Evolution of an EHS Management System:
A Leading Indicator for Success

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Abstract

The work presented in this paper is a continuation of the efforts related to the development and subsequent redeployment of the Textron Environment, Health and Safety Management System (EHSMS), and how that system is used to achieve desired and measurable continual EHS performance improvement. At *Safety 2008*, Textron presented session #559, Trials and Tribulations of an EHS Management System. This work is the natural continuation of that session, and is intended to detail the strategy that was developed during 2008 and early 2009 to redesign and redeploy an enhanced EHS Management System across the enterprise.

The paper will highlight the history of the Textron EHS Management System to provide the reader an important background in developing and implementing a customized management system. Next, the paper details the successes and the failures of the previous system, setting the stage for the complete system overhaul conducted during 2008. The work then shifts to discuss detailed information on how the revised system was designed, how it is measured and assessed, and most important, how it drives a consistent correlation between implementation and desired results achieved.

An EHS management system is a known and accepted method for driving EHS performance improvement. However, correlation between system implementation and results achieved is often either misunderstood or taken for granted without real proof. As part of the Textron EHSMS Strategy project, a conscious effort was made to develop a system that would allow for that correlation not only to be evident, but intuitive. This work will be of great interest to those individuals and businesses that are not only trying to develop an internal EHS management system, but also to those that seek to have a better understanding of how management systems correlate to improved EHS performance.

Introduction

At Textron, our vision is to be the premier multi-industry company. In order to accomplish that vision and consider ourselves premier, our safety performance must match the levels of excellence of all other business areas: cost, quality, customer service, schedule, productivity, and many others.

Exhibit 1: Textron maintains a combined Environment and Health and Safety vision statement for the enterprise.

More specifically, our safety vision is to achieve zero injuries. And in 2007, Textron launched an initiative to understand, control, and eventually reduce our global carbon footprint through energy management and increased operational efficiencies. In order to succeed in these visions, we must be able to measure our performance and project milestones to drive continual improvement. Measuring performance, however, is much more than just knowing our injury and illness rates or our greenhouse gas emissions. To establish our pathway to premier performance, we developed the Textron Environment, Health and Safety Management System (EHSMS). Today, much of the low-hanging fruit is now gone, and we were forced to consider new ways to find and achieve continuing performance improvement on our way to premier.

In 2008, EHSMS underwent a major transition as the result of lessons learned from the original system, as well as peer and external benchmarked systems. The result was a new EHS Management System unlike any other more traditional, well-known and accepted system like ISO 14001, OHSAS 18001, or ANSI Z10. The ultimate goal was to achieve better correlation between implementation of tools, techniques, and systems and actual improving performance. There was a need to accomplish that feat while still creating a system that was easier for employees to visualize and understand, easy and consistent for EHS professionals to assess, involved other non-EHS functional areas, and ultimately help Textron continue to drive improving EHS performance for many more years.

What is an EHS Management System?

An EHS Management System is a set of interrelated processes, integrated into the management of our businesses, designed to protect employees and the communities in which it operates. These processes enable the organization to maintain compliance with applicable regulations, to reduce injuries and illnesses, to mitigate risk, to protect the environment, and to promote EHS performance improvement.

Simply put, it is the way environmental, health and safety systems are managed and integrated within each business and across the enterprise. And it will lead Textron to premier EHS performance.

Management systems are a continual cycle of planning, implementing, reviewing and improving the processes and actions that businesses undertake to meet its goals. This is known as the Plan-Do-Check-Act Model (PDCA) and is comprised of the following stages:

- Plan - including identifying hazards and risks and establishing objectives and targets
- Do - including training and operational controls
- Check - including monitoring and corrective action
- Act - including progress reviews and acting to make needed changes to the business specific tools, techniques, and systems

By continually reviewing and improving tools, techniques, and systems, the results that the organization desires to achieve can be obtained. If achieving those results becomes unlikely, the PDCA Model forces reconsideration of the tools, techniques, and systems as they relate to the business. The ultimate goal for EHS is clear: integration across the enterprise and into the business culture, creating a complete, systemic vision. This vision leads to the consistent achievement of results and premier EHS performance. The question that quickly surfaces is "Why is an internal EHS Management System more valuable than a certificate system (like ISO 14001)?" Both rely heavily on the PDCA model, for example.

