Companies, large and small, are under increased pressures to improve their business value and EHS performance. These pressures stem from such factors as intensified marketplace competition, expanded expectations for shareholder return, technological change, and the introduction of management practices emphasizing quality improvement and cost reduction.

In improving their EHS performance, companies have responded to driving forces such as growing public expectations for EHS quality improvements (as expressed through more stringent legislative and regulatory requirements), more direct stakeholder monitoring of EHS performance, and changing corporate values and efforts to integrate EHS with business management through initiatives to avoid or reduce EHS-related costs. Some very important questions have been raised:

- Why are leading companies seeking to achieve EHS excellence?
- What are some key factors of success for creating a high EHS performance organization?
- What are best practices currently in use for integrating and transferring excellence in business to EHS management?
- What valuation process do companies use for EHS projects and activities?
- What is environmental excellence?

These questions point to several major challenges and trends in EHS management—the growing interaction and complexity between business and EHS issues; expanding expectations from customers, employees, communities, and other outside stakeholders for companies to account for their views in business planning; and the need for EHS programs to become financially self-sustaining and contribute measurable business value to the company.

The commitment to excellence in EHS performance is but one of many factors competing for resources and management time. There are several sets of issues motivating this push for excellence:

- Economic benefits resulting from improved EHS performance
- Corporate commitments and core values
- Reputation enhancement
- Regulatory requirements
- Meeting customer and stakeholder expectations
- EHS issues and their contributions toward strategic differentiation of the company
- Improved employee relations

It is now more important than ever to extend business management philosophies and methods to EHS management. Factors that will contribute to success in this area include:
Achieving a “boundary-less” character to business and EHS management systems so that such issues as vision and performance measurement are more consistently managed across different levels of management and across departments and other business units.

Developing scorecards for key business and EHS management system results. Scorecards help management track the outcome of performance and they also enable stakeholders as varied as financial analysts and communities to verify such results in ways that can sustain a company’s longer-term reputation and credibility. Such scorecards measure the outcomes of performance using metrics that extend beyond traditional EHS compliance issues into such areas as the efficiency of business processes.

Managing EHS issues to contribute more directly to business value-generating operations and strategies so that the value of EHS activities is more clearly demonstrated to business colleagues, shareholders, and customers.

Enhancing the personal and professional skills of managers and employees to improve EHS performance while upgrading the management system.

Expanding the diversity of stakeholder viewpoints and perspectives considered by management in making business and EHS management decisions.

Best practice areas that are frequently referred to in the literature include:

- Setting goals that are quantitative and time-specific and cascade through the organization—separate but compatible goals are established at the global, business unit, site, and department levels.

- Placing an economic value on specific EHS functions such as compliance, due diligence reviews, and product life cycle analyses—broadening the application of economic value-added methodologies to EHS activities, computing the EHS contribution to enhancing specific business processes, and developing specific results (indicators) for eco-efficiency.

- Focusing on the main processes that make products or deliver services for the company. Companies are devising an increasing number of methods for integrating their business and EHS. These can include: EHS staff review of business plans and new product reviews, improving business-EHS accountability practices, and reducing business and EHS costs by redesigning processes!

- Building and transferring core competencies. Companies committed to EHS performance excellence seek to enhance the skill levels of their personnel and continually learn about and apply practices that produce superior performance. This includes rotating business managers into EHS functions.

- Managing behavior to improve business and EHS performance. Includes incentive plans that apply to individual employees and clarify the consequences of failing to achieve EHS goals that they help to set.

- Instituting feedback processes. EHS audits of suppliers, external stakeholder reviews of EHS goals, programs and progress, and using customers and a business team to provide feedback on opportunities for improvement.

- Having EHS projects compete with non-EHS projects for access to capital, criteria for making EHS and non-EHS investment decisions, and the process used for making investment decisions.

Legally required EHS investments, such as those undertaken for compliance with laws and regulations, often do not compete for access to capital. More discretionary initiatives (e.g., prevention program projects) exhibit no clear pattern of decision making. Multiple decision criteria are often
applied in valuing EHS investment opportunities, with some companies adopting a “hard” return on investment (ROI) criterion, while others demonstrating considerable flexibility in deciding whether and when to fund individual EHS projects. Considerable discretion also exists in terms of who makes EHS investment decisions and how such decisions are made, especially in regard to projects initiated without a compliance requirement.

Because of the variety of criteria and decision-making processes used to evaluate EHS projects that are not compliance related, access to capital also appears to depend on the capabilities of individual project managers to assemble coalitions of support for funding. While many of these individuals have enjoyed great success in securing project support, the lack of a more formal approach in evaluating EHS projects may subject the latter to a more unpredictable funding outcome than competing projects.

Operational excellence is a term often used by management for initiatives to improve the overall performance of the organization. This term is often defined by the use of the Baldrige Model (see Chapter 5, Appendix 3) for performance excellence. Environmental excellence, a parallel term used in EHS performance enhancement circles, lacks a concrete and consistently applied definition. At the present time, it represents more of an aspiration than a result or destination. EHS management is in transition when it comes to using performance methods. While primarily directed toward compliance, leading companies are looking at going what they call “beyond” compliance programs and initiatives to improve their EHS performance and reputation. They are generally only in the early stages of examining or implementing ways to further integrate EHS with business management by adapting methods and tools commonly used in business processes—quality management tools. Such companies have only recently begun to systematically think of how EHS programs can add VALUE to business managers, customers, and shareholders.

As a result of these and other factors, the performance achieved from EHS programs has been relatively modest. This is true in large part because the most commonly used indicators of performance (results or outcomes of performance) are traditional, compliance-oriented factors that don’t sufficiently reflect a full range of business impacts in the EHS area. Business and EHS managers have mostly pursued incremental performance improvements rather than seeking more strategic and significant breakthrough gains in EHS through the redesign of the main processes. There are many important breakthrough opportunities left.

Characteristics that pertain to environmental excellence are as follows:

◆ Obtaining continued support for ambitious EHS goals and performance improvements from the CEO and senior business unit executives.

◆ Improving EHS performance beyond regulatory requirements because this enhances the corporation’s control of its business destiny with stakeholders and provides business managers with greater control over planning and budgeting processes.

◆ Implementing EHS stewardship programs throughout the business chain, and delivering products and services that anticipate and solve customers’ EHS-related problems.

◆ Supporting research and development and other opportunities for innovation that will lead to significant EHS performance gains while advancing measurable results signifying the outcomes of the performance.

◆ Recognizing that excellence is the combined result of a constantly improving management system and organizational practices designed to motivate people to do a superior job so that a company exceeds EHS goals, outperforms its competitors, and meets stakeholder expectations.
It is important to foster optimism and a strategic vision for EHS management so that it is viewed as a core business function and asset.

One of the major perceptions of the EHS function is that it doesn’t contribute to what’s important to the organization. EHS professionals often work on the fringes, leading to this perception that they do not contribute directly to the bottom line.

There needs to be a major shift in thinking among EHS professionals to overcome this image. EHS coordinators must focus more on the following issues:

◆ Meeting customer needs
◆ Achieving a desirable and ethical public image
◆ Improving efficiency and obtaining cost savings
◆ Achieving effective risk management and formulating contingency plans
◆ Achieving a competitive advantage through improved design of products, packaging, and processes to meet customers’ EHS needs
◆ Improving long-term profitability
◆ Minimizing the effects of EHS fees and taxes
◆ Improving standing in the local, financial, and government community
◆ Ensuring product costs include realistic assessment of related EHS costs
◆ Ensuring the continued availability of financing and insurance

Tip: Increasingly banks and insurance companies take an organization’s EHS performance into account before providing finance and/or insurance.

