

The Real Benefits of Standardizing on a Single LIMS in the Gas and Petroleum Industry

Automation of laboratory data capture and analysis is claimed to be the major challenge facing the petrochemical industry. Indeed, elimination of manual processes leads to considerable product quality improvements while also aiding compliance with strict environmental regulations. As a result, companies that wish to remain ahead of the competition are standardizing on Laboratory Information Management Systems (LIMS). PEMEX Gas and Basic Petrochemicals initiated a LIMS standardization project and implemented Thermo Scientific™ SampleManager LIMS™ across its nine gas processing facilities in Mexico.

Industry challenges

The petrochemical industry faces the consistent, yet ever increasing challenge of improving personnel efficiency, productivity, business intelligence and decision-making. Traditionally, data from different processing facilities is captured, entered and manipulated manually, often using multiple systems with proprietary file formats. This cumbersome and extremely time-consuming process results in a tremendous drain on human resources and errors and omissions lead to questionable data integrity.

Furthermore, the manual process generates a significant amount of paper records, the administration of which is particularly costly and troublesome. Data is stored in multiple places and systems, making it impossible to access real-time laboratory information from process chain and auxiliary services. With information dispersed across paper and disparate electronic sources, companies find it extremely difficult to make timely decisions and to improve or correct operational processes. Also, as international management standards such as ISO 14000, 18000, 9000 and 17025 become stricter and companies try to expand their distribution globally, manual laboratory data capture and management are impediments for companies to easily comply with these requirements and GMP practices in a cost-effective way.



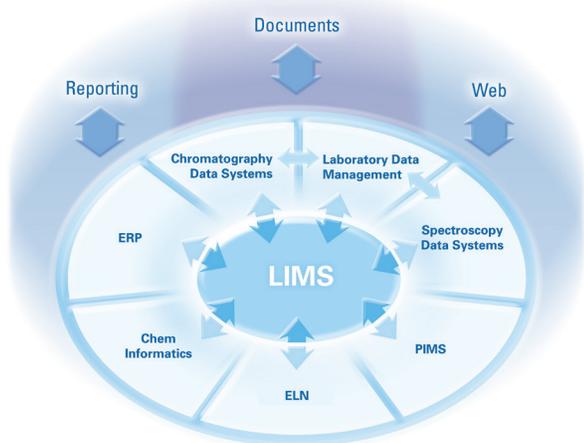
Oftentimes there are no organization-wide standards (i.e. Standard Operating Procedures and ISO 17025) for testing and analysis, so routine analysis is dependent upon an individual's experience and skill. This presents significant constraints for personnel rotation and harmonized processes across the operations. Moreover, analytical methods, job routines, reports and units often are not unified and consolidated.

The solution

In order to address these challenges, PEMEX decided to standardize on a single LIMS solution across all of its gas processing facilities. The company needed an enterprise-wide system that would automate the data capture and validation process, thus accelerating the analytical cycle. Standardization would contribute to ensuring data integrity, enabling secure access to laboratory information in real-time, and reducing duplication of tasks. This would help PEMEX speed its business decision-making process and continuously improve its practices.

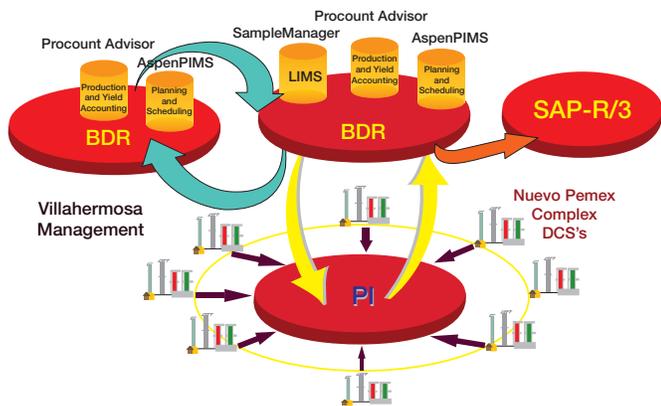
Furthermore, PEMEX needed a LIMS solution that would easily integrate with other technologies employed by the company, (See Figures 1 and 2) including their ERP System (SAP) and Process Information Management System (OSI PI). As soon as test results were entered and authorized in the LIMS by the laboratory staff, the information could be immediately available for the technicians and other personnel in the processing facilities, as well as PEMEX's headquarters and laboratory administrators.

Figure 1



LIMS can be leveraged across the organization by integrating with lab instruments and applications as well as enterprise platforms and systems.

Figure 2



How SampleManager LIMS integrates with PEMEX's enterprise systems.

It was necessary for the LIMS solution to operate under Good Laboratory and Manufacturing Practices (GMP and GLP), speeding up operations and improving product quality. PEMEX wanted to implement a system that would help enforce the parameters and specifications that certify its products under a strict quality control process and ensure regulatory

compliance. Specification checking was also required to achieve tighter control and greater profitability, as well as to contribute to better inventory and shipping management. The LIMS of choice would need to monitor and alert to any safety or quality issues along the supply chain, from the delivery of goods to the petrochemical company to the delivery of the final products to the customers. Finally, PEMEX needed a LIMS solution that could provide full audit capabilities for routine reporting to regulatory agencies.

