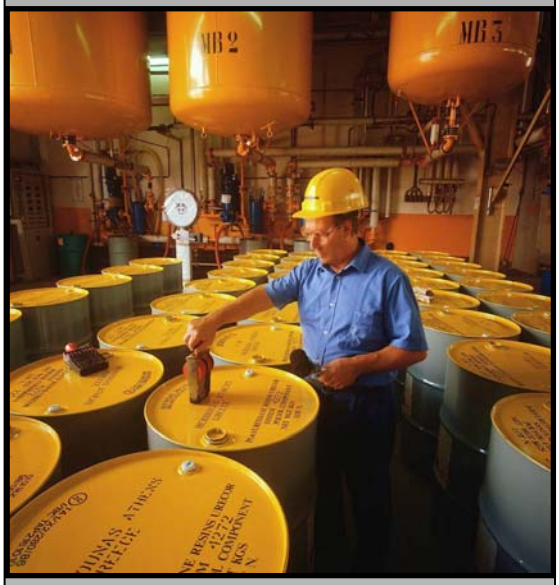
Do The Due!

Best Practices in Due Diligence for Chemical Inventory Management



By Marc E. Dillon, P.G., Chemical Management Products Manager, ESS

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Introduction

Chemical inventory management can be a daunting task for companies of all sizes. The responsibility typically falls squarely into the hands of Environmental, Health & Safety (EH&S) or material distribution staff who may be operating with limited resources. These professionals are constantly concerned with maintaining and demonstrating compliance with their facility permits and other applicable corporate, federal, state and local policies and regulations.

One element of demonstrating compliance requires the preparation of various reports that require knowledge of the type, location, storage and usage of chemicals in facilities. In order to be able to accurately generate these reports, chemical process engineers or EH&S professionals must have access to accurate chemical inventory management data. The old adage, "you can't manage what you don't measure" has never been more true than with chemical inventory and other elements of environmental management.

This article reviews the types of software products that are available to assist EH&S professionals manage, automate and improve their overall regulatory compliance with regard to chemical inventory processes. Recommendations are provided about when certain types of software products might be used and several key issues and questions are provided to help evaluate potential chemical inventory management software vendors. In addition, some "lessons learned" from system implementations are offered so that these pitfalls may be avoided once the system is selected and purchased. Selecting and implementing the appropriate type and size of solution is critical and dependent on the goals and size of the operation and the quantity of its requirements. Properly selecting the right system can provide value and save a company time and money far in excess of a solution's purchase and implementation costs.

Chemical Inventory Systems

Chemical inventory management essentially consists of the following components:

1. Chemical purchases and receipts
2. Chemical inventory transactions (storage and use)
3. Inventory Management
4. Record keeping
5. Reporting

These five elements comprise the chemical inventory management life cycle: from when chemicals are ordered, purchased and received at the facility, to when they are stored, used and depleted for disposal. The first two elements deal with the identity and quantity of materials entering the facility or enterprise. Inventory management includes tracking and maintaining proper inventory levels to maintain production or other important operational processes. Record keeping includes maintaining accurate records of the previous elements and up-to-date material composition, properties, regulatory information, and Material Safety Data Sheets (MSDSs) for the chemicals in inventory. This data is used to create reports including SARA 312 Tier I or Tier II, SARA 313, and permit required reports that, among others, may include hazardous air pollutant (HAP) and volatile organic compound (VOC) usage data.

Finding the Right Fit: Features of Chemical Inventory Management Systems

Those responsible for chemical inventory management for their facility or corporation typically employ various software products to meet the challenge. The complexity of chemical management software solutions must reflect an organization's needs, which are determined by its goals, size, operational processes and the number and type of regulatory requirements to which the organization must comply.

Chemical inventory management software products typically fall into three basic categories

1. Chemical distribution inventory tracking.
2. Transaction-based chemical inventory tracking with integrated access to regulatory requirements and report generation capabilities.
3. Enterprise level, transaction-based chemical inventory tracking with integration to other environmental monitoring systems such as waste, water or air.

The first category of products is concerned only with data related to the occurrence and distribution (location) and quantity of chemicals, and is generally stored in a spreadsheet or database. The data is typically updated a few times a year as chemicals are added or removed. This static inventory does not track the day-to-day inventory transactions. It simply tracks the type and maximum and average quantity of a chemical at each location within a facility.

The advantages of this type of software include low cost, ease of use and simple installation. The disadvantages include a lack of real-time inventory control, limited report generation capability, no actual chemical usage data — only estimates — and limited or no integration capability with external data sources, such other environmental monitoring systems or with other information technology infrastructure.