There is a growing awareness that society’s dependence on and interaction with the environment is not unlimited. Sustainability is becoming more recognized and demanded by the public. Sustainability is most often expressed as, “Meeting the needs of the present without compromising the ability of future generations to meet their own needs.”

A major challenge for EHS management is to transform its work into a major business opportunity. Those organizations that see their environmental policy solely in terms of meeting regulatory requirements will miss these opportunities. It is essential for organizations to define and incorporate EHS policy into their overall strategy and to seek to minimize any unavoidable costs of regulation. You will need to convince your financial staff and upper management that looking after the EHS issues is a huge business opportunity that can have a positive effect on staff as well as the image of the company AND the bottom line.

A key requirement of EHS management is the sustainable use of human and natural resources. The EHS manager needs to be involved in:

◆ Monitoring external developments.
◆ Identifying and benchmarking against best EHS practices.
◆ Ensuring that the EHS strategy is fully integrated into the overall business strategy.
◆ Developing EHS measures of performance.
◆ Setting EHS improvement targets and establishing monitoring procedures to know the results (i.e., outcomes of performance).
The EHS Business Value Principles

- Ensuring that EHS performance management systems are integrated into business management systems so that EHS impacts and risks can be fully incorporated into business decision making.

- Incorporating EHS considerations into capital budgeting decisions and selection of capital equipment.

- Identifying and calculating any EHS contingent liabilities.

- Identifying and estimating costs caused by the organization’s activities that have to be met by others (e.g., contaminants to the wastewater are found in surface water or drinking water).

- Producing and analyzing EHS management information. By making EHS costs more visible, managers can be made accountable for the EHS costs that they generate and EHS performance can be incorporated into management incentives.

- Identifying internal energy or water costs and allocating those to products and processes (e.g., instead of treating electricity as an overhead item it can be treated as a direct cost for each unit operation or work step).

- Sponsoring EHS consciousness in all employees through training and communications.

- Involving employees directly in EHS activities from the bottom up.

EHS management should not be seen as something separate. Management must learn to integrate EHS considerations fully into their work so that it becomes routine to factor them into all business decisions. Employees should consider EHS in everything they do every day.

Producing EHS management information can add value by helping to identify where cost savings can be made. Defining, analyzing, and reporting EHS information will improve management’s awareness and meet the increasing and diverse expectations of stakeholders.

Exemplary EHS management provides opportunities for reducing costs, since the primary cause of impacts and risks is waste in one form or another. Reducing waste will therefore have the dual effect of improving EHS performance and reducing operating costs.

In some cases, EHS management may also provide an opportunity for increasing sales revenue (called the “top line”). This could stem from the introduction of new products directed at meeting an EHS need or increasing the margins on some products to reflect the EHS-friendly nature of the product.

There are a number of important guiding principles that can help the EHS manager add business value. Each of these principles can be addressed by using one of the business value tactics described in Chapter 3 of this manual.
1. Know your company’s processes

If you ask the manufacturing manager for information about the processes responsible for making your product line or for the services offered, it is likely that he or she will provide you with a very complicated and difficult to read flowchart, process flow diagram, piping and instrument diagram, or value stream map. Chances are that very few people in the organization have ever seen or used these complex depictions of the process.

In business, processes intertwine in complex ways to provide products and services. Your company’s processes ultimately lead to its success or failure. The challenge for anyone wanting to ensure that the final result is successful is to find a way to analyze those processes. **Process mapping** is a powerful tool that allows the reviewers to get a good understanding of the process, effectively find ways for that process to become more effective, and ensure that business value is being provided to the stakeholders.

**Hierarchical process mapping** can help a team of people understand how the process works and allow the team to explain the information to management and workers alike. Unlike the other process diagramming techniques, it has a simplified structure—never allowing more than six objects on a page. The hierarchical structure of the process map makes it easy to computerize. This allows you to store all kinds of information by work step. The Systems Approach uses accounting sheets for organizing this information. When stored in a database, the information can be accessed at the work step level and be used to train the operators or simply provide them with all the updated information they need to run the process more effectively and efficiently. It is also possible to simulate the process when it is placed in a hierarchical format. This is not possible with the other process diagramming methods.

Too many process improvement specialists conduct their work with a mind-set that management must be pleased. Often these people have preconceived notions of what they will find. And even if the specialist is open-minded, the review is often done without talking to the employees. Discussions may be held with management. There may be reviews of procedures and files. But the people actually doing the work are not brought into the picture. The verification of the hierarchical process maps in the Systems Approach involves the process operators. They will freely talk about improvements that have already been made and what they would like to see improved in the future. In many cases,
they have specific recommendations on how to make these improvements. In this way, hierarchical process mapping allows a true buy-in to the completed product by the employees. Employees have participated in the mapping exercise. They will participate directly in the process improvement using the Systems Approach methodology.

If the process leads to a product or service that nobody wants, it is a waste of time—there will be no customer. The successful analysis of processes must take customers into account. It may be the primary customer—the one who buys the product or service—or it may be an internal customer—the employee who uses an output as their input to their work task. The process should be driven from the customer’s or marketplace perspective. Possibly the most important benefit of hierarchical process mapping is that it is customer-driven. To complete the hierarchical process map, everyone must understand what is being delivered to the customer and why.

These process maps are often used to ensure that the operation is as transparent to the customer as possible. Equipment can break down and supporting processes can be interrupted. This may cause delays in delivering a product. Some of this delay is built into the promised delivery time. However, excessive delay is frowned on and may even lead to the loss of a customer. Regulators want to see how the process is affecting environment, health, and safety. The better they understand the process, the more objective they can be with their assessment. Finding ways to make an operation more transparent to the various stakeholders should be the objective of any process improvement program. Hierarchical process mapping helps make this step.

2. Everything is connected to everything else

Hierarchical process mapping provides employees with an overall view of how their work adds business value and how they are part of the team responsible for the company’s product or service. The holistic approach allows them to see where their work comes from (upstream) and they can see the work steps that lead to the products (downstream). They can see why they are doing what they do. Eventually, this should lead to a final benefit to the customer. Hierarchical process maps often provide the first time employees actually understand why they are doing the work they do. It helps them understand why a bothersome statistic they have to generate is important to a report that drives future customer transactions. It also helps them see the activities that influence their safety on the job and what they might do to affect the environment in an adverse way.

In your operations, processes are constantly interacting with other supporting processes. The water is purified in a de-ionization system in order to be used as a rinse in the main process. Both operations use resources and create wastes. Both operations are subject to EHS requirements.

Too often process analysis is done in a vacuum and does not consider how these processes interrelate. Process improvement specialists often talk to one functional manager to find out what works best for them. Is it a problem with maintenance, quality, or operations? They do not worry about the EHS consequences of process improvements because this is your job! Hierarchical process mapping provides a method for taking a holistic approach to process analysis. Before approaching functional managers, the process improvement team can gain a full understanding of the process’s objectives and how they interrelate with the company’s overall objectives. The objective of each part of the process and the supporting processes is also reviewed to ensure that it benefits some greater objective. When identifying opportunities for improvement, the review team will keep all these objectives in mind to ensure that the effect of the process improvement is fully understood. By looking at the whole picture and integrating the various parts, the process improvement team can see not only what needs to be changed, but also how this affects everyone. With an overall view, the
benefits for one can be weighed against the detriments to another, and the ultimate good can be appropriately considered.

