a total of eight labels will be printed which includes two labels for sample paperwork.

The Date Received defaults to the current date and time but can be changed by clicking on the calendar to the right or by entering this information into the field in the correct format. The Location or the Printer can be changed by clicking on the drop-down arrow to the right. Click **Run Report**. If you need to reset the screen, click the **Reset** button.

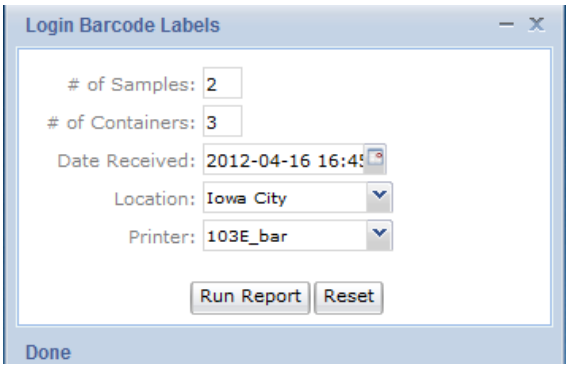


Figure 35 Login Barcode Labels Screen

The Additional Login Barcode Labels screen allows for the printing of additional sample labels for existing accession numbers. For samples that have not been entered into the system, Date Received is required. For samples that have already been entered, Date Received is replaced with the sample's received date.

To print additional/replacement labels for:

- Paperwork only
    1. Enter Accession number, i.e., 1070.
    2. Enter 0 for # of Containers.
    3. Optionally enter Date Received (see above).
    4. Click on **Run Report**.
- Container replacement label
    1. To replace label for container 0, enter Accession number with starting container id, i.e., 1070-0.
    2. Enter 1 for # of Containers.
    3. Optionally enter Date Received (see above).
    4. Click on **Run Report**.

Figure 36 Container Replacement Label

- Additional Containers
    1. To print new container labels, i.e., 1070-5 and 1070-6, enter Accession number with starting container id 1070-5.
    2. Enter 2 for # of Containers.
    3. Optionally enter Date Received (see above).
    4. Click on **Run Report**.

Figure 37 Additional Containers Labels

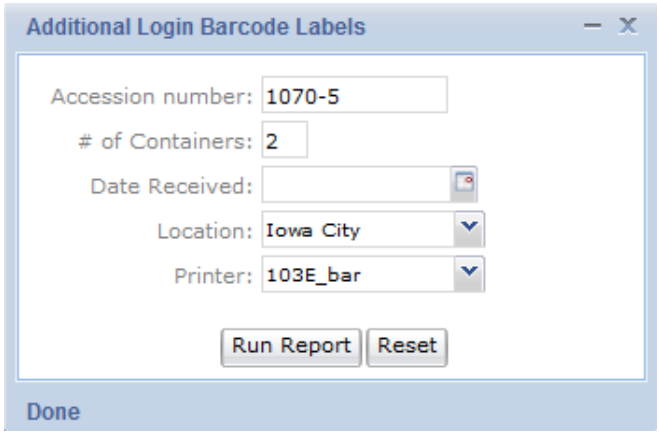


Figure 38 Additional Login Barcode Labels

3.2 QUICK ENTRY

The Quick Entry feature is primarily used by analysts in order to quickly log-in sample(s) for one or more tests. Once tests are quick entered, secondary labels may be printed, work lists and worksheets may be created, and results may be entered. This allows the analytical work to proceed without having to wait for full sample demographic information to be entered.

The Quick Entry process is not compatible with the full sample login process that uses Order #. For samples that have order information (Send-out Order) the full login module should be used.

The link to the Quick Entry module is found in the top section of the Sample Menu.

3.2.1 FIELD DESCRIPTIONS

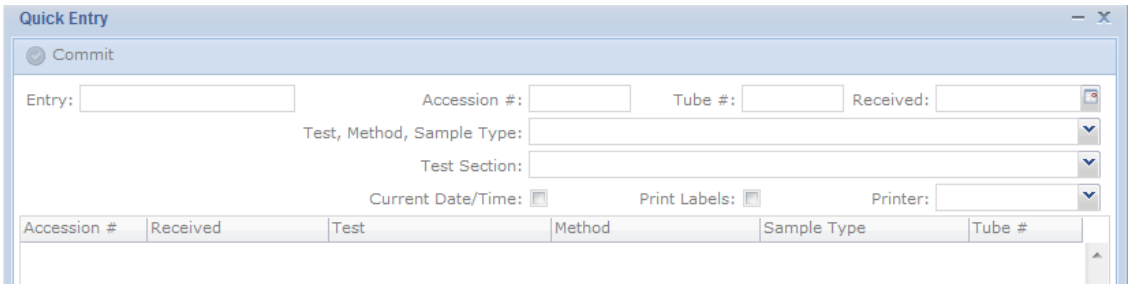


Figure 39 Quick Entry Screen

A description of the use of each field in the Quick Entry Screen follows:

Entry

The Entry field is used to scan data for all the fields: Accession #, Tube #, (Date and Time) Received, and Test, Method, Sample Type. Depending on the type of barcode scanned, the Entry field places the value into the appropriate field. For example, if you scan an accession number into the Entry field, the system will recognize the accession number format, and places the data in the Accession # field. If the scanner is not operational, you may manually enter values in these fields, followed by pressing the Enter key on the keyboard. If barcode entry does not seem to be responding, click in the Entry field before scanning again.

Accession #

Scan the accession numbers that need the selected test/method/sample type assigned to them.

Tube #

Scan this number from the barcode into the Entry field. The Tube # field will be automatically populated. Tube # has the format of three letters followed by three numbers (e.g., ABC123).

Received

Scan the date and time that the sample was Received from the first Sample Collection Form. A different date and time received only needs to be scanned if it changes.

Test, Method, Sample Type

Scan the barcode for the Test, Method, Sample Type for the test you are assigning from the preprinted Sample Type Barcode Test Report. The correct Test, Method, Sample Type may also be selected from the drop-down list to the right of this field.

Test Section

This field is automatically populated if the test is performed by one section. For tests that can be performed in multiple sections and depending on test definition, the LIMS will:

1. Default to your current location from Preference's Location if test definition specifies "Match User Location"

2. Force a selection if test definition has more than one section.

Current Date/Time

This feature has not been implemented at this time.

Print Labels

This feature has not been implemented at this time.

Printer

This feature has not been implemented at this time.

Test Order List

The Test Order List is a temporary holding place for analyses to be assigned to samples. It maintains a list of accession numbers and tests that will be entered into the LIMS. For each accession number and test, a new row will appear in the lower pane of the screen. Each test for a sample needs to be logged in separately. If a row needs to be removed, select that row and click the **Remove Row** button at the bottom of the screen.

Once the entries have been verified, click the **Commit** button on the screen. All of the tests are now committed to the LIMS, and the current list of accession numbers becomes cleared from the Quick Entry screen. Although it is not a requirement to save, it is recommended that the entries be committed occasionally in case of a power failure.

Be cautious with the entry of analyses. If the wrong test is added to a sample -- it CANNOT BE DELETED from the sample -- only cancelled. However, Sample Type can easily be updated for each sample that was entered incorrectly.

3.2.2 USING QUICK ENTRY FOR A SERIES OF SAMPLES

The following process should be followed to quick enter a series of samples:

1. Scan in the date and time the sample is received.

2. Scan in the test barcode number. A list of tests with corresponding barcodes may be printed from the Test Report Screen located in the Report/Reference Menu. (See Sample Type Barcode for more information about this feature.)
3. Scan in the tube number (optional).
4. Scan in the accession number.
5. A new entry will appear in the Test Order List.

If the received date and time and/or the test/method/sample type are the same for the next sample in the series, these fields do not have to be scanned in again as the Quick Entry screen will keep them as default values. Only the new accession number needs to be scanned. Again, an error in an entry in the Test Order List may not be corrected. The entry must be deleted with the **Remove Row** button and reentered.

3.3 FULL SAMPLE LOGIN

Sample login screen(s) are specifically designed for data entry personnel to manage one sample at a time. Every aspect of a sample, i.e., general sample information, sample containers, analyses, QA events, etc., can be entered through these screens.

The sample screens are the primary modes of entering complete sample information. Metadata for samples that were logged-in through Quick Entry are completely entered through these full sample login modules. Information from the Quick Entry sample login is imported into the full sample login screen.

Full sample login is available for each type of sample domain: environmental, private well water, SDWIS (safe drinking water), clinical, newborn screening, animal, and PT (proficiency testing).

The links to the full sample login modules are located in the middle section of the Sample Menu.

3.3.1 COMMON FIELDS

Many of the fields are the same for each sample domain. These are usually found at the top and bottom of each full sample login screen. The common fields are shown below.

3.3.1.1 COMMON FULL SAMPLE LOGIN FIELDS – TOP OF SCREEN

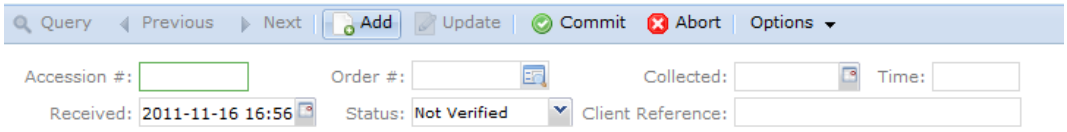


Figure 40 Common Full Sample Login Fields - Top of Screen

These are the fields that are found in the top section of all full sample login screens.

Accession #

This field is used to enter the unique accession number for the sample. In add and update operation, the LIMS verifies that the accession # is not assigned to another sample. For samples that were Quick Entered, the LIMS will automatically populate the analysis part of the screen using previously entered data.

The field also ensures that the accession number has already been issued using the Login Barcode Labels module. An error message stating "Invalid Accession Number: Number not in use yet" will appear when an attempt is made to enter an unused accession number.

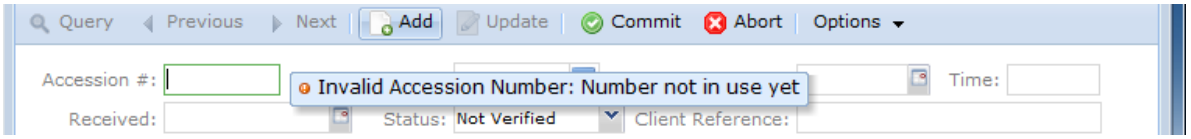


Figure 41 Error Message - Accession Number Not in Use Yet

Order #

The Order # field is the unique Id for a send-out order (for non clinical samples). When the Order # from a send-out order is entered, the information from the send-out order populates the corresponding fields in the Full Sample Login screen. The pop-up button to the right of Order # pops up a Send-out Order screen. (See SEND-OUT ORDER SCREEN for more information.) Sample order forms that have an order

number should be entered by Full Sample Login instead of Quick Entry because samples that already have tests assigned via Quick Entry cannot use an order number.

Collected

This field is for the date the sample was collected.

Time

This field is for the time the sample was collected.

Received

This field is for the date and time the sample was received at the laboratory.

(Sample) Status

This field displays the status of the sample. The sample statuses are:

- Not Verified – This is the default status of a newly entered sample. A sample remains in this status until it is verified. See USING PAPER VERIFICATION for more information on the verification process.
- Logged In – After a sample is verified its status changes to Logged In. The sample will remain in this status while testing is being performed unless an issue changes the status to Error.
- Completed – Once all of the analyses are completed, the sample will automatically go to Completed status.
- Error – A sample will go to Error status if there is a problem with its data or analyses. It will remain in this status until the problem(s) is corrected.
- Released – Once all of the analyses are released, the sample will automatically go from Completed to Released status.

The Status field cannot be directly changed by the user. This field changes automatically based on sample and analysis data.

Client Reference

The value displayed in this field is one item that ties the client's information to the sample paperwork. It could be a client's lab number or another unique identifier for a sample that they collect.

3.3.1.2 COMMON FULL SAMPLE LOGIN FIELDS – MIDDLE OF SCREEN

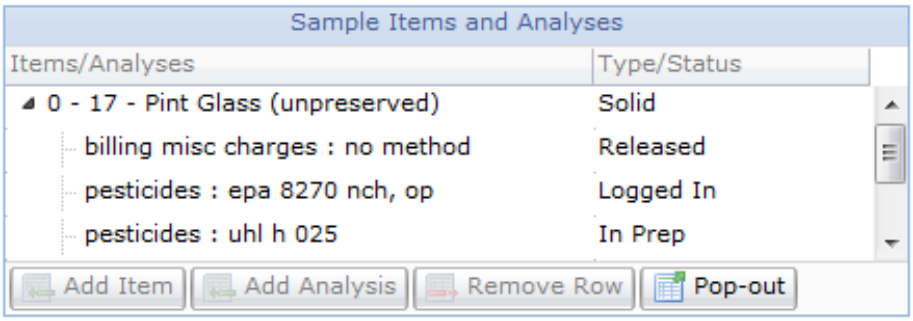


Figure 42 Sample Items and Analyses Tree - One Sample Item

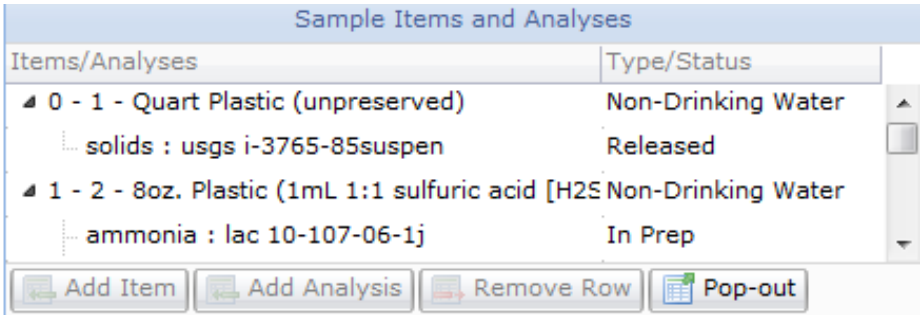


Figure 43 Sample Items and Analyses Tree - Two Sample Items

The Sample Items and Analyses tree is found in the middle section of all full sample login screens. This information is organized as a tree hierarchy with sample items (containers) being preceded with numerals and analyses assigned to the sample item following below. The sample type is specified to the right of each sample item. The analysis status is specified to the right of the analysis. The buttons shown at the bottom of this area are used to build the tree. The buttons are described below.

Add Item

The **Add Item** button allows for the addition of a sample item to the current sample. A sample item is a sample container (i.e., a tube of blood, a bottle with a preservative, a

sample aliquot) that contains the substance to be tested. When the **Add Item** button is clicked for the initial time, Item "0 - <>" is added to the Items/Analyses column in the Sample Items and Analyses tree. The sample container will replace the "<>" to the right of the "0". The sample container is selected from the Container dropdown list in the Sample Item tab located in the lower pane of a full sample login screen. (See SAMPLE ITEM TAB for more information.) The "<>" in the Type/Status column is replaced with the sample type. The sample type is selected from the corresponding drop-down list found in the Sample Item tab, as well.

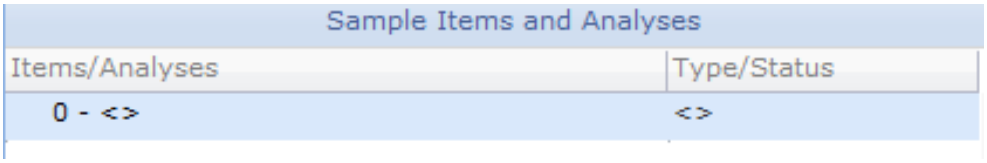


Figure 44 Adding a Sample Item in Full Sample Login

Add Analysis

The **Add Analysis** button allows the user to:

1. Add an analysis to a highlighted sample item
2. Add a peer analysis to a highlighted analysis
3. Add both a new sample item and a new analysis, if no sample item exists

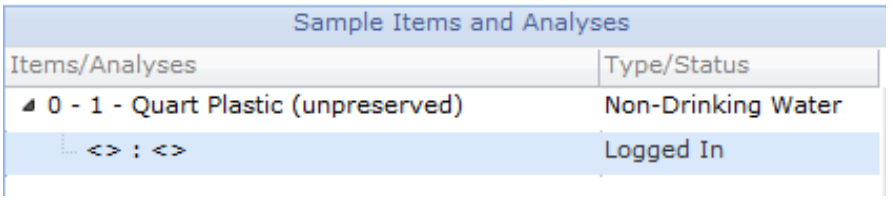


Figure 45 Adding an Analysis to a Sample Item

The "<> : <>" symbols are replaced with the test and method names. The Test and Method are selected on the Analysis tab. (See ANALYSIS TAB for a complete explanation.) The analysis Status is located to the right of the Analysis name in the Sample Items and Analyses tree. The initial analysis status would be Logged In (or In Prep for a prep test).

Remove Row

The **Remove Row** button allows you to delete a sample item or analysis that has not yet been committed. Once a sample item row is removed, its preceding numeral is no longer available for reuse. For example, if Sample Item 0 is deleted and a new sample item is added, it cannot be assigned the numeral 0 by the LIMS. If **Remove Row** is clicked for an analysis row after committing, a message pops up warning that the analysis may only be cancelled, not removed.

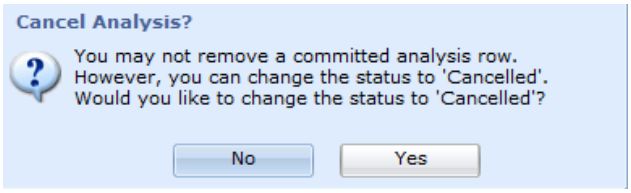


Figure 46 Cancel Analysis? Warning

Pop-out

The **Pop-out** button displays the Sample Items and Analyses table in its own screen affording easier readability and the ability to move the analysis to a different container.

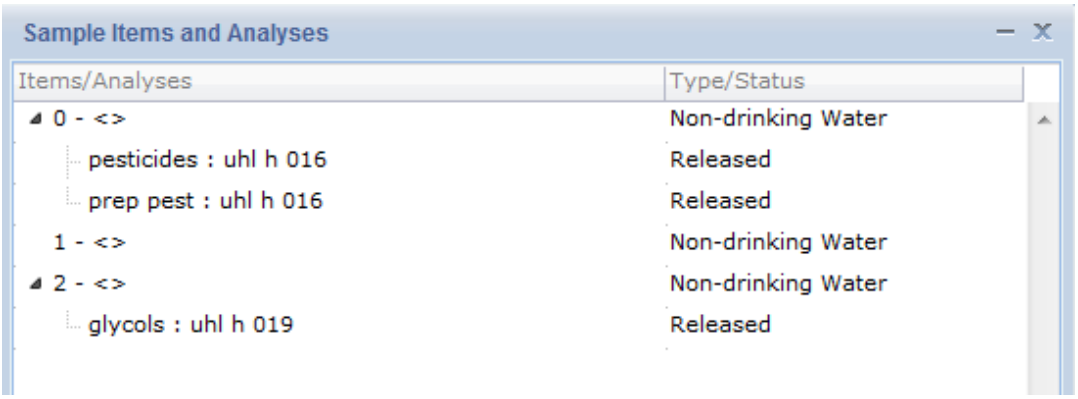


Figure 47 Sample Items and Analyses Pop-out Screen

3.3.1.3 COMMON FULL SAMPLE LOGIN FIELDS – BOTTOM OF SCREEN

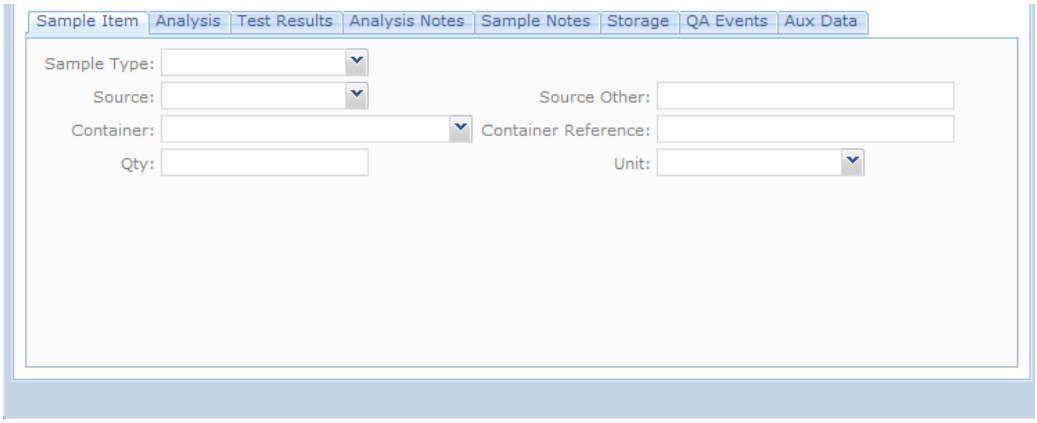


Figure 48 Common Full Sample Login Fields - Bottom of Screen

The bottom section of each full sample login screen is comprised of multiple tabs. The information in these tabs is mostly tied to sample items and analyses. To change or view information for each sample item or analysis, select the desired sample item or analysis row and click on the tab of interest. The fields found in the bottom section are described below by tab.

3.3.1.3.1 SAMPLE ITEM TAB

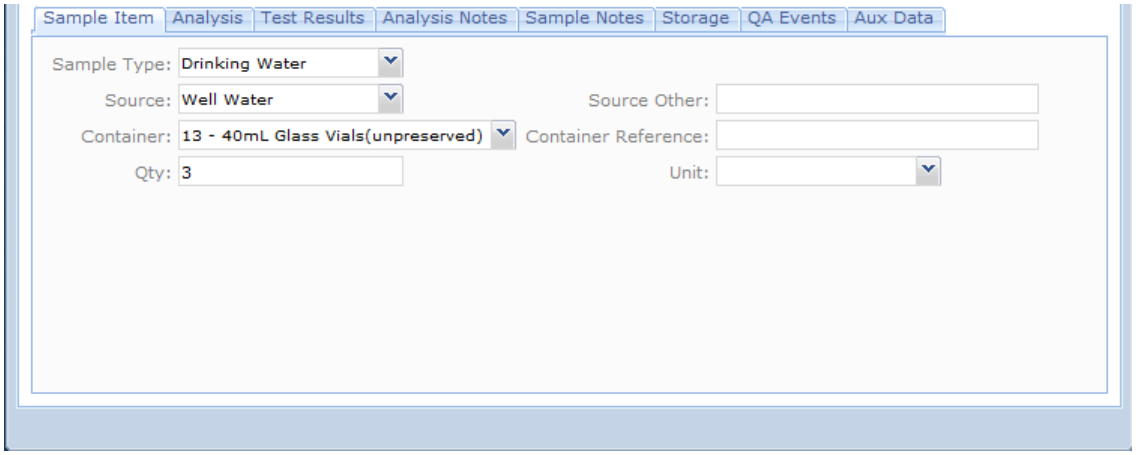


Figure 49 Sample Item Tab

Sample Type

The Sample Type drop-down list allows for the classification of the sample (e.g., Breast Milk, Dust, Liquid, Oil, etc.). The Sample Type selected affects what tests can be assigned to this sample item. For example, if a “Drinking Water” sample type is selected, the Test drop-down list on the Analysis tab will only offer tests that can be performed on drinking water.

Source

This field specifies the source of the sample such as Well Water, Ground Water, etc. For clinical samples, this field is used to specify a collection source such as Capillary for Blood sample type, Left Ear Lobe for Skin Biopsy, etc.

Source Other

This field is a text field that can be used to enter more specific source information.

Container

The container is the apparatus that holds the sample. Examples include a bottle, vial, trip blank, culture swab, etc. All SHL container names have the following format: internal id - container name. The container name can be quite descriptive and often specifies its capacity, e.g., 70 - 250ml Brown Plastic Nalgene Bottle (EDTA preservative).

Container Reference

This text field can be used to uniquely identify the received container by using the manufacturer’s inventory serial id, or the “Build Id” on the container label if you are building kits (see BUILD KITS SCREEN) through the LIMS.

Qty and Unit

These fields denotes the quantity of material in this container. For example, if the container holds 200 mL of water, enter 200 in the Qty field and select mL from the Unit drop-down list.

3.3.1.3.2 ANALYSIS TAB

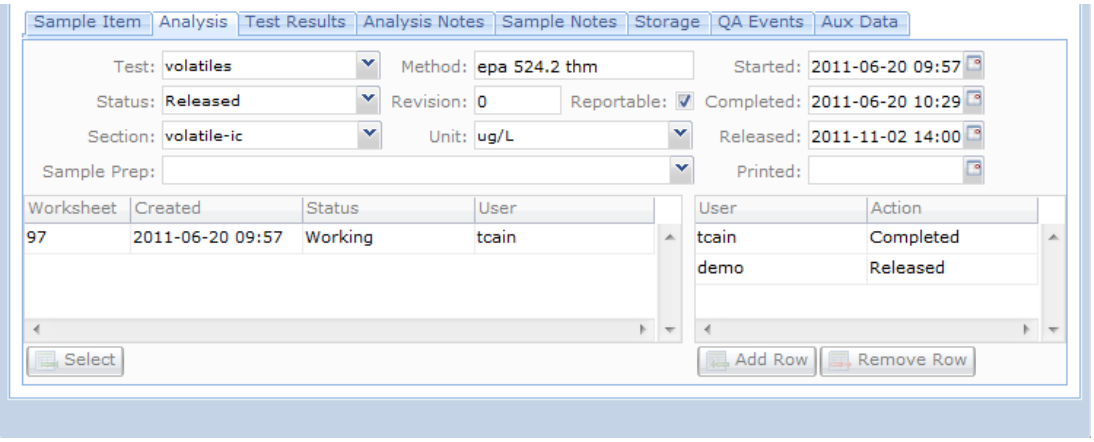


Figure 50 Analysis Tab

The Analysis tab shows current test and method information for the selected analysis. This tab is also used to select the test and method for an analysis while the record is in Add Mode. The fields on this tab and their use are described below.

Test and Method

For a new analysis, the test autocomplete field allows the user to select a test and method based on the user's input and the sample type. Once the desired test name is selected, the Method, Revision, Unit, and Reportable (if applicable) fields will be automatically entered. For an existing analysis, the test field will only allow the test's method to be changed (method flipping) for those tests that can be performed by more than one method.

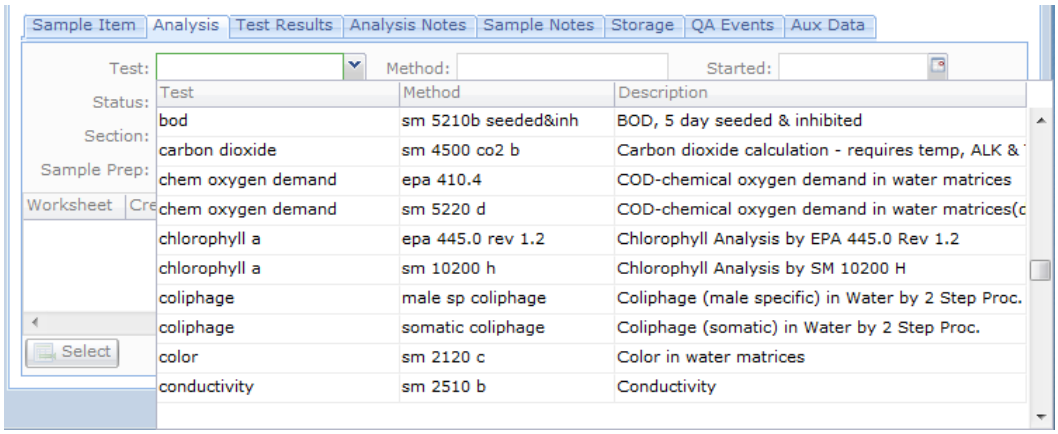


Figure 51 Test Selection Drop-Down List

(Analysis) Status

This field displays the current analysis status. The different analysis statuses are:

- Logged In – Shows that the analysis is assigned to the sample item and it is ready for testing to begin.
- Initiated – The analysis has been added to an electronic worksheet and testing has begun.
- On Hold – This status is used when the analyst is waiting for an external action (e.g., waiting on a directive from a client, other external events). This status needs to be manually selected.
- Requeue – Indicates that the analysis is rescheduled for re-analysis. See WORKSHEETS for more detail.
- Completed – Analysis has all the results and is waiting for second review. See COMPLETING AN ANALYSIS for more information.
- Released – The second review is compete and the result is available for external reporting. See RELEASING AN ANALYSIS for more information.
- Error Logged In – Analysis is in Logged In status but has missing or incorrect information such as invalid sample type.
- Error Initiated – Analysis is in Initiated status but has missing or incorrect information.

- Cancelled – Indicates that this analysis is no longer desired and should not be performed. Laboratories often cancel an analysis because of incorrect assignment. See CANCELING AN ANALYSIS for more information.
- In Prep – Analysis is waiting for its prep test to be completed.

The Status is set to "Logged In" by default (or "In Prep" if a prep test needs to be completed first).

Revision

The Revision number indicates the current version of the analysis. Laboratories sometimes unrelease an analysis in order to correct analysis information. After the correction is committed to the LIMS, the revision number is automatically incremented by one.

Reportable

An analysis with the Reportable box checked will have its test results displayed and/or transmitted via the Final Report, Data View, or electronically.

This field is defaulted to the test definition but can be changed to indicate if an analysis should be reported. For those systems that create billing, the reportable flag is also used to create billing information.

Section

This field indicates which section is performing the analysis. For tests that can be performed by different sections, the Sections-Options in the test definition specifies how this field operates. See TEST DETAILS TAB for more information.

- If Sections-Options is blank, then the user must manually select the section
- For the Match User Location option, the LIMS tries to match the section where the test is performed to the user's Location (specified under Preference)
- The Default option always defaults that section to all analyses

Sample Prep

Use this field to link the current analysis to a prep analysis within the same sample. If an analysis has a prep analysis, the dependent analysis is placed into In Prep status until the prep analysis is completed. Then the status of the dependent analysis is changed to Logged In and the analysis available date is updated.

At times it may be desirable to choose a previously logged in analysis to be the prep analysis for a dependent analysis. This is accomplished by clicking on the dropdown arrow in the Sample Prep field and selecting the desired prep analysis. For a complete explanation of prep tests, see PREP TESTS.

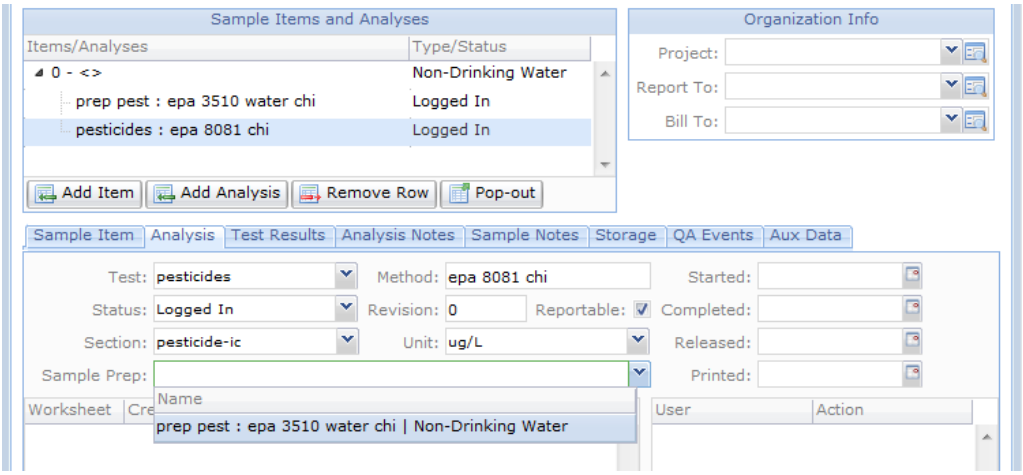


Figure 52 Selecting a Previously Logged In Analysis to be a Prep Analysis

Started

Indicates the date and time the analysis was performed. This field is automatically set to when the analysis is placed into a worksheet but can be overridden to indicate the actual time of analysis.

Completed

Indicates the date and time the results were entered into the LIMS. This field is automatically set to the date and time the worksheet was loaded back into the system.

Released

Indicates when the analysis was released or re-released. This field is set by the system and cannot be changed by the user.

Printed

The date and time the analysis was (or would have been) printed or re-printed on the Final Report.

Worksheet Table

This table displays all of the worksheets that contain this analysis. For example, if an analysis was run on two different worksheets, this table will have two entries indicating the worksheets.

To view the entire worksheet, select the row and click the **Select** button below the table.

User Table

This table displays a list of all of the laboratory staff that performed and/or released this analysis. The list is automatically populated by the Worksheet Completion and the Complete and Release modules. Additional entries can be manually added for those cases when multiple analysts worked on the analysis.

3.3.1.3.3 TEST RESULTS TAB

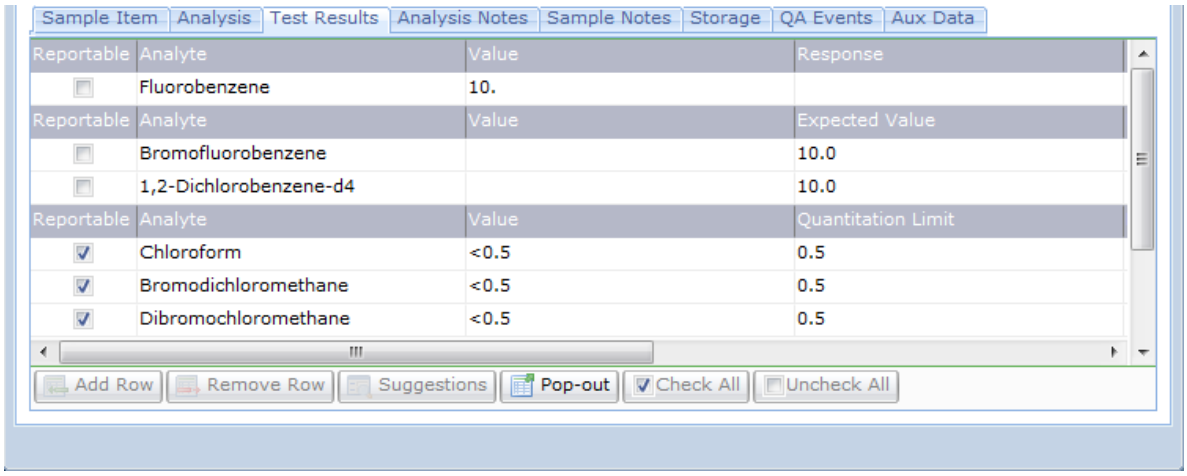


Figure 53 Test Results Tab

This tab displays the results of the analyses in an easy-to-read table. The fields/buttons and their use are described below.

Reportable

This check box is used to mark an analyte and its related results reportable. This is a second level of reporting capability as the analysis will also have to be reportable.

Analyte

This column holds the analyte that was tested. OpenELIS generally calls any question (i.e., Chloroform, Date of Onset, Sign and Symptoms) an analyte.

Value

The Value field is used to enter the result for the corresponding analyte. It can be displayed as a numerical value (<0.5), as a qualitative result (Positive, Negative), as a titer (1:8, <1:256), or a date-time field (2012-12-21 00:01).

Other column analytes, such as Expected Value, Quantitation Limit, and MCL, might be present depending upon the test definition.

Pop-out

A **Pop-out** button shows the results in a larger window to enhance the readability of the table.

Check All and **Uncheck All**

These buttons check/uncheck the Reportable column.

Suggestions

For an explanation of the **Suggestions** button, see SUGGESTIONS.

3.3.1.3.4 ANALYSIS NOTES TAB

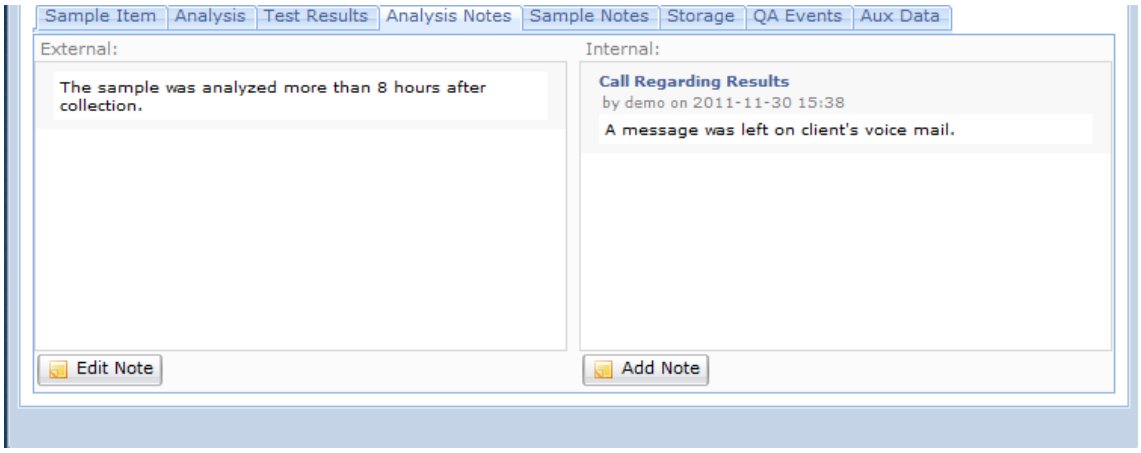


Figure 54 Analysis Notes Tab

The Analysis Notes tab allows for the entering of both internal and external comments that are related to a specific analysis. There is only one external note allowed and it may be editied as many times as needed. Internal notes, however, are individual entries, can only be committed once, and cannot be edited. The subject line, author of the note, and date and time are only present on internal notes. Only external notes appear on result reports.

Click the appropriate button (**Edit Note** for an external note or **Add Note** for an internal note) to enter an analysis note. The Standard Note Selection Screen will pop up.

3.3.1.3.4.1 STANDARD NOTE SELECTION SCREEN

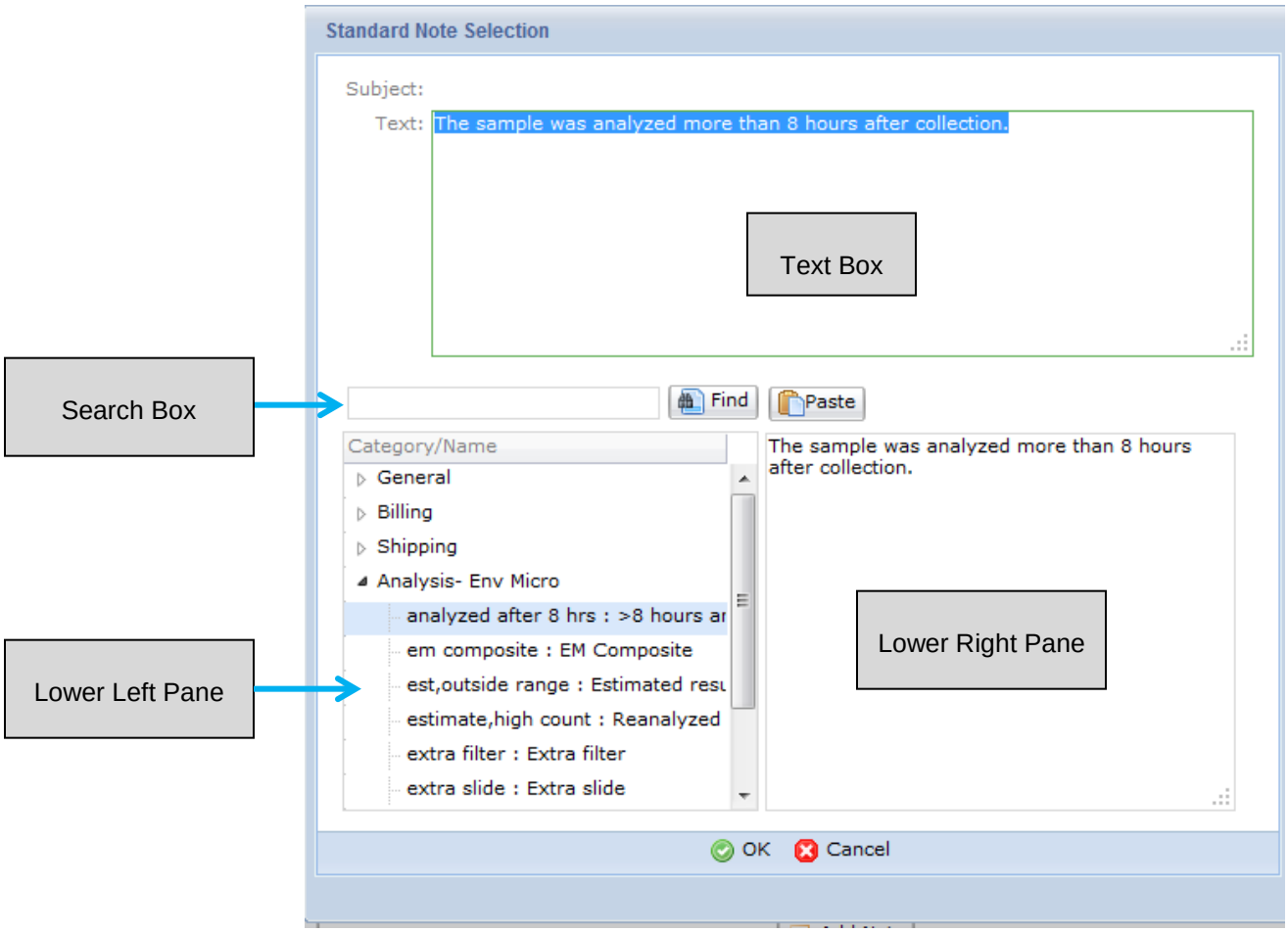


Figure 55 Standard Note Selection Screen

This screen is used for entering all internal and external notes within the LIMS. To type in a note, click in the Text Box and type in the desired note making sure to only return at the end of a paragraph.

You may also copy and paste text from the library of prewritten notes. These commonly-used notes are organized into categories and can be browsed by clicking on the tree arrows in the lower left pane. When a note *name : description* is selected the text of the note appears in the lower right pane for review. Click the **Paste** button to insert the note's text into the Text Box at the current cursor position. The note's text can be further edited in the Text Box to suit the user's needs**.**

Standard notes can also be searched and listed by entering a few letters or words in the Search Box in the middle of the screen and clicking the **Find** button. The search criteria matches the standard note's Name or Description.

Click **OK** to commit the note.

See Standard Note for more information on the structure of a standard note.

3.3.1.3.5 SAMPLE NOTES TAB

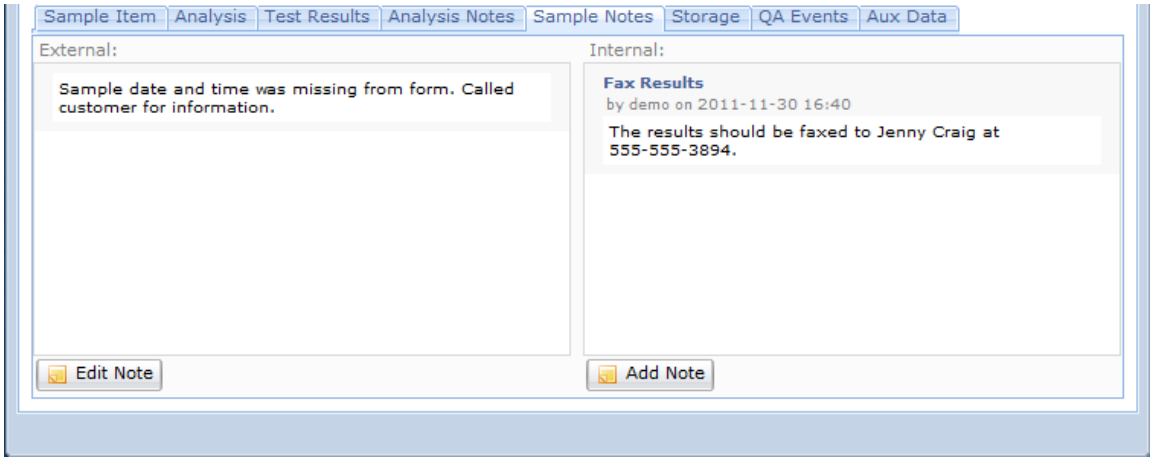


Figure 56 Sample Notes Tab

The Sample Notes tab allows for entering both internal and external comments that are tied to the entire sample. Sample notes are entered in the same manner as analysis notes. See ANALYSIS NOTES TAB and STANDARD NOTE SELECTION SCREEN for a detailed explanation.

3.3.1.3.6 STORAGE TAB

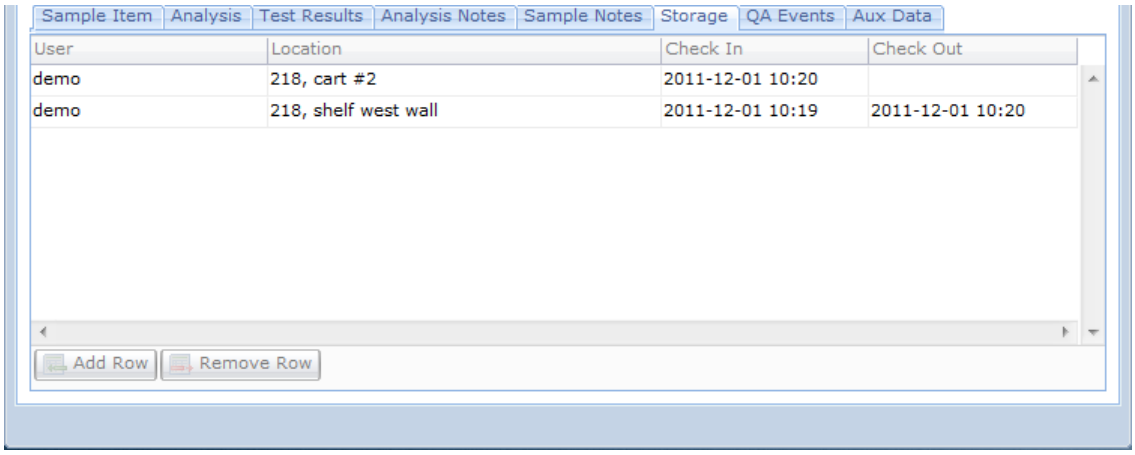


Figure 57 Storage Tab

The Storage tab displays a list of storage locations for the current sample item or analysis. Click on the desired sample item or analysis in the Sample Items and Analyses tree to display its current location. Click on the **Add Row** button to enter a new location. The User name and Check In date and time are automatically entered to reflect the logged-in user and current date and time, respectively. The storage Location can be selected from a drop-down list. Add a new row to move an item/analysis to a new location. The current date and time will be automatically entered in the Check Out field for the previous location. Check In and Check Out dates and times can be manually overridden.

3.3.1.3.7 QA EVENTS TAB

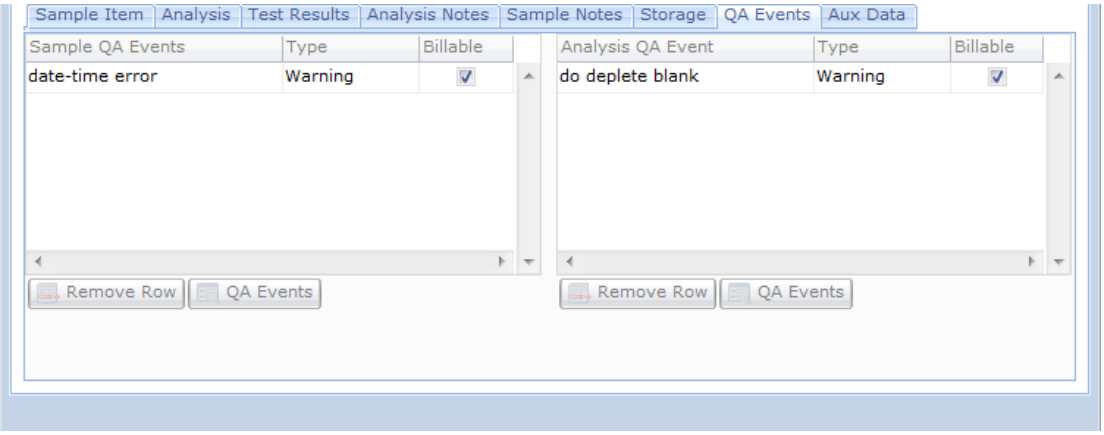


Figure 58 QA Events Tab

Quality Assurance events are flags that can be associated with a sample and/or an analysis to denote an exceptional condition. The Sample QA Events table shows a list of events that are associated with the sample while the Analysis QA Event table shows the events for the currently selected analysis.

QA events can be removed (**Remove Row** button) or added (**QA Events** button) using the appropriate button below each table. The user can also change the Type of QA Event (Internal, Result Override, or Warning) by clicking on the dropdown arrow. The Billable checkbox can also be checked or unchecked.

Since sample QA events affect all the analyses on that sample, they cannot be altered if any analysis has been released. The only exception is adding/removing internal QA events.

See QA EVENTS for a complete explanation of the benefits and types of QA events.

3.3.1.3.7.1 QA EVENT SELECTION SCREEN

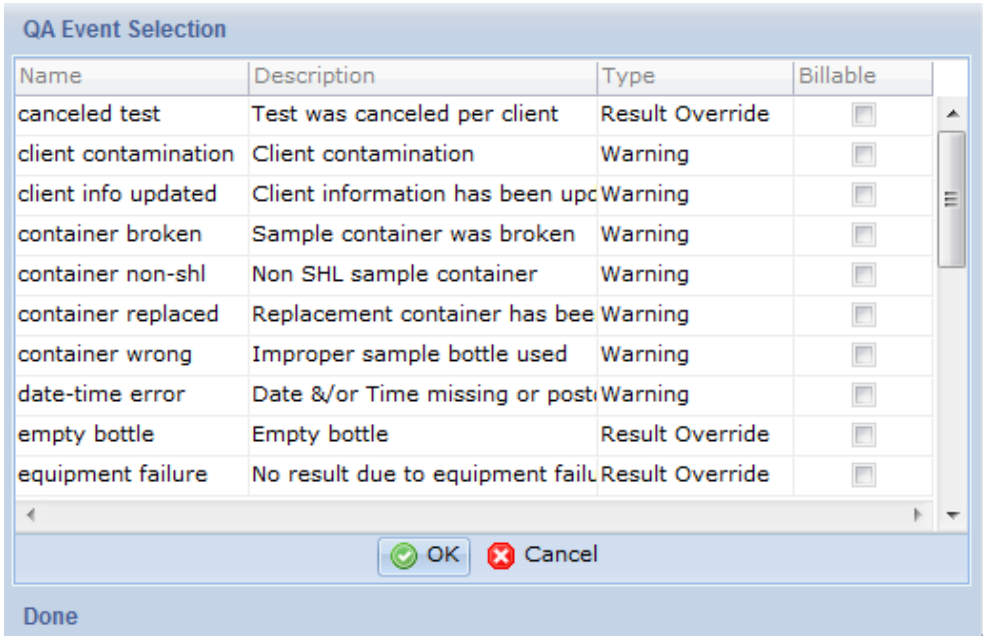


Figure 59 QA Event Selection Screen

The QA Event Selection screen is the vehicle that is used for selecting all sample and analysis QA events. This screen displays a list of available QA events. The list for analysis QA events depends on which analysis is selected in the Sample Items and Analyses tree. The default QA event type is indicated in the Type column. The Billable checkbox indicates if the QA Event is, by default, billable or not.

Multiple QA events can be **Ctrl**-selected. Click the **OK** button to insert them onto the QA Events tab.

3.3.1.3.8 AUX DATA TAB

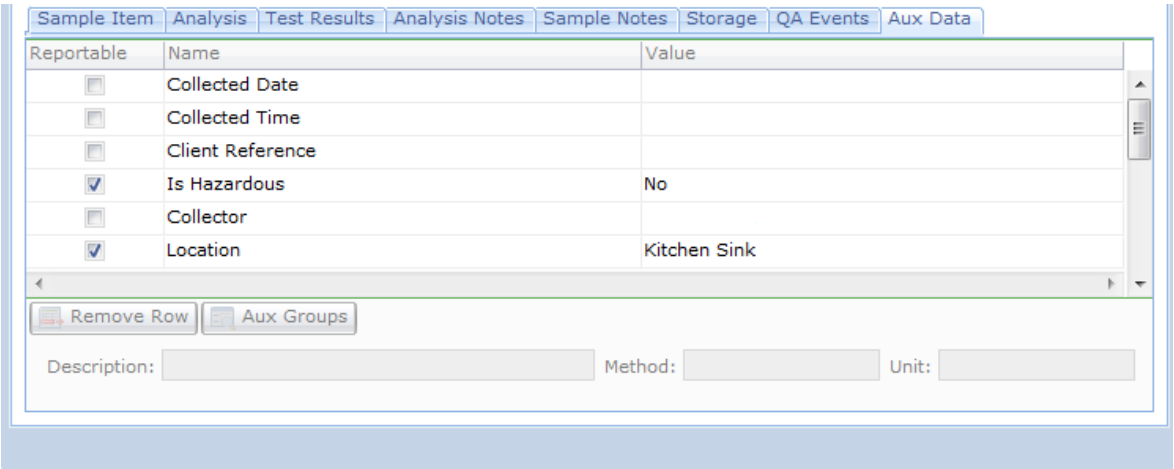


Figure 60 Aux Data Tab

The Aux (Auxiliary) Data tab displays ancillary information related to the sample. It is displayed in a three-column table (Reportable, Name, and Value). The Reportable checkbox may be manually checked (or unchecked) for any auxiliary analyte to mark it as reportable. Reportable values are visible through the Final Report, Web Data View, and electronically. Values for an auxiliary analyte may be manually entered at any time before sample release.

The Description field displays additional helpful information about the auxiliary analyte. The Method field shows the test method that is used to measure the auxiliary analyte and the Unit field displays its corresponding unit of measurement. Click on an auxiliary analyte to display its corresponding Description, Method, and Unit, if they are present. Examples include:

Description	Method	Unit
Dissolved Oxygen	SM 4500-O G	mg/L
Flow Rate Measurement	USGS CA8	CFS

To add auxiliary groups, click on the **Aux Groups** button. The Aux Group Selection Screen will pop up. Clicking the **Remove Row** button removes the entire auxiliary group, not just the individual auxiliary analyte.

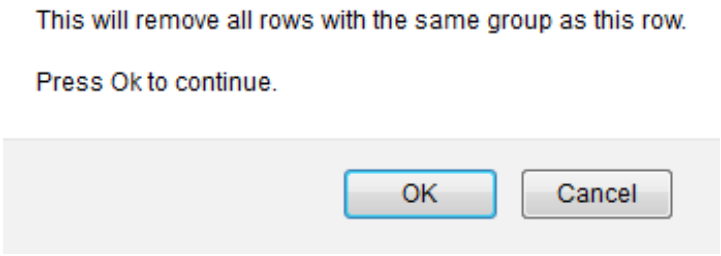


Figure 61 Aux Data Group Removal Warning

3.3.1.3.8.1 AUX GROUP SELECTION SCREEN

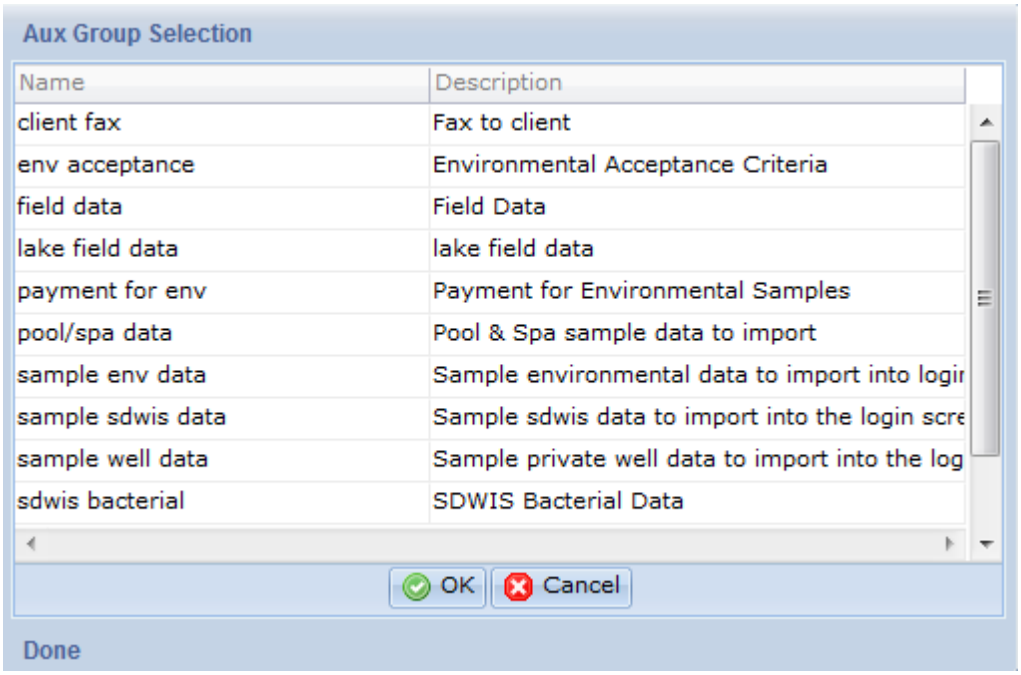


Figure 62 Aux Group Selection Screen

The Aux Group Selection screen is used to select one or more auxiliary groups to be added to a sample. Auxiliary analytes are grouped by function (e.g., environmental acceptance criteria, payment for samples, pool and spa sample, etc.) Select the

desired aux group(s) and click the **OK** button. The auxiliary analytes will populate the Aux Data tab.

3.3.2 SAMPLE DOMAIN-SPECIFIC FIELDS

There are various fields on the full sample login screens which are specific to the sample domain. These sample domain-specific fields are found in the middle sections of the full sample login screens. The following sections describe these sample domain-specific fields.

3.3.2.1 ENVIRONMENTAL SAMPLE SPECIFIC FIELDS

The environmental sample specific fields are located in two separate sections of the Environmental Sample Login screen: Environmental Info and Organization Info.

3.3.2.1.1 ENVIRONMENTAL INFO SECTION

Figure 63 Environmental Info Section

The Environmental Info section contains environmental sample demographic information. The formats specified for these fields follow.

Hazardous

The checkbox indicates if the sample is considered hazardous. Hazardous samples require special disposal.

Priority

This field specifies the number of days that the client expects for sample turnaround. For example, a value of 3 would specify that the sample should be completed and reported within 3 working days.

Collector

The collector's name can be specified in the format of *lastname firstname*. A collector ID can also be entered depending on the laboratory section's SOP.

Phone #

This field is used to specify the collector's phone number. The field will automatically format the digits for the area code, phone number, and extension (if applicable).

Location

The location for the collection of the environmental sample is specified in this field. Click on the pop-up button to the right of this field to display the Sample Location screen which shows more detailed location information such as Address, City, State, and Zip Code, as needed.

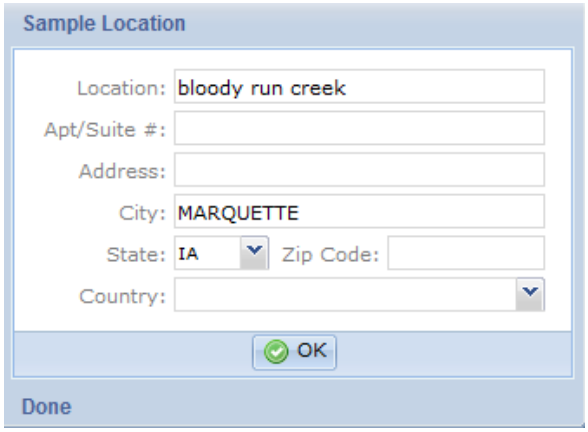


Figure 64 Sample Location Screen

Desc

The Desc(ription) text field is used to further describe the sample such as filter, duplicate, ice, etc. The information about sample type and source should be entered in the sample item tab and not in this field.

3.3.2.1.2 ORGANIZATION INFO SECTION

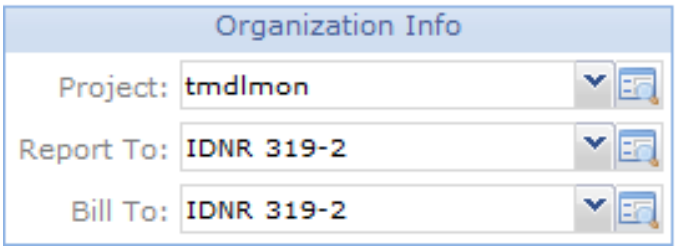


Figure 65 Organization Info Section

The Organization Info section is located to the right of the Sample Items and Analyses tree. It contains the following fields.

Project

The Project field is used to assign one or more projects to a sample. The first project can be selected from the drop-down list and additional projects can be added using the Sample Project pop-up screen by clicking on the pop-up button to the right. The permanent projects check box (Is Perm) has not been implemented and should be ignored. (See PROJECT SCREEN for more information on projects.)

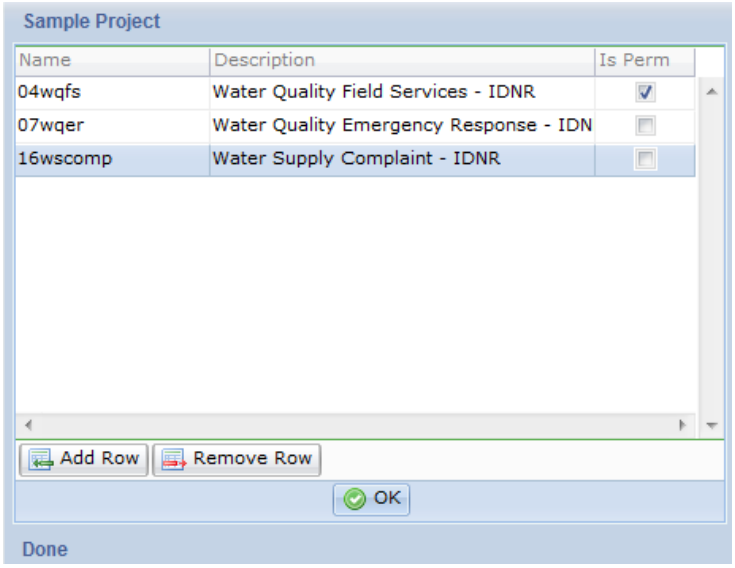


Figure 66 Sample Project Screen

Report To

This field is used to specify the organization(s) that receive the results of the sample. For the (primary) Report To organization, the sample results can be accessed through the web portal, a mailed Final Report, and faxed on a sample basis (through assignment of sample auxiliary data). (See FINAL REPORT SINGLE/REPRINT for more information on the faxing process). Secondary Report To organizations will only receive a copy of the Final Report.

The (primary) Report To organization can be selected from the drop-down list. Secondary Report To organizations can be selected using the Sample Organization pop-up screen by first clicking on the pop-up button to the right.

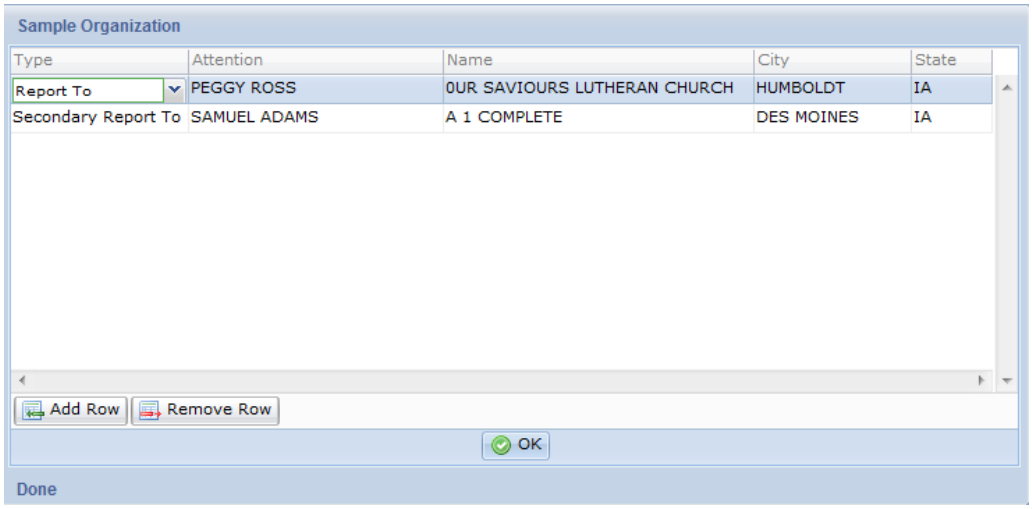


Figure 67 Sample Organization Screen

The Type field can be changed by clicking on the drop-down arrow. The three options are Report To (primary), Secondary Report To, and Bill To. Secondary Report To recipients, as well as, the billed organization can be added by using the **Add Row** button and clicking on the drop-down list in the Name field. The organizational contact person's name can be entered into the Attention text field.

Bill To

The Bill To field operates in the same manner as the Report To field. The Bill To field only needs to be completed if the billed organization is different from the Report To organization.

3.3.2.2 PRIVATE WELL WATER SAMPLE SPECIFIC FIELDS

The Private Well Water Sample Specific Fields are located in two separate sections of the Private Well Water Sample Login screen: Private Well Info and Well/Collector Info.

3.3.2.2.1 PRIVATE WELL INFO SECTION

Figure 68 Private Well Info Section

The Private Well Info section contains private well water sample demographic information. Beside the specific fields for private well water samples, this screen offers a one-time-use “report to” entry for non-repeat clients, thus, preventing the need to add a new organization to the LIMS. The formats specified for these fields follow.

Report To

This field is used to specify the organization where the results are sent. The organization can be selected from the drop-down list or manually entered.

1. If the Report To organization is selected from the drop-down list, the LIMS will automatically complete the Org Id and address information and disables these fields from being altered.
2. For one-time-use Report To addresses, the Org Id is blank and the address information fields are enabled so this information may be entered.

Apt/Suite #

This free text field contains the apartment or suite number of the “report to” organization.

Address

This free text field contains the street address of the "report to" organization.

City

This free text field contains the city of the "report to" organization.

State

The state of the "report to" organization may be selected from the drop-down list. Selections consist of states/provinces of the United States, Canada, and Mexico.

Zip Code

The five-digit or nine-digit U.S. Postal Zip Code of the "report to" organization may be entered here.

Org Id

The Org(anization) Id is a unique identifier assigned to organizations entered through the Organization screen. (See ORGANIZATION SCREEN for more information.) The Org Id is disabled when adding demographic information for a one-time-use "report to" organization through the Private Well Info Section.

Attn

The Attn (Attention) field may be entered with the name of the organizational contact person.

Phone #

The phone number of the "report to" organization may be entered in this field. It should include the area code and may include an extension, if applicable (e.g., 319/555-1212.3467).

Fax #

The fax number (including area code) of the "report to" organization may be entered here (e.g., 319/555-7629).

Location, Apt/Suite #, Address, City, State, and Zip Code

The location information specifies the sampling collection address such as the address of the home, farm, or well.

3.3.2.2.2 WELL/COLLECTOR INFO SECTION

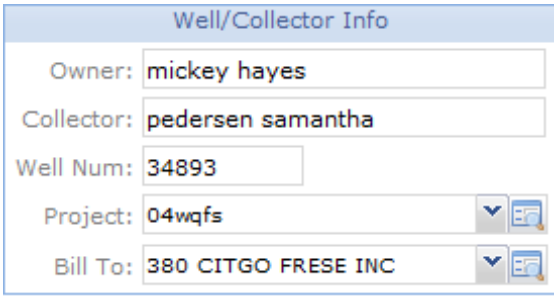


Figure 69 Well/Collector Info Section

The Well/Collector Info section contains the following fields.

Owner

The name of the well's owner may be specified in this field.

Collector

The collector's name can be specified in the format of *lastname firstname*. A collector ID can also be entered depending on the laboratory section's SOP.

Well Num

If the well has a state assigned identifier, this Well Num(ber) should be specified in this field.

Project

The Project field is used to assign one or more projects to a sample. See Project for more information.

Bill To

The Bill To field operates in the same manner as the Report To field. The Bill To field only needs to be completed if the billed organization is different from the Report To organization. See Report To for more information.

3.3.2.3 SDWIS SAMPLE SPECIFIC FIELDS

The Safe Drinking Water Information System (SDWIS) sample specific fields are located in two separate sections of the SDWIS Sample Login screen: SDWIS Info and Collector/Organization Info.

3.3.2.3.1 SDWIS INFO SECTION

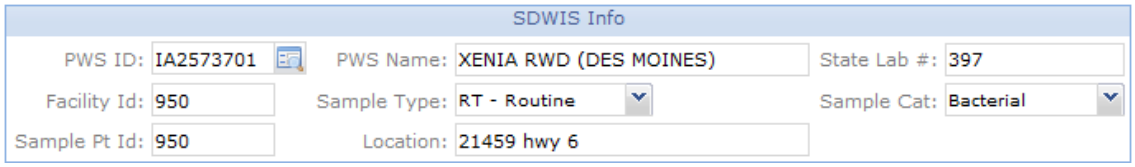


Figure 70 SDWIS Info Section

The SDWIS Info section contains SDWIS sample demographic information. The formats specified for these fields follow.

PWS ID

The PWS (Public Water Supply) ID is a unique identifier assigned by the state to all public water supplies. The PWS ID begins with a two letter state abbreviation followed by a unique seven digit number. The pop-up button to the right of this field can be used to select the PWS ID. The PWS Information screen will pop-up and allow the user to search for a PWS record. When the desired record is located, click on the **Select** button. (For more information on the PWS Information screen, see PWS INFORMATION.)

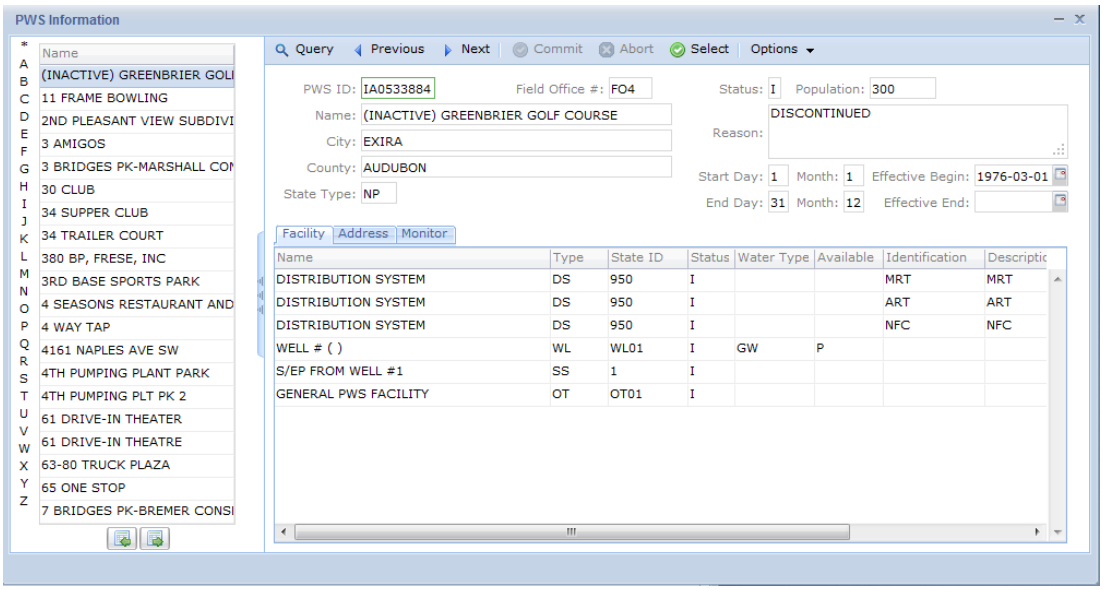


Figure 71 PWS Information Screen

PWS Name

The PWS (Public Water Supply) Name will be automatically populated when the PWS ID is selected.

