

Methodology & First Steps

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DOCUMENTING BASELINE DATA: WHY AND HOW

You can't tell everyone how far you should go if you can't tell them where you are starting. So, before your team can understand how to best pursue the chemical service model, you need to gather data that characterizes your existing chemical management system. Therefore, a key element of the CSP program is developing baseline data for your current chemical use and the costs you incur to manage those chemicals. This important baseline data provides the information to:

- ▶ Make the cost and environmental case to upper management about the importance of developing an efficient and effective chemical management program
- ▶ Develop a proposal to recruit chemical service providers
- ▶ Evaluate progress towards reducing chemical use and costs

An overview of how to gather this data is provided in this chapter. There are three sets of data that comprise the baseline data.

1. Chemical use and purchase cost data.
2. A cost analysis to determine the total cost of chemical use at the facility. This includes many "hidden," but real costs beyond the purchase price (detailed in *Chapter 4*).
3. A process-level analysis to highlight opportunities for process efficiency improvements (detailed in *Appendix 5*). **Collecting this data is optional.** A process-level analysis is a materials and cost accounting of a specific process where all material inputs and outputs are identified. This analysis helps to determine your facility's chemical use efficiency; expose existing data management systems (thereby identifying information gaps); and identify specific areas for improvement. CSP has found that performing this somewhat detailed analysis on one process demonstrates significant room for improved chemical efficiency and thus cost savings. In addition to the above cost analysis, it often provides the convincing data for your team and upper management to consider developing a chemical services program. Your choice to collect this data will depend on data availability, the complexity of your manufacturing operations, time and resource constraints. Please read *Appendix 5* to determine whether you want to collect this data.

Chapter 3

OBJECTIVE:

To quantify the current volume and purchase cost of chemicals used.

FIRST STEPS: BASELINE CHEMICAL USE AND PURCHASE COST

Baselining chemical costs begins with documenting chemical use. The goal is to generate a list of chemicals used in the last 12 months and their volumes. You may also want to document where the chemicals are used in the facility. This information helps orient potential service providers, and helps you track progress in chemical use and cost reduction by department.

The difficulty of collecting this data is largely dependent on the information systems already tracking chemical use in your company. Some companies we worked with could retrieve this information easily, yet others had multiple systems for purchasing, inventory tracking, and process data, making it more challenging to determine chemical use.

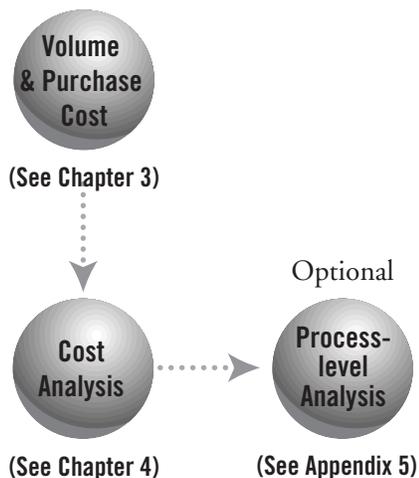
Next, you need to document chemical purchase cost. This is generally the easiest data to collect. The purchasing department should have this information. We have found it useful to document the cost in two ways:

1. The first way is to total the cost of chemicals, broken down into the major chemical categories (e.g., adhesives, acids, paints, cleaners). Such summation and segmentation provides an overview of the diversity and magnitude of the facility's chemical use (which may serve as potential providers' basis for costing proposals).
2. The second way to document chemical cost is through unit price. The value of this documentation is that it provides a baseline for measuring future price reductions. (You can expect such reductions when you consolidate your chemical purchasing.) It also gives potential providers a sense of what you pay for chemicals relative to market prices.

WHAT COMES NEXT?

Chapter 4 details the tasks required to perform a total cost analysis. After this baselining exercise, the next steps will be to determine what portion of the chemical range and lifecycle should be transferred to a chemical service provider. Chapter 5 helps you make this determination: you will consider issues of management efficiency, management control, logistical constraints, and system design.

Chapter 6 outlines how to develop and issue a Request for Proposals (RFP) to solicit a chemical service provider. Chapter 7 describes the major elements in evaluating the proposals and selecting a service provider.



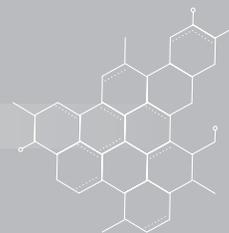
Document as You Go

It is critical to systematically document your work throughout the process so that the sources, assumptions, and methodologies are transparent and easily understood. The documentation is important for supporting your data to gain approval from upper management, select a service provider, and negotiate compensation and incentive structures with that provider. The documentation is also useful for colleagues in other facilities or business units who want to replicate your successes.