Many of the popular management initiatives do not include “systems thinking” capabilities. They are more initiative (best practice) driven. Hierarchical process mapping can bring this dimension to these programs. All projects in the Systems Approach need to check to see if their actions will cause negative reactions downstream or in one of the supporting processes. No project is allowed to stand alone. Project team leaders and the oversight committee also will look to see where else in the system the knowledge learned can be applied. This leveraging of the successes will help the company move from incremental improvement to a breakthrough improvement level.

3. Prevention is more effective than control

EHS regulations and methodologies have always stressed the use of “controls” instead of at-the-source prevention. These controls include such things as machine guards, fume incinerators, wastewater pretreatment devices, and fall protection. Often they refer to these add-on controls as “prevention.” This is quite misleading! These controls cost money that does not add value to the process. Furthermore, these controls need to be inspected, maintained, documented, and reported on. Many controls (e.g., wastewater and air pollution controls) require additional energy to operate, consume other valuable resources, and create their own wastestreams. When one looks at controls in this way, one has to wonder how we ever got into such a predicament in the first place!

Some companies have restricted their EHS program to compliance—“Show me in writing where it says I have to engage in at-source prevention!” In an ISO 14001 environmental management system and in the OHSAS 18001 health and safety management system (see Chapter 5, Appendix 3), the organization must make a commitment to prevention. However, it does not have to demonstrate that the commitment has been exercised to obtain certification. It really seems at times like the deck is stacked against the practice of at-the-source prevention in the EHS field.

Most states have offered free pollution prevention technical assistance. Small- and mid-sized companies have failed to take advantage of these programs. The U.S. EPA has since started to lower the funding level for these programs. Many trade associations and the government have run voluntary programs (e.g., OSHA's Voluntary Protection Program and the American Chemistry Council’s Responsible Care® program) that emphasize prevention. However, most of these programs are not being used by small- and mid-sized companies. Most, if not all, of these programs are “initiative-driven.” That means they operate with a collection of best practices and success stories. They rarely require the company to have a program-in-place (i.e., a program centered about something like the Systems Approach) to promote the prevention approach. Yet, even such an initiative program would be better than avoiding prevention altogether.

There has been a great idea for EHS professionals whose minds are always focused on compliance. It is called “Compliance Through Prevention.” This program was a part of President Clinton’s Executive Order 13148 and applies to all federal government facilities. It states that there are two routes to compliance:

1. You can read, understand, and follow all the EHS regulations all the time; or

2. You can work to change the process in such a way that it no longer “triggers” the very need for the regulatory requirements.

No company is in compliance with EVERY regulation all of the time! Your company is always at risk of being found in violation of a compliance requirement. A good regulatory inspector having a
bad day can find noncompliance examples in every case. By changing the process to avoid the very need for compliance, it is not possible to be found to be out of compliance!

Changing the process is exactly what all the EHS regulations sought to avoid when they were written. However, an investment in the process (i.e., making it more agile or productive) is a much better investment than spending money on a control that will not only fail to add business value, but will also put you at constant risk that it may fail, causing production disruption. Recently a company lost two shifts of production on five filling lines when a program logic control failed to communicate with the computer controlling the wastewater discharge pump. Because the company could not discharge without the pump engaged (they had installed a failsafe device to prevent discharge unless all systems were working properly and had no manual override mechanism), all processes that generate wastewater had to be shut down. The plant manager was not very happy with this event!

Engineering and operations staffs are surprisingly open to suggestions on how to improve the process. They really dislike having to treat pollution and safety control equipment as critical equipment in their preventive maintenance program. Critical equipment should be limited to the major production equipment if you are worried about business value. EHS professionals just need a way to communicate better with these other functional managers. Tactic 1 (see Chapter 3) will help improve this communication. Prevention considerations should always be considered when choosing opportunities for process improvement after completing the hierarchical process mapping. Tactics 2 and 3 will provide ample justification that prevention is better than controls when it comes to adding business value.

Another area that is important is the prevention of spills, leaks, and accidents. There is a Lean Manufacturing (see Chapter 5, Appendix 3) technique known as poka-yoke (i.e., mistake-proofing) that works very well in these programs. This technique works well in EHS projects, although few EHS professionals are familiar with the use of this technique.

4. Focus on the processes

In any organization, a certain amount of “turf” is protected by each functional manager. Each of these professionals gets their recognition based on the results of initiatives in their own silo. Workers also get judged on their work at their work step location. They are not judged on upstream and downstream consequences of their work. Because there is so much to protect, people tend to get a bit emotional about process improvement. This kind of change brings fear of repercussions that may result from the activities. Fear gets in the way of team activities.

The Systems Approach uses quality management tools to help “de-personalize” the team activity. By focusing on the process, all attention is given to fix what may be broken or improve what could be made better. Because this work is done in a systems framework, everyone can “see” how the activity will potentially affect them. Instead of just reacting to this, they can provide valuable input to the team that will protect their position. It is important to always focus arguments to the piece of paper that is being used for the quality management tool. People argue to make a change on that piece of paper. They do not argue with each other in a personal way. The “youngest” tool in the Systems Approach was published in 1943 and the oldest tool dates back to the late 1800s. In the hands of an experienced user, these tools have proven themselves over and over again for all this time to be able to help teams perform better—even without all the other team training, such as conflict management, agenda setting, and performance measurement.
It has been interesting to see how hierarchical process maps induce employees to want to get involved in process improvements of all kinds. When employees are shown a preliminary hierarchical process map during the verification process, they want to make sure the information is correct. This is a reactive move at first. However, they are amazed to see how the links are made between their work and work upstream and downstream of them. Often they have never even seen some of the supporting processes that are delivered to them by pipeline! It really gets them thinking about the process instead of just knowing that they have to follow directions that someone else wrote and probably never used. However, for the workers, this is what they do and they want to make sure it accurately reflects their work and addresses their problems. Most other process diagramming techniques cannot do this as well. Some of them (e.g., value stream mapping and piping and instrumentation drawings) are so complex that most workers do not really understand them. They often represent the process at a higher level, e.g., they may show a machining operation as a single item on the process depiction when there are four separate activities that are performed there. Each of these four steps uses and loses resources. The root cause of the problems with resource productivity is likely to be found at the work step level, not at the machine level. The focus has to be at the right level in the process.

Another pet peeve of the workers is mass training! Often this simply bores them to death. EHS and management initiatives promote mass training to build program awareness. The Systems Approach does not promote mass training. Workers are not taught how to use the tools. A facilitator or other employee that has experience using the tool helps the team use the tool when they meet to prepare the action plan. Software can be used to help with the hierarchical process mapping. Program training can be condensed and presented to the workers. Then workers can refer to their work step as represented in the hierarchical process map and the linked accounting sheets. They can be shown how the program affects them where they are working. Every worker in the training session would have the opportunity to see how the program affects them. This makes the training more meaningful to them and they tend to pay more attention. Focusing on the process in this way will build the awareness that has always been sought by the EHS professionals and other program leaders.

Most management initiatives (e.g., Lean Manufacturing and Six Sigma) do not necessarily use quality management tools to focus on the process. Instead, they are more likely to be focused on the problem. The Systems Approach tools work very well within these programs to tie the problem to the process and to improve the process to seek to eliminate the problem altogether rather than apply a Band-Aid fix to the problem. Tactic 1 is very helpful for showing the way to improving these efforts and finding the way to add the business value that is sought in all of these programs.

