

A Quality Systems approach to achieving HS&E excellence across the business enterprise

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Achieving consistent and excellent HS&E performance is a challenge regardless of the size of the business, but this challenge increases in proportion to the size of the organization. Large multi-divisional international corporations, on a daily basis, must utilize systems that assist the organization in managing differences in cultures and practices, geography, languages, and customer and regulatory requirements. Managing HS&E through the application of a quality based management system can be effective in addressing these challenges.

Introduction

Over the past few years, the petroleum exploration and production industry has gone through many changes that have challenged businesses, whether they are operators, service companies or manufacturers. All successful businesses have found new ways to become more efficient, through the development of new technology, improved processes, and/or mergers and acquisitions. Another important change in the E & P industry during this time is a greater expectation on participants to continuously improve HS&E performance. The new industry expectation is to meet business objectives without harming people or the environment. As the E&P industry has raised expectations for HS&E performance, there has been continuous exchange of ideas and best practices between customers, suppliers, and competitors. The general consensus is that there is nothing confidential about a good HS&E management practice if it can serve the benefit of the industry. It is in this spirit, that the authors present the following description of an HS&E management system that has been employed and continues to work with great success.

The challenges

In the late 1990's, our company was nearing the completion of a series of business acquisitions and mergers and was faced with the challenge of aligning different divisions toward achieving the goals of the corporate enterprise. One of the business goals of the enterprise was to have an HS&E management system that was common to all divisions and would promote continual improvement toward zero incidents and the prevention of pollution. To accomplish this goal, the system would have to overcome the following challenges:

Different business cultures- As a result of an extended series of mergers and acquisitions, the enterprise had as many as seven divisions operating under different systems for managing HSE performance. The bigger challenge was the diversity in cultures with a varying range in expectations in outcome. Moving all

divisions toward a culture that believes that all personal injuries and occupational illnesses can be prevented was necessary to achieve the desired outcome.

Different business activities- Each division conducted its business through different product lines, operating techniques, equipment, and locales. Some business activities were common to all divisions but other activities, such as chemical management, radiation, explosives, crane operation and overhead lifting, were particular to only one or a few of the divisions. Activities also varied because some divisions were more manufacturing oriented while others were involved in field service.

Different geographical locations- Managing HS&E in a global enterprise brings with it many challenges such as varying industry and legislative requirements, variances in infrastructure, local culture, and languages.

Different customer requirements- The enterprise has a customer base that includes large majors, independents of various sizes and national oil companies. Meeting the expectations of a large customer base requires consistency with a significant degree of flexibility. The challenge is to bridge the enterprise's system with that of the customer in a way that meets the customer's (and the company's) expectations.

Different suppliers- The enterprise's business model called for a greater dependence on suppliers and contractors. This inter-relation brings with it many possible exposures if expectations are not clearly communicated and HS&E objectives are not aligned.

Effectively implementing a new management system- Developing an effective HS&E management system is an achievement in itself. The greatest challenge however is implementing this system across the enterprise so that it achieves the desired results. The success of implementation is directly related to the management commitment, the appropriate resources and an education plan for all levels of the organization. Education is a precursor to implementation if the new management system is to be successful.

The Process

The first step in the process for addressing these challenges was to establish an enterprise wide commitment. This commitment, issued by the Chief Executive Officer of our company in the form of an HS&E Policy Statement, set the tone for how the company would conduct its business operations with respect to the health and safety of people and the protection of the environment. Simply stated, the HS&E policy statement requires that our company "...Conduct its business operations in a manner that does not harm people or the environment". There are several elements established to support this commitment which are detailed

in the BHI HS&E Policy statement included in the appendix of this paper for reference.

The next step in the process was to establish an enterprise wide, systematic approach to managing health, safety, and environmental aspects of our business, while ensuring that this approach supported the commitment established by our CEO. Steps that follow development of the system are actually contained in the management system itself, but include education (for management and employees), system roll out, audits and management review.

The Management System

We chose to base our HS&E management system on basic quality principles and adopted a four phase approach: Plan, Deploy, Review, and Improve. These four phases are supported by fifteen elements as illustrated below.