Real Value

The problem with traditional certification management systems is simply that they fail to create real value (real and measurable EHS performance improvement). To a large extent, they help organizations to define and implement specific programs to meet the system requirements. But the difficulty has always come when trying to determine exactly how those programs create value for the organization, like reducing injuries and illnesses. This concept was one that Textron struggled with for many years, but it was one that became increasingly more important to our facilities and businesses, especially now during these most challenging economic times.

The Journey Begins

The journey started in 1997, when a core team of safety professionals was tasked by the Textron EHS Council to make recommendations for a management system that would lead us to continuing EHS performance improvement. The groups began a barnstorming benchmark tour which included visits and information sharing with peers like Allied Signal, DuPont, GKN, Alcoa, UTC and TRW; all leading performers in the field of safety and health at the time. On gathering literally reams of data and information, the team assembled in a hotel conference room, and over a period of one week, developed the basics of the system that served us successfully over the past 10 years.

This system was then introduced to a select group of Textron operating executives for comments and suggestions. With their recommendations and buy in, the system was presented to the EHS Council and approved for a company-wide rollout in 1999. Based on a series of initial self-assessments by every facility, a set of soft goals was identified and efforts to drive system improvement implemented. For six years, facilities used the combined scoring tool and requirements list to self-assess, implementing programs to meet specific system obligations. This approach was largely responsible for the initial, and substantial, drop in injury and illness rates from 1998 to 2003, when the EHS Council charged an additional need for sustained performance improvement.

The EHS Council began discussions as to how to accelerate improvements. These discussions led to an enterprise-wide objective to obtain definitive improvements over a period of 3 to 4 years. Discussions with Textron senior management during 2005 resulted in these improvement goals becoming a CEO level objective, which was cascaded to all business unit and segment presidents. Specific, measurable improvement targets were set for each year and an external third-party assessment process was implemented to determine how closely the business units were aligned with the system elements and progressing toward goal attainment. Using Textron's goal deployment process, activity to achieve desired results was further cascaded down from senior management to individuals within manufacturing facilities. These efforts continued to produce desired results, and as the system matured, the EHS Council continued to look for ways to improve and fine tune the process.
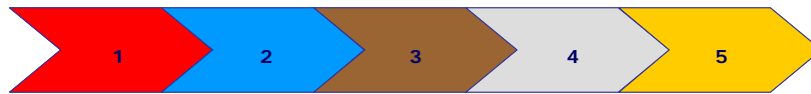

Exhibit 2: The Textron EHSMS Scoring criteria, used between 2005 and 2008, was a linear progression of points. As facility implementation matured, the score for each element would increase from 1 (Ad-Hoc) to 5 (Gold).

The work completed in 2004 and 2005 represented the first effort to create an EHS Management System that could be measured using a numerical scoring system. The concepts and elements of the one launched in 1998 were largely unchanged, while a method to score each requirement was added. Facilities could then benchmark performance with other facilities of similar scope, and businesses could compare performance at various levels of the organization. By setting specific numerical goals for each business, Textron was able to claim its EHS Management System as a leading indicator, reporting EHSMS scores in internal periodic reports, setting goals, and driving continual improvement.

The Textron EHS Management System was based primarily on two internationally recognized systems, ISO 14001, representing environmental management systems and OHSAS 18001, representing health and safety management systems.[1,2] It had 14 very familiar elements, although the requirements under each varied from general, high level requirements to very specific required EHS programs and practices. The elements were:

1. EHS Policy and Management Commitment
2. Leadership and Employee Involvement
3. EHS Hazard Identification and Recognition
4. Awareness of Legal and Other Requirements
5. Objectives and Targets
6. EHS Management Program
7. Organization and Responsibility
8. Training and Education
9. Communication
10. EHS Management System Documentation
11. Operational Control
12. Emergency Preparedness and Incident Response
13. Monitoring, Measurement, and Assessment
14. Review, Improvement, and Recognition

Facilities were thus challenged to develop and implement tools, techniques, and systems in support of the requirements.