5. Use quality management as the improvement language

All MBAs learn to use quality management tools. This serves them well as they seek to improve the business value of the companies that employ them. Management uses quality management tools to help operations meet the needs of their customers. Many management initiatives (e.g., ISO 9000 quality management system or similar program, Lean Manufacturing, Six Sigma, and Operational Excellence) also use quality management tools. The basis of the ISO 14001, OHSAS 18001, and other similar EHS management systems use the PDCA (plan, do, check, act) cycle—another quality management method. So quality management philosophy pervades many organizations.

However, EHS professionals are not as familiar with the use of quality management tools and methodologies. What makes matters worse is that all the management initiatives seem to assume that the EHS professionals do not need to be involved since the work does not directly impact their silo. This is a real bad assumption! It is also a common belief that the EHS coordinator is too busy...
for such a program with all the regulatory compliance activities they are involved with. This is an impression that many EHS professionals give to their management.

Even though all the management initiatives use quality management tools, life isn’t perfect for them. The sensi (i.e., the leader of Lean Management programs) does not always use a sequence of quality management tools. Instead, they use the tools just as they see fit, thus losing some of the advantages of the quality management approach. The Six Sigma black belts use a technique called DMAIC. It has a specific order in which quality management tools are utilized to improve the process. However, the black belts often substitute tools randomly for one another in this sequence (i.e., there are hundreds of quality management tools available), not fully realizing that it takes a lot of skill to use the tool effectively. By making the frequent changes in the tools used, they take much longer to develop the requisite skills. Lean Management and Six Sigma programs would be run more smoothly if the Systems Approach was used. The Systems Approach (Tactic 1) has been used in ISO 14001 environmental management systems and has been used by itself to help establish an environmental management system. There is a lot of pressure placed on management initiatives to demonstrate the creation of business value. People involved in managing these programs have been quite resistant to try anything to improve their programs for fear that it will detract from their effort to add the business value.

The most commonly used problem-solving tool in the world is the cause and effect diagram. This tool is used for root cause analysis. EHS managers always say that it takes too much time! However, if they developed the skill to use the method, it would take much less time and provide quite a few more alternative solutions in the brainwriting or brainstorming sessions that follow. Most companies only use root cause analysis after a major incident. They say it is to “prevent” the accident from happening again! It would be much more prudent and would add business value if root cause was used prospectively to actually and really prevent the accident—the first time!

If all the process improvement programs were using the same set of quality management tools (e.g., the Systems Approach in Tactic 1), the following benefits could be realized:

- All programs could communicate with each other using the same language;
- Management could communicate more effectively with functional managers;
- Management and employees could communicate through the use of these visual tools; and
- The company could communicate more effectively with outside stakeholders.

All of these improved communications capabilities would contribute to the creation of business value.

6. Involve employees in a bottom-up program

Almost all of the process improvement programs are operated in a top-down mode. This is a result of the emphasis placed on a management technique known as “management by objectives.” Many of the quality management gurus have found that it is also important to have a “bottom-up” component in the program. It is not effective just to tell employees what to do and judge them on how well they follow the directions. Since they are working with the process all the time, they might have some valuable knowledge that they can share with management—something that is now known as process knowledge and intellectual property or knowledge assets. Employee involvement is now a major component in most true performance evaluation methods.

The Systems Approach seeks to involve employees in the solution of the problems. It is amazing how clever they can be when directed in this way. Management is always saying, “Wow! That is a
great idea! I wonder why I didn’t think about that!” Unfortunately, the idea is “old” to the employee. When asked why they didn’t tell management about the idea in the past, there are generally two responses:

1. “Management has never asked before!”
2. “I thought it was a silly idea and management is not receptive to such input. They just want us to follow the directions that they provide and not think about such things!”

This is a really sorry state of affairs and one that needs to be promptly replaced if there is to be an effective program to build business value. Remember, “An employee never resists their own ideas!” Given an opportunity to make improvements that they are interested in will work much more effectively than trying to force-feed them what an outside expert feels is a “best practice.”

It is important to preserve the top-down component within the Systems Approach. This is accomplished by only allowing the employee teams to write a DRAFT action plan. It must be approved by management before it can be placed in action. Management can weigh in by asking the team questions about their approach and negotiate with the team over the amount of resources that are requested for each of the projects. The management can also coordinate the efforts by having different teams meet with one another along the way to share information. These linkages become apparent by using the hierarchical process maps.

By using a good blend of top-down and bottom-up management styles, the process improvement efforts as well as the EHS program efforts should be a lot more successful than just dictating everything from the top down. Lean Manufacturing programs need to be sensitive about de-emphasizing the role of the sensi. A teacher can be viewed as helpful or autocratic. Six Sigma programs need to develop sensitivity into their martial arts analogies of black belts. Sensi and black belts should be provided with facilitation training to learn to be guides for the workers to use as they seek to solve their own problems. This will be a big transition for some of the programs already in place and will take some time to make the shift to the middle of the road.

7. Thoroughly integrate EHS into all business programs

All management initiatives seek to improve business value. Each of these programs has projects to realize these important gains in business value. Often there are parallel process improvement programs in place with little integration between them. The Systems Approach is quite useful for integration of these programs. Hierarchical process mapping helps to identify the opportunities to improve the process. When selecting which opportunities to include in the program, it might make sense to select opportunities that are being considered separately in multiple programs. An example would be:

- Significant aspect in ISO 14001 or other environmental management system,
- Significant hazard in OHSAS 18001 or other occupational health and safety management system,
- Kaizen target in a Lean Manufacturing effort,
- Variability reduction target in a Six Sigma program, or
- Quality system problem in ISO 9000 or other quality management system.

The employee teams will use the managers of the different management initiatives as resources for their action planning effort using the Systems Approach tools. These initiative managers will join the functional managers on the oversight committee to oversee the process improvement effort. In
this way, these initiative managers learn that they can actually work together despite all the various “turf” issues associated with their programs and the funding for those programs. This integration effort has been used to merge Lean Manufacturing and Six Sigma into a Lean Six Sigma program. There are multiple benefits that come from merging these programs. However, it has always been difficult because of the differences between the programs. What they do have in common is the task of process improvement. They just needed a way to communicate with each other. The Systems Approach tools work fine for this.

**Tip:** It is very important to keep the focus on improving the process and not specifically on the success of each of the management initiatives per se.

Another integration opportunity comes from getting the various functional managers to work effectively with one another. Each functional manager is asked to write down their most pressing issues on a hierarchical process map at the work step level. Examples include:

- Human resources should look at the jobs that workers hate to do. Where are the complaints coming from? Where is there the most employee turnover?
- Maintenance should look at work steps where there are the most challenges. Is it with preventive maintenance or where machines are actually breaking down?
- Quality should look at work steps where defects are coming from. Where are parts and assemblies being rejected?
- Environment should look at work steps subject to environmental compliance issues.
- Health and Safety should look at work steps subject to health and safety compliance issues.
- Purchasing should examine where there is the greatest demand for resources or where there are special demands that are taking up precious time for them.
- Accounting should examine work steps they are aware of that are causing accounting issues that they need to deal with. Where are the capital equipment requests coming from?
- Supply chain management should examine where there are important interfaces between what the suppliers are providing and their need in the main process. Suppliers’ product manufacture should be seen as a supporting process in the hierarchical process map.

When the hierarchical process maps are combined, it is often found that 20% of the work steps have 80% of these concerns. These work steps become good candidates for process improvement projects. It is best to select projects where there are multiple problems. When these problems are solved as part of the same project, the payback calculations are vastly improved. These functional managers should be serving on the oversight committee and will see how their combined efforts add more business value than their previous projects.