State Lab #

This number represents the laboratory id that was assigned to your laboratory by the state's laboratory certification program.

Facility ID

This field contains the state assigned water system facility id.

Sample Type

Enter the SDWIS sample type specified for this sample. This field should not confused with the Sample Type on the Sample Item tab.

Sample Cat

The Sample Cat(egory) specifies the SDWIS sample category. The sample categories currently are bacterial, radioactive chemical, chemical, and lead/copper.

Sample Pt ID

The Sample Pt (Point) ID field often contains the same information as the Facility ID.

Location

This is a description of the sampling point location.

3.3.2.3.2 COLLECTOR/ORGANIZATION INFO SECTION

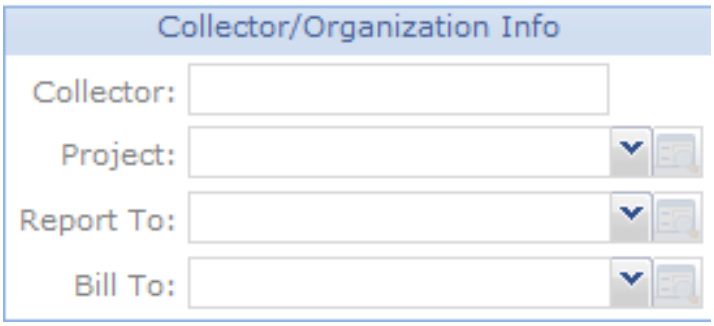


Figure 72 Collector/Organization Info Section

The Collector/Organization Info section contains the following fields.

Collector

The collector's name can be specified in the format of *lastname firstname*. A collector ID can also be entered depending on the laboratory section's SOP.

Project

The Project field is used to assign one or more projects to a sample. See Project for more information.

Report To

This field is used to specify the organization(s) to which results are reported. See Report To for more information.

Bill To

The Bill To field operates in the same manner as the Report To field. The Bill To field only needs to be completed if the billed organization is different from the Report To organization.

3.4 SAMPLE VERIFICATION

Sample verification is a process that ensures the initial data entered matches the paperwork submitted with the sample. This process can be achieved in several ways with two of the more common being paper verification and double data entry.

3.4.1 USING PAPER VERIFICATION

All logged in samples are initially in “Not Verified” status. Once the initial data has been entered into the LIMS, data entry personnel run the Verification Report to compare the entered data with the data on the paperwork and correct any discrepancies.

After the verification process has been completed, the LIMS needs to change the status of all the samples to “Logged In”. This is accomplished through the Verify Sample Data Entry screen, whose link is located in the top section of the Sample Menu. The Barcode field accepts an accession number barcode that is located on the Verification Report. Each accession number is displayed in this field for a short time and the field is cleared to accept the next sample accession barcode. The screen should be closed when all samples have been verified.

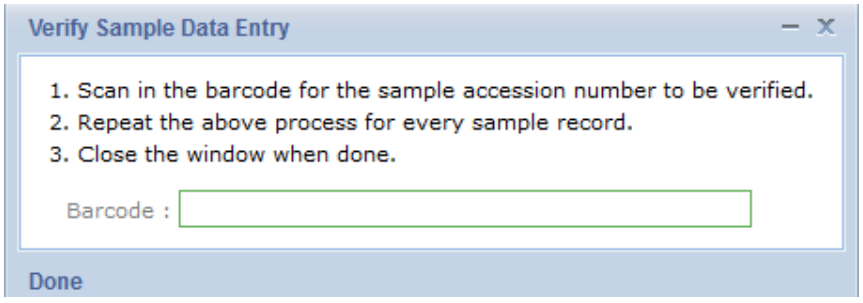


Figure 73 Verify Sample Data Entry Screen

3.4.2 USING DUPLICATE ENTRY

This function is not currently available.

3.5 QA EVENTS

QA events are flags that denote exceptional conditions associated with a sample or an analysis. These events provide several benefits to the laboratory process:

1. Provide a consistent language to inform the client about issues related to a sample or analysis.
2. Allows the laboratory to monitor and summarize issues by organization, laboratory section(s), or tests for a period of time.
3. Allow laboratories to document and inform the client about all the issues related to a sample or analysis. For example, if a sample was received outside shipping temperature requirements and also exceeded preservation time, that client might be informed to use correct packaging and a faster shipping method.

QA events are categorized into three types:

1. Result Override – these events prohibit the result(s) from appearing on client reports while providing a description of the issue.
2. Warning – these events are used to inform the client. The test result(s) are displayed on the client reports
3. Internal – these events are not shown on client reports. They are used for counting internal processes or other housekeeping events.

The Billable checkbox is used to override billing information. When unchecked, it informs the billing module to not bill for that sample/analysis. Only one QA event in the Sample QA Events list needs to be unchecked for the entire sample (and all of its analyses) to not be billed. The same thing is true for the Analysis QA Event list in that, only one unchecked QA event will make that particular analysis not billable.

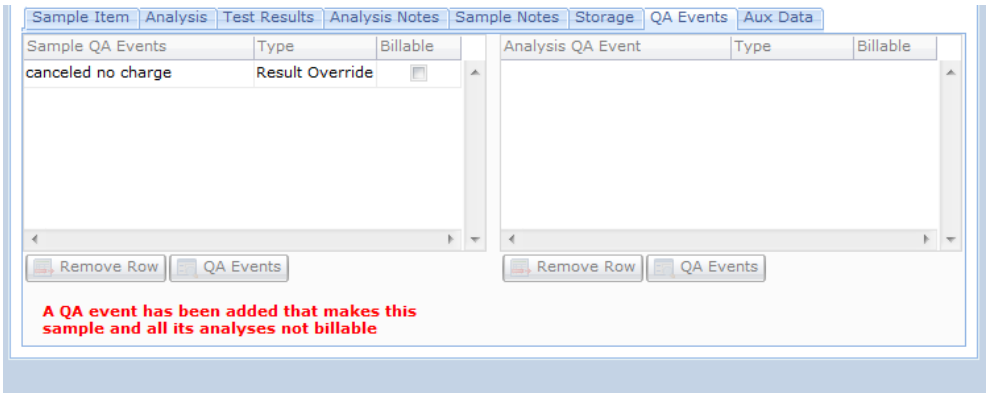


Figure 74 Entire Sample Not Billable Message

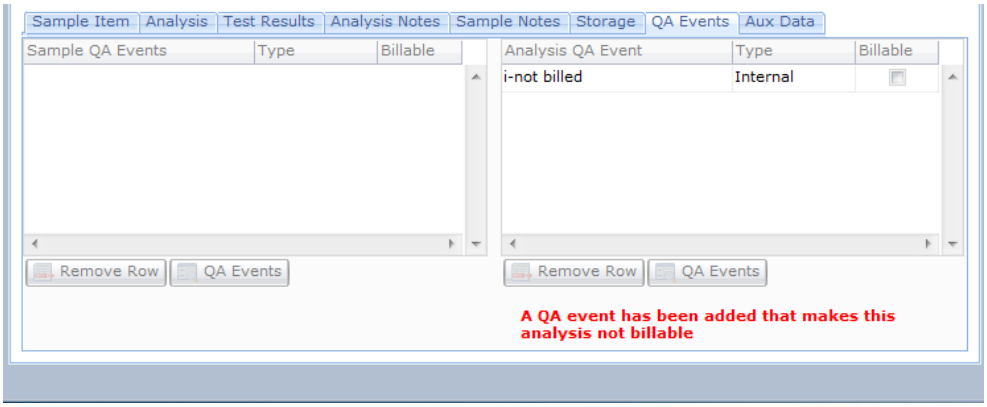


Figure 75 Analysis Not Billable Message

3.6 SAMPLE TRACKING

This screen is designed to provide lookup and general sample management capabilities for any type of sample within the LIMS. Additionally, the screen allows the user to view multiple samples in the structure of an expanding tree. In this way the user can quickly view and compare different pieces of information associated with samples.

The link to the Sample Tracking module is located in the top section of the Sample Menu.

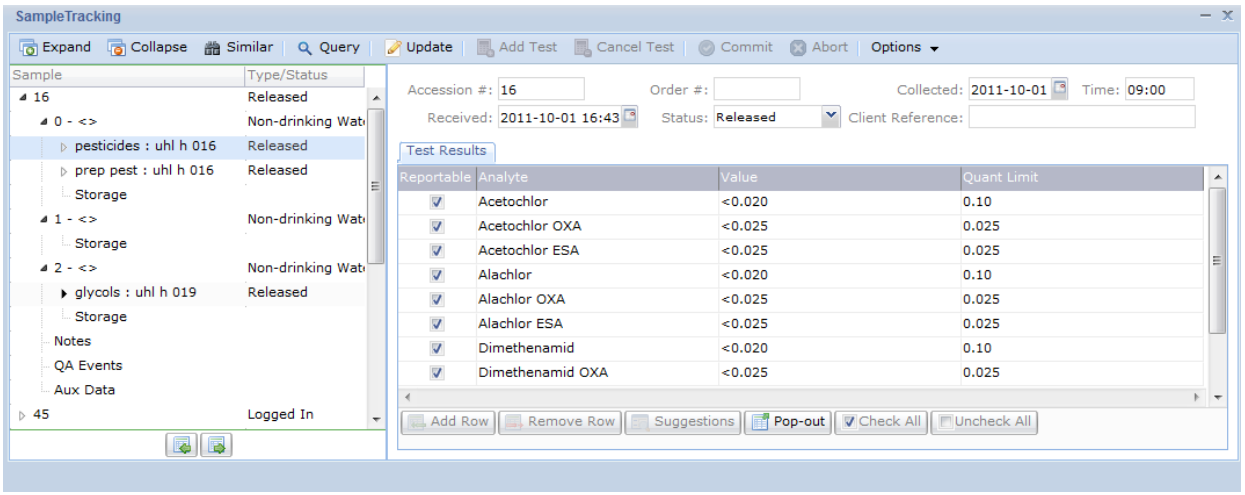


Figure 76 Sample Tracking Screen

This screen is also used to add and cancel tests, unrelease samples, and change a sample's domain. This screen should NOT be used for entering results or completing analyses.

3.6.1 UNRELEASE SAMPLE OPTION

This option allows users with sample unrelease permission to change sample metadata, add or cancel tests, or to change a sample's domain. Unreleased samples go through several changes:

1. Sample status is changed to Completed. The final sample status depends on overall status of the analysis.
2. The sample's revision number is incremented.
3. Internal comment is added to the sample explaining why the sample was unreleased.

Released analyses cannot be changed from the Sample Tracking Screen. (See UNRELEASING AN ANALYSIS for this procedure.)

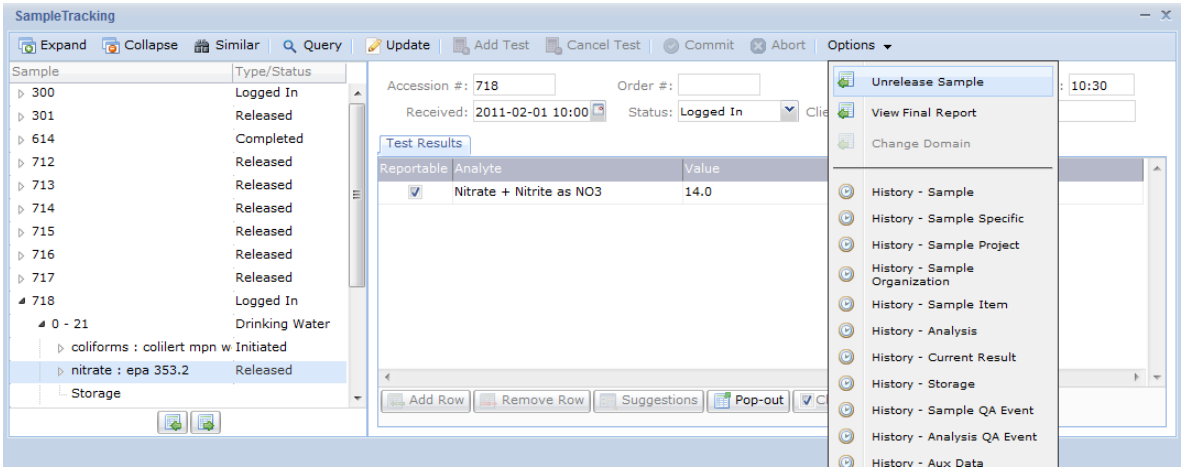


Figure 77 Unrelease Sample Option

3.6.2 VIEW FINAL REPORT OPTION

This option generates a Final Report. Only the analyses that have been released are listed on the report while pending analyses for the sample will be noted. Click on the View Final Report menu option to see the report for the selected sample.

3.6.3 HISTORY OPTION

See HISTORY for more information on the use of the history function.

3.6.4 CHANGE DOMAIN OPTION

There are occasions when a sample associated with one domain needs to be switched to a different domain. The Change Domain option switches the sample while preserving as much data as possible. The only data that will be lost is sample metadata that is domain-specific (i.e., collector, well number, PWS ID).

To change the sample's domain, you must be in Update or Unrelease Sample mode. Select the Change Domain option, select a different domain, and click OK.

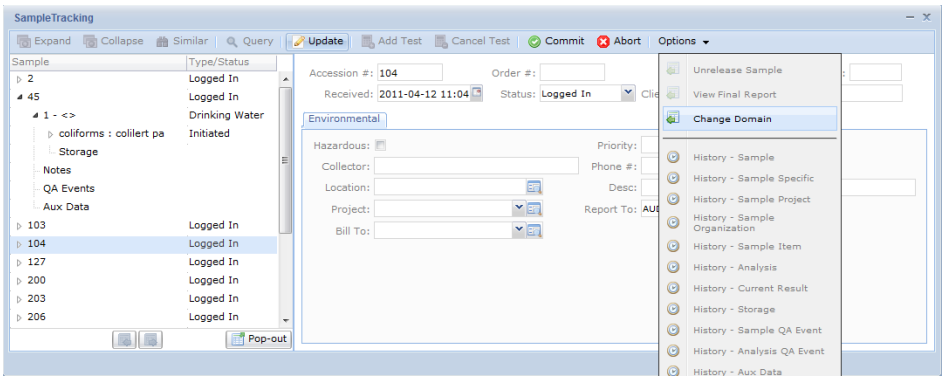


Figure 78 Change Domain Option

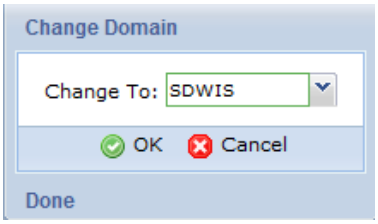


Figure 79 Change Domain Screen

3.6.5 MAKING A GENERAL QUERY IN SAMPLE TRACKING

Sample Tracking has the benefit of being able to obtain information from samples in a specific domain or across all sample domains. The latter is accomplished by making a general query. Any of the fields in the top pane of the Sample Tracking screen or in the Sample Item, Analysis, or Aux Data tabs can be used to make a general query, as they are not domain-specific. Two examples are provided below:

Example 1: General Query of a Range of Accession Numbers

1. Click on **Query** and enter "1523..1526" in the Accession # field. Click **Commit**.

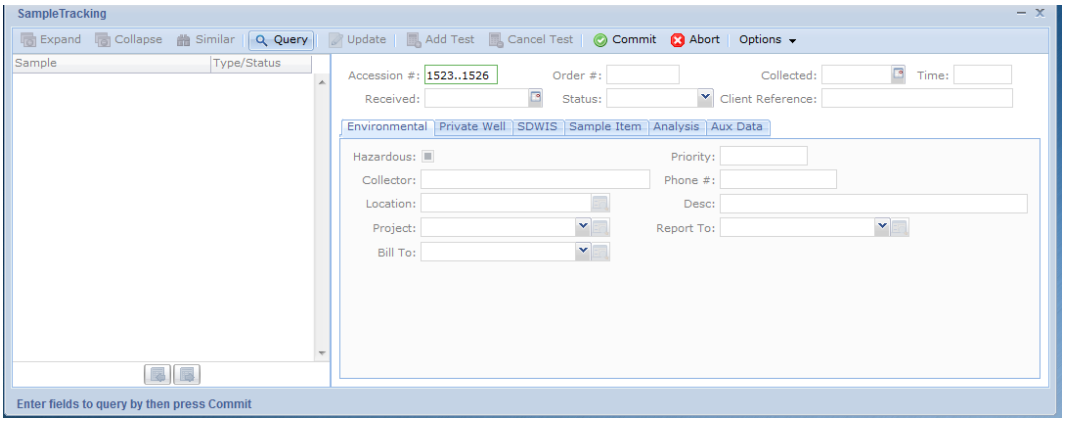


Figure 80 General Query of a Range of Accession Numbers in Sample Tracking

2. Click on the drill-down arrows in the left pane to expand the sample and analysis information or click on the **Expand** button to automatically expand all of the drill-down arrows in the entire tree.

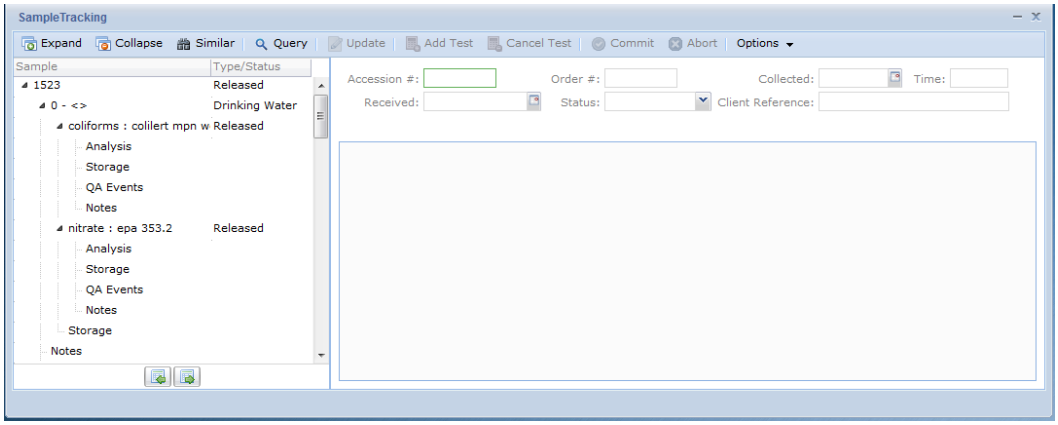


Figure 81 Expanded Sample Tree in Sample Tracking

3. Click on the drill-down arrows to collapse a sample or analysis or click on the **Collapse** button to automatically collapse all of the drill-down arrows in the entire tree.

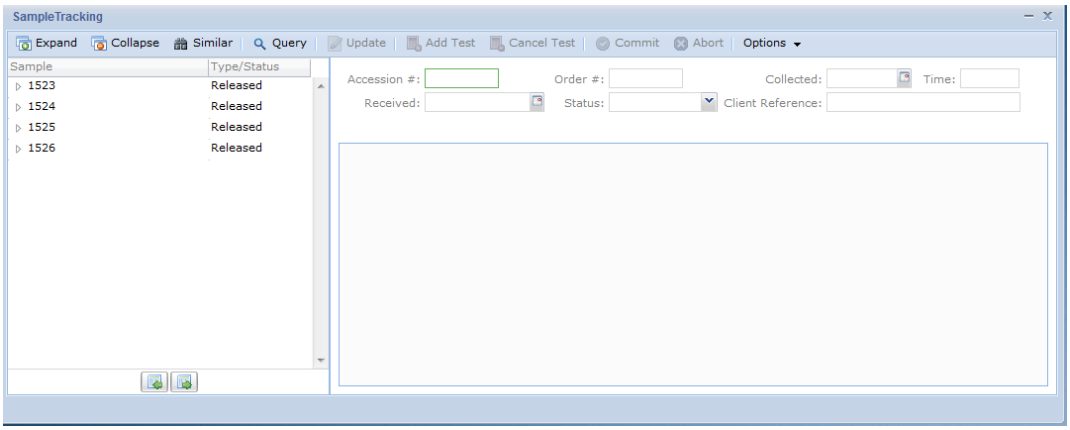


Figure 82 Collapsed Sample Tree in Sample Tracking

4. For each accession number, information related to the sample domain, sample item(s), test results, analyses assigned, sample and analysis storage, sample and analysis QA events, sample and analysis notes, and auxiliary data can be viewed. Select the label in the tree in the left pane to view the desired information. Example screen shots follow.

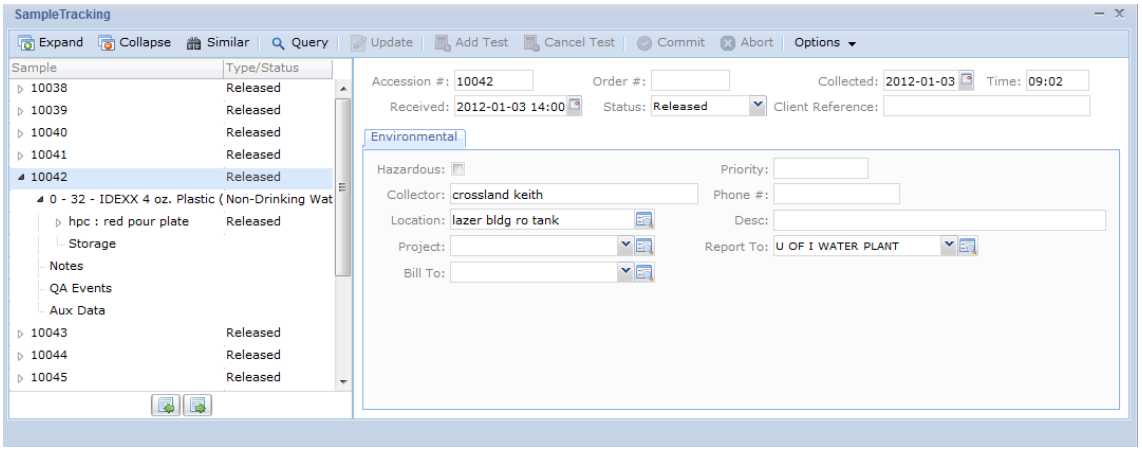


Figure 83 Domain-Specific Information in Sample Tracking

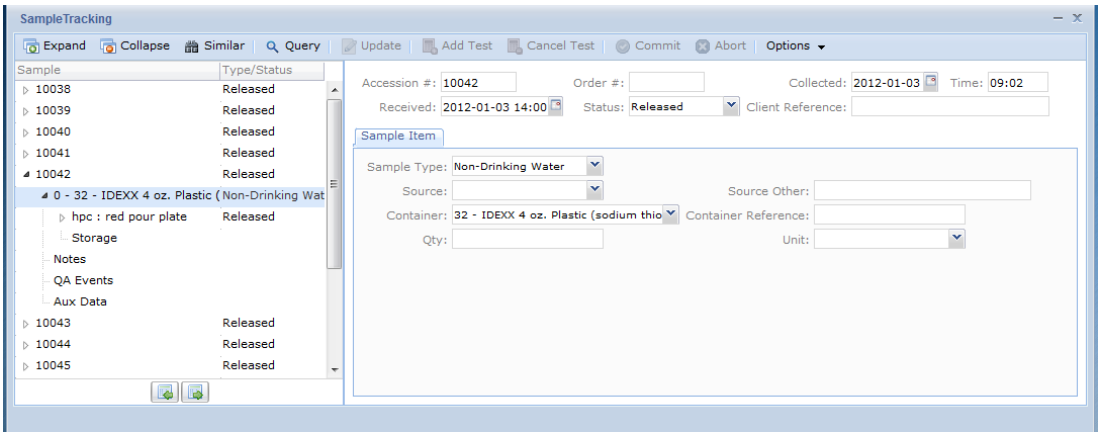


Figure 84 Sample Item Information in Sample Tracking

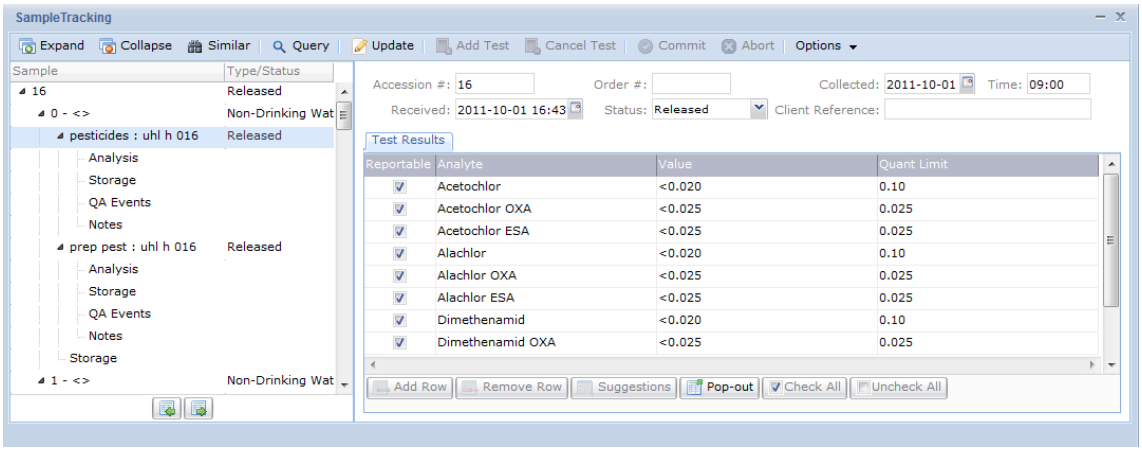


Figure 85 Test Results in Sample Tracking

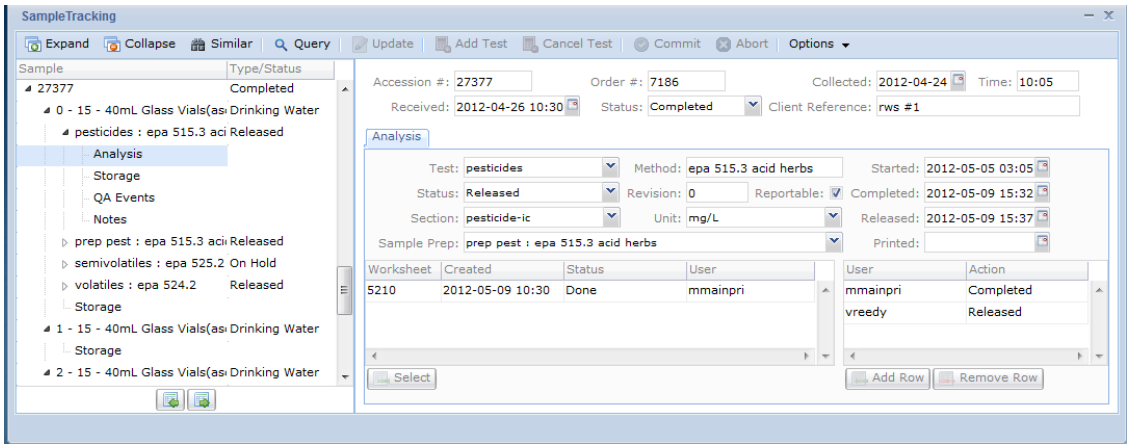


Figure 86 Analysis Information in Sample Tracking

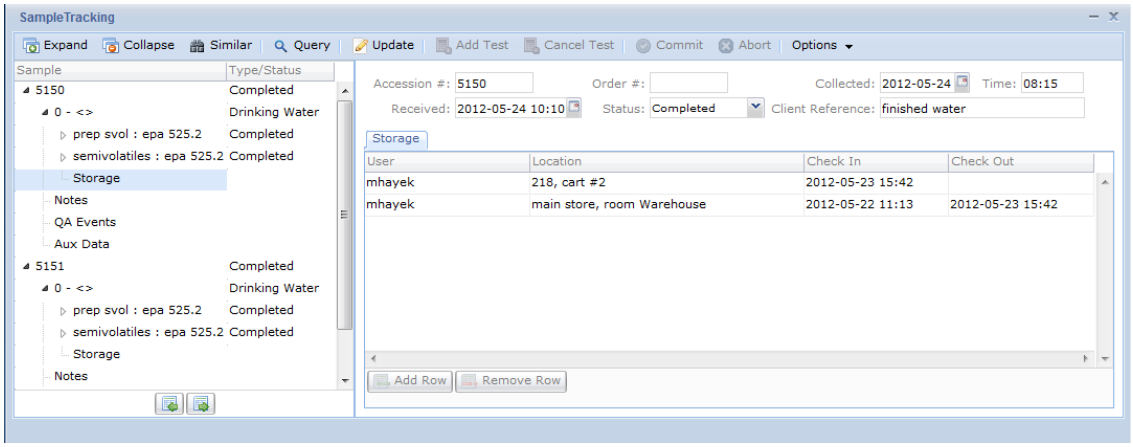


Figure 87 Analysis Storage Information in Sample Tracking

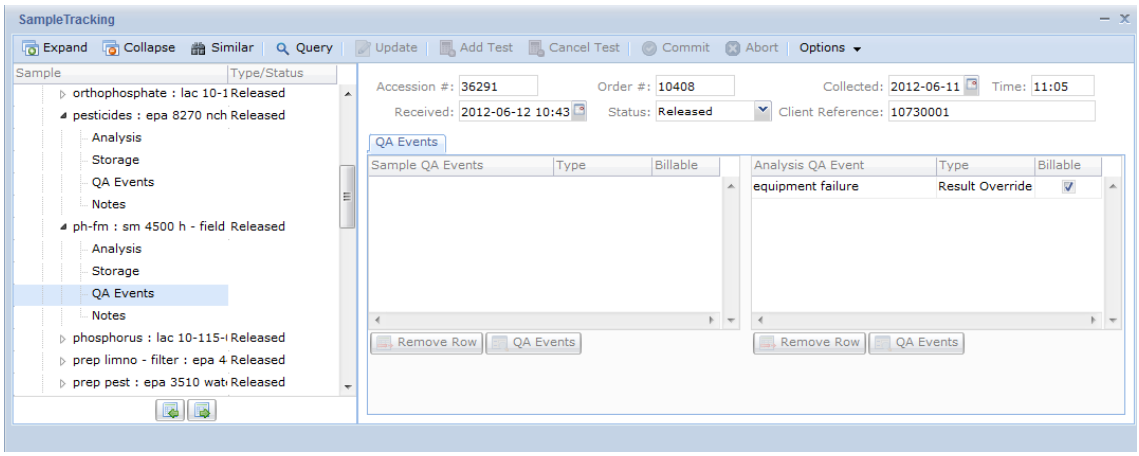


Figure 88 Analysis QA Events in Sample Tracking

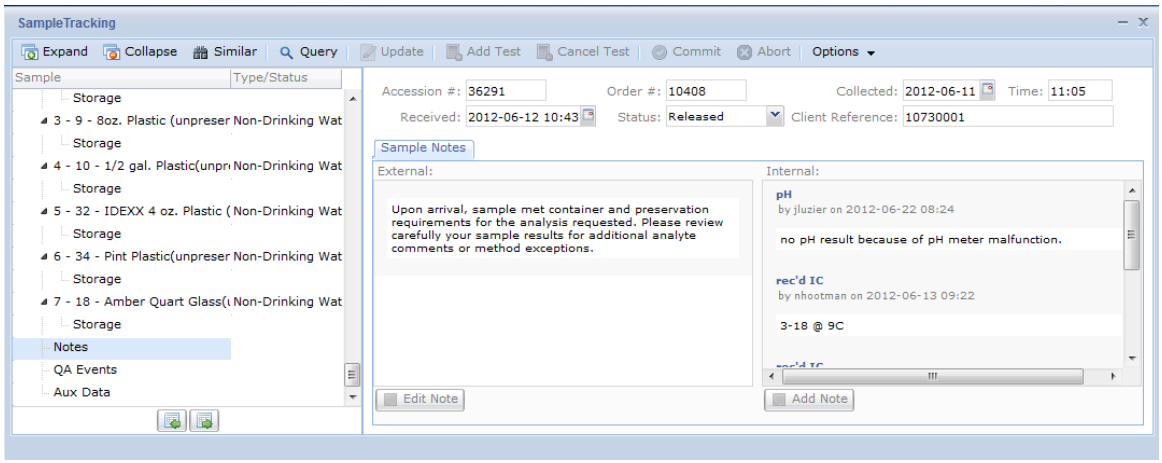


Figure 89 Sample Notes in Sample Tracking

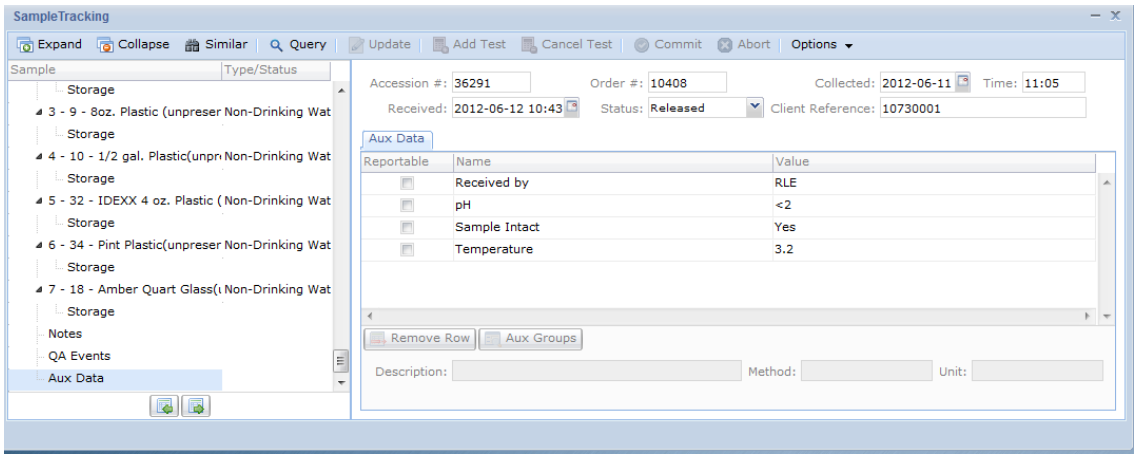


Figure 90 Sample Auxiliary Data in Sample Tracking

Example 2: General Query by Analysis Information

1. Click on **Query** and select the Analysis tab.

2. Enter “pesticides” as the Test, “uhl h 018 fifra” in the Method field, and select “In Prep” as the analysis Status.

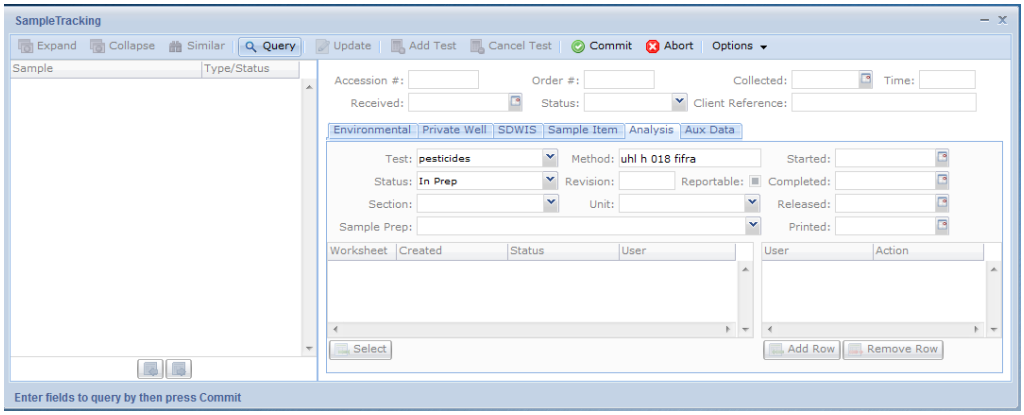


Figure 91 General Query by Analysis Information in Sample Tracking

3. Click the **Commit** button. All samples that meet these three search criteria, regardless of sample domain, will be displayed.

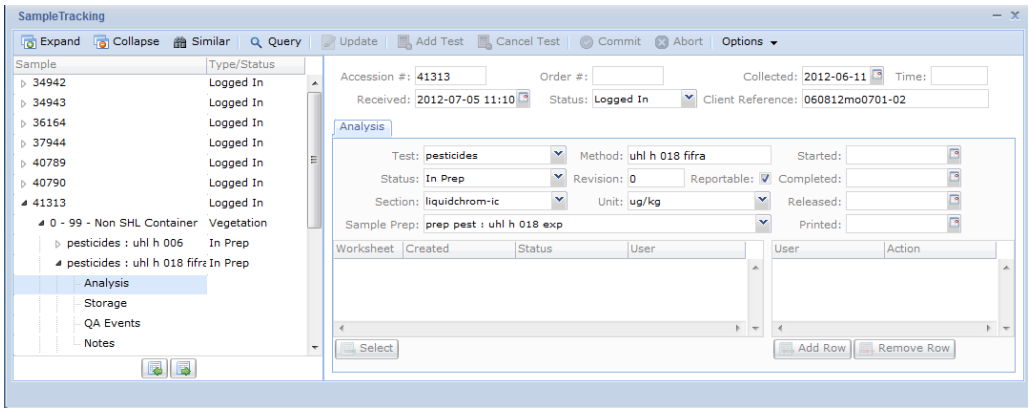


Figure 92 Matches of a General Query by Analysis Information in Sample Tracking

Example 3: General Query by Aux Data

1. Click on **Query** and select the Aux Data tab.
2. Click on the **Aux Groups** button.
3. Choose the desired aux group(s) from the Aux Group Selection screen. Click **OK**. For example, select “1-env acceptance”.
4. Enter the desired value in the Value field (i.e., “7.4” for the pH Value). It should be noted that the Value field uses string comparison, and as such, all the string character operators such as “*” or “|”are allowed. Only one aux data row (individual auxiliary analyte) can be queried at a time.

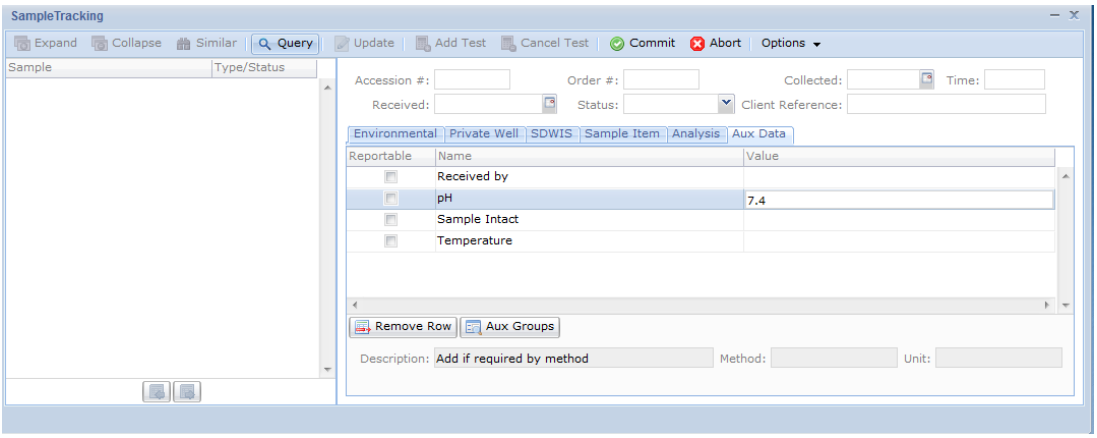


Figure 93 General Query by Aux Data in Sample Tracking

5. Click **Commit**. All samples that meet these search criteria, regardless of sample domain, will be displayed.

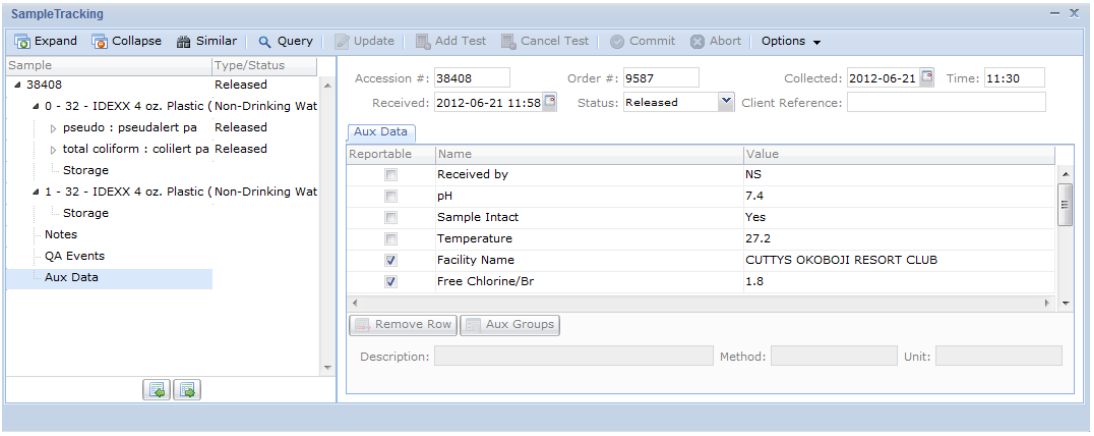


Figure 94 Matches of a General Query by Aux Data in Sample Tracking

3.6.6 MAKING A DOMAIN-SPECIFIC QUERY IN SAMPLE TRACKING

When any field on a domain-specific tab (i.e., Environmental, Private Well, SDWIS, etc.) is used to query for samples, only matches from that particular domain will be returned.

Example 1: Query Using Domain-Specific Fields Only

Querying for “hay*” in the Collector field on the Environmental tab returns samples from the environmental sample domain whose collector’s last name begins with the letters “hay”.

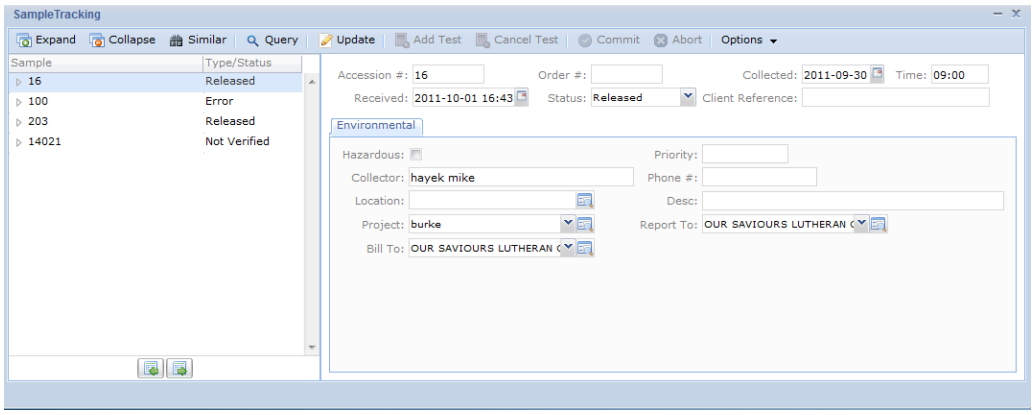


Figure 95 Matches for a Domain-Specific Query in Sample Tracking

Example 2: Query Using a Combination of General and Domain-Specific Fields

Querying for a collected date range of "2012-05-01..2012-05-31", a sample Status of "Released", and project "gtc" returns matches that meet all three of the search criteria. Note that the first two criteria are general in nature, and the last one is domain-specific.

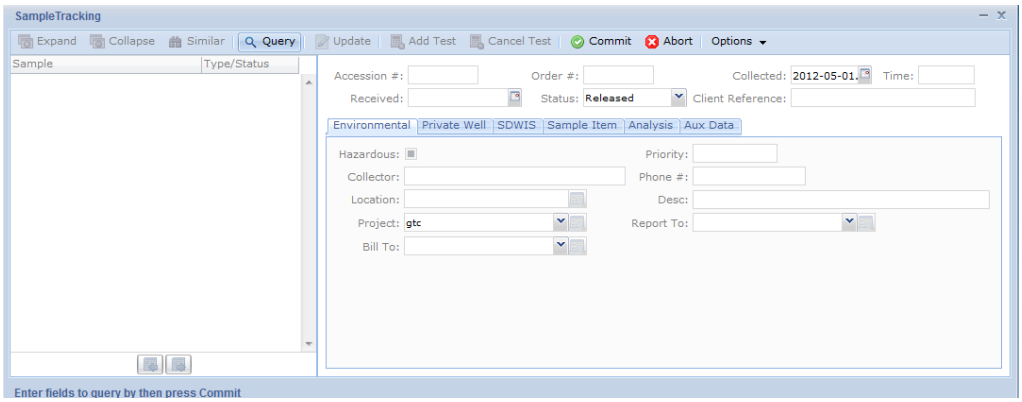


Figure 96 Making a Domain-Specific Query in Sample Tracking

Example 3: Multiple Domain Querying is Not Allowed

If fields in two different domains are used to query for samples, an error message will be displayed in the Status Area of the screen prohibiting this action. For example, if a query is conducted for all samples with a Project of "gtc" on the Environmental tab,

and a Sample Type of "RT – Routine" on the SDWIS tab, the following error message will be displayed:

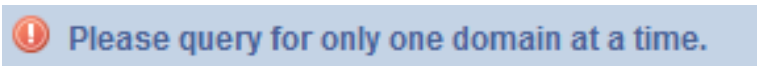


Figure 97 Error Message for a Multiple Domain Query in Sample Tracking

3.6.7 ADDING A TEST TO A SAMPLE IN SAMPLE TRACKING

1. Query and enter the Accession # or another parameter to find the desired sample.
2. Click on the accession # in the tree in the left pane.
3. Click on **Update**.
4. Click on the sample item.
5. Click on the **Add Test** button. The new test (highlighted below) will appear.

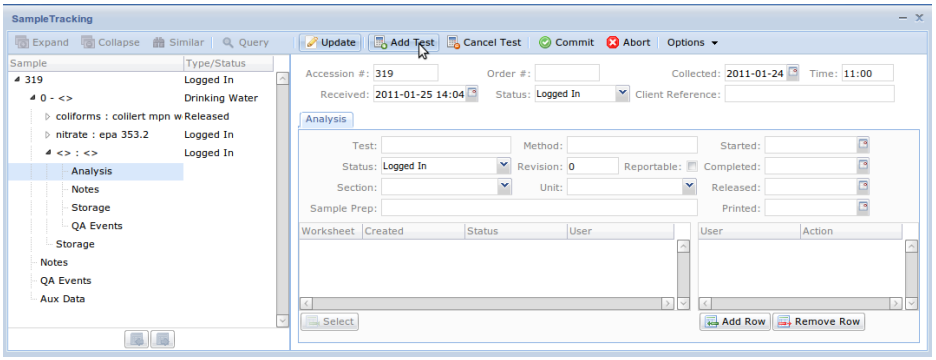


Figure 98 Adding a Test in Sample Tracking

6. Enter information into the Test field under the Analysis tab. The user must have permission to add a test.
7. Click on **Commit**, and the test will be added.

3.6.8 CANCELLING A TEST IN SAMPLE TRACKING

1. Query and enter the Accession # or another parameter to find the desired sample.

2. Click on the accession # in the tree in the left pane.
3. Click on the **Update** button.
4. Click on the analysis that needs to be cancelled.
5. Click on the **Cancel Test** button.
6. A pop-up box with the following instructions appears on the screen.

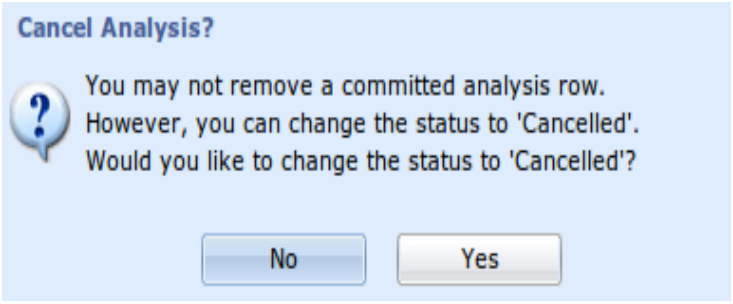


Figure 99 Cancelling an Analysis in Sample Tracking

7. Select the appropriate response from “No/Yes”.
8. By clicking “Yes”, the status of the logged-in analysis changes to “Cancelled”.
9. By clicking “No”, the status remains as “Logged In”.
10. Click **Commit** to save your most recent changes.

CHAPTER 4 MANAGING ANALYSES

Tests are the procedures that are used to analyze the sample; they are the units of work that the analytical staff perform to obtain the results. Tests that are assigned to samples become “analyses”. Analyses have additional information such as the date-time they were assigned to the sample, what status they are in, who performed the analyses, etc. that record the various aspects of the work performed. Much like samples, an analysis has a lifecycle that moves it along from initial login to completion and reporting. For more information on various analysis statuses, see (Analysis) Status.

The Analysis Menu provides analysts with access to screens used in their daily processes.

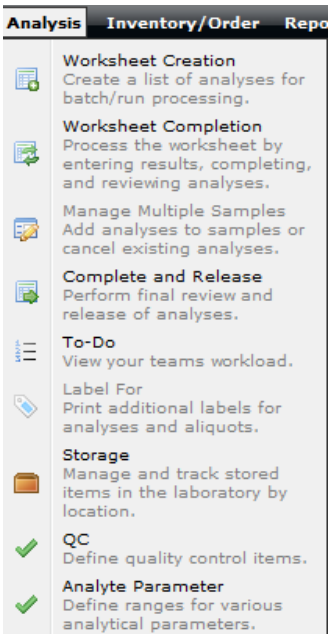


Figure 100 Analysis Menu

4.1 TO-DO LIST

The To-Do List in the Analysis Menu provides a detailed, sortable, filterable listing of items of interest. It is an improvement over the traditional paper to-do list, as it has up-to-the-minute information. The To-Do List is an extremely useful tool for analysts to view the workload across the lab, see what work needs to be done, and target problematic areas, especially the percent holding time used and the percent average turnaround time used.

The “Show my section’s only” option is checked by default allowing the To-Do List to be narrowed to analyses that are relevant to the logged-in user. Unchecking this box will show the analyses for the entire laboratory. The **Refresh** button updates the To-Do List by retrieving up-to-the-minute information from the database. The **Details** button pops up the selected sample’s information in a Sample Tracking screen. (On the Worksheet tab the **Details** button pops up the selected worksheet’s Worksheet Completion screen.) The bottom pane found on many of the To-Do List’s tabs displays a bar graph of tab-specific data. Users may also hover the mouse pointer on an individual bar to view its time and quantity values. The Override column found on many of the tabs indicates if the analysis or sample has been flagged with a QA event which overrides its results.

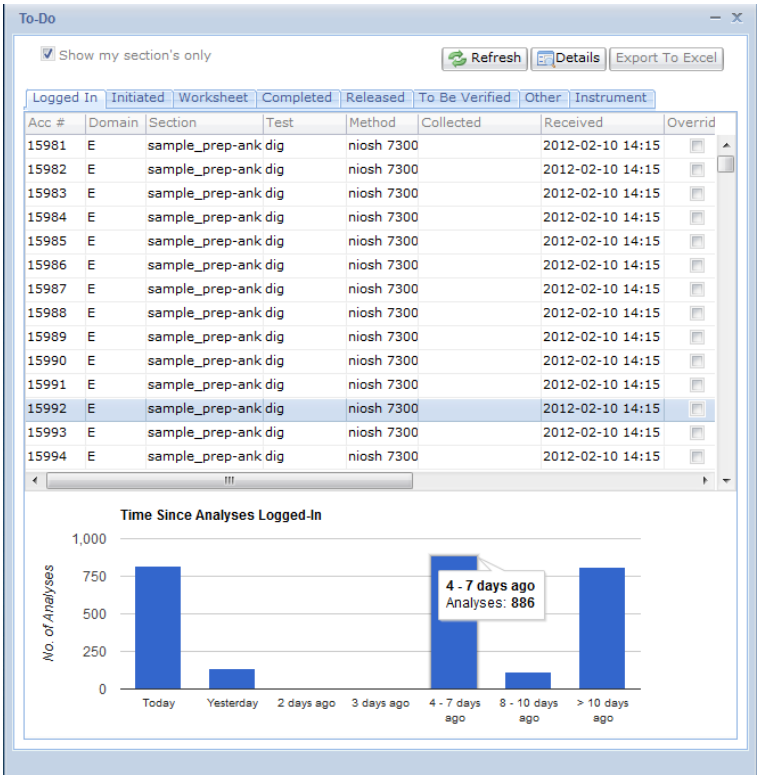


Figure 101 Logged In Tab of To-Do List

4.1.1 SORTING AND FILTERING THE TO-DO LIST

The sorting and filtering capabilities that are inherent to the To-Do List allows the user to quickly narrow the list to the desired set. To access the sort or filter menus, hover the mouse on the column heading and click on the dropdown arrow.

The two sorting options that are available in most of the columns are ascending (A to Z) and descending (Z to A) sorts. The following example shows the options available for the Test column.

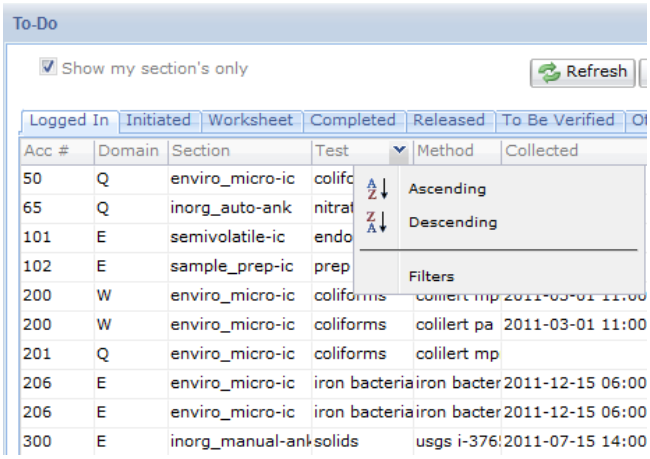


Figure 102 Ascending and Descending Sorting

Filtering is available with many of the columns of the To-Do List. Available filtering options are dictated by the data in that column. One or more filtering options may be checked or unchecked for a column. Users may also apply filters to multiple columns, thus, limiting the list that is displayed. It is recommended that the user uncheck filters to go back to a previous set, instead of clicking the **Refresh** button. The **Refresh** button uses more system resources and is only meant to be used to update the To-Do List after a longer period of time has passed.

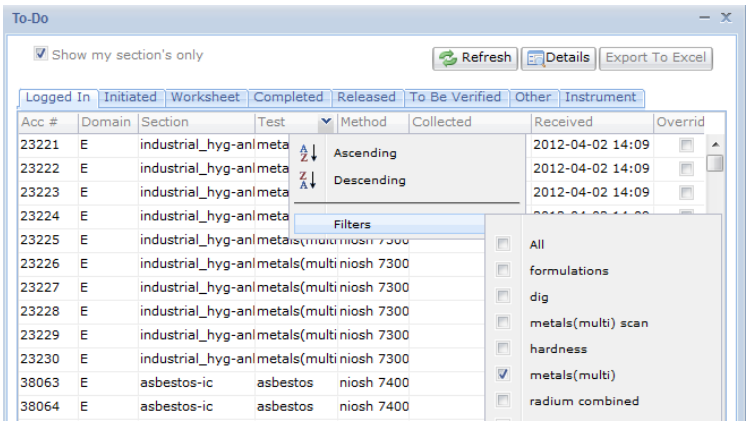


Figure 103 Filtering the To-Do List

4.1.2 SAMPLE DOMAIN CODES

Sample Domain Codes are used in many of the tabs of the To-Do List to distinguish the domain to which the sample belongs.

Domain Code	Sample Domain
E	Environmental
Q	Quick Entry
S	SDWIS
W	Private Well Water

Figure 104 To-Do List Sample Domain Codes

4.1.3 DOMAIN SPECIFIC FIELD

This field, located on all tabs but the Worksheet tab, contains information which can be used to help identify an analysis/sample. The To-Do List's "Domain Specific Field" contains information from one or more domain-specific sample fields joined together

in the order specified in the table below. If one of the component domain-specific fields is empty, it is skipped in the formation of the To-Do List's "Domain Specific Field".

Sample Domain	Domain Specific Field
Environmental	Priority [pri], Project [prj], Location [loc]
SDWIS	PWS Name [pws], Facility Id [fac]
Private Well Water	Owner [own]

Figure 105 Descriptions of To-Do List Domain Specific Field

4.1.4 LOGGED IN TAB

The Logged In status tab is displayed by default when the To-Do List is opened. This tab provides the analytical staff with their team's workload of analyses that are in "logged in" status. For an explanation of logged in status, see (Analysis) Status.

Two special columns are found on this tab: % Holding Used and % Exp Completion.

% Holding Used

The Percent Holding Time Used for an analysis is calculated from the Turnaround Holding Hours value in its test definition:

$$\%\ Holding\ Used = \frac{(Started\ DateTime * \ -\ \ Collected\ DateTime **)\ x\ \ 100}{Turnaround\ Holding\ Hours\ in\ Test\ Definition}$$

* For analyses that have not been started, the Current DateTime is used to show the continual depletion of holding time.

** The % Holding Used is set to 0.0% if Collected DateTime is not present in the system.

The bars in the % Holding Used column are color-coded to allow for easy interpretation.

Color	Percentage Range
Red	75.0 % and Above
Brown	50.0 – 74.9 %
Yellow	25.1 – 49.9 %
Green	25.0 % and Below

Figure 106 To-Do List Bar Colors

% Exp(ected) Completion

The Percent Expected Completion for an analysis is calculated from the Priority of the sample.

$$\%\ Exp\ Completion = \frac{(Current\ DateTime\ -\ Collected\ DateTime\ *)\ x\ 100}{Priorty\ **}$$

* The Received DateTime is used for this calculation if Collected DateTime is not present in the system.

** The Turnaround Average Days in the test definition is used for this calculation if a Priority value is not present in the system.

The bars in the % Exp Completion column use the same color code as above.

The bar graph in the lower pane of the Logged In tab displays the distribution of analyses by the number of days since the analyses reached logged in status. See Logged In Tab of To-Do List for an example of the Logged In tab.

4.1.5 INITIATED TAB

The Initiated status tab displays analyses that have been added to an electronic worksheet and in which testing has begun.

Two special columns are found on this tab: % Holding Used and % Exp Completion. These columns are calculated in the same manner that they are for the Logged In Tab.

The bar graph in the lower pane of the Initiated tab displays the distribution of analyses by the number of days since the analyses were initiated.

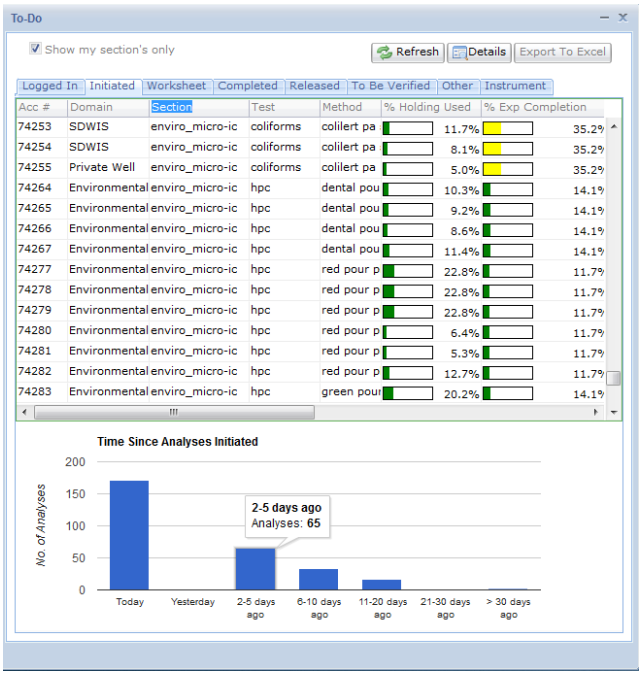
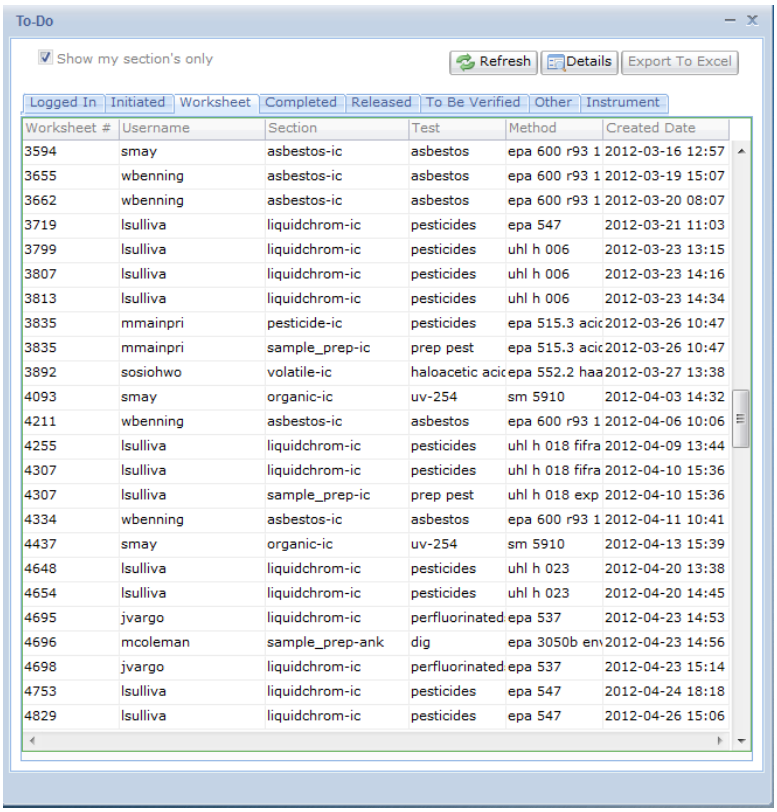


Figure 107 Initiated Tab of To-Do List

4.1.6 WORKSHEET TAB

The Worksheet tab displays a list of worksheets that are yet to be completed. Clicking on the **Details** button will pop up and display the selected worksheet. For additional information about worksheet completion, see WORKSHEET COMPLETION.

If the tab includes worksheets that should not be on the list, the worksheet status should be changed to “Done”.



Worksheet #	Username	Section	Test	Method	Created Date
3594	smay	asbestos-ic	asbestos	epa 600 r93 1	2012-03-16 12:57
3655	wbenning	asbestos-ic	asbestos	epa 600 r93 1	2012-03-19 15:07
3662	wbenning	asbestos-ic	asbestos	epa 600 r93 1	2012-03-20 08:07
3719	lsulliva	liquidchrom-ic	pesticides	epa 547	2012-03-21 11:03
3799	lsulliva	liquidchrom-ic	pesticides	uhl h 006	2012-03-23 13:15
3807	lsulliva	liquidchrom-ic	pesticides	uhl h 006	2012-03-23 14:16
3813	lsulliva	liquidchrom-ic	pesticides	uhl h 006	2012-03-23 14:34
3835	mmainpri	pesticide-ic	pesticides	epa 515.3 acic	2012-03-26 10:47
3835	mmainpri	sample_prep-ic	prep pest	epa 515.3 acic	2012-03-26 10:47
3892	sosiohwo	volatile-ic	haloacetic acic	epa 552.2 haa	2012-03-27 13:38
4093	smay	organic-ic	uv-254	sm 5910	2012-04-03 14:32
4211	wbenning	asbestos-ic	asbestos	epa 600 r93 1	2012-04-06 10:06
4255	lsulliva	liquidchrom-ic	pesticides	uhl h 018 fifra	2012-04-09 13:44
4307	lsulliva	liquidchrom-ic	pesticides	uhl h 018 fifra	2012-04-10 15:36
4307	lsulliva	sample_prep-ic	prep pest	uhl h 018 exp	2012-04-10 15:36
4334	wbenning	asbestos-ic	asbestos	epa 600 r93 1	2012-04-11 10:41
4437	smay	organic-ic	uv-254	sm 5910	2012-04-13 15:39
4648	lsulliva	liquidchrom-ic	pesticides	uhl h 023	2012-04-20 13:38
4654	lsulliva	liquidchrom-ic	pesticides	uhl h 023	2012-04-20 14:45
4695	jvargo	liquidchrom-ic	perfluorinated	epa 537	2012-04-23 14:53
4696	mcoleman	sample_prep-ank	dig	epa 3050b en	2012-04-23 14:56
4698	jvargo	liquidchrom-ic	perfluorinated	epa 537	2012-04-23 15:14
4753	lsulliva	liquidchrom-ic	pesticides	epa 547	2012-04-24 18:18
4829	lsulliva	liquidchrom-ic	pesticides	epa 547	2012-04-26 15:06

Figure 108 Worksheet Tab of To-Do List

4.1.7 COMPLETED TAB

The Completed status tab displays a list of analyses that have been completed, but that still need to be reviewed by a second analyst for release.

The bar graph in the lower pane of the Completed tab displays the distribution of analyses by the number of days since the analyses were completed.

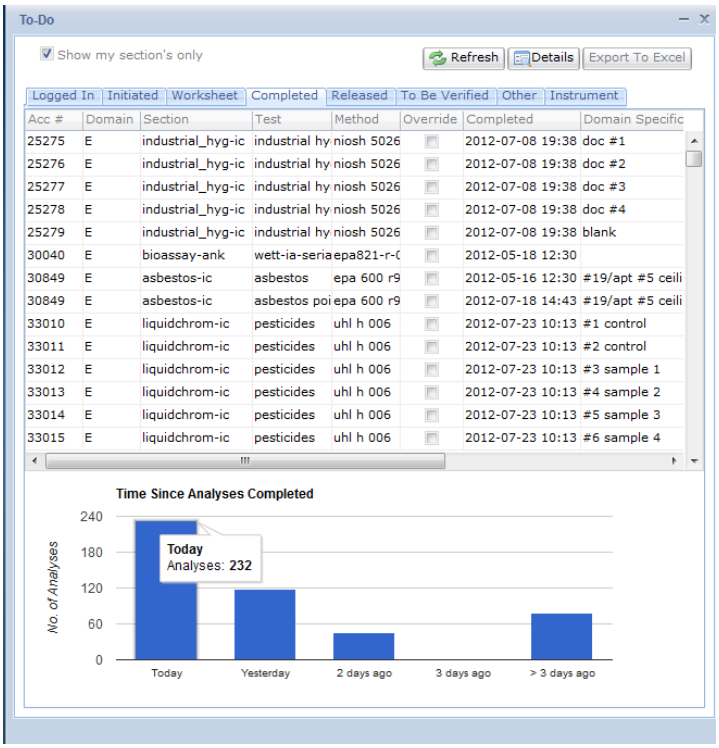
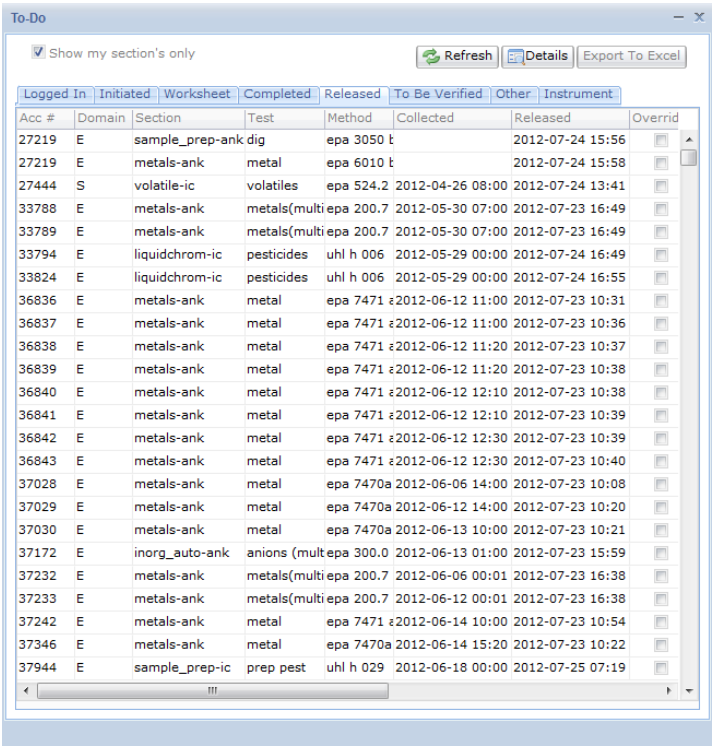


Figure 109 Completed Tab of To-Do List

4.1.8 RELEASED TAB

The Released status tab is used by client services staff to view the volume of analyses that have been released in the last four days. This tab allows users to easily check to see if an analysis has been recently released and to look up any information related to it.



Acc #	Domain	Section	Test	Method	Collected	Released	Overrid
27219	E	sample_prep-ank	dig	epa 3050 b		2012-07-24 15:56	
27219	E	metals-ank	metal	epa 6010 b		2012-07-24 15:58	
27444	S	volatile-ic	volatiles	epa 524.2	2012-04-26 08:00	2012-07-24 13:41	
33788	E	metals-ank	metals(multi	epa 200.7	2012-05-30 07:00	2012-07-23 16:49	
33789	E	metals-ank	metals(multi	epa 200.7	2012-05-30 07:00	2012-07-23 16:49	
33794	E	liquidchrom-ic	pesticides	uhl h 006	2012-05-29 00:00	2012-07-24 16:49	
33824	E	liquidchrom-ic	pesticides	uhl h 006	2012-05-29 00:00	2012-07-24 16:55	
36836	E	metals-ank	metal	epa 7471 a	2012-06-12 11:00	2012-07-23 10:31	
36837	E	metals-ank	metal	epa 7471 a	2012-06-12 11:00	2012-07-23 10:36	
36838	E	metals-ank	metal	epa 7471 a	2012-06-12 11:20	2012-07-23 10:37	
36839	E	metals-ank	metal	epa 7471 a	2012-06-12 11:20	2012-07-23 10:38	
36840	E	metals-ank	metal	epa 7471 a	2012-06-12 12:10	2012-07-23 10:38	
36841	E	metals-ank	metal	epa 7471 a	2012-06-12 12:10	2012-07-23 10:39	
36842	E	metals-ank	metal	epa 7471 a	2012-06-12 12:30	2012-07-23 10:39	
36843	E	metals-ank	metal	epa 7471 a	2012-06-12 12:30	2012-07-23 10:40	
37028	E	metals-ank	metal	epa 7470a	2012-06-06 14:00	2012-07-23 10:08	
37029	E	metals-ank	metal	epa 7470a	2012-06-12 14:00	2012-07-23 10:20	
37030	E	metals-ank	metal	epa 7470a	2012-06-13 10:00	2012-07-23 10:21	
37172	E	inorg_auto-ank	anions (mult	epa 300.0	2012-06-13 01:00	2012-07-23 15:59	
37232	E	metals-ank	metals(multi	epa 200.7	2012-06-06 00:01	2012-07-23 16:38	
37233	E	metals-ank	metals(multi	epa 200.7	2012-06-12 00:01	2012-07-23 16:38	
37242	E	metals-ank	metal	epa 7471 a	2012-06-14 10:00	2012-07-23 10:54	
37346	E	metals-ank	metal	epa 7470a	2012-06-14 15:20	2012-07-23 10:22	
37944	E	sample_prep-ic	prep pest	uhl h 029	2012-06-18 00:00	2012-07-25 07:19	

Figure 110 Released Tab of To-Do List

4.1.9 TO BE VERIFIED TAB

The To Be Verified status tab lists the samples that are pending data entry verification. See SAMPLE VERIFICATION for a complete description of this process.

The bar graph in the lower pane of the To Be Verified tab displays the distribution of samples by the number of days since the samples were received at the laboratory.