In large part, the efforts put forth under this management system may have contributed to the performance improvement across the enterprise. Over the 10 years this system was deployed, injury and illness rates declined dramatically; 82 percent for recordable cases and 76 percent for lost day cases. During the same period, EHSMS scores have risen from an overall average of 2.0 to a score of 4.6. While not a direct statistical correlation, this improvement gives credence to the theory - work the system and the system will work for you. And for Textron overall, we did. Unfortunately, however, at that high level enterprise correlation is the best the old system could afford. In other words, facilities were unable to determine to what extent the improvement realized was due directly to the efforts of the management system. This difficulty became increasingly critical as facilities closed in on Gold level performance by the end of 2008. Over 30 facilities, while reporting increasing management system score, were experiencing either flat or increasing injury and illness rates; a concept that was contradictory to what the EHS Council intended and unexpected from a leading indicator.

The EHS Council began to recognize that the measurable results of our existing EHSMS were not correlating well on a facility by facility basis with specific EHS performance improvement, including injury and illness rates reduction, reduction of significant injuries, and the reporting and correcting of near miss events. In 2008, the most significant EHSMS revision since its deployment 10 years prior was undertaken. The intent was to establish an entirely new system, based on known and accepted business management systems, rather than solely on EHS management systems, to drive correlation between implementation and desired EHS performance improvement.

Change in the Air

A team of EHS professionals from each Textron business unit was assembled to take on the effort of redesigning the Textron EHS Management System. The effort began by answering a seemingly innocent question; "Do we need to make a change?" Understanding the scope of that question took almost six months. The team started by obtaining voice of customer from EHS professionals, facility leaders, operations managers, engineers, and human resource professionals from around the company. Questions focused on both liked and disliked aspects of the existing system, and the types of changes that would be the most helpful and beneficial to facilities and individuals alike. Collecting hundreds of responses, the team quickly discovered much consistency in the feedback.

Roles and Responsibilities
Many of the respondents, especially operations and facility managers, were unaware of exactly their role in the EHS Management System. Without question, they all understood they needed to support EHS, but how they fit into the existing system was not intuitive and difficult for them to grasp. Further, other employees from different levels within the organization (supervisors, foreman, shop level employees, and support function employees) all had differing views of an EHS management system, its purpose, and their role. The design of the new system needed to include a visual representation of roles and responsibilities, be easy to explain, and easy to interpret by multiple levels of the organization.

Not Just EHS Anymore

Surprisingly, perhaps, most of the feedback received indicated the existing EHSMS was too EHS-centric. It did not address areas like product safety and product lifecycle, health and wellness programs, supply chain and purchasing programs, customer voice, or community involvement. These programs are typically not managed by the EHS function, but they have a place in an EHS Management System, especially one that seeks to correlate performance improvement with program implementation. The improved Textron EHSMS needed to incorporate these areas, but do so in a way that did not attempt to move ownership of them into the EHS function.

Appropriate for a Diverse, Complex Organization

If you operate a small service or light assembly operation, there is nothing more bothersome than having complex corporate initiatives, designed for larger and higher risk manufacturing centers, imposed on you. Unfortunately, that is exactly what the feedback told the team about the existing System. Originally designed to account for the largest, most complex manufacturing center, it was not flexible enough to account for the smaller, lower risk facilities that, appropriately, lacked the EHS resource to implement and maintain a full-scale management system. It contained many specific requirements that did not make sense for a small-scale assembly operation, for example, to manage. The revisions had to account for Textron's complex, global organization as well as its diverse set of facility operations and services.

Alignment with Existing Internal Processes

In 2006, Textron launched an effort to challenge for the Shingo Prize for Operational Excellence, a business management system with a heavy focus on lean manufacturing.[3] Textron Six Sigma was charged with developing an assessment tool to help businesses prepare for the challenge, which was widely accepted and now is familiar to most operations and facility managers. Much of the feedback suggested modeling the upgraded EHSMS on an existing business process, helping facilities to recognize the tools and techniques and to support the effort to challenge for the Shingo Prize. As a result, the team spent additional resources to become familiar with the Shingo Prize criteria, including its EHS criteria, and build an EHS management system that would be assessed consistently, in a familiar manner, across the enterprise.

Correlation Between Program Implementation and Results Achieved

The most critical feedback, and the most challenging to address, dealt with the ability to correlate the EHSMS score to actual performance results, especially injury and illness rates.

Everyone agrees good systems drive good performance. But how is that proven? How does implementing a program to meet a requirement actually ensure improved performance? As the new management system was designed, these questions weighed heavily. No other internationally recognized EHS Management System attempts to prove this out. It is a topic that has been discussed countless times, by countless organizations, without much success.