T A S K S

- ▶ Collect data on the volume of chemicals used at your facility in the past year
- ▶ Collect cost data on chemicals purchased
 - By chemical categories
 - By unit price





Baselining Your Chemical Costs

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WHY THIS ANALYSIS?

The analysis of your chemical management system is one of the most important parts of the entire process. The analysis tracks chemical use and cost through the entire chemical lifecycle: from purchasing, to distribution, to disposal. This analysis includes such costs as the purchase and storage of chemicals; management of environmental, health, and safety issues associated with chemicals; and management of waste. Through this analysis, you obtain documentation of your existing system and the full cost of managing chemicals.

The first step for the team is to map your current chemical management system. The “map” illustrates how chemicals are purchased, received, moved, used, and disposed of in the facility.

From this work, you will be able to characterize your existing system, and determine the full cost of managing chemicals. This information will then help you develop components for a new system and provide a basis for pricing a service contract.

As we’ve said, the true cost of chemical use to any company goes beyond the purchasing cost of chemicals. The problem is usually that the related costs are obscured, making them hard to account for in regular accounting methodology. Unfortunately, design, production, and management decisions regarding chemicals are typically made without consideration of these hidden costs. The true cost of chemical use actually can be up to fifteen times what the chemicals themselves cost. This can be quite a shock to even the best of managers.

Once you estimate the total cost of chemicals, you will be able to raise management’s awareness of its magnitude. This startling realization often helps stimulate action towards managing down the total cost of chemical management.

This data is the most difficult to collect, but also reveals the most about your true costs of chemical use and management. These numbers—usually surprising—help convince upper management to support a chemical service program. This information is also critical for analyzing the costs and benefits of developing a chemical service program with a chemical service provider.

Throughout this analysis, remember to ask as many “Why?” questions as possible. “Why are we storing these chemicals for so long?” “Why are we using these chemicals and not less toxic ones...is there an alternative?” You see what we mean: in essence, get to the root of the issue. Sometimes companies have found that by getting to the root of the question, they are able to come up with less expensive answers.

A LIFECYCLE FRAMEWORK FOR GATHERING DATA

Chemical management involves many departments throughout the facility and thus, often makes total chemical-related costs difficult to quantify. For example, just purchasing and storing chemicals involves a range of departments including procurement, engineering, materials storage, environmental and safety, finance, and legal. The method we use with our partner companies is a valuable tool for

Chapter 4

OBJECTIVE:

To determine what it costs you to manage chemicals at your facility.

both characterizing the system and identifying the cost elements that underlie it. We start with the lifecycle of the chemicals as they move through the facility as shown in *Figure 4.1* below.

Figure 4.1 Chemical Lifecycle



At each stage, the facility incurs costs of labor, materials, equipment, and the harder-to-quantify costs of space and capital all to support the management of the chemicals.

Using this framework, there are three major steps involved with performing the analysis:

1. Map the flow of chemicals and identify the responsible internal departments at each stage of the lifecycle
2. Assign the costs of chemical use to each lifecycle stage
3. Analyze the nature of the costs and verify them

MAP THE FLOW OF CHEMICALS

Mapping the movement of chemicals through the facility often illuminates a surprisingly complex chemical path. It also shows just how many people and resources are involved in each stage of the chemical lifecycle. This process is largely a manual, interactive effort that entails following chemicals through the facility to identify which departments are involved at each stage.

It is important to engage the whole team in this exercise, since everyone has a different perspective on chemical management. Entire team participation is another vital ingredient that cannot be overstated. It is a “must.”

