Environmental Management Systems

Key Issues on Design, Value & Implementation

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February 2011

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An Overall Perspective:

In recent years many companies have adopted an environmental management system (EMS) as a means of systematically and continuously improving their environmental performance. An EMS can be defined as a tool that provides a systematic approach for managing those components of an operation, function or business that are both critical to achieve a desired level of environmental performance and to ensure relevant regulatory compliance. An EMS permits a company to:

- Identify and control the environmental impact of its activities, products or services
- Continuously improve its environmental performance, and
- Implement a systematic approach to setting environmental objectives and targets, achieving these and demonstrating that they have been achieved.

An EMS is used by companies to develop and implement their environmental policy and manage their environmental risks (aspects) (ISO, 2011). It does not specify a level of environmental performance but establishes a framework of requirements that guide all of an organization's environmentally-related activities as well as those documented work processes and procedures essential to ensure conformance with these requirements. Many of those work processes, particularly those related to operations, will already be in place and documented prior to EMS development. The EMS further provides for a strategic approach to an organization's environmental policy, plans and actions.

Rather than including work processes and procedures in their formal EMS, some companies choose to focus their EMS on environmental requirements and reference the supportive work processes and procedures as separate documentation. This focuses the EMS on what needs to be done, provides individual work locations and functions the flexibility to develop work processes and procedures tailored to their own specific operations, and thus decide how they can best comply with the requirements of the EMS. These options are further discussed in the "EMS Design" section of this white paper.

Multiple Standards for Environmental Management

The development of new standards for environmental management is a worldwide phenomenon as national and international attention to environmental performance has grown. Governments are increasingly demanding that companies adopt a systematic approach to environmental issues. Examples include:

- U.S.: Standards for compliance assurance programs in the U.S. Department of Justice (DOJ) Prosecutorial and U.S. Sentencing Commission Guidelines; OHSAS 18001 Occupational Health & Safety Management System; Environmental Protection Agency (EPA) National Enforcement Investigation Center (NEIC) - 12 key elements of an Environmental Management System. ANSI:Z10-OHSMS
  US Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE) – 30 CFR Part 250 - Safety & Environmental Management Systems
- European Union: Community Eco-management and Audit Scheme (EMAS)
- Great Britain: BS 7750 Specification for Environmental Management Systems
- International: ISO 14001 Environmental Management System

Industry associations also recognize this trend with their own standards:

- American Petroleum Institute (API) Model EHS Management System and Recommended Practice 75
- American Chemistry Council (ACC) Responsible Care® (RC 14001 or RCMS)
- E&P Forum, Guidelines for the Development and Application of HSE Management Systems

Finally, there is increasing public pressure for improved environmental performance and better information. Companies must find ways to align with the standards that are relevant to their operations in ways that drive performance improvement in their operations.

The requirements of a typical EMS are generally clustered under several different headings, often referred to as elements, to facilitate understanding and implementation.

As will be seen later, an EMS requires significant resources to develop and implement, and invariably encompasses a strong emphasis on a plan-do-check-act philosophy. This philosophy first gained substantive recognition as the result of the work of W. Edwards Deming, the American statistician credited with introducing the concept of quality manufacturing to the Japanese automotive industry after the Second World War (Deming 1989). His approach was subsequently adopted extensively in U.S. manufacturing, and plan-do-check-act became a critical component of management systems regardless of the discipline they are designed to address (e.g. quality or environmental).

An EMS must not only reflect a company's environmental management philosophy but must also address how the company will respond to environmental regulatory requirements potentially from multiple agencies and levels of government.

In order to address the environmental impacts of a company, regulators and policymakers have historically required industries to implement pollution control technologies or have established emission limits (Coglianese and Nash, 2006). Traditionally, how a company achieved improved environmental performance was not the policymaker's focus (Salzman and Thompson, 2003). However, Tinsley and Pillai (2006) pointed out that increased environmental legislation stimulated companies to look for more systematic ways to minimize their exposure to environmental risk. Management-based approaches, such as an EMS, are appealing since they provide companies with the flexibility to develop their own solutions to manage the environmental risks of their operation. This is advantageous because of the complex nature of environmental issues (Coglianese and Nash, 2006) and the reality that these issues differ both between industries and from company to company. Coglianese and Nash (2001) state that EMSs establish internal rules, create organizational structures, and direct resources that managers use to routinize behavior in order to help meet their organization's environmental goals.

