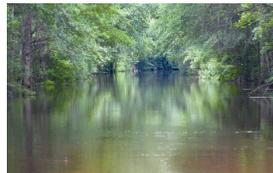




## Replacement of a Legacy LIMS with SQL\*LIMS in an Environmental Monitoring Lab - Project Review



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**DOE Complex Wide LIMS User Group**

**August 17, 2005**

# Topics

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## **I. Overview of the Lab Processes**

- A. History and background**
- B. How samples are scheduled**
- C. Analyses and instruments**
- D. Reports**

## **II. Description of the Legacy LIMS**

## **III. Management Approach**

## **IV. Technical Innovations**

- A. Scheduler Interface**
- B. Re-use of instrument interfaces**
- C. Reporting Database**

## **V. Current Status**

# Timeline of Environmental Sampling at SRS

**1951-53 Baseline sampling. 6600 samples processed.**

**1953 First reactor goes critical.**

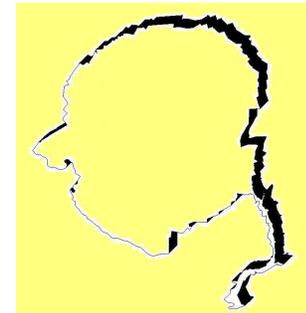
**1954 Environmental and bioassay lab building (735-A) completed.**

**1980s Water quality lab (735-11A) is built.**

**1987 Development begins on legacy LIMS, EMCAP (EMCAP=Environmental Monitoring Computer Automation Program)**

**1990 EMCAP goes into production.**

**2001-2002 Environmental and bioassay operations move to new Regulatory Monitoring and Bioassay Lab building**



# Environmental Sample Types

- **Effluent (Outfalls from facilities)**
- **Groundwater wells**
- **Rivers and streams**
- **Rainwater**
- **Soil**
- **Stationary Thermo Luminescent Detectors**
- **Stack filters**
- **Biota (Milk, Fish, Deer, Plants, ...)**
- **Radiological screening of samples sent to offsite labs.**
- **Annual Sample Load:**
  - 120,000 radiochemical determinations**
  - 25,000 water quality determinations**

# Sample Collection Scheduling

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- **For routine samples, the frequency, location, reason, and analysis regimen are input months in advance.**
- **Sample labels are generated prior to sample collection.**
- **Barcode on labels is used to login samples.**
- **Non-routine samples are scheduled as needed or logged in when received.**
- **Non-routine samples have increased in recent years due to facility shutdowns and cleanup projects.**

# Radiological Instruments

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**Canberra Genie Gamma Spec (K40, Co60, I129, Cs137, ...)**

**Canberra Alpha Analyst (Am241, Cm244, Pu, U, ...)**

**Packard TriCarb 2500TR LSC (H3, Total Activity, C14)**

**EG&G CountMaster GFPC**

**Oxford Tennelec LB5100 GFPC (Gross alpha/beta, Sr)**

**replaced by**

**Tennelec LB4110 GFPC**

# REPORTS

## Operational

- Prep Status (Status, location of samples)
- Reruns by analyst, lab
- Turnaround time
- Sample completion (whether subsamples are done)
- Sample disposal
- Technician qualification

## Customer

- AN98 (Electronic data deliverable)
- Trending by sample location
- Dosage reports integrating various sample matrices
- Site Annual Environmental Report



## Description of the Legacy System - EMCAP

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- **Operating System: VMS 6.2**
- **Database: Ingres 6.4**
- **SAS Statistical Reporting Package**
- **Custom contractor-written code**
- **Languages: FORTRAN and C with embedded SQL, DCL**
- **Contains 14 years worth of environmental data.**

## Why Replace Old EMCAP?

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- **EMCAP could not handle anticipated increase in the sample load.**
- **VAX system, Ingres database no longer supported.**
- **VMS, Ingres, and custom-made LIMS violate site standards and industry trends.**
- **EMCAP was hard to maintain.**
- **EMCAP didn't have QC data.**

# Management Approach

- **Requirement specifications written in week long “lock-in”**
- **Schedule accelerated by identifying pieces that could wait until after initial installation.**
- **Team made up from several organizations.**
  - 8 - Lab Process Systems (LIMS people)**
  - 3 - Other Process Control**
  - 2 - Information Technology**
  - 1 - Savannah River National Lab**
  - 1 - Pool of unfunded employees**
- **Replicated vendor training in house.**
- **Mentor responsibilities formally established.**
- **Project Manager from Project Design & Construction Business Unit**
- **Schedule gains were applied to the test phase.**
- **Database of testing defects.**

## Technical Innovations - Scheduler Interface

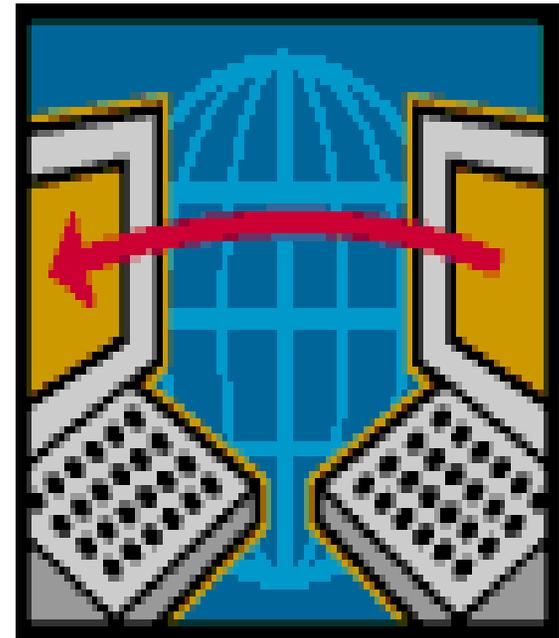
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- The existing EMCAP scheduler was retained because of its unique capabilities. Output from the scheduler is transmitted to SQL\*LIMS. Scheduled samples are automatically logged in.
- Sample plans were reduced from approximately 1500 to 100