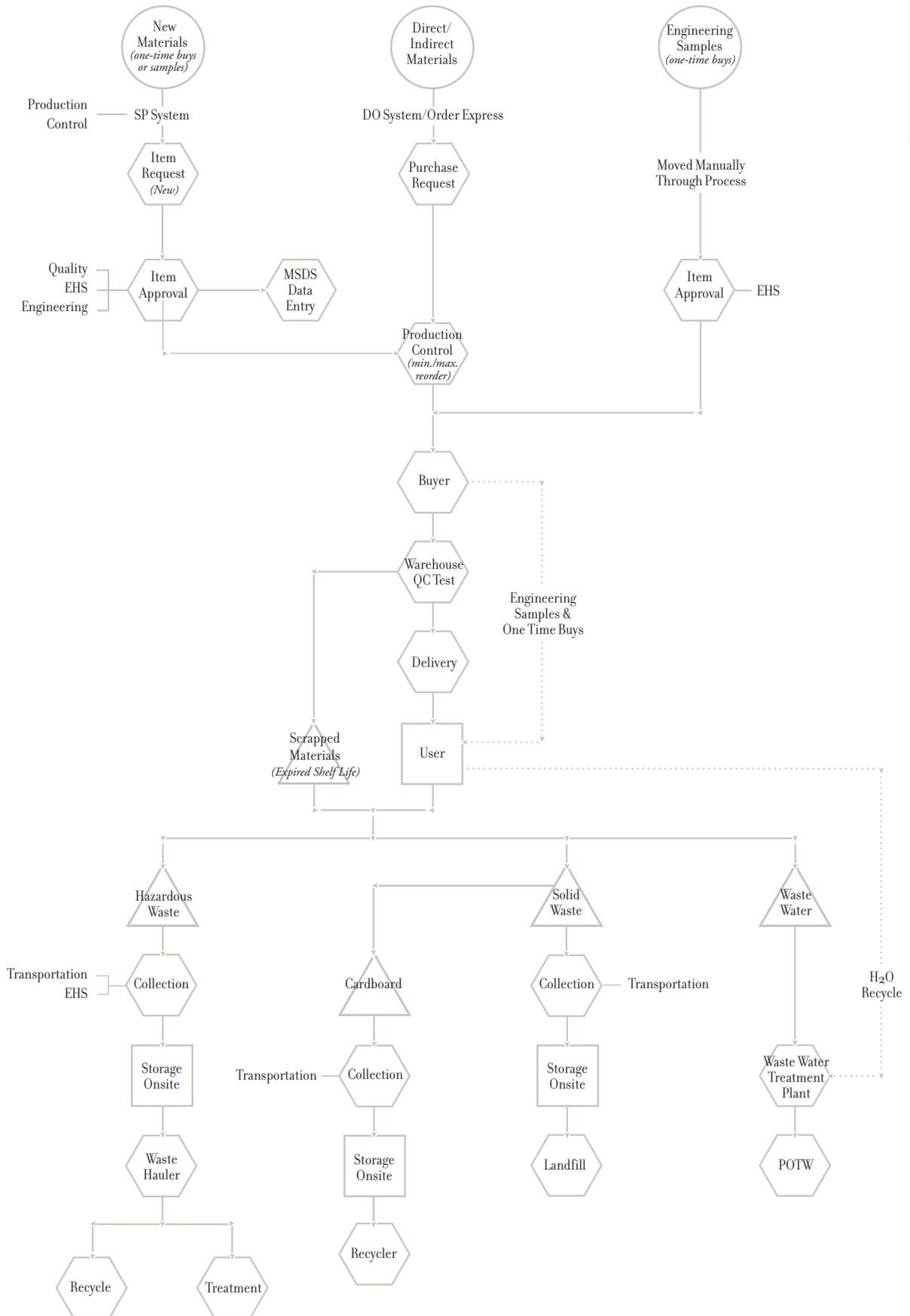
When mapping the flow of chemicals through the facility, the team should include the people, equipment, and information systems involved. (See *Figure 4.2*) The complexity, problems, and inefficiencies are quickly identified through this process. Team members are usually very surprised when they see the whole picture at once.

ASSIGN COSTS OF CHEMICAL USE

The next step is to attach costs to each lifecycle stage. This is done by determining the resources specific to chemical management within each organizational function. *Table 4.1* provides an example of the organizational functions and cost elements for each lifecycle stage. To collect this information, team members talk with the responsible people in each department. This

It is important to engage the whole team in mapping the flow of chemicals, since everyone has a different perspective on chemical management.

Figure 4.2 Chemical Management Flow Chart



provides estimates of time and other resources devoted to chemical-related tasks.

We have found that the bulk of chemical management costs are labor costs. Therefore, a vital and challenging part of this analysis is developing reliable estimates of time people spend on chemical-related activities. Team members need to be aware that they may cause concerns and anxiety among personnel they interview. As you ask facility staff how they spend their time, they can become defensive about their work and suspicious about their job security. It is important that all team members give a consistent and clear explanation of what the team is doing, its goals, and expected outcomes. This will help relieve potential anxieties.

Once you have time estimates, you will need labor rates to convert time into money. Your finance department can provide you these rates for different labor grades. For the purposes of this exercise, fully burdened labor rates should be used.

Other costs—such as equipment costs, inventory carrying costs, and waste management costs—may be more readily determined via cost reports. Generally, these cost reports also come from the finance department.