ISO 14001

EMSs existed both formally and informally to varying degrees before a generic international environmental management system standard (ISO14001) was published by the International Standards Association (ISO) in 1996 and subsequently revised in 2004. Work on the ISO 14000 series of standards began in 1991 when the Association established a strategic advisory group on the environment. Other EMS standards that preceded ISO 14001 included the British Standard Institution's BS 7750 (1994), the European Union's Eco-Management Audit Scheme (EMAS) (1993), and Spain's UNE 77-801(1994).

ISO14001 is designed to promote environmental protection, while spurring international trade and commerce, by establishing a common approach to environmental management systems worldwide. According to ISO, the 14001 standard helps organizations manage the impact of their activities on the environment and to demonstrate sound environmental management practices (ISO, 2006). Organizations that implement ISO 14001 can obtain certification from an accredited and independent third-party to demonstrate their conformance with the standard.

ISO14001 is not in itself a management system, but rather a standard that defines specific requirements that an environmental management system should contain.

Requirements that address a particular theme or topic are grouped into individual elements. The ISO14001 standard contains 17 elements, listed below, each with its own specific requirements.

ISO14001 Elements

Environmental Policy	Document Control
Environmental Aspects	Operational Control
Legal & Other Requirements	Emergency Preparedness & Response
Objectives & Targets	Monitoring & Measurement
Environmental Management Programs	Non-Conformance, Corrective & Preventative Action
Structure & Responsibility	Records
Training, Awareness & Competence	Environmental Management System Audit
Communication	Management Review
Environmental Management System Documentation	

Subsequent to the publication of ISO14001 it was widely believed that certification under this standard would become a condition for doing business on a global scale including in North America. In reality it appears that, although a number of North American companies have adopted ISO14001, there are many more that have found it more productive to operate with an EMS customized to their specific company culture and needs.

Understanding the Value of an EMS

The unfortunate reaction in many companies to the very mention of an EMS is that it is nothing more than bureaucracy, tons of paper, a replacement for common sense, a barrier to creativity and change, and a start-from-scratch initiative. In reality, nothing could be further from the truth. Companies that have an effective EMS realize a host of benefits including improved environmental performance, better environmental compliance, a reduced cost of compliance, improved operating performance, increased accountability and improved profitability. For example, a leading energy company that implemented a safety and environmental management system reduced safety and environmental documentation by 34% and cut annual training costs by 20% in its first three years of operation

Specifically, an EMS provides:

Greater Efficiency

An EMS that defines a consistent set of requirements across a company eliminates redundant activities. As will be discussed below, companies invariably seek efficiencies of scale when they engage in a merger or acquisition. An EMS provides the opportunity to do that within the scope of ongoing operations.

As an example, a robust EMS provides companies with methodology that functions both vertically up and down management levels as well as horizontally across departments and business units. When employees change jobs with differing environmental responsibilities or demands within a company, they can function efficiently in their new position almost immediately because they already know the EMS.

An important issue which company management often fails to recognize is how dependent they are upon the specific knowledge of particular employees. For example, if a company relies exclusively on the knowledge of a highly experienced employee for environmental compliance reporting, they run a significant risk of losing that knowledge if the individual retires, leaves the company, becomes incapacitated or worse dies. An

EMS institutionalizes individual employee knowledge and makes it available to anyone who steps into the job. The system captures knowledge (not just data), so that employees can be moved to new positions without negatively impacting work processes.

As an example, U.S. federal and state environmental regulations are sufficiently complex that it is virtually impossible for one person, or even several, to handle regulatory compliance unassisted. The only way to ensure complete and uniform handling of all compliance requirements is with a work process-based EMS. The system must be useable and sharable by everyone who has a part to play in the work activity or a stake in the outcome.