8. **Translate all process improvements to financial terms**

You can earn the respect of your management team by aligning EHS activities with what’s important to them. More often than not, what’s important is financial performance. Once you show the financial links through easy-to-understand metrics, you’ll have senior management asking for information. They will become much more interested in the EHS function and its contributions to the organization. You have to become conversant in the language and make the connection to the bottom-line financial results. If you cannot figure out what the process improvement is worth, don’t bother proposing it to management. Every action plan created using the Systems Approach has two
tasks that require the employee teams to convert their physical measurements to financial terms. They have to use the methods employed in Tactic 2 to track the costs and benefits of their actions.

When managers obtain a masters’ degree in business administration (MBA) or in public administration, they typically view economic responsibility in four areas:

1. Economics
2. Finance
3. Accounting
4. Quantitative analysis

These topics are covered in a book titled *The Ten Day MBA*. The book is subtitled “A step-by-step guide to mastering the skills taught in America’s top business schools.” It has well-written chapters on each of these topics along with a host of other topics, including ethics. Besides helping people decide whether they want to go to business school, the book provides some excellent insight into how managers operate in most organizations.

This paperback book is easy to read and will provide you with the background you need to cope with some of the accounting aspects of economic responsibility in a sustainable development program.

The subsections below will address the three types of accounting that will impact EHS and other process improvements.

**Traditional Accounting**

Accounting is the language of business. Businesses and local governments use accounting to communicate their financial results to their stakeholders. The audience includes employees, investors, creditors, customers, suppliers, and communities. Within the organization, accounting information provides the means to control, evaluate, and plan operations and processes.

Accounting answers the following questions:

1. What does the organization own?
2. How much does the organization owe others?
3. How well did the organization’s operations perform their processes?
4. How does the organization get the cash to fund itself?

All the organization’s activities must eventually be measured in monetary terms (i.e., dollars in the USA). You must have a working knowledge of accounting to function in an organization. Because employee performance is often evaluated with accounting data, you must be familiar with the basic concepts.

There are three basic concepts you need to master:

- General ledger—credits and debits,
- Balance sheet—assets and liabilities, *and*
- Income statement—profit (surplus in local government) and loss.

The general ledger has a chart of accounts. This is a very important document when you are working with a sustainable development program. It assigns an account to all financial transactions.
The next item to learn is cash flow analysis. This is the forecast of cash flowing into the organization and cash leaving the organization. This is a very powerful management tool. Cash flow can make the difference between growth and stagnation and success and failure. This analysis seeks to know “what does an investment cost?” and “how much cash will it generate each year?” Cash generated by an organization can be put to good use to pay off debt, to pay dividends, invest in research and development, or invest in the process improvement program projects. It asks, “What is the current investment?” and what are the future benefits? Cash flow analysis helps:

- Define the value of the investment
- Calculate the magnitude of the benefits
- Determine the timing of the benefits
- Quantify the uncertainty of the benefits
- Answer the question: Do the benefits justify the wait?

Net present value is used to put the cash flow analysis in today’s dollars. It recognizes that a dollar today is worth more than a dollar received in the future. It takes the future cash flows and discounts them to present day value. This method can be used to compare different sustainable development projects with capital budget items to see which one to sponsor.

Another way to look at capital expenditures is with internal rate of return. This is the rate at which the discounted cash flows in the future equal the value of the investment today. The higher the discount rate, the less cash is worth today and the more risk is implied.

**Managerial Accounting**

Over the past 20 years, most organizations have been moving their reliance from traditional financial accounting systems to recognition of the importance of managerial accounting, and activity-based cost accounting (ABC) in particular.

Financial accounting systems were never designed to help with internal financial analysis. Instead, these accounting systems are explicitly focused on external presentation of information. Because of this, they aggregate things that should be looked at separately for decision-making. Managerial accounting systems are more focused on internal costs such as a product’s or service’s cost. With some extra work, managerial accounting systems can be made to focus on things such as cost of environment, health and safety activities, or something else of interest.

Although ABC is fairly complex, you can learn the basic ideas fairly easily. Currently, ABC is the most accurate method of cost analysis. Of course, accurate methods do not lead to accurate analysis without a lot of extremely hard work. So, ABC does not usually give the results people expect. ABC is not the magic bullet that people had hoped because it is not people-proof.

Cost accounting determines the cost of producing goods and providing services. It is typically managed by people trained in managerial accounting. For manufactured goods, direct labor and direct materials are relatively simple to allocate to the cost of the product. However, allocating overhead is much more difficult. If it is not done properly, it may falsely determine profitability of individual products. Overhead should not be based on proportions, but rather on the actual usage of the overhead expenses. This is why it is called ABC.

The traditional accounting system was developed in the paper and pencil days when it was extraordinarily difficult to process transactions. As a result, the traditional system depended on ignoring actual costs and taking a very broad and misleading average, which was called “overhead” and charged to lower-level units. This is not necessarily a bad thing as long as you do not treat the
“overhead charge” as a real number. However, this was usually forgotten and overhead expenses are implicitly used as if they are real costs.

By the late 1980s it was clear that if business wanted to be more competitive, it needed to be more accurate with its accounting, and new methods would be needed. Across North America a large number of companies simultaneously started experimenting with what has come to be called Activity Based Costing. The main thing that happened was that the old idea that activities drive costs was coupled with modern computing power, which made the large number of transactions possible.

An example that shows the difference between traditional accounting and ABC is provided in the figure below:

<table>
<thead>
<tr>
<th>Resource Cost Drivers</th>
<th>ABC (Process Engineering Dept.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salaries</td>
<td>$600,000</td>
</tr>
<tr>
<td>Equipment</td>
<td>$150,000</td>
</tr>
<tr>
<td>Travel Expenses</td>
<td>$60,000</td>
</tr>
<tr>
<td>Supplies</td>
<td>$40,000</td>
</tr>
<tr>
<td>Use &amp; Occupancy</td>
<td>$30,000</td>
</tr>
<tr>
<td>TOTAL:</td>
<td>$880,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Resource Cost Drivers</th>
<th>ABC (Process Engineering Dept.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Create BOMs</td>
<td>$31,000</td>
</tr>
<tr>
<td>Maintain BOMs</td>
<td>$121,000</td>
</tr>
<tr>
<td>Create Routings</td>
<td>$32,000</td>
</tr>
<tr>
<td>Maintain Routings</td>
<td>$101,000</td>
</tr>
<tr>
<td>Process Special Orders</td>
<td>$83,000</td>
</tr>
<tr>
<td>Improve Processes</td>
<td>$45,000</td>
</tr>
<tr>
<td>Study Capabilities</td>
<td>$119,000</td>
</tr>
<tr>
<td>Design Tooling</td>
<td>$145,000</td>
</tr>
<tr>
<td>Train Employees</td>
<td>$45,000</td>
</tr>
<tr>
<td>Admin. Dept.</td>
<td>$158,000</td>
</tr>
<tr>
<td>TOTAL:</td>
<td>$880,000</td>
</tr>
</tbody>
</table>

The big lesson of ABC is ACTIVITIES, ACTIVITIES, ACTIVITIES! This is the most important concept for cost reduction and process improvement. Traditional accounting systems focus on departments and try to charge expenses properly to departments. Depending on what you want to know this is just fine, but most EHS issues cross departmental lines, and thus, are invisible in such a system. By changing the focus to activities, we can learn about activities that cross departmental lines. You will remember that the hierarchical process maps cross departmental lines and follow the product or service from its start to its conclusion.

