# Integrating Environmental, Occupational Health and Safety Management Systems (EHSMS) In Strategic Planning For Securing Business Excellence

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***Abstract:*** *A truly effective EHS governance model brings together in an integrated whole the vital elements of an enhanced performance health, safety and environment program that increases productivity and protects business. This papers aims to explain about integrating EHSMS in strategic planning for securing business excellence. It describes EHSMS requirements for implementation as per ISO 14001 and 18001 standards. This paper also discusses how to improve and sustain EHS management system. It covers the steps for EHSMS certification, auditing principles and checkpoints.*

***Keywords:*** *Environmental Management, Occupational Health and Safety Management, ISO 14001, ISO 18001, ISO 19001, EHSMS requirements, EHSMS performance, EHSMS sustanence, EHSMS auditing.*

## I. Introduction

Every employee or contract worker should expect a safe working environment. Any worker has the right to stop any job they believe to be unsafe. Safe operations also lead to enhanced efficiency and less environmental impact for operations. With rising public awareness of the need to protect the environment, governments and businesses are under increasing pressure to minimize their environmental footprint and promote sustainable development. The ISO 14001 - Environmental Management Systems (EMS) Standard helps organizations to identify, manage and control the activities that have an environmental impact. Industrial companies, service organisations, utility and public bodies worldwide have embraced ISO 14001 as the preferred model for environmental management and improved performance. OHSAS 18001 is an international management system standard developed with input from international companies, cooperating National Standards Bodies and registrars. The structure of OHSAS 18001 is complimentary to the clause (element) structure of ISO 9001 and ISO 14001.

## II. Environmental, Occupational Health and Safety Management Systems

### 2.1 Environmental Management system

An Environmental Management System (EMS) is a structured system which helps an organisation to identify the environmental impacts resulting from its business activities and to improve its environmental performance. The system aims to provide a methodical approach to planning, implementing and reviewing an organization's environmental management. Most organisations will have systems for managing their human resources, business objectives and finances. An Environmental Management System will work more effectively if it is designed to operate in line with an organization's existing systems and processes, such as the planning cycle, the setting of targets and improvement programs, corrective and preventive action and management review.

An environmental policy sits at the top of an organization's environmental management systems and articulates the overall intentions and direction of an organisation regarding its environmental performance. It provides a formal way for the organisations top management to express commitment to environmental management and improvement. An EMS also provides a way for organisations to plan for and demonstrate that steps have been taken to reduce or prevent environmental harm from occurring as a result of the organisations operations. An EMS requires the organisation to assess how it meets its legal and other requirements relating to its environmental aspects.

### 2.2 Occupational Health and Safety Management Systems

An Occupational Health and Safety Management system is a frame work that allows an organization to consistently identify and control its health and safety risks, reduce the potential for accidents, help achieve compliance with health and safety legislation and continually improve its performance. Implementing an Occupational Health and Safety Management system standard is now a legal requirement in many countries.

The new OHSAS 18001: 2007 provides an organization with a structured approach to planning, implementing and managing an OHSAS.

## III.    Introduction to ISO 14001 and OHSAS 18001

**3.1 ISO 14001 - Environmental Management Systems**
The International Organization for Standardization (ISO) is a non-government network of national standards institutes. It develops and publishes international standards. The ISO 14000 series comprises a range of standards on environmental management systems, environmental assessment, environmental performance evaluation, environmental labeling, life cycle analysis and greenhouse gases.

There are two standards on environmental management systems:
1.  ISO 14001—Environmental management systems—Requirements with guidance for use
2.  ISO 14004—Environmental management systems—General guidelines on principles, systems and support techniques

The critical elements of an Environmental Management System are:
- Defining environmental aspects
- Analyzing relevant environmental impacts
- Removing the impacts
- Improving environmental performance

According to ISO 14001, the concern for the environment should be concentrated on the surroundings in which the organization operates such as air, water, land, fauna, flora and human interactions. The clear definition and differentiation between activities, associated aspects and the resulting environmental impacts is very crucial to any effective environmental management system but this does cause many companies some difficulty quite often in the initial development of their system. In order for a successful environmental management system to be implemented, the above aspects should thus be dealt with greater significance.

**3.2 OHSAS 18001 - Occupational Health and Safety Management System**
An Occupational Health and Safety Management System (OHSMS) provides a framework for managing OH&S activities, procedures and processes so they become more efficient and a more integrated part of the overall business operations. An OH&S management system also provides a formal structure for identifying and managing significant OH&S hazards and risks. OH&S Management Systems are based on standards which specify a process for achieving improved OH&S performance and complying with regulations.