Improved Communication

An EMS rooted in "how work is done" helps make sure that the right people, at the right time, get the right information to do the right thing the first time around. It also establishes a common language for getting things done. As work processes are standardized, so are the terms that describe them. The result is that all employees, whether in corporate offices or the field, can communicate to each other without the confusion of multiple interpretations or definitions. This is particularly important as companies rotate operational and business employees through environmental positions. A systematic approach makes such rotation easier and enables everyone to benefit from cross-fertilization.

A corollary of this is that an EMS opens additional career paths within a company. Historically, quality environmental professionals may have a limited opportunity for movement outside of the function because management did not believe it could afford to lose their expertise and transfer them. Dead-end environmental career paths can have a profound negative impact. A dead-end environmental job may not draw the brightest people. If a company has outstanding environmental employees that cannot be transferred to another function for career growth because of a fear of losing their experience and expertise, then they may choose to resign for opportunities elsewhere.

With an EMS, knowledge resides within the system. As a result, companies can rotate employees more freely to take advantage of their capabilities and further develop their skills. An environmental assignment then becomes a more sought-after experience for promising young leaders, and both they and the company benefit.

Gains during Mergers and Acquisitions

One of the primary reasons that companies engage in acquisitions and mergers is the potential savings that are to be gained by such consolidation. No longer are two staff departments needed to support the merged or acquired enterprise. Activities, such as environmental support, can be integrated into a single staff group with a potentially significant headcount reduction and financial saving. However, it is generally agreed that well over 50% of mergers and acquisitions fail to deliver the planned or promised synergies and results.

The obvious, but under-appreciated, reason for such failure is a lack of understanding about the difficulties of merging cultures, procedures, and corporate standards. One of the best ways to avoid this is to start by standardizing at home first and focusing on environmental activities. If procedures and standards are successfully standardized within an EMS, the approach can be exported to virtually every other area of the company.

An EMS helps facilitate successful mergers and acquisitions because it provides a vehicle to which the acquired or merged company can align. Very little discussion may be required. The acquired company need only adapt to the standard of the acquiring company, and the EMS makes it clear what needs to be done. In the experience of the authors some 80% of the activities of an acquired company can be mapped back to whatever EMS the buyer has in place, leaving only 20% to be built in.

Reduced Incidents Save Money, Reduce Harm to People and the Environment, and Enhance Company Image

Companies that successfully implement an EMS invariably experience a significant reduction in environmental incidents. The EMS focuses the organization's attention on how work is done, rather than simply monitoring performance indicators that track incidents after they have occurred. Such companies build risk mitigation into their operations instead of reacting to risks after they materialize. By operating in a preventative rather than a reactive mode, the incidence of environmental failure diminishes. The American Chemistry Council (ACC) has recognized this and mandated an environmental and safety management system for their member companies, and the U.S. Environmental Protection Agency (EPA) routinely negotiates environmental management system requirements into consent decrees. Most recently, the U.S. Department of the Interior is requiring that companies engaging in exploration, drilling and production activities in the Gulf of Mexico implement a safety and environmental management system based on the American Petroleum Institute's (API's) Recommended Practice 75.

Reduced environmental spills, releases or other incidents have obvious social benefits, such as better employee and community relations, and a more positive company image. They also are becoming more and more of a factor with the financial rating agencies which factor a company's environmental and safety performance in assessing their future financial health and stability.

In addition to significantly improved environmental protection, a major benefit of reduced incidents is improved profitability. In fact, the reality that EMS implementation affords both economic and environmental benefits is a key strategic factor in driving management commitment to make an EMS an operational reality. Things will be done faster, better, and cheaper, not only because mishaps will be avoided, but also because of the efficiency gains that result from running a company in a more systematic manner.

The easiest way to put environmental costs in perspective is to take the same approach as is used when assessing the cost of quality. There is a cost for prevention, a cost for appraisal (system checking), and a cost for failure. The goal is to invest enough in prevention and appraisal to significantly drive down failure costs.