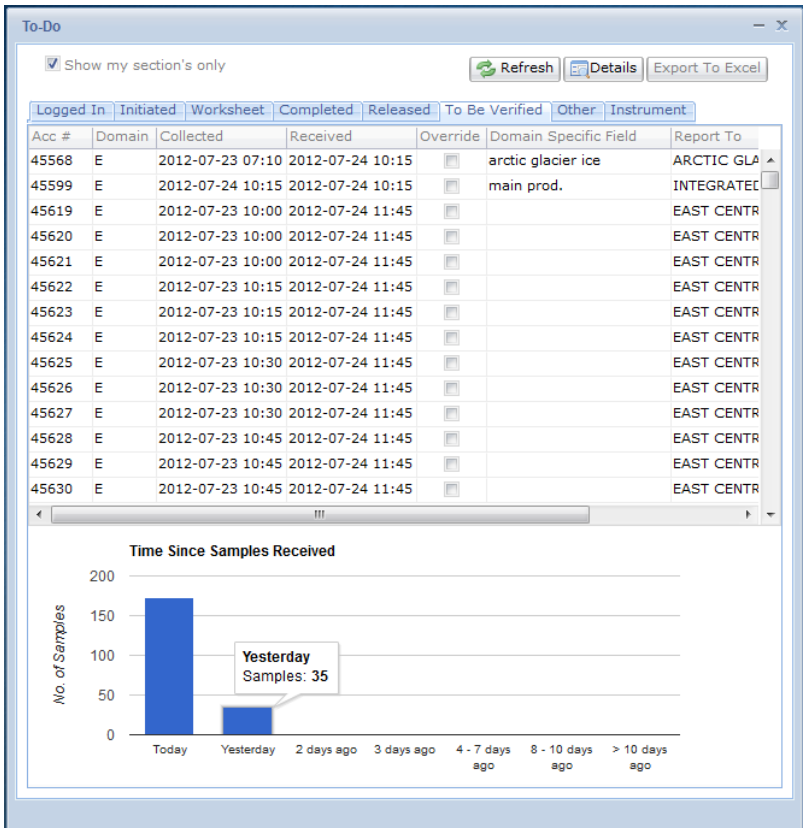
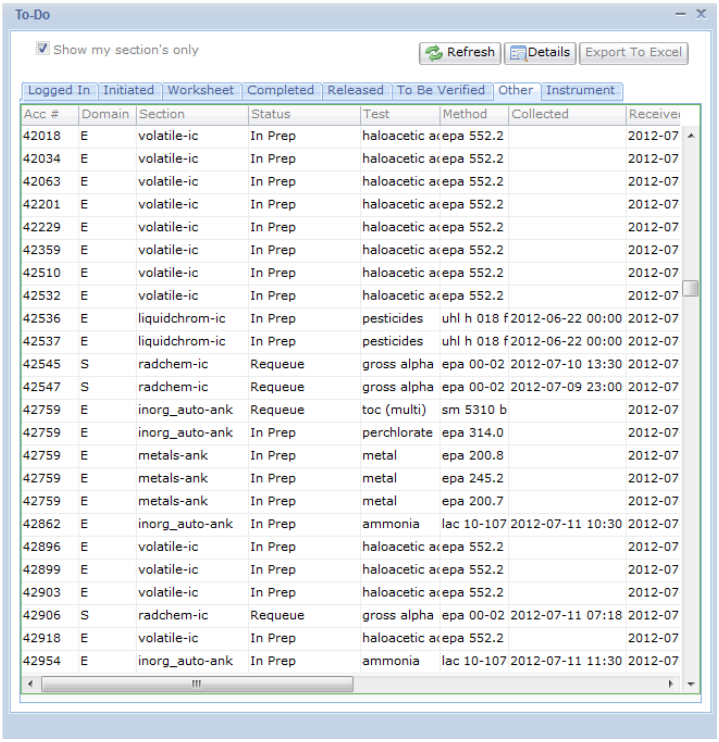


Figure 111 To Be Verified Tab of To-Do List

4.1.10 OTHER TAB

This Other status tab is designed for laboratory staff to troubleshoot issues. The tab displays information for analyses that are not currently in the normal workflow process. These analysis statuses include: Error Completed, Error Initiated, Error In Prep, Error Logged In, In Prep, On Hold, and Requeue. This tab should be referred to frequently when an analysis cannot be found on the other tabs.



Acc #	Domain	Section	Status	Test	Method	Collected	Receive
42018	E	volatile-ic	In Prep	haloacetic a	epa 552.2		2012-07
42034	E	volatile-ic	In Prep	haloacetic a	epa 552.2		2012-07
42063	E	volatile-ic	In Prep	haloacetic a	epa 552.2		2012-07
42201	E	volatile-ic	In Prep	haloacetic a	epa 552.2		2012-07
42229	E	volatile-ic	In Prep	haloacetic a	epa 552.2		2012-07
42359	E	volatile-ic	In Prep	haloacetic a	epa 552.2		2012-07
42510	E	volatile-ic	In Prep	haloacetic a	epa 552.2		2012-07
42532	E	volatile-ic	In Prep	haloacetic a	epa 552.2		2012-07
42536	E	liquidchrom-ic	In Prep	pesticides	uhl h 018 f	2012-06-22 00:00	2012-07
42537	E	liquidchrom-ic	In Prep	pesticides	uhl h 018 f	2012-06-22 00:00	2012-07
42545	S	radchem-ic	Requeue	gross alpha	epa 00-02	2012-07-10 13:30	2012-07
42547	S	radchem-ic	Requeue	gross alpha	epa 00-02	2012-07-09 23:00	2012-07
42759	E	inorg_auto-ank	Requeue	toc (multi)	sm 5310 b		2012-07
42759	E	inorg_auto-ank	In Prep	perchlorate	epa 314.0		2012-07
42759	E	metals-ank	In Prep	metal	epa 200.8		2012-07
42759	E	metals-ank	In Prep	metal	epa 245.2		2012-07
42759	E	metals-ank	In Prep	metal	epa 200.7		2012-07
42862	E	inorg_auto-ank	In Prep	ammonia	lac 10-107	2012-07-11 10:30	2012-07
42896	E	volatile-ic	In Prep	haloacetic a	epa 552.2		2012-07
42899	E	volatile-ic	In Prep	haloacetic a	epa 552.2		2012-07
42903	E	volatile-ic	In Prep	haloacetic a	epa 552.2		2012-07
42906	S	radchem-ic	Requeue	gross alpha	epa 00-02	2012-07-11 07:18	2012-07
42918	E	volatile-ic	In Prep	haloacetic a	epa 552.2		2012-07
42954	E	inorg_auto-ank	In Prep	ammonia	lac 10-107	2012-07-11 11:30	2012-07

Figure 112 Other Tab of To-Do List

4.1.11 INSTRUMENT TAB

This tab is currently not functional.

4.2 ADDING AN ANALYSIS TO A SAMPLE

An analysis can be added to a sample through three different types of screens: the full sample login screens (environmental, private well water, SDWIS, etc.), Sample Tracking, and Quick Entry (as long as the sample has not been fully logged in).

For a complete explanation of the procedure for adding an analysis through the full sample login screens, see COMMON FULL SAMPLE LOGIN FIELDS – MIDDLE OF SCREEN and ANALYSIS TAB.

For a complete explanation of the procedure for adding an analysis to a sample in Sample Tracking, see ADDING A TEST TO A SAMPLE IN SAMPLE TRACKING.

For a complete explanation of how to add an analysis through the Quick Entry module, see QUICK ENTRY.

4.3 GETTING ADDITIONAL TEST SPECIFIC LABELS

This feature has not been currently implemented.

4.4 PREP TESTS

A prep test is a test that is a prerequisite for another test. Examples include digestions, leaching, sample preparation, and afb digestion/concentration. While a test can have multiple prep tests available from which to select, only one prep test can be assigned to the dependent analysis. In other words, an analysis can have only one prep analysis. When there are multiple prep tests available from which to select, the Prep Test Selection screen will pop up to allow a selection. Check the Select box for the desired prep test and click **OK**.

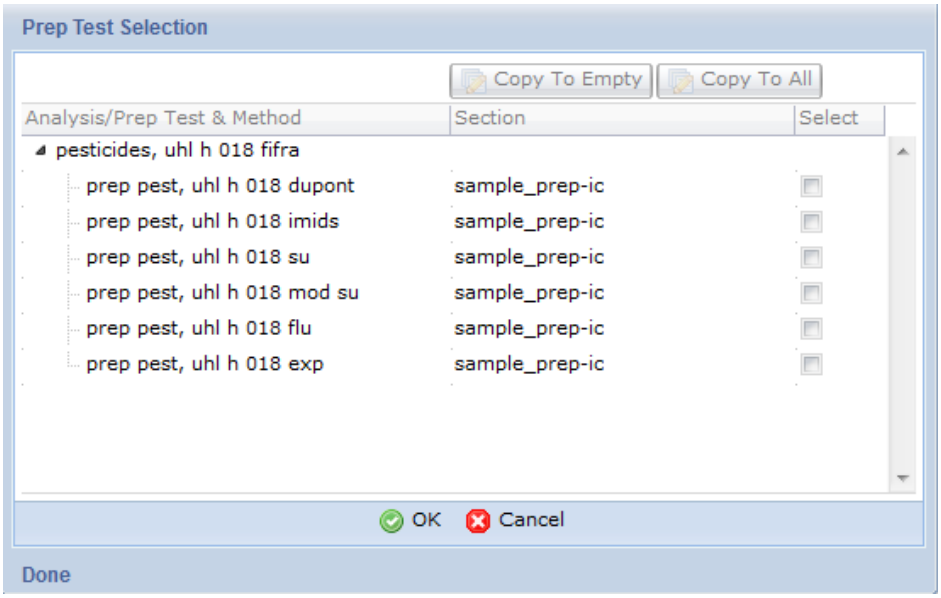


Figure 113 Prep Test Selection Screen

Tests that are defined with a required prep test will have the Select checkbox preselected and it cannot be unselected. Click **OK** to accept the required prep test.

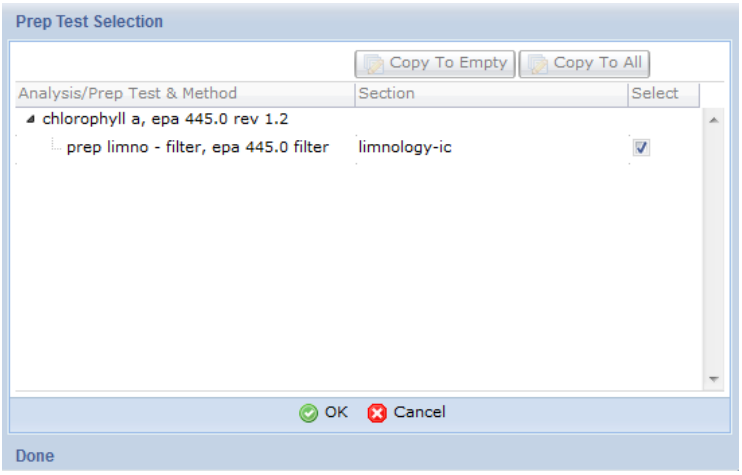


Figure 114 Prep Test Selection Screen for a Required Prep Test

The **Copy To All** button copies the highlighted section to all the prep tests. The **Copy To Empty** button performs the same operation but only on those prep tests that don't have any predefined section.

Another way to select a prep test is by choosing a previously logged in analysis to be the prep analysis for its dependent analysis. See Sample Prep for an explanation of how to perform this action.

For a complete explanation of how prep tests are built into a dependent test definition, see PREP TEST & REFLEX TEST TAB.

4.5 REFLEX TESTS

Often a result of a test requires an additional or confirmatory test to be performed. This additional test is known as a reflex(ed) test. A reflex analysis is linked to its parent analysis and result which is important in tracking the testing process.

Multiple tests can be reflexed from a single analysis giving the analyst the choice for selecting the next step. When there are multiple reflex tests available from which to choose, the Reflex Test Selection screen will pop up to allow a selection. Check the Select box(es) for the desired reflex test(s) and click **OK**.

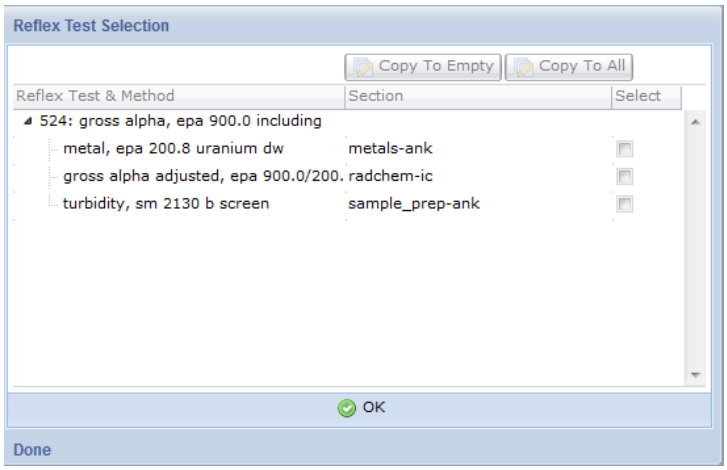


Figure 115 Reflex Test Selection Screen

Tests that are defined with a required reflex test(s) will have its Select checkbox preselected and it cannot be unselected. Click **OK** to accept the required reflex test(s).

For a complete explanation of how reflex tests are built into a parent test definition, see PREP TEST & REFLEX TEST TAB.

4.6 CANCELING AN ANALYSIS

There are times that a laboratory wishes to remove an analysis from a sample. However, for auditing purposes an analysis cannot be removed from a sample and must be cancelled. Once an analysis is cancelled, it cannot be un-cancelled, reported, or modified in any way.

An analysis can be cancelled in two different places. It can be cancelled from the Sample Tracking screen. (See CANCELLING A TEST IN SAMPLE TRACKING.) It can also be cancelled from any of the full sample login screens. Click on the analysis in the "Sample Items and Analyses" section and then click on the **Remove Row** button. A "Cancel Analysis?" warning window pops up allowing the user to change the status of the analysis to cancelled. This action must then be committed to take effect.

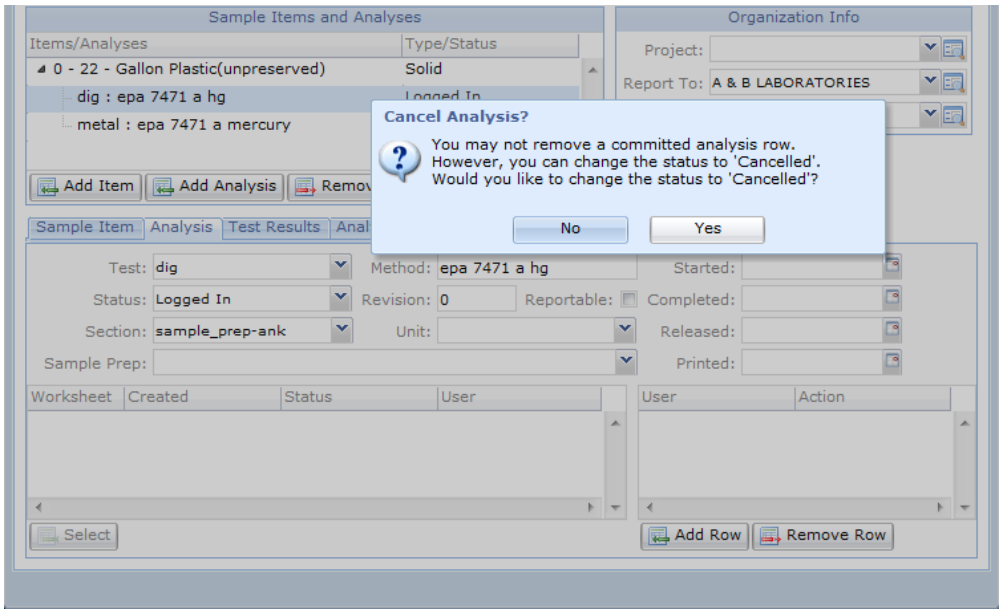


Figure 116 Canceling an Analysis in Full Sample Login

In the instance where a client no longer wishes for a requested analysis to be performed, the laboratory procedure could be to add an overriding QA event. This still reports that analysis (excluding the results) to the client with possible external comments documenting the client "cancellation". The reason to do this is because an analysis "cancellation" by a client has billing, turnaround, and analyses volume implications.

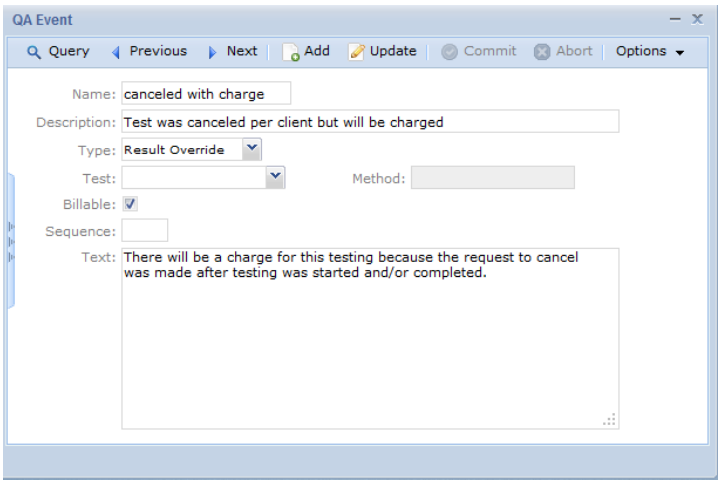


Figure 117 QA Event: Test Was Canceled Per Client But Will Be Charged

4.7 ADDING QA EVENTS, EXTERNAL NOTES, AND INTERNAL NOTES

For general information about QA events, please see QA EVENTS TAB and QA EVENTS. Additionally, sample level QA events cannot be added/removed if any analysis has been released. This is to prevent the meaning of a previously reviewed analysis from changing on reports.

Sample and analysis internal notes are viewable only by lab personnel and are meant to explain any circumstances of note. The major difference between QA events and notes comes from the fact that QA events can be tracked, tabulated, and analyzed, whereas, notes cannot. For more information on adding external and internal notes, see ANALYSIS NOTES TAB and SAMPLE NOTES TAB.

4.8 COMPLETING AN ANALYSIS

The Complete and Release screen found in the Analysis Menu is used to review, complete, and release analyses.

- Analysts can query based on accession number, test, method, analysis status, and sample status.
- For each record, there are information tabs for sample, domain (environmental, private well water, SDWIS, etc.), sample item, analysis, test results, analysis notes, sample notes, storage, QA events, and auxiliary data.
- Any of the information in these tabs can be updated by clicking on the **Update** button, followed by the **Commit** button.

The sample can be queried, thus, displaying the analyses that were conducted on the sample. First, the desired analysis row is selected in the top pane of the Complete and Release screen. Next, the Test Results tab is selected in the bottom pane and the analysis values are entered. When the user is certain that the analysis is complete, the **Complete** button is clicked. If the result information is incomplete, there will be a warning that is displayed on the bottom of the screen.

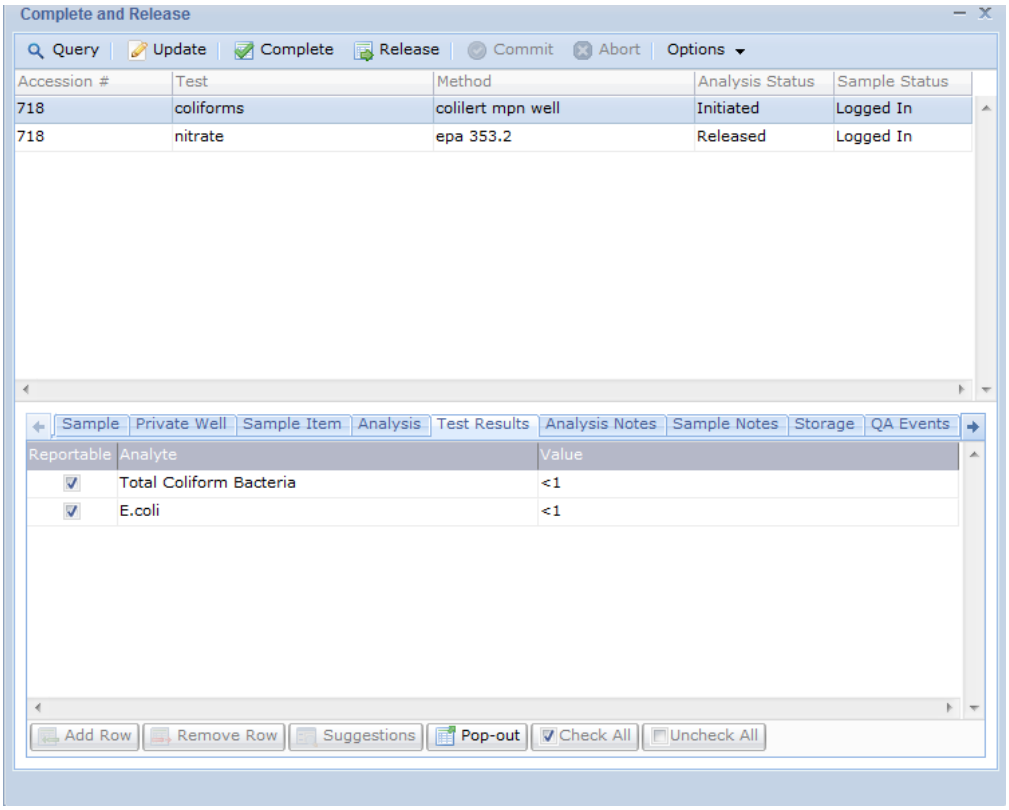


Figure 118 Complete and Release Screen

The Analysis Status changes to “Completed”. If this is the final analysis to be completed for the sample, the Sample Status also changes to “Completed”.

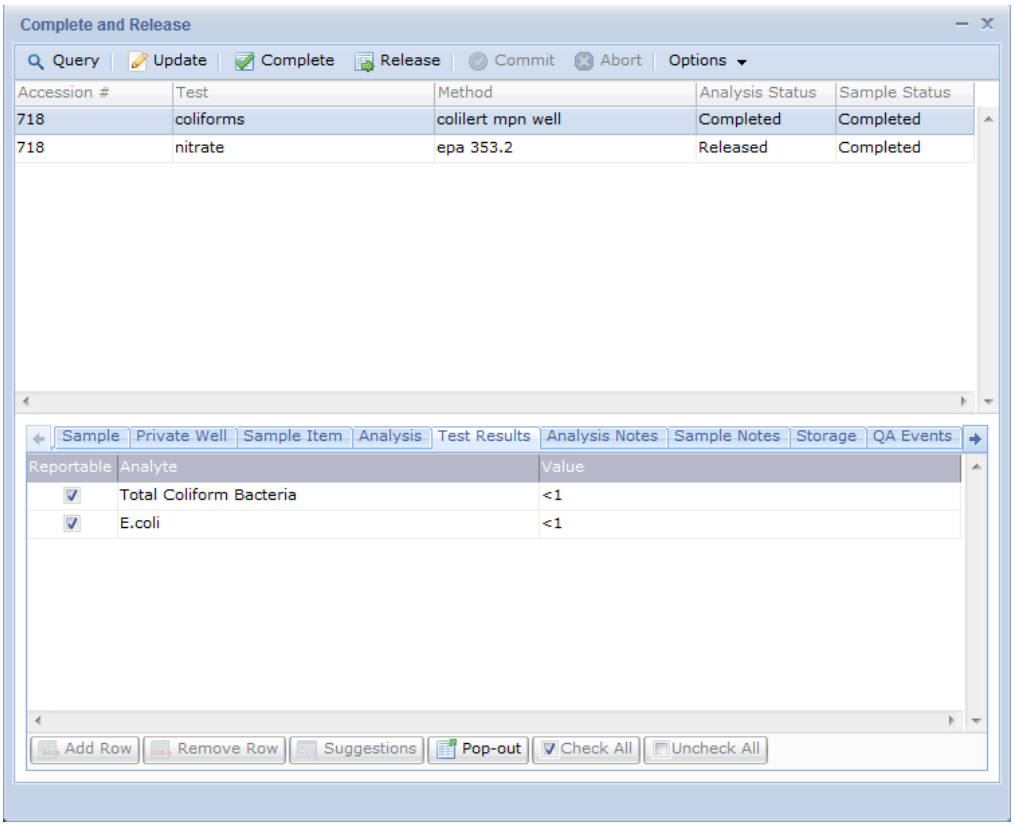


Figure 119 Completing an Analysis

4.9 RELEASING AN ANALYSIS

The Complete and Release screen found in the Analysis Menu is used to review and release an analysis. The sample accession number can be queried, thus, displaying the analyses that were conducted on the sample. First, the desired analysis row is selected in the top pane of the Complete and Release screen. Next, the various tabs are selected in the bottom pane to review their information. When the user is certain that the analysis is ready to be released, the **Release** button is clicked. You may release one or more analysis' records at one time. To release more than one analysis, select multiple rows before clicking on the **Release** button.

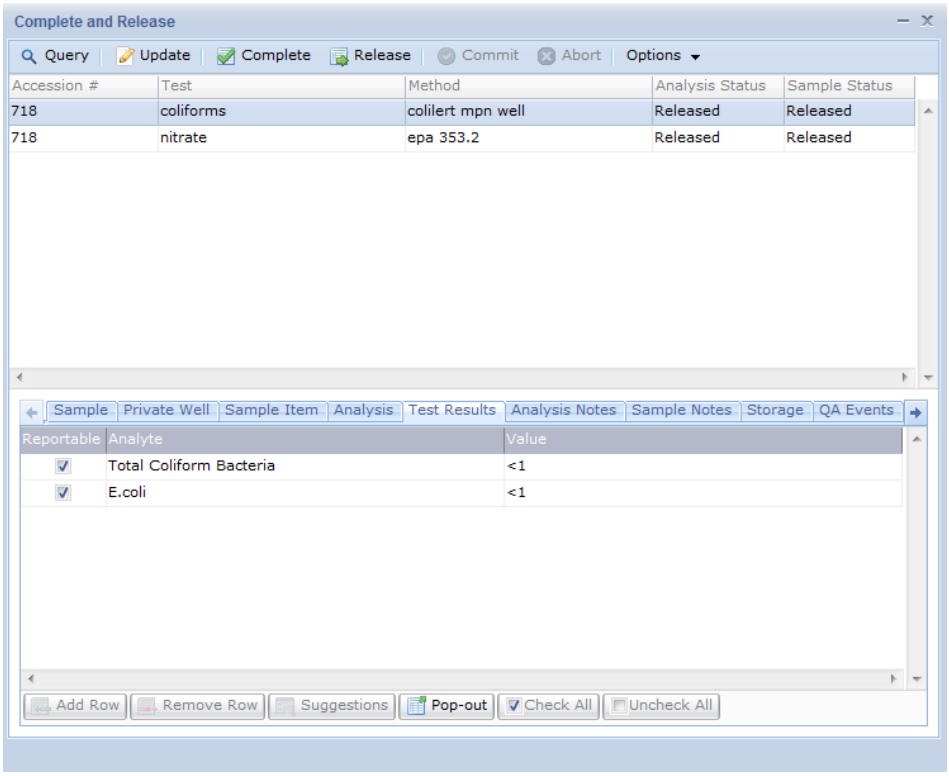


Figure 120 Releasing an Analysis

The Analysis Status changes to “Released”. If this is the final analysis to be released for the sample, the Sample Status also changes to “Released”.

4.10 UNRELEASING AN ANALYSIS

In order to update any analysis or result information on a released analysis, the analysis needs to be unreleased first. Select the analysis from the Complete and Release screen and click on the Unrelease Analysis button on the Options drop-down list.

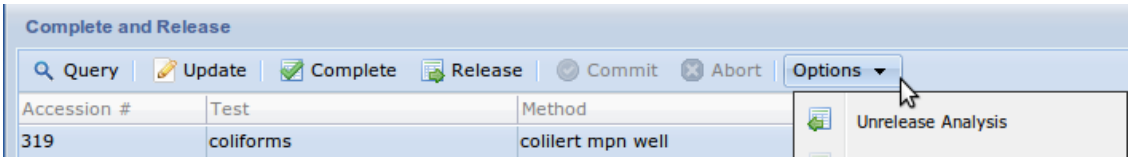


Figure 121 Unreleasing an Analysis

As part of the unrelease process, the system requires an internal note explaining the reason for unreleasing the analysis. The “Unrelease Analysis” message pops up to inform the analyst of this requirement.

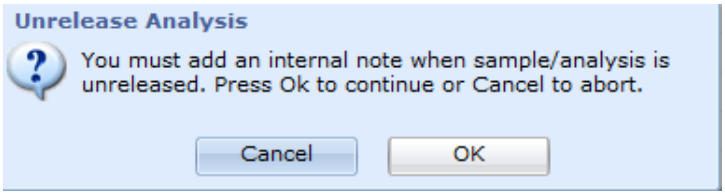


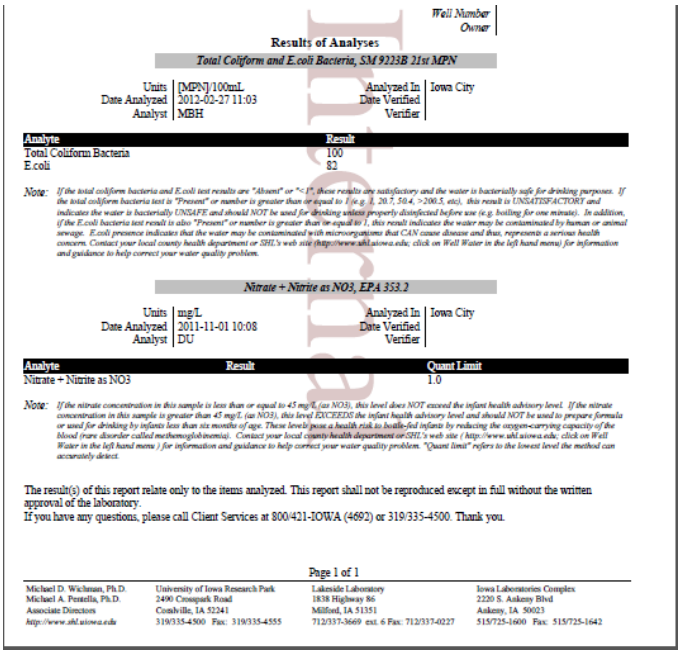
Figure 122 Unreleasing an Analysis Internal Note Requirement

Once an analysis has been unreleased, it will go to completed status and must be re-released. Only users with analysis release/unrelease permission can perform these actions.

4.11 PREVIEW FINAL REPORT OPTION

It is useful for a reviewer to see the completed analysis information and results in a report format before the analysis is released. The Preview Final Report option on the Complete and Release screen was developed for that purpose.

Since this option shows any analysis before it is released, an “Internal” watermark is placed in the background to distinguish between this preview and the actual Final Report.



Well Number
Owner

Results of Analyses

Total Coliform and E.coli Bacteria, SM 9223B 21st MPN

Units [MPN]/100mL
Date Analyzed 2012-02-27 11:03
Analyst MBH
Analyzed In Iowa City
Date Verified
Verifier

Analyte	Result
Total Coliform Bacteria	100
E.coli	82

Note: If the total coliform bacteria and E.coli test results are "Absent" or "<1", these results are satisfactory and the water is bacterially safe for drinking purposes. If the total coliform bacteria test is "Present" or number is greater than or equal to 1 (e.g. 1, 20.7, 50.4, >200.5, etc), this result is UNSATISFACTORY and indicates the water is bacterially UNSAFE and should NOT be used for drinking unless properly disinfected before use (e.g. boiling for one minute). In addition, if the E.coli bacteria test result is also "Present" or number is greater than or equal to 1, this result indicates the water may be contaminated by human or animal sewage. E.coli presence indicates that the water may be contaminated with microorganisms that CAN cause disease and thus, represents a serious health concern. Contact your local county health department or SHL's web site (http://www.uhl.uiowa.edu; click on Well Water in the left hand menu) for information and guidance to help correct your water quality problem.

Nitrate + Nitrite as NO3, EPA 353.2

Units mg/L
Date Analyzed 2011-11-01 10:08
Analyst DU
Analyzed In Iowa City
Date Verified
Verifier

Analyte	Result	Quant Limit
Nitrate + Nitrite as NO3		1.0

Note: If the nitrate concentration in this sample is less than or equal to 45 mg/L (as NO3), this level does NOT exceed the infant health advisory level. If the nitrate concentration in this sample is greater than 45 mg/L (as NO3), this level EXCEEDS the infant health advisory level and should NOT be used to prepare formula or used for drinking by infants less than six months of age. These levels pose a health risk to bottle-fed infants by reducing the oxygen-carrying capacity of the blood (rare disorder called methemoglobinemia). Contact your local county health department or SHL's web site (http://www.uhl.uiowa.edu; click on Well Water in the left hand menu) for information and guidance to help correct your water quality problem. "Quant limit" refers to the lowest level the method can accurately detect.

The result(s) of this report relate only to the items analyzed. This report shall not be reproduced except in full without the written approval of the laboratory.
If you have any questions, please call Client Services at 800/421-IOWA (4692) or 319/335-4500. Thank you.

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Ankeny, IA 50023
515/725-1600 Fax: 515/725-1642

Figure 123 Final Report Preview

An analysis that has not been released can be previewed in Final Report format by checking the **Preview Final Report** checkbox (on the Options drop-drown list). Each analysis that is selected will automatically cause the Final Report Preview to be refreshed.

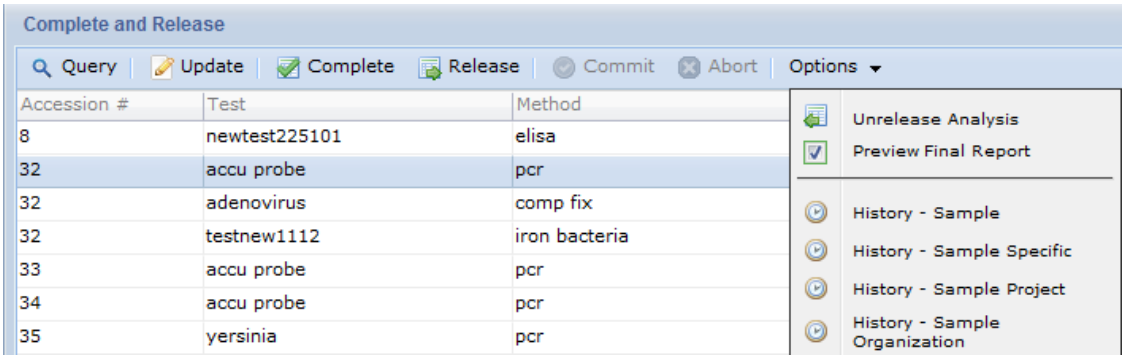


Figure 124 Previewing the Final Report

4.12 SUGGESTIONS

The **Suggestions** button on the bottom of the Test Results tab of the Complete and Release screen can be used to view the permissible value(s) for the selected field. This is useful if the user wishes to see the valid result range or a list of dictionary entries.

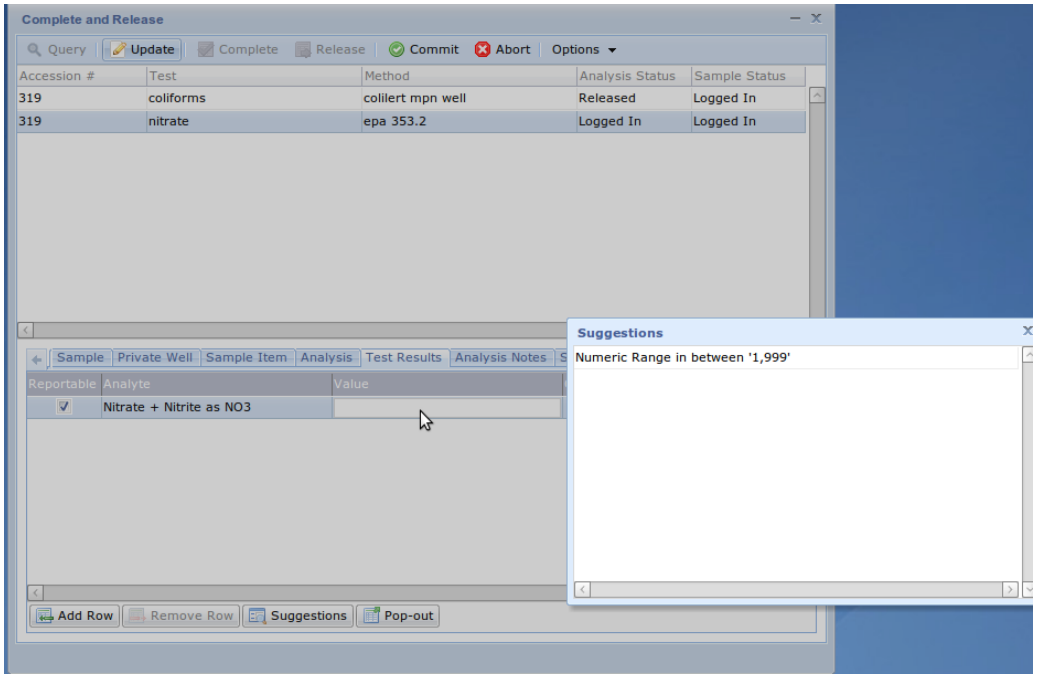


Figure 125 Suggestions for a Numeric Range

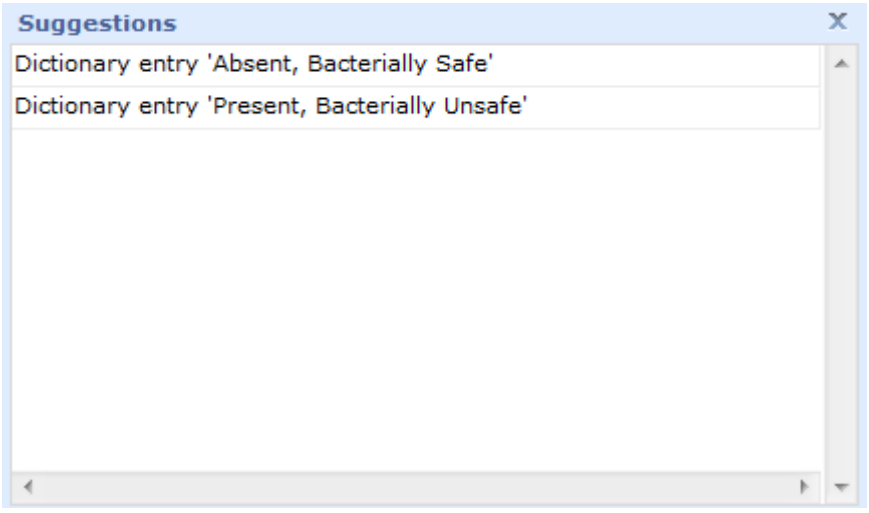


Figure 126 Suggestions for a Qualitative Result

4.13 STORAGE

The Storage screen provides the ability to view, move, and discard items from storage locations. Both sample items (containers) and analysis ??? are tracked through this screen: the Current tab shows all of the items that are presently in the storage location, while the History tab shows all of the items that were formerly stored in that location. This screen is not used for general inventory items such as reagents or standards.

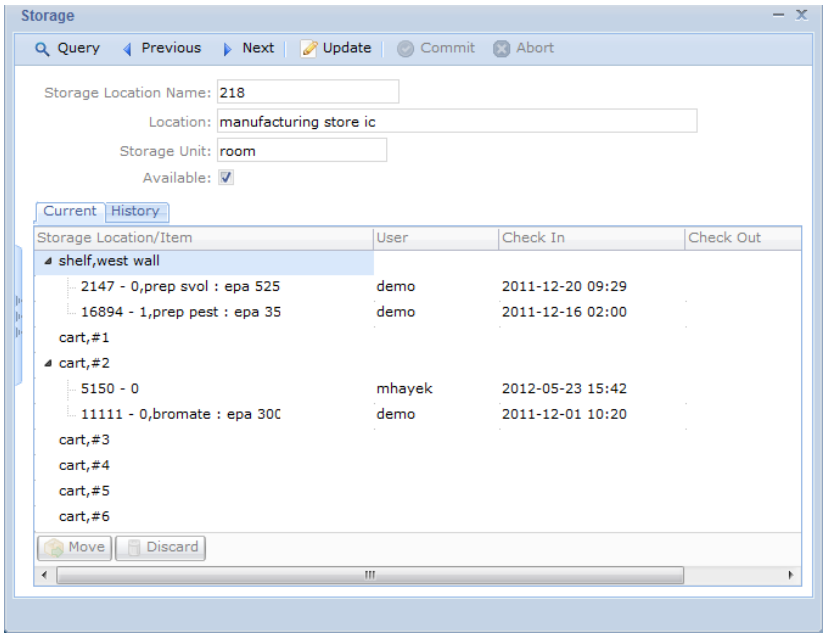


Figure 127 Storage Screen

The fields on the Storage screen are described below. The top section is used for querying and cannot be edited; it is defined by using the Storage Location screen.

Storage Location Name

This is a short name for the storage location and is usually a room number/name.

Location

This field provides a more detailed description of the Storage Location Name (e.g., Bottle Prep, Manufacturing Store Ankeny).

Storage Unit

This field defines the type of storage for this storage location. Examples include bench, cart, fridge, room, shelf, etc. This field is defined by using the Storage Unit screen.

Available

This checkbox displays whether the storage location is available for use.

Current Tab

This tab provides a list of items currently stored in the storage location. Items in that location (e.g., refrigerator, freezer, incubator) should match this list. The Current tab displays each Storage Location and Item, the User who checked-in the item, and the Check In date and time. The Check Out column will usually be blank. Storage locations that have sub-locations (i.e., a refrigerator with shelves) must be expanded to view the sample, sample item, and analysis ??? information.

A sample container is displayed with the format of Accession Number – Sample Item Number, Container name while an analysis ??? is displayed with Accession Number – Sample Item Number, Test Name : Method Name.

History Tab

The History tab displays items that were formerly stored in that location. This provides a permanent record for auditing purposes; showing a chain-of-custody for sample items/analyses ??? . The columns found in this tab show the Storage Location, Item information, the User who checked-in the item, the Check In date and time, and the Check Out date and time.

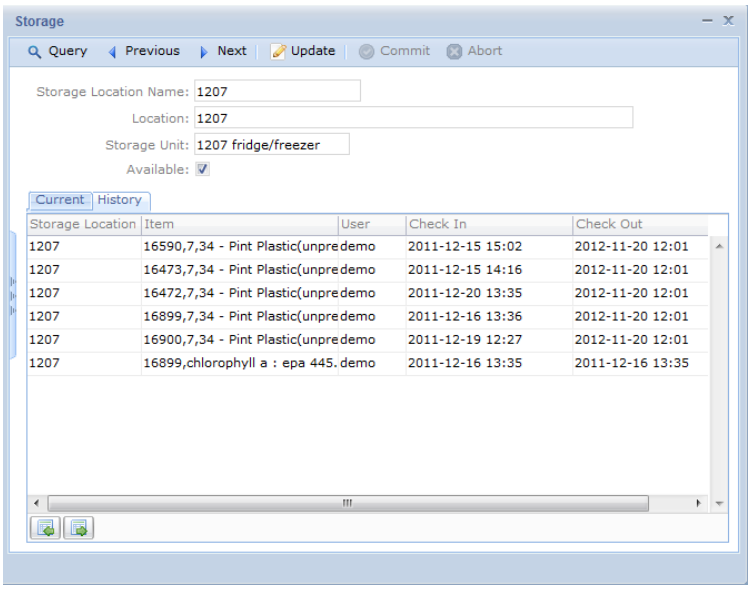


Figure 128 Storage Screen - History Tab

4.13.1 MOVING ITEMS TO A NEW STORAGE LOCATION

Item(s) from a storage location can be moved to another storage location or discarded. Multiple items can be moved by **Ctrl**-selecting or **Shift**-selecting them, and then, clicking the **Move** button.

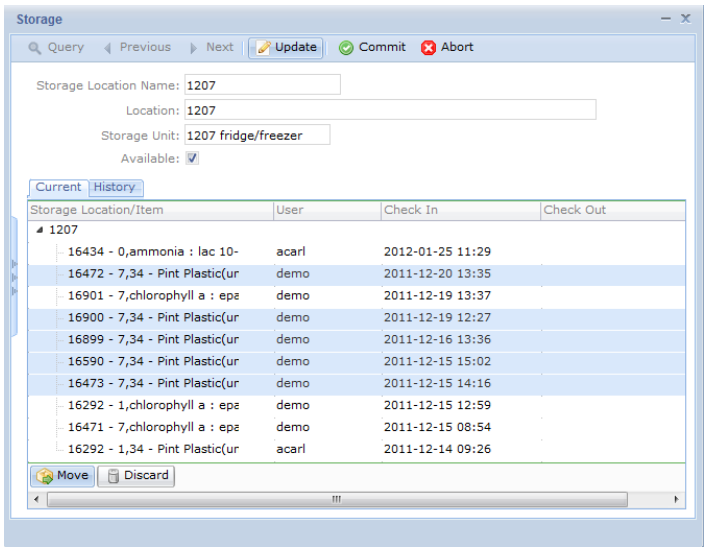


Figure 129 Moving Items to a New Storage Location

The Storage Location Selection screen will pop up. Select the new storage location and click **OK**.

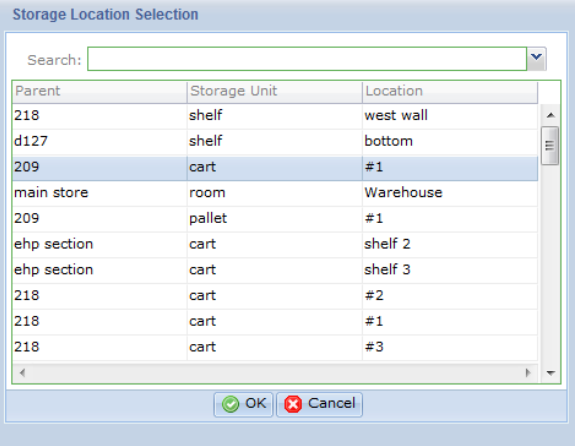


Figure 130 Storage Location Selection Screen

The moved items will be time stamped with the current date-time in the Check Out column and will be checked into the new location concurrently. The moved items will not be displayed in the Current tab of their former location after the screen refreshes. They will instead be displayed in the History tab.

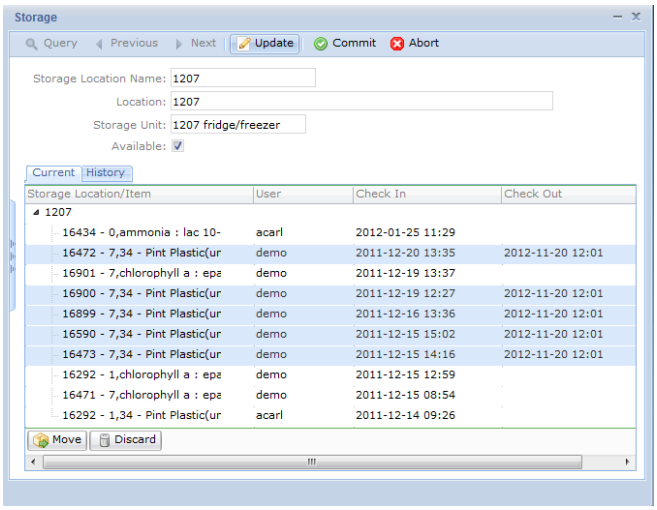


Figure 131 Moved Items Checked-Out of Former Location

4.13.2 DISCARDING ITEMS

Item(s) from a storage location can also be discarded. Multiple items can be discarded by **Ctrl**-selecting or **Shift**-selecting them, and then, clicking the **Discard** button. The difference between discarding and moving items is that discarding does not check the items into a new storage location. They are permanently removed from the LIMS. A record of where these discarded items were formerly stored will still be viewable through the History tab(s) of their former location(s).

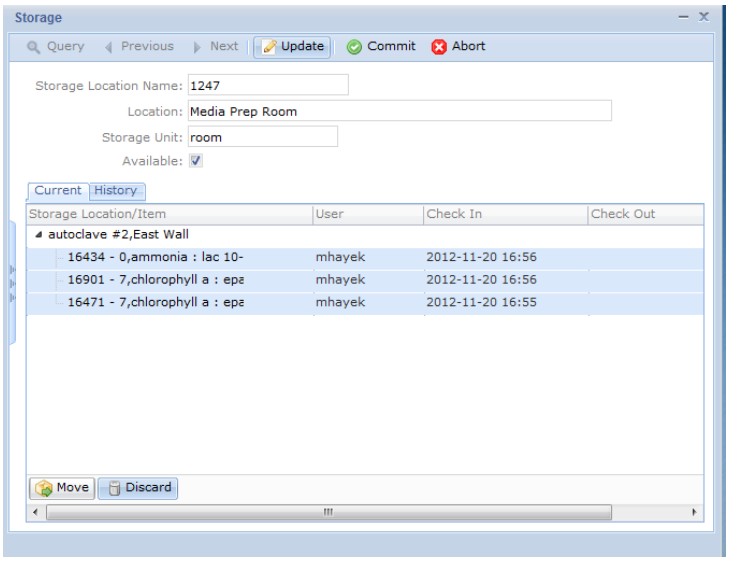


Figure 132 Discarding Items

Laboratories often desire to maintain logs of materials that are autoclaved, discarded, or sent to other agencies for containment. This can be achieved by creating storage locations such as “autoclave”, “chem waste pickup”, etc., moving sample items/analyses ??? to that location first, and then discarding these items from there. Once again, this will provide a permanent record for auditing purposes and provide evidence of chain-of-custody for sample items/analyses ??? .

4.14 QC

This screen is being redeveloped.

4.15 ANALYTE PARAMETER

This screen is used to define a range of performance criteria over a period of time for a set of analytes such as those defined in tests, QCs, or associated with the performance of a provider.

The fields of the Analyte Parameter screen are described below.

Type

Currently, there are two types of analyte parameters implemented in the LIMS: Test and QC. One of the types must be selected for a query to be executed. The type specifies as to whether the selected screen applies to a test, QC, or provider.

Name

This field contains the name of the test, QC, or provider to which the analyte parameters are associated. The test name that is displayed consists of the paired test and method names. The QC name that is displayed consists of the QC name followed by its Id in parentheses. The provider name consists of first and last name.

Active

This checkbox denotes whether the analyte parameter is currently defined and usable for calculations.

Analyte

This field specifies the analyte from the test, QC, or provider.

Sample Type

This field can be used to further restrict an analyte parameter by type of sample (drinking water, liquid, solid, non-drinking water, etc.)

Begin Date

This is the initial date and time that the parameter(s) for the corresponding analyte were available to be used in the system.

End Date

This is the final date and time that the parameter(s) for the corresponding analyte can be used (or were used) in the system.

P1, P2, P3

These fields contain values that are specific to the selected test/QC/provider and analyte. These values are dependent on how that information is used, e.g. they can represent min, max, and average % recovery, lower control limit (LCL), UCL, and mean for QC Charting Analyte Parameter (fixed) option, etc.

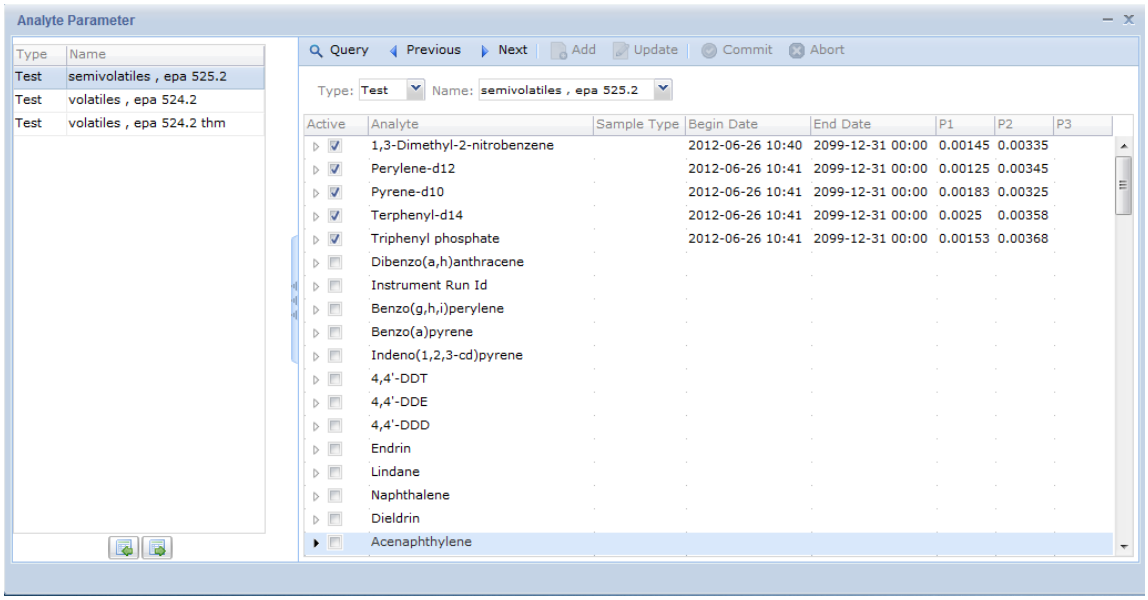


Figure 133 Test Analyte Parameters

CHAPTER 5. WORKSHEETS

OpenELIS uses an electronic worksheet (bench sheet) to organize and manage laboratory runs or batches. There are many benefits to using an electronic worksheet including reduction in transcription errors, ability to provide automatic calculations, and to easily store and retrieve a significant amount of data. In general, electronic worksheets provide the following functions:

1. The ability to capture and retain all of the raw instrument data per analyte while transferring only a subset to the analysis results
2. Capture and retain QC data
3. Link QC data to analyses
4. Worksheet runs can be tied to the instrument to capture instrument usage
5. Worksheets can be linked to provide continuous calibration or to link a QC validation worksheet to analytical runs
6. Document failed runs, obtain statistics on QCs used and the number of times an analysis has been run, and view the entire run when releasing the analysis

The additional benefit to using an electronic worksheet is to easily create control charts. See QC CHART for a complete description of this process.

5.1 WORKSHEET CREATION

The initial step to creating any worksheet utilizes the Worksheet Creation module. The link to the Worksheet Creation module is located on the Analysis Menu. The steps below illustrate how to create a worksheet.

1. Select the Worksheet Creation module from the Analysis Menu. The Worksheet Creation Lookup screen will appear on top of the Worksheet Creation screen to aid in the location of samples to be added to the worksheet that is being built.
2. Query by the Test/Method of the analyses which will be run. Select the desired analysis status. While the analysis status normally selected will be “Logged In”, other statuses such as “Requeued” may also be chosen when desired. It is possible to query by several other fields, if necessary. Click the **Search** button.

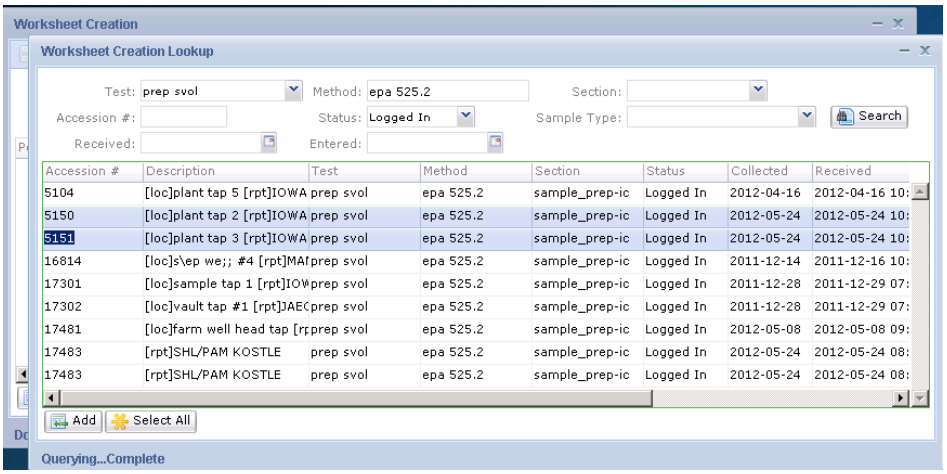


Figure 134 Worksheet Creation Lookup Screen

3. **Ctrl**-select or **Shift**-select the analysis rows to add to the worksheet. Alternatively, the **Select All** button can be used to add all of the analyses from the query.
4. Click the **Add** button.
5. If there are QCs built into the test definition, OpenELIS will attempt to load them onto the worksheet that is being created. (See WORKSHEET LAYOUT TAB of the test definition for more information.) If there is more than one active lot in the LIMS for a particular QC, a warning message will pop up stating this fact.

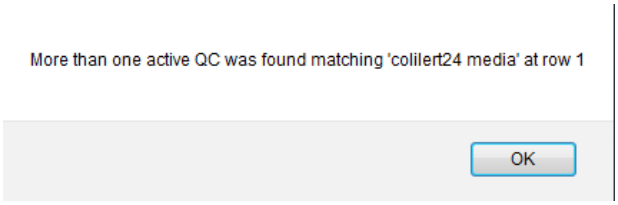


Figure 135 QC Warning Message

6. After **OK** is clicked, a QC Lookup screen will pop up that allows the user to select the QC with the lot number that is appropriate for her use. Click **OK** and this specific QC/Lot Number will be added to the worksheet.

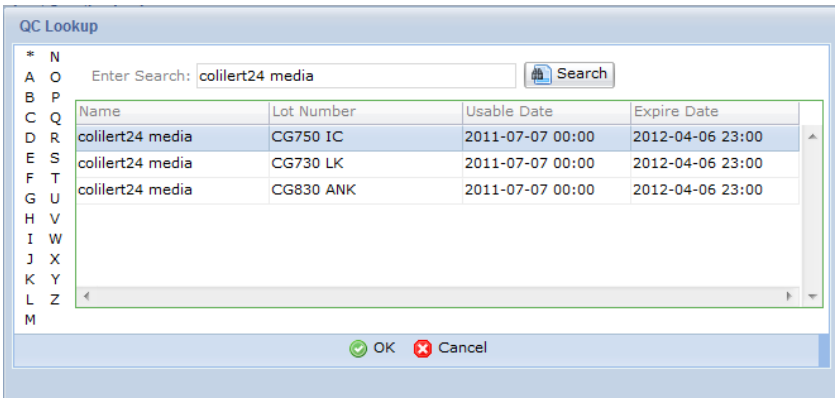


Figure 136 QC Lookup Screen

7. Selected analyses and any QCs that are associated with their test definitions are placed on the Worksheet Creation screen. QCs have an Accession # with a format of "worksheet_number.position_number". When the worksheet is saved the "X" in the QC Accession # is replaced with the Worksheet #. For example, a QC with an Accession # of X.2 means that the QC has been placed in Position 2 on the worksheet that is being created. After the worksheet is saved the Accession # might change to 932.2, meaning that the QC occupies Position 2 on Worksheet # 932.

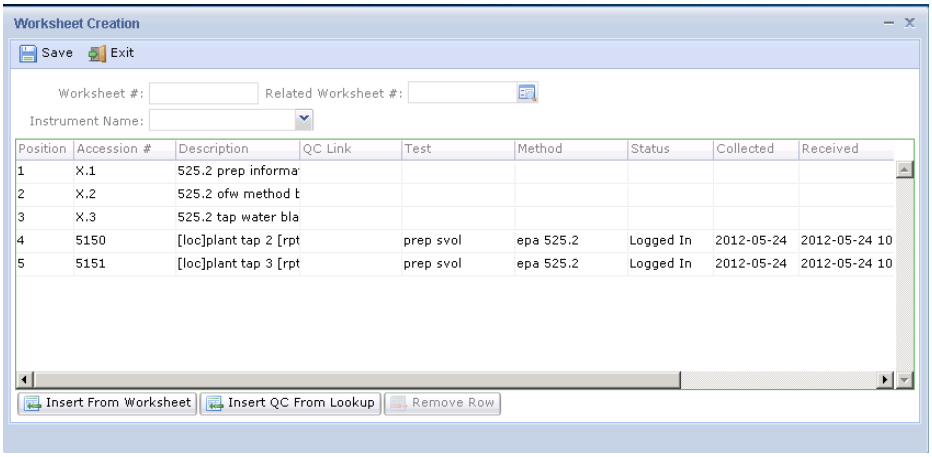


Figure 137 Worksheet Creation Screen

8. It is possible to re-query for analyses to be added to the worksheet as many times as necessary. Go back to Step 2 to repeat this process. Some analysts

perform separate queries in order to add “Requeued” analyses first to their worksheets, followed by “Logged In” analyses, or vice-versa.

9. If the worksheet has been created satisfactorily, skip to Step 13. If additional QCs need to be inserted, click the **Insert QC From Lookup** button.
10. The QC Lookup screen will pop-up over the Worksheet Creation screen. Query for the desired QC by typing the beginning of its name in the Enter Search box or clicking on the first letter of its name in the sidebar. Click the **Search** button.
11. Select the desired QC(s) and click **OK**.

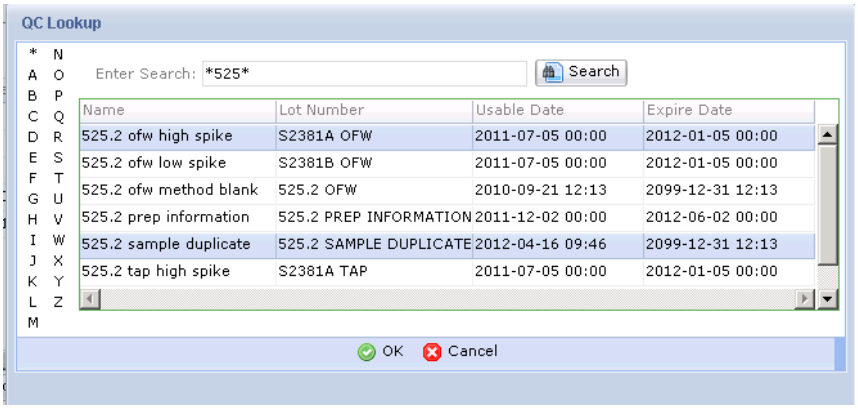


Figure 138 QC Lookup Screen

12. Additional QCs that are selected from the QC Lookup screen are automatically added to the first available positions on the Worksheet Creation screen.

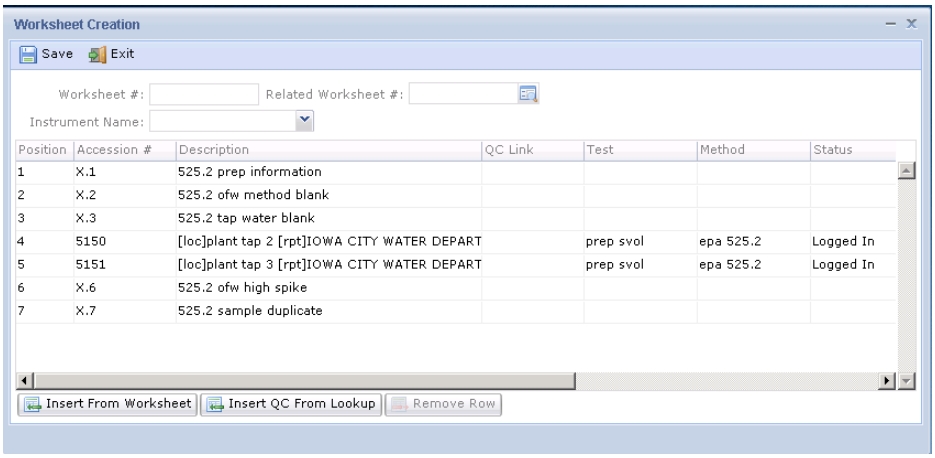


Figure 139 Worksheet Creation Screen with Two Additional QCs Added at the End

13. When adding a sample duplicate QC, click on the corresponding QC Link field to select the Accession # of the sample for which it is a duplicate.

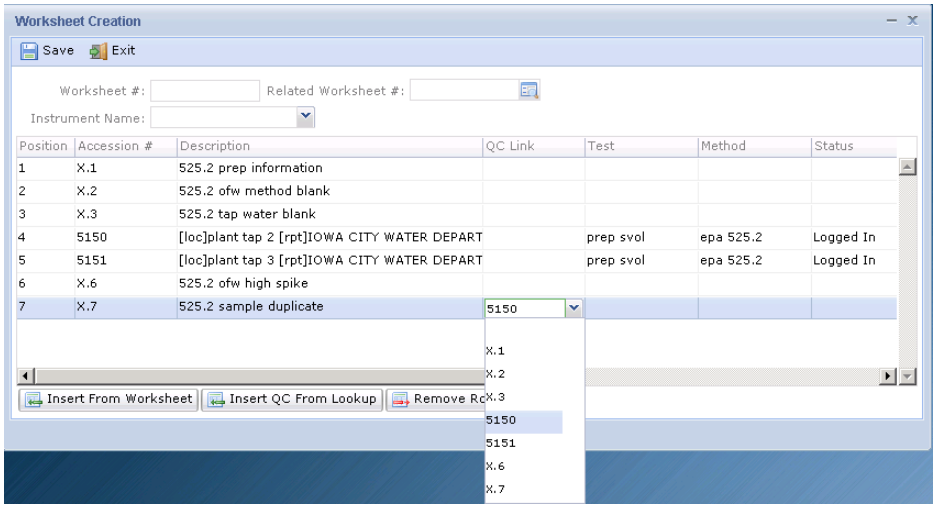


Figure 140 Inserting a QC Link

14. Analyses rows from another worksheet could be inserted into the worksheet that is being created. If this process is not desired, skip to Step 20.
15. To do this, click the **Insert From Worksheet** button on the Worksheet Creation screen.
16. Enter the Worksheet # (or another search parameter) into the Worksheet Lookup screen that pops up and click **Search**.
17. Click on the desired worksheet from the list and click **Select**.

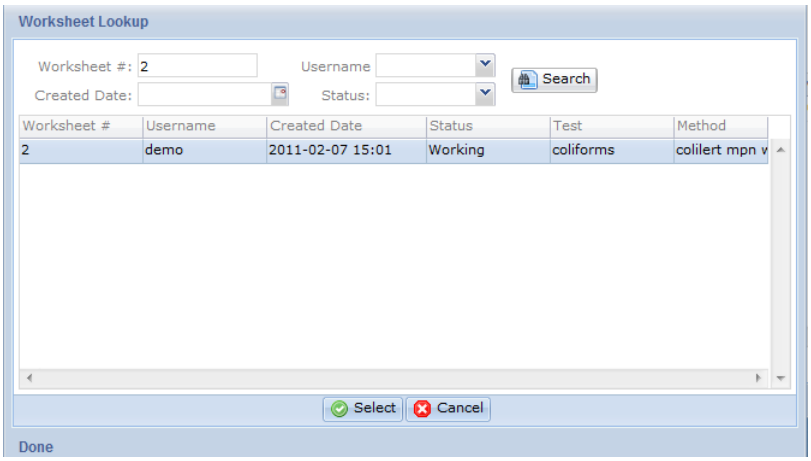


Figure 141 Worksheet Lookup Screen

18. Select the rows from the Worksheet Row Selection Screen that will be added to the new worksheet and click **OK**.

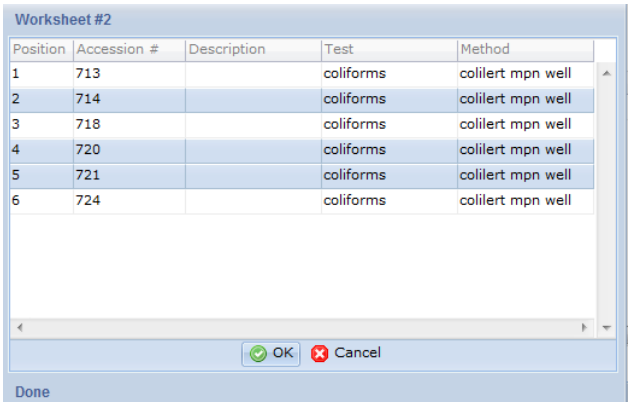


Figure 142 Worksheet Row Selection Screen

19. These selected analyses will be added to the first available rows on the Worksheet Creation screen.
20. Any of the fields of the Worksheet Creation screen can be used to sort the analyses list. Once sorted, the saved worksheet will maintain that order.

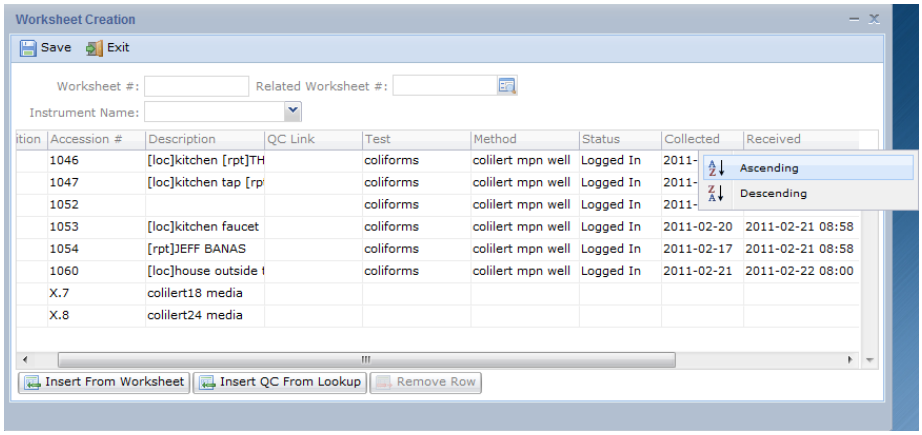


Figure 143 Sorting Analyses on the Worksheet Creation Screen

21. Enter/select the Related Worksheet # to link this worksheet to another worksheet, if applicable.
22. Select the Instrument Name of the instrument that is being used to analyze the run, if applicable.

23. Review the Worksheet Creation screen and click the **Save** button. The following message pops up stating that worksheets cannot be changed once they have been saved. Click the **Save** button on the message.

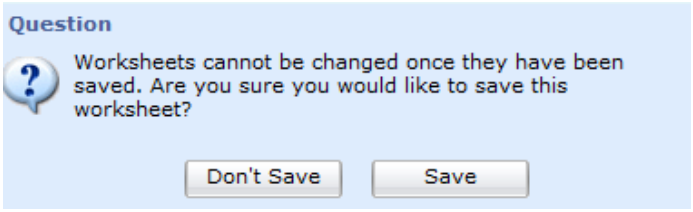


Figure 144 Worksheet Save Warning

24. The Worksheet # is assigned by the LIMS. It is suggested to note the Worksheet # for future use. Click the **Exit** button.
25. Complete the laboratory work.

See WORKSHEET CREATION FOR A PREP TEST and ANALYTICAL WORKSHEET CREATION for worksheet creation examples.

5.1.1 ORDER OF QCs ADDED TO WORKSHEETS

There are some special rules that apply to the order that QC's are added onto a worksheet. These rules follow:

1. QCs will automatically be added to the end of the list if no row (position) is selected when **Insert QC From Lookup** is clicked. See Worksheet Creation Screen with Two Additional QCs Added at the End.
2. If a row (position) is selected, the QC will be added immediately after that row unless there are fixed position QCs present. In that case the QC will be added after the fixed position QCs. As an example, when Row 4 is selected, QC "525.2 ofw low spike" is added to Row 5; Accession #'s X.6 and X.7 stay put because they are fixed-row QCs; and the analysis with Accession # 5151 is forced to move down to Position 8.