The OHSAS 18001 Standard may be applied within any organization that wishes to:
1.  Establish and implement an OH&S management system in order to eliminate or minimize hazards and risks to employees and people working on its behalf.
2.  Implement, maintain, and continually improve its OH&S management system and specific OH&S performance targets.
3.  Provide a mechanism to facilitate OSHA compliance.
4.  Demonstrate to customers, employees, and other stakeholders that the organization conforms to an internationally recognized standard.
    OHSAS 18001 is compatible with the ISO 9001 and ISO 14001 series of standards and their underlying principles and processes such as the Plan-Do-Check-Act.

## IV.    EHSMS Requirements
The first step to getting certified with the ISO 14001 Environmental Management Standard and OHSAS 18001 Occupational Health and Safety Management standard is to define a policy and establishing good performance management system as a strategic objective.

**4.1 Environmental policy**
An environmental policy sets the direction for management of the environment. By providing a framework for setting and reviewing environmental objectives and targets, it describes the expectations of top management (and the rest of the organisation) for environmental performance. Development of the policy requires top management to make critical decisions on what the organisation aims to achieve in environmental management, such as reducing the use of natural resources, increasing the use of renewable energy, or initially just measuring its contribution to the emission of greenhouse gases. The policy is intended to guide the organisation to focus its effort and resources. The standard requires the policy to be suitable for the nature, scale

and environmental impacts of the organization's activities, products and services. It is therefore helpful if the policy outlines what the organisation does and produces, and where it operates.

The standard also requires the policy to make three commitments:
1. Compliance with all applicable legal requirements, and with other requirements related to environment.
2. Prevention of pollution.
3. Continual improvement.

To be effective, the policy must be communicated to everyone working in and on behalf of the organisation. The standard also requires an organisation to publicize its environmental policy. Most organisations achieve this through their intranet and website, but display of the policy at head office and other locations through the organisation can also be effective. Development of a policy can be considered as an opportunity to inspire an organization's staff and other stakeholders.

### 4.2 Occupational safety and health policy
An organization's Health and Safety Policy should contain:
- A declaration of management's commitment to health and safety
- Overall goals and objectives of the health and safety program
- General health and safety responsibilities of management, workers, contractors and visitors while at the work site
- A requirement to comply with applicable government legislation, and
- A requirement to comply with the organization's own health and safety standards.

## V. Implementing EHSMS as per ISO 14001 and OHSAS 18001
The Plan – Do – Check – Act (PDCA) cycle is the foundation of all ISO management system standards. The cycle ensures development, continuous improvement and control of the management system in question. It is a simple tool that ensures constant monitoring of your organization's effectiveness. It consists of the following:
- Plan – EHS management system implementation using ISO 14000 and OHSAS 18001 guidelines
- Do – conducting life cycle assessment and managing environmental, safety and health aspects
- Check – conducting audits and evaluating environmental, safety and health performance
- Act – using and maintaining the environmental management system through continuous improvement

EHSMS is a process designed to systematically identify, assess and manage the environmental and operational risks to employees, contractors, stakeholders, business and the environment. The routine application of the EHSMS provides on-going identification, prioritization and control of these risks. This standard establishes a continuous improvement process for the implementation of the EHSMS policy, leadership expectations and core values. There are four distinct phases comprising of 15 interrelated elements.

Proper implementation of each element is essential for the effective functioning of the EHSMS. In some instances, Focus Area Specific Requirements are included in the elements to highlight a requirement. Each phase of the process builds on the previous phases. The elements in the PLAN phase identify the hazards, risks and regulatory requirements that must be addressed.

These elements also identify the risk mitigation requirements that will be built-out in the DO phase and provide for the establishment of strategic plans, goals and objectives. The elements in the DO phase detail the specific implementation tools needed to manage the risks and requirements previously identified in the PLAN phase. The CHECK phase provides for detailed monitoring and auditing to ensure risks and requirements are being identified, assessed and managed. The ACT phase calls for reviews of the EHSMS and its implementation in order to identify strengths, gaps and opportunities for improvement.

### 5.1 Plan phase
The elements in the PLAN phase identify the hazards, risks and regulatory requirements that must be addressed.

**Element 1 – Policy & Leadership:** Leaders are expected to show a command of EHSMS policy and actively drive the implementation and execution of the various requirements and principles. They will communicate policy to employees, contractors and others who work at company sites and confirm the information is accessible and understood.

