

LIMS standardization at Fera delivers improved laboratory efficiencies

The Food and Environment Research Agency (Fera) is an executive agency of the UK government's Department for Environment, Food and Rural Affairs (Defra). It supplies goods and services to public and private sector customers. Fera was founded by bringing together the Central Science Laboratory (CSL), the UK Government Decontamination Service (GDS), the Plant Health and Seeds Inspectorate (PHSI), Plant Variety Rights Office and Seeds Division (PVS) and Plant Health Division (PHD).

Fera adopted a Laboratory Information Management System (LIMS) as part of its continuous focus on sample management across its entire site. The company selected Thermo Scientific LIMS software to improve efficiencies, productivity and sample integrity.

Profile

Fera provides robust evidence, rigorous analysis and professional advice, underpinned by world class research, to help Defra, other government departments and many other customers support and develop a sustainable and secure food chain, a healthy natural environment and protect the global community from deliberate chemical, biological, radiological and nuclear (CBRN) or major accidental Hazardous Material (HazMat) incidents. With almost 900 employees across 4 main sites, Fera provides operational policy and oversees regulation in support of these activities, particularly in respect of plant and bee health, crop varieties and seeds. In addition, it undertakes and delivers high quality support and input into other regulatory issues relevant to its expertise to other public and private sector organisations on a commercial basis. Fera has responsibility to support government in responding to and recovering from emergency situations, by providing capacity, scientific evidence and advice.



Fera has over 40,000 customers and 1,000 collaboration partners spread over some 100 countries. This stakeholder base is made up from Government, academia, industry and commerce and, while a significant proportion of Fera's work is UK-based, it has global reach across Europe, and five of the other six continents, the exception being Antarctica. Fera manages over 600 research projects, analyzing over 50,000 plant and food samples a year and is the National Reference Laboratory for chemicals in food, pesticides, veterinary drugs, dioxins and polychlorinated biphenyls (PCBs) in feed. The company standardized on Thermo Scientific LIMS software to improve efficiency and to improve efficiency and key parts of sample management across the laboratory.



Paul Burrell, LIMS system manager, and Dan Sykes, LIMS implementer at Fera

Business challenge

Fera's main laboratory facility is located on a 32 hectare site at Sand Hutton near York in the United Kingdom. The laboratory has specialist areas of analysis and testing using in-house LIMS implemented by scientists on site.

With the aim of establishing both best-in-class practice and laboratory-wide consistency of approach, the company outlined a requirement to invest in a corporate LIMS. Its stated aim was to deploy a central numbering system for samples across the entire site to ensure sample integrity. The intention was simply to ensure that there was only one #1 sample on site, and not multiple samples with the same number in the different areas of work. Being a government organization added additional pressure to display a level of professionalism—Fera specified that in order to have credibility it required robust processes and that investing in a LIMS would support this objective. Fera wanted to maintain its reputation as one of the best units in the world, and ensuring that all samples are well managed is a crucial part of this objective. A LIMS would dramatically reduce the amount of error-prone paper work, minimize mistakes and expedite sample management.

Paul Burrell, LIMS system manager at Fera, said that having been responsible for the creation of an in-house LIMS, the need to move to an external supplier was also practical—there was too much pressure on one in-house member of staff to support the needs of the laboratory, both in terms of back-up support and also in terms of professional future-proofing.

Fera required a LIMS to manage all samples on site within a single repository. An automated system was also required to manage the issue and reconciliation of laboratory worksheets across the laboratory. Analytical trend data was being recorded and assessed manually, so there was a need for a LIMS system that would readily generate trend data in an acceptable format to support internal investigation and reporting functions.

Vendor selection

The initial decision to purchase a LIMS was a corporate decision. The team posted an OJEU (Official Journal of the European Union) notice and created a user-group committee, consisting of chemists, laboratory managers, laboratory technicians, QA, etc. to evaluate tenders. The team selected a solution from Thermo Fisher Scientific.

Paul Burrell stated that the users selected the LIMS for several reasons: First, its ability to scale-up. At the time of decision, one work area alone was processing 10,000 samples with 100,000 results (this number has now grown five-fold to 50,000 samples). The LIMS was a fit with Fera's stated objective to expand capacity and has provided the ability to move up to millions of data rows. The Oracle database allowed Fera to scale up to meet future unknown requirements. Thermo Scientific LIMS software is a flexible solution that can be tailored to different projects—for Fera, this was key.

Furthermore, Mr. Burrell confirmed that the tender panel preferred the look and feel of the LIMS—its GUI was intuitive and similar to Explorer, making it easier for users to understand and learn its usage. He also stated that the LIMS “seemed like a complete product”. At tender stage, it appeared to do everything to meet Fera's immediate needs. Fera wanted a system that could be tailored to their multiple diverse requirements.

Implementation

The original usage of the LIMS was standard and followed basic laboratory requirements.