Although we use the term “phases”, sequential implementation is not required. In other words, there may be times when the Improvement phase and Planning phase are conducted simultaneously

Plan

There are four elements that support the “Planning” phase. Each element is critical to this phase because it allows management to determine what the needs of the organization are. For instance, the very first element, “**HS&E Risks and Impacts**” enables the organization to ensure that Health and Safety Risks and Environmental Impacts arising from the organization’s activities are identified, assessed, and controlled. Health and Safety hazards and Environmental

aspects of the organization's activities are reviewed periodically and for example, when significant changes or incidents occur, when relevant information from regulatory agencies, customers, stakeholders, or audits is received, and when additional hazards and aspects are identified.

Identifying **Legal, Business, and Regulatory Requirements** allows management to define the current and proposed requirements that may affect the organization, then plan adequately for compliance. The following examples of information sources may help to identify requirements:

- Communications from internal HS&E Groups (Divisional/Corporate).
- Communications from government bodies, agencies, regulators, or other expert sources.
- Government or private seminars.
- Divisional goals and targets.
- Guidance from industry associations.
- Conferences, seminars and forums with clients and competitors.
- Client tenders, questionnaires or meetings.
- Contracts or master service agreements.

Obviously, setting **Goals and Plans** is considered to be part of the "Plan" phase. Goals and Plans are set at many levels and are cascaded down through the organization. Enterprise wide goals and plans are developed based on input from the HS&E Steering Committee, comprised of division and corporate HS&E leadership. Sources and information used to develop goals includes the following:

- The Corporation HS&E Policy Statement;
- Previous global goals and achievements;
- The Corporate three year plan;
- Performance measurement data and trends;
- HS&E risks and impacts;
- Chronic HS&E issues and best management practices;
- Views of other stakeholders.

Once enterprise wide goals are set, each division sets goals that support the Enterprise goals by considering issues specific to the division. The same process is used at the region, district, base, and even in some cases to the department level. Plans are then developed to achieve the established goals, and the status of the plan is tracked so that real time progress toward the goals can be communicated through out the organization.

Although a component of the management system for some time, we decided to elevate "**Management of Change**" to "Element" status for increased visibility. When a change is expected (planned) or encountered (unplanned), the "management of change" process must be initiated to ensure the evaluation and

mitigation of any health and safety risks and environmental impacts. We have found that serious incidents have often occurred due to inadequate response to change in the work place. It is therefore important that proper management of change occurs and that any control measures generated during the process are properly implemented and communicated. This process also provides an excellent opportunity to elicit employee participation and “buy-in”.

Deploy

After the planning phase is complete, the next logical step is to deploy the plan. In order for proper deployment to occur, there must be proper **Structure and Responsibilities** defined and in place. We chose this point in the process to describe the three level structure of the management system documentation.

As stated earlier in this paper, the Policy Statement establishes the commitment of the corporation to conduct its business operations in a manner that does not harm people or the environment.

Level 1 of the management system documentation establishes the requirements of each of the elements. In other words it describes “What” we do.

Level 2 documentation describes the methodology used in each of the elements of the management system. In other words - “How” we do it.

Level 3 documentation describes procedures applicable to an operating division, region or location. In other words – “How” we do it “here”. This level provides flexibility for operation s to adapt the management system to meet their local needs.

HS&E Policy Statement

Top management statement of company HS&E values and commitment

LEVEL 1:

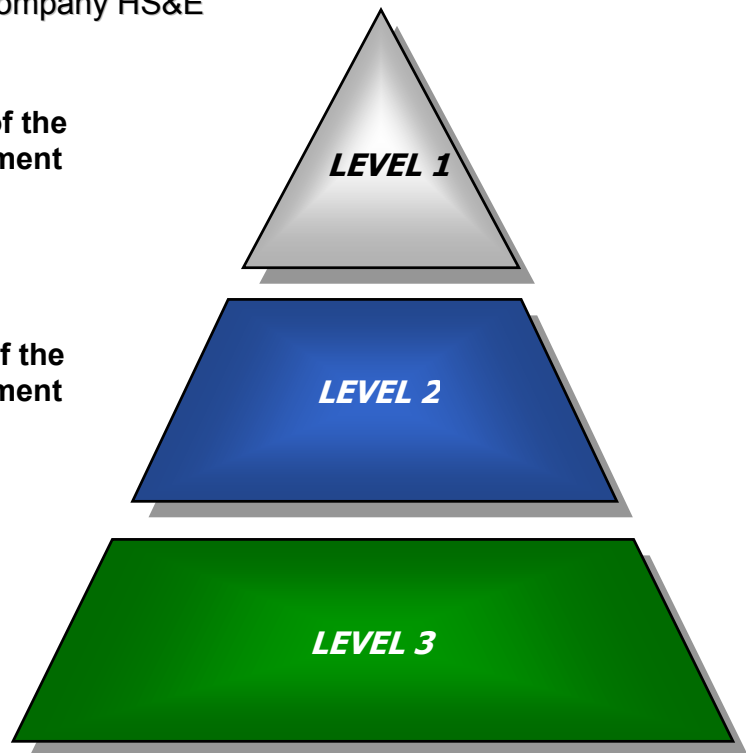
Establishes the requirements of the elements of the HS&E Management System