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**Element 2 – Risk Assessment:** A business unit's EHSMS will contain a description of Risk Assessment activities performed, including both formal and informal Hazard Identification and Risk Assessment of those hazards. Processes or procedures shall include provisions for communicating hazards to potentially affected personnel. In addition, assessed risks must be communicated to and addressed by specified levels of business unit supervision and management. Formal Risk Assessments must be documented, implemented and maintained. The EHSMS will have processes and procedures to document the three basic steps associated with risk assessment: Hazard Identification, Risk Evaluation & Analysis, and Risk Treatment. The business unit shall periodically update the various risk assessments based on audits, reviews and changing regulatory requirements.

The scope of the assessments shall include activities, operations, projects and products from acquisition or inception through decommissioning, abandonment and disposal. The assessment shall consider normal, abnormal and emergency operating conditions. Importantly, it will address related impacts to the business unit, its staff, facilities, contractors, customers, the general public, the environment and the surrounding community.

**Element 3 – Legal Requirements & Standards of Operation:** To assure compliance with legal requirements and applicable Standards of Operation, business units will maintain a process to monitor changing laws and regulations. Responsibilities will be assigned at the task level with an owner accountable for ensuring that legal requirements are identified, communicated and consistently monitored. EHSMS legal requirements comprise all legal constraints imposed on the operation, including laws and regulations, permits, registrations, orders, consent decrees and commitments made in permit applications and in other legal documents. The organisation will, as a minimum, comply with all applicable legal requirements of the country or region of operation.

**Element 4 – Strategic Planning, Goals & Objectives:** Business units must have a documented strategic planning, goals and objectives process for EHSMS. The Strategic EHSMS Plan, which will include both a 5-year plan and annual goals and objectives, will be developed, communicated and measured. Goals and objectives will address continuous improvement opportunities, as well as identified gaps in efforts associated with environmental stewardship, personnel safety, occupational health, process safety and sustainable development. Progress will be reviewed at least annually by business unit management with input from employees and stakeholders. Employees will set annual EHSMS goals, which specify actions that will be taken to promote a strong EHSMS culture and achieve EHSMS performance targets.

### 5.2 Do phase
The DO phase details the specific implementation tools needed for managing identified risks.

**Element 5 – Structure & Responsibility:** An organizational structure of EHSMS roles, responsibilities and accountabilities will be documented and communicated, including site-level employee participation. Business unit management will provide the resources and structure essential for implementation, operation and maintenance of the EHSMS. The system will also manage changes in personnel and organizational structure.

**Element 6 – Programs & Procedures:** Programs and procedures will be established and maintained to manage significant risks and comply with legal requirements and Standards of Operation. They will be accessible to employees, contractors, and government entities as appropriate. Business units will develop a written program which will include compulsory procedures, as well as others deemed necessary to the business. For each item, the business unit will provide a procedure to identify and mitigate risk. Programs and procedures must be reviewed regularly and updated as necessary.

**Element 7 – Asset & Operation Integrity:** To minimize EHSMS risks associated with operations and equipment failure, business units will develop programs and procedures to ensure that assets are properly designed, fabricated, installed, operated and maintained. Asset integrity programs include quality assurance/quality control and defined inspection and maintenance intervals for critical process equipment. In addition, business units will implement programs to ensure safe operating procedures, assess and manage risk due to asset and operating deviations, and utilize Management of Change procedures and Pre-Startup Safety Reviews.

**Element 8 – Emergency Preparedness:** Each facility or site will have a written Emergency Response plan in place. The plan will include a process for identifying potential emergency situations and planning for mitigation and control. Employees will be trained according to their responsibilities and assignments under the plan, and drills will be conducted periodically and critiqued. At least once a year the emergency response plans and documents will be fully reviewed. At the corporate level, the company will maintain a Crisis Management Plan with personnel in place to provide prompt and effective support to supplement actions taken at the emergency site. The company will also utilize Regional Response Teams to support businesses during major emergencies.

**Element 9 – Awareness, Training & Competency:** Each business unit will establish and implement a program which ensures that all employees have the necessary skills, training and competency to perform assigned duties in a safe, environmentally and socially responsible manner. This training, which will be presented in a language the trainee understands, includes EHSMS policy and compliance; operations, mechanical and technical skills; emergency preparedness and response; and mandated certifications. The program will also include plans for providing orientation and EHSMS training to contractors and verifying their participation.