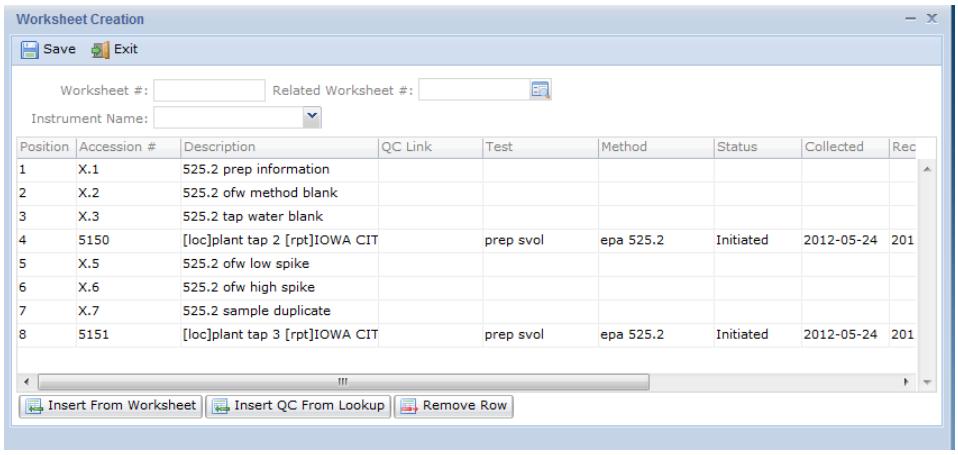


Figure 145 Inserting a QC After a Specific Row

3. If Position 5 (containing QC 525.2 ofw low spike) is removed, a warning Question box pops up.

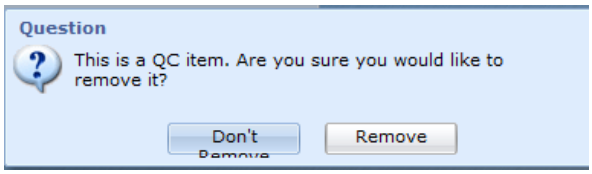


Figure 146 QC Removal Warning

4. If the QC is removed, Accession # 5151 vacates Position 8 and moves back up to Position 5, thus, returning to the original order on the worksheet shown in Worksheet Creation Screen with Two Additional QCs Added at the End.
5. It is important to double-check QC links after adding or removing rows to make sure that they have not disappeared. QC links can always be re-added before saving the worksheet. See Inserting a QC Link for this process.

5.2 WORKSHEET COMPLETION

The Worksheet Completion module allows the laboratory analyst to process a worksheet by entering results, reviewing, and completing analyses. The steps below illustrate how to complete a worksheet.

1. Click on the Worksheet Completion module in the Analysis Menu.

2. The Worksheet Lookup screen pops up on top of the Worksheet Completion screen.
3. A created worksheet can be queried by Worksheet #, Username, Created Date, and/or Status. Worksheet statuses consist of Working, Done, Failed Run, and Void. Normally, an analyst will query for a worksheet in Working status. Click the **Search** button. Highlight the desired worksheet from the table in the lower pane and click the **Select** button. The Worksheet Lookup screen automatically closes allowing the Worksheet Completion screen to be displayed.

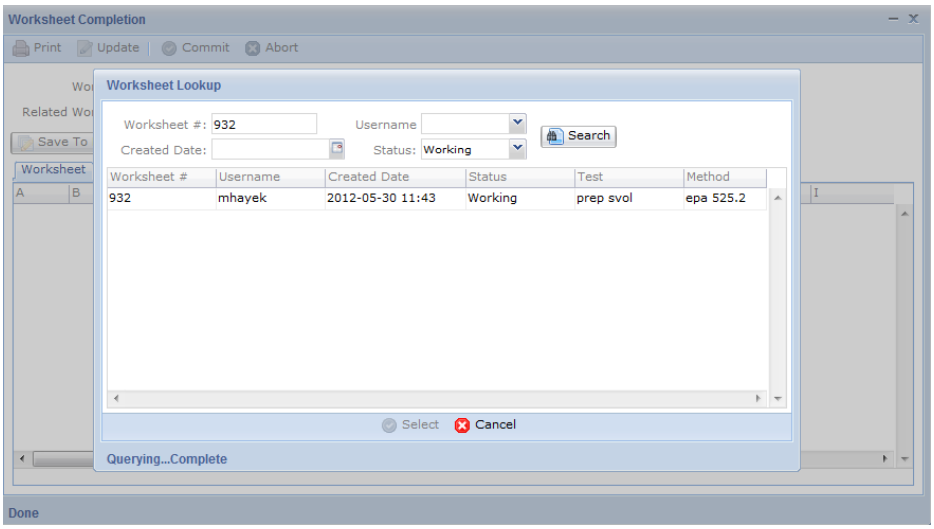


Figure 147 Worksheet Lookup Screen

4. All of the information and the analytes from the test definition are loaded into the Worksheet Completion screen. This screen displays the Worksheet #, Status, Related Worksheet #, and Instrument Name in its top pane. The bottom pane consists of two tabs: Worksheet and Note. The Worksheet tab has the same columns and values that are found in the Excel version of the worksheet. The Worksheet Completion screen is only a viewer – you cannot edit the worksheet from this screen. In order to edit the worksheet it must be saved to an Excel file. Click the **Save To Excel File** button for this purpose. The location of the saved Excel file on the network drive will be specified in the Status Area of the screen.

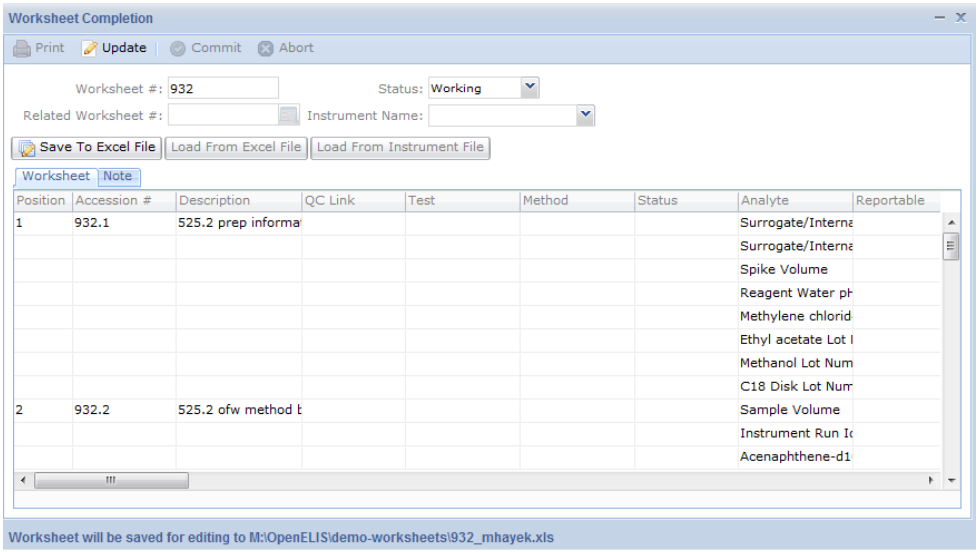


Figure 148 Worksheet Completion Screen

5. The Note tab on the Worksheet Completion screen is used to write any notes that might be related to the run. This tab is intended to contain notes pertaining to the worksheet (e.g., an explanation of why the run failed). Click **Update** and then **Add Note**. The Standard Note Selection screen will pop up. See STANDARD NOTE SELECTION SCREEN for more information on how to use standard notes.

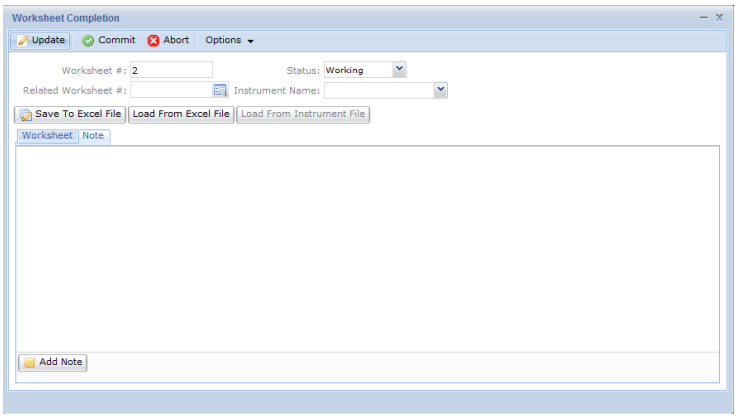


Figure 149 Note Tab of Worksheet Completion Screen

6. Open the Excel worksheet file. If an Excel Security Warning pops up saying "Macros have been disabled.", click on the **Enable Content** button.
7. Click the **Yes** button on the Security Warning pop-up message: "Do you want to make this file a Trusted Document?". Excel has the capability to automatically enable macros for certain Excel files. Ask your IT group on how to enable this option.
8. With each Position, Accession #, and Description are attached rows of analytes.

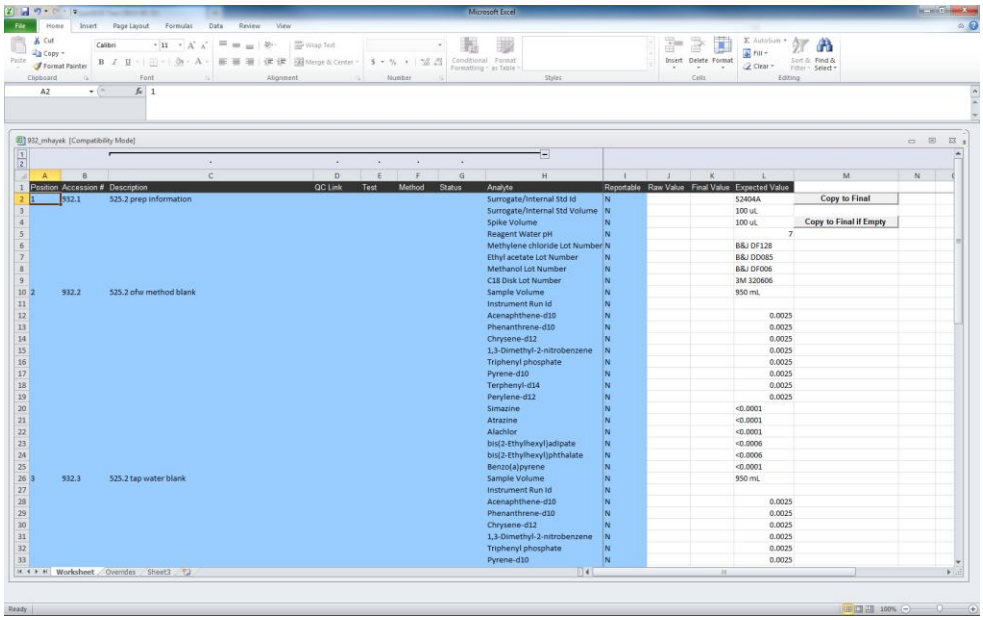


Figure 150 Excel Worksheet

9. Every cell in blue cannot be edited. It is write-protected.
10. The bar at the top can be used to collapse (**-** button) and expand (**+** button) the middle columns of the spreadsheet so that the user can easily edit the values in the white columns on the right side of the spreadsheet.
11. The Status can be changed for an analysis by selecting the appropriate choice from the dropdown list. This is normally only done to change the analysis status to On Hold or Requeue. It is not necessary to change the status of each analysis to Completed, as the system will automatically do this when the Worksheet Completion screen is committed.

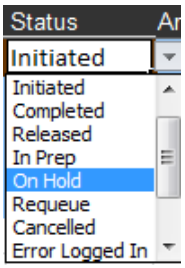


Figure 151 Changing the Analysis Status on the Excel Worksheet

12. The Reportable column can be changed from Y to N or vice versa for each analysis by clicking on the dropdown arrow.

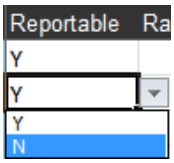


Figure 152 Changing the Reportable Flag for an Analysis on the Excel Worksheet

13. Expected Values include information, defaults, concentrations for chemical analytes, surrogates and internal standards, target analytes for a method blank, etc.
14. Raw Values may include any measurement (i.e., volume measurements, pH measurements, or measurements that came off an analytical instrument).
15. Some considerations for Raw Values include:
    a. They could be different from the Final Values. Some tests require multiple dilutions and the Raw Value is not representative of the Final Value.
    b. If the Raw Value is not entered into the worksheet, the data that came off the instrument will not be captured. Only the Final Value will remain stored in the LIMS. If another user changes the Final Value, the previous Final Value is lost, and there will not be any raw instrument values to view or compare.
    c. The Raw Value Is not rounded in the Excel worksheet but may be rounded to compute the Final Value if it is specified in the test definition.

16. Every worksheet has several built-in Macro buttons to perform routine calculations or data transfers. The **Copy to Final** button copies all values from the Raw Value or Calculated Value column to the Final Value column. All of these types of values are saved back to the LIMS. The Final Value is what goes into the Value field on the Test Results tab of the full sample login and Complete and Release screens and are the values that are reported. Final Values can be manually overridden (e.g., to report an average of calculated values).

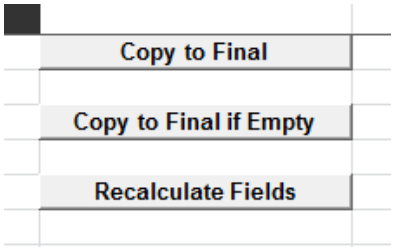
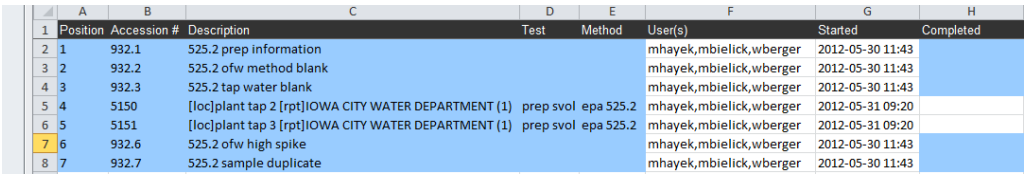


Figure 153 Excel Macro Buttons

17. The **Copy to Final if Empty** button copies values from the Raw Value (or Calculated Value) column to the Final Value column, only for those Final Value cells that are empty. This is used so that values that are already entered in the Final Value column are not overridden.
18. The **Recalculate Fields** button does a number of checks and calculates the macros (i.e., completes the Calculated Value column, compares results to Range Low and Range High values, determines Calculated % Recovery based on Expected Value, etc.)
19. The Overrides tab of an Excel worksheet allows the user to override several pieces of information for an analysis. By default the logged-in user is credited with completing the analysis when the Worksheet Completion screen is committed. Multiple usernames can be entered in the User(s) cells on the Overrides tab to allow credit for completion of the analysis to be shared. The logged-in user's username must be entered for he/she to receive credit in such a situation. A network username should be entered, followed by a comma, and with no spaces between usernames. Make sure it is copied down for each analysis row, if appropriate.



	A	B	C	D	E	F	G	H
1	Position	Accession #	Description	Test	Method	User(s)	Started	Completed
2	1	932.1	525.2 prep information			mhayek,mbielick,wberger	2012-05-30 11:43	
3	2	932.2	525.2 ofw method blank			mhayek,mbielick,wberger	2012-05-30 11:43	
4	3	932.3	525.2 tap water blank			mhayek,mbielick,wberger	2012-05-30 11:43	
5	4	5150	[loc]plant tap 2 [rpt]IOWA CITY WATER DEPARTMENT (1)	prep svol	epa 525.2	mhayek,mbielick,wberger	2012-05-31 09:20	
6	5	5151	[loc]plant tap 3 [rpt]IOWA CITY WATER DEPARTMENT (1)	prep svol	epa 525.2	mhayek,mbielick,wberger	2012-05-31 09:20	
7	6	932.6	525.2 ofw high spike			mhayek,mbielick,wberger	2012-05-30 11:43	
8	7	932.7	525.2 sample duplicate			mhayek,mbielick,wberger	2012-05-30 11:43	

Figure 154 Overrides Tab of an Excel Worksheet

20. The Overrides tab of the Excel worksheet is also used to correct the Started date and time for an analysis to the actual date and time that the analysis began. The Started date and time is set by default to the worksheet creation date and time.
21. The Completed date and time for each analysis can also be overridden, if necessary, using the Overrides tab. The Completed date and time is set by default to the date and time that the Worksheet Completion screen is committed.
22. When finished make sure to save and close the Excel file so that it doesn't sit on the network drive indefinitely.
23. Open the Worksheet Completion module. Enter the Worksheet # (or another search parameter) into the Worksheet Lookup screen and click **Search**.
24. Select the desired worksheet and click **Select**.
25. Click the **Update** button on the Worksheet Completion screen. Click the **Load From Excel File** button. The Worksheet Completion screen is populated with the values from the completed Excel worksheet.
26. After reviewing the Worksheet Completion Screen, the status can be changed to one of the following:
    a. **Done**. This sets all of the analyses to Completed status if possible; if an analysis has an analyte with a required result but no result value, then the analysis cannot be changed to completed. Completed analysis must still be Released. See RELEASING AN ANALYSIS for more information on this procedure.
    b. **Failed Run**. This status will change all of the worksheet's analyses to Requeued status so that they may be rerun at a later time.
    c. **Void**. This status will set all of the analyses back to Logged In status.
27. Click **Commit**. This will save the worksheet and all the information back to the database.

See WORKSHEET COMPLETION FOR A PREP TEST and ANALYTICAL WORKSHEET COMPLETION for worksheet completion examples.

CHAPTER 6. ORGANIZATIONS, PROJECTS, AND PROVIDERS

Organization, provider, and project information form the basis for many of the client interactions with the system. For example, the sample “Report To” organization provides the necessary permissions for external users to view their results through the web portal; projects group samples for disease outbreak/case management or to provide billing/contract discounts. Similarly, the provider information offers hospitals the ability, through electronic data exchange, to notify physicians when their results are available.

Organization, project and provider information can be queried, added, or updated through these three specific screens. Only select personnel will have permission to update or add these records, whereas, most lab personnel will only be allowed to query this information.

Querying for organization, project, or provider information works in the same manner as any of the other OpenELIS queries. Clicking on the * at the top of the Query Sidebar displays all of the current records in alphanumeric order. The user can page through the records or click on the initial letter/number of the name of the organization, project, or provider. Alternatively, a query can be conducted using most fields. See QUERY SIDEBAR and QUERY FUNCTION for more information on performing queries.

Organization, project, and provider information can be added in much the same way in which other records in OpenELIS are added and updated. A description of the fields on each of the three screens follows.

6.1 ORGANIZATION

The Organization screen contains information about all of the clients that interact with the laboratory. This includes diverse organizations such as environmental regulatory agencies, private businesses, municipalities, hospitals, physician offices, etc. Due to the pervasive effect that organization information has on the reporting, billing, and statistical analysis processes, only select personnel will have permission to update or add these records. The duplication of organization records is allowed in OpenELIS, but this action will most likely lead to confusion. It should only be performed as a last resort.

Having duplicate organizations will also lead to other errors, such as samples being assigned to a wrong organization. This has confidentiality implications both in terms of sending a final report to an incorrect organization and providing immediate web access to someone else's results.

Many laboratories have developed a standard process for adding new organizations to the system which include querying for an organization in multiple ways such as partial name search, looking for all the organization in the same city/address, etc.

The link to the Organization screen is found at the bottom of the Sample Menu.

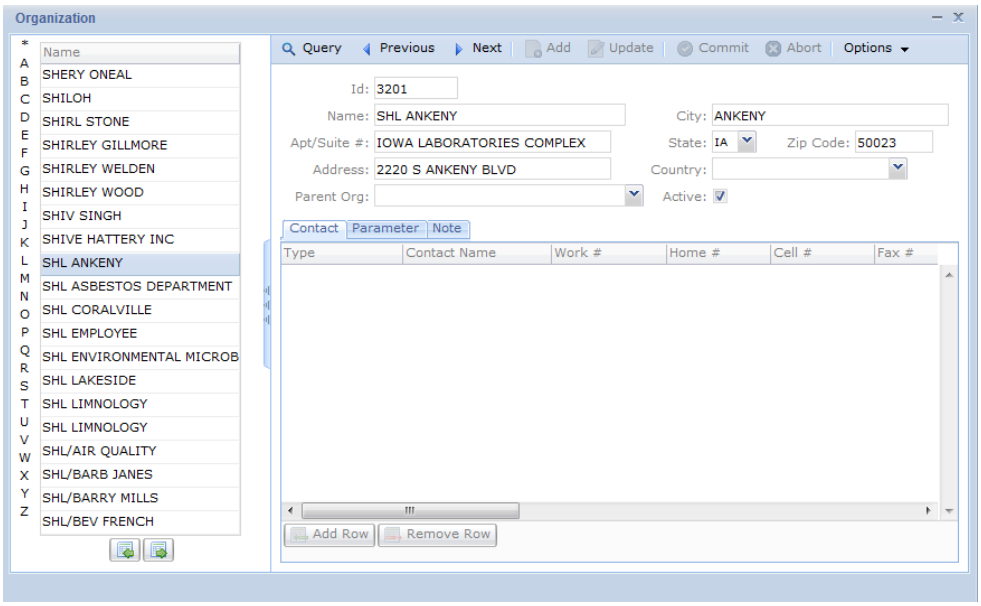


Figure 155 Organization Screen

6.1.1 GENERAL FIELDS

The general fields of the Organization screen are detailed below.

Id

The organization Id is a unique integer that is used to assign permissions for web users to view the results that are reported to that organization. It also serves as the billing Id for an automated billing program.

Name

This field contains the complete name of the client organization.

Apt/Suite #, Address, City, State, Zip Code, and Country

These fields specify the complete address of the client organization.

Parent Organization

Subsidiary organizations can be linked to their parent organization in order to determine overall sample volumes, discounts, and other statistics.

Active

The Active checkbox indicates whether samples can be linked to this organization. For organizations that no longer exist, the laboratory should deactivate the organization. If an organization changes its name or address, the updated information will not only affect future reports but also previously reported samples. This is the correct behavior because the laboratory would want to send an updated final report to the current correct address.

6.1.2 CONTACT TAB

The Contact tab can hold contact information for the organization including the name of the contact person(s), work, home, and cell phone numbers, fax numbers, e-mail addresses, and mailing addresses. Additional contact types can be added through the dictionary table. The **Add Row** button is used to add a contact.

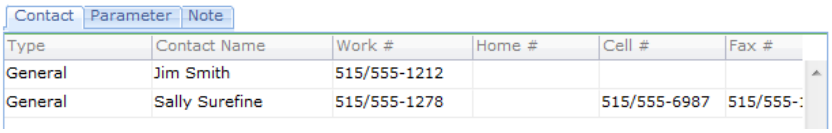


Figure 156 Organization Contact Tab

6.1.3 PARAMETER TAB

This tab is used to set special parameters at the organization level. The Type field specifies the specific name of the parameter, while the Value field contains a related

value, such as a date, e-mail address, or fax number. The **Add Row** button is used to add a parameter. Common organization parameters are detailed below.

Parameter Type	Value	Function of Parameter
Received Report-to Email	E-mail address of web access user	Notifies user that sample has been received at the lab
Released Report-to Email	E-mail address of web access user	Notifies user that sample/analysis has been released by the lab
General FAX Number	Fax number for general use	Fax number that can be used to send any forms, documents, or instructions to the organization
Final Report Fax Number	Fax number of "report to" organization	Instead of printing the Final Report, it faxes the report to this number
Don't Print Final Report	Effective date (yyyy-mm-dd)	Causes the Final Report to not be printed (for paperless reporting)
Hold/Refuse Sample	Effective date (yyyy-mm-dd)	Used to notify lab staff that samples from this organization should be held or refused due to chronic non-payment

Figure 157 Organization Parameters

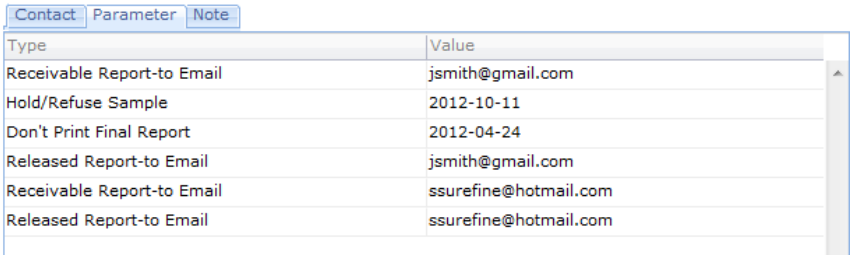


Figure 158 Organization Parameter Tab

6.1.4 NOTE TAB

The Note tab can be used to document a change or log client calls for use by other staff. The **Add Note** button is used to accomplish this task. This brings up the STANDARD NOTE SELECTION SCREEN which is used to enter a note.

Figure 159 Organization Note Tab

6.2 PROJECT

The Project screen contains information about the projects in the LIMS. Projects are utilized to group multiple samples that are related, for example, all the samples collected from a certain river or clean-up site or all the samples collected from an outbreak. Projects

can also play an important role in billing since the project can be tied to a contract or special pricing.

To reduce ambiguity, project names have to be unique. However, a project name can be reused if the previous project is deactivated. This is useful in case the begin/end date for the project or other parameters have changed.

The link to the Project screen is found at the bottom of the Sample Menu.

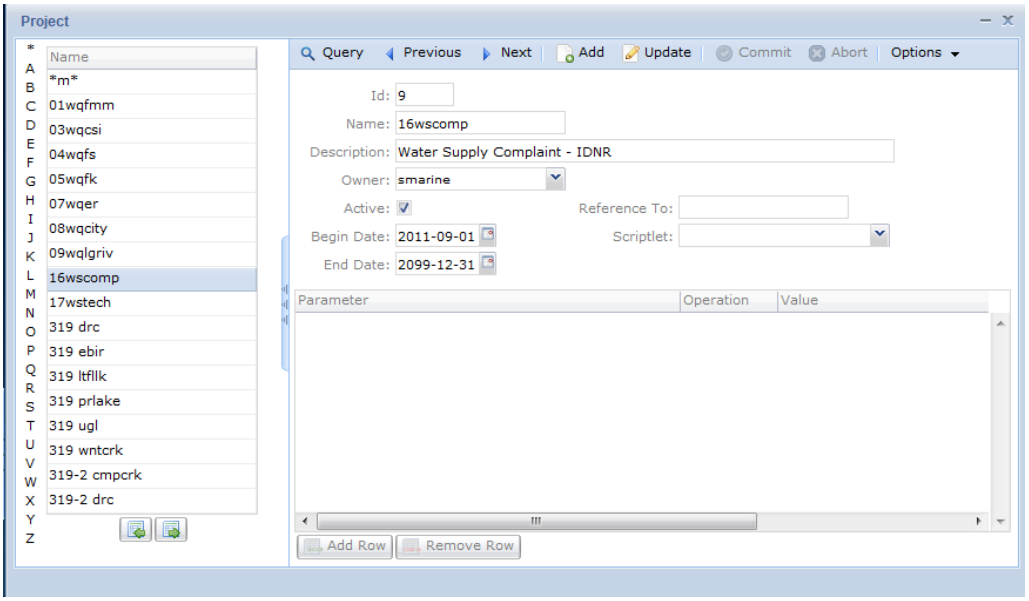


Figure 160 Project Screen

The fields of the Project screen are detailed below.

Id

The project Id is a unique integer assigned to each project. This id is also used to assign permissions for web users to view the results that are assigned to that project.

Name

This is the abbreviated name of the project and it appears on results reports and web access dropdown lists for selection.

Description

This field contains a detailed description of the project.

Owner

The Owner field contains the username of the person responsible for the project in the LIMS.

Active

The Active checkbox indicates whether future samples can be linked to this project. For projects that are no longer current, the laboratory should deactivate the project.

Reference To

This field may contain an external identifier. Examples include an external contract number, a CDC case number, or a CDC outbreak number.

Begin Date

This is the date that the project officially started.

End Date

This is the date that the project is scheduled to terminate.

Scriptlet

This functionality has not yet been implemented.

Parameter Table

This functionality has not yet been implemented.

6.3 PROVIDER

The Provider screen contains demographic information about individual clinical providers. The provider information is used for newborn screening and other clinical samples throughout the system including electronic orders and results.

The link to the Provider screen is found at the bottom of the Sample Menu.

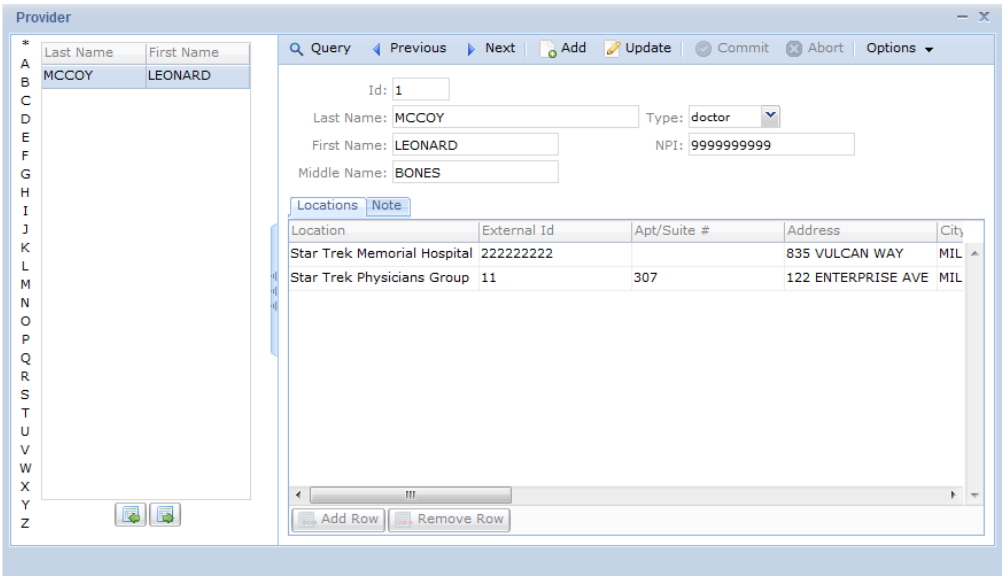


Figure 161 Provider Screen

6.3.1 GENERAL FIELDS

The general fields of the Provider screen are detailed below.

Id

The provider Id is a unique integer that is assigned by OpenELIS.

Last Name, First Name, Middle Name

These fields comprise the complete name of the provider.

Type

This field denotes the type of provider (i.e., doctor, nurse, etc.) Additional provider types can be added through the dictionary table.

NPI

This field contains the National Provider Identifier. It is a unique 10-digit identification number issued to health care providers in the United States by the Centers for Medicare and Medicaid Services (CMS).

6.3.2 LOCATIONS TAB

This tab allows for entering complete contact information for every working location of the provider. A new location can be added by using the **Add Row** button. The fields on this tab include: Location, External ID, Apt/Suite #, Address, City, State, Zip Code, Country, Work #, Home #, Cell #, Fax #, and Email.

The External Id is the identifier for that provider that is assigned by her organization and is used for electronic orders to match provider information.

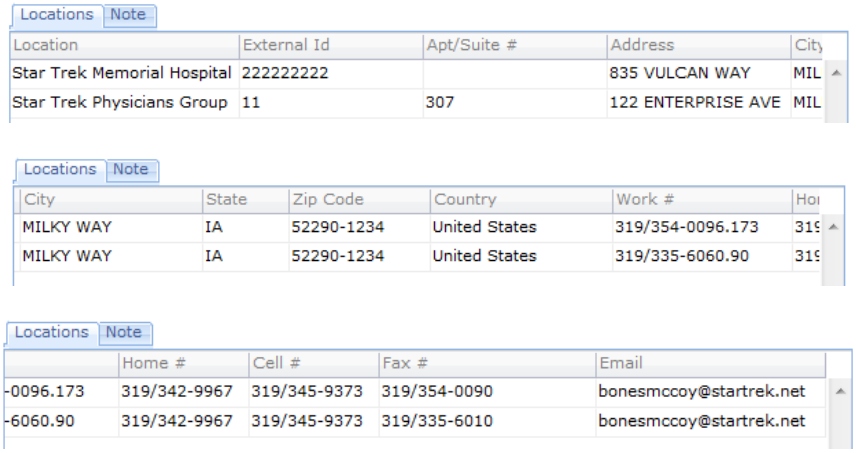


Figure 162 Provider Locations Tab

6.3.3 NOTE TAB

The Note tab can be used to document a change or explain any part of the provider's information. The **Add Note** button is used to accomplish this task. This brings up the STANDARD NOTE SELECTION SCREEN which is used to enter a note.

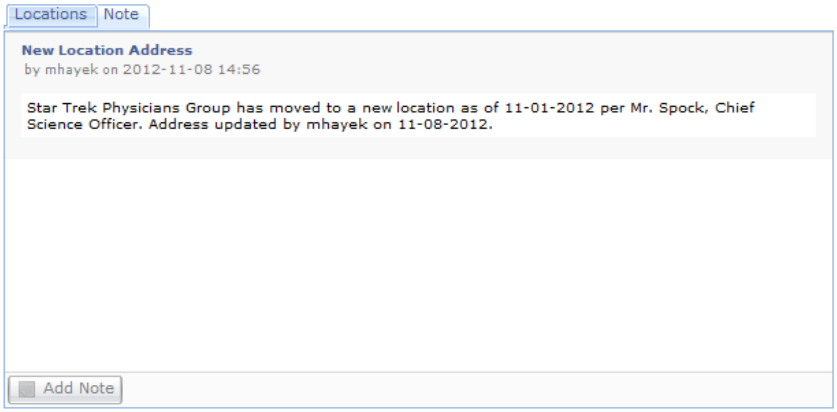


Figure 163 Provider Note Tab

CHAPTER 7. MANAGING INVENTORY AND ORDERS

Many public health laboratories require the capability to manage inventory items in direct support of the testing process, as well as, the ability to send inventory such as kits and media to other organizations.

The inventory and order modules are all conveniently located on the Inventory/Order Menu. These modules include: Internal Order, Vendor Order, Send-out Order, Fill Order, Shipping, Build Kits, Inventory Transfer, Inventory Receipt, Inventory Adjustment, and Inventory Item.

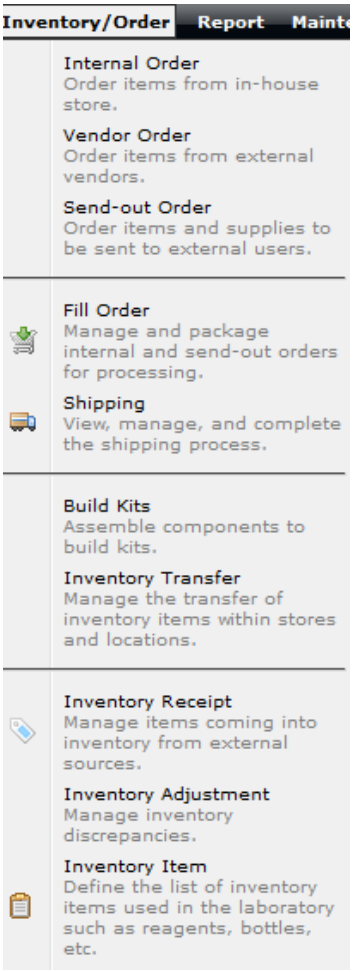


Figure 164 Inventory/Order Menu

7.1 INVENTORY ITEM

The purpose of the Inventory Item module is to define the list of inventory items used in the laboratory such as reagents, containers, instructions, labels, and kits. Inventory items may be queried, updated, and added in the usual manner. See QUERY FUNCTION for more information on general query formats and capabilities.

Before inventory items can be entered into the system, there are two concepts that should be considered, namely “store” and “storage location”. The store is used to define how items are replenished and dispensed. This includes a general store that contains all the inventory items of the laboratory that are purchased and dispensed at vendor quantities – acid in 2.5 liter containers and gauze in quantities of 1000/box. The general store is used to requisition items for laboratory bench use and manufacturing stores.

For laboratories that build kits or manufacture media or reagents, additional manufacturing stores will be setup to manage the inventory in smaller, dispensed quantities. For example, to build a bacterial water kit you will need a bottle, a Styrofoam mailer, and a chipboard bottle mailer all in a quantity of one, which will not be available in the general store. The manufacturing store is used to hold a subset of general store items that are dispensed at the minimum level needed to build any kits in that store. Using the acid example from above, the manufacturing store would transfer acid from the general store in quantities of 2500 mL while dispensing it in quantities of 1 mL.

The concept of the store should not be confused with storage location. The items in a store can be placed in one or more storage locations, even at separate geographical locations. Each storage location will maintain its own quantity on hand and lot information (depending on item parameters).

7.1.1 GENERAL FIELDS

The link to the Inventory Item module is found in the bottom section of the Inventory/Order Menu.

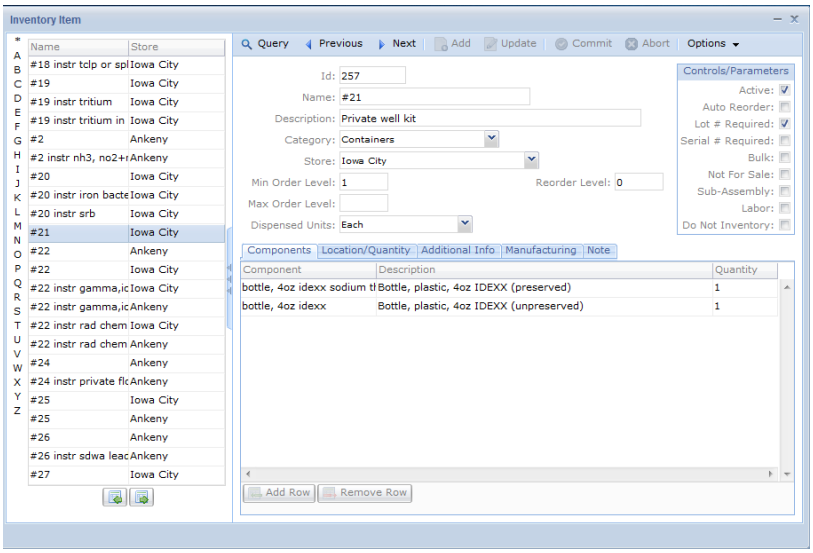


Figure 165 Inventory Item Screen

The fields in the upper pane of the Inventory Item Screen include:

Id

The Inventory Item Id is a unique identifier assigned by the LIMS.

Name

This is the abbreviated name of the inventory item and can consist of a number and/or words (e.g., “#17”, “#15 trip blank”, or “label, hazard, #8”. This field appears in all the dropdowns on the other inventory and order screens.

Description

This field contains a detailed description of the inventory item, such as “Private well kit”, “instr for atrazine immunoassay”, or “Bottle, Plastic, 120ml clear IDEXX (sodium thiosulfate)”.

Category

This field specifies the classification of the inventory item (i.e., General Lab Supplies, Standards, Gas Cylinders/Tanks, Solvents/Reagents, Office Supplies, and Containers, etc.)

Store

This is the name of the store that stocks this item. A laboratory often has a general store and one or more manufacturing stores for building kits, reagents and media.

Min(imum) Order Level

This integer when appended with the Dispensed Units selection specifies the minimum amount of the item which should be ordered from the external vendor.

Reorder Level

This integer when appended with the Dispensed Units selection specifies the threshold amount of the item which will trigger an external vendor order to be created if the Auto Reorder parameter is checked.

Max(imum) Order Level

This integer when appended with the Dispensed Units selection specifies the maximum amount of the item which should be ordered from the external vendor.

Dispensed Units

This field specifies the unit in which the item is dispensed. Examples include: each, package, case, bottle, box, jug, mg, kg, and mL.

7.1.2 CONTROL/PARAMETERS

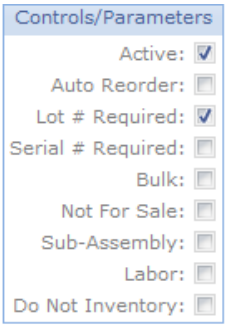


Figure 166 Inventory Item Screen - Controls/Parameters

In the upper right corner of the Inventory Item screen is located the Controls/Parameters section. The following controls/parameters may be checked:

Active

This parameter denotes whether the inventory item is available to be used in the system. If the Active checkbox is not checked, the item has been retired.

Auto Reorder

If this parameter is checked, the inventory order report will include this item if the quantity on hand falls below the Reorder Level.

Lot # Required

The lot number is an identification number assigned to a particular quantity or lot of material from a single manufacturer. When items with this flag are being replenished through the Vendor Order or Build Kits processes, additional requirements and/or information is requested:

1. When receiving or building inventory, the user needs to provide lot number information. Lot numbers from a single vendor are unique; laboratory manufactured items should follow the same rules and have a unique numbering system.
2. An expiration date can be entered for any item marked with Lot # Required.
3. When receiving inventory, items received in one shipment are different from items received in an earlier or later shipment, even if all the other information is identical. See Inventory Receipt Screen for more information.
4. When building kits, the quantity requested (the number of kits that can be built) is dependent on its components and their quantity on-hand. See Build Kits Screen for more information.

Serial # Required

This field triggers the LIMS to create serialized inventory. Serialized inventory are always at quantities of one and can be uniquely identified through their system-wide, unique serial number. Newborn screening collection cards are an example of serialized inventory since each card has a unique serial barcode.

Bulk

The field indicates that all quantities of this item do not require detailed tracking. The inventory system will continue to track inventory levels and locations but not lot, serial, or expiration information.

Not For Sale

This flag is used to indicate that the item is used internally and should not be sent to other organizations.

Sub-Assembly

This field indicates that the item is used as part of another item such as a kit. These types of items are often marked Not For Sale.

Labor

To accurately manage costs, staff time for building kits or preparing reagents can be entered and managed through the inventory process. For example, a laboratory can create an inventory item called “box assembly labor” in units of one minute and then assign the item as a component to various kits. This item needs to be replenished and inventoried with an associated cost just like any other inventory item. A standard inventory report can then account for this cost.

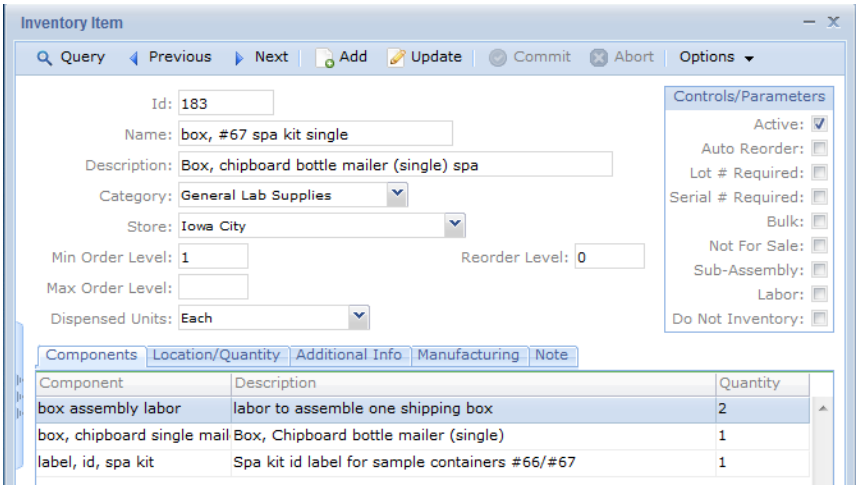


Figure 167 Labor Component of an Inventory Item

Do Not Inventory

Items marked with this flag do not have to be replenished and the system does not subtract from their quantities as they are being used. For building kits, the instructions that are sent with kits are marked with Do Not Inventory. This allows the instructions to be printed on demand without having to preprint and physically store the instructions. See Build Kits Screen for more information.

There are five tabs found in the lower pane of the Inventory Item Screen: Components, Location/Quantity, Additional Info, Manufacturing, and Note.

7.1.3 COMPONENTS TAB

Some inventory items are made from multiple components. The Components Tab displays the list of components that are part of this inventory item. To use a component, the component must first be entered into OpenELIS as an inventory item. Most inventory items will not have any components, with kits being the major exception. For example, a Private Well Water Kit consists of two components: one 4 oz. plastic IDEXX bottle (preserved) and one 4 oz. plastic IDEXX bottle (unpreserved).

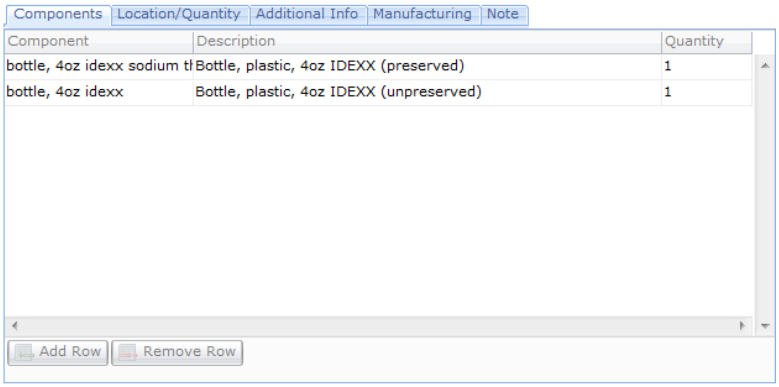


Figure 168 Inventory Item Screen - Components Tab

The fields of this tab are described below:

Component

The entry in this field is taken from the Name field of the component item's record.

Description

The entry in this field is taken from the Description field of the component item's record.

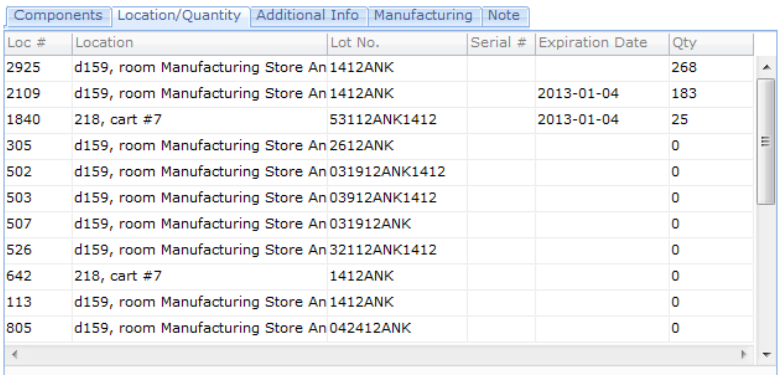
Quantity

This field specifies the quantity of the component used within the inventory item (kit).

7.1.4 LOCATION/QUANTITY TAB

This tab displays the location and quantity of this item throughout the laboratory.

This tab displays all the location(s) where this inventory is or has been stored. Locations with a quantity of zero are displayed for documentation purposes as they provide lot and expiration data. The list is sorted by quantity with zero quantities at the bottom.



Loc #	Location	Lot No.	Serial #	Expiration Date	Qty
2925	d159, room Manufacturing Store An	1412ANK			268
2109	d159, room Manufacturing Store An	1412ANK		2013-01-04	183
1840	218, cart #7	53112ANK1412		2013-01-04	25
305	d159, room Manufacturing Store An	2612ANK			0
502	d159, room Manufacturing Store An	031912ANK1412			0
503	d159, room Manufacturing Store An	03912ANK1412			0
507	d159, room Manufacturing Store An	031912ANK			0
526	d159, room Manufacturing Store An	32112ANK1412			0
642	218, cart #7	1412ANK			0
113	d159, room Manufacturing Store An	1412ANK			0
805	d159, room Manufacturing Store An	042412ANK			0

Figure 169 Inventory Item Screen - Location/Quantity Tab

The fields of this tab are described below:

Loc(ation) #

This field specifies a unique ID for that item received at that location and time.

Location

This field specifies the physical location where the item is or has been stored. A location is defined using the Storage Location screen and each part of the name is separated by a comma.

Lot No.

The lot number is an identification number assigned to a particular quantity or lot of material from a single manufacturer. The Inventory Receipt Screen is used to enter the lot number for an item that is received from an external vendor, whereas, the Build Kits Screen is used to enter the lot number for an item that is manufactured internally. See Lot # Required for more information on lot numbers.

Serial #

This field specifies the system-wide, unique serial number for an individual item. Serialized inventory are always at quantities of one.

Expiration Date

This date specifies when the quantity at that location will expire. The Inventory Receipt Screen is used to enter the expiration date for an item that is received from an external vendor, whereas, the Build Kits Screen is used to enter the expiration date for an item that is manufactured internally.

Qty (Quantity)

This field specifies the number of the item at that location.

7.1.5 ADDITIONAL INFO TAB

This tab provides additional information about inventory, inventory transfer, and usage statistics for the inventory item.

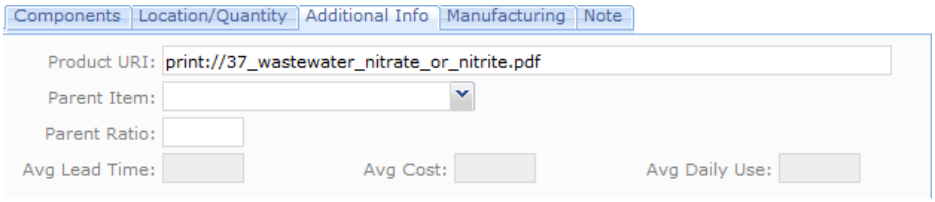


Figure 170 Inventory Item Screen - Additional Info Tab

The fields of this tab are described below:

Product URI

The Product URI (uniform resource identifier) field identifies a product resource for the inventory item such as a product or vendor web page. Another use for this field is to provide on-demand printing. On-demand printing is used to print forms such as collection or shipping instructions at the time the kit is being assembled or inventory is being sent out.

For on-demand printing, the format of the URI is “print://filename.ext”. The directory path is specified in the system variable, inventory_uri_directory, and is prepended to the filename to locate the file. The file content must be suitable to be sent directly to the printer; Word or Excel documents will not work but PS or PDF formats can often be directly processed by the printer.

Parent Item

This field links together two related inventory items that exist in different stores. This function is used to link items from a manufacturing store with the same item in a general store to facilitate automatic inventory transfer during kit building. Please see BUILD KITS for a complete explanation.

Parent Ratio

This field is used to multiply the quantity transferred from the parent inventory store. For example, a value of 5 means that for every 1 item transferred from the parent store, 5 items are placed in the current store.

Avg (Average) Lead Time

This field is currently not implemented.

Avg (Average) Cost

This field is currently not implemented.

Avg (Average) Daily Use

This field is currently not implemented.

7.1.6 MANUFACTURING TAB

The Manufacturing Tab displays assembly instructions for kits, reagents, and media. The **Edit** button opens a Rich Text Editor so that bolding, italicizing, numbering, and bulleting, etc., can be used to edit the instructions/recipe. The instructions can be repeatedly modified and saved.

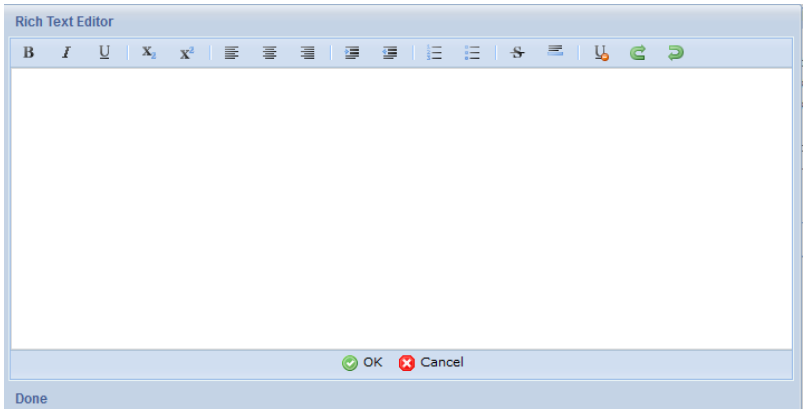


Figure 171 Rich Text Editor

7.1.7 NOTE TAB

This tab is used for internal notes. The **Add Note** button pops up the Standard Note Selection Screen so that a plain text note can be added. These notes cannot be modified after committal.

7.2 INTERNAL ORDER

The Internal Order module allows the user to order items from the in-house stores. Previous internal orders can be queried by any of the fields. See QUERY FUNCTION for more information on general query formats and capabilities.

This screen can also be used to view orders that are automatically created when the staff builds kits or transfers inventory from one location or store to another.

The link to the Internal Order module is found in the top section of the Inventory/Order Menu.

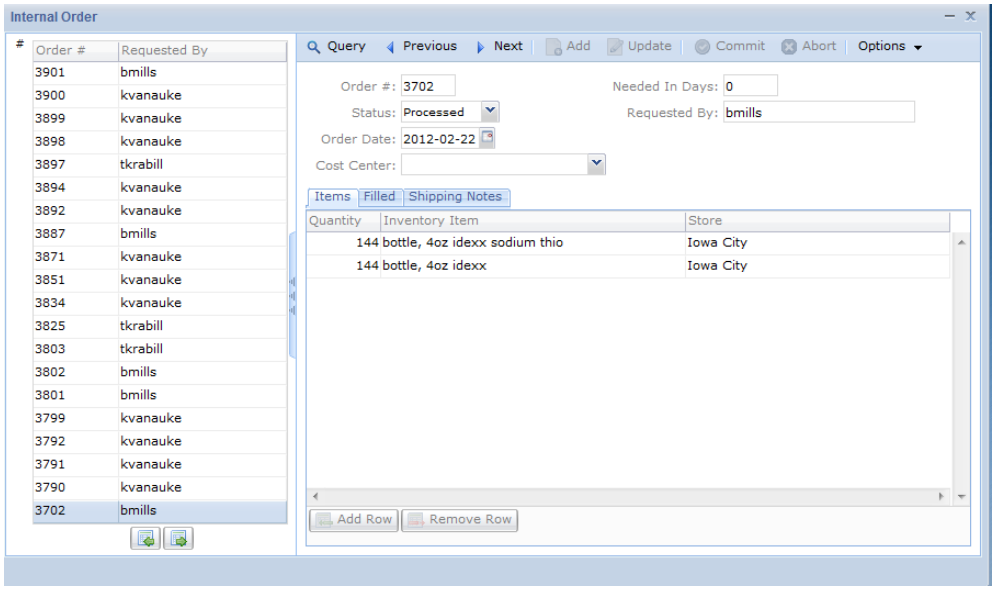


Figure 172 Internal Order Screen

7.2.1 GENERAL FIELDS

The general fields of this screen are described below.

Order #

This is a unique system-wide order number assigned by the LIMS. All orders (internal, send out, and vendor) share the same pool of order numbers.

Needed In Days

This field specifies the number of days in which the order needs to be filled. For automatically placed orders, the system enters a value of zero.

(Order) Status

The status of the order is specified in this field:

Pending – the order is waiting to be filled through the FILL ORDER screen.

Cancelled – the order filler can use this status to indicate the order has been cancelled because it is not needed.

Back Ordered – the order filler can use this status to indicate the order, in whole or in part, is back ordered.

Processed – the order has been filled through the FILL ORDER screen.

On Hold – the order is not ready to be filled due to missing items or information. This status can be selected by the order requester to indicate the order should not be filled yet.

Requested By

This field is defaulted to the username but can be overridden to the requesting person or the department name.

Order Date

This is the date that the order was entered into the system. This date can be changed to reflect the actual order date.

Cost Center

This field contains the organizational unit, program, or project that is responsible for the cost of the order. This field is linked with the dictionary category system name “cost_centers”.

The **Duplicate** button in the Options drop-down menu allows for an order to be easily duplicated.

There are three tabs present in the lower pane of the Internal Order screen that provide details of the order: Items, Filled, and Shipping Notes. The tabs are described below.

7.2.2 ITEMS TAB

The Items tab contains a table that lists the items that were requested in the internal order.

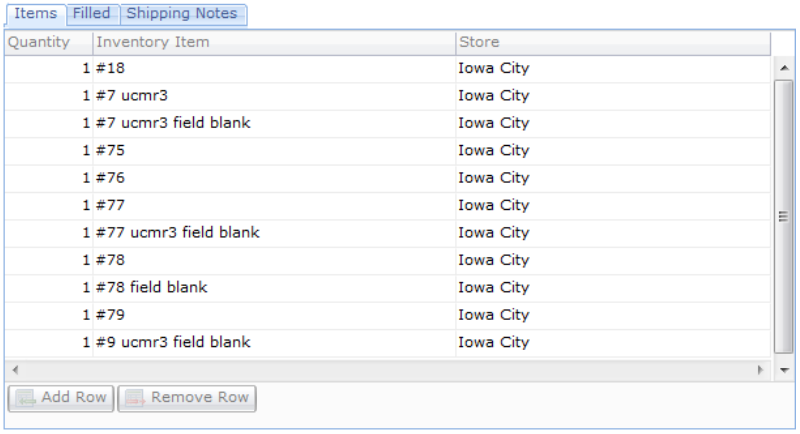


Figure 173 Internal Order Screen - Items Tab

The fields located on this tab are described here.

Quantity

The number of each inventory item being requested is specified in this field.

Inventory Item

This field contains the name of the inventory item that is being requested. See INVENTORY ITEM for a detailed explanation of how inventory items are created and managed in OpenELIS.

Store

This is the name of the store from which this item is being requested. A laboratory often has a general store and one or more manufacturing stores for building kits, reagents and media. See INVENTORY ITEM for a detailed explanation of stores.

7.2.3 FILLED TAB

The filled tab displays the items that were filled along with related information.

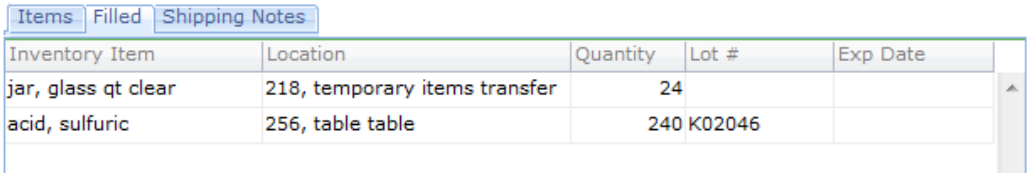


Figure 174 Internal Order Screen - Filled Tab

The fields located on this tab are described here.

Inventory Item

This field contains the name of the inventory item that was filled. See INVENTORY ITEM for a detailed explanation of how inventory items are created and managed in OpenELIS.

Location

This field specifies the physical location from where the item was taken. A location is defined using the Storage Location screen and each part of the name is separated by a comma.

Quantity

The number of each inventory item that was filled is shown in this field. If an item is filled from more than one location, there will be multiple rows with different quantities.

Lot No.

The lot number is an identification number assigned to a particular quantity or lot of material from a single manufacturer. The Inventory Receipt Screen is used to enter

the lot number for an item that is received from an external vendor, whereas, the Build Kits Screen is used to enter the lot number for an item that is manufactured internally. See Lot # Required for more information on lot numbers.

Exp(iration) Date

This date specifies when the quantity at that location will expire. The Inventory Receipt Screen is used to enter the expiration date for an item that is received from an external vendor, whereas, the Build Kits Screen is used to enter the expiration date for an item that is manufactured internally.

7.2.4 SHIPPING NOTES TAB

The Shipping Notes tab is used to enter a note specifying how the items should be shipped. This note can be written or edited by clicking on the **Edit Note** button. This action will pop up the Standard Note Selection Screen to be used for this purpose.

7.3 VENDOR ORDER

The Vendor Order module allows the user to order items from external vendors. Any item that is managed in the inventory system can be ordered from any vendor. The system does not manage a preferred vendor list, however, similar orders are often duplicated which functionally provides the same capability.

Once the order is placed in the system, the purchasing department can locate and process the newly created orders. Additional information such as Order Date and Ext Order Number can be entered as the order is being placed with the vendor.

The users can track their orders through this screen. See QUERY FUNCTION for more information on general query formats and capabilities. Once the order is received by the laboratory, the status of the order will change to “Processed”.

The link to the Vendor Order module is found in the top section of the Inventory/Order Menu.

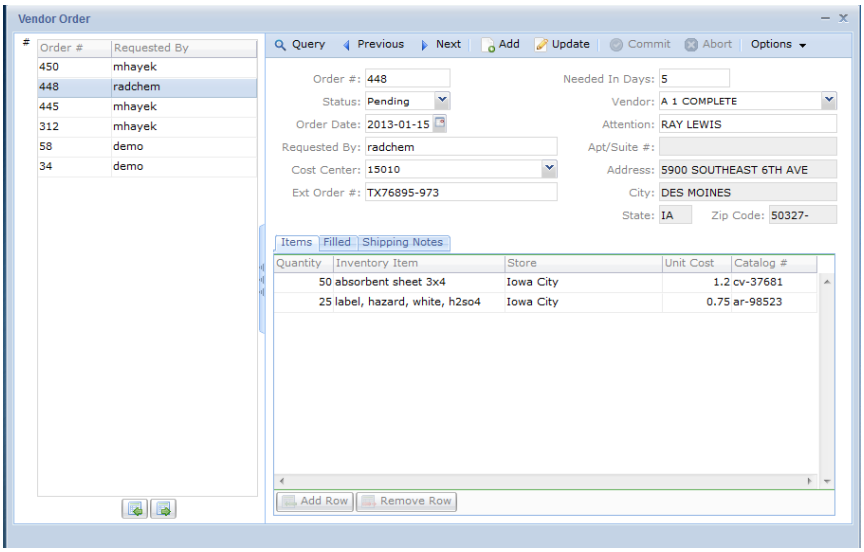


Figure 175 Vendor Order Screen

7.3.1 GENERAL FIELDS

The general fields of this screen are described below.

Order #

This is a unique system-wide order number assigned by the LIMS. All orders (internal, send out, and vendor) share the same pool of order numbers.

(Order) Status

The status of the order is specified in this field. See (Order) Status for a definition of each status.

Order Date

This is the date that the order was entered into the system. This date can be changed to reflect the actual order date.

Requested By

This field is defaulted to the username but can be overridden to the requesting person or the department name.

Cost Center

This field contains the organizational unit, program, or project that is responsible for the cost of the order. This field is linked with the dictionary category system name "cost_centers".

Ext(ernal) Order #

Many times when an order is placed with a vendor, the vendor issues an order number that is unique to their system. This field is used to capture that information and can be used in the Inventory Receipt screen to quickly locate and receive an order from the vendor's paper manifest.

Needed In Days

This field specifies the number of days in which the order needs to be filled.

Vendor

This is the name of the external vendor. A vendor is an organization defined in the Organization screen.

Attention

This text field may contain the name of the person at the vending company who is responsible for servicing the order.

Apt/Suite #, Address, City, State, Zip Code

Once a vendor is selected, the associated address information from the Organization screen will automatically populate these fields.

The **Duplicate** button in the Options drop-down menu allows for an order to be easily duplicated.

There are three tabs present in the lower pane of the Vendor Order screen that provide details of the order: Items, Filled, and Shipping Notes. The tabs are described below.

7.3.2 ITEMS TAB

The Items tab contains a list of items that were requested in the vendor order.

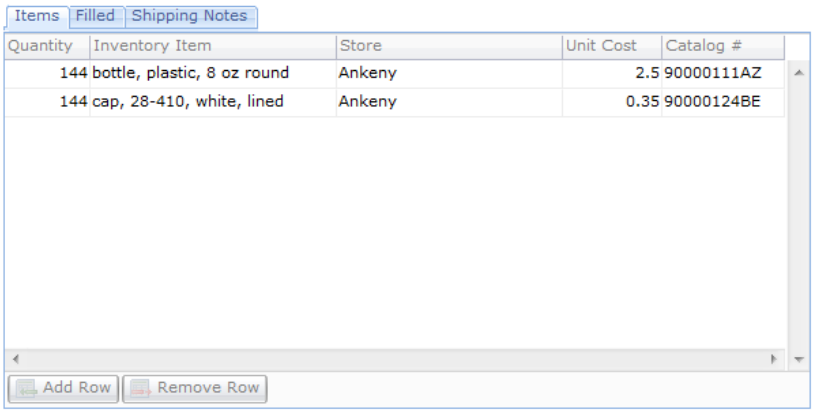


Figure 176 Vendor Order Screen - Items Tab

The fields located on this tab are described here.

Quantity

The number of each inventory item being requested is specified in this field.

Inventory Item

This field contains the name of the inventory item that is being requested. See INVENTORY ITEM for a detailed explanation of how inventory items are created and managed in OpenELIS.

Store

This is the name of the store where the inventory item will be housed when it arrives. A laboratory often has a general store and one or more manufacturing stores for building kits, reagents and media. See INVENTORY ITEM for a detailed explanation of stores.

Unit Cost

This field contains the cost of each item in U.S. dollars.

Catalog #

This field may be used to record the vendor's catalog number. This information is often useful to the ordering department to match a specific item from the vendor.

7.3.3 FILLED TAB

The filled tab displays the items that have been received from the vendor.

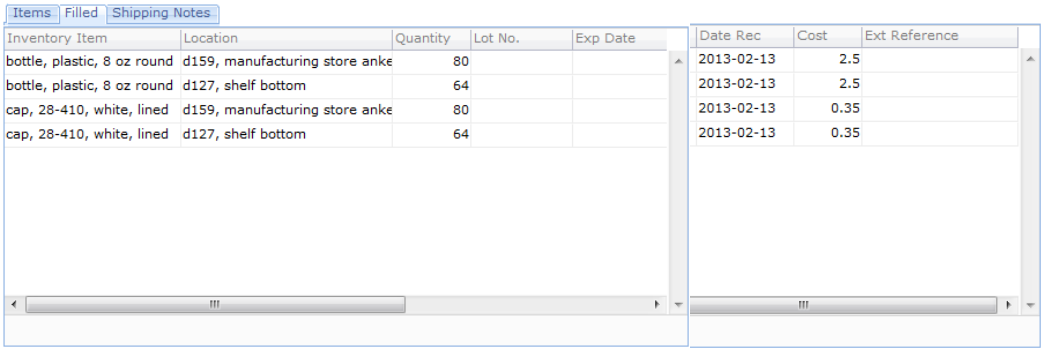


Figure 177 Vendor Order Screen - Filled Tab

The fields located on this tab are described here.

Inventory Item

This field contains the name of the inventory item that was filled. See INVENTORY ITEM for a detailed explanation of how inventory items are created and managed in OpenELIS.

Location

This field specifies the physical location where the item was placed. A location is defined using the Storage Location screen and each part of the name is separated by a comma.

Quantity

This field displays the quantity of the item received. If an item is stored in more than one location, or the item was received multiple times because of a back order, there

will be multiple rows with different quantities, received dates, and possibly lot numbers and expiration dates.

Lot No.

The lot number is an identification number assigned to a particular quantity or lot of material from a single manufacturer. The Inventory Receipt Screen is used to enter the lot number for an item that is received from an external vendor. See Lot # Required for more information on lot numbers.

Exp(iration) Date

This date specifies when the quantity at that location will expire. The Inventory Receipt Screen is used to enter the expiration date for an item that is received from an external vendor.

Date Rec(eived)

The date that the item was received from the vendor is displayed in this field. The Inventory Receipt Screen is used to enter the date that an item is received from an external vendor.

Cost

The actual unit cost of the item in U.S. dollars is displayed in this field. The Inventory Receipt Screen is used to enter the actual unit cost of an item that is received from an external vendor.

Ext(ernal) Reference

This free text field may contain any reference information related to the item or the order such as PO#, Sequestered Lot information, etc.

7.3.4 SHIPPING NOTES TAB

The Shipping Notes tab is used to enter a note specifying how the items should be shipped. This note can be written or edited by clicking on the **Edit Note** button. This action will pop up the Standard Note Selection Screen to be used for this purpose.

7.4 SEND-OUT ORDER

The Send-out Order module allows the SHL employee to order items and supplies to be sent to external users. Previous send-out orders can be queried by most of the fields.

The link to the Send-out Order module is found in the top section of the Inventory/Order Menu.

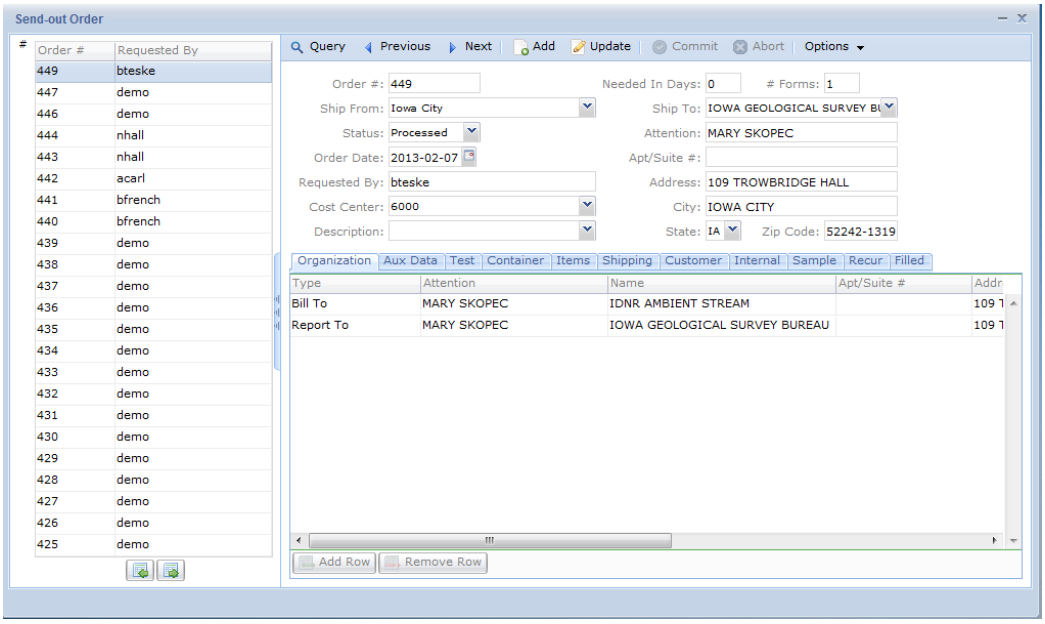


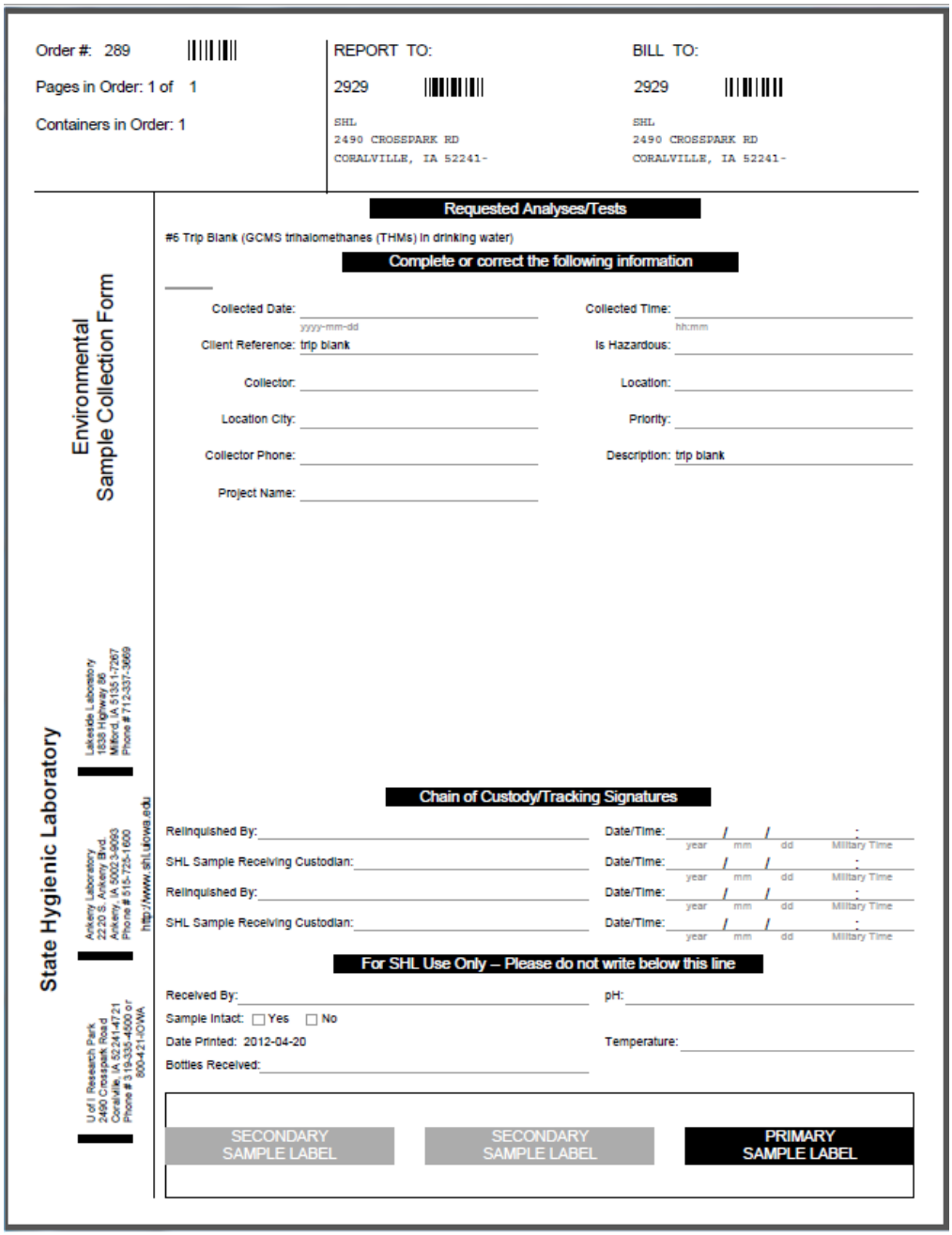
Figure 178 Send-out Order Screen

7.4.1 GENERAL FIELDS

The fields that are present in the top pane of the Send-out Order screen are the SHL assigned order #, ship from (Ankeny, Iowa City, or Lakeside), order status (pending, cancelled, back ordered, processed, or recurring), order date, requested by, cost center, description, needed in days (number), # forms, and the “ship to” name and address. There are nine tabs present in the lower pane: Report/Bill To, Aux(iliary) Data, Test, Items, Shipping, Customer, Internal, Recur, and Filled.

