

# Laboratory Information Management System (LIMS) in EMRL

## History of LIMS at EMRL

- November of 2003, EMRL purchased a commercial LIMS system to replace an LLNL built system
  - Use for multiple groups
  - Keep current with changing computer technology
  - Ability for EMRL staff to create and implement changes to system
  - Lower personnel and Comp support costs

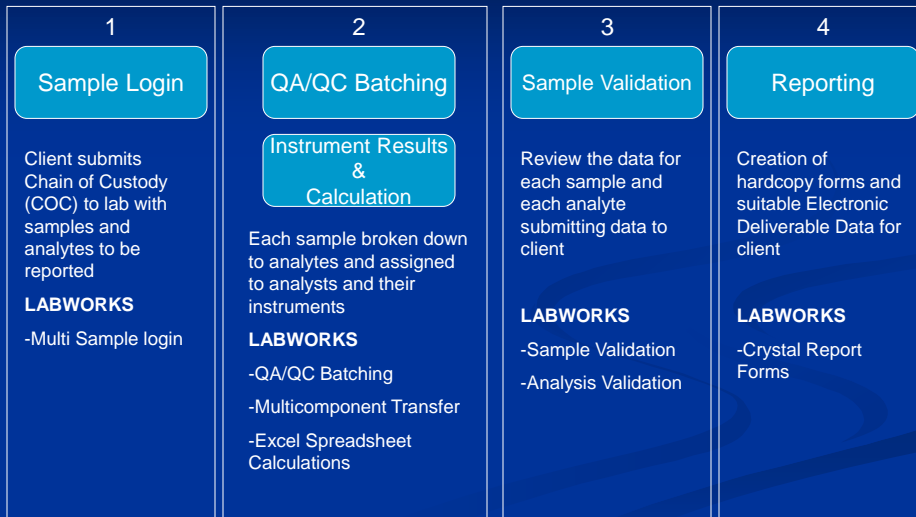
## EMRL LIMS

- PerkinElmer LABWORKS selected
  - Purchase hardware (server and label printer) and software (LABWORKS, BarTender, statistical QC package)
  - Runs on SQL server Database
  - Created three separate DB's all of which run through LABWORKS desktop
  - SQL server database is accessible to users

## Implementation Timeline

- LABWORKS installed in Nov. 2003
  - Installation with vendor takes one day
    - Creation of multiple databases
    - Begin customization of databases
- First data reported by Jan. 2004 to sponsoring organization
  - Begin with on analysis and added additional analyses over time

# Stages of Sample Management



## EMRL Examples

The screenshot displays the EMRL software interface. A 'Select Tests' dialog box is open, showing a list of tests and their descriptions. The background shows a table of sample data with columns for COC #, Location, Location Description, Analytes, Matrix, Collection Date, and Collection Time. The 'Select Tests' dialog has a 'Current Number of Tests Selected: 2' indicator and buttons for 'OK', 'Cancel', and 'Print'.

### Sample Login

Client submits Certificate of Custody (COC) to lab with samples and analytes to be reported

#### LABWORKS

- Multi Sample login

**Analysis Codes (multicomponent)**

**Analysis Code description**

**EMRL Examples**

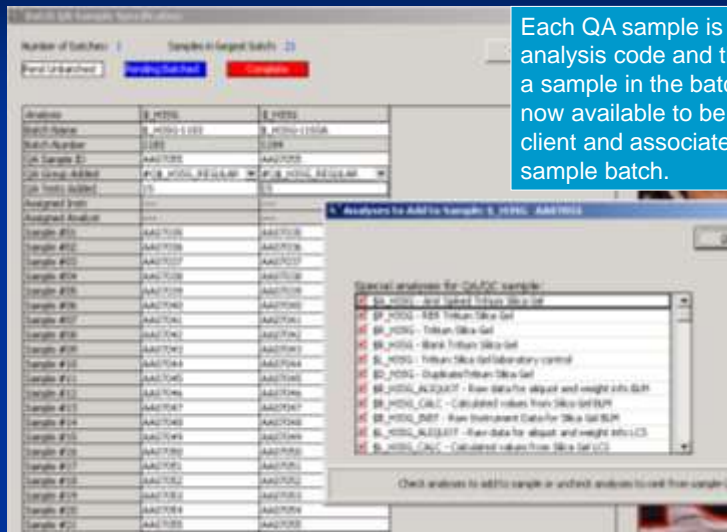
Analysis Codes: LABWORKS method of describing which analyses are to run with the sample. Multiple analysis codes can be attached to each sample.

**EMRL Examples**

Location Codes: Used by LABWORKS to identify samples along with sample ID. **EVERY SAMPLE MUST HAVE A LOCATION CODE**

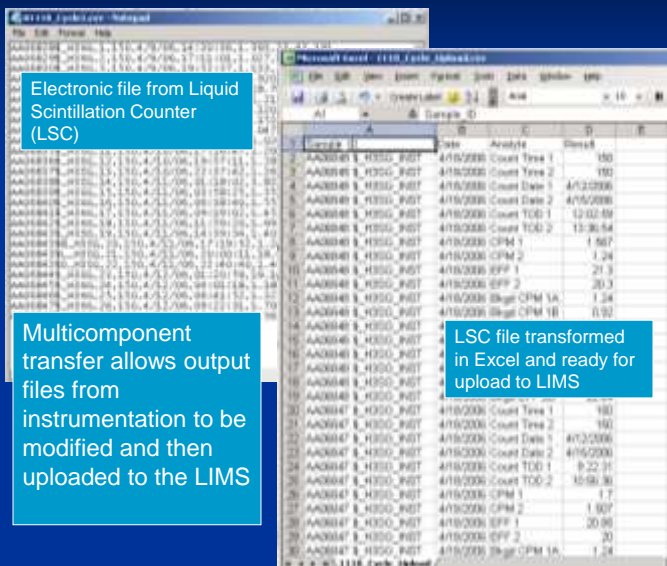


# EMRL Examples



Each QA sample is assigned an analysis code and then attached to a sample in the batch. The QC is now available to be reported to the client and associated with a sample batch.