Deciding on the suitability of a LIMS solution

When deciding on a LIMS solution to standardize your operations, there are a number of criteria that need to be taken under careful consideration in order to make an informed decision. Initially, the system must be able to standardize and consolidate laboratory practices such as methods, analysis and reports while also eradicating inconsistent information originated by manual capture and calculations. It must deliver results within the least time possible and operate under a single centralized database to simplify administration.

The system should be able to demonstrate the following proven capabilities:

- Easy to use by all laboratory employees
- Web access to information (See Figure 3)
- PI interface
- Bi-directional connection to share information with network (i.e. SAP) systems
- Simple configuration tools for extending the LIMS functionality
- Easy to use reporting tool for internal and external reporting/communication requirements

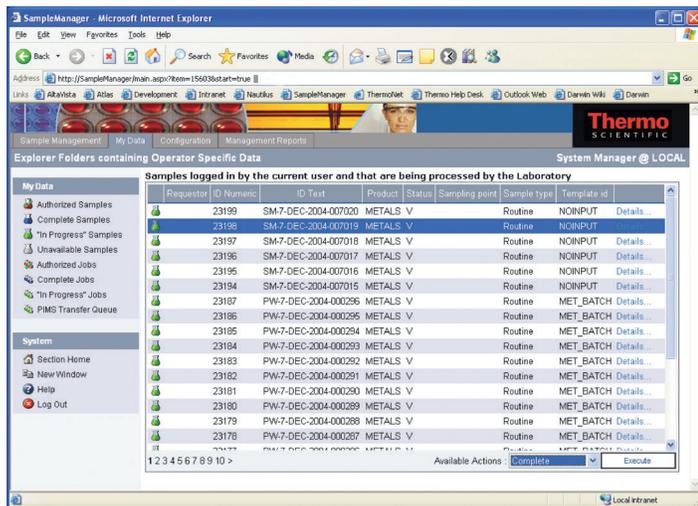
With all the above criteria in mind and after completing in-depth research, PEMEX Gas and Basic Petrochemicals decided to deploy Thermo Scientific SampleManager LIMS™ in its gas processing complex in Tabasco State in Mexico. The implementation generated significant productivity gains, which led the company to commence an enterprise-wide LIMS standardization project.

Why Thermo Scientific SampleManager LIMS

SampleManager is among the leading LIMS serving the specific needs of the petrochemical industry, with major global companies standardizing on this enterprise solution. The system operates via a single centralized server, thus providing easy access to queries and administration of information, as well as the capability to unify and consolidate analytical methods, job routines, reports and units. Furthermore, working with a single server that is easy to access and administer protects and saves the integrity of the information, avoiding the storage of data in personal computers as Excel or Word files. Enabling electronic publishing and fast access to information contained on standard reports, SampleManager improves business decision-making.

SampleManager is capable of supporting both local and global laboratory deployments, is scalable for a large user base and is available in multiple languages. The system integrates all of the laboratories with the process plants and the enterprise, as well as with desktop applications and laboratory instrumentation, providing a foundation for a complete laboratory automation solution. A three-tier client/server solution operating on Windows® environments with an Explorer driven interface makes the system particularly easy to use with the least training possible. The solution is also fully auditable satisfying laboratories operating in a regulated environment while being designed, developed and supported within an ISO 9001/TickIT environment.

Figure 3



Reviewing SampleManager data through the Web interface.

The benefits

The standardization of SampleManager across all of PEMEX's gas processing facilities has resulted in a significant reduction of the company's production costs. Indeed, PEMEX has achieved an estimated production cost savings of over \$500,000 per year. Already there has been a notable increase in revenues generated by the improved productivity and quality of the products. The use of an enterprise-wide LIMS solution has helped PEMEX to improve product quality and accelerate time to market at a lower cost by converting raw data into real-time knowledge for fast, timely and fact-based business decisions. Cost savings were also achieved since LIMS generates electronic reports eliminating hard copies and printers.

With a smooth and particularly rapid installation for PEMEX, as well as easy-to-use interface for all laboratory employees, the standardized LIMS solution has also reduced employee training costs considerably and allowed PEMEX to rotate personnel across its gas processing facilities. Risk of accidents and insurance costs have been reduced since employees no longer manually transfer documents throughout the different areas of the operation.