The **Duplicate** button in the Options drop-down menu allows for an order to be easily duplicated. Clicking on the **Shipping Information** button in the Options menu pops up

the Shipping Screen with all of the information relevant to shipping the send-out order. See SHIPPING SCREEN for more information on this screen. Clicking on the **Order Request Form** button in the Options menu pops up the Environmental Sample Collection Form for the send-out order in pdf format. This form already has the "report to" and "bill to" information, requested analyses/tests, and some of the requested auxiliary data already completed. This form can be printed and sent out with the order.



Order #: 289

Pages in Order: 1 of 1

Containers in Order: 1

REPORT TO:

2929

SHL
2490 CROSSPARK RD
CORALVILLE, IA 52241-

BILL TO:

2929

SHL
2490 CROSSPARK RD
CORALVILLE, IA 52241-

Environmental
Sample Collection Form

State Hygienic Laboratory

Lakeside Laboratory
1838 Highway 86
Milford, IA 51351-7267
Phone # 712-337-3669

Ankeny Laboratory
2220 S. Ankeny Blvd.
Ankeny, IA 50023-9093
Phone # 515-725-1600
http://www.shl.uiowa.edu

U of I Research Park
2490 Crospark Road
Coralville, IA 52241-4721
Phone # 319-335-4500 or
800-421-IOWA

Requested Analyses/Tests

#6 Trip Blank (GCMS trihalomethanes (THMs) in drinking water)

Complete or correct the following information

Collected Date: (yyyy-mm-dd)

Collected Time: (hh:mm)

Client Reference: trip blank

Is Hazardous:

Collector:

Location:

Location City:

Priority:

Collector Phone:

Description: trip blank

Project Name:

Chain of Custody/Tracking Signatures

Relinquished By: Date/Time: / / : (year mm dd Military Time)

SHL Sample Receiving Custodian: Date/Time: / / : (year mm dd Military Time)

Relinquished By: Date/Time: / / : (year mm dd Military Time)

SHL Sample Receiving Custodian: Date/Time: / / : (year mm dd Military Time)

For SHL Use Only – Please do not write below this line

Received By: pH:

Sample Intact: ☐ Yes ☐ No

Date Printed: 2012-04-20 Temperature:

Bottles Received:

SECONDARY SAMPLE LABEL | SECONDARY SAMPLE LABEL | PRIMARY SAMPLE LABEL

Figure 179 Environmental Sample Collection Form

7.4.2 REPORT/BILL TO TAB

The Report/Bill To tab contains the names and addresses of these organizations if the "report to" organization is different from the "bill to" organization.

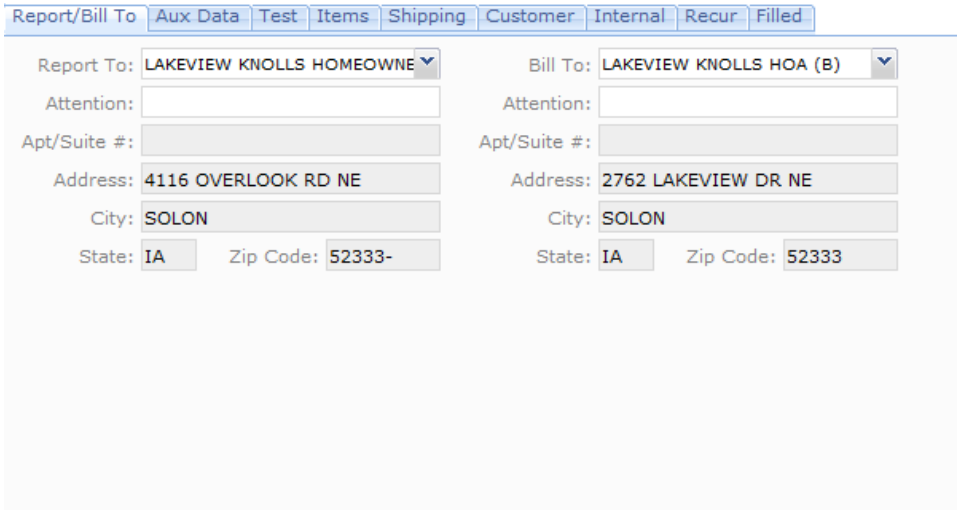


Figure 180 Send-out Order Screen - Report/Bill To Tab

7.4.3 AUX DATA TAB

The Aux Data tab contains a table with the fields of Reportable, Name (of the auxiliary data), and its Value. The auxiliary data items are usually standard for the tests that are ordered.

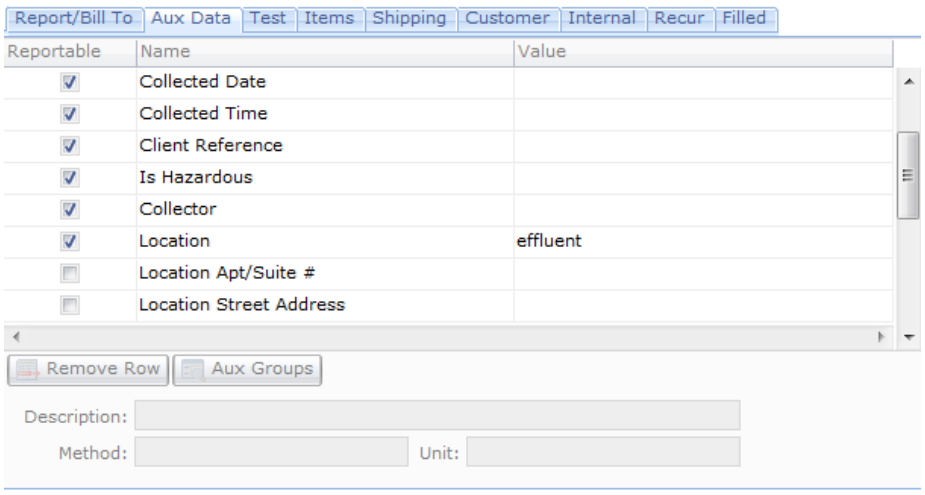


Figure 181 Send-out Order Screen - Aux Data Tab

7.4.4 TEST TAB

The Test tab contains the fields Test, Method, and Description in its upper pane and Container, Quantity, and Sample Type in its lower pane. The test and method is usually entered by client services or central accessioning personnel after consultation with the external client.

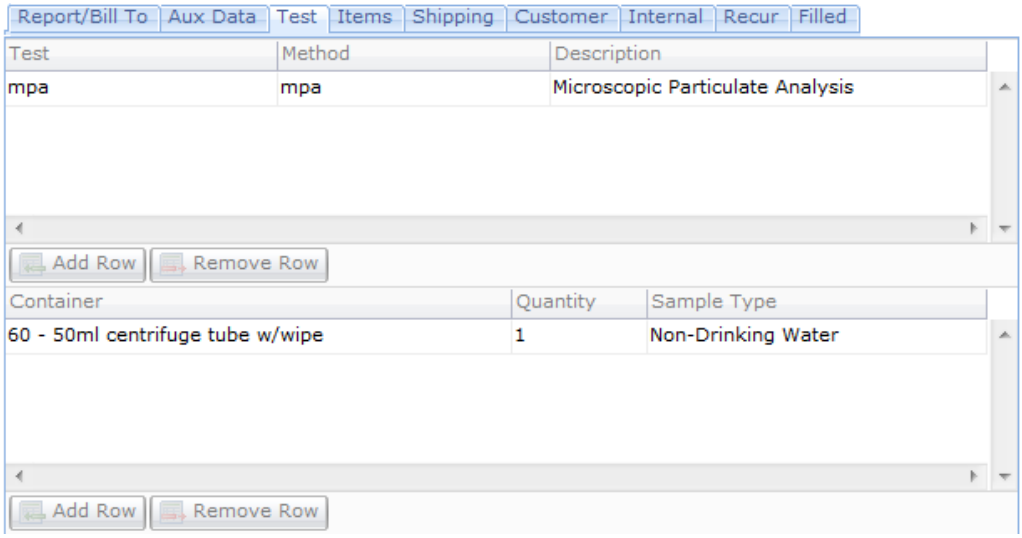


Figure 182 Send-out Order Screen - Test Tab

7.4.5 ITEMS TAB

The Items tab contains the fields Quantity, Inventory Item, and Store (Ankeny or Iowa City).

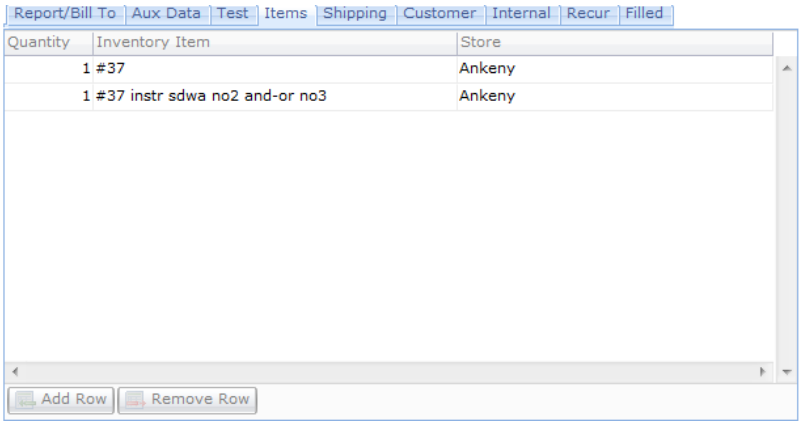


Figure 183 Send-out Order Screen - Items Tab

7.4.6 SHIPPING TAB

The Shipping Tab contains special shipping information for the send-out order.

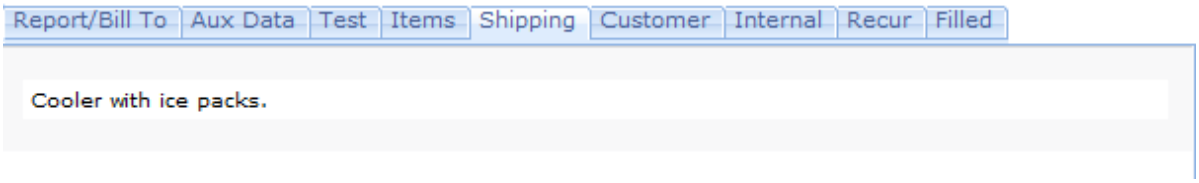


Figure 184 Send-out Order Screen - Shipping Tab

7.4.7 CUSTOMER TAB

The Customer Tab …..

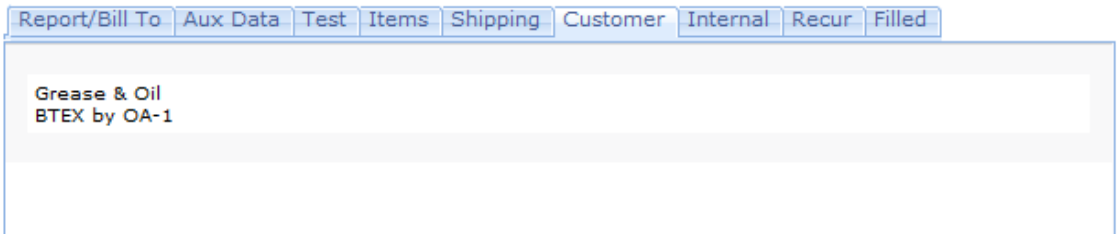


Figure 185 Send-out Order Screen - Customer Tab

7.4.8 INTERNAL TAB

The Internal Tab displays internal notes created by SHL personnel that are related to the send-out order. Each note will have a subject line, the author's name, and the creation date and time.

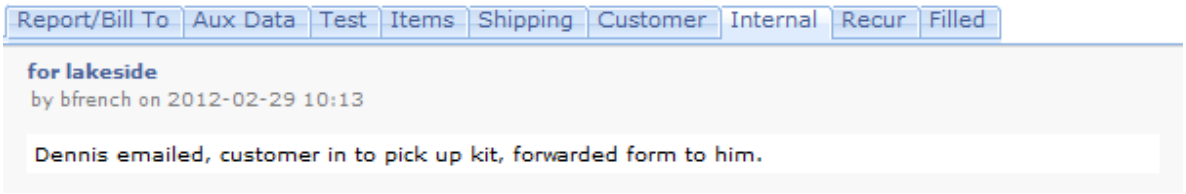


Figure 186 Send-out Order Screen - Internal Tab

7.4.9 RECUR TAB

The Recur Tab displays the details for recurring send-out orders. The required fields in this tab are active (status), begin date, end date, frequency, and unit (days, months, years). Optional fields include parent order # and order will recur on (which displays the dates of the recurring send-out order by clicking on the **Show Dates** button.

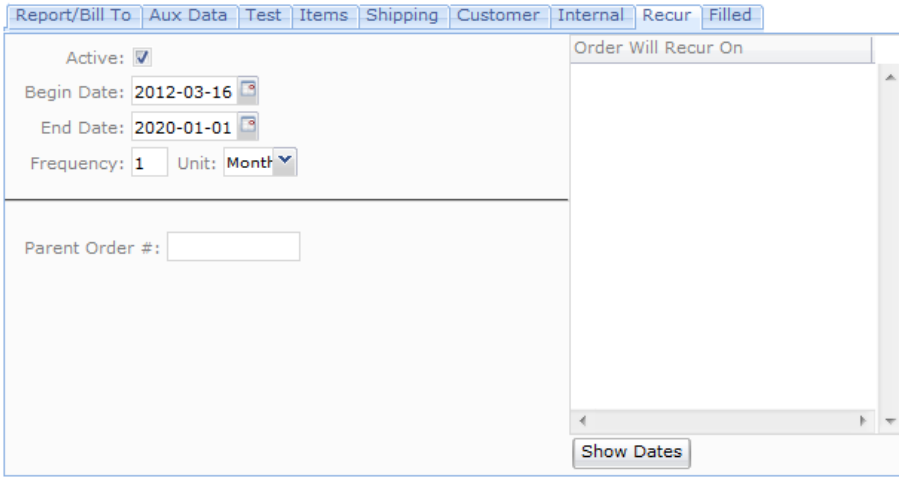


Figure 187 Send-out Order Screen - Recur Tab

7.4.10 FILLED TAB

The Filled Tab shows the details of the filled items from the send-out order. The fields present in this tab are SHL inventory item (number), (storage) location, quantity, lot #, and exp(iration) date.

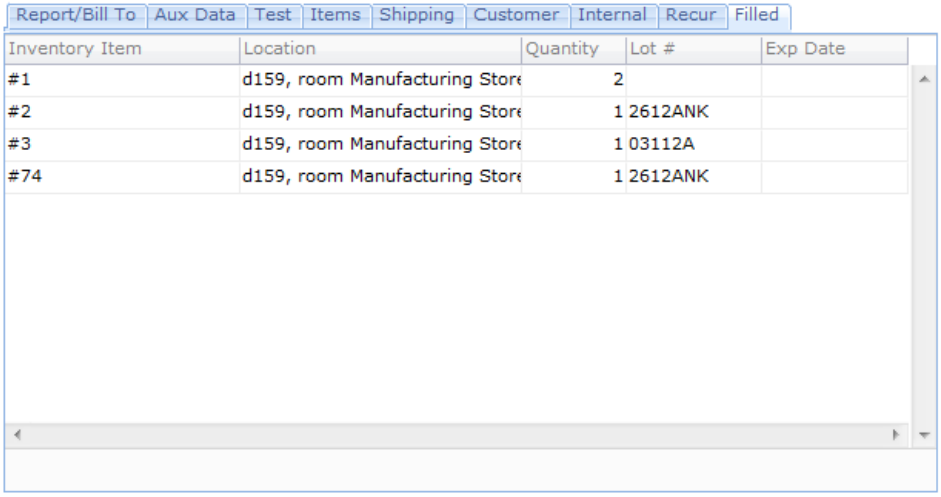


Figure 188 Send-out Order Screen - Filled Tab

7.5 FILL ORDER

The Fill Order screen provides the capability to manage and package internal and send-out orders for processing. The user can query in this screen by most of the fields. By default, a query will be performed for any orders with a status of “pending”, although orders with any status may be queried. By selecting an order in the upper pane of this screen, its details are displayed in the lower pane. The tabs in the lower pane are Items, Shipping Notes, and Customer Notes. The Items tab displays the cost center, “ship to” address, SHL ord(er) #, qty, Item (name), (storage) location, lot #, and exp(iration) date.

The link to the Fill Order module is found in the second section of the Inventory/Order Menu.

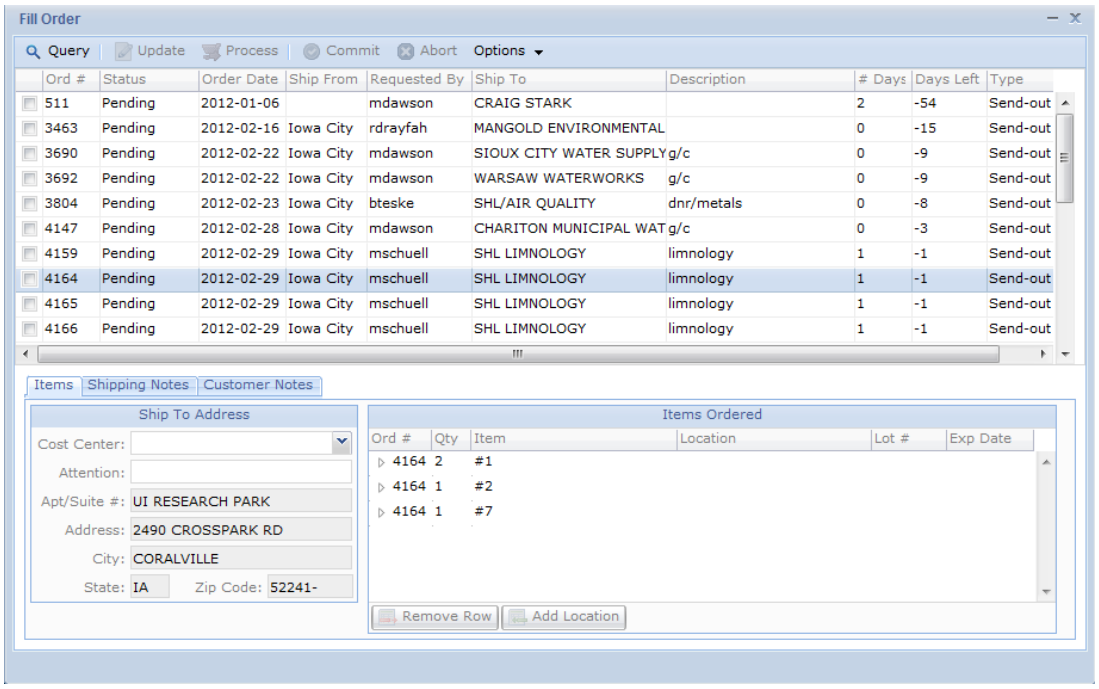


Figure 189 Fill Order Screen

The Shipping Notes tab displays any notes that are related to shipping out the order.

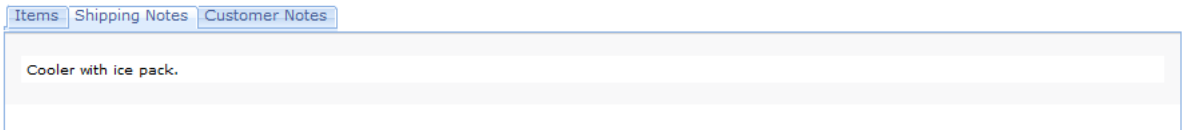


Figure 190 Fill Order Screen - Shipping Notes Tab

The Customer Notes tab displays

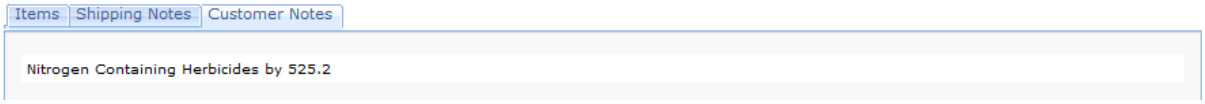


Figure 191 Fill Order Screen - Customer Notes Tab

7.5.1 PROCESS FOR FILLING AN ORDER

The steps to fill an order are listed below.

1. The desired order can be queried by any of the fields in the Fill Order Screen.

2. The **Update** button is clicked and the box is checked in front of the desired order to be filled.

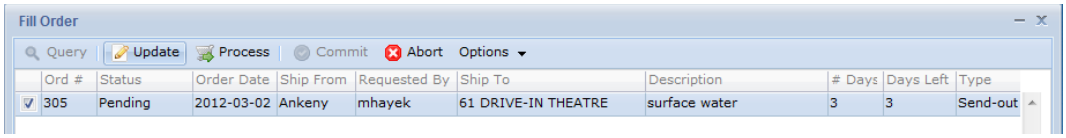


Figure 192 Fill Order Screen – Selecting an Order to be Filled

3. The item row under Items Ordered is selected and the Add Location button is clicked.

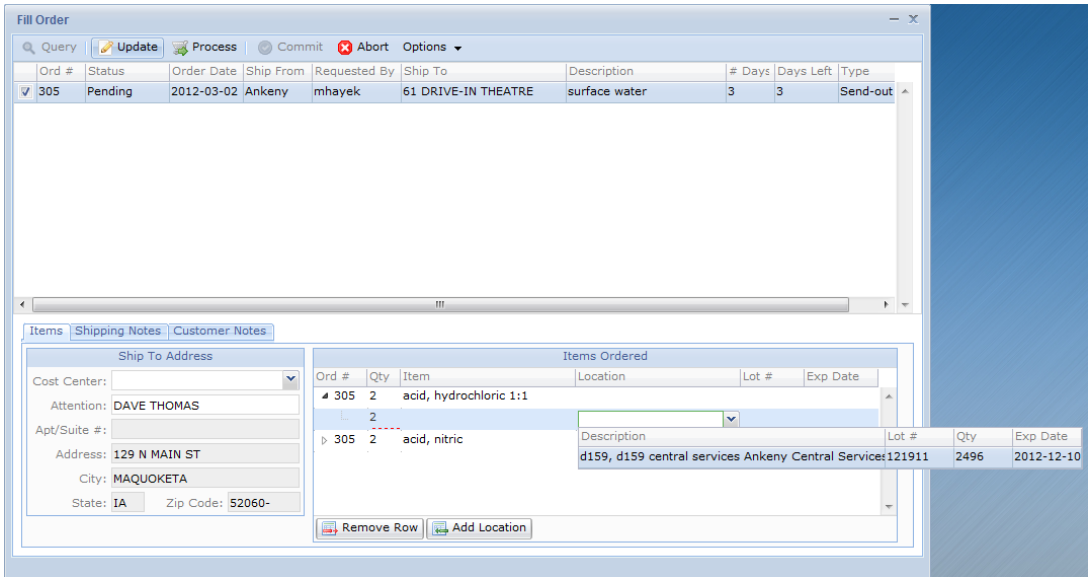


Figure 193 Fill Order Screen - Specifying a Location for Items Ordered

4. The (storage) location of the item can be chosen. The lot # and exp(iration) date are automatically entered if this information is present.
5. The **Process** button is clicked, and the Shipping Screen pops up.
6. For information on how to use the Shipping Screen, see SHIPPING SCREEN.

7.6 SHIPPING

The link to the Shipping module is found in the second section of the Inventory/Order Menu.

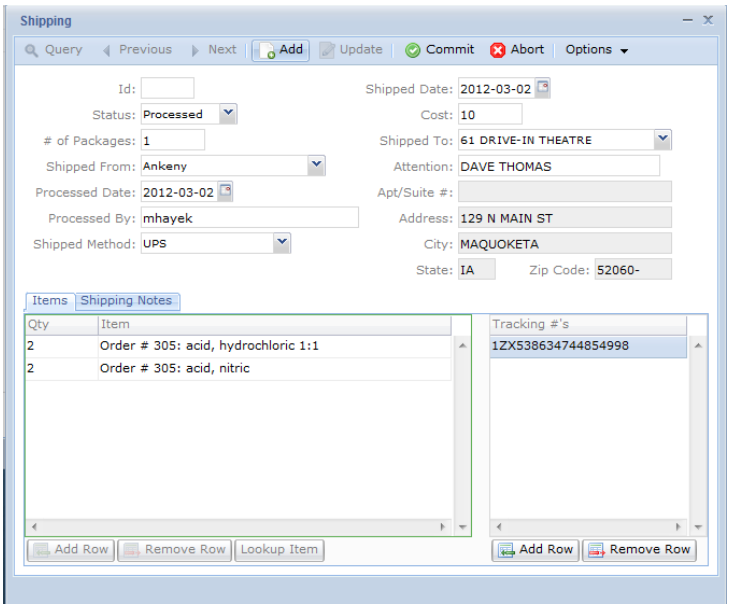


Figure 194 Shipping Screen

Using the Shipping Screen the # of packages, shipped method (courier, FedEx, pick up, UPS, USPS, etc.), shipped date, and cost are entered by shipping personnel. The "shipped from" location, "processed by" employee name, "shipped to" organization, and attention fields may be changed on this screen. A package tracking # can be added by clicking the **Add Row** button and entering the number. A shipping note may be added by selecting the Shipping Notes tab and clicking the **Add Note** button. When the required fields have been completed, click the **Commit** button.

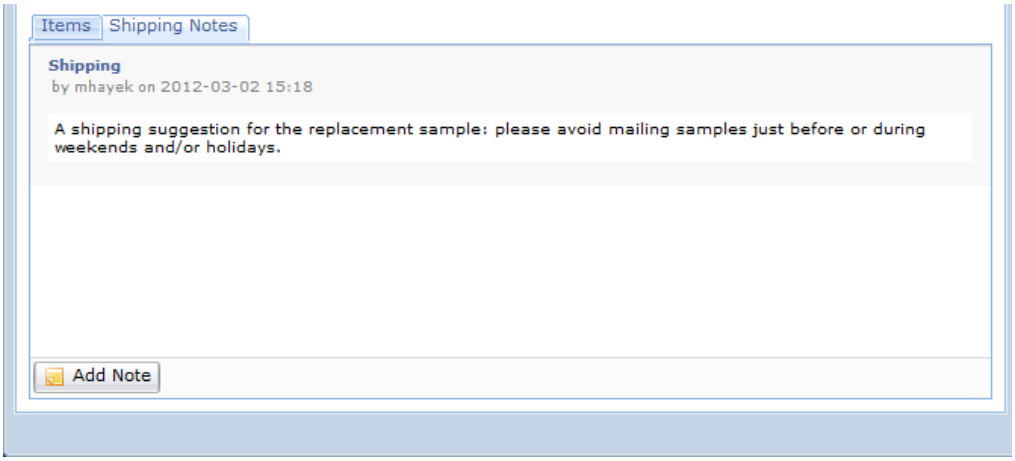


Figure 195 Shipping Screen - Shipping Notes Tab

A Shipping Print Screen will pop up with the options of print manifest, print labels, print instructions, and print request form checked by default. The user's preferences for printer and barcode printers are selected by default. Any of these print options can be changed on this screen.

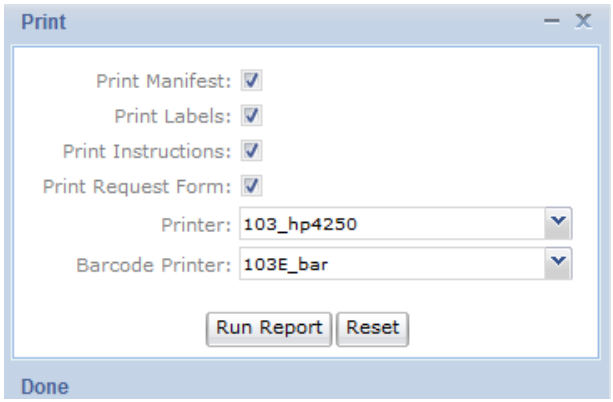
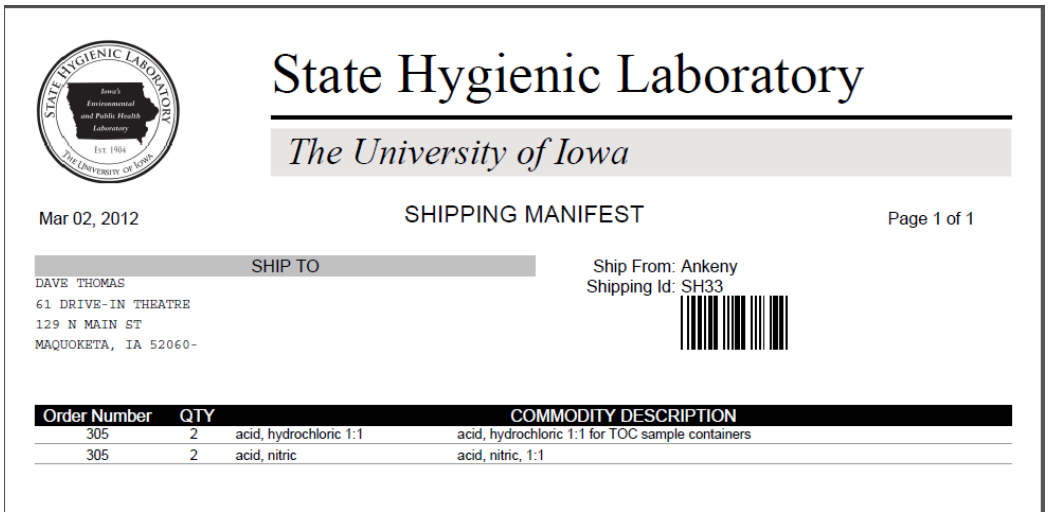


Figure 196 Shipping Print Screen

The Shipping Manifest for the above order is shown below.



State Hygienic Laboratory

The University of Iowa

Mar 02, 2012

SHIPPING MANIFEST

Page 1 of 1

SHIP TO

DAVE THOMAS
61 DRIVE-IN THEATRE
129 N MAIN ST
MAQUOKETA, IA 52060-

Ship From: Ankeny
Shipping Id: SH33

Order Number	QTY		COMMODITY DESCRIPTION
305	2	acid, hydrochloric 1:1	acid, hydrochloric 1:1 for TOC sample containers
305	2	acid, nitric	acid, nitric, 1:1

Figure 197 Shipping Manifest

An example of a shipping label is displayed below.

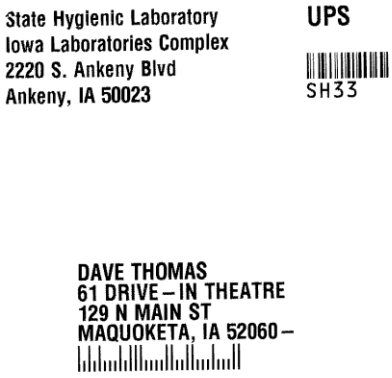
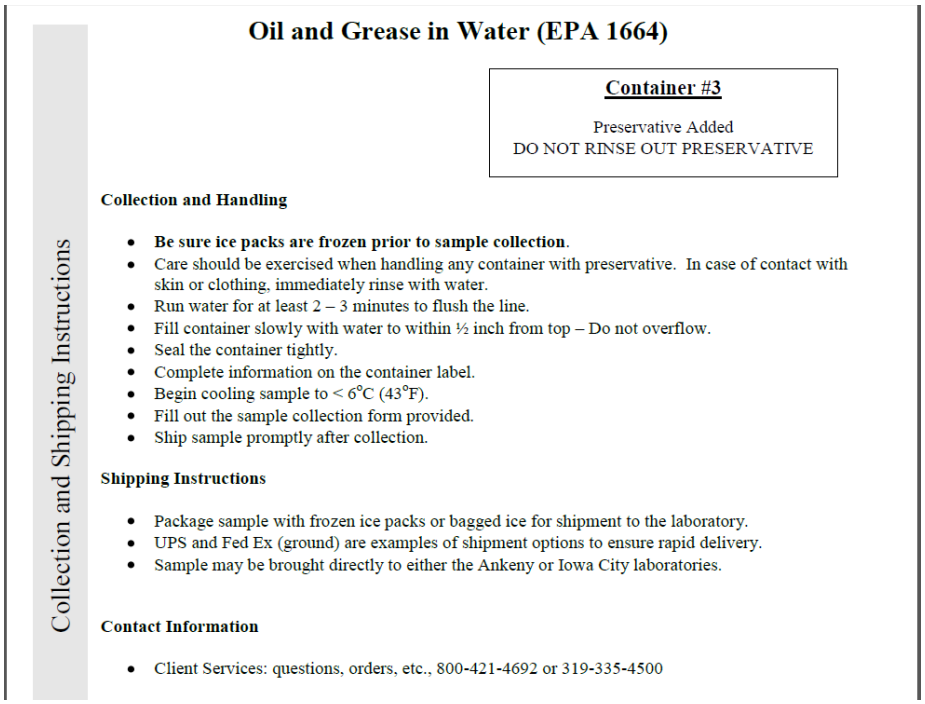


Figure 198 Shipping Label

An example of an instruction sheet follows.



Collection and Shipping Instructions

Oil and Grease in Water (EPA 1664)

Container #3

Preservative Added
DO NOT RINSE OUT PRESERVATIVE

Collection and Handling

- **Be sure ice packs are frozen prior to sample collection**.
- Care should be exercised when handling any container with preservative. In case of contact with skin or clothing, immediately rinse with water.
- Run water for at least 2 – 3 minutes to flush the line.
- Fill container slowly with water to within ½ inch from top – Do not overflow.
- Seal the container tightly.
- Complete information on the container label.
- Begin cooling sample to < 6°C (43°F).
- Fill out the sample collection form provided.
- Ship sample promptly after collection.

Shipping Instructions

- Package sample with frozen ice packs or bagged ice for shipment to the laboratory.
- UPS and Fed Ex (ground) are examples of shipment options to ensure rapid delivery.
- Sample may be brought directly to either the Ankeny or Iowa City laboratories.

Contact Information

- Client Services: questions, orders, etc., 800-421-4692 or 319-335-4500

Figure 199 Collection and Shipping Instructions

For an example of an Environmental Sample Collection Form (Request Form), see Environmental Sample Collection Form.

Other than the history options, there are two other choices in the Options menu of the Shipping Screen: Process Shipping and Print. The Process Shipping option allows the user to scan in a barcode for the shipping record and any tracking numbers associated with that record. The Print option pops up the Shipping Print Screen allowing the user to select which items (shipping manifest, shipping labels, collection and shipping instructions, and/or request form) to print or reprint. See Shipping Print Screen for more information.

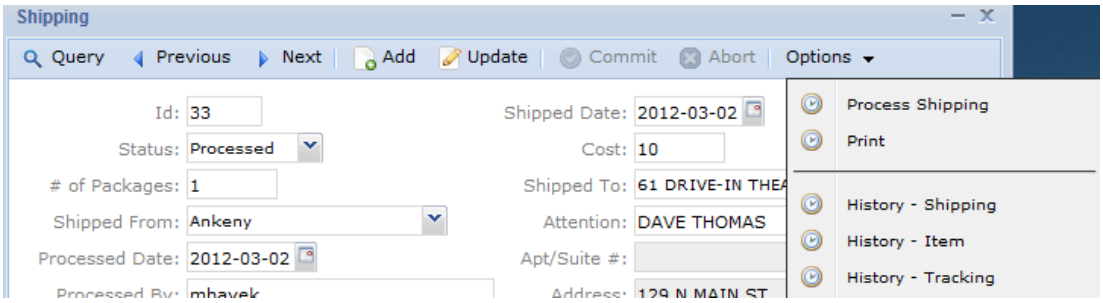


Figure 200 Shipping Screen Options

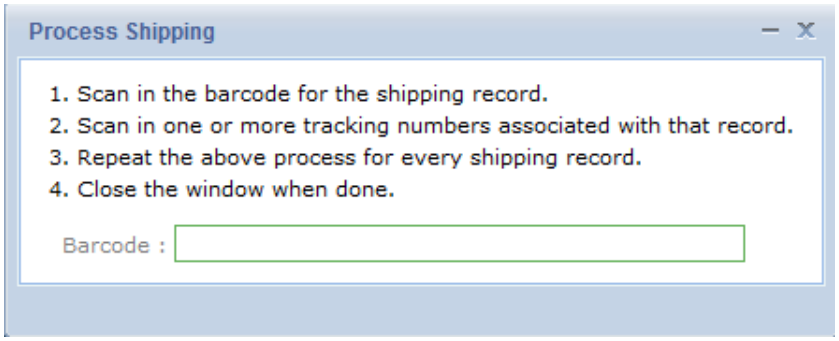


Figure 201 Process Shipping Screen

7.7 BUILD KITS

The Build Kits screen enables the user to assemble components in order to build kits for both internal laboratory and external client use. The kit must first be defined as an inventory item before kits can be assembled.

The link to the Build Kits module is found in the third section of the Inventory/Order Menu.

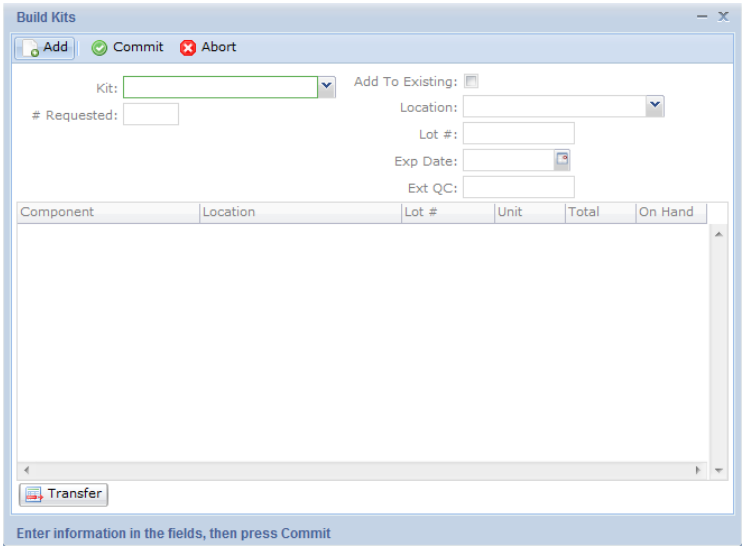


Figure 202 Build Kits Screen

After the **Add** button is clicked, the initial characters of the kit's name can be typed in the Kit field, which will allow the desired kit name to be selected from a drop-down list.

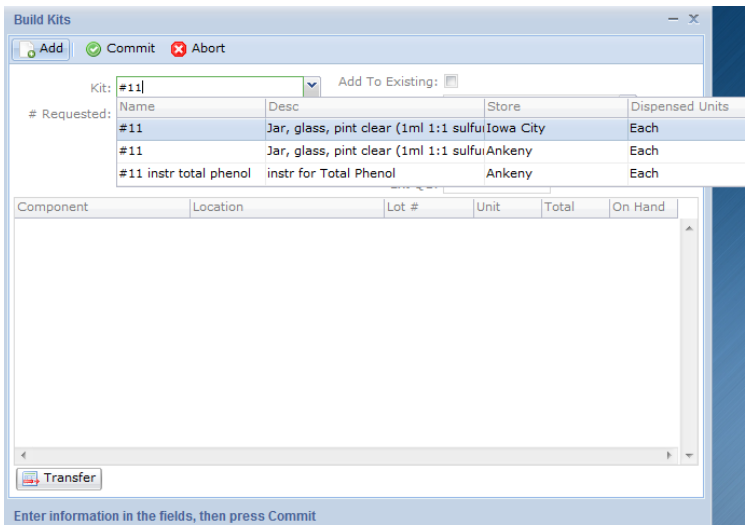


Figure 203 Build Kits Screen - Entering a Kit Name

The components of the kit will be automatically displayed in the lower pane of the screen. The user then must select the location of each component from a drop-down list. If there is an insufficient quantity of units available for the component, the user

should click on the **Transfer** button at the bottom of the screen. See INVENTORY TRANSFER SCREEN for more information on transfers. The unit, total, on hand, and lot # (if applicable) fields will be automatically entered with the correct information. The quantities in the Total column will reflect the quantity ratio for the components as defined for the kit in the Inventory Item Screen.

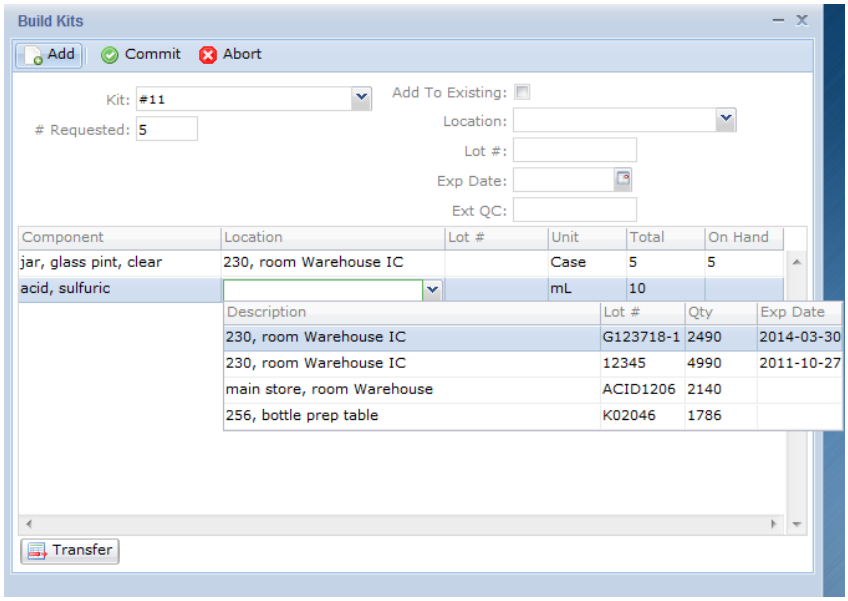


Figure 204 Build Kits Screen - Selecting a Component Location

The # requested, (storage) location, lot #, exp(iration) date, and ext(ernal) QC fields can be completed with appropriate values. The Add To Existing box can be checked for bulk item kits only so that they may be added together. If any component of the kit has a lot # value then it cannot be considered as a bulk item, and this checkbox will be inactivated.

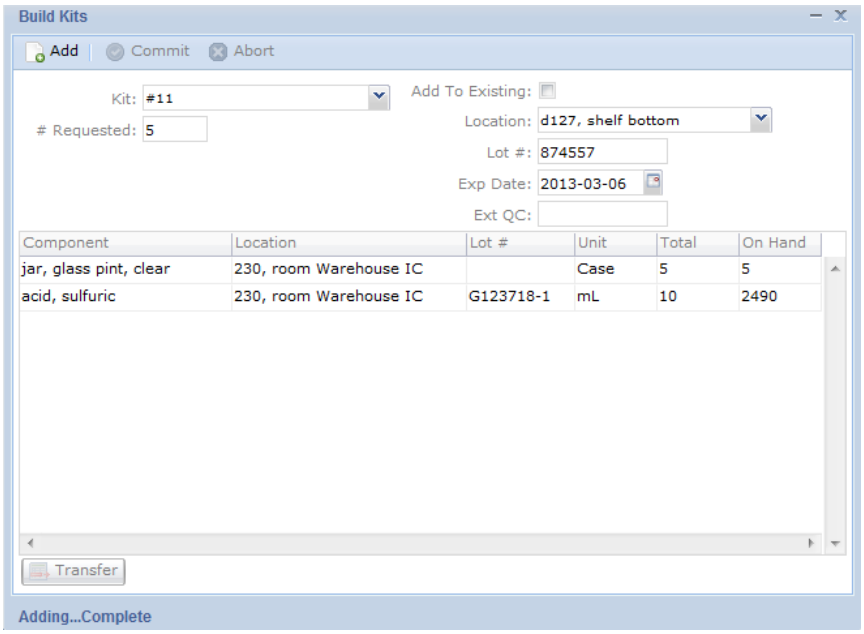


Figure 205 Completed Build Kits Screen

After the **Commit** button is clicked, the build kits record is added to OpenELIS and the Kit Labels Print Screen pops up. The user can specify the starting # for the kit labels, select whether or not special instructions should be printed on the labels, or choose a different barcode printer from her default one.

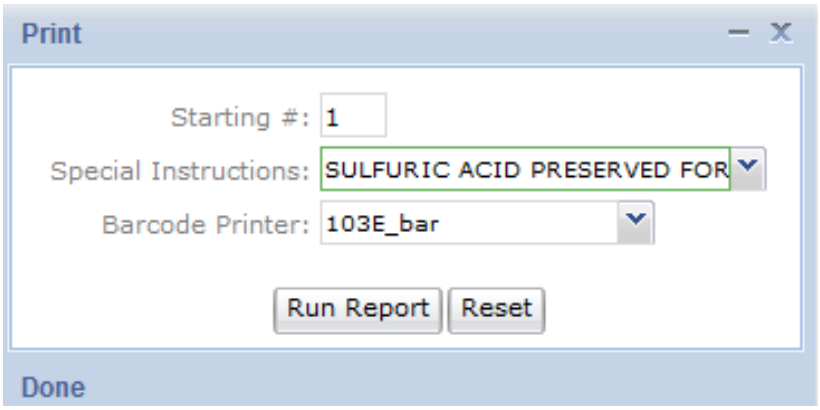
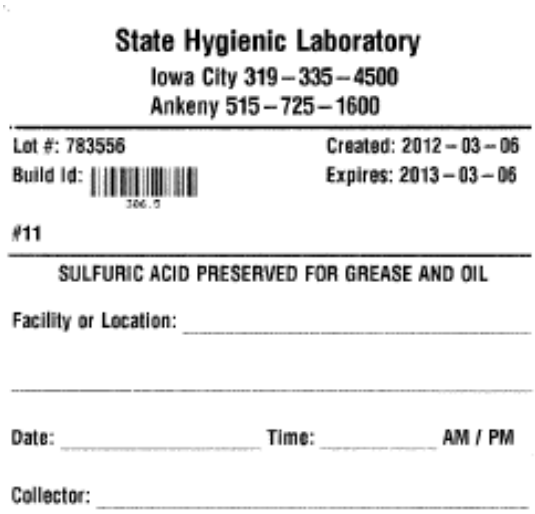


Figure 206 Kit Labels Print Screen

An example of a kit label is shown below.


State Hygienic Laboratory
Iowa City 319–335–4500
Ankeny 515–725–1600

Lot #: 783556 Created: 2012–03–06
Build Id: Expires: 2013–03–06

#11

SULFURIC ACID PRESERVED FOR GREASE AND OIL

Facility or Location: _____

_____

Date: _____ Time: _____ AM / PM

Collector: _____

Figure 207 Kit Label

7.8 INVENTORY TRANSFER

The Inventory Transfer Screen is used to manage the transfer of inventory items within stores and storage locations. After clicking the **Add** button, the user clicks on the **Add Row** button for each inventory transfer that he wishes to make. The item to be transferred is selected from the drop-down list available in the From Item field. The From Loc(ation) and On Hand fields are automatically entered with their respective values. The quantity to be transferred is entered by the user in the Qty field. Next, the "To Item" is selected from its drop-down list. If the item to be transferred is a bulk item, the Add To Exst (Existing) box may be checked. The "To Loc(ation)" is then selected from its drop-down list. When all inventory transfer fields have been completed, the **Commit** button is clicked.

The link to the Inventory Transfer module is found in the third section of the Inventory/Order Menu.

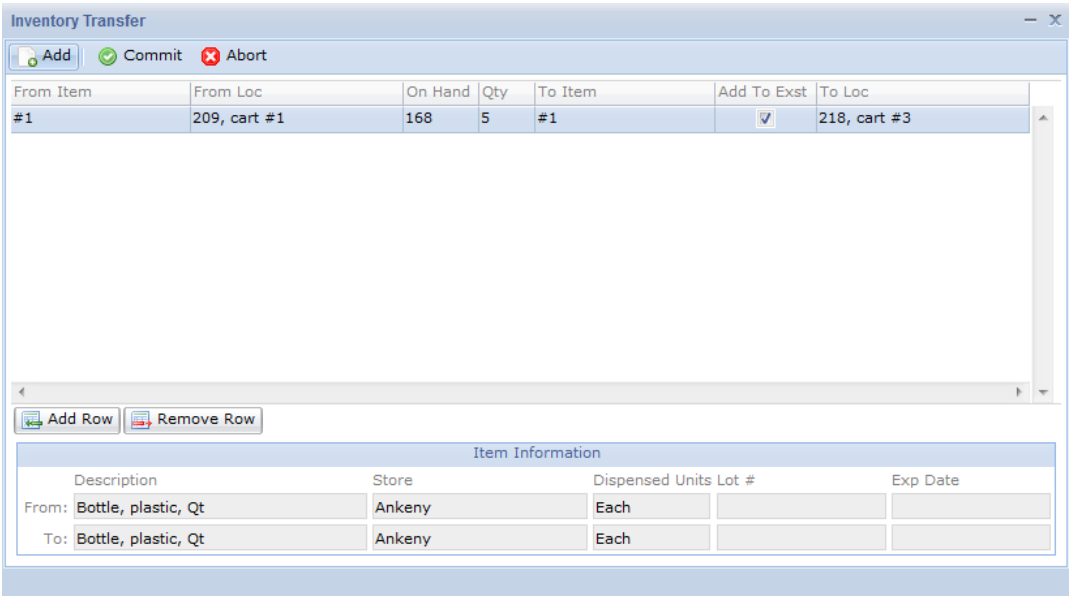


Figure 208 Inventory Transfer Screen

7.9 INVENTORY RECEIPT

The Inventory Receipt Screen is used to manage items that are placed into inventory from external sources.

The link to the Inventory Receipt module is found in the bottom section of the Inventory/Order Menu.

7.9.1 QUERYING INVENTORY RECEIPT RECORDS

Inventory Receipt records can be queried using the Ord(er) # or Ext(ernal) Order # fields.

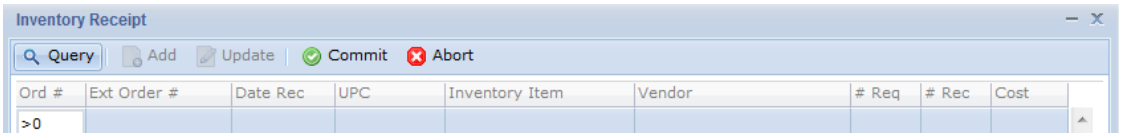


Figure 209 Inventory Receipt Screen - Querying by Order #

The top pane contains the following fields: Ord(er) #, Ext(ernal) Order #, Date Rec(eived), UPC (Universal Product Code), Inventory Item, Vendor, # Req(uired), # Rec(eived), and Cost (per item).

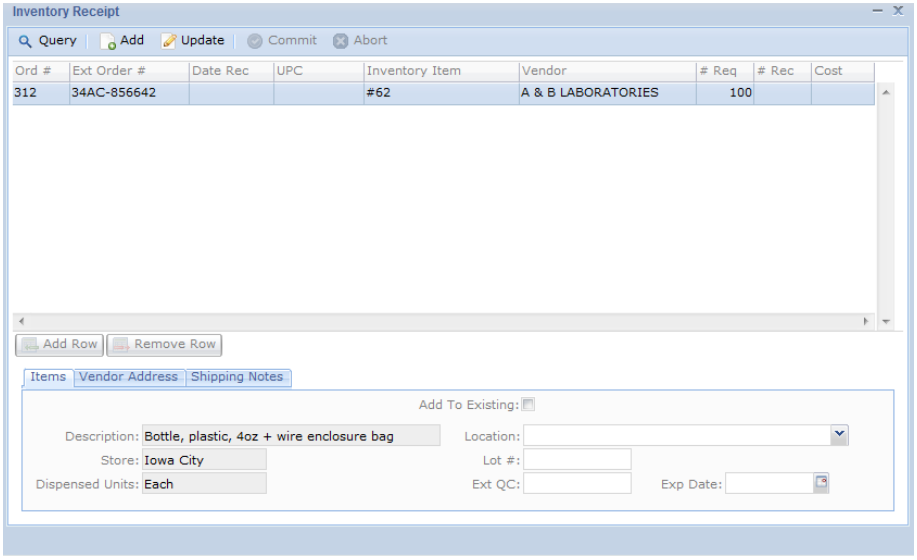


Figure 210 Inventory Receipt Screen

Selecting the desired inventory receipt row in the top pane displays the information in the lower pane. The lower pane has three tabs: Items, Vendor Address, and Shipping Notes. The Items tab has Description, Store, Dispensed Units, Add To Existing, Location, Lot #, Ext(ernal) QC, and Exp(iration) Date fields.

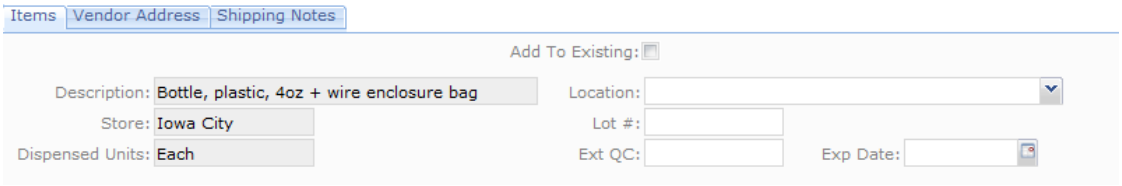


Figure 211 Inventory Receipt Screen - Items Tab

The Vendor Address tab displays the complete address of the vendor from which the inventory item was received.

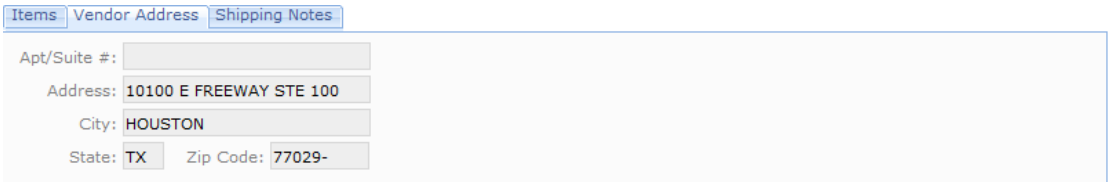


Figure 212 Inventory Receipt Screen - Vendor Address Tab

The Shipping Notes tab displays any relevant shipping information pertaining to this vendor order.

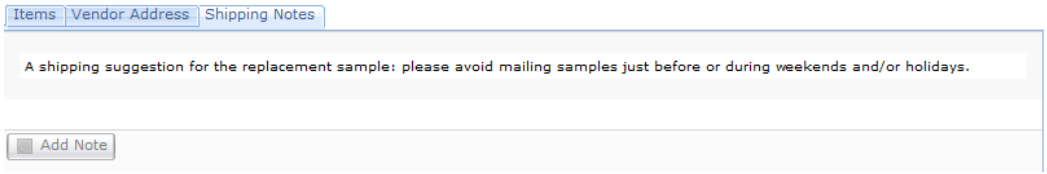


Figure 213 Inventory Receipt Screen - Shipping Notes Tab

7.9.2 UPDATING AN INVENTORY RECEIPT RECORD

First, the desired inventory receipt row in the top pane must be selected and the **Update** button must be clicked. The Date Rec(eived) for the item in that row can now be chosen. The # Rec(eived) for that item can be entered and the Cost (per item) can be adjusted, if necessary. A storage location must be chosen for the received items. It can be selected from the drop-down list in the Location field of the Items tab. Shipping notes may also be added through their tab in the lower pane of the screen.

7.9.3 ADDING AN INVENTORY RECEIPT RECORD

After clicking the **Add** button, the **Add Row** button must be clicked. Information may then be entered in the Date Rec, UPC, Inventory Item, Vendor, # Rec and Cost fields. A storage location must be chosen for the received items. It can be selected from the drop-down list in the Location field of the Items tab. If there is already a quantity of the selected item in inventory, the Add To Existing box in the Items tab may be checked. Lot #, Ext QC, and Exp Date values can also be entered in the Items tab depending upon the inventory item.

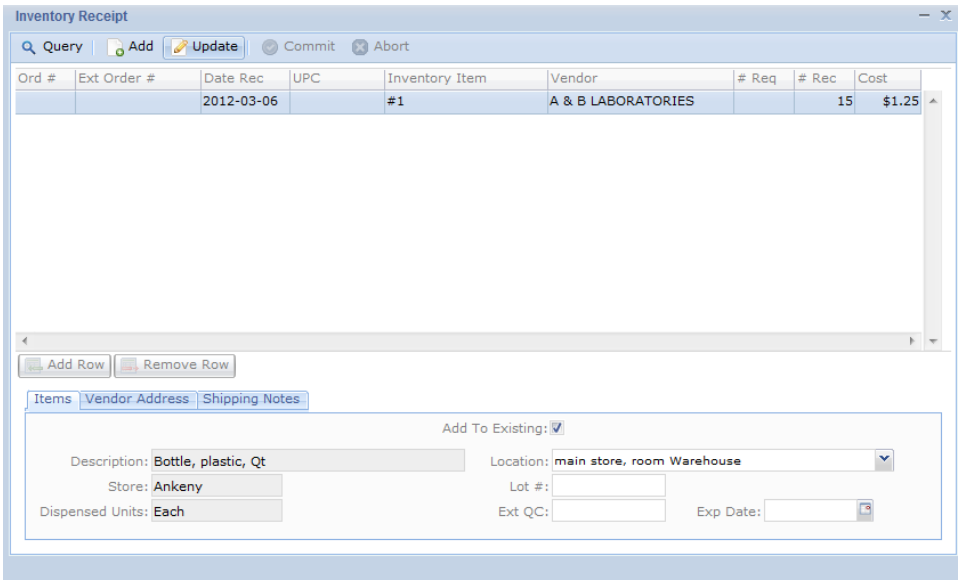


Figure 214 Adding an Inventory Receipt Record

7.10 INVENTORY ADJUSTMENT

The Inventory Adjustment screen is utilized for the management of discrepancies in inventory.

The link to the Inventory Adjustment module is found in the bottom section of the Inventory/Order Menu.

7.10.1 QUERYING INVENTORY ADJUSTMENT RECORDS

Inventory Adjustment records may be queried by most of the fields on this screen. The integer in the On Hand field reflects the current quantity of the inventory item accounted for by the OpenELIS system, not the quantity of the item that was accounted for by the system at the time of the inventory adjustment.

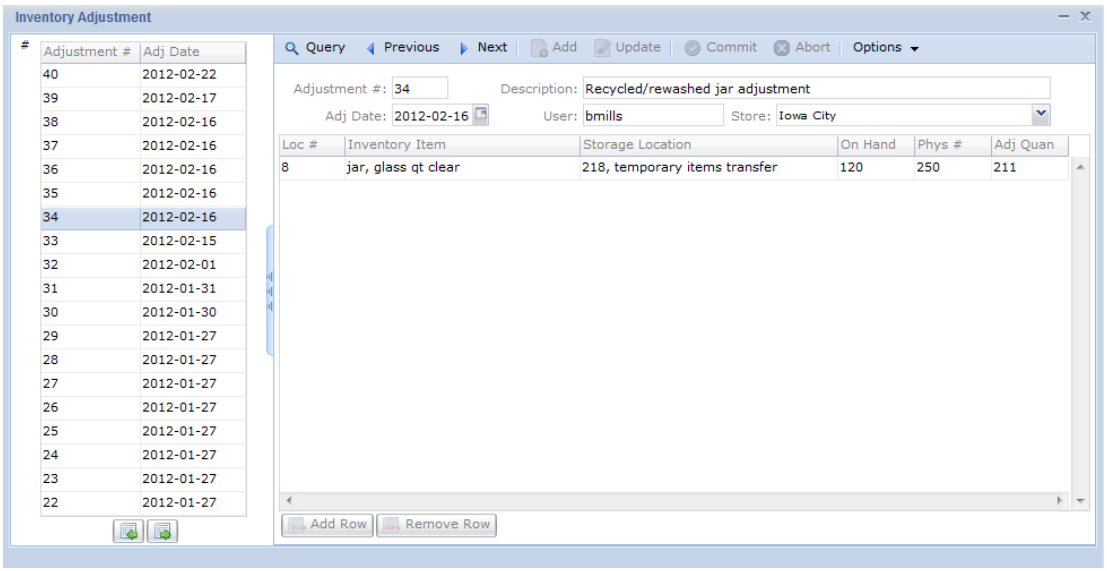


Figure 215 Querying an Inventory Adjustment Record

7.10.2 UPDATING AN INVENTORY ADJUSTMENT RECORD

After querying for and selecting the desired inventory adjustment record, it may be updated by clicking on the **Update** button. The following fields may be updated: Description, Adj(ustment) Date, Store, Loc(ation) #, Inventory Item, and Phys(ical) #.

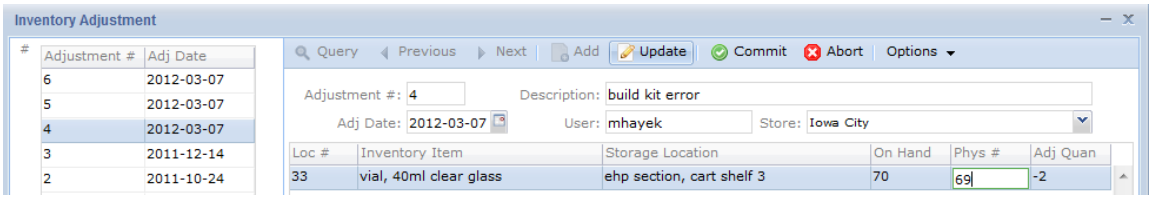


Figure 216 Updating an Inventory Adjustment Record

7.10.3 ADDING AN INVENTORY ADJUSTMENT RECORD

Click on the **Add** button to create an inventory adjustment. Values must be entered in the Description and Store fields. The Adj(ustment) Date and the User fields will be automatically entered, however, the Adj Date may be overridden. Click on the **Add Row** button. Next, the user will select the item to be adjusted from the drop-down list in the Inventory Item field.

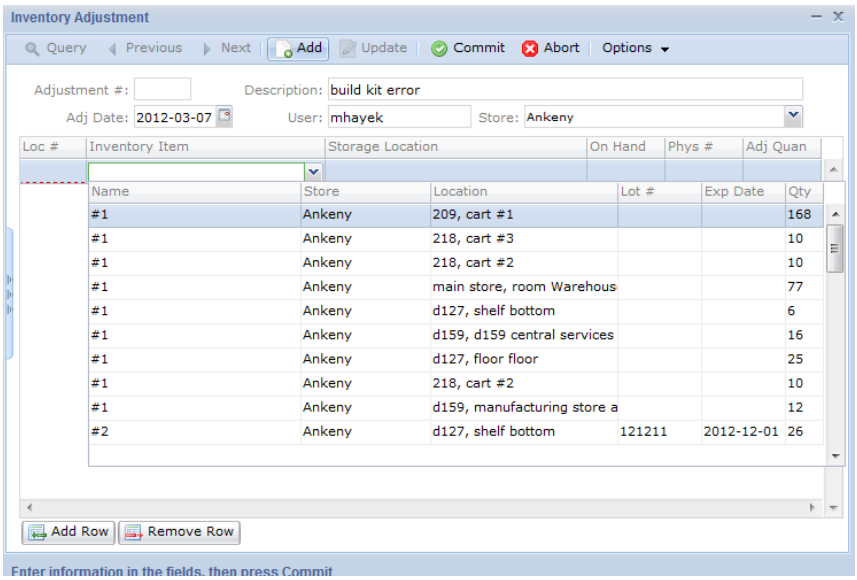


Figure 217 Adding an Inventory Adjustment Record

The Loc(ation) #, Storage Location, and On Hand (quantity accounted for in the OpenELIS system) will be automatically entered. The user enters the actual quantity of the item in the Phys(ical) # field. The Adj(ustment) Quan(tity) field will be automatically entered with the difference between the On Hand and Phys # values. A negative Adj Quan value indicates that there are fewer actual items in inventory than were previously accounted for by the system. A positive Adj Quan value indicates that there are more actual items in inventory than were previously accounted for by the system. When all desired adjustments have been entered, click the **Commit** button.

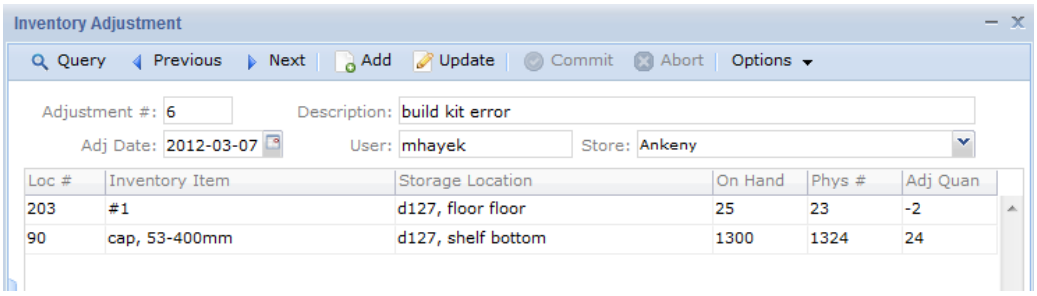


Figure 218 Completed Inventory Adjustment Record

CHAPTER 8. DEFINING TESTS AND METHODS

The Test , Method, and Panel modules define the testing procedures that are used in OpenELIS.

8.1 TEST DEFINITION

The Test module defines information about tests available in the OpenELIS database. Test information is managed by the OpenELIS Protocol Committee and the IT staff due to its various implications, such as result management, analytes result entry, and reporting.

Tests need to be defined and activated within the database before they can be assigned to a sample. Multiple test records can share a test name but only one test record can be active at a given time. This is accomplished by checking the Active box. Known as “test aging”, this allows the database to maintain information about old testing procedures and to create new tests as procedures change.

The Test Screen has three global fields that are displayed at the top regardless of which tab is selected: (test) Id, (test) Name, and Method. There can be multiple tests with the same test name, but with different methods and unique test Id’s. Each test has a short name that is used internally by SHL (the Name field). This name is used along with the Method short name wherever a test is entered throughout all internal screens.

The link to the Test module is located in the top section of the Maintenance Menu.

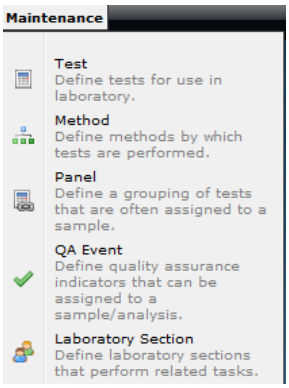


Figure 219 Maintenance Menu - Top Section

The following subsections describe the five tabs of the Test Screen: Test Details, Sample Type, Analytes & Results, Prep Test & Reflex Test, and Worksheet Layout.

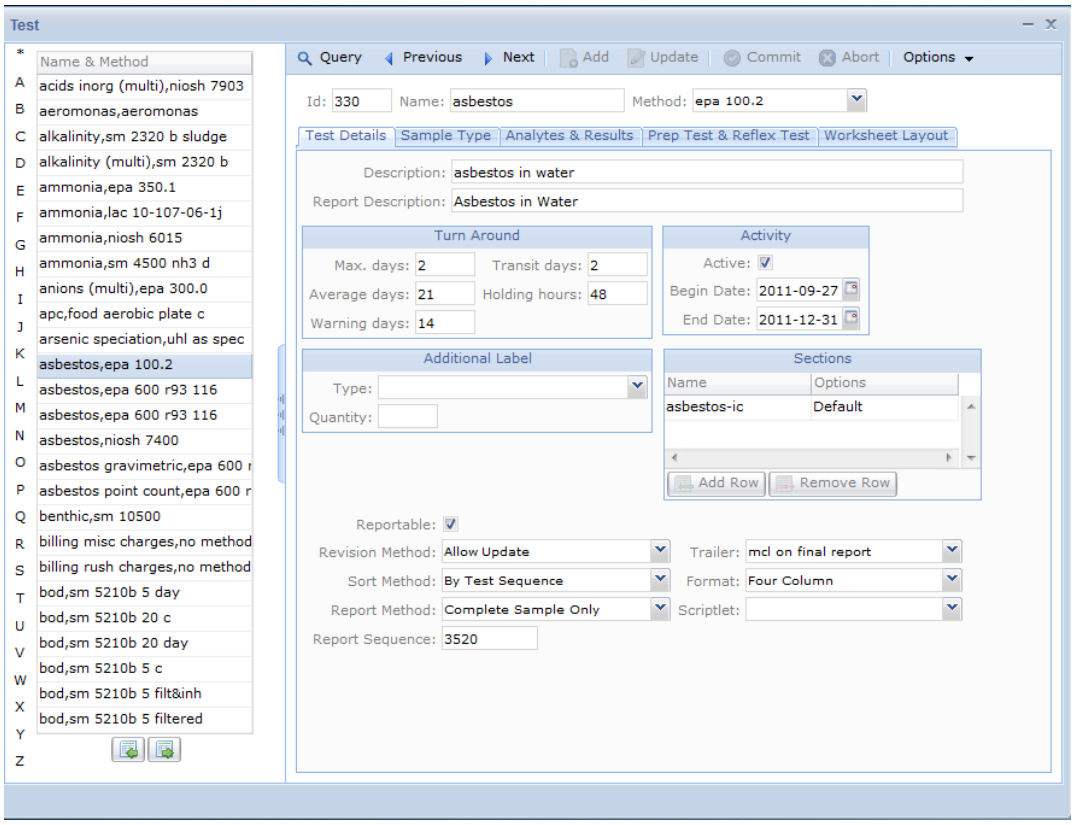


Figure 220 Test Screen

8.1.1 TEST DETAILS TAB

The first field on the Test Details Tab, Description, is also used internally, but it is a longer and more descriptive version of the test name. The Report Description field is used in the Final Report and other reports that are generated for organizations.

The Turn Around section of this tab shows laboratory workflow information related to this test and method. The Turn Around fields are Max. days, Average days, Warning days, Transit days, and Holding hours. Holding Time is the maximum number of hours from time of sample collection to the time the analysis should begin.

The Additional Label section (Type and Quantity) are used to create additional barcode labels. See SAMPLE LABELS for more information about printing additional barcode labels.