Thermo Scientific LIMS software was required for:

- Package receipt for chain of custody
- Sample login and storage
- Bar-coded labels
- Results and reporting

The opportunity was also taken to simplify some of the existing working practices wherever possible and build new processes to take advantage of the flexibility and functionality provided by the LIMS. Today, samples are logged into a central repository which includes the following steps: setup, sample receipt, login, numbers, barcodes, and ship to labs. Dan Sykes, LIMS implementer, explains, “We set up a central sample reception facility that was secure and allowed in-situ login to the LIMS and storage of the samples. Login of samples is site-wide. There was an immediate mandate that the Fera laboratory had to use the LIMS to login samples across the entire site, from day one.”

Thermo Scientific LIMS software was selected for its ease of use and because it could be easily configured and managed in-house at Fera. Since original selection, the Fera LIMS team has been consistent and is still 75% as it was at the outset. The team consists of former scientists who have moved into the LIMS role.

The LIMS does not just support the sample handling; Fera also uses it to help generate income for the business. The project has grown, so the selection of a flexible LIMS has given Fera the ability to grow with the business, and has allowed Fera to be more competitive. Paul Burrell explains, “Fera’s use of the LIMS has expanded as our organization has changed. We have had some major success using the features of the LIMS to enable Fera to help win and deliver new work and projects.”

Post-implementation benefits

Thermo Scientific LIMS software is in use at Fera’s Sand Hutton site and is used by over 200 staff. The major benefit realized at Fera since the installation of the LIMS is improved operational efficiency. The LIMS provides Fera with a full sample recording, management and reporting system.

Since its implementation, the LIMS has operated efficiently and has proven a significant benefit to Fera. Data is entered one time only and is shared among all departments as necessary. At sample intake, the LIMS has improved the efficiency and security of data entry and has greatly assisted sample identification and tracking by printed and automated label generation. As all samples are now recorded on a single electronic database, the LIMS has provided Fera with a means to retrieve and report data in a way that would never have been possible previously. The flexibility and intuitive user interface the LIMS offers make it easy for laboratory personnel to configure the LIMS to suit the individual workflows of the very different laboratories.

For example, Fera’s Molecular Testing Unit has seen significant time savings since the implementation of the LIMS. Before the system was installed, 384 plate-well values had to be recorded manually by hand which could take over an hour to complete. This step can now be completed within minutes. In the Food Analytical Services area there also have been substantial improvements in laboratory efficiencies. Using the LIMS, the laboratory is now 95% paperless and saves 25-30% of lab time. As there is no manual recording of data, transcription errors are eliminated.

With regards to commercial benefits, the LIMS offers Fera the ability to communicate efficiently and effectively with its customers. All reports can be published online via Fera’s existing secure web applications so clients can quickly and easily obtain relevant information about specific samples and download data electronically. Communication and data transfer between Fera and its customers is totally seamless and secure.



Fera has undertaken large microbiological projects using LIMS-generated sampling forms and labels to allow staff at Fera to take meat samples from butchers and supermarkets all around the country. These were then received back into the LIMS via their barcodes. The customer used Fera’s secure web portal to check the status of samples and could review the results after the lab had completed the testing. Final reports were unnecessary because the customer had the ability to download the data themselves. The laboratory staff found the best savings came from the automatic generation of over 7,000 labels a week via the LIMS during the project.

Paul Burrell commented, “In addition, the LIMS has the potential for integration with other business systems. With this LIMS in place, we are confident that we can meet any future challenges.”

Future plans

Some work areas currently use the LIMS for sample login only. The LIMS team has a two-year program ahead to roll out this solution into other areas of the laboratory for everyday use.

Fera is also looking at ways to incorporate handheld PDAs to improve the efficiency of sample management and data collection. Data can be transferred directly between a geographic information system and the LIMS database, meaning that in the event of a contingency situation data would appear in the central server within seconds of it being captured in the field.

Upgrades continue to demonstrate the success of the LIMS implementation at Fera, with added functionality in a number of key areas including user interface, workflows, plate handling and data management. Scientific Data Management Software (SDMS) is used to pick up and package files from local data drives and associated files within the LIMS records. It can be used as a secure storage point for files. The system is able to record service records for instruments and photographs of samples, etc. Fera will gradually expand its use into other work areas, perhaps using it to search for and retrieve documents like engineer service reports to attach to instruments and assign digital photos to samples.

In the future, the team also plans to integrate the LIMS with additional laboratory instruments (currently several laboratories have integrated instruments, such as balances, in their LIMS workflows). Integrating the LIMS with as many pieces of laboratory equipment as possible will allow for automated data transfer and additional efficiencies.

Paul Burrell concludes, "Fera is working in an enhanced commercial environment. Our customers are under increasing financial pressure to outsource projects with minimum cost, which drives pressure onto Fera to deliver professionally, on-time and within budget. Having invested



in the LIMS for our organization, we use it as a tool for operational sample management making the laboratory more efficient. We reduce costs by eliminating paper reports, working electronically and involving customers in the project by giving them access to their results electronically in real-time. Only with Thermo Scientific LIMS software can Fera continue to manage so many diverse projects across such a large laboratory."

Partnering with Thermo Fisher Scientific

Thermo Fisher Scientific is the worldwide leader in laboratory software and services, providing enterprise-wide, multi-laboratory solutions that are relied on by food and beverage companies globally. To support our LIMS installations, we provide implementation, validation, training, maintenance and support from the industry's largest worldwide informatics services network.

Find out more at thermofisher.com/digitalscience

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