Money for prevention should primarily be spent on establishing an EMS that impacts employees when, where, and how they do their jobs, and provides meaningful incentives to do things better. A significant portion of the funds spent on prevention should be dedicated to in-process activities, so that the EMS is operationalized in such a way that its requirements are integrated into standard operating procedures (SOPs) at the worker level. Are the components that should be driving environmental improvement embedded into day-to-day work activities? Or is everything really important still sitting on the desk of the company environmental manager? The biggest boost to profitability comes from spending prevention dollars to improve the way the work gets done.

The financial impact of failure when environmental incidents do occur can be staggering and rapidly eclipse the investment a company makes in incident prevention through EMS implementation. Such costs include remediation, repair or replacement of faulty or outmoded equipment, compensation for litigation by impacted third parties, workers compensation, and medical costs for injured employees etc. Recent events in the Gulf of Mexico should leave no one in doubt as to the potential financial impact of a significant environmental failure.

EMS Design

The authors have observed three common design strategies for building an EMS:

1) Alignment with an existing standard,
2) Alignment with a company's structure, or
3) Alignment with a company's existing business processes

Each has distinct advantages and disadvantages.

It may make sense to align with an existing standard if a company has very few standards to meet. For example, a tier-1 supplier to Ford Motor Company, which requires ISO14001 certification, may want to design their EMS on that model. The resulting system will be easy for an outsider to see and understand, and it will also be easy to audit. The disadvantages of this approach is that it can create duplicate documentation (a risk that increases proportionally with the number of other standards to be met), and it requires the company to think according to the standard rather than how the company actually works or how environmental work is done.

Aligning an EMS with a company's structure offers the advantage of a simplified top-down implementation that can easily be mapped and associated with existing functions. The disadvantage of this approach is that, while such a system may be streamlined and responsive at one facility, it may end up fragmented across the organization if there are multiple facilities that do different work or do the same work differently.

Finally, companies that align their EMS to their organization's existing business processes face greater challenges during deployment, but greater success over the long haul. At the corporate level, the system is implemented vertically based on management and the reporting requirements of the various standards the company must meet. At the facility level, however, the system is implemented horizontally according to existing work processes, so that the system flows in parallel with the work. This approach provides the closest alignment to "how the work is done" (an important element in a successful system), but it requires that the organization shift its focus from how the work is organized to how it is actually carried out. The process of implementing such a system can also uncover a number of work process problems that need to be addressed.

The first task in implementing an EMS system is to decide what standards the system must be designed to comply with. How important is each standard? In what ways do the standards track together and how do they differ? If there is a mix of process and performance standards and, if so, which ones are critical to meeting the company's performance expectations? One goal of the system should be to simplify operations by eliminating the need for employees to deal with the detail of the standards and enable them to focus efforts on improving how the work is done.

The next task is to determine which design strategy the organization will follow. Will it be one of the three outlined above, a combination of the three, or some other design

strategy? A common mistake which companies all too often make is to simply copy or replicate systems in place elsewhere only to realize afterwards that, while the design may be great, it doesn't deliver the desired end result. Another company or organization may have very different goals and a very different environmental culture. So an EMS designed to succeed there will, not surprisingly, fail to deliver. The system must be responsive to the future strategic direction and goals of the company and be designed to facilitate achieving these.

Once a design strategy has been adopted, experience has proven that a company must go through the time and effort of actively engaging in the EMS design process and that key stakeholders be active participants. A proven way to do this is to establish one or more cross-functional design teams. It is critical to include some of the people who will be implementing what the team designs. Line managers and supervisors know from experience what is implementable and what is not. In the early days of ISO 14001, design teams tended to be limited to higher-level environmental staff professionals, and the end results were less than stellar.

Regardless of the design strategy utilized, a recurring question is how much EMS documentation detail is required. A good rule of thumb is to ask whether or not an outsider, knowledgeable about the operations involved but not of those specific to the company, could clearly understand the environmental requirements associated with your operations. A positive response is a good indication of an effective management approach.