To manage changing requirements, the business unit will develop training needs analysis and a training matrix for the organization. Where specific competencies are required for various jobs, the required skill level will be stated. In addition, documented methods will monitor training compliance and report results to business unit management.

**Element 10 – Nonconformance Investigation & Corrective Action:** To ensure the proper handling of nonconformance's, near misses and incidents, the business unit will closely adhere to a written process that specifies how such events will be reported, investigated, addressed and tracked to closure. The process will include provisions for workers to report hazards.

Investigations will be conducted in a timely manner and must focus on determining all causes, including the root cause, and identifying management system deficiencies. Corrective actions must address immediate and systemic causes. Investigations that reveal worthy lessons will be shared with other business units.

**Element 11 – Communication:** Business units will implement processes and procedures to facilitate effective internal communication of EHSMS related issues, including policy, risk assessment and expectations for compliance. Communication will focus on education and employee involvement. Care must be taken to facilitate two-way communication between management and the workforce and to identify and remove any potential barriers. Processes and procedures shall be in place to communicate important EHSMS information to external stakeholders. These procedures must define responsibility for addressing inquiries from external parties. Each step in the process must be documented.

**Element 12 – Document Control & Records:** Each business unit will produce a written EHS Management System document. It must, at a minimum, comply with the EHSMS Standard and will detail how the business unit will execute its EHSMS. The business unit will put processes in place to ensure that documents and records are accessible and to specify how they are identified, managed and maintained. Processes will dictate specific employee roles and responsibilities. Documents will be periodically reviewed and revised as necessary, with obsolete documents managed in accordance with the company Records Management System.

**5.3 Check phase**

The CHECK phase provides for detailed monitoring and auditing to ensure that risks and requirements are being identified, assessed and managed.

**Element 13 – Measuring & Monitoring:** To determine if EHSMS goals and objectives are being met, business units will have a process in place to measure and monitor their operations and activities. The process will assess the implementation and effectiveness of operational controls and track and evaluate health, occupational safety, process safety and environmental performance. It will also assure compliance with Legal Requirements and monitor compliance with required Training. Performance measures will be generated and made available periodically. Such measures will provide management with the tools to understand trends and impacts and identify opportunities for improvement.

**Element 14 – Audits:** Each business unit will establish and maintain auditing processes that assess the adequacy and effectiveness of HSE controls and compliance with legal requirements and Standards of Operation. Joint ventures, partnerships and contractors will be included in the auditing process. Audit programs will be documented and include a process for communicating results to management and provisions for periodic review and corrective actions.

**5.4 Act phase**

The ACT phase calls for reviews of the EHSMS and its implementation in order to identify strengths, gaps and opportunities for improvement.

**Element 15 – Review:** Business units will implement a documented process to review the content and functionality of the EHSMS. Reviews will include data, such as leading and lagging metrics, audit findings, and nonconformance and incident statistics. The process will assess system strengths and weaknesses and include, as

appropriate: the need for policy or management system changes; objectives, goals and work plans in light of changing circumstances and the commitment to continuous improvement; resource allocation for system implementation and maintenance; and significant issues from risk assessments and changing regulatory requirements. Conducted annually by a team that includes the business unit leader, the review will identify actions for improvement and further the organization's EHSMS goals and objectives.

## VI.    EHSMS certification

### 6.1 Time and cost

The time required to implement an EHSMS compliant system is a function of the size of the company, the number of people involved under the scope of the certification, the complexity of the processes, the sector in which the company operates in, the number and significance of the identified hazards and risks, and the degree to which the existing EHS management system meets the requirements of the standard. A typical time line for implementation is six to twelve months. Certification costs, that is, those fees paid to the certification body, are small compared to the overall internal costs of the development and implementation of the EHS management system. The registrar fees are a function of the audit days required to verify conformance to the standard, which in turn is a function of the hazards and risks associated with the organization's activities and the number of employees and sites, etc. Most of the certification bodies will provide a no obligation costs quotation on request.

### 6.2 Selecting the certification body

If the organisation is planning to become certified to ISO 14001, OHSAS 18001 or another accredited management system standard, the selection of the "certifying" body is an important decision. Everything being equal, this is a relationship that will be in place for a very long time. That is why it is so important that the choice is one which will provide the organisation with a partnership approach to certification, provides with value-added services and result in a certification that is recognized and accepted by the customers and prospects. In the ISO 14001 and OHSAS 18001 marketplace there are a large number of certifying bodies offering certification services. It is an unregulated market - that is, anybody can set themselves up as a certifying body, perform audits and issue certificates. It is very much a "buyer beware" market place. So the challenge lies in selecting a recognized certifying body.