The problem stems from a system's lack of focus on results. It allows businesses to make great strides in developing programs and identifying problems, but is unable to drive those businesses to implement consistent solutions that align with performance objectives. The revised system attempts to correct the issue by consciously creating an entire system element dedicated to EHS business results. Concepts under such an element are results-oriented, and require the foundational principles of the system to align directly with it. It is the old "show me the money" adage; prove that a program is the right one for the business, is effectively implemented, and is achieving the results expected, whether safety, environmental, employee wellness, or even product lifecycle considerations.

From Concept to Reality

The next challenge was simply to take the concepts received from the voice of the customer and turn it into reality. Not so simple after all. The design team spent the latter half of 2008 putting pen to paper, or finger to keyboard as the case may be, designing the solution. Through the use of various Six Sigma tools, and following a gated Design for Six Sigma process, the team began by studying some existing systems commonly in use today:

1. ISO 14001 (2004)
2. OHSAS 18001 (2007)
3. ANSI Z-10 (2005)[4]
4. OSHA VPP[5]
5. NIST Baldrige National Quality Program[6]
6. Shingo Prize for Operational Excellence (2008)

Applying the best of all words, with an intentional focus on both the overall design concepts and the EHS requirements within the Shingo Prize for Operational Excellence criteria, the team developed an EHSMS based on four levels of EHS performance improvement, or levels of transformation: Ad-Hoc, Tools-Driven, Systems-Driven, and Culturally Embedded. Ultimate success in EHS is not achieved by merely building and implementing isolated tools and techniques. Success comes from embedding these tools and techniques into the culture of the business.

As organizations progress through the levels of EHS transformation, they will advance from Ad-Hoc to Tools-Driven to Systems-Driven and finally to Culturally Embedded. The Ad-Hoc level represents sporadic, partially implemented programs. Organizations operating at this level are unable to sustain continual improvement. At the Tools-Driven level, businesses have built and implemented effective tools, but these tools remain isolated within functional areas and are not integrated into the business system of the organization. As the journey continues, more integrated and sustained improvement occurs at the Systems-Driven level. Finally, as systems mature, all employees throughout all business functions develop a deeper understanding of the systems, allowing the organization to deploy specific practices resulting in continual EHS performance improvement. Only then is the goal of premier EHS performance achieved.