Over the past 15 years ABC has taken over the world of accounting. Most accounting software that has been written in the past 8 to 10 years is based on ABC. This includes enterprise resources planning (ERP) software such as SAP and Peoplesoft. However, the software can also be used on non-ABC mode because not all users have made the conversion, and they may not be aware of this capacity on their software.

On the negative side, there are many more activities than there are departments, so this system can easily bog down if people are not careful. There is a business that makes four products in one factory with 140 employees that ended up with more than 9,000 activities in their accounting system before they just said “no!” So, one of the paradoxes of ABC is that it slows down innovation because ABC gives no signal as to when to stop seeking more accuracy. This lesson, although clearly not unique, is driven home very sharply only when we have a tool that encourages us to seek more and more accuracy, ultimately to no useful purpose.
What is important for us, however, is something else: Even though an improvement, ABC, as used today, is based on a concept of costing that makes it difficult to tease out the type of issue that we are concerned about here. The main reason is that ABC, as implemented, is still focused on “products.” Many EHS issues have difficulty surfacing because the amount of cost driven by hazardous material handing that can be assigned, for example, a can of tomatoes is so small to the tomato-products brand manager that the EHS issue never gets on the table. Fortunately, ABC has the inbuilt language we need to try and reveal these other messages.

One of the important things about ABC is that it uses a very abstract language, which we can use to our advantage. For example, ABC does not talk about products, but about cost objects. In fact, there was an explicit push to focus on cost objects other than products in the early days of ABC. What happened was that ABC was so difficult to manage that no one had the extra time or energy to really get a handle on how to understand the cost of other cost objects. Additionally, relational databases and/or object-oriented programming needed some significant development before these other cost objects could be analyzed easily. However, the knowledge and vocabulary are there to extend to our issues.

For EHS managers, the ability to define a relevant cost object the way we want and have the accounting staff give it a go would make a big difference. For example, if a cost object was defined as the cost of the hazardous material wastestream, and this was pursued with diligence, we would probably get surprising results. We could develop a work code for hazardous material issues that all employees used to code their time. Then all meetings, discussions, and internal and external consultations could be assigned to the wastestream as a cost. This system would give us the hard data we would like. Then, as a result of the information, we would probably change the handling of hazardous materials, which would then mean that the coding system might have to be changed. Of course, setting up the system and getting everyone to do the coding, and then changing the system will cost A LOT of money and A LOT of time, so we see one of the reasons ABC does not usually deliver as much as people want, it is very costly, and all the extra work on top of a busy day only draws resistance.

There is another way to approach ABC that can be effective for our analysis situations. Let’s break ABC down as follows:

<table>
<thead>
<tr>
<th>Method</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABA—Activity Based Analysis</td>
<td>Build your cost model and try to understand the activities.</td>
</tr>
<tr>
<td>ABC—Activity Based Costing</td>
<td>Put this knowledge in the accounting system.</td>
</tr>
<tr>
<td>ABM—Activity Based Management</td>
<td>Make decisions with the knowledge.</td>
</tr>
</tbody>
</table>

It may be best to focus on ABA and ABM, but not ABC. It is too difficult, currently, to use an existing system to analyze multiple cost objects at the same time. If you try to do this you will encounter resistance from the accounting staff because they are already as busy as you are. ABA can be used for one-time or short-term special studies based on locating the activities and estimating the costs associated with them, and provoking changes and then using this to make decisions (i.e., ABM). This is like “project management”—and everyone understands this.

Using the ABC language and some basic common sense, it is possible to get help from the accounting/finance staff in setting up the analysis. The early stages of ABC are like an introductory science class where you brainstorm a model and then try to disprove it by gathering data to support it. If you cannot find data for a portion of your model, then it is likely not to be part of the cost stream.
The first step is to build a hierarchical process map of the chain of activities you are interested in. Another way is to have activity accounting sheets attached to the existing hierarchical process maps along with the resource accounting sheets. The traditional ABC activity hierarchy is usually helpful in thinking about activities:

<table>
<thead>
<tr>
<th>Level</th>
<th>Activities performed on...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit-level</td>
<td>Activities performed on individual units</td>
</tr>
<tr>
<td>Batch-level</td>
<td>Activities performed on batches</td>
</tr>
<tr>
<td>Product line-level</td>
<td>Activities performed on product lines</td>
</tr>
<tr>
<td>Customer-level</td>
<td>Activities performed on or for customers</td>
</tr>
<tr>
<td>Facility-level</td>
<td>Activities performed on facilities, and everything else, i.e., “overhead”</td>
</tr>
</tbody>
</table>

The U.S. military is one of the most aggressive users of advanced cost management tools in the world. Government organizations are always under budget pressure. Since they do not really have a lot of revenue possibilities, cost reduction is a major focus. In fact, there is a Defense Acquisitions University which has, as one main focus, education about the cost management of the acquisitions process. Another example is TQM (Total Quality Management), originally created and named by the U.S. Navy for their acquisitions and internal processes.

First, we need to get data from the accounting system, if possible, and from independent reports circulated in sub-units of the company. For example, there could easily be monthly reports on shipments of waste used internally in a disposal department that are never used outside the department.

Computerized maintenance management systems (CMMS) can be used to set up project accounts and having the employees charge their time to these accounts. This helps gather information within a project structure without bothering the accounting staff.

Since we need information that is good enough and timely enough for decisions but usually cannot get the actual information, you could also use a modified Delphi method (see table) to gather the information:

**Tip:** A modified Delphi method is a group decision process to determine the likelihood that certain events will occur. It uses a panel of subject-matter experts on the required areas of expertise. The notion is that well-informed individuals, calling on their insights and experience, are better equipped to predict the future than theoretical approaches or extrapolation of trends. Their responses to a scenario and a series of questions are conducted in rounds where the summary of opinions of the people that responded before them is provided. It is believed that the group will converge toward the “best” response through this consensus process. The process does not require complete agreement by all the panelists since the majority opinion is represented by the median of responses.
The EHS Business Value Principles

### Overall Analysis Method (Modified Delphi)

<table>
<thead>
<tr>
<th>Activity</th>
<th>Tool/Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Determine purpose of investigation</td>
<td>Interviews and negotiation with company representatives to refine project</td>
</tr>
<tr>
<td>Data preparation</td>
<td>Existing internal reports gathered and re-worked to remove duplication</td>
</tr>
<tr>
<td>Data sharing—Circulate reports to experts</td>
<td>Modified Delphi group formed and provided with information</td>
</tr>
<tr>
<td>Expert determination of values</td>
<td>Modified Delphi process to reach consensus on facets of the economic effect of environmental performance</td>
</tr>
<tr>
<td>Analysis—ABC, or applied options model (see the Real Options discussion below)</td>
<td>Values determined by experts are entered into valuation spreadsheet</td>
</tr>
<tr>
<td></td>
<td>Qualitative results and valuation summary prepared</td>
</tr>
<tr>
<td>Distribution</td>
<td>Results distributed to Delphi group and/or companywide with other scheduled reporting</td>
</tr>
<tr>
<td>Evaluation</td>
<td>Consistent with a Quality philosophy, a post-activity audit should be conducted to evaluate the effectiveness of the process itself</td>
</tr>
</tbody>
</table>

### Evaluating the Intangibles

It is important for you to be aware of the general topic of Real Options. Although this is a complicated subject, you should be able to get a pretty good understanding of the basics.