## Technical Innovations – Instrument Interface Re-use

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- Instrument interface software had been developed which processed old EMCAP data through SQL\*LIMS. This software was re-used on the project.

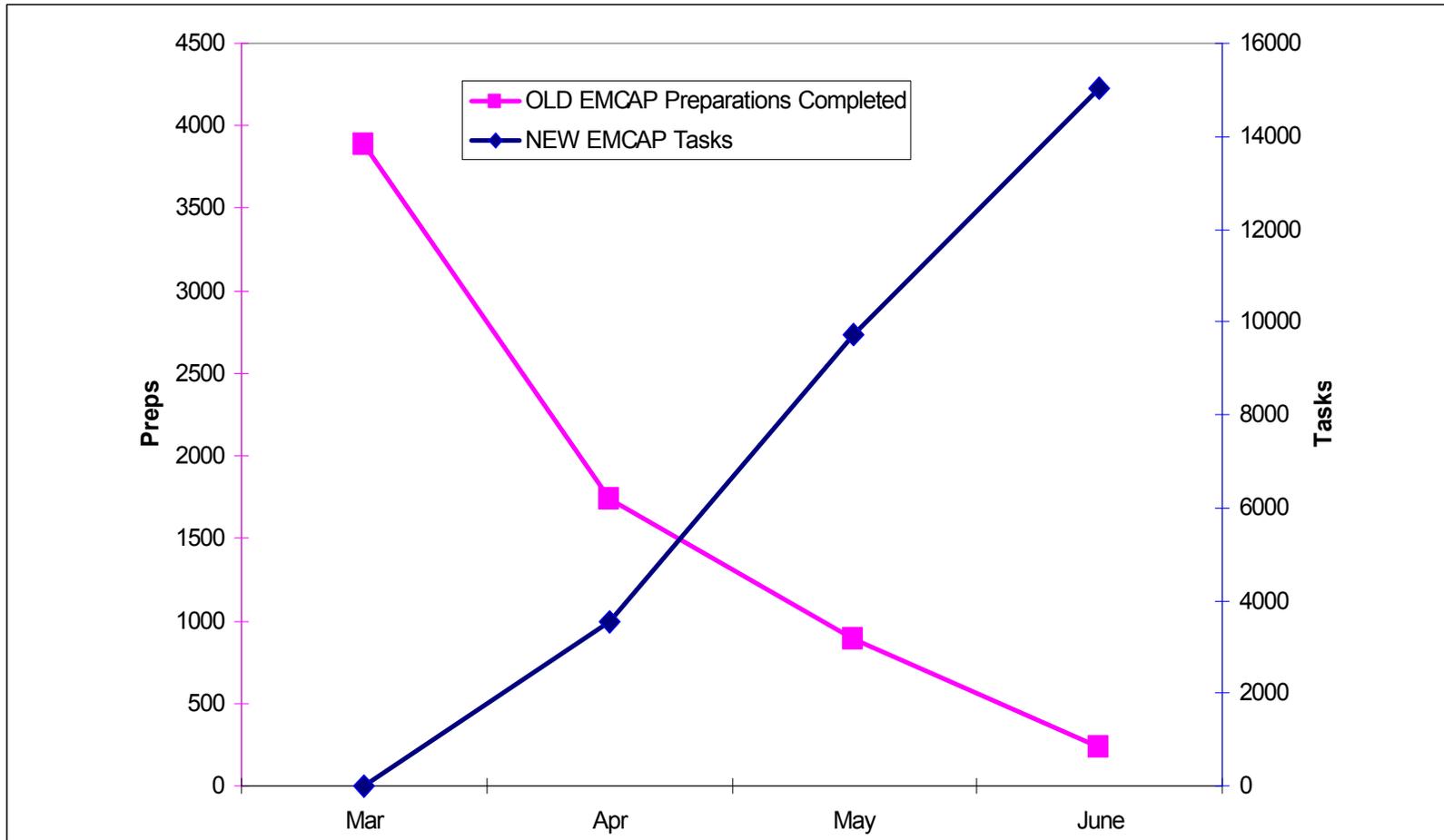


## Technical Innovations – Reporting Database

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- Allowed old EMCAP data to be used with the new system for historical checks
- Minimal change in reporting tools
- Maintained separation between lab and customers.
- Will ease integration of years of EMCAP data with current results.

# Sample Load Shifted From EMCAP to SQL\*LIMS During Spring 2005



# Conclusion

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\$ 1.7 million project using 16 programmers was completed on time and under budget and will save the customer an estimated \$800,000 in FY05 and \$2.4 million per year thereafter.