As you collect this information, you can compile the cost information in CSP's Chemical Management Cost Analysis tool. (Please see *Appendix 6*). The tool is a simple Excel workbook designed to help users identify and collect data from all the departments where chemical-related activities are likely to occur. Once the data is entered, the tool summarizes the data in a series of charts, graphs and other visuals that quickly help the team identify major areas of cost. *Figure 4.3* is a sample graph from the tool that provides a good format for presenting results to the team and other stakeholders (e.g. top management, department managers, etc.) It is important to clearly define what costs are included in each lifecycle stage. (See *Table 4.1* for a description of the activities and costs included in each lifecycle stage.)

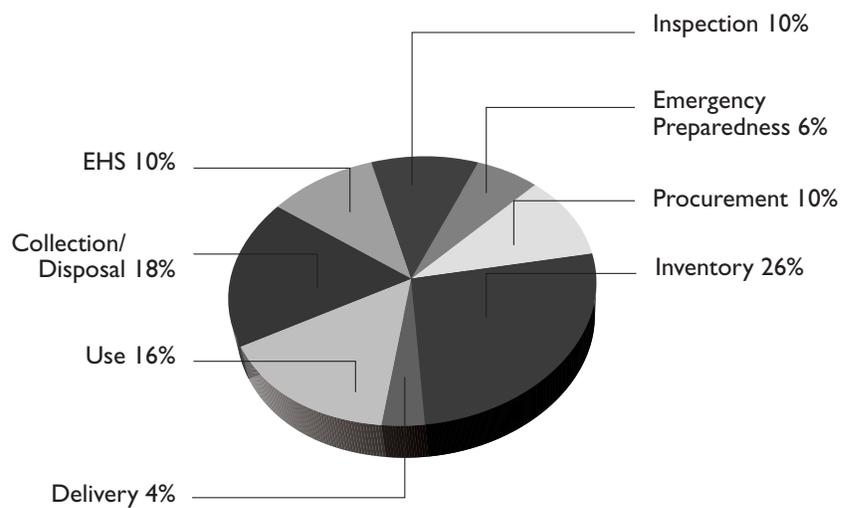


Figure 4.3

Chemical Management Cost Analysis
(Company purchases \$8 million in chemicals/yr)

Table 4.1 Sample Lifecycle Stages & Organizational Functions

Lifecycle Stage	Departments/ Organizational Functions	Associated Cost Elements
Procurement	<ul style="list-style-type: none"> ▶ Materials procurement 	<ul style="list-style-type: none"> ▶ Management of suppliers ▶ EHS approval of chemicals ▶ Chemical buyers' labor costs ▶ Delivery of chemicals to the warehouse ▶ Information system
Inspection	<ul style="list-style-type: none"> ▶ Quality control/assurance ▶ Logistics 	<ul style="list-style-type: none"> ▶ Quality certification labor and expenses ▶ Lab space
Inventory	<ul style="list-style-type: none"> ▶ Inventory management ▶ Shipping ▶ Receiving 	<ul style="list-style-type: none"> ▶ Chemical storage personnel ▶ Facility space ▶ Inventory carrying costs ▶ Shipping/packaging labor and expenses ▶ Receiving labor
Delivery - from warehouse to point of use	<ul style="list-style-type: none"> ▶ Transportation ▶ Garage 	<ul style="list-style-type: none"> ▶ Labor, vehicles, lifts, etc., necessary to move chemicals throughout site ▶ Maintenance time and expenses for equipment
Use	<ul style="list-style-type: none"> ▶ Operations ▶ Chemical technical support ▶ Personal protective equipment (PPE) ▶ Facilities ▶ Use reduction activities ▶ Training 	<ul style="list-style-type: none"> ▶ Labor to troubleshoot problems, maintain chemical baths, etc. ▶ Gloves, goggles, etc. ▶ Costs associated with containment areas and plant protection systems (alarms, etc.) ▶ Additional capital goods: explosion-proof motors, special ventilation systems, etc. ▶ Hazardous material handling training
Collection/Disposal	<ul style="list-style-type: none"> ▶ Collection and transportation ▶ Storage ▶ Waste management ▶ Treatment systems 	<ul style="list-style-type: none"> ▶ Labor and expenses associated with in-plant waste collection ▶ On-site storage and requirements for hazardous and non-hazardous waste ▶ Labor and expenses associated treatment and disposal ▶ Waste management vendor fees
Environment, Health and Safety	<ul style="list-style-type: none"> ▶ Monitoring ▶ Reporting ▶ Operations 	<ul style="list-style-type: none"> ▶ Labor to track chemicals and waste ▶ MSDS maintenance and compliance ▶ Labor to monitor usage and compliance ▶ Labor to gather reporting data ▶ Monitoring equipment
Emergency Preparedness	<ul style="list-style-type: none"> ▶ Fire protection ▶ Hazardous materials training ▶ Spill response training 	<ul style="list-style-type: none"> ▶ Labor and expenses associated with emergency response units for hazardous spills, fire, and confined space calls ▶ Labor time spent in training sessions relating to chemical management
Liability	<ul style="list-style-type: none"> ▶ Insurance ▶ Medical ▶ Accident recovery/Remediation 	<ul style="list-style-type: none"> ▶ Insurance rates for environmental liabilities ▶ Workers' compensation

It is important to clearly define what costs are included in each lifecycle stage.