# EMRL Examples



Electronic file from Liquid Scintillation Counter (LSC)

Multicomponent transfer allows output files from instrumentation to be modified and then uploaded to the LIMS

LSC file transformed in Excel and ready for upload to LIMS

QA/QC Batching

Instrument Results & Calculation

Each sample broken down to analytes and assigned to analysts and their instruments

**LABWORKS**

- QA/QC Batching
- Multicomponent Transfer**
- Excel Spreadsheet Calculations

# EMRL Examples

The screenshot shows a spreadsheet with columns for 'Background' and 'Sample'. The 'Background' section includes 'Avg CFM', 'Avg pF', 'Avg pF/L', and 'Avg pF/mL'. The 'Sample' section includes 'Avg CFM', 'Avg pF', 'Avg pF/L', and 'Avg pF/mL'. There are also columns for 'Conc'd' and 'Heavy Cont'd'. The data is organized into rows for different analytes and instruments.

QA/QC Batching

Instrument Results & Calculation

Each sample broken down to analytes and assigned to analysts and their instruments

**LABWORKS**

- QA/QC Batching
- Multicomponent Transfer
- Excel Spreadsheet Calculations

Once uploaded, data from analysis codes can be exported to Excel and results imported to another analysis code.

# EMRL Examples

The screenshot shows a 'Sample Validation' window with a table containing columns: Sample, Name, Analyzed, Address, No. PCB, SPQC, Lab Code, Cal Date, Lab Date, Project, Log No., Calc, and Print. Below the table are fields for 'Sample Number info', 'Comments', and 'Special Warnings'. A note at the bottom says 'Please verify fields in bold or check to validate. Page 1 of 1'.

Sample Validation

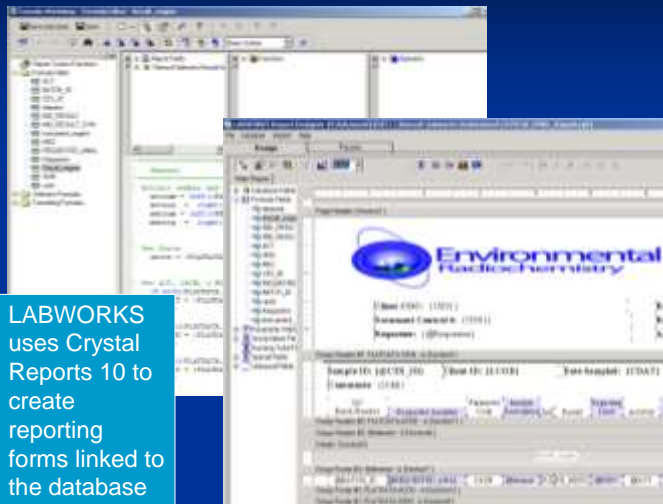
Review the data for each sample and each analyte submitting data to client

**LABWORKS**

- Sample Validation
- Analysis Validation

Depending on configuration, sample data can be validated. QA/QC data, sample history, comments, violations and more can be reviewed before data is ready for reporting

## EMRL Examples



LABWORKS uses Crystal Reports 10 to create reporting forms linked to the database

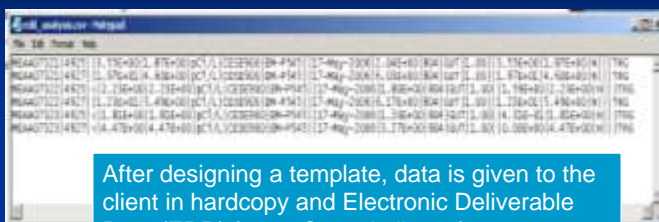
### Reporting

Creation of hardcopy forms and suitable Electronic Deliverable Data for client

#### LABWORKS

-Crystal Report Forms

## EMRL Examples



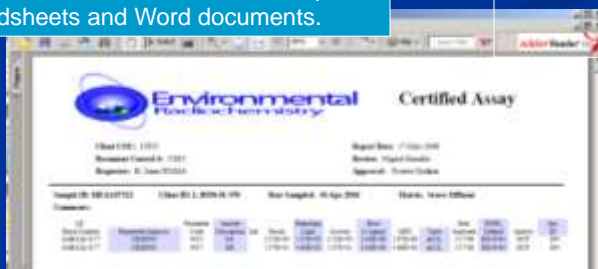
After designing a template, data is given to the client in hardcopy and Electronic Deliverable Data (EDD) form. Crystal allows for many different formats to be created like Adobe pdf, Excel spreadsheets and Word documents.

### Reporting

Creation of hardcopy forms and suitable Electronic Deliverable Data for client

#### LABWORKS

-Crystal Report Forms





## Wrap up

- Use for multiple groups
- Keep current with changing computer technology
- Ability for EMRL staff to create and implement changes to system
- Lower personnel and Comp support costs
- Created DB for EMRL, ICPMS and Noble Gas
- Has kept up with transitions from Windows XP to Windows 7
- EMRL Staff customized LABWORKS and created Crystal Reports
- No full time Comp support and all analysts can use system