The Textron EHSMS can be thought of as a "House of EHS." The house represents how an organization progresses along its transformational journey to premier EHS performance. The foundation of the house is Culture. Without a solid foundation of leadership, communication, and employee involvement, the house cannot stand, and the journey toward premier EHS performance cannot begin. Within the house reside Operating Processes and Strategic Processes. Operating Processes comprise those tools and techniques that must be designed and implemented to ensure businesses remain in compliance with applicable internal and external requirements, to assist in identifying hazards and risks, to help control or prevent hazards, and to drive continual improvement. Strategic Processes include setting objectives and targets, planning for future activities, and reviewing those activities currently deployed.
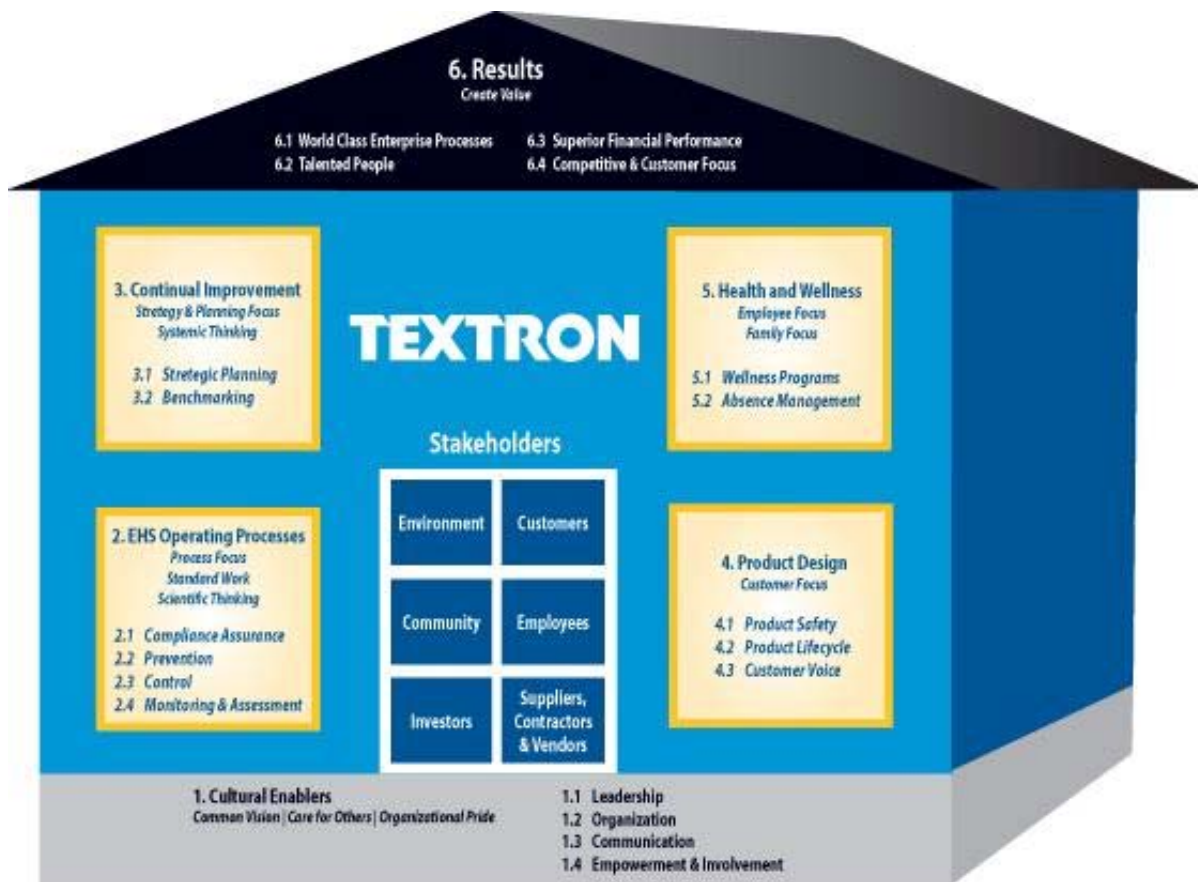
Exhibit 3: Textron's House of EHS is the visual representation of its new EHS Management System. The underlying principle of the system is the concept of progressing from foundation to roof, creating value for the organization along the way by implementing systems to meet high-level requirements. The House is used as a communication tool to present basic system elements and emphasize roles and responsibilities.

Next within the EHS house are Product Design and Health and Wellness. To achieve true success and reach premier EHS performance, an organization cannot continue to manage EHS as a single function; integration of tools, techniques, and systems into all aspects of the business is required, especially into the design, use, and disposal of products and the health and wellness of employees. Finally, at the top of the house is Results, to which all transformation must lead. Constantly and consistently measuring results will ensure tools, techniques, and systems are appropriate for the organization, create value, and have become culturally embedded throughout. By understanding the results, businesses understand if the systems are working.

Thus, the six Dimensions of the Textron EHS Management System are:

1. Cultural Enablers
2. EHS Operating Processes
3. Continual Improvement
4. Product Design

5. Employee Health and Wellness
6. Results

Also represented in the EHS house are stakeholders. These groups represent other organizations or individuals that are either affected or influenced *by* the tools, techniques, and systems implemented, or have an affect or influence *on* the tools, techniques and systems implemented. They include:

- Employees
- Environment
- Community
- Customers
- Suppliers, Contractors, and Vendors
- Investors

Creating Value

Designing and implementing a series of tools, techniques, and systems can provide great results. However, the level of improvement may be inconsistent, or the results achieved may not align with the organizational goals established. Dimension 6, Results is designed to measure the effectiveness of the programs established as required by Dimensions 1 through 5. Careful measurement of the programs and processes established will allow the organization to evaluate the effectiveness of those programs and processes, make changes to existing ones, or create new ones to drive the desired performance.

Dimension 6, Results contains required measures. Required measures are those that are most essential in determining EHSMS effectiveness and must be applied across all businesses. Some of these required measures include Environment, Compliance, Engagement, Absence Management, Loss Value, and Recognition. Within each of these areas, organizations define an appropriate metric, based on the nature and scale of the operation as well as on the identification of the most significant improvement opportunity. Results are tracked over a three year period, trends are analyzed, and the effectiveness of the EHS Management System can be measured.