Finally, company management needs to be committed to the reality that it will likely take at least five years of effort before the EMS becomes an operational reality and truly defines how work is done. The less the system design aligns with the company's overall business model and culture, the less likely it is to be successful. If the system is designed to stimulate a change in work culture and improve how work is done, experience has proven that it will take this period of time before real and lasting benefits are realized. Those who suggest that EMSs don't work are, all too often, those who lack the persistence and commitment that such systems require.

Two questions that the authors are routinely asked relates to the issue of how many elements a successful EMS should contain and whether or not the supportive work processes and procedures should be formally included in EMS documentation. The authors have worked with numerous companies on EMS design and implementation over the years and the simple answer to both questions is that there is no single right or wrong approach.

Both depend significantly on the culture, management style and risk profile of the company involved. Companies with as many as twenty EMS elements have been equally as successful as those with only six or eight. And, provided it is recognized up-front that documented work processes and procedures are vital and essential in ensuring that EMS requirements are met, their inclusion as a formal part of the EMS is again a matter of company preference. As an example, some companies elect to share their EMS and its impact on environmental performance with interested third-party stakeholders. In this case, it is impractical to include the multiplicity of supportive work processes and procedures in such communication since they are generally extensive and often proprietary.

Some companies also elect to establish an additional level of documentation between the elements of their EMS and the supportive work processes. This level of documentation, often referred to as guidance documents, is intended to provide those

responsible for EMS implementation assistance in determining what work processes and procedures are needed to ensure EMS compliance.

An EMS that formally includes both requirements for compliance and the specific work processes and procedures necessary to ensure compliance tends to be more prescriptive in nature (it focuses on both the "what" needs to be done and the "how") and may work best in a company with essentially identical or similar operations at its various work locations. An EMS that focuses primarily on environmental requirements and permits management at its various work locations to design the necessary work processes and procedures to ensure compliance is best be suited to a company with a multiplicity of different operations.

Critical Factors in Successful EMS Implementation

Experience has taught the authors that there are several factors critical to the successful design and implementation of an EMS. If any one of these is lacking, the chances of success diminish significantly:

Executive Commitment

Those companies that have demonstrated the most successful and sustained implementation of an EMS are invariably those where the chief executive officer, or a direct report with operational responsibility, is strongly, if not passionately, committed to the management system approach and acts as a visible and active champion.

In the final analysis all levels of the organization must be committed to the EMS and involved in its implementation. However, people generally do what they believe their management wants. If they see top management indicating no or minimal interest in an EMS even though EHS staff are actively promoting its adoption and benefits, the chances are high that the initiative will fail. The EMS needs to be presented and seen as a company-management driven initiative, not one being driven by EHS staff.

As mentioned earlier, a significant aspect of executive commitment must also be the recognition that an EMS is not an instant fix but will take several years to fully implement. Executive management needs to recognize that reality from the outset and be prepared to display persistence and visible commitment over an extended period of time.

Resources

Adequate resources—time, personnel, and training—must be committed for an extended period of time, typically five years. The EMS will never work if it is viewed as the project-of-the-month or even as the project-of-the-year. Management must recognize that multiple employee exposures over an extended period of time are essential to bring people onboard and change the culture of the organization. This change will occur by focusing on work processes (how work is done) and not on individuals.

Multi-Functional Involvement

A mistake commonly made by companies during the design and even implementation phase of an EMS is to assign responsibility for both to their environmental staff. The reality is that those responsible for the ultimate success of an EMS are not support staff, but rather employees in the operations function where the real opportunity to prevent environmental incidents resides. Environmental staffs provide a critical support role in

both EMS design and implementation, but ultimately the responsibility for implementation must rest with those who manage those facilities where the opportunity for an environmental incident resides.

Since operations personnel have such a critical role to play in the effective implementation of an EMS, they must also be intimately involved in its design. They know up-front what is practical or impractical and can almost always offer constructive suggestions on how an EMS can be optimized. As suggested earlier in this paper, one or more cross-functional teams have generally proven to be the most practical approach to both EMS design and implementation.