LEVEL 2:

Establishes the methodology of the elements of the HS&E Management System.

LEVEL 3:

Procedures applicable to an operating division, region, or location



The Structure and Responsibility element also establishes the roles and responsibilities for implementation of the management system throughout the organization.

Once the structure of the organization is set and responsibilities defined, **Training, Awareness, and Competency** requirements must be established. The organization must ensure that all employees have the requisite knowledge and competencies to fulfill their responsibilities in the management system. This usually necessitates a training needs analysis for new and existing employees based on legal business and client requirements, and the activities performed or materials/equipment used by the employee. Once these needs are determined, the plan is adjusted accordingly.

Effective Management Systems contain a **Communication** element to ensure that relevant HS&E information is disseminated to and from both internal and external parties. Employee communication and participation could be the subject of an entire presentation on its own, but some key items to be communicated include:

- Risk/Impact Assessment information
- HS&E observations

- HS&E training information
- Incident reviews
- HS&E performance information
- Management directives and guidelines, and
- HS&E alerts, etc.

Some examples of communications to external interested parties could include regulatory agency reports, emergency response information, and chemical information.

Document Control is essential to any management system. There are many methods used to accomplish this, but whatever method used must ensure that only the correct revision of the policy or procedure is accessible to workers.

The **Operational Control** element of our management system contains the specific procedures that apply to our organization's activities, products, processes and services. They establish minimum requirements for minimizing risks and impacts associated with our business activities. Some examples of specific procedures contained in operational controls are: isolation of energy (Lock out/Tag out), chemical safety, respiratory protection, hearing conservation, etc. This is the largest section of the management system because it contains specific procedures (minimum standards) for our business operations. Each level of the organization has the flexibility to develop location specific operational controls as long as they meet or exceed these minimum requirements.

The last element contained in the Deploy phase of the management system is the **Emergency Planning and Response** element. Each facility is required to develop and implement Emergency Preparedness and Response Plans that include:

- Identification of foreseeable emergency situations and the appropriate responses and notifications
- Communication to all employees and appropriate parties, and
- A periodic review and test

REVIEW

The review phase of the management system allows the organization to review its performance as well as the adequacy of the system to meet organizational needs.

HS&E Audits provide a process for the organization to verify conformance with the management system. Our organization uses three types of HS&E audits for this purpose:

- HS&E Management System Audits
- Site Visits

- Follow-up Audits.

Each type of audit serves its purpose in the system, but all are intended to verify conformance with requirements as well as verifying the adequacy of the system. Audit findings are trended to determine opportunities for improvement. Corrective actions resulting from audits are then tracked to closure..

Obviously, during the REVIEW phase of implementation, **HS&E Records** become an important source of information. Effective management systems include a requirement to retain certain records for periodic review. This requirement should include a description of specific required records and their retention times. Examples of some records that may be retained are: incident reports, audit reports, inspection, maintenance, training records, HS&E related correspondence, and many others, depending on the operation.

When reviewing the performance of an organization, a review of **Non-conformances and Incidents** is also required. Although there is no question that emphasis should be placed on prevention of non-conformances and incidents, when they do occur we must learn from them. Non-conformances must be reported and investigated, and appropriate corrective actions must be implemented and followed to closure. It is important that lessons learned are communicated throughout the organization. This is an example of when the Deploy and Review phases are used simultaneously.

It has been said that “What gets measured gets done” and effective management systems monitor and measure performance to ensure effective implementation of the management system. **Performance Monitoring and Measurement** requires the establishment of relevant indicators, the diligent collection of data to against those indicators, and the review of that data on a periodic basis. HS&E activities can be measured through operational control measurements, measured against HS&E goals and initiatives, HS&E performance and compliance monitoring, and non-conformance and corrective and preventive actions.

