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

1. Sample Login
   - Client submits Chain of Custody (COC) to lab with samples and analytes to be reported
   - LABWORKS: Multi Sample login

2. 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

3. Sample Validation
   - Review the data for each sample and each analyte submitting data to client
   - LABWORKS: Sample Validation, Analysis Validation

4. Reporting
   - Creation of hardcopy forms and suitable Electronic Deliverable Data for client
   - LABWORKS: Crystal Report Forms

EMRL Examples

- Sample Login
  - Client submits Certificate of Custody (COC) to lab with samples and analytes to be reported
  - LABWORKS: Multi Sample login
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

Sample Login
LABWORKS
-Multi Sample login
After login, sample ID's are assigned. At this point worksheets and labels can be created.

EMRL Examples

QA/QC in Labworks allows users to assign controls, blanks, duplicates and other specialized QA/QC to sets of samples.

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
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.

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

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

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
EMRL Examples

QA/QC Batching

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

Sample 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.

LABWORKS
- Sample Validation
- Analysis Validation
LABWORKS uses Crystal Reports 10 to create reporting forms linked to the database.

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.
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