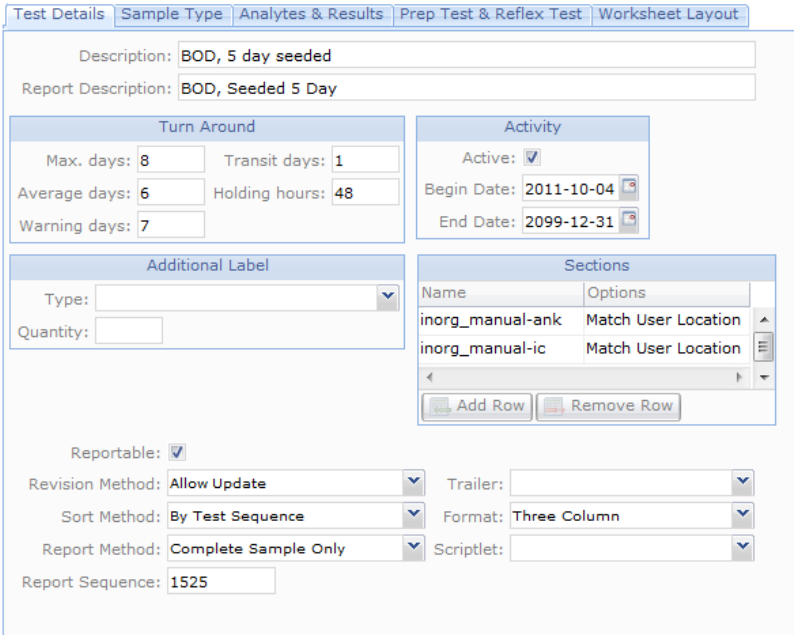


Figure 221 Test Screen - Test Details Tab

The Activity section of this tab shows whether the test is active or has been aged out. Active tests will have this box checked. There are also fields for the beginning and ending dates of the test.

The section of the Test Details Tab entitled “Sections” lists the SHL laboratory sections that are authorized to perform this test. The Name of the lab section is displayed in the first

column and the Options (Default or Match User Location) are displayed in the second column.

The bottom section of the Test Details Tab has a miscellaneous grouping of fields including Reportable, Revision Method, Sort Method, Report Method, Report Sequence, Trailer, Format, and Scriptlet. The Revision Method options are Allow Update, Copy and Update, and Ask. The Sort Method options are As Analyses Complete and By Test Sequence. The Report Method choices are As Analyses Are Released and Complete Sample Only. The Report Sequence specifies the order that the test is displayed on the Final Report. A test with a Report Sequence of 1 would be printed first on the Final Report. The Trailer field specifies the name of the test trailer that will be printed on the Final Report. The Format field specifies the number of columns that will be used to print out the analysis results on the Final Report. The choices include: one, two, three, four, five, and six equally-sized columns, four columns with a wider column for a long analyte name, and five columns with a wider column for a long analyte name.

8.1.2 SAMPLE TYPE TAB

The Sample Type Tab lists all of the possible types of samples that can be analyzed with that specific test and method. There are only two columns on this tab: Sample Type with its corresponding Unit of Measure. An example of the Sample Type Tab is shown below.

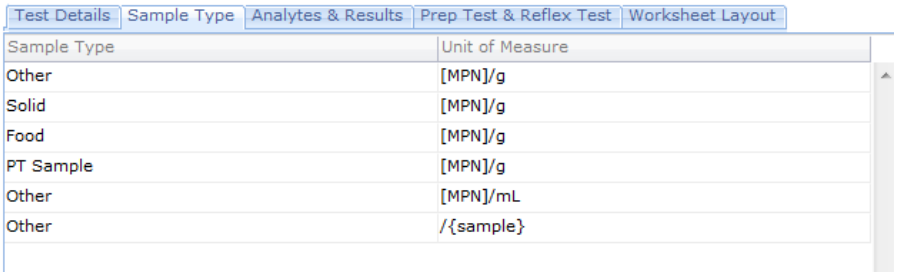


Figure 222 Test Screen - Sample Type Tab

8.1.3 ANALYTES & RESULTS TAB

The Analytes & Results Tab displays information about acceptable result values and types (among other things) for each analyte for that particular test.

8.1.3.1 INTERPRETING INFORMATION ON THE ANALYTES & RESULTS TAB

The upper table of the Analytes & Results Tab of a typical test may display the column headings Analyte, Value, Quant Limit, and MCL. The integer in each of the fields (Value, Quant Limit, and MCL) designates the subtab of the lower table that displays the details for that parameter. The details of each subtab may be displayed by either clicking directly on the subtab in the lower table or by clicking on the corresponding integer in the upper table. For example, the Value Subtab 1 (see Test Screen - Analytes & Results Tab – Value Subtab) illustrates that for the analyte Chlorite's result value, its unit is not specified, its value must have a type of numeric, and its value must be in the range of 0 to 100,000.

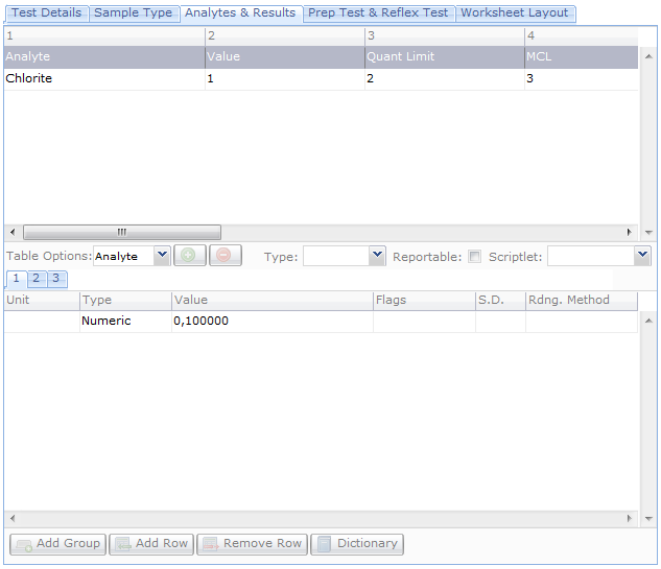


Figure 223 Test Screen - Analytes & Results Tab – Value Subtab

The Quant Limit Subtab 2 (see Test Screen - Analytes & Results Tab – Quant Limit Subtab) shows two acceptable units for this parameter: mg/L and ug/L. The paired entries in this table define that a quant limit with a unit of mg/L must have a numeric type and its value must be in the range of 0 to 100,000 with a default value of 0.04 mg/L. A quant limit with a unit of ug/L must have a numeric type and its value must be in the range of 0 to 100 with a default value of 20 ug/L.

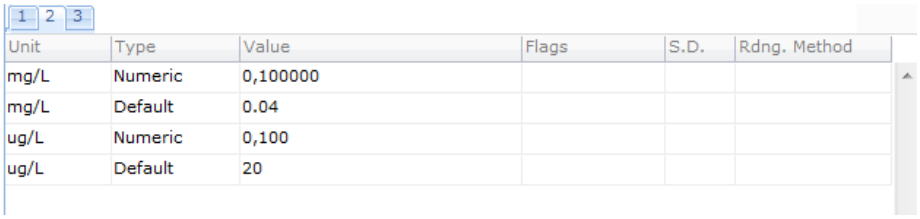


Figure 224 Test Screen - Analytes & Results Tab – Quant Limit Subtab

The MCL Subtab 3 (see Test Screen - Analytes & Results Tab – MCL Subtab) illustrates that the Maximum Contaminant Level (MCL) must have a unit of mg/L, a type of numeric, a value in the range of 0 to 1.1, and a default value of 1.0 mg/L.

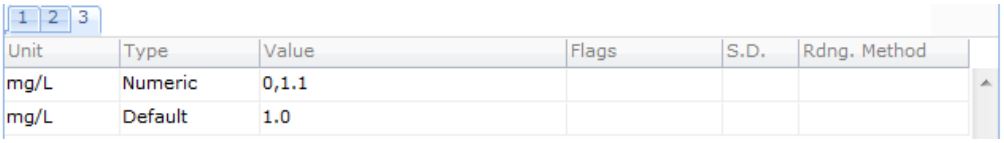


Figure 225 Test Screen - Analytes & Results Tab – MCL Subtab

8.1.3.2 ADDING/UPDATING INFORMATION ON THE ANALYTES & RESULTS TAB

The options and buttons in the middle of the Analytes & Results Tab are used to build the upper table on this tab. There are three choices for Table Options: Analyte, Column, and Header. After the choice is selected, the button must be clicked. The Analyte name and column headers can be chosen from the drop-down list or text entered. The button is used to remove a row from the upper table.

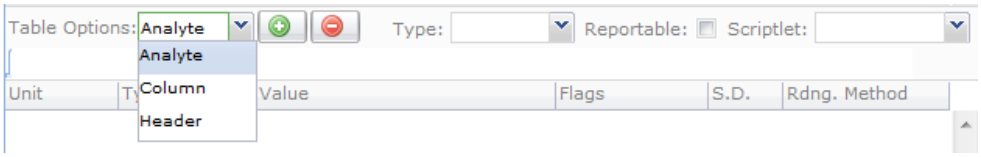


Figure 226 Test Screen - Middle of Analytes & Results Tab – Table Options

The Type field specifies whether the analyte is Required, Optional, Read Only, or Supplemental. The box labeled Reportable should be checked if the result of the analysis needs to be listed on the Final Report.

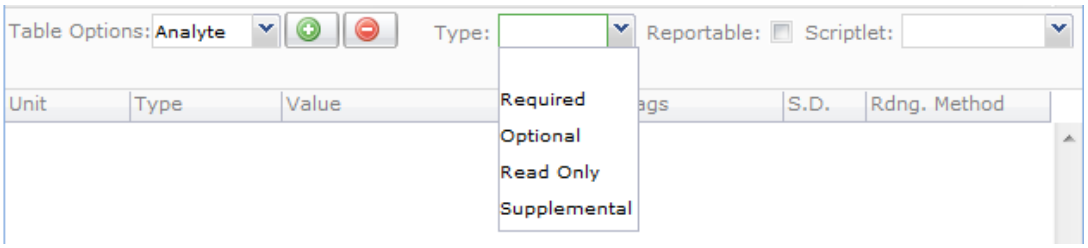


Figure 227 Test Screen - Middle of Analytes & Results Tab – Type

The buttons at the bottom of the Analytes & Results Tab are used to build the lower table on this tab. The **Add Group** button creates an analyte group in this table represented by the information on its own subtab. The **Add Row** button creates a row in the lower table. The fields in each row consist of Unit, Type (Dictionary, Numeric, Titer, Date, Date-Time, Time, Default, Alpha Lowercase, Alpha Uppercase), Value, Flags, S.D. (Standard Deviation), and Rdng. (Rounding) Method. The **Remove Row** button removes a row in the lower table, and the **Dictionary** button pops up the Dictionary Entry Selection Screen to aid in completing this table.

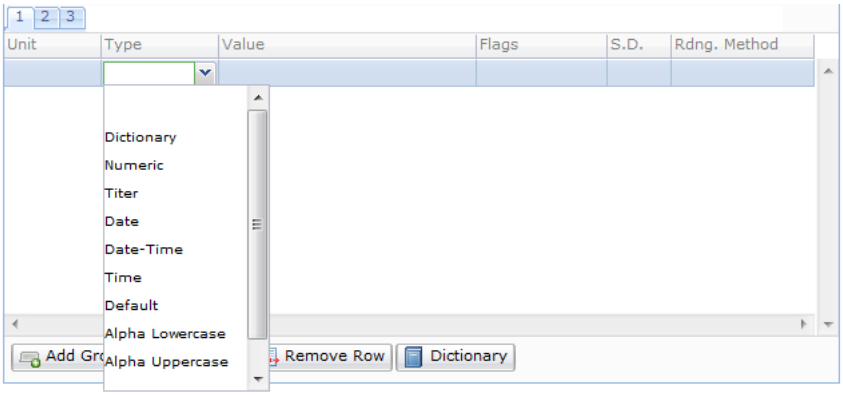


Figure 228 Test Screen - Lower Table of Analytes & Results Tab – Type

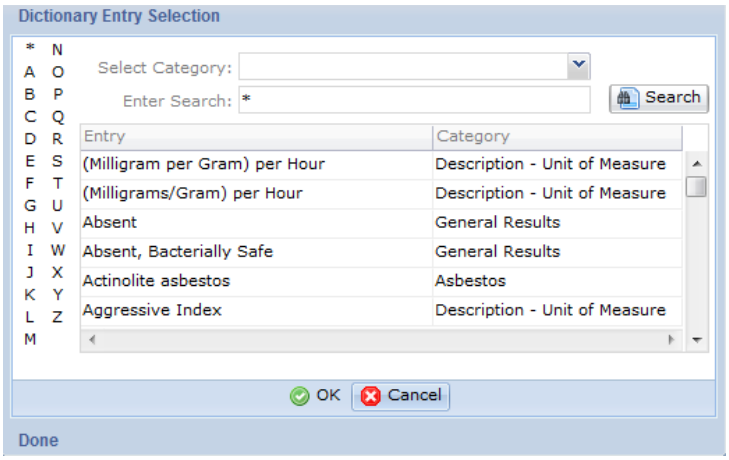


Figure 229 Dictionary Entry Selection Screen

8.1.4 PREP TEST & REFLEX TEST TAB

A prep test is a test that is done in preparation for another test. A prep test may be mandatory or optional. The upper table on the Prep Test & Reflex Test Tab of the Test Screen specifies the prep test(s) and their corresponding method(s) for the chosen test. The box labeled Optional will be checked if the prep test is not mandatory.

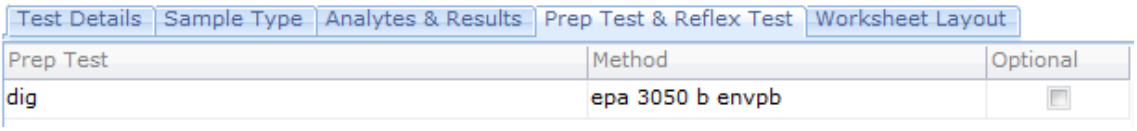


Figure 230 Test Screen - Prep Test & Reflex Test Tab – Prep Test Table

A reflex(ed) test is another test that may be required to be performed if the result of the chosen test for the designated analyte falls within a certain range. The information pertaining to the reflex test(s) is found in the lower table on the Prep Test & Reflex Test Tab of the Test Screen. The Reflex Test name and corresponding Method is located in the first two columns. The name of the test analyte that may trigger the reflex test to be conducted is located in the Analyte column. The range of results that may trigger the reflex test to be conducted is found in the Result column. The Flags field has the following options: Auto-Add (automatically add the reflex test to the sample regardless of whether or not it has already been added), Prompt (ask the analyst if the reflex test should be added to the sample regardless of whether or

not it has already been added), Auto-Add, Non-duplicate (automatically add the reflex test to the sample if it has not already been added), or Prompt, Non-duplicate (ask the analyst if the reflex test should be added to the sample if it has not already been added).

Reflex Test	Method	Analyte	Result	Flags
metal	epa 200.8 uranium dw	Gross Alpha including Uranium	15,1000000	Prompt, N
gross alpha adjusted	epa 900.0/200.8	Gross Alpha including Uranium	15,1000000	Prompt, N
turbidity	sm 2130 b screen	Gross Alpha including Uranium	15,1000000	Prompt, N

Figure 231 Test Screen - Prep Test & Reflex Test Tab – Reflex Test Table

8.1.5 WORKSHEET LAYOUT TAB

The Worksheet Layout Tab provides details of how the worksheet that corresponds to the test was constructed. The Format field provides the name of the worksheet template that was utilized to create the specific test worksheet. The Subset Capacity specifies the maximum number of analyses that can be conducted in a subset of the total (e.g. 96 for a 96-well plate). The Total Capacity specifies the maximum number of analyses that can be conducted on the worksheet.

In the QC Items table the column labeled Position specifies the exact position of that QC item in the test run (e.g. Position 1 would indicate the first well on a plate). The column named Type has the following options for QC items: Fixed, Fixed Always, Duplicate, Random, Last of Subset, Last of Run, Last of Subset & Run. For example, a QC item with a “fixed” position of 10 will only show up on the worksheet if the run is large enough to get to the 10th position. A QC item with a “fixed always” position of 10 will be displayed on the worksheet regardless of whether or not the run is large enough to get to the 10th position. A QC item with a type of “duplicate” will be a copy of the QC item that is found in the preceding position. A QC item with a type of “random” will be located in a randomly determined position. A QC item specified with a type of “last of subset” will always be located in the final position of the subset (e.g. the last well on the plate). A QC item with a type of “last of run” will always be located in the final position of the run. Finally, a QC item specified as “last of subset & run” will occupy only one position (the final position) which will be considered as both the

last of the subset **and** the last of the run. The column labeled QC Name specifies the name of the QC item.

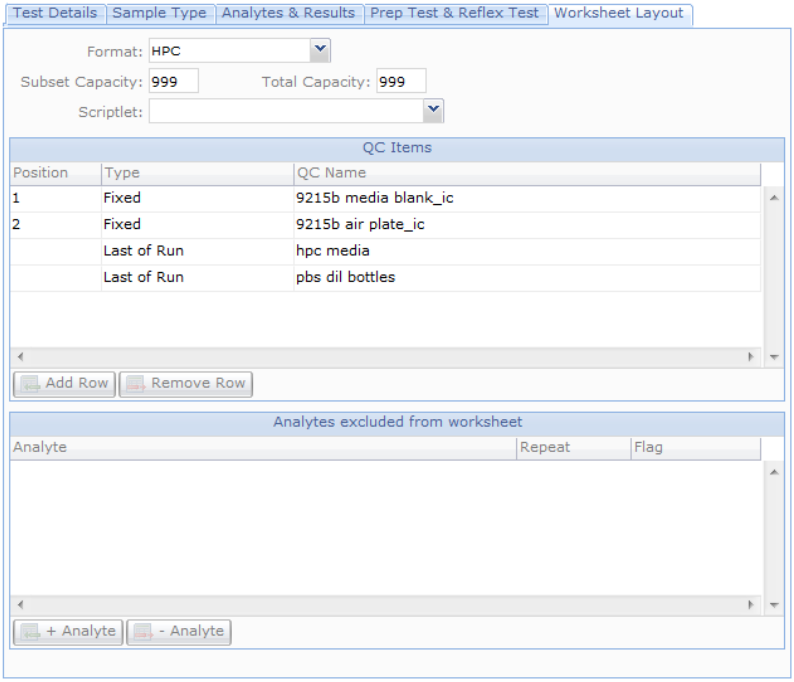


Figure 232 Test Screen - Worksheet Layout Tab

The table entitled “Analytes excluded from worksheet” on The Worksheet Layout Tab of the Test Screen lists the analytes that will not be found on the worksheet, along with the fields of Repeat and Flag. The Repeat field contains an integer which specifies the number of times to exclude this analyte from the worksheet. The Flag field has the options of Choose Highest, Average, Choose Lowest, Standard Deviation, and Median. The **+ Analyte** and **– Analyte** buttons are used to add and delete analytes from this table, respectively.

8.2 METHOD

The Method screen displays a full description of each testing method. Methods are required for each test defined within the OpenELIS database. The link to the Method screen is located in the top section of the Maintenance Menu.

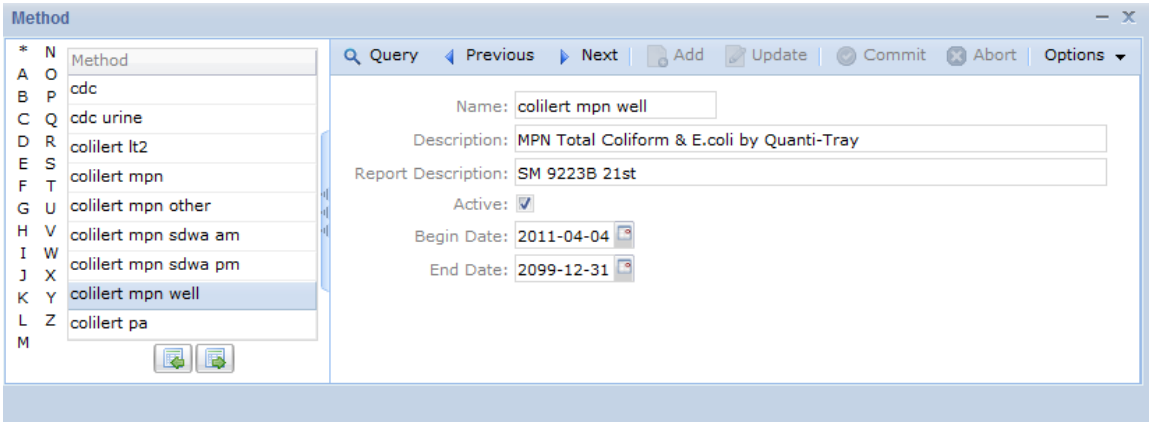


Figure 233 Method Screen

The name of the method is specified in the Name field. The Description field is a longer and more detailed explanation of the method. Both of these fields are used internally on analysis screens in OpenELIS. The Report Description field is used in the Final Report and other reports for organizations to specify the method. The Active field is a checkbox which should be checked for all active methods. The starting date for the method is specified in the Begin Date field. The last date for which the selected method was or can be used is detailed in the End Date field.

8.3 PANEL

The Panel screen allows tests to be grouped under a single name. For example, the “rad alpha exclu only” test panel, described below as “Panel- gross alpha (excluding uranium) only”, will assign those tests (gross alpha, gross alpha adjusted, metal, and env acceptance) and methods to the sample.

The link to the Panel screen is located in the top section of the Maintenance Menu.

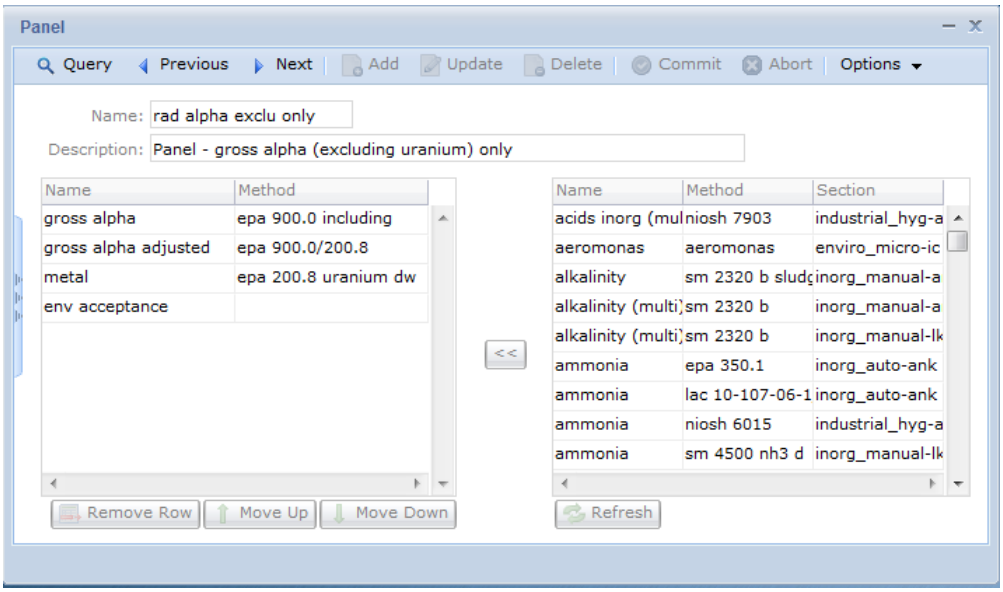


Figure 234 Panel Screen

To create a panel, click on the **Add** button, and specify a name and description for the panel. Next, select tests from the available ones in the right-hand pane, and move them to the left-hand pane by clicking on the double arrow button. The buttons on the bottom of the screen allow for the tests to be placed in a specific order (**Move Up**, **Move Down**), or for a test to be deleted from the panel (**Remove Row**).

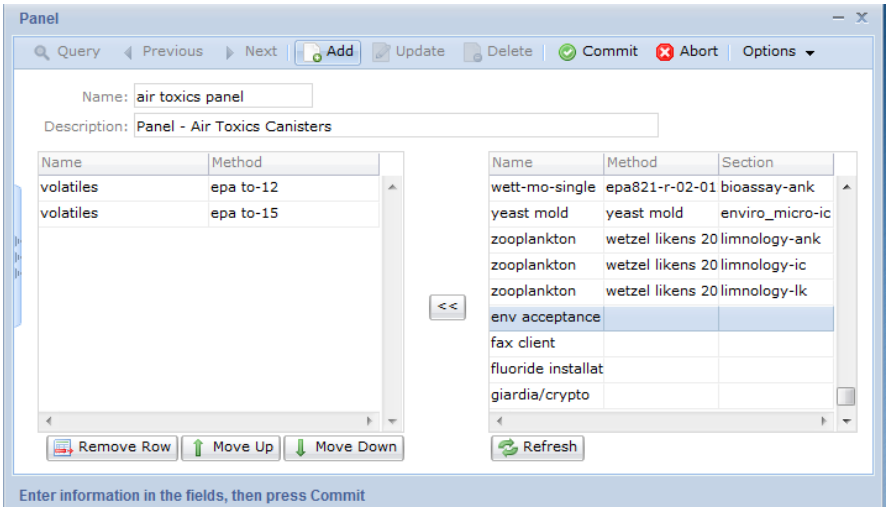


Figure 235 Creating a Panel

CHAPTER 9. DEFINING NEW QUESTIONS (ANALYTES) AND ANSWERS (DICTIONARY)

9.1 ANALYTE

The Analyte screen defines the chemicals and other substances that are used to perform an analysis. The fields on this screen consist of Name, Parent Analyte, External Id, and Active. Any of these fields can be used to query.

The link to the Analyte screen is located in the second section of the Maintenance Menu.

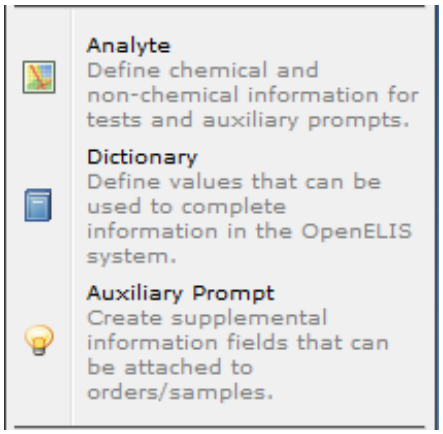


Figure 236 Maintenance Menu – Second Section

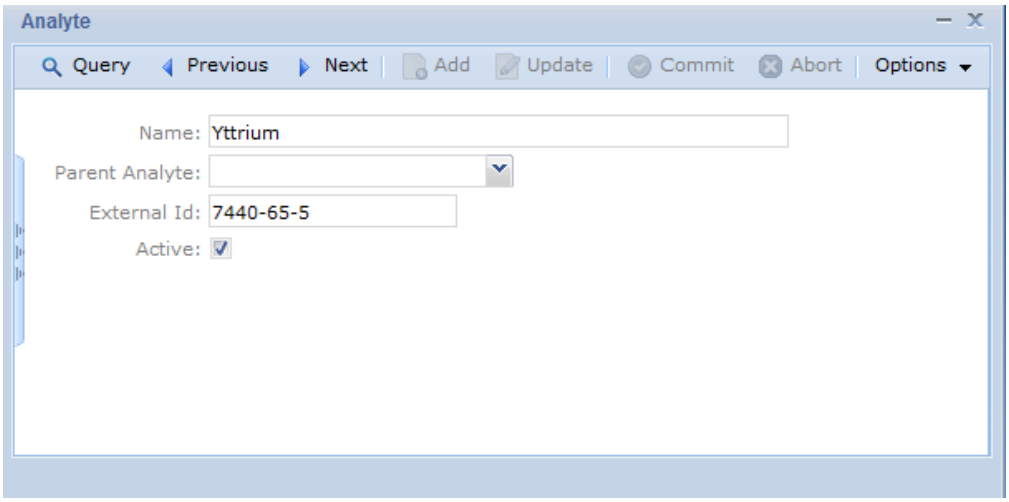


Figure 237 Analyte Screen

The Name field lists the name of the analyte. The field known as Parent Analyte displays which other analyte is the predecessor of this analyte. The External Id field normally contains a numerical value assigned by . The Active checkbox shows the availability of the analyte to be used in the OpenELIS system.

9.2 DICTIONARY

The Dictionary screen contains categorizations and definitions of terms used in the OpenELIS system. The upper pane contains the information that is related to the selected dictionary category.

The link to the Dictionary screen is located in the second section of the Maintenance Menu.

The first field in the upper pane is entitled Category Name. The dictionary is arranged by this field. The second field, Description, contains a more detailed explanation of the Category Name. If completed, the Section field specifies the SHL laboratory section that utilizes this dictionary category. The System Name field contains the name of the selected category as it is used by the system code. The System Name is always lowercase and uses underscores instead of spaces. The System checkbox denotes those categories that are part of the system software. Categories that are not marked as “System” are used for analysis results and auxiliary data values.

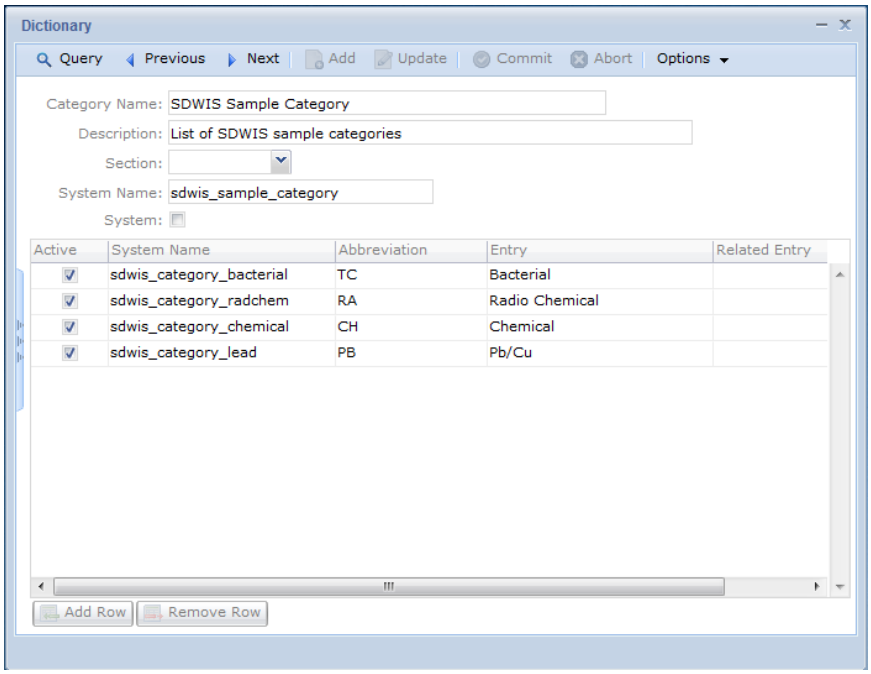


Figure 238 Dictionary Screen

The table in the lower pane of the Dictionary Screen contains the dictionary entries for each dictionary category. Each category may contain numerous dictionary entries for use in the system. The first column (Active) holds checkboxes for marking each entry as being active in the system or not. This column is followed by the System Name, Abbreviation, Entry (name), and Related Entry, if applicable. The System Name is used as the name for the variable in the software code, whereas, the Entry name is how the variable is specified as an option in a drop-down list.

The dictionary can be queried using any field on the Dictionary Screen.

9.3 AUXILIARY PROMPT

The Auxiliary Prompt screen defines the organization and parameters relating to auxiliary data. Auxiliary data is information that is collected and recorded that can be considered as supplemental to testing results. Any field on this screen can be used to conduct a query.

The link to the Auxiliary Prompt screen is located in the second section of the Maintenance Menu.

The upper pane contains the global fields that define the selected auxiliary group. The first field, Group Name, contains the actual name of the auxiliary group. The Description field provides a more detailed explanation of the group name. The Active checkbox denotes whether the auxiliary group is active in the system or not. The Begin Date and End Date fields contain the starting and expiration dates for the auxiliary group.

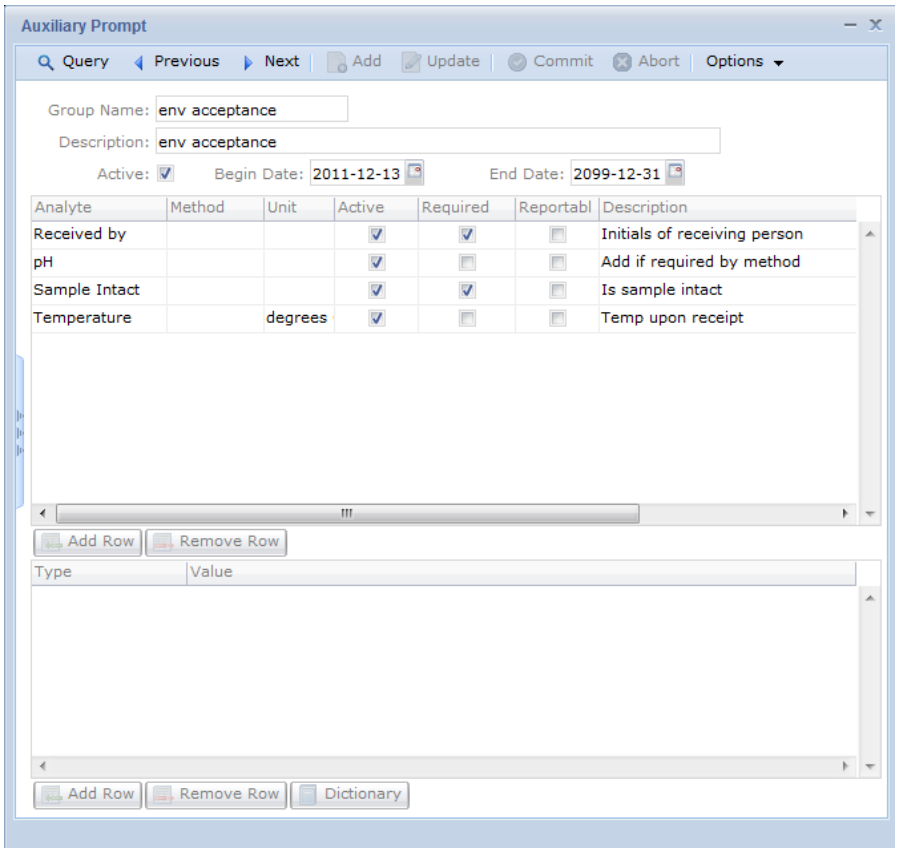


Figure 239 Auxiliary Prompt Screen

The middle pane is comprised of a table consisting of the following columns: Analyte, Method, Unit, Active, Required, Reportable, Description, and Scriptlet. The Analyte column contains the individual auxiliary data items that make up the auxiliary group. The Method field contains the lone testing method associated with the analyte, if

applicable. The Unit field specifies the measurement unit for the analyte. The Active checkbox denotes whether the auxiliary item is active in the system or not. The Required checkbox and the Reportable checkbox specify whether each item is mandatory and/or displayed on the Final Report, respectively. The Description field provides a more complete explanation of the auxiliary item.

The lower pane of the Auxiliary Prompt Screen …

CHAPTER 10. SUPPORT MODULES

The OpenELIS Support Modules define such diverse entities as storage units and locations, testing instruments, test trailers, standard notes, labels, laboratory sections, and QA events. This chapter describes each of these modules.

10.1 QA EVENT

QA (Quality Assurance) events are the circumstances surrounding the sample and/or an analysis. Sample QA events are usually general in nature, while Analysis QA events can be general or test-specific. For example, the QA event named "sample leaking" when attached at the sample level will place the following statement in boldfaced type near the top of the Final Report: "Sample was leaking upon receipt. Integrity of sample is questionable." QA events can also be used for missing information on the sample collection form.

Note: **Not analyzed. No sample information form received. Information was taken from container label. Collection time of sample to receipt in laboratory (holding time) was outside the acceptable limits.**

Figure 240 Sample Level QA Events on the Final Report

QA events can also be selected at the analysis level in OpenELIS. They are listed as a note in boldfaced type below the appropriate analysis on the Final Report.

Nitrate + Nitrite as NO3, EPA 353.2

Units	mg/L	Analyzed In	Iowa City
Date Analyzed		Date Verified	2012-03-07 10:32
Analyst		Verifier	CLL

Note: **Not analyzed. Improper sample bottle was received for the test requested.**

Figure 241 Analysis Level QA Events on the Final Report

QA events will be listed on the Final Report in the order selected (unless there is an integer in the Sequence field of the QA Event screen). Internal QA events are never printed on Final Reports. They have a name that begins with "i-".

QA events can be tracked in the OpenELIS database and can be used to keep control/track of processes internally if and only if related to clients (for internal QA events only).

The QA Event screen may be accessed through the link in the top section of the Maintenance Menu. It is used to enter new QA events into the LIMS, or to look up any existing QA event, by querying in the Name, Description, Type, Test, Billable, or Sequence fields. This screen provides internal information as well as the text of the QA event that appears on the Final Report.

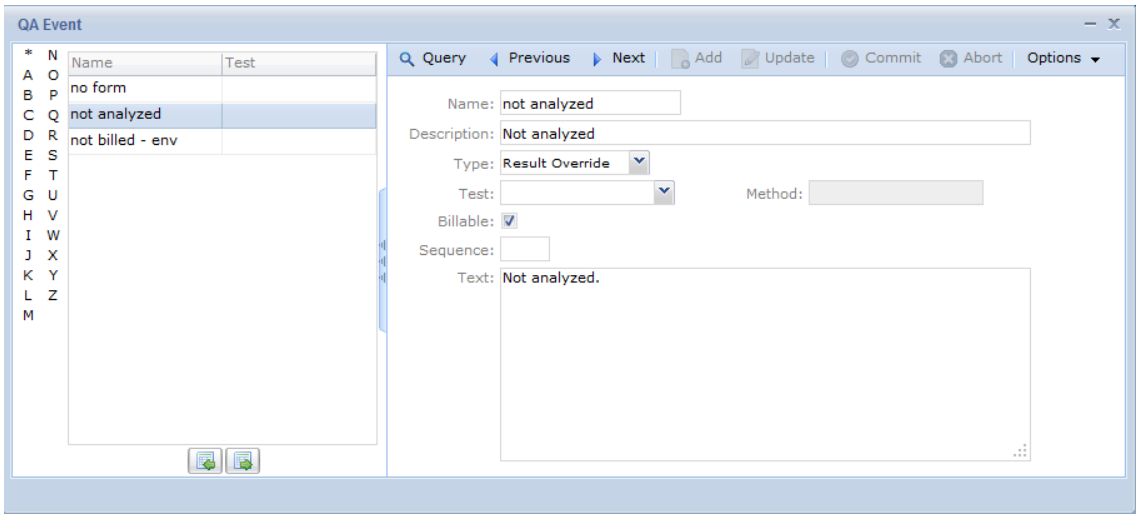


Figure 242 QA Event Screen

Each field of the QA Event screen is explained below.

Name

Each QA event has a short name that is used internally by the laboratory.

Description

The Description field is used internally but is a longer, more detailed explanation of the name.

Type

The field specifies which type (Internal, Result Override, or Warning) the QA event is categorized as. The QA event has to be set to one type by default.

Internal QA events are for lab use only and do not appear on the Final Report. For example, " i-fax" is a faxed Final Report and this QA event can be tracked and used to keep statistics on the number of Final Reports that an organization requests to have faxed.

Result Override QA events will appear in place of a result when an event prohibits the sample from being released with an analysis result; however, a test still needs to be assigned to the sample in order to have the QA event linked to the proper analysis. For example, the "container not rec'd" QA event will show the following statement in place of the results on the Final Report: "Test was not performed because the laboratory did not receive the required container."

Warning QA events appear on the Final Report in addition to the analysis result. For example, the "client contamination" QA event will display "Information from sender indicates possible sample contamination." in addition to the result.

QA events will be listed on the Final Report in the order that they were selected. It is strongly recommended not to use more than three QA events for any given sample and to list the Result Override QA event(s) first for clarity and brevity.

Test and Method

These fields specify the test and method to which this QA event is associated. These fields are empty for general QA events. General QA events are used by many sections of the laboratory; whereas, test-specific QA events can only be assigned to the designated test and method. Test-specific QA events will only be displayed in drop-down lists for their corresponding analyses.

Billable

The billable checkbox shows the default behavior of the QA event. QA events that are not checked as billable will override the charging for an analysis. For example, when the QA event "lab accident" is assigned to an analysis that is routinely billed, the QA event overrides the billing, and that analysis will not be charged. The billable checkbox can still be selected or unselected by the user at the time that the QA event is assigned.

Sequence

The Sequence field is the integer that specifies the order in which QA events are displayed on the Final Report. QA events without an integer entered in the Sequence field will appear first on the Final Report; followed by QA events in ascending numerical order.

Text

The Text field displays the explanation of the QA event as it will be displayed to the client on the Final Report.

For general information about QA events, please see QA EVENTS TAB and QA EVENTS.

10.2 LABORATORY SECTION

The purpose of the Laboratory Section screen is to define service groups within the laboratory that perform related testing or other work. The purpose of defining laboratory sections using this screen is three-fold.

- To assign appropriate OpenELIS permissions to employees.
- For defining and linking tests with a particular laboratory section.
- To link e-mail notifications for certain testing thresholds (e.g., MCL violations, turnaround time warnings and maximums) to designated employees of that laboratory section.

The Laboratory Section screen may be accessed through the link in the top section of the Maintenance Menu. An explanation of each field on this screen is displayed below.

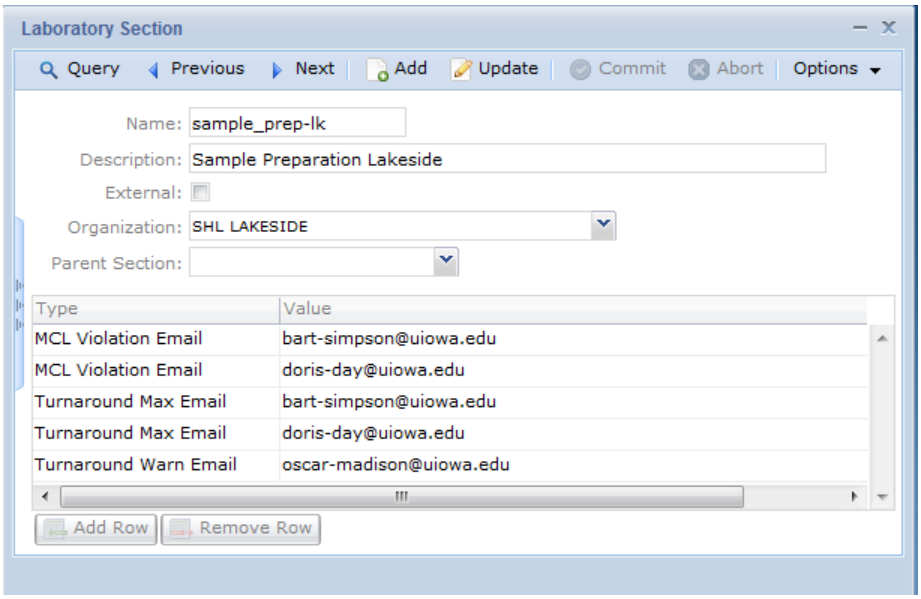


Figure 243 Laboratory Section Screen

Name

This field contains an abbreviated section name.

Description

This field holds the complete section name.

External

This field is a checkbox indicating if this section is external to the laboratory.

Organization

This field contains the name of the organization which encompasses this laboratory section (e.g., SHL LAKESIDE, SHL ANKENY). It is a drop-down and auto-complete field.

Parent Section

This drop-down and auto-complete field is designed to be used for the major sections of the laboratory when there are subsections.

Type and Value

These fields specify the type of laboratory section parameter and their associated values. The three parameter types currently in OpenELIS are all system-generated e-mail notifications: MCL Violation Email, Turnaround Warn(ing) Email, and Turnaround Max(imum) Email. The values for each of these three types consist of the e-mail addresses of designated employees belonging to that lab section.

10.3 LABEL

The third section of the Maintenance Menu contains the links to open the Label, Standard Note, and Trailer for Test screens.

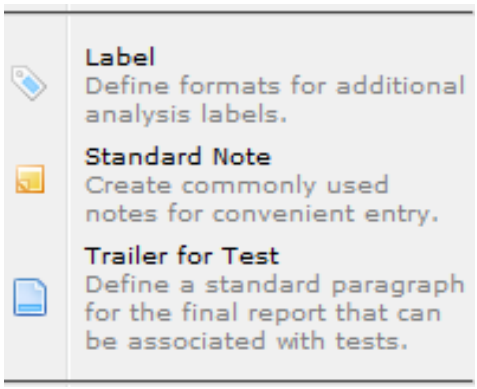


Figure 244 Maintenance Menu – Third Section

The Label module has not yet been implemented.

10.4 STANDARD NOTE

Standard notes are used to explain a commonly occurring sample condition/requirement or analysis result. External standard notes will appear on the Final Report so that their message can be conveyed to the client. Internal standard notes will only appear in the internal LIMS and will not be displayed on the Final Report. They are meant to provide an explanation to fellow employees and serve as documentation. Standard notes can be applied at the sample or analysis level depending upon the scope of the explanation. See ANALYSIS NOTES TAB and STANDARD NOTE SELECTION SCREEN for more information on how to search, insert, and edit analysis and sample standard notes.

The link to the Standard Note screen is located in the third section of the Maintenance Menu.

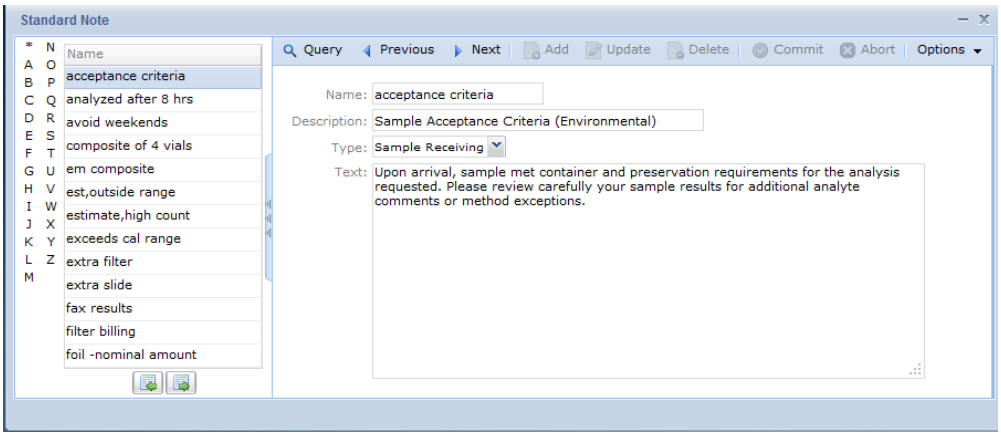


Figure 245 Standard Note Screen

All of the fields of the Standard Note screen may be used to query for standard notes, except for the text field.

An explanation of each field of the Standard Note screen follows.

Name

This is a short name for the standard note and it is designed for internal use only.

Description

The Description field offers a longer explanation for the use of the standard note.

Type

These are the pre-defined categories for standard notes. The types include: Analysis – Analytical Services, Analysis – Enviro. Micro., Billing, Client Services, General, Sample Receiving, and Shipping.

Text

This field contains the exact text of the standard note. This text is printed on the Final Report if this standard note is selected as an external note. It can be edited, as necessary, during the selection process.

10.5 TRAILER FOR TEST

The Trailer for Test screen allows you to define a block of standard information that is associated with a test. A test trailer is often an explanation of how the test was conducted, how the results should be interpreted, or it may contain an accreditation laboratory ID. A test can have only one test trailer, and the trailer cannot be changed based on the test results.

The link to the Trailer for Test screen is located in the third section of the Maintenance Menu.

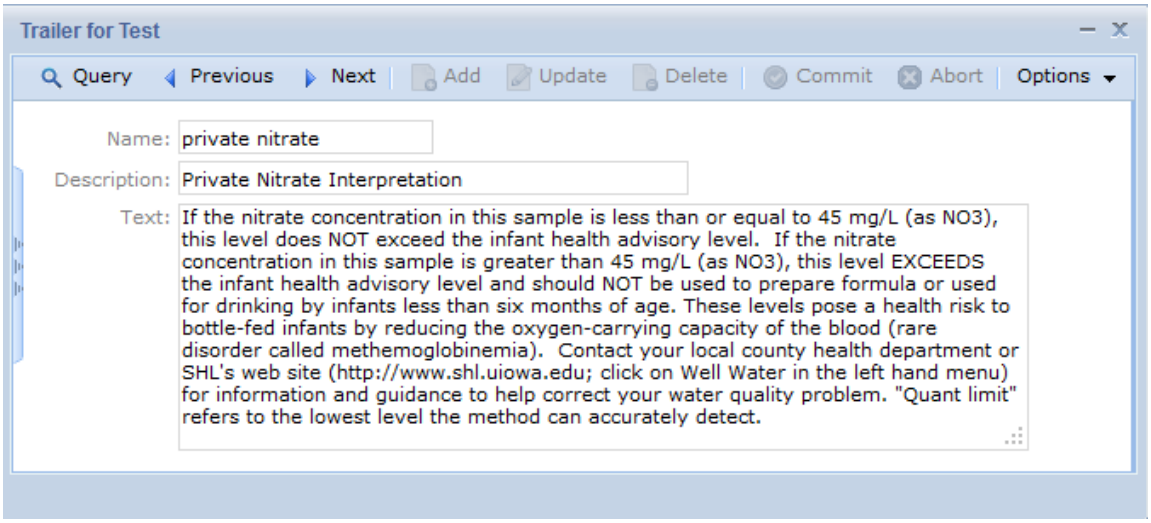


Figure 246 Trailer for Test

The fields in the Trailer for Test screen are explained below.

Name

This field contains the short name that is used internally in the laboratory.

Description

This field is also used internally but it is a longer and more detailed characterization of the test trailer.

Text

The text of the test trailer is italicized in the Final Report and it is displayed in the Note section below the associated analysis results.

Analyte	Result	Result (ppm)	% Desorption Efficiency	Quant Limit
n-Butyl alcohol	2860		90	360

Note: Calculation of concentration is based upon sampling information provided to the laboratory by the client. AIHA-LAP, LLC accreditation Laboratory ID 102530. Sample results are not blank corrected.

Figure 247 Test Trailer Displayed in a Final Report

10.6 STORAGE UNIT AND STORAGE LOCATION

The Storage Location screen is used in conjunction with the Storage Unit screen to create storage places in the laboratory. Sample items (containers) and analysis ??? are then managed in these storage locations through the Storage screen.

The fourth section of the Maintenance Menu contains the links to open the Storage Unit and Storage Location screens.

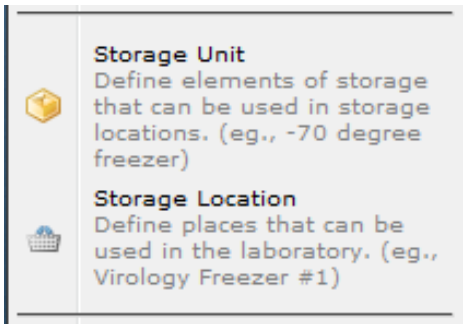


Figure 248 Maintenance Menu – Fourth Section

10.6.1 STORAGE UNIT

The Storage Unit Screen is used to define elements of storage that can be utilized in storage locations. Storage units can include carts, refrigerators, freezers, rooms, tables, temporary, etc.

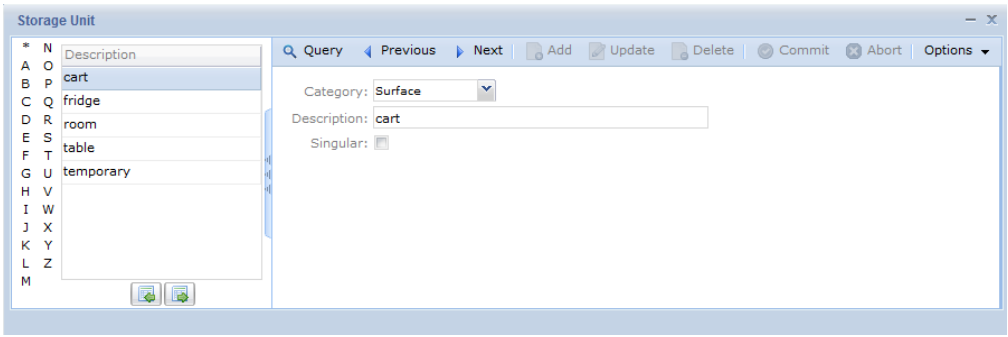


Figure 249 Storage Unit Screen

An explanation of the use of each field is found below.

Category

This field categorizes the storage unit (i.e., room, fridge, surface, etc.)

Description

The Description field provides a brief characterization of the storage unit (i.e., cart, fridge, bench, counter, room, table, temporary, etc.)

Singular

The checkbox denotes whether the storage unit is a solitary item.

10.6.2 STORAGE LOCATION

The Storage Location screen defines actual places that can be used in the laboratory for storage. Storage locations hold sample items (containers), analysis ???, and general inventory items such as reagents, standards, and kits. Examples of storage locations include “Limnology IC Storage” and “Manufacturing Store Ankeny”.

The upper pane of this screen contains the fields Name, Location, Storage Unit, and Available. The Name field can contain any alphanumeric name of the location, but it is generally assigned a number. The Location field contains a more descriptive explanation of where the storage location is situated. The Storage Unit field is a dropdown list. The usual choice for the storage unit would be “room”. The choices for this field are defined in the aforementioned Storage Unit Screen. The Available field contains a checkbox that denotes whether this storage location is currently available to be used.

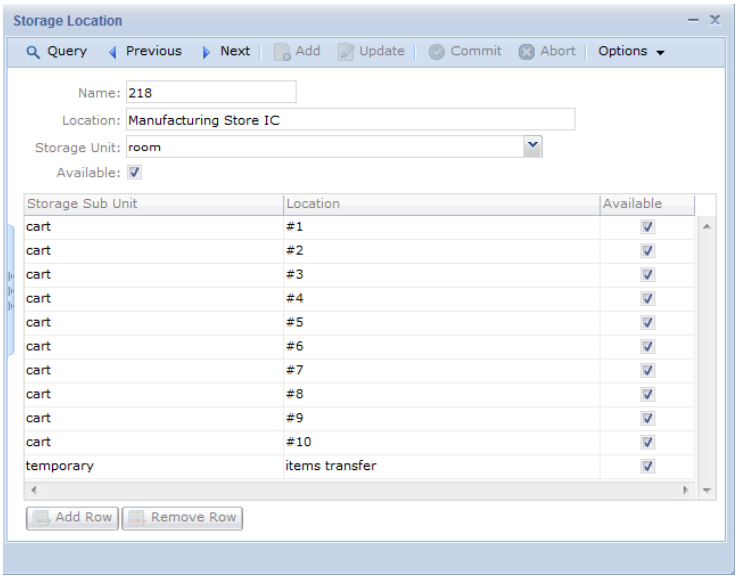


Figure 250 Storage Location Screen

An explanation of the use of each field is found below.

The lower pane consists of a chart that details the storage sub units that make up the storage location. The first field, Storage Sub Unit, is a dropdown list consisting of such choices as cart, fridge, table, and temporary. These choices are the same ones that are defined in the aforementioned Storage Unit Screen. The Location field specifies the location (or a further descriptor) of the storage sub unit. The Available field contains a checkbox that denotes whether this storage sub unit is currently available to be used.

10.7 INSTRUMENT

The fifth section of the Maintenance Menu contains the link to the Instrument module. The Instrument Screen is utilized to define instruments that can be used in the laboratory. It can also associate instruments with analysis runs and Excel worksheets.

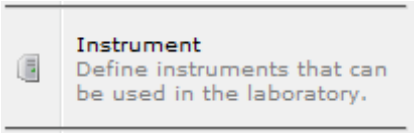


Figure 251 Maintenance Menu – Fifth Section

The upper pane contains the instrument information. The Name field contains a brief instrument name, while the Description field holds a longer, more detailed explanation of the instrument. The next two fields contain the Model # and Serial #, respectively. The Type field is a dropdown list consisting of such instrument categories as Balance, Dissolved Oxygen Meter, and Gas Chromatograph/Mass Spectrometer. The Location field specifies the lab section(s) that use the instrument followed by the room number (e.g., semivolatile-ic, pesticide-ic, 2160-P). The Active field is a checkbox denoting whether the instrument is active or not in the OpenELIS system. The Begin Date and End Date specify the starting and ending dates for the instrument. Any of these fields can be used to query for an instrument. The Query Sidebar displays the Name and Serial # for the instruments that match the query.

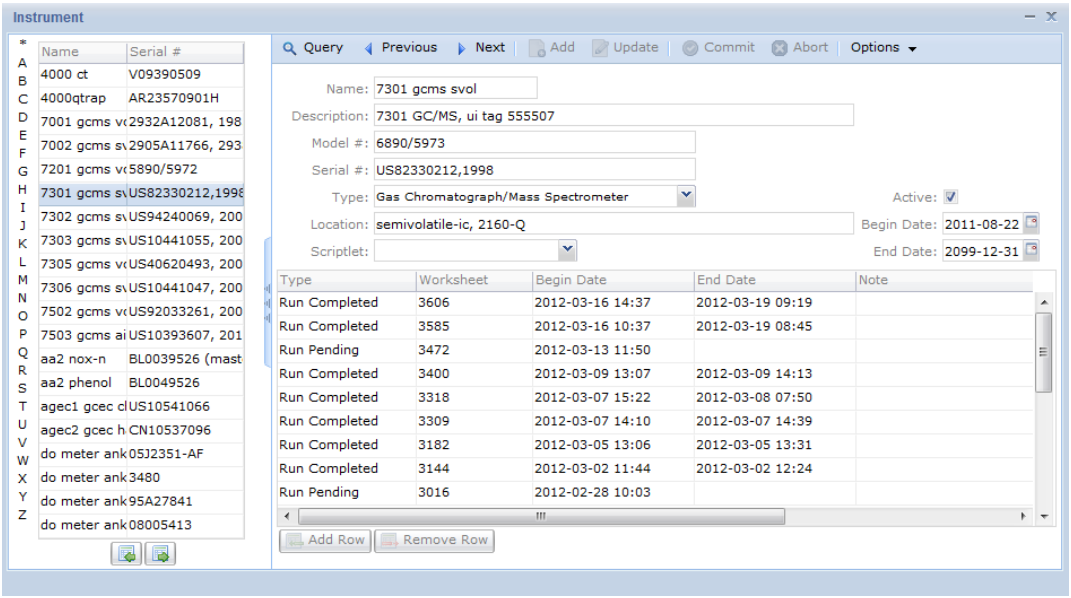


Figure 252 Instrument Screen

The lower pane consists of a chart containing logging information pertaining to the instrument. These chart entries are logged automatically if the instrument is selected on an analysis Excel worksheet. Entries can also be made manually on the chart. Manual entries are used especially for recording instrument maintenance events. The first column in this chart, Type, lists the category for the entry: Lab Maintenance (Unavailable), Offline (Unavailable), Run Completed, Run Pending, Service Call (Unavailable), and Service Performed. The second column (Worksheet) contains the analysis Excel worksheet number of this entry, if applicable. Begin Date and End Date lists the starting and finishing dates for the analysis run, if applicable. The final column, Note, displays any special notes that may have been entered for the run or maintenance event.

10.8 SYSTEM VARIABLE

The sixth section of the Maintenance Menu contains the link to the System Variable module. This module is used by OpenELIS administrators to define system properties.

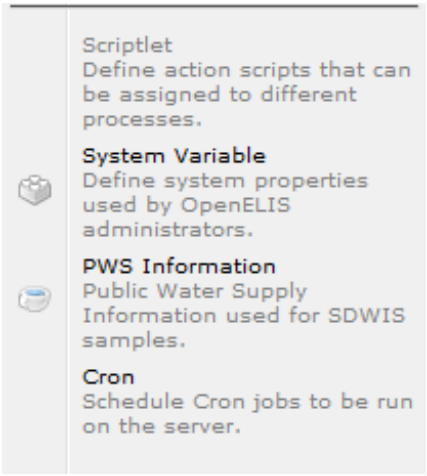


Figure 253 Maintenance Menu – Sixth Section

Each system variable has a Name and Value. Name's use underscores to separate individual words and are lowercase. Values can consist of numbers, words, dates and times, etc. For example, the mcl_violation_email system variable currently has a value of labfax@dnr.iowa.gov,matthew-bielicke@uiowa.edu. The system variable, last_billing_report_run, has a value that is automatically updated by the system to stay current (e.g., 2012-06-26 00:09).

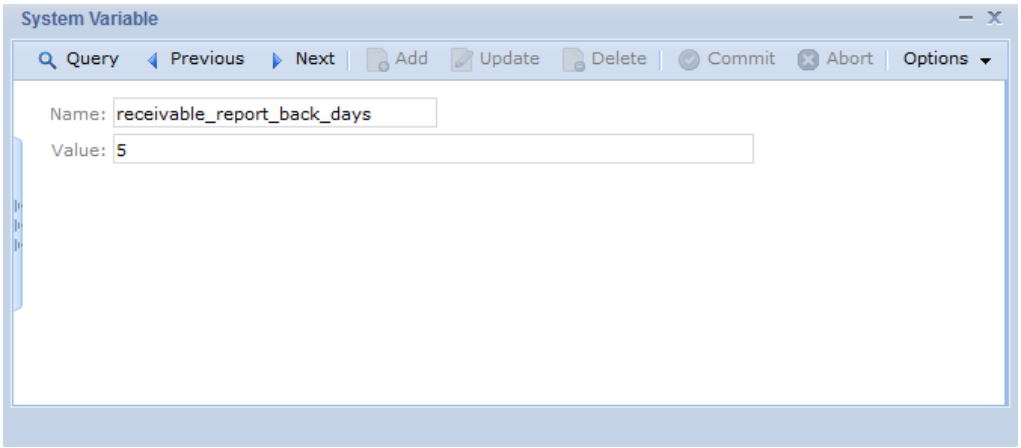


Figure 254 System Variable Screen

10.9 PWS INFORMATION

The PWS Information screen is used to view public water supply information pertaining to SDWIS samples. The link to this screen is located in the sixth section of the Maintenance Menu.

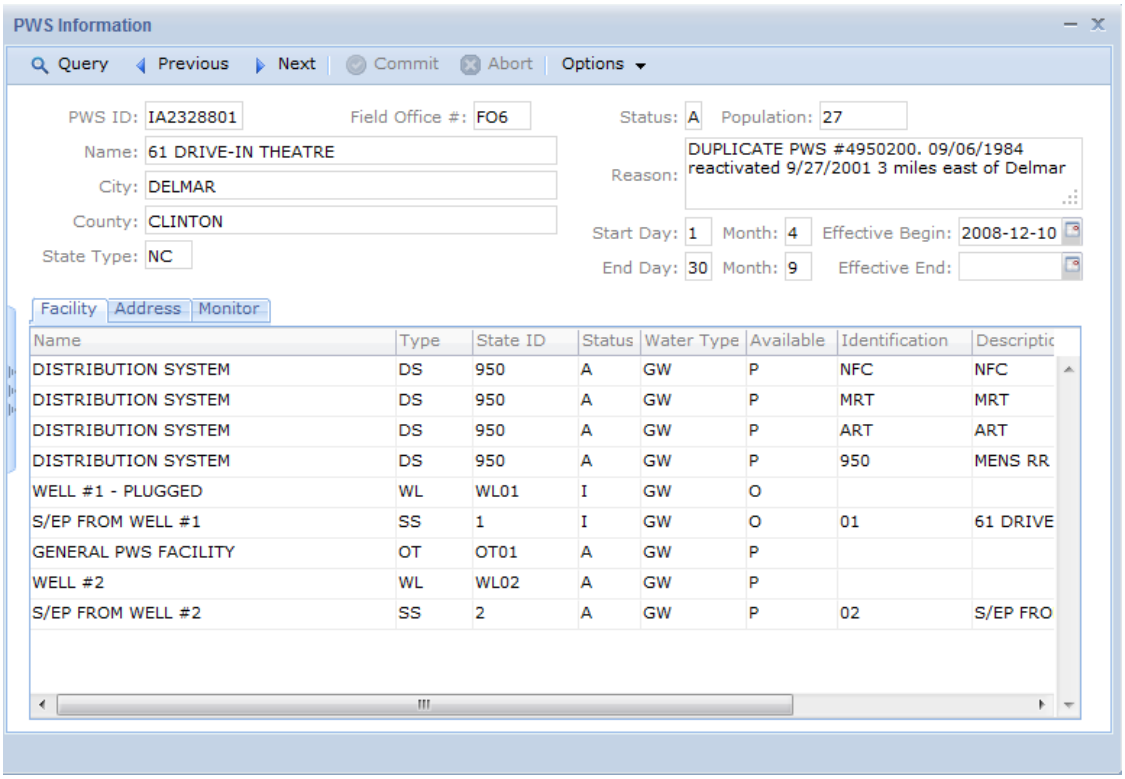


Figure 255 PWS Information Screen

10.9.1 GENERAL PWS INFORMATION

The upper pane of the PWS Information screen contains general information describing the public water supply. The fields are defined as follows.

PWS ID

The PWS (Public Water Supply) ID is a unique identifier assigned by the state to all public water supplies. The PWS ID begins with a two letter state abbreviation followed by a unique seven digit number (e.g., IA0533884).

Field Office #

This is the number of the Iowa Department of Natural Resources field office which has jurisdiction over this public water supply (e.g., FO4).

Status

The status of the PWS is specified in this field. Codes consist of A for active, I for inactive, and P for pending.

Population

This field contains the number of people who are served by this PWS (i.e., population of the municipality, seating capacity of the restaurant, number of residents of the housing development, etc.).

Name

The name of the PWS is displayed in this field.

City

The nearest city to the public water supply is shown here.

County

The county in which the PWS is located is specified in this field.

State Type

This field specifies the type of public water supply as classified by the state in which it is located. State Types can include C to denote a community water system, NC for a non-community water system, and NTNC for a non-transient non-community water system.

Reason

This field provides a place to explain such circumstances as, the PWS has merged with another PWS, the PWS has discontinued operation, or to correct or add additional demographic information.

Start Day and Month

These fields display the beginning day and month during a year in which PWS service is provided.

End Day and Month

These fields display the ending day and month during a year in which PWS service is provided.

Effective Begin

This field shows the effective date that the PWS began providing service.

Effective End

This field shows the effective date that the PWS quit providing service.

10.9.2 FACILITY TAB

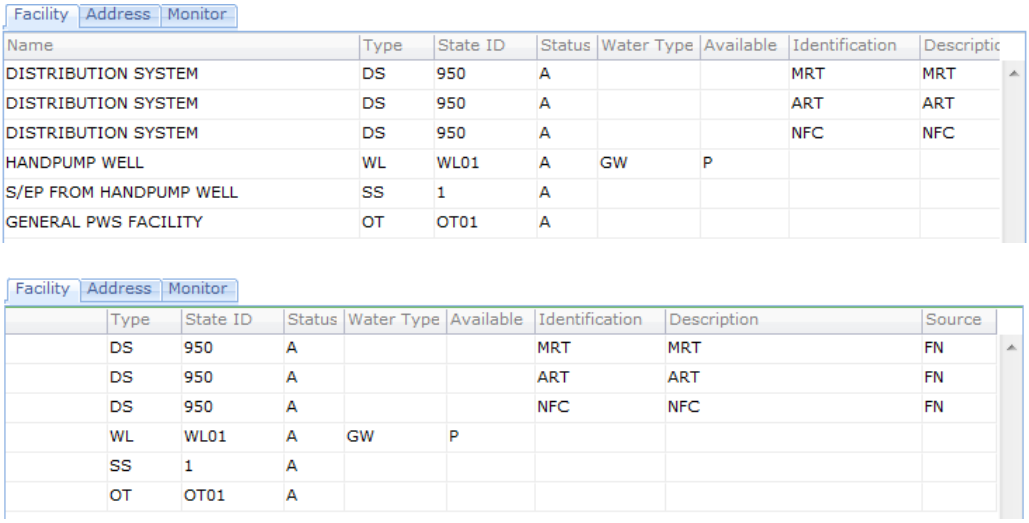


Figure 256 PWS Information Screen - Facility Tab

The lower pane of the PWS Information screen consists of three tabs: Facility, Address, and Monitor. A facility is a component of a public water supply system (e.g., distribution system, well, water treatment plant). These facilities have various characteristics that are described on this tab. The fields in the Facility tab are defined below.

Name

This field displays the name of the facility (i.e., Distribution System, Well #1 (1959), Treatment Plant, General PWS Facility, Breezeway Tap #1, etc.)

Type

This field denotes the facility type. Some examples include a code of DS for distribution system, TP for treatment plant, WL for well, and OT for other.

State ID

This identifier is assigned by the state to distinguish each facility. For the state of Iowa, the State ID is a text field with the leading zeros being dropped (e.g., the "1" in the figure above is actually "01"). All source entry points from 1 to 9 begin with a leading zero. Most distribution systems have a facility State ID of 950 or above.

Status

This field displays the status of the facility (e.g., A for active and I for inactive).

Water Type

This field denotes the type of water (e.g., GW for groundwater, SW for surface water, GU for groundwater under the direct influence of surface water).

Available

This field characterizes the availability of the facility (e.g., P for permanent, S for seasonal, and E for emergency).

Identification

This field normally matches the facility's State ID, except for some sampling in the distribution system. Possible values include: MRT (maximum residence time), ART (average residence time), and NFC (near first customer).

Description

This is a text field describing the sample location (e.g., 202 S 4TH, BATHROOM TAP, WATER PLANT, WELL #2, DISTRIBUTION SYSTEM, RAW, etc.)

Source

This is the source of the water sample (e.g., FN for finished water and RW for raw water).

10.9.3 ADDRESS TAB

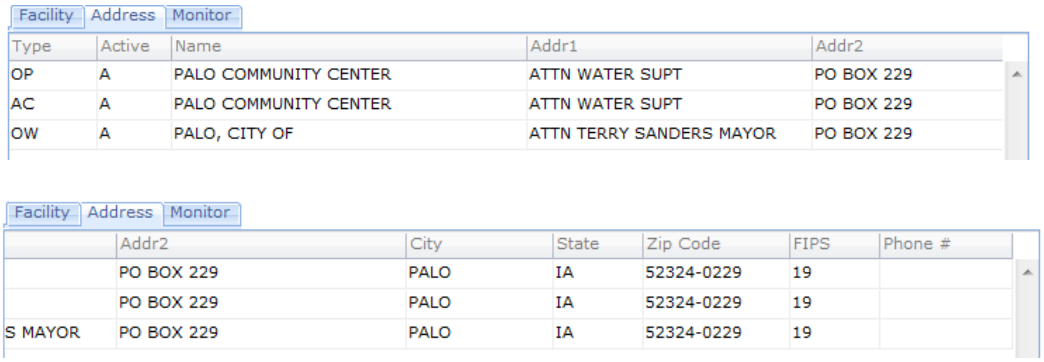


Figure 257 PWS Information Screen - Address Tab

The Address tab provides name, address and other contact information for the public water supply. The fields are described below.

Type

This field denotes the type of address that is provided for the Public Water Supply in this particular row. Options include: OP for the operator of the PWS, OW for the owner of the PWS, and AC for the administrative contact for the PWS.

Active

The status of the PWS address information is specified in this field. Codes consist of A for active, I for inactive, and P for pending.

Name

The name of the owner, operator, or administrative contact for the PWS is provided in this field.

Addr1

This is the first line of the address. This field is often used to specify the name of the person to whose attention correspondence should be sent.

Addr2

This is the second line of the address and often contains the street address or post office box.

City, State, Zip Code

These fields contain the city, state, and zip code of the owner, operator, or administrative contact for the PWS.

FIPS

The Federal Information Processing Standard (FIPS) code is contained in this field for the state in which the PWS is located (e.g., 19 for the state of Iowa).