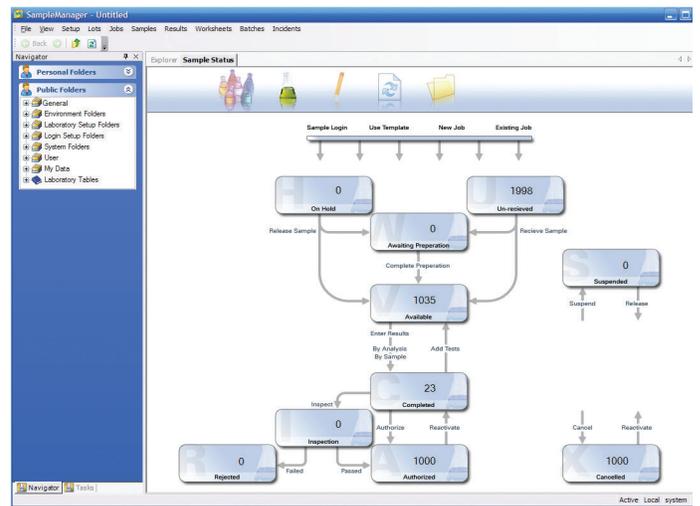
LIMS standardization has also allowed for more effective planning of the tasks taking place in PEMEX's laboratories, organizing them by different levels of priority on a daily basis. Moreover, all tasks for all processor facilities have been consolidated and programmed in the most efficient way. Being an open system, the LIMS has further allowed the integration of equipment and enterprise systems while ensuring remote access capabilities for efficient and effective support.

Additional developments

Following the extensive benefits generated by LIMS implementation, PEMEX decided to standardize on an enterprise-wide chromatography data system (CDS) and selected Thermo Scientific Atlas CDS™. The CDS was implemented across all nine gas processing facilities to extend their LIMS capabilities to include their chromatography data. This single automation system combines LIMS and CDS functionalities.

"The use of Thermo Scientific Atlas CDS and its integration with SampleManager LIMS makes operations, maintenance, and incidence resolution easier, now that we are working with a single system and under standardized operations," said Jose Manuel Cardel Gonzalez,

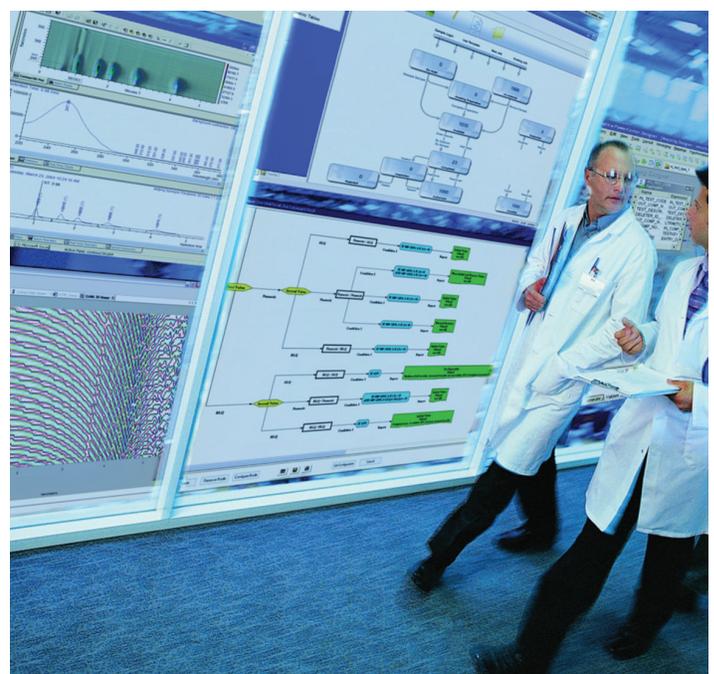
Figure 4



SampleManager's interactive graphical interface allows users to easily view their sample workflow and sample status.

Laboratories Coordinator for PGBP, who served as project manager for the SampleManager implementation. "This allows us real-time control and access to the whole production process." The LIMS and CDS are part of a technical platform that includes SAP/R3 Enterprise Resource Management System and OSI/PI Process Information Management System to support business operations.

"Since first implementing SampleManager, PEMEX Gas and Basic Petrochemicals has continued to turn to Thermo Fisher Scientific for solutions that increasingly automate their processes and raise productivity while driving down the total cost of ownership," said Dave Champagne, vice president and general manager of informatics for Thermo Fisher Scientific. "We are delighted to work with PEMEX on integrating our LIMS and CDS products, which will further improve productivity and enable us to offer these same benefits to our other process customers facing similar challenges."



Conclusion

LIMS standardization is the solution needed in today's high throughput petrochemical laboratories, requiring automation of laboratory data capture and analysis and regulatory compliance at the lowest cost possible. The standardization generates a number of important and immediate benefits including considerable reduction in the time needed to conclude the different tasks and elimination of the logical risks generated by manual processes. The availability of consistent and real-time information enables the continuous improvement of the production processes, the quality control of the end products according to certain specifications, and the implementation of adjustments and corrections during the production process for improving the final product. The end result is a substantial overall production cost reduction.

Partnering with Thermo Fisher Scientific

Thermo Fisher Scientific is the worldwide leader in laboratory software and related services, providing enterprise-wide, multi-laboratory solutions that have become the corporate standard at leading organizations. Our LIMS and CDS control manufacturing quality data at many of the world's leading process companies. To support our global customers, we provide implementation, training, maintenance and support from the industry's largest worldwide informatics services network.

SampleManager is the flagship LIMS in Thermo Scientific's comprehensive portfolio of software solutions, including Atlas CDS™, a leading chromatography data system that integrates tightly with SampleManager.



Find out more at thermofisher.com/IntegratedInformatics

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