Some complicated mathematics are involved in dealing with Options Theory. The originators won the Nobel Prize for doing this (i.e., the Black-Sholes model (see **Chapter 5, Appendix 4**) with financial options. It is useful to have a fairly good understanding of the theory and implications of Real Options. When the numerical analysis is required, you can hire someone, usually a finance professor, to prepare the formal analysis.

Real Options has some organizational politics features that can be helpful to using the technique. The methodology appears to be the cutting edge of high-quality decision-making. This feature will make it attractive for many managers. Just this opening gives leverage in introducing the less certain issues surrounding sustainability since these issues must be assessed in estimating value.
Real Options still does not correctly capture the effects of variability for most of these management decisions, but it comes much closer than prior methods, such as net present value (NPV). Also, in many cases, you can facilitate management decisions without the Real Options analysis. However, the Real Options “framework” is very helpful in pushing bottom-line-oriented managers out of the protection of the traditional decision-making framework. It is very important to realize that the traditional framework protects managers in several ways. For example, it makes the short run appear clearer and more solid than it is, and also, the managers are usually evaluated on only the expected outcomes of a project. Unintended outcomes (i.e., that are not large disasters) usually disappear.

Measuring organizational value has always been a problem because there was no good way to measure the effect of variance, or variability, around events. Present value methods were useful attempts to try to value projects; however, since they do not directly place a value on variability they almost always undervalue alternatives. Present value methods can be used to value uncertain investments by valuing all possible future circumstances and all possible responses to those circumstances and then picking the response with the largest value under the most circumstances; however, this task is normally too difficult and time consuming to be realistic.

Options Pricing Theory was developed to value variability. Options pricing is the most important idea in applied finance in the past 50 years. Originally, it focused on the financial markets and the valuation of “call or put options” on exchanges such as the Chicago Mercantile Exchange. Now, however, Options Pricing Theory has developed to the point that it can be applied to a range of business problems. Over the past 10 years, analysts have developed the ability to value non-financial, or real options (i.e., the phrase real options indicates that they are not financial options). As the method was developed, it became clear that NPV analysis always undervalues multiperiod projects, sometimes by several hundred percent. One of the most important applications of real options theory is valuing oil properties.

Additionally, real options thinking injects a more global, market-focused thinking process into organizations that use it. In fact, it is hard to know whether the valuation method or the change in thinking is more important. Some experts even advocate using the logic of Options Pricing Theory without the actual computational models.

We know today that variability has an important effect on economic value. Not knowing exactly how many errors or their type or size means that every organization must always provide “protection” for a worst-case scenario. The main business issue is that the cost of errors is driven as much by the variability as by the frequency. This is because in order to respond to errors, you must have what we refer to as “reserve capacity” (insurance, expertise, time, money, equipment, legal staff, etc.) that can be deployed to fix the errors. This reserve capacity must be paid for whether used or not.

In our personal lives, we try to have several month’s savings and also buy insurance to protect us against the cost of problems, such as fixing our cars after an accident. Since we do not know when an accident will happen, or how large it will be, it is worth it for us to buy insurance. If we knew when we would have an accident and how severe it would be, we might, in many cases, choose to forego buying insurance. For example, if we knew we would not have an accident this year, we would not buy insurance this year. It is the variability of accidents that gives insurance its value. So, insurance is a type of option. It is fairly crude since it averages accidents across many people, but it is an option. Using Option Pricing Theory we try to make a more-focused measurement of the value of protection (i.e., reserve capacity) that is more relevant for a single person or company.

An additional problem faced by companies that individuals do not usually face is that, through time, reserve capacity actually becomes invisible as people adopt work practices that cause them to devote excess time to low-value activities that appear to be part of their main job. They, in fact,
come to believe that the reserve capacity is necessary and, as a result, stop examining it for improvements. Evidence of this can be seen when, in emergency situations, the reserve capacity is called on with proportionately little impact on continuing operations. When the reserve capacity becomes this embedded it becomes extremely difficult to detect or extract the reserve capacity. If variability of errors can be reduced, and employees refocused on examining the reserve capacity, existing resources can be slowly redeployed to revenue growth areas, leading to higher value for the company.

Financial options pricing models require measurement of a number of variables that are best obtained from a functioning market. Real options, of course, do not have directly observable values for many items. The analysis proposed here uses expert assessment by employees to measure the options model. This approach focuses the knowledge of key experts on the effects of errors. So, the measurements are the consensus judgments of experts. This is an important departure from classic options theory and results in a model that captures the expert judgment developed at a company and allows it to become a source of competitive advantage through time.

In order to estimate the value of an asset in Real Options using the Black-Sholes model, you need the following information:

<table>
<thead>
<tr>
<th>Element</th>
<th>Common label</th>
<th>Relationship to value of the option</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current value of underlying asset (the company or division)</td>
<td>( P )</td>
<td>+, increase in value of company causes option to increase</td>
</tr>
<tr>
<td>Strike cost/purchase cost of project</td>
<td>( E_{x} )</td>
<td>-, increase in cost of project causes option to decrease</td>
</tr>
<tr>
<td>Volatility or variance of the value of the company or division</td>
<td>( \sigma^{2} )</td>
<td>+, increase in variability of the value of the company or division causes the option to increase</td>
</tr>
<tr>
<td>Dividends paid or cash flow foregone</td>
<td>( D )</td>
<td>-, increase in lost cash inflows causes option to decrease</td>
</tr>
<tr>
<td>Life of option in years</td>
<td>( T )</td>
<td>-, a decrease in the life of the option causes the option to decrease</td>
</tr>
</tbody>
</table>

These values are put into a series of equations and a market price is computed. Now it should come as no surprise that most of the above pieces of information are not actually available in an objective way. This is the main problem with the Real Options area (i.e., the need for hard data on future events and their cash flows).

The use of the modified Delphi method described on page 21 can help you get around this problem. This has the additional large benefit that it commits the management to clear public statements about things like probability of certain events, such as oil spills. This means that they become more careful and more dedicated to the analysis project.
It is important to note that this method is not a true Real Options analysis since there is very little objective data. This method uses Real Options methods to tap into the knowledge base and also to make clear some of the underlying assumptions. This approach uses Real Options analysis on the opinions and beliefs of the decision-makers. In other words, it is a simulation based on expert assessments. Its distinct aspect is that it uses the Real Options framework. It is not run as a simulation with management generating alternate values, but the numbers are run only after management has made its commitment.

An additional benefit is that managers find the analysis compelling because it comes from their opinions rather than dictated by a consultant-driven ABC study. They see it develop through the Delphi cycles. So, this method both captures and reveals beliefs in a way that the managers can be held accountable. As well, the method serves to:

- Develop a prototype for consensus decision-making
- Develop a market-centered focus for decision-making
- Document migration of knowledge through the company

As an additional benefit, this type of modified Delphi process both expresses and develops organizational knowledge in powerful ways. Real Options are very important to consider for use to value the many intangibles that one finds in the development of a more-effective EHS program.

9. Score the true performance of process improvement

Most EHS professionals confuse “results” and performance. The term “performance results” often appears in the EHS literature. Results are actually a measurement of the outcomes of performance. It is also possible to measure performance itself without measuring its outcomes (results). This is accomplished using a methodology known as the Baldrige model. This model actually scores performance (this will be referred to in this manual as the true performance) and results separate from each other. Within a 1,000-point system, the true performance comprises approximately 600 points, while the results comprise approximately 400 points.