Transaction-based chemical inventory tracking allows users to monitor batches or individual chemical containers. The transactions track the occurrence, distribution and movement of each chemical container or batch of containers. With transaction systems, data such as type and quantity of chemical used, location of use, how the chemical is applied (spray, brush, etc.) and person or cost center using the chemical can be captured. Furthermore, with a serialized, bar-coded inventory system, data elements such as expiration date, batch and lot numbers can be tracked to each individual container.

The advantages of transaction-based systems can include providing complete, real-time inventory control; actual or estimated chemical usage data; container labeling capabilities; container expiration date tracking; standard and customized reporting formats — often with electronic submittal to agencies, if appropriate; and links to external data sources. Another advantage of these systems is the ability to allow remote data to be collected with handheld devices and imported into the inventory database.

Most of these systems provide a link between the chemicals and their associated regulatory requirements from federal, state and local agencies, and can link to the chemical's MSDS in text and image format. These solutions are available in both browser-based and client-server based formats.

The disadvantages of this type of software are its higher purchase cost and potential challenges with implementation. Since these systems often involve IT departments, management and other stakeholders, such as material distribution and procurement departments, competing priorities, conflicting workflow and data flow processes can make the project challenging. Implementation time (and costs) can be very high depending upon the quality of existing data prior to startup and the amount of configuration needed to match workflow.

Enterprise software includes all the features of transaction-based systems, but includes integration with other key environmental management functions at an enterprise level. This means that other EH&S systems, such as waste management, air emissions tracking, compliance management, storm water, wastewater, industrial hygiene and occupational health & safety can be integrated with chemical tracking.

The advantages of an enterprise chemical inventory tracking system is that because a facility's emissions to air, waste and water originate from the chemicals it maintains in inventory and the processes that use those chemicals, enterprise software provides a true mass balance, from cradle to grave, of all materials touched by a single facility or across an entire corporation. These solutions are typically deployed in browser-based formats. These systems can generate multi-media reports such as the TRI report.

The disadvantages of enterprise software are its relatively high cost and challenges in implementation. Implementation of these systems requires a significant investment for a company to clearly define and refine their workflow and dataflow processes, and then migrate existing data into the application database and model these processes during configuration. However, this usually becomes an advantage for the system's use as efficiencies are maximized. Implementation is typically a lengthy process that involves numerous stakeholders, including IT management and infrastructure, material distribution, procurement, accounting, and site and corporate level management.

The benefits of implementing and operating an efficient chemical inventory management system most often far outweigh the purchase, implementation and support cost. These benefits include:

- Accurate data for EH&S, material distribution and management departments
- Compliance with hazardous materials and hazard communication regulations
- More efficient use of material and time
- Consolidation of chemical inventories and lower chemical purchase costs
- Reduced chemical usage
- Waste minimization
- Pollution prevention

- Ability to perform “first in, first out” (FIFO) or “just in time” (JIT) inventory control
- Internal and external customer satisfaction
- Concentration on core business
- Enhanced relationship with regulatory agencies

Case in Point:
HB Fuller’s Successful Chemical Management Strategy

An example of how a collection of enterprise and legacy systems can be integrated to realize operational success is clearly depicted in the story of specialty chemical manufacturer HB Fuller:

H.B. Fuller has used ESS products since 1998. *Essential Suite* is connected to an Oracle data mart that houses information from multiple systems, an internally developed Product Lifecycle Management software package that stores all of the company's raw materials data and finished product formulations, and Enterprise Resource Planning (ERP) software. Raw material and formulation data is shared with the *Essential Suite* modules on a real-time basis.

The system's use of the *Essential Chemical Inventory* module is a good example of how the various tools in the company's software system work together. Once a week, a data stage job collects inventory totals, including disposal and scrap transactions. Then, Chemical Inventory stores data including the components and physical properties of the materials so the regulatory reports can be run.

Essential Chemical Inventory is used in the development of Toxic Chemical Threshold reports for the United States Toxic Release Inventory (TRI) and Canadian National Pollutant Release Inventory (NPRI). The module is also used for Tier II reporting in the United States, and threshold reports for specific state rules, utilizing the LOLI data that is included in the module.

H.B. Fuller also uses the transportation form within *Essential Chemical Inventory* to share information with other systems. The company created Visual Basic forms to customize the module to help them with regulatory issues including the Arts & Crafts Manufacturer's Institute, U.S. Food and Drug Administration (FDA), the Canadian Environmental Protection Act (CEPA), the Toxic Substance Control Act (TCSA) and the European Inventory of Existing Substances (EINICS), and more.