Improve

Lastly, **Management Review** is required to ensure the continuing suitability, adequacy and effectiveness of the HS&E Management System. This review is performed from the very highest levels of the enterprise and down through the organization to the location and sometimes departmental level. Management reviews occur at least annually and are instrumental in ensuring that the management system functions properly...

Implementing the System

Of the many important steps that must be taken in order to implement a successful quality based management system, the most important is securing

management commitment. Top management must be involved in determining the goals of the system and must be involved in communicating their expectations throughout the organization. This visibility is necessary to ensure the entire organization is engaged in the HS&E management process. Within our organization, total commitment, consistent communication, and focus of purpose was established in several ways.

Demonstrating management's commitment- In the example we offer, commitment was established at the Chief Executive Officer's level. This is demonstrated by his endorsement of the HSE policy and the management system with his signature and photo. He also communicates this message at all business meetings with his direct reports as well as the "town hall" type meetings he conducts during the year with employees from the various divisions. These actions by the CEO create huge momentum within the organization, and establish the importance of these objectives. They also set a precedent for expected management behavior within the organization and are important in establishing a new culture. For example, when the CEO begins every business meeting by discussing the HSE performance his direct reports soon see the importance of HS&E to the CEO and start adapting their style to begin their meetings with a discussion of HS&E issues as well.

Educating Line Management- The momentum that the CEO creates continues through the organization by the efforts of line management. Before line management could effectively lead their organization with the implementation of the management system, they first had to be educated on the management system as well as the techniques of managing HS&E effectively. This education included soft skills training in areas such as HS&E leadership as well as hard skill such as incident investigation and root cause analysis. Educating line management must take place before or at least simultaneously with the implementation of the management system, and requires a coordinated training schedule with ample instructors to complete the training within the first year of implementation. A system to provide follow-up training must be in place to provide training for new managers as well as refresher courses. When properly educated and informed, line managers are better equipped to implement the management system within their organization and are better mentors to their employees.

Dedicating Resources- Allocation of sufficient resources is necessary to facilitate successful implementation of the management system. Although actual implementation of the management system was performed by operations management, we determined that there was a need for a support network of HS&E professionals that could provide guidance and assistance to line management. To lead this group, the CEO appointed a high level operations executive from one of the company divisions as Vice President of HS&E. This appointment sent an important message to the organization that reinforced the importance of the HSE management system. The V.P. of HS&E performs the

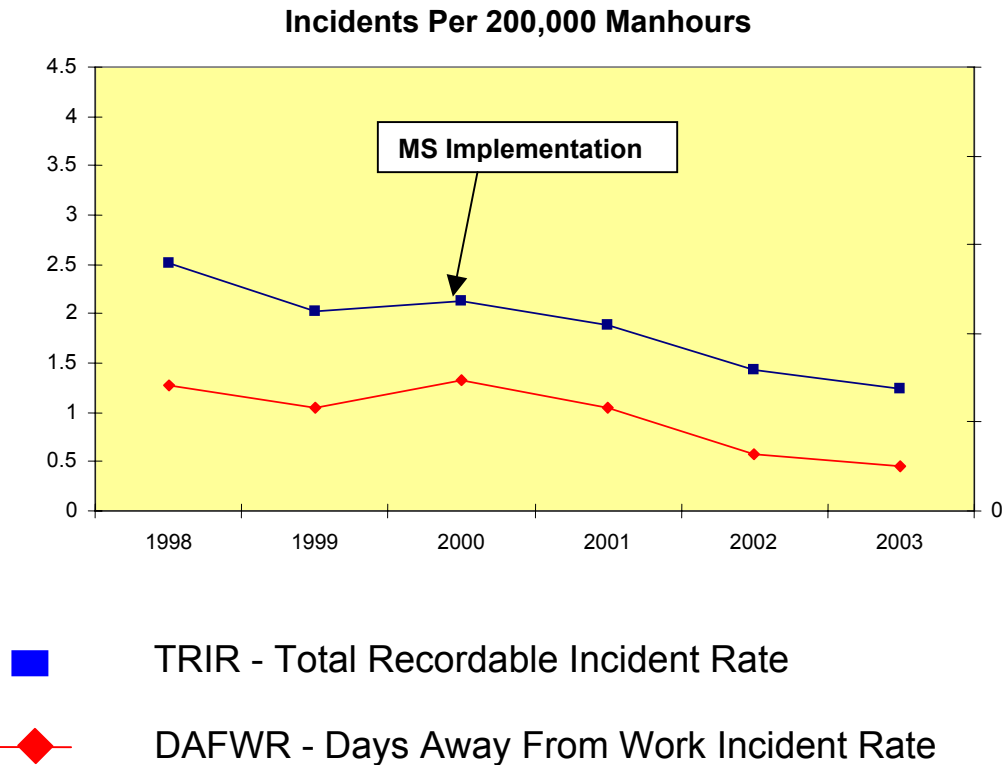
important role of monitoring the effectiveness of the system, providing feedback to the organization, and keeping focus on the intended objectives at the enterprise level. Thus the effect of dedicating resources to the implementation was twofold, in that it provided the necessary technical support that was necessary as well as communicating the company's commitment to the management system. What is also critical at this point is that line management have a clear understanding of what is expected from them in implementing the management system. Although the global minimum standards provided in Level 2 of the management system provide information on company requirements, these standards must be applied locally. The line manager must understand that it is within his area of responsibility to ensure that appropriate local standards (Level 3 documents) are developed to meet local organizational needs. What we found was that there was frequently a "disconnect" between the commitment of management at the top of the organization and the line manager. This should be corrected by establishing a system of accountability between upper and middle management, and between middle and line management. Although a professional and dedicated HS&E staff can provide guidance, technical support, and system tools, the management system will not be effective without a management accountability component.