It is better to check with several companies by asking a series of challenging questions - "What was your experience with XYZ certifying body? What impressed you most about the certifying body? What did you least like about your dealings with them? Would you recommend them to others?" If these questions are asked to six or seven companies, a pretty good picture can be obtained of the overall character and the philosophy of the certification body. Everything being equal, this is a relationship that will be in place for a long time and it is therefore imperative that you make a decision based on sound information. Areas to consider when evaluating selecting certification bodies are technical competencies, interpretation of the standard and overall philosophy, price and people factors.

### 6.3 Technical competencies

Most certifying bodies that are accredited have very similar "technical" competencies. These competencies are defined and are mandatory requirements of the accreditation bodies or the professional standards body. The "rules" that certifying body operate under are largely governed by what is known in the certification industry as "accreditation bodies." Most of the countries that have adopted or accepted the ISO 14001 and OHSAS 18001 standard have their own national accreditation body. In order to become "accredited" a certifying body must undergo a rigorous audit and review process. However, certifying bodies accredited for ISO 14001 and OHSAS 18001 in order to maintain their accreditation, are subject to ongoing surveillance audits and other formal requirements to ensure the quality of their services and for the maintenance of technical competencies. Not all accredited certifying bodies are created equal. There are considerable differences between them that should be assessed before a selection is made.

### 6.4 Applying

Certification application to certification body can be applied through online quotations form or by phone, fax and email. Certifying body reviews all the information and provides the company with a quotation. The quotations may cover a three-year period corresponding to the certification cycle and are calculated to make sure that every customer receives the certification service best suited to their needs.

### 6.5 Gap assessment

A gap assessment is optional and is not a requirement of the certification process. Applicants can proceed at their own pace, with assessment dates arranged to suit. If the organisation is unsure whether it is ready to undergo assessment for registration, a gap assessment can be conducted, in which:

- Conduct an on-site analysis of the organisation current system
- Assess the current system against the relevant standard
- Prepare a report highlighting the gaps between the current system and the standard.

### 6.6 Preliminary assessment – stage-1

The Preliminary Assessment involves an inspection of the documentation and a review ranging over various areas including the proposed scope of the registration, the status of implementation of the management system, the appropriate regulatory and legal requirements, EHSMS policies and objectives, whether the system addresses the key areas of the business, site-specific activities – top level process review, key management elements, e.g. internal audits, reviews and complaints procedures, readiness to move onto Stage 2 of the assessment, the Registration Assessment.

The Preliminary Assessment normally takes place on-site. An interval of several weeks is recommended between the Preliminary Assessment and the Registration Assessment to allow time to resolve any issues arising from the Preliminary Assessment. After the Preliminary Assessment is completed, a brief report is prepared and produced evaluating the readiness to proceed to the next stage and identifying any areas that need to be improved before moving to Stage 2. If the Preliminary Assessment finds that the organization is not ready for full Registration Assessment, it becomes, in effect, a Gap Assessment. That means that a second Preliminary Assessment has to be carried out.

During the stage-1 audit (initial visit), the audit team will check that the company has identified all of the applicable federal, state and local EHSMS requirements, statutes and any other requirements to which it subscribes. The effectiveness of the management review process for identifying and defining hazards and risks will also be evaluated. A review of how the significance of the identified hazards and risks is determined will also be conducted. Since EHSMS is based on a "Plan-Do-Check-Act" model, the stage one audit of the EHSMS management system is focused on ensuring that the "plan" aspect of the model has been effectively implemented. Areas of non-conformity will be noted and corrective actions may be required.

### 6.7 Registration assessment – stage-2

The Registration Assessment (Stage 2) involves a full review of the management system, including relevant records and documents. Its purpose is to confirm that the management system is properly controlled and has predictable outcomes. At the end of the Registration Assessment, a detailed report is prepared, together with the outcome (whether to recommend registration or not). For issues found during the assessment, the organisation is expected to submit an action plan detailing what changes are planned to be made to the management system to eliminate or reduce the risk of the same issues re-occurring.

The stage-2 audit (certification audit) is typically scheduled 4 to 6 weeks after the stage-1 initial visit audit. The focus of stage-2 audit is the "do, check, act" parts of the model. The auditors are seeking to objectively verify that the organization adheres to its EHSMS policy, objectives, and procedures as they directly relate to the requirements of ISO 14001 and OHSAS 18001. The actual recommendation for certification to ISO 14001 and OHSAS 18001 is based on objective evidence that the EHS management system is in conformance with ISO 14001 and OHSAS 18001, and that the organization's associated internal EHS procedures are implemented and maintained. Ultimately, certification depends on whether or not any major and/or minor non-conformances were issued by the auditor against the EHS management system.