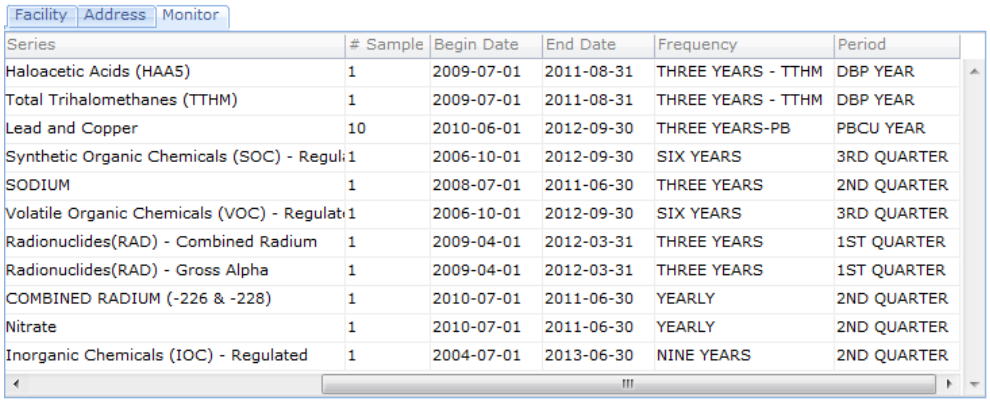
Phone #

The phone number of the owner, operator, or administrative contact for the PWS is located in this field.

10.9.4 MONITOR TAB

Facility | Address | Monitor

Type	Name	Series	# Sample	Begin Date	End Da
950	DISTRIBUTION SYSTEM	Haloacetic Acids (HAA5)	1	2009-07-01	2011-0
950	DISTRIBUTION SYSTEM	Total Trihalomethanes (TTHM)	1	2009-07-01	2011-0
950	DISTRIBUTION SYSTEM	Lead and Copper	10	2010-06-01	2012-0
1	WELLS 4, 5 @ WATER PLANT	Synthetic Organic Chemicals (SOC) - Regul	1	2006-10-01	2012-0
1	WELLS 4, 5 @ WATER PLANT	SODIUM	1	2008-07-01	2011-0
1	WELLS 4, 5 @ WATER PLANT	Volatile Organic Chemicals (VOC) - Regulat	1	2006-10-01	2012-0
1	WELLS 4, 5 @ WATER PLANT	Radionuclides(RAD) - Combined Radium	1	2009-04-01	2012-0
1	WELLS 4, 5 @ WATER PLANT	Radionuclides(RAD) - Gross Alpha	1	2009-04-01	2012-0
1	WELLS 4, 5 @ WATER PLANT	COMBINED RADIUM (-226 & -228)	1	2010-07-01	2011-0
1	WELLS 4, 5 @ WATER PLANT	Nitrate	1	2010-07-01	2011-0
1	WELLS 4, 5 @ WATER PLANT	Inorganic Chemicals (IOC) - Regulated	1	2004-07-01	2013-0



Facility | Address | Monitor

Series	# Sample	Begin Date	End Date	Frequency	Period
Haloacetic Acids (HAA5)	1	2009-07-01	2011-08-31	THREE YEARS - TTHM	DBP YEAR
Total Trihalomethanes (TTHM)	1	2009-07-01	2011-08-31	THREE YEARS - TTHM	DBP YEAR
Lead and Copper	10	2010-06-01	2012-09-30	THREE YEARS-PB	PBCU YEAR
Synthetic Organic Chemicals (SOC) - Regul	1	2006-10-01	2012-09-30	SIX YEARS	3RD QUARTER
SODIUM	1	2008-07-01	2011-06-30	THREE YEARS	2ND QUARTER
Volatile Organic Chemicals (VOC) - Regulat	1	2006-10-01	2012-09-30	SIX YEARS	3RD QUARTER
Radionuclides(RAD) - Combined Radium	1	2009-04-01	2012-03-31	THREE YEARS	1ST QUARTER
Radionuclides(RAD) - Gross Alpha	1	2009-04-01	2012-03-31	THREE YEARS	1ST QUARTER
COMBINED RADIUM (-226 & -228)	1	2010-07-01	2011-06-30	YEARLY	2ND QUARTER
Nitrate	1	2010-07-01	2011-06-30	YEARLY	2ND QUARTER
Inorganic Chemicals (IOC) - Regulated	1	2004-07-01	2013-06-30	NINE YEARS	2ND QUARTER

Figure 258 PWS Information Screen - Monitor Tab

The Monitor tab provides monitoring requirements for distribution systems and a public water supply's other facilities such as wells, water treatment plants, etc. Monitoring requirements indicate the type of monitoring (analytical series), number of samples, the period between which those samples must be collected, and the frequency of monitoring. The fields are described below.

Type

This field contains the facility's State ID. The leading zeros have been dropped (e.g., the "1" in the figure above is actually "01")

Name

This is the name of the facility.

Series

This field specifies the analytical series that is being monitored.

 # Sample

This field specifies the number of samples that are required to be tested. For Total Coliform Rule - bacteria sampling and Lead and Copper monitoring this could be more than one sample.

Begin Date

Sampling should start on or after this date.

End Date

Sampling should end on or before this date. If a sampling cycle runs over several calendar quarters, then sampling is usually conducted in the last quarter. The last quarter of the sampling cycle is indicated in the Period field (see below).

Frequency

The frequency, or spacing, between sampling.

Period

This is the time frame when the sample(s) should be taken. Generally, this is the last quarter of a given frequency cycle. For example, the sampling period would be in the third quarter of a three year cycle. For Lead and Copper, the sampling period would be from June 1 to September 30 (the PBCU Year).

10.10 CRON

"Cron" is the time-based job scheduler in Linux and Unix-based computer operating systems. Cron enables users to schedule jobs (commands or shell scripts) to run periodically at certain times or dates. It is commonly used to automate system maintenance or administration. The OpenELIS Cron module is used by system administrators to schedule cron jobs to be run on the LIMS server. The link to this screen is located in the sixth section of the Maintenance Menu.

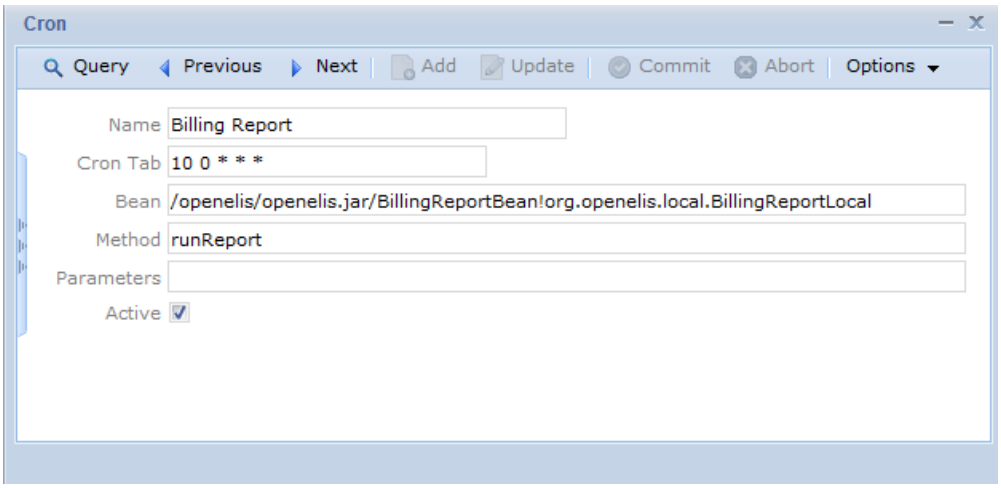


Figure 259 Cron Screen

The fields on the Cron screen are detailed below.

Name

This field contains the name of the cron job.

Cron Tab

The Cron Tab (cron table) field contains the time component for the cron job. The values are entered in this order: Minute Hour Day Month DayofWeek. The wildcard character (*) accepts any value. DayofWeek can have an integer value from 0 (Sunday) to 6 (Saturday). In the example above, the Billing Report will be run at 12:10 AM every day. A cron job with a Cron Tab entry of 30 8 * * 6 will be run at 8:30 AM every Saturday. A cron job with a Cron Tab entry of 0 15 * * 1,2,3,4,5 will be run at 3:00 PM every weekday.

Bean

The Bean field contains the Java class that contains the method that this cron job is trying to call.

Method

This field contains the method that the cron job is trying to call.

Parameters

This field contains the parameters passed to the stated method.

Active

The Active checkbox displays whether this cron job is currently active in the system.

CHAPTER 11. REPORTS

The Report Menu of the OpenELIS LIMS allows users to set parameters that generate dynamic, predetermined reports.

11.1 VERIFICATION REPORT

The link to the Verification Report Screen is located in the Login Section of the Report Menu.

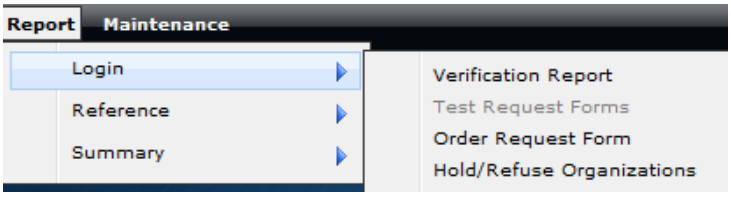


Figure 260 Login Section of the Report Menu

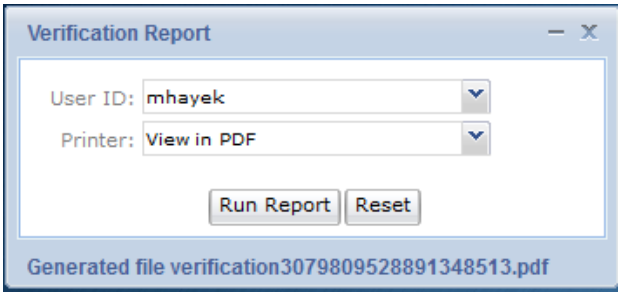
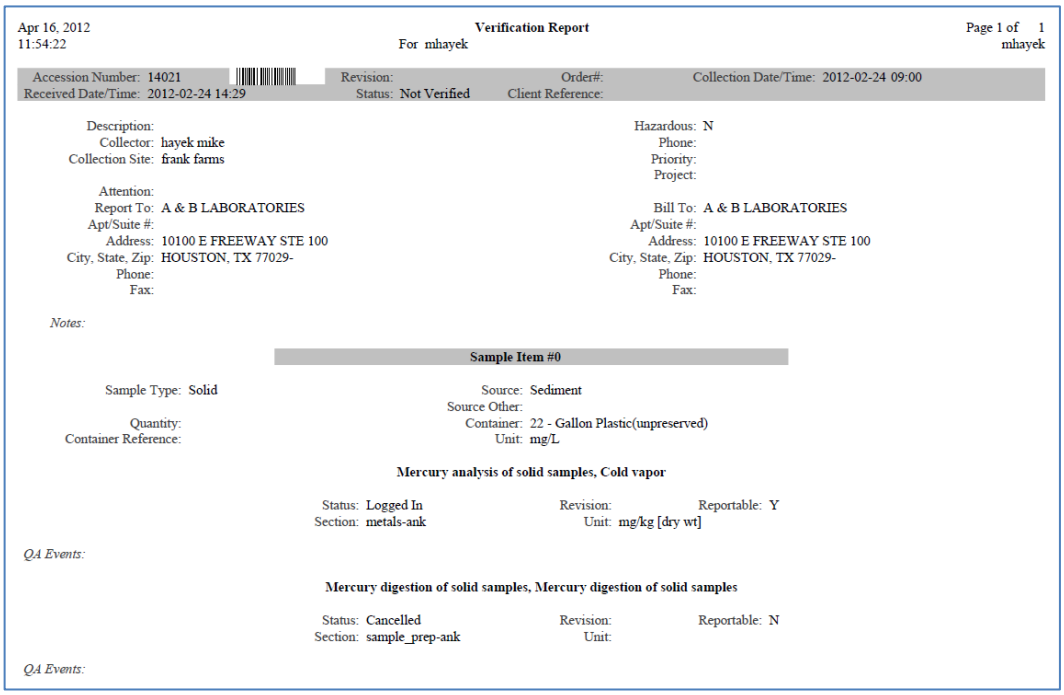


Figure 261 Verification Report Print Screen

All logged in samples are initially in “Not Verified” status. Once the initial data has been entered into the LIMS, data entry personnel run the Verification Report to compare the entered data with the data on the paperwork and correct any discrepancies. The Verification Report creates a sample list and its associated tests for this purpose. Entering the User ID allows the person calling up the report to print her workload. If nothing is specified in the User ID field, it defaults to the user who is currently logged-in to OpenELIS. The specimens printed are in the same order as they were entered.

After the verification process has been completed, the LIMS needs to change the status of all the samples to “Logged In”. This is accomplished through the Verify Sample Data Entry screen. The Barcode field accepts an accession number barcode that is located on the Verification Report.

For more information on sample entry paper verification see Using Paper Verification.



Apr 16, 2012 11:54:22 — **Verification Report** — For mhayek — Page 1 of 1 — mhayek

Accession Number: 14021 | Revision: | Order#: | Collection Date/Time: 2012-02-24 09:00
Received Date/Time: 2012-02-24 14:29 | Status: Not Verified | Client Reference:

Description:
Collector: hayek mike
Collection Site: frank farms
Hazardous: N
Phone:
Priority:
Project:

Attention:
Report To: A & B LABORATORIES
Apt/Suite #:
Address: 10100 E FREEWAY STE 100
City, State, Zip: HOUSTON, TX 77029-
Phone:
Fax:

Bill To: A & B LABORATORIES
Apt/Suite #:
Address: 10100 E FREEWAY STE 100
City, State, Zip: HOUSTON, TX 77029-
Phone:
Fax:

Notes:

Sample Item #0

Sample Type: Solid
Source: Sediment
Source Other:
Quantity:
Container: 22 - Gallon Plastic(unpreserved)
Container Reference:
Unit: mg/L

Mercury analysis of solid samples, Cold vapor

Status: Logged In | Revision: | Reportable: Y
Section: metals-ank | Unit: mg/kg [dry wt]

QA Events:

Mercury digestion of solid samples, Mercury digestion of solid samples

Status: Cancelled | Revision: | Reportable: N
Section: sample_prep-ank | Unit:

QA Events:

Figure 262 Verification Report

11.2 ORDER REQUEST FORM

An Order Request Form can be printed from the Login Section of the Report Menu.

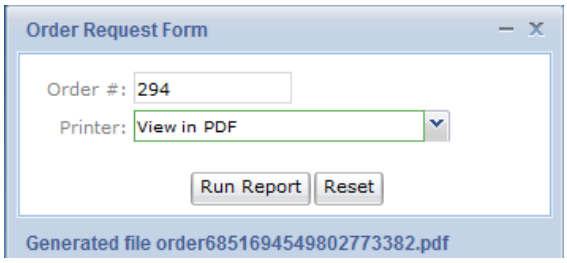


Figure 263 Order Request Form Screen

The Order # needs to be inputted into this screen along with the printer selection. The Order Request Form will contain all of the information that is pertinent to the order. See SEND-OUT ORDER SCREEN and Environmental Sample Collection Form for a detailed description of the Order Request Form.

11.3 HOLD/REFUSE ORGANIZATIONS REPORT

Occasionally, organizations are delinquent in paying their invoices to laboratories. When a laboratory's payment policy necessitates that samples be refused or held from an organization until their account is in good standing, the Hold/Refuse Sample parameter may be assigned to that organization. (See the Organization screen's Parameter Tab section for more information.) This parameter is then used to generate the Hold/Refuse Organizations Report. This report is designed to alert sample receiving and accessioning staff to hold or refuse samples from these organizations.

A Hold/Refuse Organizations Report can be printed from the Login Section of the Report Menu. The report can be printed directly to a printer or viewed as a pdf.

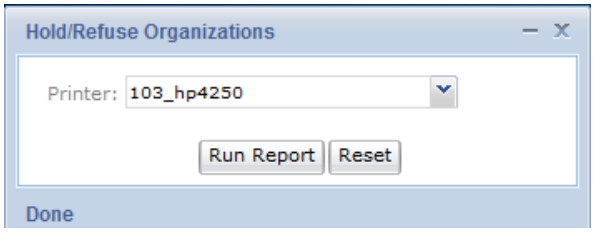


Figure 264 Hold/Refuse Organizations Screen

The Hold/Refuse Organizations Report contains the following fields:

Org. ID

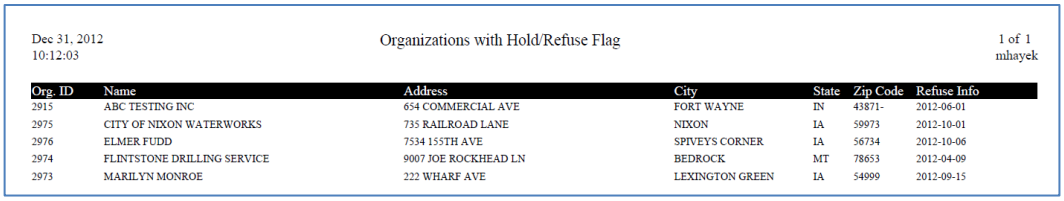
This field specifies the internal identifier for the organization.

Name, Address, City, State, Zip Code

These fields specify the name and address information of the organization.

Refuse Info

This field displays the effective date (yyyy-mm-dd) when samples from the organization are to be refused or held.



Dec 31, 2012
10:12:03

Organizations with Hold/Refuse Flag

1 of 1
mhayek

Org. ID	Name	Address	City	State	Zip Code	Refuse Info
2915	ABC TESTING INC	654 COMMERCIAL AVE	FORT WAYNE	IN	43871-	2012-06-01
2975	CITY OF NIXON WATERWORKS	735 RAILROAD LANE	NIXON	IA	59973	2012-10-01
2976	ELMER FUDD	7534 155TH AVE	SPIVEYS CORNER	IA	56734	2012-10-06
2974	FLINTSTONE DRILLING SERVICE	9007 JOE ROCKHEAD LN	BEDROCK	MT	78653	2012-04-09
2973	MARILYN MONROE	222 WHARF AVE	LEXINGTON GREEN	IA	54999	2012-09-15

Figure 265 Hold/Refuse Organizations Report

11.4 TEST REPORT

The link to the Test Report Screen is located in the Reference Section of the Report Menu.

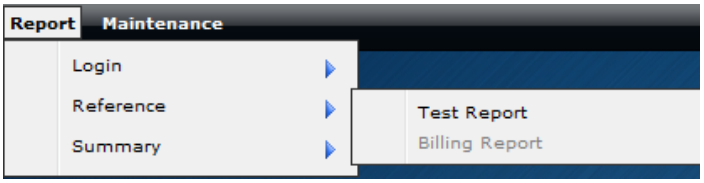


Figure 266 Reference Section of the Report Menu

The Test Report prints a list of all available tests within the LIMS. Tests are grouped by laboratory sections. Test Reports can be printed by individual or multiple Section Name and/or individual or multiple Test Name.

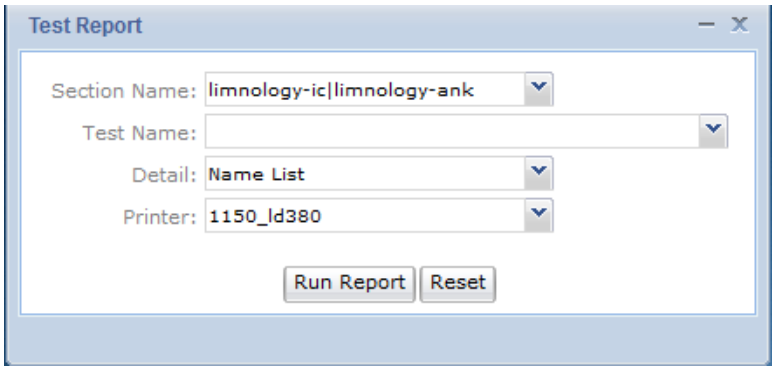
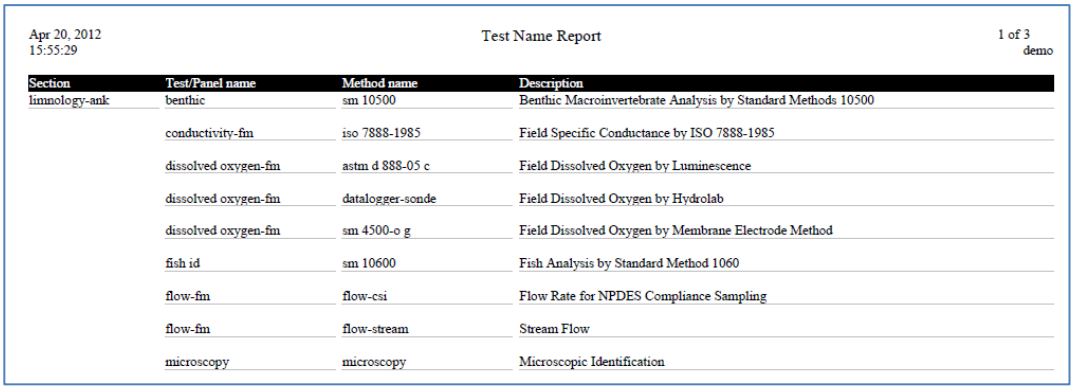


Figure 267 Test Report Screen

The Test Report can be generated in three formats. The format is selected in the Detail field of the Test Report Screen.

11.4.1 NAME LIST

This is a brief characterization of each test by Section, Test/Panel name, Method name, and Description.



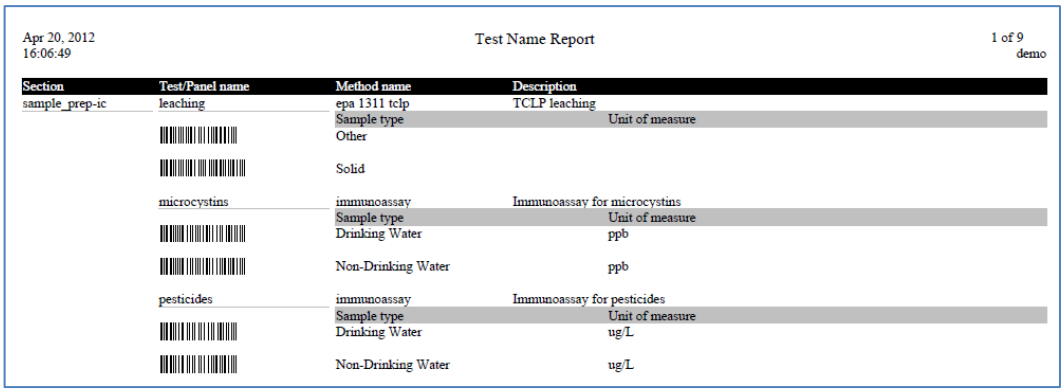
Apr 20, 2012 15:55:29 — Test Name Report — 1 of 3 demo

Section	Test/Panel name	Method name	Description
limnology-ank	benthic	sm 10500	Benthic Macroinvertebrate Analysis by Standard Methods 10500
	conductivity-fm	iso 7888-1985	Field Specific Conductance by ISO 7888-1985
	dissolved oxygen-fm	astm d 888-05 c	Field Dissolved Oxygen by Luminescence
	dissolved oxygen-fm	datalogger-sonde	Field Dissolved Oxygen by Hydrolab
	dissolved oxygen-fm	sm 4500-o g	Field Dissolved Oxygen by Membrane Electrode Method
	fish id	sm 10600	Fish Analysis by Standard Method 1060
	flow-fm	flow-csi	Flow Rate for NPDES Compliance Sampling
	flow-fm	flow-stream	Stream Flow
	microscopy	microscopy	Microscopic Identification

Figure 268 Name List Test Report

11.4.2 SAMPLE TYPE BARCODE

This format includes all of the information that is present in the Name List format with the addition of barcodes for each defined sample type of a particular test/method. The corresponding unit of measure is also displayed if it is defined in the test definition. This report format can be used during Quick Entry to scan in a test/method.



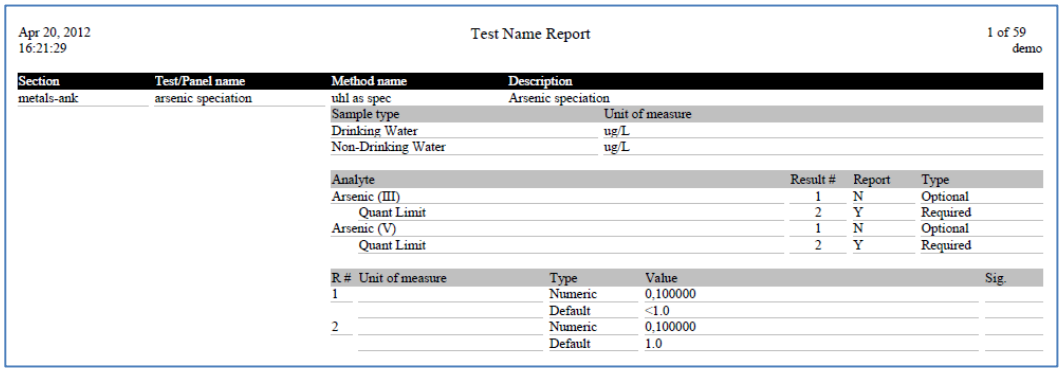
Apr 20, 2012 16:06:49 — Test Name Report — 1 of 9 demo

Section	Test/Panel name	Method name	Description
sample_prep-ic	leaching	epa 1311 tclp	TCLP leaching
		Sample type	Unit of measure
		Other	
		Solid	
	microcystins	immunoassay	Immunoassay for microcystins
		Sample type	Unit of measure
		Drinking Water	ppb
		Non-Drinking Water	ppb
	pesticides	immunoassay	Immunoassay for pesticides
		Sample type	Unit of measure
		Drinking Water	ug/L
		Non-Drinking Water	ug/L

Figure 269 Sample Type Barcode Test Report

11.4.3 FULL DETAIL

This format gives the complete test details including Section, Test/Panel name, Method name, Description, Sample type, Unit of measure, and individual analyte parameters. This format does not include sample type barcodes.



Apr 20, 2012 16:21:29 — Test Name Report — 1 of 59 demo

Section	Test/Panel name	Method name	Description
metals-ank	arsenic speciation	uhl as spec	Arsenic speciation
		Sample type	Unit of measure
		Drinking Water	ug/L
		Non-Drinking Water	ug/L

Analyte	Result #	Report	Type
Arsenic (III)	1	N	Optional
Quant Limit	2	Y	Required
Arsenic (V)	1	N	Optional
Quant Limit	2	Y	Required

R #	Unit of measure	Type	Value	Sig.
1		Numeric	0,100000	
		Default	<1.0	
2		Numeric	0,100000	
		Default	1.0	

Figure 270 Full Detail Test Report

11.5 SAMPLES IN-HOUSE REPORT

The link to the Samples In-House Report screen is found in the Summary Section of the Report Menu.

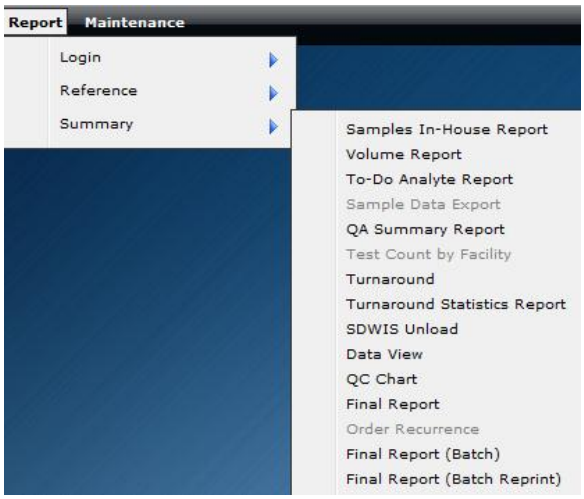


Figure 271 Summary Section of the Report Menu

The Samples In-House Report screen allows for the generation of a report that provides details of samples that are being processed or have been processed. Any of the fields on this screen can be utilized to provide a custom sample report. These fields consist of Starting Entered Date, Ending Entered Date, Section Name, Test Name, Analysis Status, Project, and Organization Id. The Sort By field determines the column that will be used to determine the sorting order. The report can be sorted by Accession Number (the default), Collection Date, Date Received, Test & Method, and Analysis Status. The Printer field is used for selection of the printer to print a hard copy, to view the report in pdf format on the computer monitor, to fax it, or to e-mail it to the user as a pdf file.

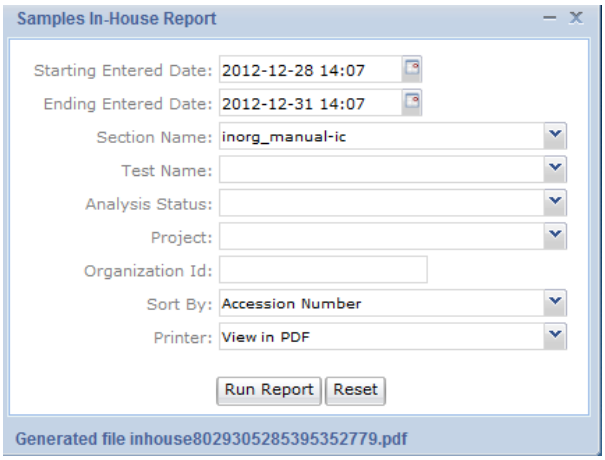
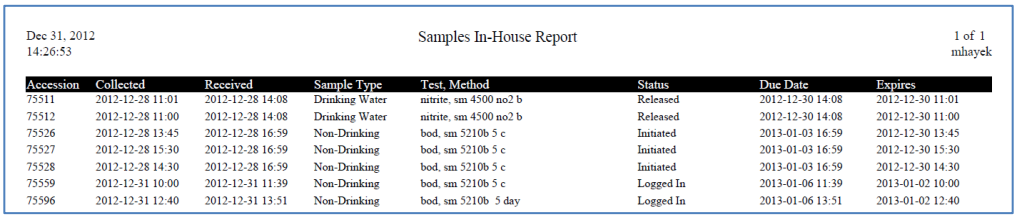


Figure 272 Samples In-House Report Screen

Using the entries that were provided in the Samples In-House Report Screen above, the following report was generated.



Dec 31, 2012
14:26:53

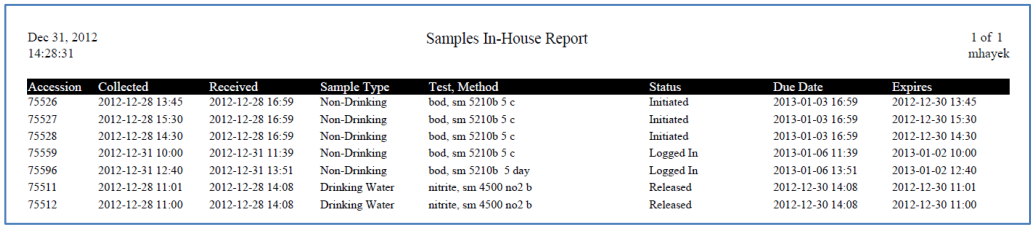
Samples In-House Report

1 of 1
mhayek

Accession	Collected	Received	Sample Type	Test, Method	Status	Due Date	Expires
75511	2012-12-28 11:01	2012-12-28 14:08	Drinking Water	nitrite, sm 4500 no2 b	Released	2012-12-30 14:08	2012-12-30 11:01
75512	2012-12-28 11:00	2012-12-28 14:08	Drinking Water	nitrite, sm 4500 no2 b	Released	2012-12-30 14:08	2012-12-30 11:00
75526	2012-12-28 13:45	2012-12-28 16:59	Non-Drinking	bod, sm 5210b 5 c	Initiated	2013-01-03 16:59	2012-12-30 13:45
75527	2012-12-28 15:30	2012-12-28 16:59	Non-Drinking	bod, sm 5210b 5 c	Initiated	2013-01-03 16:59	2012-12-30 15:30
75528	2012-12-28 14:30	2012-12-28 16:59	Non-Drinking	bod, sm 5210b 5 c	Initiated	2013-01-03 16:59	2012-12-30 14:30
75559	2012-12-31 10:00	2012-12-31 11:39	Non-Drinking	bod, sm 5210b 5 c	Logged In	2013-01-06 11:39	2013-01-02 10:00
75596	2012-12-31 12:40	2012-12-31 13:51	Non-Drinking	bod, sm 5210b 5 day	Logged In	2013-01-06 13:51	2013-01-02 12:40

Figure 273 Samples In-House Report – Accession Number Sort

The following columns are found in the Samples In-House Report: Accession (number), (date) Collected, (date) Received, Sample Type, Test/Method, Status, Due Date, and (date) Expires. Changing the Sort By field in the report screen to Analysis Status yields a new report with the Status field ordered alphabetically (Initiated, Logged In, Released, etc.)



Dec 31, 2012
14:28:31

Samples In-House Report

1 of 1
mhayek

Accession	Collected	Received	Sample Type	Test, Method	Status	Due Date	Expires
75526	2012-12-28 13:45	2012-12-28 16:59	Non-Drinking	bod, sm 5210b 5 c	Initiated	2013-01-03 16:59	2012-12-30 13:45
75527	2012-12-28 15:30	2012-12-28 16:59	Non-Drinking	bod, sm 5210b 5 c	Initiated	2013-01-03 16:59	2012-12-30 15:30
75528	2012-12-28 14:30	2012-12-28 16:59	Non-Drinking	bod, sm 5210b 5 c	Initiated	2013-01-03 16:59	2012-12-30 14:30
75559	2012-12-31 10:00	2012-12-31 11:39	Non-Drinking	bod, sm 5210b 5 c	Logged In	2013-01-06 11:39	2013-01-02 10:00
75596	2012-12-31 12:40	2012-12-31 13:51	Non-Drinking	bod, sm 5210b 5 day	Logged In	2013-01-06 13:51	2013-01-02 12:40
75511	2012-12-28 11:01	2012-12-28 14:08	Drinking Water	nitrite, sm 4500 no2 b	Released	2012-12-30 14:08	2012-12-30 11:01
75512	2012-12-28 11:00	2012-12-28 14:08	Drinking Water	nitrite, sm 4500 no2 b	Released	2012-12-30 14:08	2012-12-30 11:00

Figure 274 Samples In-House Report – Analysis Status Sort

11.6 VOLUME REPORT

The link to the Volume Report screen is found in the Summary Section of the Report Menu. The Volume Report Screen generates a spreadsheet detailing the number of analyses by test for a selected date range and laboratory section(s).

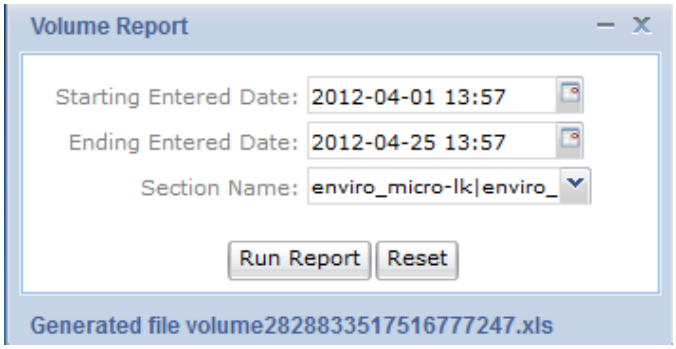


Figure 275 Volume Report Screen

The Volume Report Spreadsheet contains the following columns: Section; Test; Method name; analyses with a status of Logged In, Initiated, On Hold, Completed, Released, and Other; Test Total, and Section Total. The Section Total specifies the total number of analyses for the entire section for all tests.

volume2828833517516777247 [Read-Only] [Compatibility Mode]

	A	B	C	D	E	F	G	H	I	J	K
1	Section	Test	Method name	Logged In	Initiated	On Hold	Completed	Released	Other	TestTotal	Section Total
2	enviro_micro-ank	MPN Total Coliform & E.	colilert mpn well				2	6	0	8	349
3	enviro_micro-ank	P/A Total Coliform &	colilert pa					16	0	16	349
4	enviro_micro-ank	Total Coliform & E.coli	colilert mpn sdwa am						1	1	349
5	enviro_micro-ank	Total Coliform & E.coli	colilert pa sdwa am					1	0	1	349
6	enviro_micro-ank	Total Coliform & E.coli	colilert pa sdwa pm				4	168	0	172	349
7	enviro_micro-ank	HPC, all other water	blue pour plate					6	0	6	349
8	enviro_micro-ank	E.coli MPN (Colilert),	colilert mpn				4	123	2	129	349
9	enviro_micro-ank	Fecal Coliform by	mf fecal					8	1	9	349
10	enviro_micro-ank	MPN Total Coliform & E.	colilert mpn other				2		5	7	349
11	enviro_micro-ic	MPN Total Coliform & E.	colilert mpn well		7			120	0	127	2302
12	enviro_micro-ic	P/A Total Coliform &	colilert pa	1	21			299	0	321	2302
13	enviro_micro-ic	Nitrate for Private Drinking	epa 353.2	1	33			357	3	394	2302
14	enviro_micro-ic	Total Coliform & E.coli	colilert mpn sdwa am					5	0	5	2302
15	enviro_micro-ic	Total Coliform & E.coli	colilert mpn sdwa pm					10	0	10	2302
16	enviro_micro-ic	Total Coliform & E.coli	colilert pa sdwa am		18			350	0	368	2302

Figure 276 Volume Report Spreadsheet

11.7 TO-DO ANALYTE REPORT

The link to the To-Do Analyte Report screen is found in the Summary Section of the Report Menu.

11.8 QA SUMMARY REPORT

The link to the QA Summary Report Screen is found in the Summary Section of the Report Menu. This screen generates a report detailing the QA events that have been linked to specific samples and analyses for a selected date range and laboratory section(s). As in most other report screens, multiple sections and test names can be selected using the **Control** key.

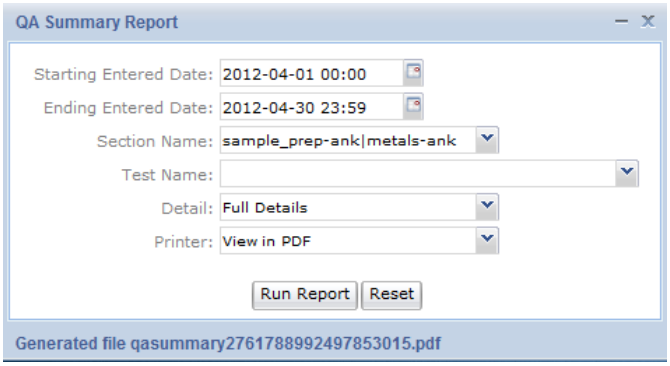
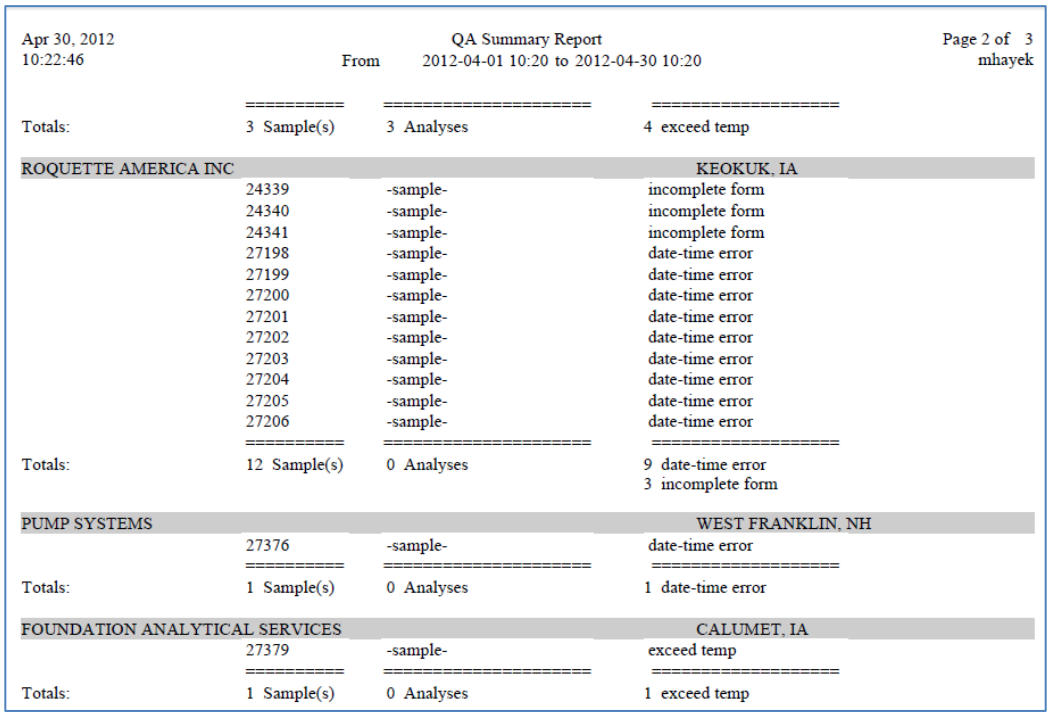


Figure 277 QA Summary Report Screen

There are three types of QA Summary Reports that may be printed: Full Details, Client Summaries, and Grand Totals Only. The type of report is selected in the Detail drop-down field of the QA By Organization Screen.

11.8.1 QA SUMMARY REPORT – FULL DETAILS

The Full Details version of the QA Summary Report lists each organization in a gray background as a section header followed by a line for each QA event associated with that organization for the specified time period. The first column of the report lists the sample accession numbers that have QA events tied to them. The second column denotes whether the QA event is at the sample level or is linked to a specific analysis. The third column specifies the internal QA event name. There is a Totals row for each organization that summarizes this information. Near the end of the report is located the Grand Totals which summarizes this information for all of the organizations that are tied to the report.



Apr 30, 2012 10:22:46 — QA Summary Report — From 2012-04-01 10:20 to 2012-04-30 10:20 — Page 2 of 3 — mhayek

Totals:	3 Sample(s)	3 Analyses	4 exceed temp
ROQUETTE AMERICA INC			KEOKUK, IA
	24339	-sample-	incomplete form
	24340	-sample-	incomplete form
	24341	-sample-	incomplete form
	27198	-sample-	date-time error
	27199	-sample-	date-time error
	27200	-sample-	date-time error
	27201	-sample-	date-time error
	27202	-sample-	date-time error
	27203	-sample-	date-time error
	27204	-sample-	date-time error
	27205	-sample-	date-time error
	27206	-sample-	date-time error
Totals:	12 Sample(s)	0 Analyses	9 date-time error 3 incomplete form
PUMP SYSTEMS			WEST FRANKLIN, NH
	27376	-sample-	date-time error
Totals:	1 Sample(s)	0 Analyses	1 date-time error
FOUNDATION ANALYTICAL SERVICES			CALUMET, IA
	27379	-sample-	exceed temp
Totals:	1 Sample(s)	0 Analyses	1 exceed temp

Figure 278 QA Summary Report - Full Details

A bar graph is located at the end of the report that illustrates the grand totals for each QA event.

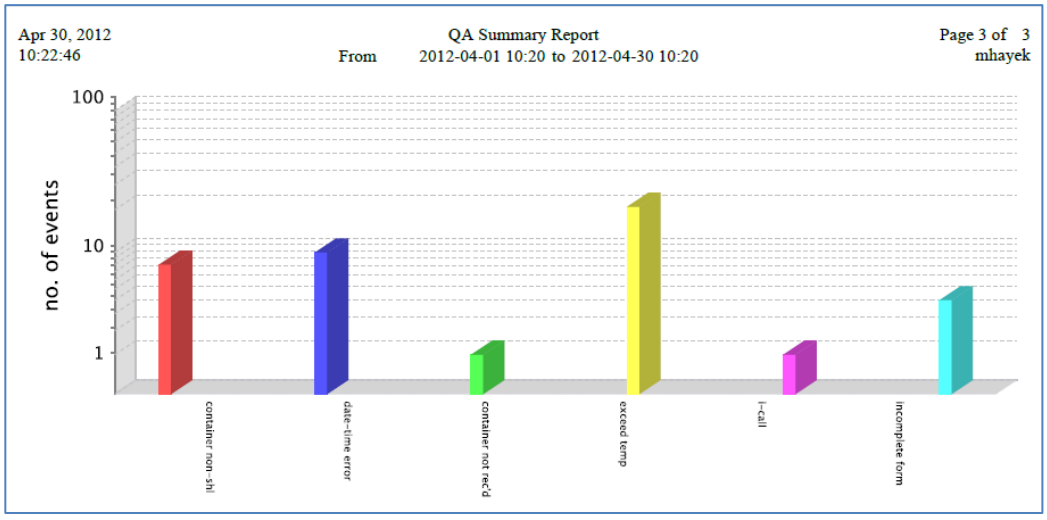
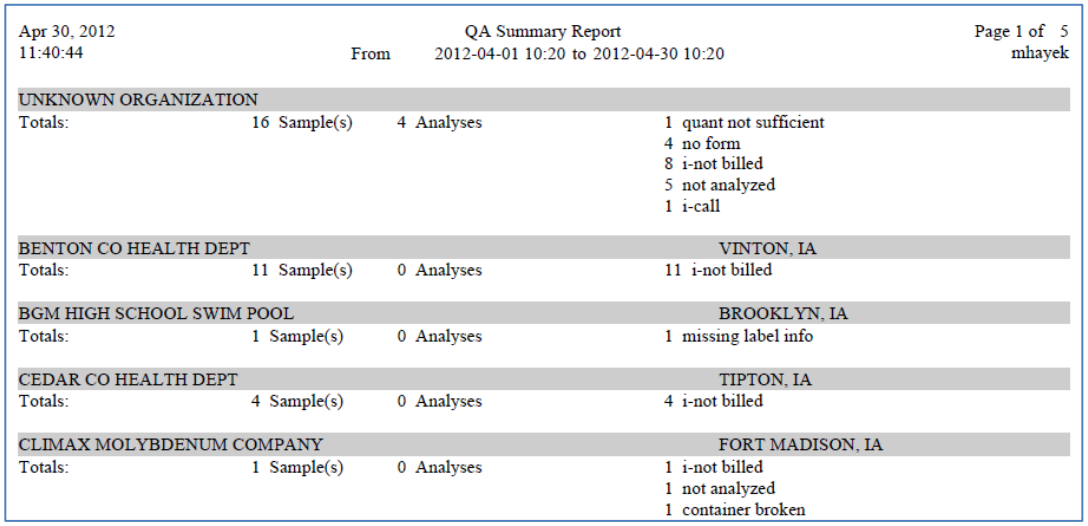


Figure 279 QA Summary Report - Bar Graph of Grand Totals

11.8.2 QA SUMMARY REPORT – CLIENT SUMMARIES

The Client Summaries version of the QA Summary Report lists each organization in a gray background as a section header followed by the totals for the QA events associated with that organization for the specified time period. The Totals denote the number of samples and analyses that have QA events associated with them, and list the quantity of each specific QA event. Near the end of the report is located the Grand Totals which summarizes this information for all of the organizations that are tied to the report. A bar graph is located at the end of the report that illustrates the grand totals for each QA event.



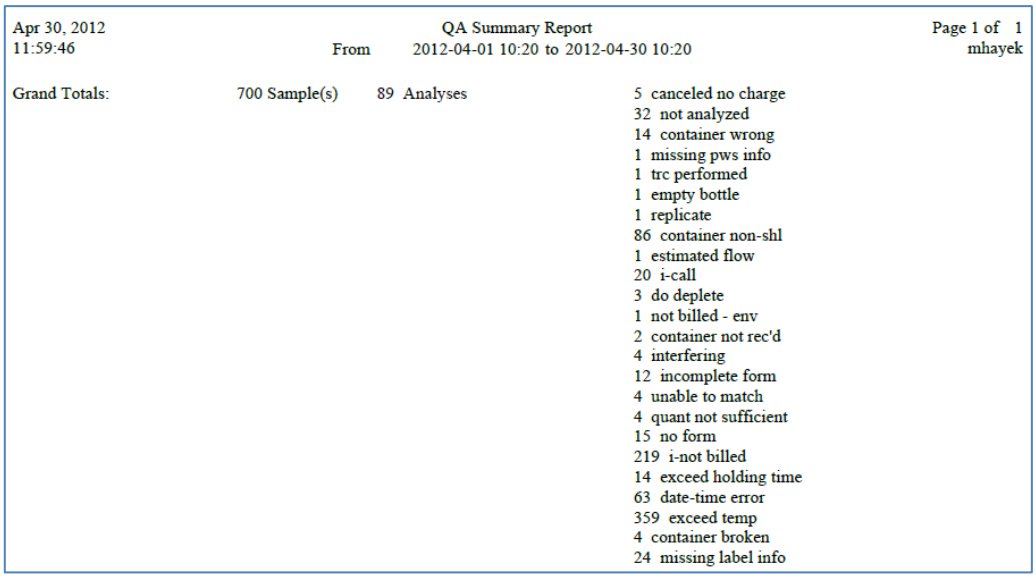
Apr 30, 2012 11:40:44 — QA Summary Report — From 2012-04-01 10:20 to 2012-04-30 10:20 — Page 1 of 5 — mhayek

UNKNOWN ORGANIZATION			
Totals:	16 Sample(s)	4 Analyses	1 quant not sufficient 4 no form 8 i-not billed 5 not analyzed 1 i-call
BENTON CO HEALTH DEPT			**VINTON, IA**
Totals:	11 Sample(s)	0 Analyses	11 i-not billed
BGM HIGH SCHOOL SWIM POOL			**BROOKLYN, IA**
Totals:	1 Sample(s)	0 Analyses	1 missing label info
CEDAR CO HEALTH DEPT			**TIPTON, IA**
Totals:	4 Sample(s)	0 Analyses	4 i-not billed
CLIMAX MOLYBDENUM COMPANY			**FORT MADISON, IA**
Totals:	1 Sample(s)	0 Analyses	1 i-not billed 1 not analyzed 1 container broken

Figure 280 QA Summary Report - Client Summaries

11.8.3 QA SUMMARY REPORT – GRAND TOTALS ONLY

The Grand Totals Only version of the QA Summary Report denotes the number of samples and analyses that have QA events associated with them, and lists the quantity of each specific QA event for all of the organizations that are tied to the report. A bar graph is located at the end of the report that illustrates the grand totals for each QA event.



Apr 30, 2012 11:59:46 — QA Summary Report — From 2012-04-01 10:20 to 2012-04-30 10:20 — Page 1 of 1 — mhayek

Grand Totals:	700 Sample(s)	89 Analyses	5 canceled no charge 32 not analyzed 14 container wrong 1 missing pws info 1 trc performed 1 empty bottle 1 replicate 86 container non-shl 1 estimated flow 20 i-call 3 do deplete 1 not billed - env 2 container not rec'd 4 interfering 12 incomplete form 4 unable to match 4 quant not sufficient 15 no form 219 i-not billed 14 exceed holding time 63 date-time error 359 exceed temp 4 container broken 24 missing label info

Figure 281 QA Summary Report - Grand Totals Only

11.9 TURNAROUND REPORT

The link to the Turnaround Report screen is found in the Summary Section of the Report Menu. The Turnaround Report Screen generates a Turnaround Report detailing the different turnaround times for a selected date range and laboratory section(s).

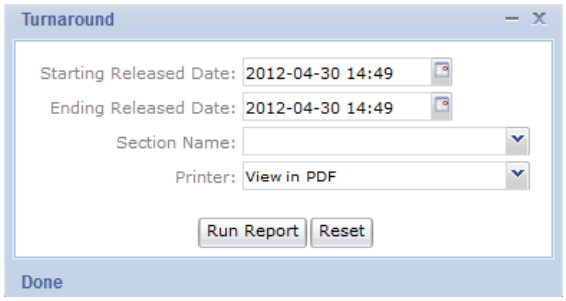
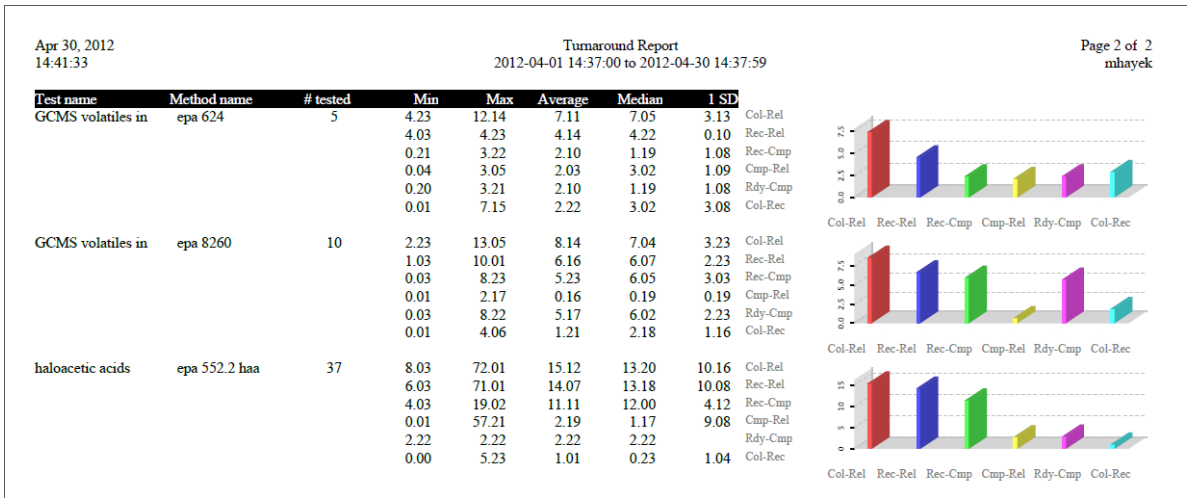


Figure 282 Turnaround Report Screen

The Turnaround Report is organized by columns that specify the Test name, Method name, and # tested. The report then gives the Min (minimum), Max (maximum), Average, Median, and 1 SD (standard deviation) turnaround times for the specified test and method. There are six different turnaround times calculated on the report:

- Col-Rel (sample collected date/time to analysis released date/time)
- Rec-Rel (sample received at the lab date/time to analysis released date/time)
- Rec-Cmp (sample received at the lab date/time to analysis completed date/time)
- Cmp-Rel (analysis completed date/time to analysis released date/time)
- Rdy-Cmp (analysis available date/time to analysis completed date/time)
    - The analysis available date/time would be after any applicable prep analyses have been performed.
- Col-Rec (sample collected date/time to sample received at the lab date/time)

All turnaround times are in days and hours, i.e., 4.09 represents 4 days and 9 hours. There is a bar graph to the right of each test and method that illustrates these six different average turnaround times.



Apr 30, 2012
14:41:33

Turnaround Report
2012-04-01 14:37:00 to 2012-04-30 14:37:59

Page 2 of 2
mhayek

Test name	Method name	# tested	Min	Max	Average	Median	1 SD	
GCMS volatiles in	epa 624	5	4.23	12.14	7.11	7.05	3.13	Col-Rel
			4.03	4.23	4.14	4.22	0.10	Rec-Rel
			0.21	3.22	2.10	1.19	1.08	Rec-Cmp
			0.04	3.05	2.03	3.02	1.09	Cmp-Rel
			0.20	3.21	2.10	1.19	1.08	Rdy-Cmp
			0.01	7.15	2.22	3.02	3.08	Col-Rec
GCMS volatiles in	epa 8260	10	2.23	13.05	8.14	7.04	3.23	Col-Rel
			1.03	10.01	6.16	6.07	2.23	Rec-Rel
			0.03	8.23	5.23	6.05	3.03	Rec-Cmp
			0.01	2.17	0.16	0.19	0.19	Cmp-Rel
			0.03	8.22	5.17	6.02	2.23	Rdy-Cmp
			0.01	4.06	1.21	2.18	1.16	Col-Rec
haloacetic acids	epa 552.2 haa	37	8.03	72.01	15.12	13.20	10.16	Col-Rel
			6.03	71.01	14.07	13.18	10.08	Rec-Rel
			4.03	19.02	11.11	12.00	4.12	Rec-Cmp
			0.01	57.21	2.19	1.17	9.08	Cmp-Rel
			2.22	2.22	2.22	2.22		Rdy-Cmp
			0.00	5.23	1.01	0.23	1.04	Col-Rec

Figure 283 Turnaround Report

11.10 TURNAROUND STATISTICS REPORT

The link to the Turnaround Statistics Report screen is found in the Summary Section of the Report Menu.

11.11 SDWIS UNLOAD

The link to the SDWIS Unload screen is found in the Summary Section of the Report Menu.

11.12 DATA VIEW

The link to the Data View screen is found in the Summary Section of the Report Menu. The Data View module generates a spreadsheet allowing the user to compare information across a range of samples and/or analyses. Each field (checkbox) selected becomes a column in the spreadsheet. The Data View Screen is separated into five tabs.

11.12.1 QUERY TAB

The first tab, Query, contains the fields that may be used to search for samples/analyses. Analysis fields such as Test, Method, Status, Completed (from) and To dates, and Released (from) and To dates may be used to query for analyses. Sample fields such as Accession # (from) and To ranges, Collected (from) and To dates, Received (from) and To dates, Project (code), and Report To (organizations) may be used to search for samples. The user can also Exclude Results and Exclude Aux(iliary) Data in her search. Why is this called Result Fields To Search By?

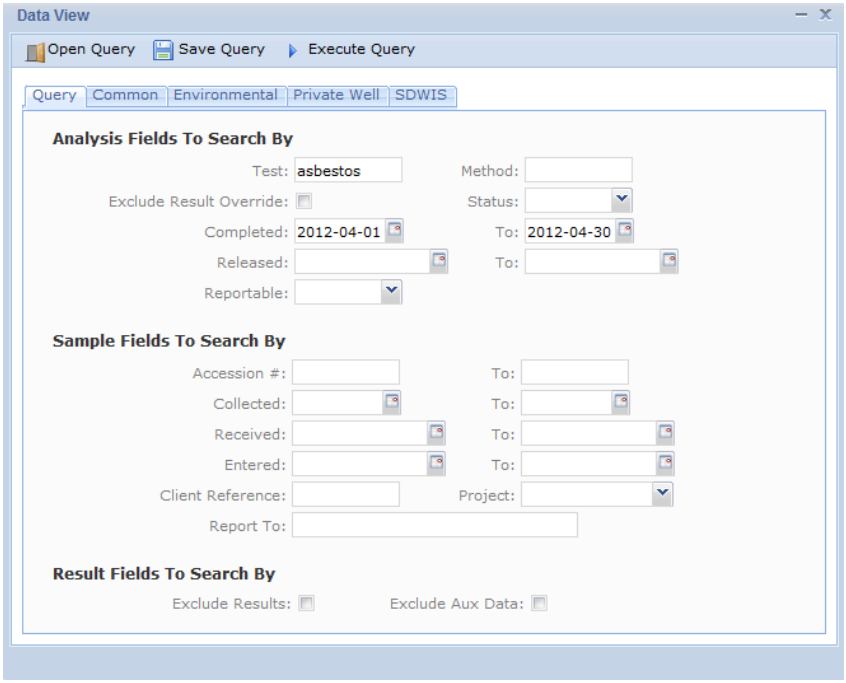


Figure 284 Data View - Query Tab

11.12.2 COMMON TAB

The Common Tab of the Data View Screen contains checkboxes that can be selected to specify which fields will be displayed on the Data View spreadsheet. These fields consist of four types: sample, organization, sample item, and analysis.

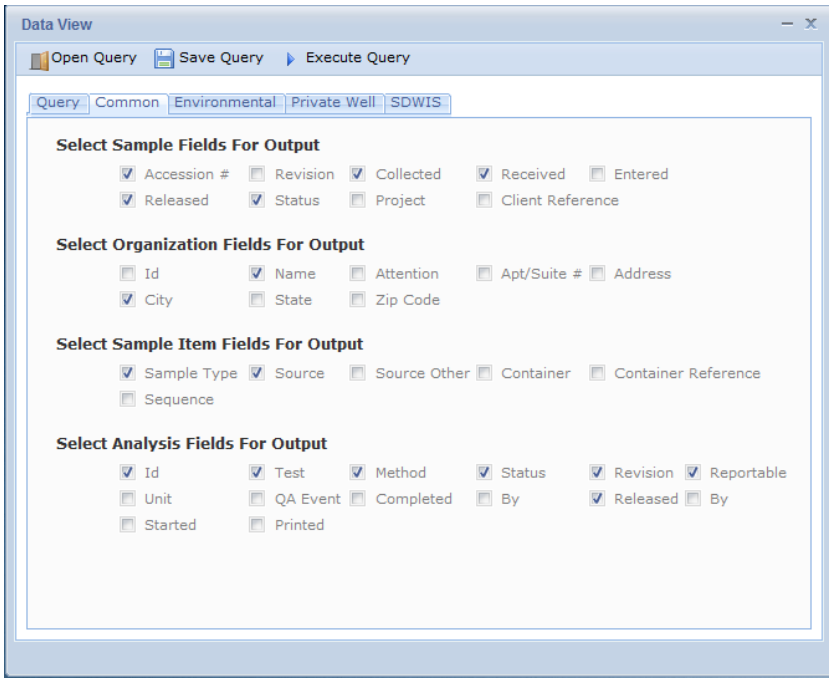


Figure 285 Data View - Common Tab

11.12.3 DOMAIN-SPECIFIC TABS

There are currently three domain-specific tabs found on the Data View Screen. These domain-specific tabs are mutually exclusive. In other words, fields may only be selected from one of these domains. The Environmental Tab contains such fields as Collector (name), Location, and Description.

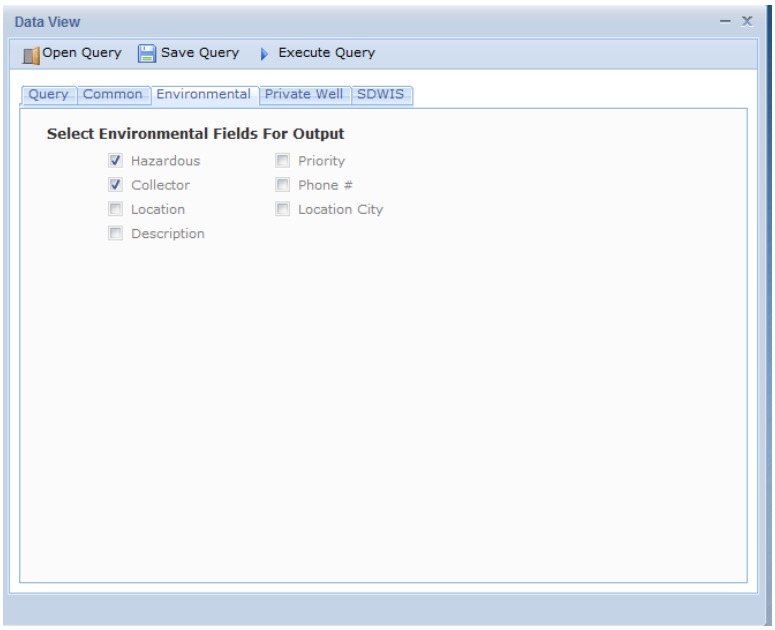


Figure 286 Data View - Environmental Tab

The Private Well Tab contains such fields as Owner, Well Num(ber), and Phone #.

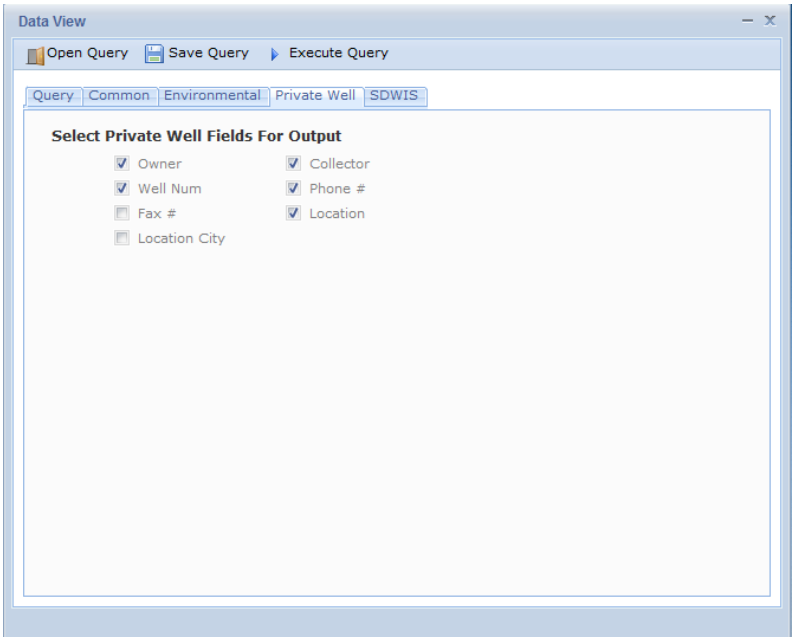


Figure 287 Data View - Private Well Tab

The SDWIS Tab contains such fields as PWS ID, PWS Name, and State Lab #.

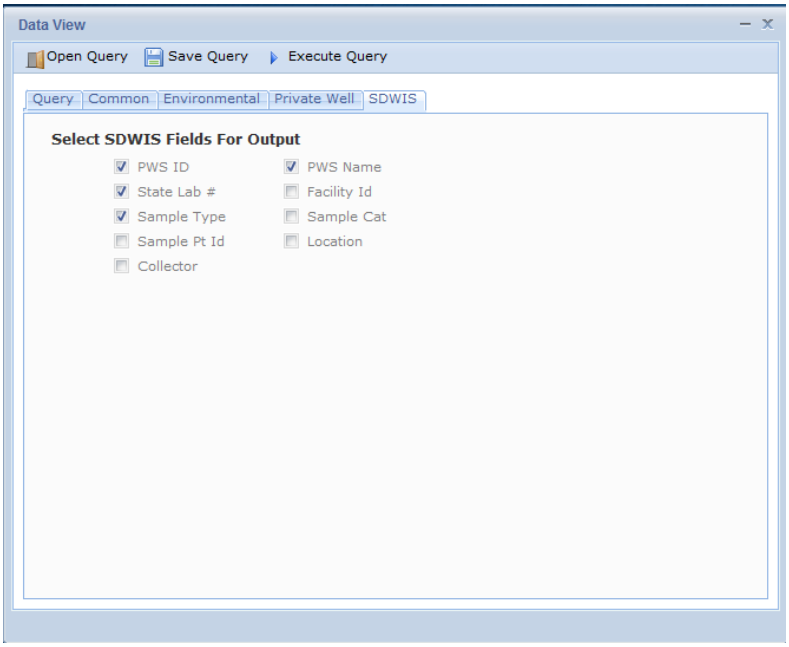


Figure 288 Data View - SDWIS Tab

11.12.4 HOW TO GENERATE A DATA VIEW SPREADSHEET

Several steps must be performed in order to generate a Data View spreadsheet. These are outlined below.

1. At least one pair of “From” and “To” fields must be entered. Examples would include Completed (from) and To dates, Accession # (from) and To, and Received (from) and To dates. As always, entering information in multiple fields will limit your query.
2. Select the Common and domain-specific fields to be displayed in the spreadsheet (optional). It is recommended that at least a few fields (i.e., Accession #, Sample or Analysis Status, (Organization) Name, Sample Type) be selected to distinguish analysis rows in the spreadsheet.
3. Click the **Execute Query** button at the top of the screen.
    a. A query may also be saved for future use by clicking on the **Save Query** button at the top of the screen. It will be saved as an XML document.

b. When the time comes to run the saved query, click on the **Open Query** button at the top and navigate to the location of the saved query to open it. This action will automatically populate the desired fields of the Data View screen with the saved values. These fields may be edited and additional ones may also be used. Click on the **Execute Query** button.

4. The Filter By Test Analyte And AuxData Screen will next pop up. Select the Test Analyte(s) and/or Aux Data in the left-hand pane(s) to use to filter the data. Next, select the associated Result(s) or Value(s) in the right-hand pane to further refine the data filtering. Alternatively, use the **Select All** buttons to display all of the corresponding test analyte and auxiliary data.
5. Click the **Run Report** button.
6. Open or save the Data View Spreadsheet.

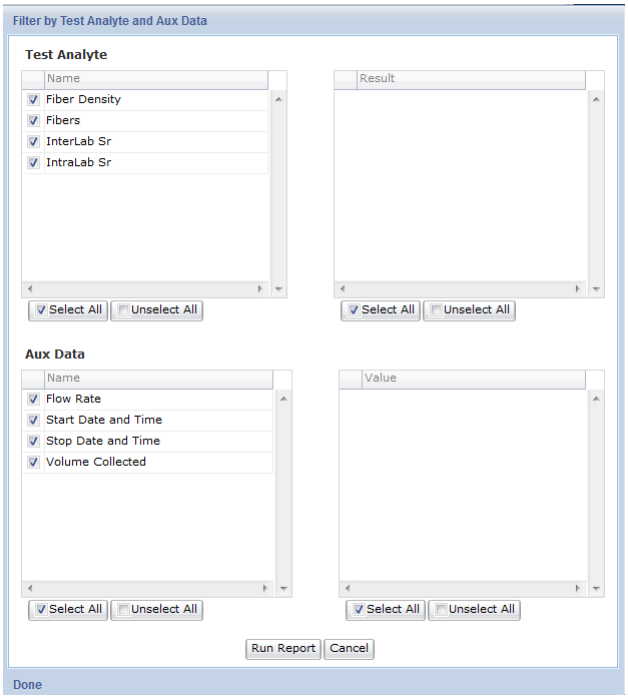


Figure 289 Filter by Test Analyte and Aux Data Screen

	A	B	C	D	E	F	G	H	I	J	K
1	Accession #	Collection Date	Released Date	Sample Status	Sample Type	Test	Method	Location City	Analyte	Value	Quant Limit
2	22706	2012-03-19 12:30	2012-04-02 10:26	Released	Air	asbestos	niosh 7400	CEDAR RAPIDS	Fiber Density	110 fibers/mm2	7 fibers/mm2
3	22706	2012-03-19 12:30	2012-04-02 10:26	Released	Air	asbestos	niosh 7400	CEDAR RAPIDS	Fibers	0.12	0.010
4	22706	2012-03-19 12:30	2012-04-02 10:26	Released	Air	asbestos	niosh 7400	CEDAR RAPIDS	InterLab Sr	0.16	no units
5	22706	2012-03-19 12:30	2012-04-02 10:26	Released	Air	asbestos	niosh 7400	CEDAR RAPIDS	IntraLab Sr	0.11	no units
6	22706	2012-03-19 12:30	2012-04-02 10:26	Released				CEDAR RAPIDS	Flow Rate	x2	
7	22706	2012-03-19 12:30	2012-04-02 10:26	Released				CEDAR RAPIDS	Start Date and Time	2012-03-19 12:30	
8	22706	2012-03-19 12:30	2012-04-02 10:26	Released				CEDAR RAPIDS	Stop Date and Time	2012-03-19 15:30	
9	22706	2012-03-19 12:30	2012-04-02 10:26	Released				CEDAR RAPIDS	Volume Collected	180	
10	22707	2012-03-19 12:30	2012-04-02 10:25	Released	Air	asbestos	niosh 7400	CEDAR RAPIDS	Fiber Density	<7 fibers/mm2	7 fibers/mm2
11	22707	2012-03-19 12:30	2012-04-02 10:25	Released	Air	asbestos	niosh 7400	CEDAR RAPIDS	Fibers	<0.045	0.045
12	22707	2012-03-19 12:30	2012-04-02 10:25	Released	Air	asbestos	niosh 7400	CEDAR RAPIDS	InterLab Sr	0.16	no units
13	22707	2012-03-19 12:30	2012-04-02 10:25	Released	Air	asbestos	niosh 7400	CEDAR RAPIDS	IntraLab Sr	0.25	no units
14	22707	2012-03-19 12:30	2012-04-02 10:25	Released				CEDAR RAPIDS	Flow Rate	x2	
15	22707	2012-03-19 12:30	2012-04-02 10:25	Released				CEDAR RAPIDS	Start Date and Time	2012-03-19 12:30	
16	22707	2012-03-19 12:30	2012-04-02 10:25	Released				CEDAR RAPIDS	Stop Date and Time	2012-03-19 13:00	
17	22707	2012-03-19 12:30	2012-04-02 10:25	Released				CEDAR RAPIDS	Volume Collected	60	
18	22708	2012-03-20 08:30	2012-04-02 10:26	Released	Air	asbestos	niosh 7400	CEDAR RAPIDS	Fiber Density	<7 fibers/mm2	7 fibers/mm2
19	22708	2012-03-20 08:30	2012-04-02 10:26	Released	Air	asbestos	niosh 7400	CEDAR RAPIDS	Fibers	<0.010	0.010
20	22708	2012-03-20 08:30	2012-04-02 10:26	Released	Air	asbestos	niosh 7400	CEDAR RAPIDS	InterLab Sr	0.16	no units
21	22708	2012-03-20 08:30	2012-04-02 10:26	Released	Air	asbestos	niosh 7400	CEDAR RAPIDS	IntraLab Sr	0.25	no units

Figure 290 Data View Spreadsheet

11.13 QC CHART

The link to the QC Chart screen is found in the Summary Section of the Report Menu. This screen is used to generate a table of QC analyte data points which can then be plotted to display a series of statistics.