Measure and Review- As stated earlier, a key to maintaining the effectiveness of the management system is in determining the key metrics, measuring them periodically, and communicating them back through the organization. Reviewing the effectiveness of the system takes place in many ways and is a continuous process. Line management must exhibit discipline and leadership. This is done by investing the appropriate amount of time each month, quarter, and year not only to review their organization's performance metrics but also to review the effectiveness of their various activities such as incident investigation, problem resolution, training, action item completion and action planning. It is important that metrics include the measurement of incident prevention activities, or what we call "In Process" measurements as well as results (statistics). These measurements go hand in hand with the accountability process mentioned above. Although management of HS&E issues is integrated unto all aspects of our business on a daily basis, the management review creates a time for managers to re-focus their attention to specific HS&E activities

Conclusion

The content of this paper has been associated with achieving excellence in HS&E performance by using a quality based management system approach when establishing an HS&E management process. The description of this particular HS&E management system along with some of the results will hopefully provide an example that other organizations may consider, as well as stimulate ideas that will improve upon the examples stated. In this case HS&E management provided a good demonstration of how a quality based management system approach could be applied in any organization, including a

large multi-national. Although we have a long way to go, we have seen good results with this approach so far, and expect continued improvement in performance as we continue to review and improve the system. The current HS&E management system was introduced enterprise wide in early 2000. We are finalizing a revision to the system that will be implemented during 2004. The results of our efforts are clearly shown below.



Although HSE management was the example, the message is that a quality based management system, if applied correctly, can achieve similar results regardless of the business segmentation. Quality management will work for any organization if there is management commitment, if the management team and work force is properly educated and if sufficient resources are dedicated to its successful implementation.

Appendix

Health, Safety & Environmental Policy

It is the policy of Baker Hughes Incorporated to conduct business activities in a manner that does not harm people or the environment. Baker Hughes Incorporated will facilitate this policy through a Health, Safety and Environmental (HS&E) Management System.

Essential elements of our process include:

- Measurable objectives that promote continual improvement toward zero incidents and the prevention of pollution.
- Visible management commitment, effective communication and training to ensure environmental protection, as well as the safety and health of our employees and the community.
- Line management responsibility for HS&E matters and the individual contribution of all employees.
- Recognition by all employees and subcontractors that safety and environmental protection is a condition of employment and that they are accountable for their safety and the safety of those around them.
- Integration of HS&E considerations, including identifying and controlling risks, into our business decisions, plans and operations.
- Annual goals and regular audits of HS&E systems and performance that are periodically reviewed.
- Compliance with all applicable legislation, regulations and relevant industry standards.
- Providing appropriate resources to implement this policy, including making it available to the public and employees.

Baker Hughes Incorporated is a responsible corporate citizen committed to the health and safety of people and protection of the environment. We firmly believe that this commitment adds value to our customer, employees and shareholders..



Michael Wiley
Chairman, President, and
Chief Executive Officer
Baker Hughes Incorporated

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