### 6.8 Surveillance and re-assessment (re-certification)

At least once a year, the certifying body visits each registered company to ensure the management system is being maintained and is achieving its expected outcomes. During each visit, part of the management system is reviewed in depth. Certificates expire every three years, with the expiry date indicated on the certificate. Before that date, the certifying body undertakes a detailed reassessment, reviewing the performance of the whole management system to make sure every element is performing satisfactorily. The results of the previous visits are taken into account.

During the period of registration, changes are inevitable. The certification body works with each registered organization to make sure the management system remains sound. Normally, change can be reviewed and assessed during routine surveillance visits. In cases where change leads to the breakdown of the system, the certifying body reserves the right to suspend or revoke certification.

## VII. Improving EHS Performance
### 7.1 Auditing requirements

The Plan – Do – Check – Act (PDCA) cycle is the foundation of all ISO management system standards. The cycle ensures development, continuous improvement and control of the management system in question. It is a simple tool that ensures constant monitoring of your organization's effectiveness.

**7.1.1 Plan phase**
- **Scheduling:** An annual plan should be prepared for carrying out internal safety audits.
- **Management Support:** To be of value, senior management should be fully committed to the concept of auditing and its effective implementation within the organisation.

**7.1.2 Do phase**
- **Audits:** Audits provide a comprehensive and formal assessment of the organisation's compliance with OH&S procedures and practices. The end result of an audit should include a detailed written assessment of EHSMS procedures, the levels of compliance with procedures and practices and should where necessary identify corrective actions.
- **Auditors:** One or more persons may undertake audits. A team approach may widen the involvement and improve co-operation. They should be independent of the part of the organisation or the activity that is to be audited.

**7.1.3 Check phase: Data collection and interpretation**
Relevant documentation should be examined. This may include EHSMS management system documentation, EHSMS policy statement, EHSMS emergency procedures, Permit to work systems and procedures, Minutes of OH&S meetings, Accident/Incident reports and records, Training records, Reports or communication with the enforcing authority.

**Audit results:** At the end of the audit, and before submitting their report, the auditor or the Audit team should hold a meeting with the responsible manager of the audited area. The main purpose of such a meeting is to communicate the results of the audit to the responsible manager in order to ensure that it is understood and agreement is reached.

**Content of the Report:** The content of the final audit report should, depending on the case, contains the audit objectives and scope, the particulars of the audit plan, identification of the members of the auditing team and the audited representative, dates of audit and identification of the area subject to audit, the identification of reference handbooks used to conduct the audit, the cases of non conformance, the auditors assessment of the degree of conformity to ISO 14001 and OHSAS 18001, the ability of the EHS management system to achieve the stated EHSMS objectives.

**7.1.4 Act - Continuous Improvement:** In order to ensure continuous improvement a planned management review has to be conducted. This involves evaluating audits, ensuring the meeting of the organization's objectives and targets, ensuring the meeting of ISO 14001 and OHSAS 18001 requirements, devising improvements to the processes, evaluating changing circumstances such as legal requirements.

The continuous improvement process for ISO 14001 is slightly different than for the quality management systems. It includes 3 aspects:
- Expansion – more and more business areas should get covered by the implemented EMS
- Enrichment – more and more activities, products, processes should be involved in the EMS
- Upgrading – improvement in structure and framework of the EMS through know-how gained by the business when dealing with environmental issues

The continuous improvement of the environmental management system should result in the environmental thinking of the whole organization; it should move from operational measures to a strategic approach on how to deal with environmental challenges.

## VIII.     Sustaining EHSMS

Managing occupational incident and accident reporting are the focal points of most EHS management efforts. However, by applying the same management controls and disciplines to additional related areas, the effectiveness of overall health & safety programs can be improved and risks better managed. The correct focus in these five areas:
- Audits and Self Inspections
- Industrial Hygiene
- Occupational Medicine
- Emergency Response
- Training Management

Can lead to dramatic improvements and sustaining overall EH&S performance and ensure that organizational goals for operational excellence are met.