Data can be retrieved based on a date range or on a number of most recent QCs. A single QC name/type can be selected in the Name field. Currently, only the “Lab Control Spike” type has been implemented for charting; future design enhancements are needed to retrieve (and chart) data for QCs of other types (Duplicate, Blank, etc.). The Plot Using option specifies whether the control limits and other statistics should be computed dynamically or statically. Selecting the “data points (dynamic)”option will use the QC data to compute standard deviation, control limits, etc. Selecting the “analyte parameters (fixed)” option will select the same data but produces a chart illustrating control limits based on fixed parameters P1 and P2 which can be set in the Analyte Parameter module.

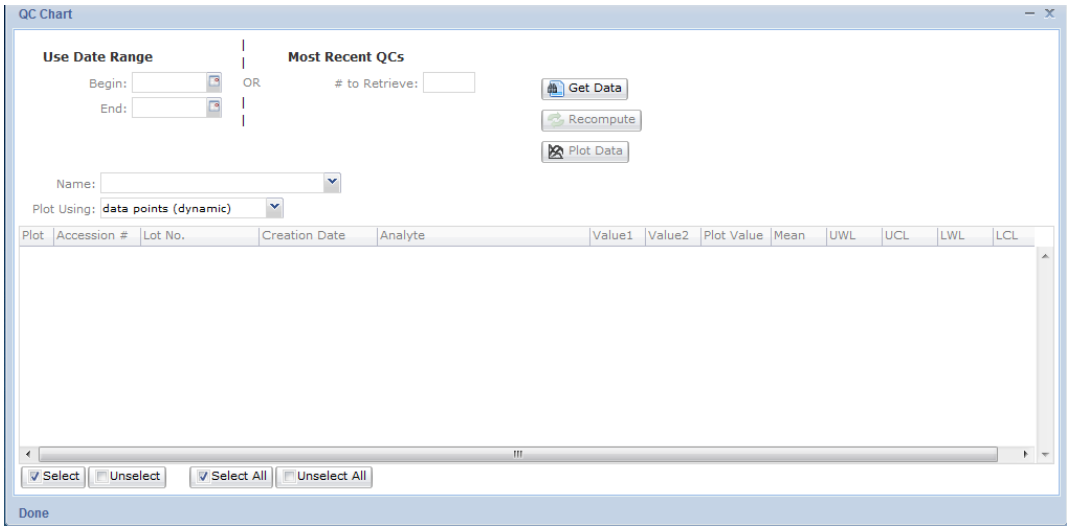


Figure 291 QC Chart Screen

The **Get Data** button retrieves all the matching data along with calculated values. Data from worksheets having a status of "void" and "failed run" are excluded in the data retrieval. When retrieving QC data based on the "# to Retrieve", the prep worksheet is counted even though it may contain no values to plot; therefore the number of QCs retrieved may differ from the number of data points retrieved.

The table of data can be sorted by Accession #, Lot No., Creation Date, or Analyte in order to view or unselect a range. The table includes columns labeled Value1, Value2, and Plot Value, which are specific to the type of QC being plotted. Individual data points may be deselected in the table and the various statistics can be re-computed using the **Recompute** button. The fields in the table on the lower half of the QC Chart screen are described below.

Plot

This checkbox is used to select whether the corresponding analyte data point should used in computations and plotted.

Accession

This is the unique identifier for the QC and is defined in the format of worksheet_number.position_number. For example, Accession # 1718.8 indicates that

the QC item was originally located on Worksheet 1718 and in position 8. If the QC was initially added to a sample preparation worksheet, the Accession # will indicate the prep_worksheet_number.position_number.

Lot No.

This field displays the unique lot # for the QC.

Creation Date

This is the date-time that the worksheet that contains the QC item was created. For prep QCs that are included on analytical worksheet, the creation date references the analytical worksheet.

Analyte

This field contains the name of the analyte.

Value1, Value2, Plot Value

These values are dependent on the QC type. Please refer to the relevant QC type subsection for specific information.

Mean

This field displays the average of the plot values for the specific analyte. It is calculated from the currently retrieved QC data. When the “analyte parameters (fixed)” option is selected, the Mean is equal to the fixed parameter, P3.

UWL (Upper Warning Limit)

This field represents +2 SD (standard deviations) from the mean. It is a measure of the upper limit of uncertainty for precision.

UCL (Upper Control Limit)

This field represents +3 SD from the mean. This calculation indicates the upper threshold at which the process output is considered statistically “unlikely”. When the “analyte parameters (fixed)” option is selected, the UCL is equal to the fixed parameter, P2.

LWL (Lower Warning Limit)

This field represents -2 SD from the mean. It is a measure of the lower limit of uncertainty for precision.

LCL (Lower Control Limit)

This field represents -3 SD from the mean. This calculation indicates the lower threshold at which the process output is considered statistically "unlikely". When the "analyte parameters (fixed)" option is selected, the LCL is equal to the fixed parameter, P1.

11.13.1 QC CHART REPORT

The QC Chart Report is produced from a table of selected data points in the QC Chart screen by clicking the **Plot Data** button. This report includes a graph of the plot values, as well as, a table of statistics. The UCL, LCL, UWL, LWL, and Plot Mean are found on every QC Chart Report. The other statistics vary and are based on the QC's parameters.

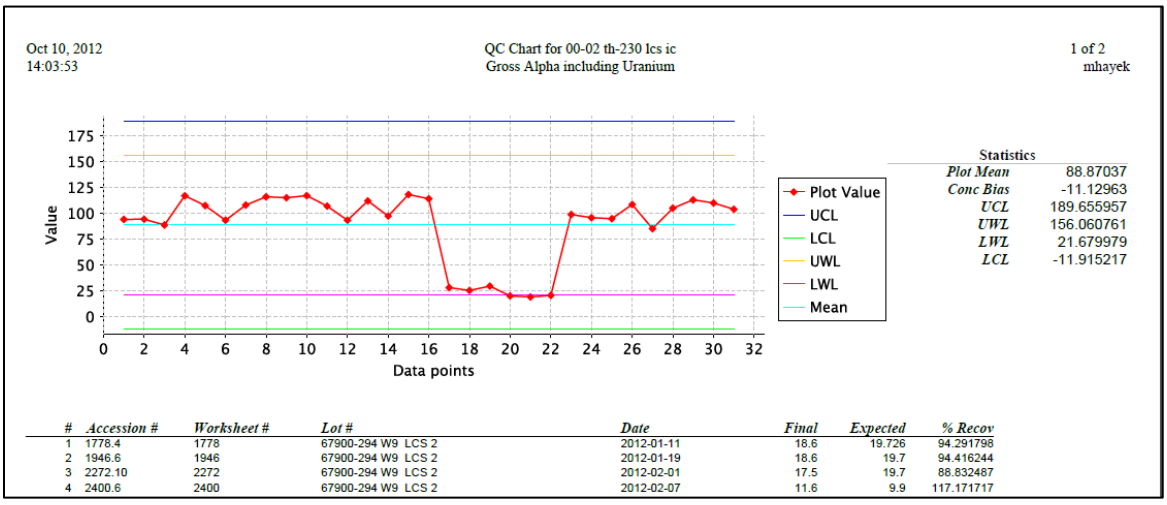


Figure 292 QC Chart Report

The Worksheet # on the QC Chart Report refers to the worksheet from which the data for the QC was retrieved.

11.13.2 LAB CONTROL SPIKES

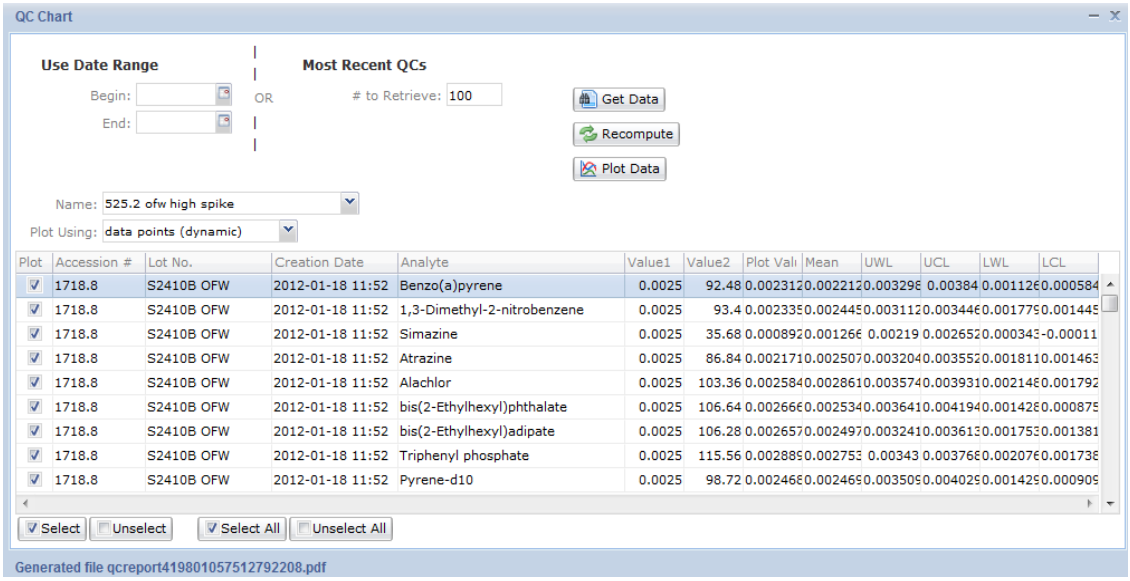


Figure 293 QC Chart Screen for Selecting Lab Control Spikes

The fields of the QC Chart screen which are specific to lab control spikes are defined below.

Value1: Expected Value

The Value1 field is the Expected Value from the analytical worksheet. It may differ from the QC definition. Its column is labeled as Expected on the QC Chart Report.

Value2: % Recovery

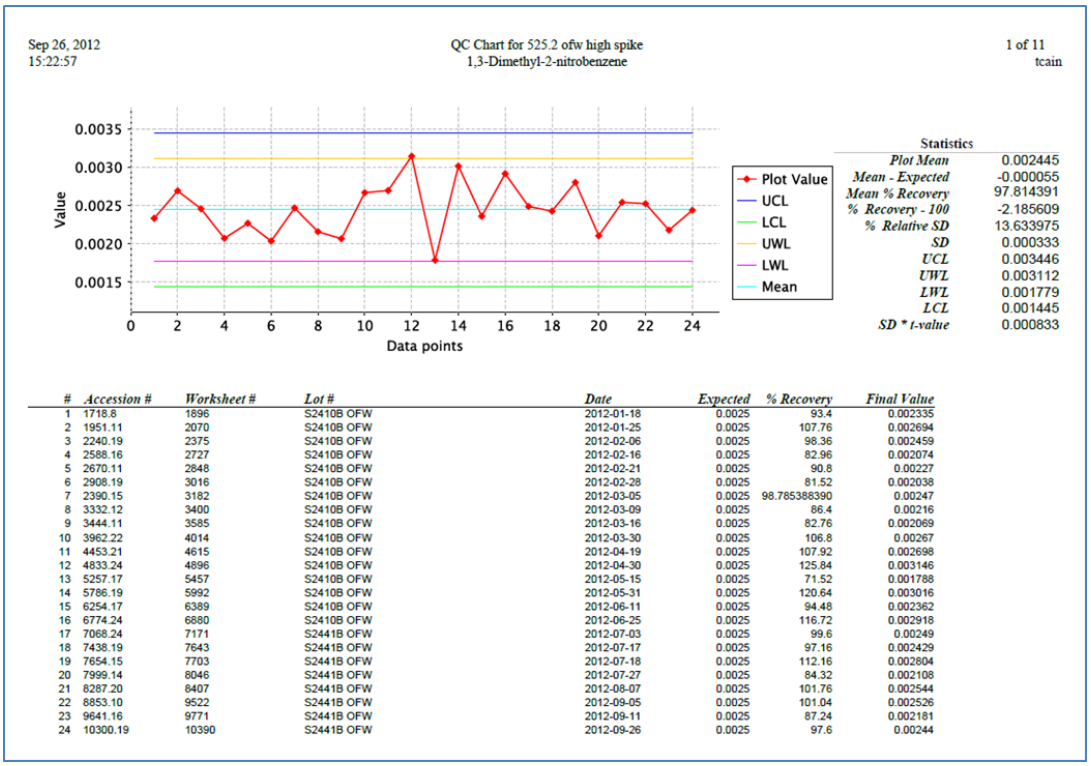
This Value2 field represents the percent recovery and is calculated based on the following formula:

$$\%\ Recovery\ (Value2) = \frac{\text{Final Value (Plot Value) for each QC Result x 100}}{\text{Expected Value (Value1) for each individual analyte}}$$

Its column is labeled as % Recovery on the QC Chart Report.

Plot Value: Final Value

The Plot Value field is the Final Value for each QC result, and its column is labeled Final Value on the QC Chart Report.



#	Accession #	Worksheet #	Lot #	Date	Expected	% Recovery	Final Value
1	1718.8	1896	S2410B OFW	2012-01-18	0.0025	93.4	0.002335
2	1951.11	2070	S2410B OFW	2012-01-25	0.0025	107.76	0.002694
3	2240.19	2375	S2410B OFW	2012-02-06	0.0025	98.36	0.002459
4	2588.16	2727	S2410B OFW	2012-02-16	0.0025	82.96	0.002074
5	2670.11	2848	S2410B OFW	2012-02-21	0.0025	90.8	0.00227
6	2908.19	3016	S2410B OFW	2012-02-28	0.0025	81.52	0.002038
7	2390.15	3182	S2410B OFW	2012-03-05	0.0025	98.785388390	0.00247
8	3332.12	3400	S2410B OFW	2012-03-09	0.0025	86.4	0.00216
9	3444.11	3585	S2410B OFW	2012-03-16	0.0025	82.76	0.002069
10	3962.22	4014	S2410B OFW	2012-03-30	0.0025	106.8	0.00267
11	4453.21	4615	S2410B OFW	2012-04-19	0.0025	107.92	0.002698
12	4833.24	4896	S2410B OFW	2012-04-30	0.0025	125.84	0.003146
13	5257.17	5457	S2410B OFW	2012-05-15	0.0025	71.52	0.001788
14	5786.19	5992	S2410B OFW	2012-05-31	0.0025	120.64	0.003016
15	6254.17	6389	S2410B OFW	2012-06-11	0.0025	94.48	0.002362
16	6774.24	6880	S2410B OFW	2012-06-25	0.0025	116.72	0.002918
17	7068.24	7171	S2441B OFW	2012-07-03	0.0025	99.6	0.00249
18	7438.19	7643	S2441B OFW	2012-07-17	0.0025	97.16	0.002429
19	7654.15	7703	S2441B OFW	2012-07-18	0.0025	112.16	0.002804
20	7999.14	8046	S2441B OFW	2012-07-27	0.0025	84.32	0.002108
21	8287.20	8407	S2441B OFW	2012-08-07	0.0025	101.76	0.002544
22	8853.10	9522	S2441B OFW	2012-09-05	0.0025	101.04	0.002526
23	9641.16	9771	S2441B OFW	2012-09-11	0.0025	87.24	0.002181
24	10300.19	10390	S2441B OFW	2012-09-26	0.0025	97.6	0.00244

Figure 294 QC Chart Report for Lab Control Spikes

The following values are located in the Statistics table at the top of the QC Chart Report. The Mean – Expected, % Recovery – 100, and Mean % Recovery values are based on the assumption that the Expected Value is assumed to be fixed for an individual QC.

Plot Mean

This value is the calculated average of all the plotted QC Final Values for that analyte.

Mean - Expected

This value represents the bias in concentration and is based on the mean of the Final Values minus the Expected value for Data Point #1 in the table.

Mean % Recovery

This value is the calculated average of all of the % Recovery values in the table for that analyte.

% Recovery – 100

This value is calculated by subtracting 100 from the Mean % Recovery. It represents the bias in percent (uncertainty for accuracy).

% Relative SD

This value is the standard deviation divided by the mean times 100.

SD

The sample standard deviation is calculated from the following formula

$$s = \sqrt{\frac{1}{N-1}\sum_{i=1}^{N}(x_i - \overline{x})^2},$$

where **s** is the standard deviation, **N** stands for the size of the sample, **$\{x_1, x_2, \ldots, x_N\}$** are the observed values of the sample items, and $\overline{x}$ is the mean value of the sample items.

SD * t-value

This value is the standard deviation times the student's t-value using a table of t-values. The table contains 200 t-values for $\geq$ 201 data points. SD * t-value may be used to calculate method detection limits with a minimum of seven data points at an appropriate concentration.

11.14 FINAL REPORT SINGLE/REPRINT

The link to the Final Report Single/Reprint Screen is found in the Summary Section of the Report Menu. This screen is used to print or fax a Final Report for an individual accession number with print being the default action.

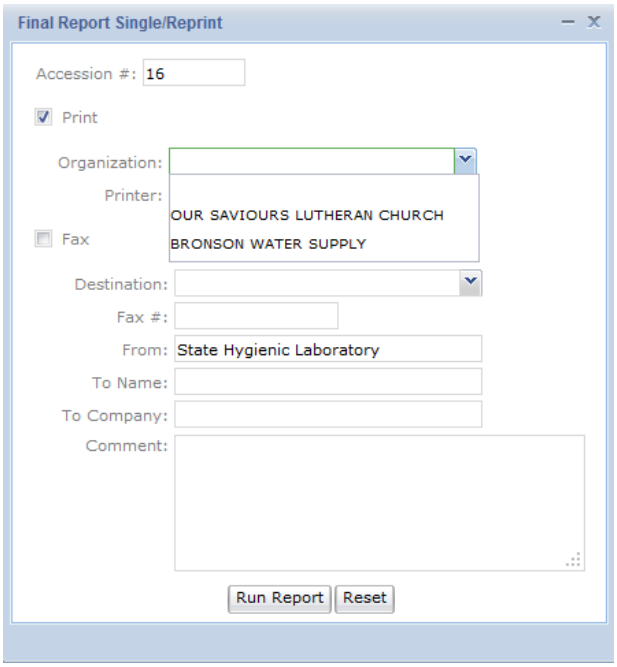


Figure 295 Final Report Print Option - Organization Dropdown List

After the Accession # is entered the LIMS will display all of the “report to” organizations (both primary and secondary) in the Organization drop-down list. If the first option in the drop-down list (the “blank” choice) is selected, then separate copies of the Final Report will be printed for all of the “report to” organizations. Alternatively, one of the organizations may be selected to populate the “report to” name and address of the Final Report and only that copy will be printed.

The Fax checkbox must be selected to fax the Final Report. The Fax # field must be populated in one of three ways.

1. The Fax # may be entered manually.
2. If “From Sample” is selected from the Destination dropdown list, the LIMS will automatically enter any relevant auxiliary items that are present in the sample data (i.e., Fax # and To Name).

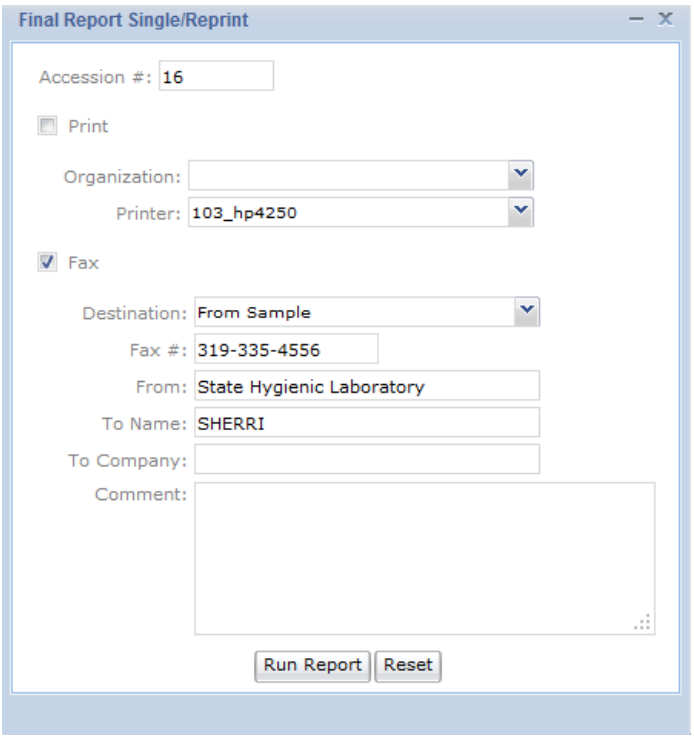


Figure 296 Final Report Fax Option – Destination: From Sample

3. If the name of a "report to" organization is selected in the Destination dropdown list, the LIMS will automatically enter any relevant parameters that are present in the Organization screen (i.e., Fax #).

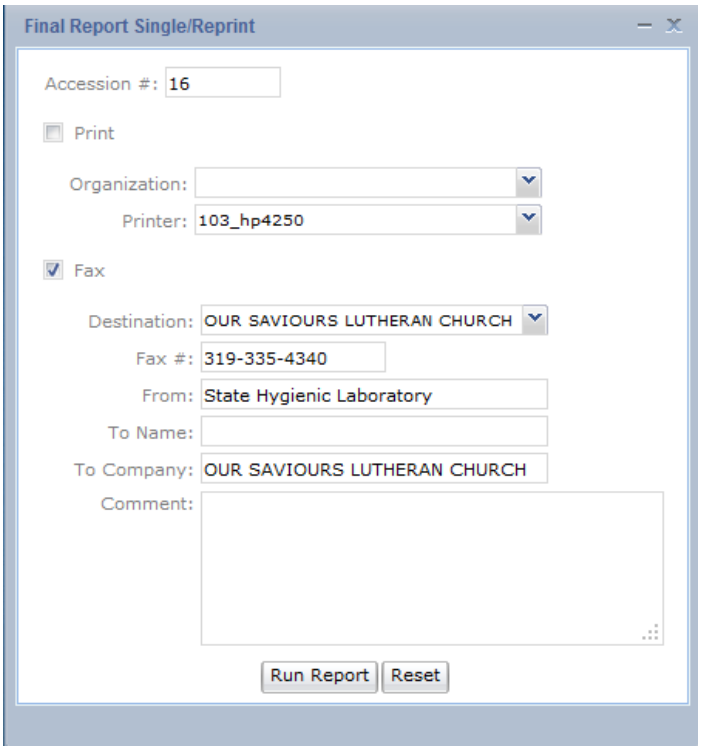
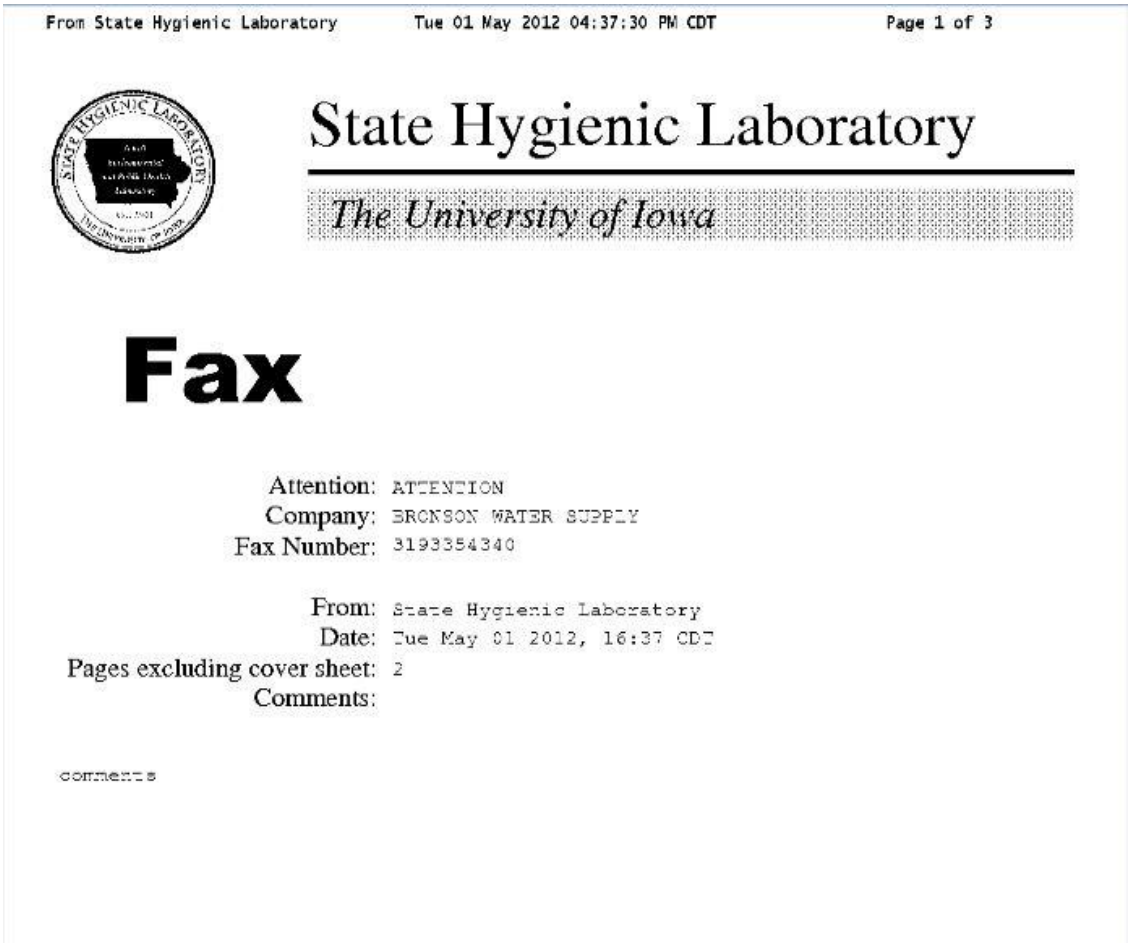


Figure 297 Final Report Fax Option - Destination: Organization

As with the Fax # field, the To Name, To Company, and Comment fields may all be entered manually. An SHL cover sheet is automatically generated and faxed along with the Final Report.



From State Hygienic Laboratory Tue 01 May 2012 04:37:30 PM CDT Page 1 of 3

State Hygienic Laboratory

The University of Iowa

Fax

Attention: ATTENTION
Company: BRONSON WATER SUPPLY
Fax Number: 3193354340

From: State Hygienic Laboratory
Date: Tue May 01 2012, 16:37 CDT
Pages excluding cover sheet: 2
Comments:

comments

Figure 298 SHL Fax Cover Sheet

CHAPTER 12. TROUBLESHOOTING

12.1 FREQUENTLY ASKED QUESTIONS (FAQS)

Question: I don't have the permissions that I need, who can help me?

Answer: Call or e-mail Mike Hayek in IT (319-335-4358, michael-hayek@uiowa.edu) to request a change in permissions.

Question: I typed my password in wrong too many times and now I'm locked out of OE, what do I do?

Answer: You have a maximum of 4 tries before the system will lock you out. You must wait 10 minutes before you can try again. Double check to make sure you are typing in the correct password (remember the field is case sensitive).

Question: Can I be logged onto OE on more than one computer?

Answer: No.

Question: I was away from my computer and OE has timed out, what do I do now?

Answer: The OE system will sign of any user that is inactive for more than 30 minutes. You will need to login again.

Question: I want to override the start date and time and/or the completion date and time in OE through the Excel spreadsheet, what is the format?

Answer: All date/time fields in the OE system are in the following format; YYYY-MM-DD HH:MM.

Question: I am trying to upload an Excel spreadsheet that contains user override information and the system keeps giving me an error message. What do I do now?

Answer: Abort your update in OE and check the Excel spreadsheet file to make sure that the users names are spelled correctly and that they are separated by a comma without a space (ie. jsmith,tjones). Also make sure that there are units assigned to the test.

Question: When encountering errors in OE, what things can I check before calling IT department?

Answer: There are 4 things to try;

- Checks to see if you are logged into the correct system (production vs. test)
- Try clearing the cache (there is a "how to" under LIMS/OpenELIS folder).
- Checks to make sure you are using the correct browser (Mozilla Firefox not Internet Explorer).
- Try rebooting your computer.

Question: How do I print a final report?

Answer: You can print a final report by using "options" in the Sample Tracking screen.

Question: Can I search by a range of accession numbers or dates in OE?

Answer: You can search a range of accession number by using two periods between the numbers (i.e. 345..349). For a search of date ranges use the (..) between the two dates.

Question: How do I search for 2 different accession numbers instead of a range?

Answer: You can use the | symbol (located above the Enter key) between numbers to indicate more than one number.

Question: Can I reprint a label or print additional labels?

Answer: Yes, if you have label printing permissions, it's located under the Label tab.

Question: Can I view a bottle order, and where do I do this?

Answer: Yes you can view a bottle order by looking under the "Inventory/Order tab and choosing the "Send-out Order" option.

Question: Data processing has the record locked that I want to update, what do I do?

Answer: Click on abort to cancel your update. Wait 2-3 minutes and try to perform the update again. If the record is still locked, call the individual who has the record locked.

Question: I'm releasing results for a test and I found a data processing error, what do I do now?

Answer: Notify the data processing department of the error and wait until the issue has been resolved before releasing the analysis.

Question: A bottle order has the incorrect test assigned to it. Should I (and can I) change the test?

Answer: If you have permission to add & delete the test in your section, then yes you can and should change the test/method to the correct test/method. You should also notify the client services department that a bottle order needs to be corrected. Be sure to supply them with the bottle order number as well as the test ID's.

Question: When & why should I use worksheets in OE?

Answer: Using worksheets in OE makes entering several analysis results (batch processing) faster. Worksheets also allow you to track QC for the analysis.

Question: When do Final Reports get printed?

Answer: Monday – Friday at 10:30 & 3:00, Saturday 8:30 & 10:30.

Question: Do customers receive notification of receipt of sample; if so, how and when?

Answer: Clients are notified via e-mail (if requested) 24hrs every day at 10 minutes past the hour.

Question: Is there a training manual and/or training videos and where are they located?

Answer: Yes there is a training manual and training videos and they are located under;

M:\LIMS\TrainingGroup\OpenELIS\OpenELIS Manual v2.pdf

and

M:\LIMS\TrainingGroup\OpenELIS\Training_Videos

12.2 HELP

If you have questions about the OpenELIS database, please contact Dari Shirazi (319-335-4451), Matt Bielicke (319-335-4462), or Mike Hayek (319-335-4358).

If you have questions or comments regarding the OpenELIS Manual, please contact Dari Shirazi at dariush-shirazi@uiowa.edu or Mike Hayek at michael-hayek@uiowa.edu .

APPENDIX

A. WORKSHEET CREATION FOR A PREP TEST

The initial step to creating any worksheet utilizes the Worksheet Creation module. The link to the Worksheet Creation module is located in the Analysis Menu. After this module is selected, the Worksheet Creation Lookup screen is displayed on top of it to aid in the location of samples to be added to the worksheet that is being built. The steps below illustrate how to create a worksheet for a semivolatiles prep test on two SDWIS drinking water samples.

1. Select the Worksheet Creation module from the Analysis Menu. The Worksheet Creation Lookup screen will appear on top of the Worksheet Creation screen.
2. Query for Test/Method (e.g., type “prep svol” in the Test field and select “epa 525.2” as the Method). Select “Logged In” as the Status. Click the **Search** button.

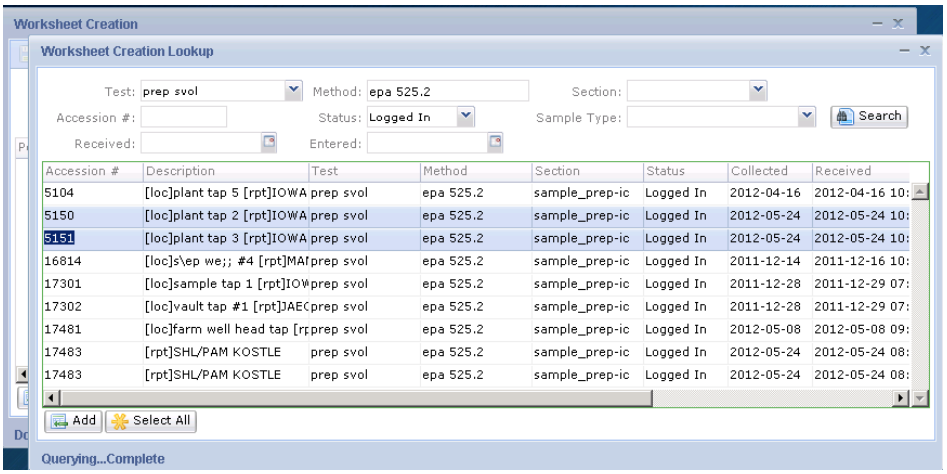


Figure 299 Worksheet Creation Lookup Screen

3. **Ctrl**-select or **Shift**-select the desired Accession Numbers to add to the worksheet.
4. Click the **Add** button. Alternatively, the **Select All** button can be used to add all of the samples from the query.

5. On the Worksheet Creation screen, the three QCs that are associated with the prep svol test (Accession #'s X.1, X.2, and X.3) are placed in the top 3 positions followed by the two samples (Accession #'s 5150 and 5151) in Positions 4 and 5. When the worksheet is saved the "X" in the QC Accession # is replaced with the worksheet number.

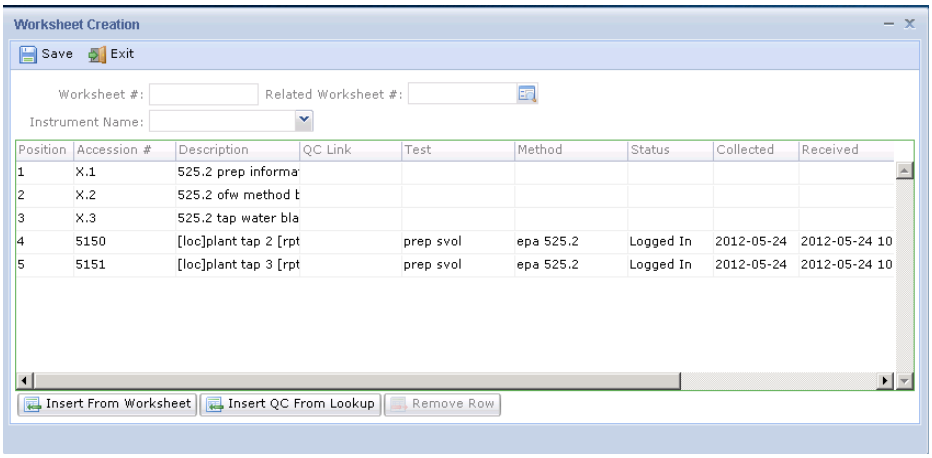


Figure 300 Worksheet Creation Screen for a Prep Test

6. If the worksheet has been created satisfactorily, skip to Step 11. If additional QC's need to be inserted, click the **Insert QC From Lookup** button.
7. The QC Lookup screen will pop-up over the Worksheet Creation screen. To search for QC's that have a name that begins with that method number, "*525*" could be typed in the Enter Search field. Click the **Search** button.
8. **Ctrl**-select "525.2 ofw high spike" and "525.2 sample duplicate" and click **OK**.

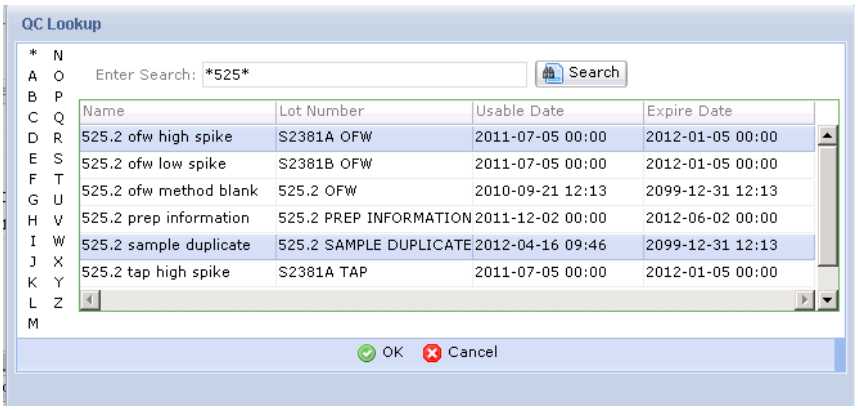


Figure 301 QC Lookup Screen

9. These two QCs are added to Positions 6 and 7 on the Worksheet Creation screen (as Accession #'s X.6 and X.7, respectively). Please note: When the worksheet is saved the "X" in the QC Accession # is replaced with the worksheet number.

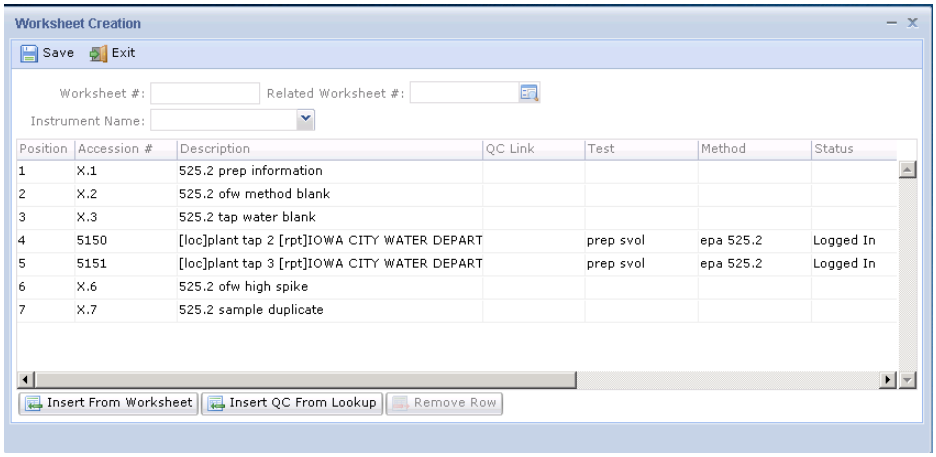


Figure 302 Worksheet Creation Screen with Two Additional QC's Added at the End

10. For the sample duplicate QC in Position 7, click on the corresponding QC Link field to select the Accession # of the sample for which it is a duplicate.

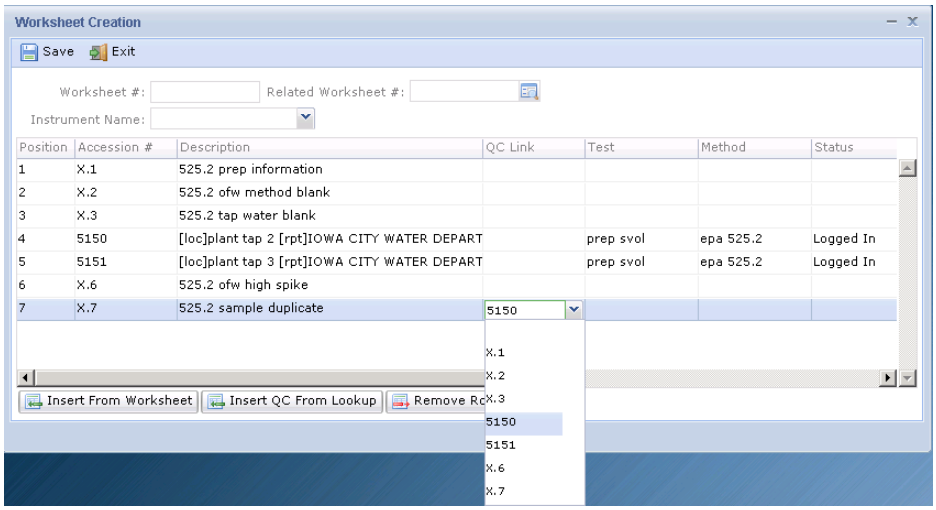


Figure 303 Inserting a QC Link

11. Since this is a prep test batch there isn't any Instrument Name to choose.
12. Save the Worksheet Creation screen by clicking the **Save** button. A warning message pops up notifying the user that worksheets cannot be changed once

they have been saved. The Worksheet # is assigned by the LIMS. It is suggested to note the Worksheet # for future use. Click the **Exit** button.

13. Complete the laboratory work.

B. WORKSHEET COMPLETION FOR A PREP TEST

The Worksheet Completion module allows the laboratory analyst to process a worksheet by entering results, completing, and reviewing analyses. The steps below illustrate how to complete a worksheet for the same example that was used in Appendix A. WORKSHEET CREATION FOR A PREP TEST.

1. Click on the link to the Worksheet Completion module in the Analysis Menu.
2. The Worksheet Lookup screen pops up on top of the Worksheet Completion screen.

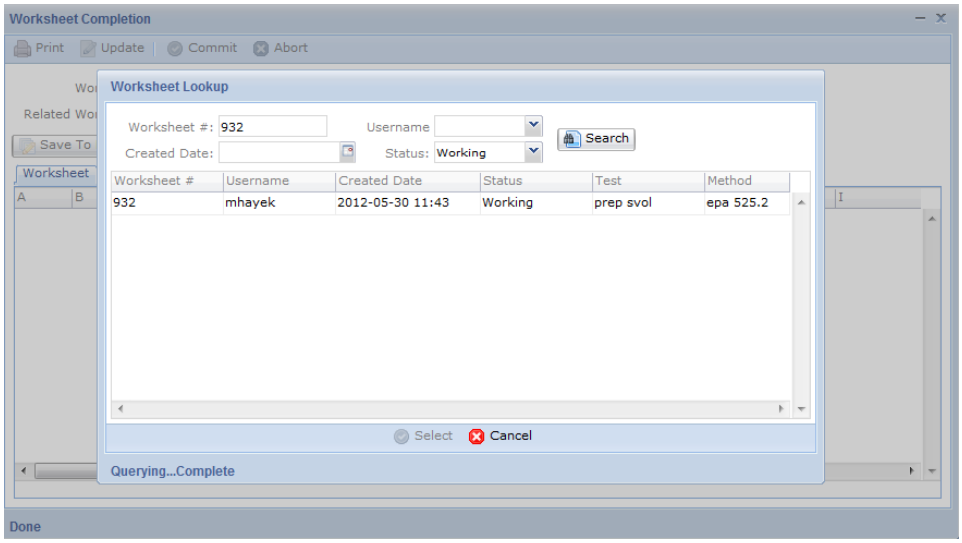


Figure 304 Worksheet Lookup Screen

3. A created worksheet can be queried by Worksheet #, Username, Created Date, and/or Status. Worksheet statuses consist of Working, Done, Failed Run, and Void. Click the **Search** button. Highlight the desired worksheet from the table in the lower pane and click the **Select** button. The Worksheet Lookup screen automatically closes allowing the Worksheet Completion screen to be displayed.

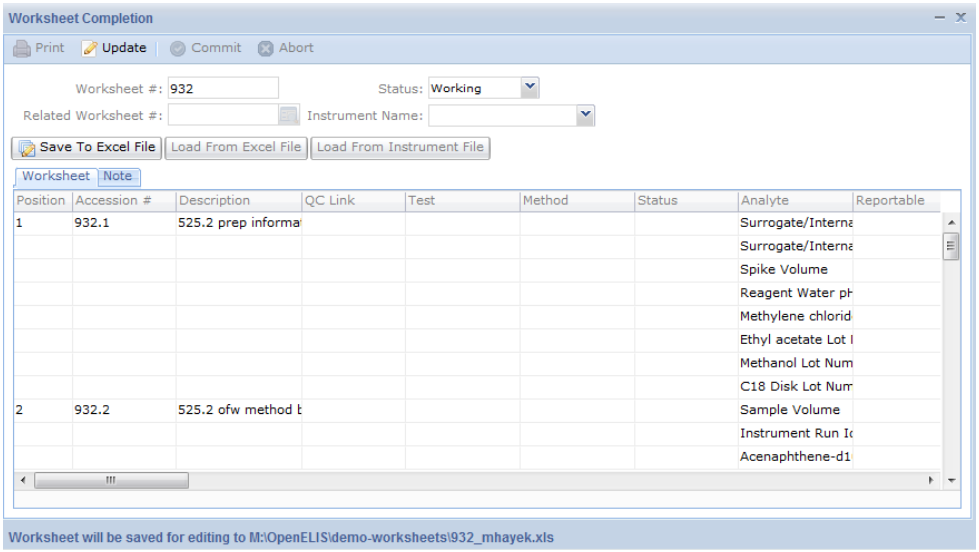


Figure 305 Worksheet Completion Screen

4. The Worksheet Completion screen displays the Worksheet #, Status, Related Worksheet #, and Instrument Name in its top pane. The bottom pane consists of two tabs: Worksheet and Note. The Worksheet tab has the same columns and values that are found in the Excel version of the worksheet. The Worksheet Completion screen is only a viewer – you cannot edit the worksheet from this screen. In order to edit the worksheet it must be saved to an Excel file. Click the **Save To Excel File** button for this purpose. The location of the saved Excel file on the network drive will be specified in the Status Area of the screen.

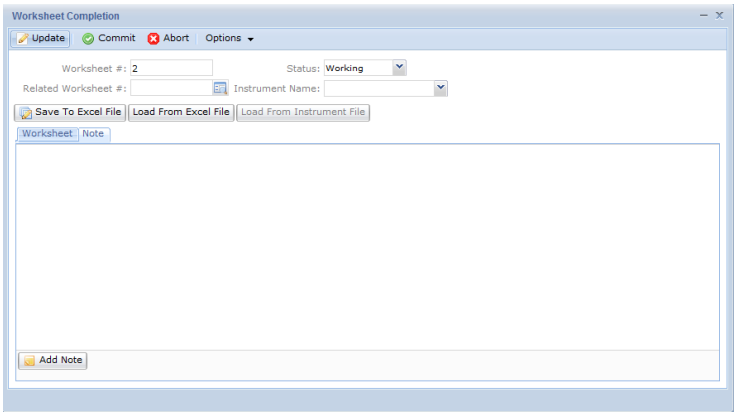


Figure 306 Note Tab of Worksheet Completion Screen

5. The Note tab on the Worksheet Completion screen is for user convenience to write any notes that might be related to the run. This tab is intended to contain notes pertaining to the worksheet (e.g., an explanation of why the run failed). Click **Update** and then **Add Note**. The Standard Note Selection screen will pop up. See STANDARD NOTE SELECTION SCREEN for more information on how to use standard notes.
6. Open the Excel worksheet file. If an Excel Security Warning pops up saying "Macros have been disabled.", click on the **Enable Content** button.
7. Click the **Yes** button on the Security Warning pop-up message: "Do you want to make this file a Trusted Document?"
8. With each Position, Accession #, and Description are attached rows of analytes.

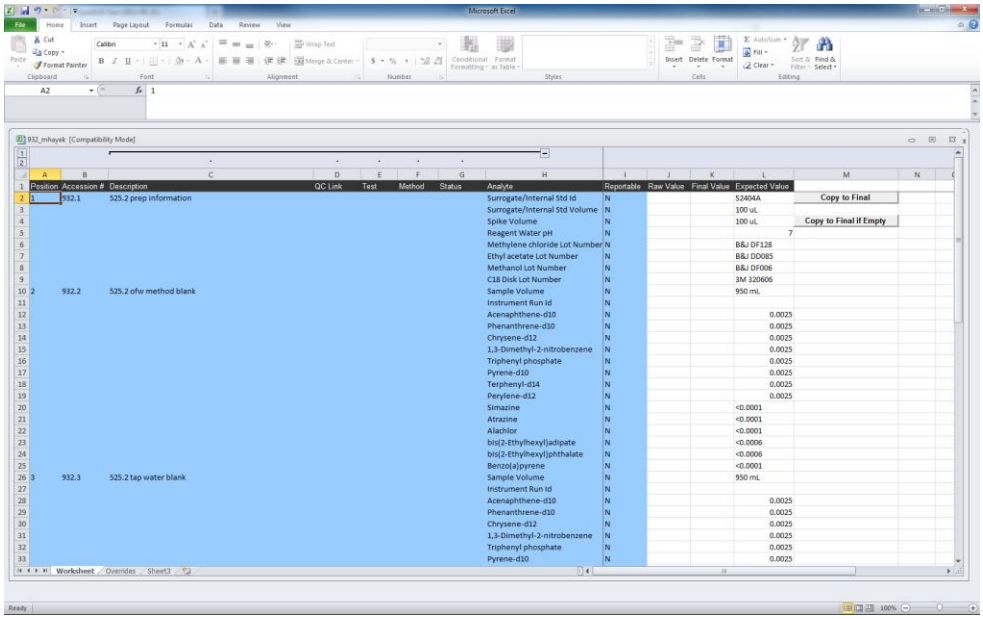
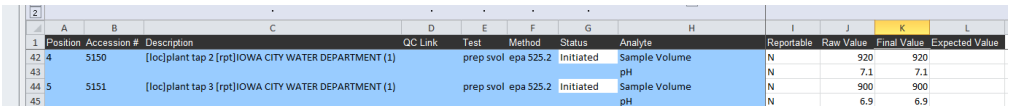


Figure 307 Excel Prep Analysis Worksheet

9. Every cell in blue cannot be edited. It is write-protected.
10. The bar at the top can be used to collapse (**-** button) and expand (**+** button) the middle columns of the spreadsheet so that the user can edit the values in the white columns on the right side of the spreadsheet.

11. Expected Values include information, defaults, concentrations for chemical analytes, surrogates and internal standards, target analytes for a method blank, etc.
12. Raw Values may include volume measurements, pH measurements, or measurements that came off an analytical instrument. The following Raw Values were entered in this example:
    a. "920" for the Sample Volume of Sample Accession # 5150
    b. "7.1" for the pH of Sample Accession # 5150
    c. "900" for the Sample Volume of Sample Accession # 5151
    d. "6.9" for the pH of Sample Accession # 5151
13. Some considerations for Raw Values include:
    a. They could be different from the Final Values. Some tests require multiple dilutions and the Raw Value is not representative of the Final Value at all.
    b. If the Raw Value is not entered into the worksheet, the data that came off the instrument will not be captured. Only the Final Value will remain stored in the LIMS. If another user changes the Final Value, the previous Final Value is lost, and there will not be any raw instrument values in which to compare it.
    c. The Raw Value Is not rounded in the Excel worksheet but may be rounded to compute the Final Value if it is specified in the test definition.
14. The **Copy to Final** button copies values from the Raw Value column to the Final Value column. Both types of values are saved back to the LIMS. The Final Value is what goes into the Value field on the Test Results tab of the full sample login and Complete and Release screens.



	A	B	C	D	E	F	G	H	I	J	K	L
1	Position	Accession #	Description	QC Link	Test	Method	Status	Analyte	Reportable	Raw Value	Final Value	Expected Value
42	4	5150	[loc]plant tap 2 [rpt]IOWA CITY WATER DEPARTMENT (1)		prep svol	epa 525.2	Initiated	Sample Volume	N	920	920	
43								pH	N	7.1	7.1	
44	5	5151	[loc]plant tap 3 [rpt]IOWA CITY WATER DEPARTMENT (1)		prep svol	epa 525.2	Initiated	Sample Volume	N	900	900	
45								pH	N	6.9	6.9	

Figure 308 Raw Values Copied to Final Values in an Excel Prep Analysis Worksheet

15. The **Copy to Final if Empty** button is used so that values that are already entered in the Final Value column are not overridden. Need example here.

16. The Overrides tab is used to correct the Started date and time for a sample or QC item to the actual date and time that the analysis began. The Started date and time is defaulted to the worksheet creation date and time.
17. The User(s) cells on the Overrides tab are defaulted to the logged-in user when the worksheet is saved to the LIMS. You can override this user and add a second, third (or more) user who worked on the analysis. The logged-in user's username must be entered or it will not be recorded in the LIMS. The network username should be entered, followed by a comma, and with no spaces between usernames. Make sure it is copied down for each sample row.

	A	B	C	D	E	F	G	H
1	Position	Accession #	Description	Test	Method	User(s)	Started	Completed
2	1	932.1	525.2 prep information			mhayek,mbielick,wberger	2012-05-30 11:43	
3	2	932.2	525.2 ofw method blank			mhayek,mbielick,wberger	2012-05-30 11:43	
4	3	932.3	525.2 tap water blank			mhayek,mbielick,wberger	2012-05-30 11:43	
5	4	5150	[loc]plant tap 2 [rpt]IOWA CITY WATER DEPARTMENT (1)	prep svol	epa 525.2	mhayek,mbielick,wberger	2012-05-31 09:20	
6	5	5151	[loc]plant tap 3 [rpt]IOWA CITY WATER DEPARTMENT (1)	prep svol	epa 525.2	mhayek,mbielick,wberger	2012-05-31 09:20	
7	6	932.6	525.2 ofw high spike			mhayek,mbielick,wberger	2012-05-30 11:43	
8	7	932.7	525.2 sample duplicate			mhayek,mbielick,wberger	2012-05-30 11:43	

Figure 309 Overrides Tab of an Excel Prep Analysis Worksheet

18. Make sure to close the Excel file so that it doesn't sit on the network drive indefinitely.
19. Open the Worksheet Completion module. Enter the Worksheet # (or another search parameter) into the Worksheet Lookup screen and click **Search**.
20. Select the desired worksheet and click **Select**.
21. Click the **Update** button on the Worksheet Completion screen. Click the **Load From Excel File** button. The same Excel worksheet is now loaded on this screen.
22. After reviewing the Worksheet Completion Screen, change the Status from Working to Done. Changing the Status to Failed Run will send the prep analyses to Requeued status. Changing the Status to Void will send the prep analyses back to Logged In status.
23. Click **Commit**. This sets the prep analyses to Completed status. They must still be Released. See RELEASING AN ANALYSIS for more information on this procedure.

C. ANALYTICAL WORKSHEET CREATION

The process for creating an analytical worksheet is largely the same as the one used to create a prep test worksheet. The example that was used for the prep test worksheet

is used here to show how the process would be continued to create and complete an analytical worksheet. The steps are listed below:

1. Select Worksheet Creation from the Analysis Menu.
2. The Worksheet Creation Lookup screen will pop up on top of the Worksheet Creation screen. Enter “semivolatiles” in the Test field and select the Method “epa 525.2”.
3. Change the Status to Logged In. Click the **Search** button. When the prep test is completed, the analytical test status automatically goes from In Prep to Logged In.
4. Select the desired analytical tests from the Worksheet Creation Lookup screen and click **Add** or **Select All**. These rows get added to the Worksheet Creation screen.
5. Next, everything from the prep worksheet could be inserted into the analytical worksheet to create an all-encompassing worksheet.
    a. To do this, click the **Insert From Worksheet** button on the Worksheet Creation screen.
    b. Enter the Worksheet # (or another search parameter) into the Worksheet Lookup screen that pops up and click **Search**.
    c. Click on the desired worksheet and click **Select**.
    d. Select the rows you want from the specified Worksheet screen and click **OK**.
    e. The prep test rows will be added below the analytical test rows on the Worksheet Creation screen.
6. Additional QC Items that are specific to the analytical tests/run can be added now by clicking on the **Insert QC From Lookup** button.
7. The Instrument Name can be selected.
8. Review the Worksheet Creation screen and click the **Save** button. The following message pops up. Click the **Save** button on the message.

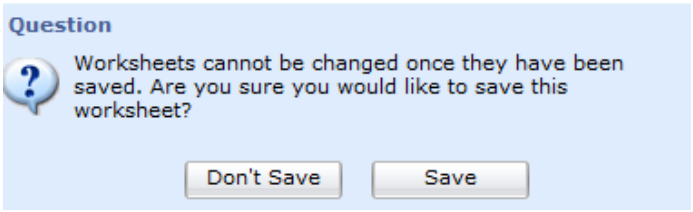


Figure 310 Worksheet Save Warning

9. The Worksheet # is assigned by the LIMS. It is suggested to note the Worksheet # for future use.
10. Click the **Exit** button on the Worksheet Creation screen.

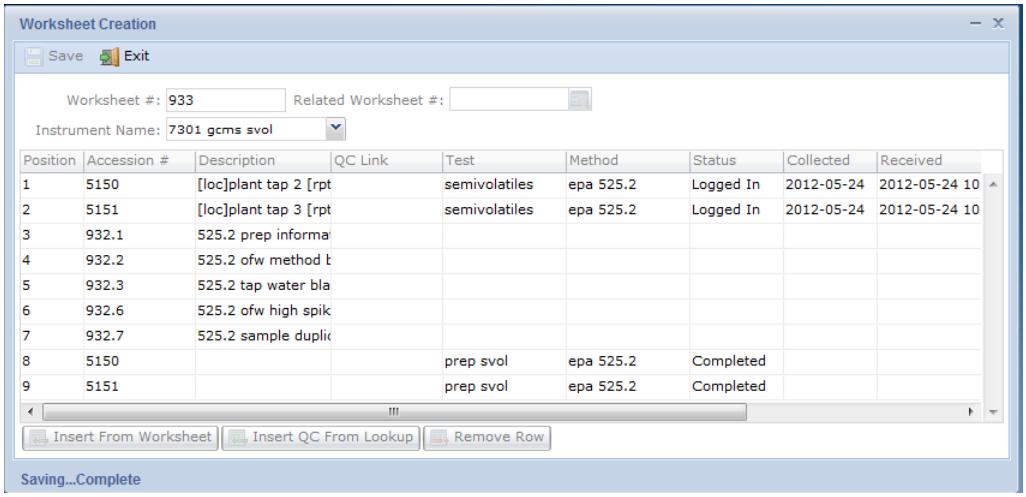


Figure 311 Worksheet Creation Screen for an Analytical Run

11. Complete the laboratory work.

D. ANALYTICAL WORKSHEET COMPLETION

The Worksheet Completion module allows the laboratory analyst to process a worksheet by entering results, completing, and reviewing analyses. The steps below illustrate how to complete a worksheet for the same example that was used in Appendix C. ANALYTICAL WORKSHEET CREATION.

1. After the analytical run is performed, click on the link to the Worksheet Completion module in the Analysis Menu.

2. The Worksheet Lookup screen pops up on top of the Worksheet Completion screen.
3. Enter the Worksheet # (or another search parameter) into the Worksheet Lookup screen and click **Search**.
4. Select the analytical test row and click the **Select** button.
5. All of the information and the analytes from the test definition are loaded into the Worksheet Completion screen. This worksheet has more columns than the prep test worksheet.
6. The Worksheet Completion screen is just the viewer. To edit the worksheet, click the **Save to Excel File** button. The location of the worksheet on the network drive will be specified in the Status Area.
7. The Excel worksheet is used as the electronic worksheet editor. If an Excel Security Warning pops up saying “Macros have been disabled.”, click on the **Enable Content** button.
8. Click the **Yes** button on the Security Warning pop-up message: “Do you want to make this file a Trusted Document?”

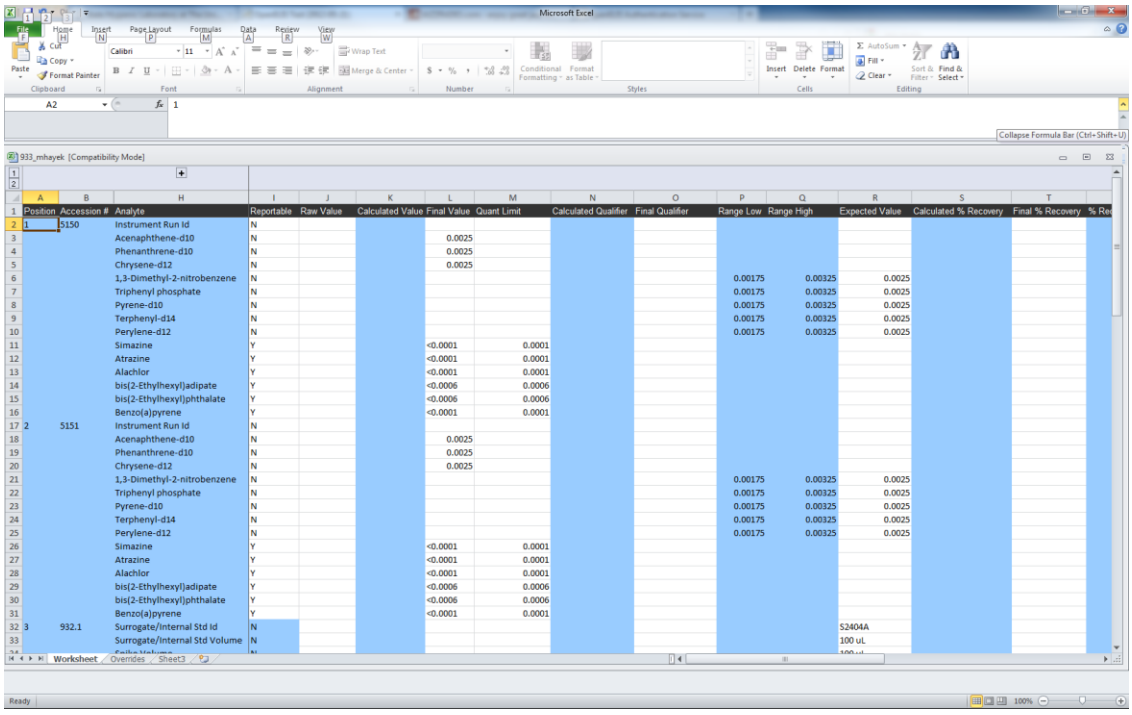


Figure 312 Excel Analytical Worksheet

9. With each Position, Accession #, and Description are attached rows of analytes.
10. Every cell in blue cannot be edited. It is write-protected.
11. The bar at the top can be used to collapse (- button) and expand (+ button) the middle columns of the spreadsheet so that the user can edit the values in the white columns on the right side of the spreadsheet.
12. The Reportable column can be changed from Y to N or vice versa.
13. Below are examples of Raw Values that could be obtained from instrument readings. These values will be entered to demonstrate how the Excel worksheet handles them.
    a. Simazine (a target analyte) = 0.0002 (a little above the Quant Limit of 0.0001)
    b. Atrazine (another target analyte) = 0.000001 (below the Quant Limit of 0.0001)
    c. Triphenyl phosphate (a surrogate) = 0.0025 (within the expected range of 0.00175 to 0.00325
    d. Pyrene-d10 (another surrogate) = 0.0008 (below the Range Low value of 0.00175
    e. Terphenyl-d14 (another surrogate) = 0.0044 (higher than the Range High value of 0.00325
14. Clicking on the **Recalculate Fields** button does a number of checks and calculates the macros (i.e., completes Calculated Value column, compares results to Range Low and Range High values, determines Calculated % Recovery based on Expected Value, etc.

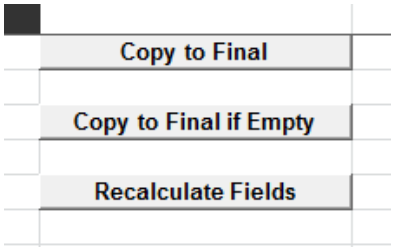


Figure 313 Excel Macro Buttons

15. For the three surrogates it places the Raw Values into the Calculated Values column.

16. For the two target analytes the macros do a check.
    a. If the Raw Value is above or equal to the Quant Limit, it puts the Raw Value into the Calculated Value field.
    b. If the Raw Value is below the Quant Limit, it puts a "< quant_limit_value" into the Calculated Value field (i.e., <0.0001) and "under limit" into the Calculated Qualifier field.
17. For the three surrogates the macros calculate the Calculated % Recovery based on the Expected Value and they place a "low" or "HIGH" flag in the % Recovery Flag column based on P1 and P2 (Range Low and Range High) values. If the Calculated Value for the surrogate falls within the expected range, no flag is placed in the % Recovery Flag field.

	A	B	H	P	Q	R	S	T	U
1	Position	Accession #	Analyte	Range Low	Range High	Expected Value	Calculated % Recovery	Final % Recovery	% Recovery Flag
2	1	5150	Instrument Run Id						
3			Acenaphthene-d10						
4			Phenanthrene-d10						
5			Chrysene-d12						
6			1,3-Dimethyl-2-nitrobenzene	0.00175	0.00325	0.0025			
7			Triphenyl phosphate	0.00175	0.00325	0.0025	100	100	
8			Pyrene-d10	0.00175	0.00325	0.0025	32	32	low
9			Terphenyl-d14	0.00175	0.00325	0.0025	176	176	HIGH
10			Perylene-d12	0.00175	0.00325	0.0025			

Figure 314 % Recovery and % Recovery Flag

18. Click the **Copy to Final** button to copy the Calculated Values to Final Values. A pop-up message will ask, "Are you sure you want to transfer these results?" Click the **OK** button. The Final Values are the values that will be reported. Final Values can be manually overridden (e.g., to report an average of calculated values).

	A	B	H	I	J	K	L	M	N	O
1	Position	Accession #	Analyte	Reportable	Raw Value	Calculated Value	Final Value	Quant Limit	Calculated Qualifier	Final Qualifier
2	1	5150	Instrument Run Id	N						
3			Acenaphthene-d10	N			0.0025			
4			Phenanthrene-d10	N			0.0025			
5			Chrysene-d12	N			0.0025			
6			1,3-Dimethyl-2-nitrobenzene	N						
7			Triphenyl phosphate	N	0.0025	0.0025	0.0025			
8			Pyrene-d10	N	0.0008	0.0008	0.0008			
9			Terphenyl-d14	N	0.0044	0.0044	0.0044			
10			Perylene-d12	N						
11			Simazine	Y	0.0002	0.0002	0.0002	0.0001		
12			Atrazine	Y	0.000001	<0.0001	<0.0001	0.0001	under limit	under limit
13			Alachlor	Y			<0.0001	0.0001		
14			bis(2-Ethylhexyl)adipate	Y			<0.0006	0.0006		
15			bis(2-Ethylhexyl)phthalate	Y			<0.0006	0.0006		
16			Benzo(a)pyrene	Y			<0.0001	0.0001		

Figure 315 Calculated Values Copied to Final Values

19. Save and close the Excel worksheet.

20. Query for the worksheet on the Worksheet Completion screen and click Update. Click the **Load From Excel File** button. The Worksheet Completion screen is populated with the values from the completed Excel worksheet.
21. If applicable, add a note that is relevant to the worksheet on the Note tab by clicking the **Add Note** button. See STANDARD NOTE SELECTION SCREEN for more information on how to use standard notes.
22. Review the entire screen. If everything worked correctly, change the Status from Working to Done. Click the **Commit** button.
23. The analysis status for the two samples goes from Initiated to Completed. The analyses must still be Released. See RELEASING AN ANALYSIS for more information on this procedure.
24. The Instrument Name can be changed (or selected) before the worksheet Status is changed to Done.
25. The Analysis tab of the Complete and Release screen lists the two worksheets for the prep analysis (the prep worksheet and the analytical worksheet) and the one worksheet for the analytical run (the analytical worksheet). A worksheet can be viewed from this tab by highlighting it and clicking the **Select** button below. The Worksheet Completion screen will pop up.

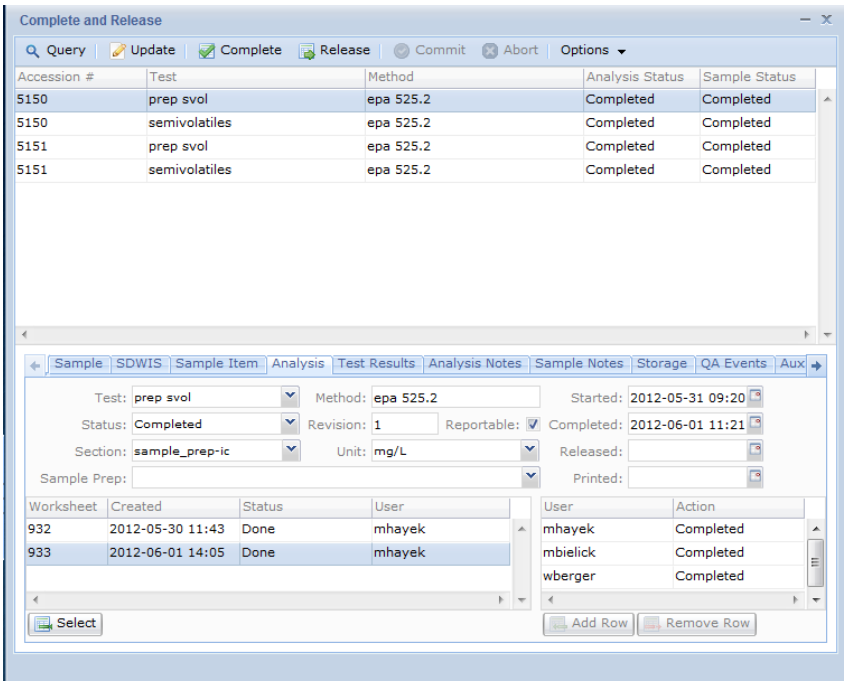


Figure 316 Worksheet Table on the Complete and Release Screen

26. The Test Results tab of the Complete and Release screen shows the results from the worksheet with the designated number of significant figures and the rounding performed, as prescribed by the test definition.

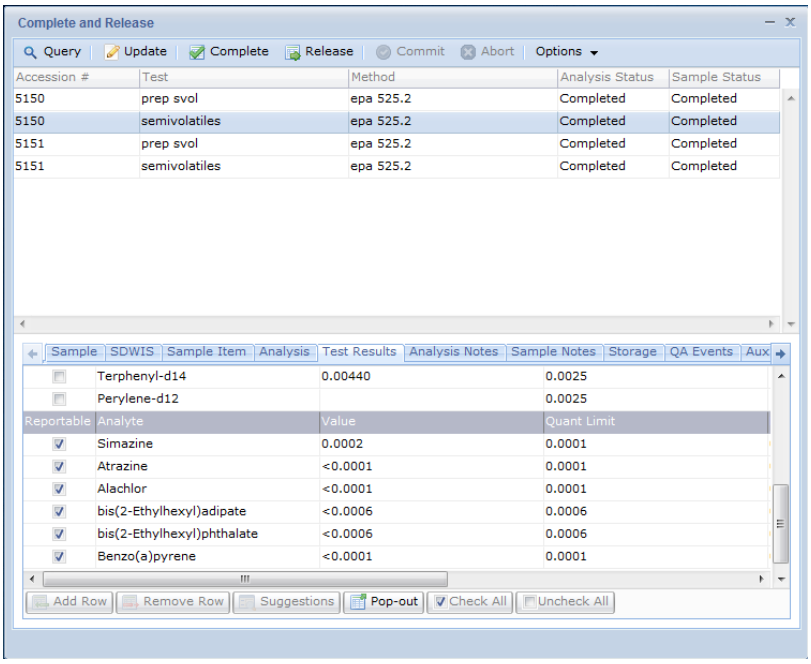


Figure 317 Test Results Tab of the Complete and Release Screen

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