Willingness to Change

Company management and employees must be prepared to embrace changing the way that work is done at all levels of the organization in order for an EMS to be successful. It represents a significant culture change and, in practical terms, means:

- Integrating environmental considerations and operational controls into daily work tasks
- Repeatedly communicating with employees until they understand how to plan, self-check, and continuously improve their work tasks
- Including environmental objectives, initiatives and activities into individual performance measurement and making this a factor in employee performance evaluations and compensation

Establishing Goals and Monitoring Progress

Many companies, prior to the implementation of an EMS, have used lagging indicators to track environmental performance – in other words measures that track spills, releases or regulatory non-compliances after they have occurred. The adoption of an EMS must bring about a different mind-set when it comes to establishing performance measures and setting goals.

Systems measures should be utilized to track progress rather than the outcome measures mentioned above. Examples might include measures related to EMS training such as the percent of employees trained or an assessment of the effectiveness of the training being provided. Others might address how well the EMS is being operationalized. And yet others might focus on actions that are being taken to prevent environmental incidents such as audits and inspections.

Employee Communication

The company that waits to communicate to employees about its EMS until implementation begins is way too late. People need to understand from the start what an EMS is, why it is important to the company, and why it is important to them personally. Employee communication should start early and occur frequently through company newsletters, management briefings, lunch-and-learn sessions, contests, and award and recognition events, etc.

Another important component of EMS communication is to constantly remind employees that implementation is all the steps of the plan-do-check-act cycle, not just plan and do. A company should be willing to expend the same resources on gap assessments and continual improvement as are invested in planning and development. Doing less is false economy.

Employee communication should also focus on promoting a process rather than project mentality. It should help people understand that the new system will never be “finished” because there will always be better ways to do things, or better things to do. Communication resources should be invested to keep this idea alive.

Keep it Simple

A frequent up-front concern when a company is considering the development and implementation of an EMS is that it creates a mountain of paperwork that will serve only to frustrate and demotivate employees. The culture of some companies is such that extensive and complex documentation is a way of life. Others actively pursue a philosophy of less onerous documentation.

Again there is no right or wrong here. While proper documentation is a critical and essential component of any EMS, the authors’ advice to those charged with designing an EMS is to focus on keeping the documentation as simple as possible provided that it ensures the desired end result.

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John has over 28 years of diversified experience in industrial operations and management. His areas of expertise include EHS performance improvement, training and competency improvement, organizational effectiveness and change management, occupational health and staffing and human resource management. John has gained valuable experience by holding leadership positions in a variety of manufacturing operations, including petrochemical processing, petroleum refining, natural gas gathering and distribution, inorganic chemicals, ductile iron and brass foundries, shipbuilding, automotive and heavy metal fabrication, coatings and assembly operations.

John earned a DrPH (Occupational Health) from the University of Texas, an MBA from the Keller Graduate School of Management, an MSPH in Public Health (Occupational Health) from Tulane University and a BS in Public Affairs (Environmental Health Management) from Indiana University. He is a Certified Safety Professional and a member of the American Society of Safety Engineers.

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Mike has extensive executive management experience during acquisitions, mergers, demergers, partnerships and in the management of change. He also has a broad background in the international arena where, for five years, he headed the EHS and R&D functions for the Canadian operations of Dow Chemical. He also served in management positions in Dow Latin America including two years resident in Bogota, Colombia.

In his twelve years as a consultant, Mike has facilitated the successful restructuring of a Fortune 200 company including the development of an EHS management system. He has worked with numerous oil and chemical companies in the development, implementation and assessment of effective safety and environmental management systems. Using E.Vironment's proven Pathfinder Matrix® process, he has also worked with the executive staffs of several of the same companies in helping them reach consensus on a safety and environmental philosophy, direction and long-term strategy for their organization. Mike holds a BS degree in Chemistry from the University of Sheffield (England) and a PhD in Organic Chemistry from the University of Alberta (Canada).