**8.1 Audits and Self Inspections**

Organizations need to measure the effectiveness of their health and safety policies by assessing (a) how effectively risk are controlled (b) how deeply a positive health and safety culture is embedded in the organization and (c) how well policies are understood and followed by the workforce. Increasingly, an organization's EHSMS audit program will directly input into standards-based programs such as ISO14001 and ISO18001 as well as corporate sustainability reporting initiatives.

A low accident rate, even over a period of years, is no guarantee that risks are being effectively controlled and will not lead to injuries, ill health or loss in the future. This is particularly true in organizations where there is a low probability of accidents but where major hazards are present. Here the historical record can be an unreliable or even deceptive indicator of safety performance. Periodic reviews and audits of the health and safety management system elements are needed to ensure that operational policies and related management controls are working correctly and are effective. Such a review should include:

- A full audit of all safety systems of the organization
- A comparison of the standards established during planning and implementing - and in current use - to the latest issued standards
- Other information that can help determine whether or not the initial strategy is working or whether change is needed to achieve the desired objectives
- A survey or other measure to confirm that the workforce understands the policy and has confidence in its completeness and effectiveness
- Health & Safety audit programs may also include behavior-based safety observations since these can provide important frontline feedback on the effectiveness of your overall policies.

**8.2 Industrial Hygiene**

Industrial Hygiene (IH) is the practice of protecting and enhancing the health and safety of people at work and in their communities. Health and safety hazards cover a wide range of chemical, physical, biological and ergonomic stressors. Anticipation, recognition, evaluation and control of these hazards have always been the prime goal for industrial hygiene programs. The knowledge from the IH program is used to anticipate when a hazardous condition may occur and then take corrective actions as needed to mitigate the discovered hazards. Effective Industrial Hygiene programs address five key areas: (1) Health hazard recognition, (2) Health hazard evaluation, (3) Health hazard control, (4) Employee education and training, (5) Audit of the program's effectiveness and update of the program for continuous improvement.

Establishing a comprehensive industrial hygiene program can be a formidable task even when many of the basic elements are available. The growth of an organization often requires a change in industrial hygiene operational methods, as well as increases in resources to manage the program. Needed components of successful programs includes: 1) learning the management system; 2) defining IH concerns; 3) establishing IH priorities, goals and objectives; 4) defining the business needs; 5) communicating the business needs; and 6) managing the program and measuring progress. The growth of an organization often requires a change in industrial hygiene operational methods, as well as increases in resources to manage the program.

**8.3 Occupational Medicine**

Occupational Medicine is designed to minimize personnel health risks from working with hazardous materials through monitoring and prevention. Occupational Medicine programs are intended to enhance the efficiency of existing safety and health programs and keep the organization / company in compliance with all applicable regulations.

Occupational Medicine programs generally include workplace safety history and hazard evaluation, periodic medical review, re-examination for specific problems, specific workplace hazards with special requirements, injury medical care, exposure monitoring (evaluation of results from IH), regulatory and internal performance reporting requirements, PPE usage including respirators.

**8.4 Emergency Planning and Response**

A comprehensive emergency management program encompasses all hazards and all related planning areas including emergency and disaster planning and preparedness, hazard identification and mitigation, emergency response, disaster recovery, business continuity and resumption, crisis management, continuity of operations, and related areas. An Emergency Management Program is an overarching process that includes mitigation, preparedness, response, and recovery.

Essential elements of emergency preparedness planning include identify hazards and assess risk, assess capabilities and resources, develop an emergency plan and procedures, integrate the plan with the community plan, conduct training, public relations, conduct Drills and Exercises, develop Plan Audit Procedures, documenting meetings and outcomes, assigning following Actions & Tasks.

### 8.5 Training Management

Key elements of training management include competence management, content management, learning management and compliance with standards. Effectively managing the required skills and qualifications of the organisation staff, including identifying and remediating when these skills or qualifications need updating, ensures that individuals understand their responsibilities and accountability to achieve workplace compliance and ensure a hazard free environment. When workforce training data is included in an integrated management system, it becomes a powerful tool when on-boarding staff, moving staff between operational areas and as an input when conducting causal analysis as part of your investigations process.

## IX.    Monitoring EHS Performance

Most organizations recognize the importance of reporting against Key Performance Indicators (KPI's) or metrics, but many struggle with what they should actually be measuring. Establishing meaningful and relevant metrics is a crucial part of the performance measurement process to demonstrate an organization's commitment to "continuous improvement." Properly selected metrics will allow for the accurate collection of information, tracking of progress, and acknowledgement of reaching a goal. But before the metrics can be defined, it is necessary to understand the nature of the goals themselves and the process subject to the measurement.