So, what is the Baldrige model? It is based on the Malcolm Baldrige National Performance Excellence Award program initiated in the United States in 1987. Since that time, more than 70 countries and 44 of the 50 states have adopted this model as a platinum standard for measuring performance. Independent studies have shown that organizations that participate in the Baldrige program outperform financially those companies not participating by more than 300% when compared to the Standard and Poor’s 500 Index. For many organizations, using the criteria has resulted in better employee relations, higher productivity, greater customer satisfaction, increased market share, and improved profitability.

An organization does not need to participate in an award program to gain the financial benefit of this true performance and results measurement system. Many companies (e.g., Baxter Healthcare, Johnson & Johnson, Intel, Motorola, and Eaton Corporation) have adopted this model and use it to drive process improvement in their companies. EHS programs are finding that they need to adjust to this model since every facility is scored on how each program is contributing to the overall performance and results.

Other companies and/or their EHS programs use the model simply to keep track of how process improvements are improving true performance and results. The National Institute for Standards and Technology (NIST)—an organizational component of the U.S. Department of Commerce—
maintains a website for the Baldrige program. It has much information on how to use the Baldrige model for your program.

The state of New Mexico adopted the Baldrige model to measure environmental excellence. Their program is called the Green Zia Environmental Excellence Program. Many of the organizational participants in their program have chosen to seek EHS excellence and not restrict it to just environmental excellence. While this is an award program, it helps to reinforce the concept that true performance and results excellence can be applied to EHS programs.

For the true performance scoring to work, there must be a “program-in-place.” For the Baldrige programs, applicants have a quality management system in place. To use the Baldrige model for scoring the true performance and results of an EHS program, it would help to have both an environmental management system and an occupational health and safety management system in place. To use the Baldrige model for scoring a sustainability program, a sustainability management system should be in place.

These management systems are referred to as conformance systems. The organization is required to conform to ALL of the provisions listed in the program. A performance program is different from a conformance program. The organization does what it is best at doing and scores points for doing this well. This organization must do well even in the things it does not do well to gain excellence. The figure will point out the major differences between conformance and performance. An organization must perform well to continually move down the path to sustainable development.

See page 26 for a further explanation of performance versus conformance perspectives.
It is through true performance that behaviors are changed. This helps the conformance program work better. The two items are quite complementary. They work very well together.

The Baldrige performance excellence criteria provide a framework that any organization can use to improve overall performance. Seven categories are included:

**Leadership**—Examine how senior executives guide the organization and how the organization addresses its responsibilities to the public and practices good citizenship.

**Strategic planning**—Examine how the organization sets strategic directions and how it determines key action plans.

**Customer and market focus**—Examine how the organization determines requirements and expectations of customers and markets; builds relationships with customers; and acquires, satisfies, and retains customers. For EHS program evaluation, this includes all of the outside stakeholders of the organization.

**Measurement, analysis, and knowledge management**—Examine the management, effective use, analysis, and improvement of data and information to support key organization processes and the organization’s performance management system.

**Human resource focus**—Examine how the organization enables its workforce to develop its full potential and how the workforce is aligned with the organization’s objectives.

**Process management**—Examine aspects of how key production/delivery and support processes are designed, managed, and improved. There is an emphasis placed on the business value creation process.
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**Business results**—Examine the organization’s performance and improvement in its key business areas: customer satisfaction, financial and marketplace performance, human resources, supplier and partner performance, operational performance, and governance and social responsibility. The category also examines how the organization performs relative to competitors. This criterion focuses on results and is scored differently from the other six true performance criteria.

According to a report by the Conference Board, a business membership organization, “A majority of large U.S. firms have used the criteria of the Malcolm Baldrige National Quality Award for self-improvement, and the evidence suggests a long-term link between use of the Baldrige criteria and improved business performance.” The criteria include many factors that contribute to financial performance, including business decisions and strategies that lead to better market performance, gains in market share, and customer retention and satisfaction. Organizations are urged to use financial information, including profit trends, in analyzing and reporting on improved overall performance and to look for the connection between the two.

The perception by some that receiving the Baldrige Award is the primary goal of certain organizations is not supported by the facts. Earnest Deavenport, chairman and chief executive officer of Eastman Chemical Company, states, “Eastman, like other Baldrige Award winners, didn’t apply the concepts of total quality management to win an award. We did it to win customers. We did it to grow. We did it to prosper and to remain competitive in a world marketplace.” Thousands of organizations are using Baldrige Award performance excellence criteria to assess their organization and to improve. The program has helped to stimulate an amazing movement to improve U.S. organizations, including companies; academic institutions; and federal, state, and local government agencies. Small businesses have applied for and won the award. Size is not a reason not to want to improve the operations and remain competitive in the marketplace.

Tactics 6 and 7 in Chapter 3 will help your organization use this powerful means for developing business value.

10. **Seek continuous improvement with lessons learned**

Many quality management programs fail because organizations have not properly dealt with the fact that continuous improvement requires continuous learning. Without learning, companies repeat old practices and meaningful change cannot occur. Dr. Peter Senge coined the term “learning organization.” He defines a learning organization as follows:

A learning organization is an organization skilled at creating, acquiring and transferring knowledge, and at modifying its behavior to reflect the new knowledge.

A learning organization moves from what is called “adaptive learning” to something called “generative learning.” Adaptive learning concerns itself with reacting to the changing business environment and coping in a reactive manner with the current situations. Generative learning seeks to expand an organization’s capabilities and creates new opportunities. This learning requires the employees to find new ways of looking at what they do everyday. Generative learning focuses on the process and views it as a system rather than focusing on activities and results.

The hierarchical process maps create the mental model that everyone should be focused on. Getting the product or service to market with a competitive price and with the quality that the customer demands is the reason that the company exists and the basis for it to grow in the future. The focus on the process provides a common goal and shared vision for all employees. It is not about
improving EHS compliance! This shared vision must be important and visible enough in order to gain acceptance of everyone in the organization.

Many organizations have moved to the use of teams for implementing programs. They must then create a climate that enables the teams to achieve positive results. Team members must feel free to resolve the difficult issues that are essential to the team working together and to participate in a meaningful dialogue. The transfer of knowledge must occur between teams as well as within teams. In this way, the organization learns along with the individual employee and team learning that takes place.

By using something referred to as “systems thinking,” there is no one to blame for the problems that occur. The problem is in the process, and the purpose of the activity is to improve the process to eliminate the problem. It’s not just how we learn, but what we learn. The most important learning in our companies concerns gaining shared insights into complexity and how we can shape change. Learning cannot be switched on. The student in school learns that the name of the game is not learning—it’s performing. Mistakes are punished, correct answers are rewarded. If you do not have the correct answer, you are to remain silent or face the consequences.

Lessons learned allow the employee teams to experiment and discover new insights from making mistakes—outcomes that did not go according to the plan. The Systems Approach actually helps remove the blunt meaning of the word “error” from the term “trial and error.” This is accomplished by having the team use root cause analysis and systems thinking through the use of the hierarchical process map and accounting sheets. In this way, the team talks through all the alternative solutions and actually thinks about the consequences of using these alternative solutions in a system before any action is taken.

At the end of their project, the team members are asked, “If you were to do this all over again, would you do it the same way?” Of course, the answer to this question is always “no!” This is where the lessons learned come in. Every action plan created by the Systems Approach methods ends with a task for the employee team to take stock of their “lessons learned” at the end of the project.

It is up to the oversight committee to keep written records of these lessons learned since they represent the knowledge assets of the company. They need to be shared with all of the other employees as a way to improve both present and future projects.

EHS has to take advantage of lessons learned even outside team activities. No safety meeting should ever be held without asking for lessons learned by the participants. Even EHS compliance activities are the source of lessons learned. This is the best way to become a learning organization.