Scoring and Assessment

The Textron EHS Management System is assessed using an Assessment Tool built on a Microsoft Excel platform. The tool is divided into the same six Dimensions that can be seen in the House. A score is determined by the performance level that best describes the organization's current practices.

There are four performance levels, or Levels of Transformation, that represent the progression from the implementation of basic EHS programs to premier EHS performance. The Levels of Transformation are:

1. Ad-Hoc: Sporadic and inconsistent implementation of tools; partially implemented programs or processes; ineffective programs or processes (EHSMS Basic)
2. Tools-driven: Development and implementation of effective tools; tools remain isolated to specific functional areas or to specific individuals; tools are not integrated into the business management system of the organization (EHSMS Bronze)
3. Systems-driven: Demonstrated use of tools and techniques form a comprehensive and documented system; evidence of integrated and sustained improvement (EHSMS Silver)

4. Culturally embedded: Employees throughout various business functions developed a deep understanding of the systems, allowing the organization to deploy specific, routine practices that result in continual EHS performance improvement (EHSMS Gold)
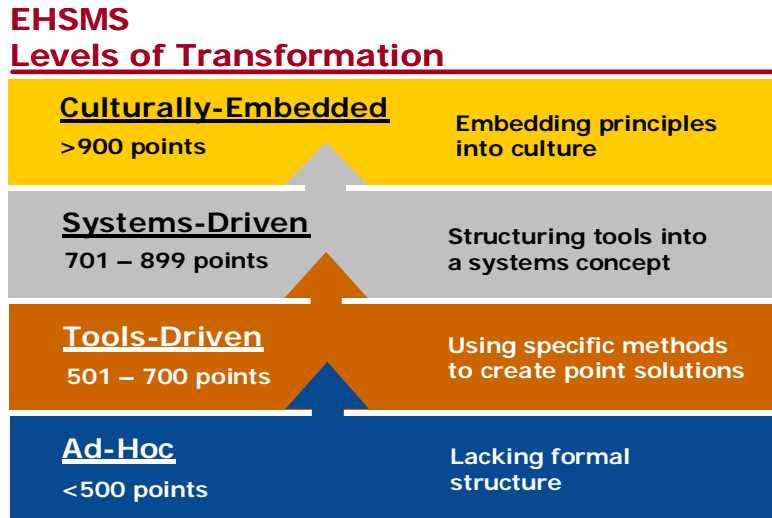
EHSMS
Levels of Transformation

Culturally-Embedded	Embedding principles
>900 points	into culture

Systems-Driven	Structuring tools into
701 – 899 points	a systems concept

Tools-Driven	Using specific methods
501 – 700 points	to create point solutions

Ad-Hoc	Lacking formal
<500 points	structure

Exhibit 4: There are four levels of transformation that describe how an organization advances towards premier EHS performance.

Understanding principles, throughout the organization, establishing and executing systems that support these principles, and selecting and utilizing appropriate tools and techniques, guide an organization to achieve its plans and goals. Only an organization that exhibits positive performance trends for metrics that were carefully chosen and appropriate can achieve top level, or premier, EHS performance. Program implementation is now only a small part of the EHS Management System.

Conclusion

Currently, Textron is in the midst of the formal deployment of the enhanced management system described in this paper. A formal training campaign, including over 25 webinars and six 8-hour classroom programs, was launched in December of 2008. Businesses are working to conduct baseline assessments of EHSMS, identify gaps, set goals, and implement tools, techniques, and systems to achieve those goals by the end of the 2009.

Although it is still too early to report on the results of our efforts, the initial feedback from the business units is overwhelmingly positive. The attempts to address each of the concerns voiced during the early stages of the project were fulfilled. There is understanding and appreciation of the effort taken to involve other functional groups, like Human Resources and Engineering, into the system. A large part of the initial success comes from the initial communication efforts, and the intentional involvement of these other functional groups at various decision points during system design and deployment.

The overall effort, from idea to final product, took over a year. Designing and launching a system such as this can only be attempted in an organization that already has an established and mature internal EHS Management System. However, the concepts shared in this paper can be easily applied to those organizations just starting to consider an EHS Management System as well

as those with more mature systems. Once more data becomes available, additional opportunities to share more lessons learned, as well as the results of this effort, will be sought.

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