“All of the compliance reporting is accomplished by 10 power users worldwide," said Molly Coskran, Regulatory manager, responsible for all of the related EH&S and product knowledge applications at H.B. Fuller.

"We leverage the expertise of the few people who help the operations teams maintain compliance in this complex world, striving to keep facilities in compliance, and building a legacy for the business,” Ms. Coskran said. "This is really what we've turned to the software to do."

Evaluating Chemical Inventory Management Systems

Many vendors offer chemical inventory software products. However, before choosing a vendor, an organization must do some homework.

Internal Due Diligence:

Those professionals in charge of selecting, purchasing, and using the system must ask:

- What are the specific goals and objectives for using such a system?
- What are the "must have" and "nice to have" features and functionality of the selected system?
- What is the specific, expected output of the system?
- Is a stand-alone chemical inventory system or multi-module (air, water, waste, etc.) system needed?
- Is integration needed with external systems (ERP or other)? If so, what other systems and why? What specific data elements need to be integrated with these systems?
- Will sufficient internal expertise and resources be available to implement all or part of the system or will one rely on the software vendor or a third-party implementation partner(s)?

External Due Diligence:

Questions to ask potential suppliers should include:

- Does the firm have an understanding of your industry segment, regulatory environment and your specific facility needs?
- How many similar systems have they successfully implemented in the past year or two?
- Do they have a quality assurance, quality control policy and plan?
- What is the depth and availability of technical support?
- How many experienced project managers, developers and programmers are on staff? What are their qualifications and backgrounds?
- What is the company's financial history?
- Is the vendor willing to provide references of companies who recently purchased or implemented their software, and give potential clients the right to solicit feedback from them?
- What is the vendor's experience with the applicable regulations and management practices concerning your operation?
- What types of databases does their software support?

Lessons Learned

The following are some key points to consider before selecting and purchasing a chemical inventory tracking system. These are not trivial points, as history can point to many implementations that have failed or faltered and expectations that were not met because these lessons learned were not followed.

- Start with the "end in mind" and work your way backward. When the system is up and running it will produce_____ and look like _____, etc.
- Understand and agree on what success looks like before beginning the evaluation/purchase/implementation process.
- Design the performance metrics that will be used to demonstrate success. Collect the data for these metrics before, during, and after the implementation.
- Ensure that all stakeholders are involved in the process of gathering and developing system requirements. Otherwise, actual and expected system functionality will not match and implementation difficulty (and cost) will escalate.
- Ensure that there is both an IT and business (EH&S) stakeholder involved at the minimum.
- Collect system hardware and software requirements from the potential vendors before making a decision to ensure that there are no hidden costs and that compatibility will not be an issue.
- Collect references from the vendor for other customers, get permission to contact them and follow up (without the vendor) for feedback.
- Arrange for detailed system demonstrations with the vendor and ensure that product managers and technical staff, in addition to sales staff, are present for questions. Provide the vendor with current or anticipated workflow scenarios and ensure that their product can meet these requirements "off the shelf" or with minimal (and within budget) configuration.
- If data is to be migrated into the new system, review the data to ensure completeness and quality. Be able to give specifics on the data source (database type and version, etc.). If integration is needed with outside systems (like an ERP system), coordinate with those stakeholders to provide system specifics to the chosen vendor and/or implementation partner.
- If processes, workflow, or dataflow are scheduled for change or need to be changed, ensure that these are well documented and reviewed prior to software selection and implementation planning.
- Develop a plan to calculate and evaluate the business value and return on investment (ROI) expected. This may include baseline values for chemical purchases, etc. at a given production level before and after system implementation and use.

Conclusion

Chemical inventory management software can provide environmental compliance data to assist professionals with a multitude of regulatory requirements that need to be met within any organization. Selecting and implementing the appropriate type and size of solution is critical and dependent on the goals and size of the operation and the quantity of its requirements. Properly selecting the right system can provide value and save a company time and money far in excess of a solution's purchase and implementation costs.

About the Author

Marc Dillon is the Chemical Inventory and MSDS Management Products Manager and Director of Consulting Services for ESS. Mr. Dillon has more than 15 years of experience in the environmental management and engineering industry. Prior to joining ESS, he was a Senior Environmental Engineer in the aerospace industry. There he coordinated and managed EH&S issues including hazardous materials management, air and water compliance programs, ISO 14001, and the implementation of a chemical inventory tracking and MSDS management system. Prior to his industry experience, Mr. Dillon was a Senior Hydrogeologist for an international environmental and engineering consulting firm, where he helped commercial clients maintain compliance with their environmental and safety requirements. Mr. Dillon has an M.S. in Geophysical Sciences from the Georgia Institute of Technology and a B.S. in Geology from Florida State University.