ANALYZE AND VERIFY COSTS

Once the team has identified the chemical management costs, analyzing them in the context of overall business management costs will help in further understanding their significance. There are several analyses worth doing:

1. What is the ratio of total chemical management costs to total chemical purchases? In other words, for every dollar of chemicals purchased, how many (“x”) dollars are spent managing them? This brings to light the hidden costs of managing chemicals.
2. What are the chemical management costs relative to the total amount spent in facility key cost categories? For example:
 - ▶ What percent of inventory cost is spent on chemical inventory?
 - ▶ What portion of procurement resources is devoted to chemical procurement?

While these proportions are often small, they may demonstrate a disproportionate share of resources that chemicals demand. You might find that while chemicals represent only 10% of total materials purchased, they consume 30% of procurement resources.

3. Another useful analysis is to delineate the fixed-versus-variable nature of chemical management costs. Costs can vary according to the volume of chemicals purchased; the number of orders placed; and the number of different chemicals used. Some do not vary. For example, if fewer chemicals are purchased, it is likely that variable costs such as procurement, inspection, and inventory costs will be reduced. However, fixed costs such as emergency response, monitoring, and reporting are unlikely to change much.

This task is especially difficult. Determining the definition of what is a fixed cost and what is a variable cost will vary among team members. In the example above, inspection and inventory costs could be considered fixed costs because as long as you purchase any level of chemicals, you will always need inspection services and a warehouse for inventory. A rough estimate is a good start and may be all you need.

Understanding the differences in cost drivers can help determine where systematic changes are needed; what savings are possible when chemical use is reduced; and what the cost structure of the chemical service contract may be.

4. Finally, you need to determine which activities could be transferred to a chemical service provider. It is useful to consider which cost savings will result in actual bottom-line savings (hard savings), versus those that will free up resources for other uses (soft savings).

For example, transferring chemical purchasing to a chemical service provider may result in hard savings in chemicals purchased (i.e., the chemical service provider can leverage their volume to get lower prices on chemicals purchased). In addition, it could produce soft savings by eliminating the 20% time that a purchasing manager spends on troubleshooting chemical purchase problems. That is considered a “soft savings” because the purchasing manager who remains fully employed on purchasing issues now has more time to work on other more productive tasks. In our experience, this information is invaluable in justifying and supporting a chemical service contract.

Once the nature of the costs has been determined, we recommend the analysis be verified with your finance department. You will build many assumptions into your analysis in the course of gathering and compiling information and they need to be confirmed. Since the team will be relying on this information as it moves forward, it is important to achieve the highest possible level of confidence in the analysis results. So, involve the finance department; ask them questions; and get their buy-in.

Accuracy Versus Time and Cost

The time required to perform the analysis in Chapter 4 will depend largely on existing data management systems and the complexity and number of chemicals and chemical users at your facility. While there is certainly value to the information you can gain from this analysis, it does not come without a cost: time.

Therefore, as you begin the cost analysis, keep in mind your purpose and specifically, what you will do with the information once you get it. Ask yourself even more questions. “Why do we need this information?” “What will we do with it?” “What will it tell us?” “What can we leave out?” It is necessary to consider the trade-offs between achieving greater accuracy and incurring more costs to do so. Sure, accuracy is important but “don’t let perfect ruin good.”

Note: *Working with a chemical service provider is not an exercise in shifting costs, but rather eliminating costs. When you develop this new and integrated relationship with a service provider, they are helping you to reduce costs overall. This happens through better efficiency in many aspects of chemical management where the service provider has invested resources to improve efficiency. Whether it is stream-lining inventory management, initiating a chemical tracking system, or identifying cheaper and less toxic chemicals, the service provider is focusing on ways to reduce costs and improve quality as part of their own core competency.*

T A S K S

- ▶ Map the flow of chemicals through the facility
- ▶ Collect cost data for each lifecycle stage using the CSP Cost Analysis tool
- ▶ Summarize data
- ▶ Analyze data and identify major cost drivers