The goals an organization sets should always be SMART. There are many different variations of the meaning of the SMART acronym but all have the same basic premise, which are to highlight the key elements for setting goals.

- Specific - very clearly defines what is being measured;
- Measurable - data needs to be reasonably available that can be quantified;
- Actionable - the subject must be something you can reasonably control;
- Realistic - goals should be outside what would be considered normally, but attainable; and
- Time Constrained - there has to be dates or schedules to define the performance period

When setting goals, it is important to keep in mind the desire to pursue improvement as their core function. In order to do that the goals must be formulated remembering that they should be able to detect weaknesses, push opportunity, address known risks, and foster communication. Tracking progress toward proper goals encourages an organization to respond to problems and eventually prevent them. Setting the right goals for an organization should enhance performance, encourage a culture of improvement and accountability, result in more cost effective behavior, and increase stakeholder perceptions.

Tracking progress toward goals involves the use of indicators, or information that represents key factors relevant to each goal. This is definitely a situation where the results are only going to be as good as the information used. Choosing the indicators and how they will be handled is very important as they will be what defines progress toward goals. When choosing indicators, especially in the case of goals which are complex or long in schedule, be sure to use indicators which can be used to set milestones for progress toward the goal for use in evaluating performance along the way. Milestones set strong management tools and allow for the potential to celebrate minor successes along the way.

Establishing meaningful goals is the first step toward effective performance measurement, but the critical follow-up is actually collecting the data about the indicators. Many organizations still rely on hard copy forms and disjointed information systems to collect data about their EHS management systems. If there are places where data can be pulled across systems within an organization, even from separate databases or spreadsheets, this is the place to start. The idea is to make information collection and tabulation as effortless as possible by finding ways to connect to information which is already available.

Measuring and tracking performance within an organization is a necessary step for any organization dedicated to improvement. Only through the organized review of historical and present performance will trends become apparent allowing for the development of focused plans of action. Organizations which are willing to take a critical look at themselves and aim for improvement will be the ones who reap the benefits. Twenty years ago it was a relatively new concept to consider EHS affairs as anything beyond liability and obligation. Today improved EHSMS performance is seen by successful companies as a keystone to efficient resource use, positive public image, and competitive advantage. But before those things can be realized, a focused, meaningful, and strategic performance measurement and tracking system has to be successfully implemented.

Attempting to achieve operational understanding and a holistic focus of the goal setting process becomes challenging and inspirational throughout an organization. However, the goals are just the beginning. Once the metrics are established, many decisions remain: (1) How often and in what manner is progress reviewed? (2) What is being done to ensure success? (3) How are progress and results communicated? (4) How to incentivize involvement within the organization? (5) How is achievement rewarded?

## X.    ISO19011: 2011 and EHS auditing principles as per ISO 19011:2011

ISO 19011:2011 provides guidance on auditing management systems, including the principles of auditing, managing an audit programme and conducting management system audits, as well as guidance on the evaluation of competence of individuals involved in the audit process, including the person managing the audit programme, auditors and audit teams. ISO 19011:2011 is applicable to all organizations that need to conduct internal or external audits of management systems or manage an audit programme. The application of ISO 19011:2011 to other types of audits is possible, provided that special consideration is given to the specific competence needed. ISO/TC 207 is recognized as a leading world-forum for the development of international standards that lead to improvements in environmental performance of organizations and their products facilitate world trade and contribute to sustainable development.

### 10.1 Discipline-specific knowledge and skills of EHSMS auditors

Knowledge and skills related to the discipline and the application of discipline-specific methods, techniques, processes and practices should be sufficient to enable the auditor to examine the management system and generate appropriate audit findings and conclusions.

### 10.1.1 Environment Management System audit skills

The audit knowledge required for an ISO 14001 auditor is related to the following:

- environmental terminology
- environmental metrics and statistics
- measurement science and monitoring techniques
- interaction of ecosystems and biodiversity
- environmental media (e.g. air, water, land, fauna, flora)
- techniques for determining risk (e.g. environmental aspects/impacts evaluation, including methods for evaluating significance)
- life cycle assessment
- environmental performance evaluation
- pollution prevention and control (e.g. best available techniques for pollution control or energy efficiency)
- source reduction, waste minimization, reuse, recycling and treatment practices and processes
- use of hazardous substances
- greenhouse gas emissions accounting and management
- management of natural resources (e.g. fossil fuels, water, flora and fauna, land)
- environmental design,  reporting and disclosure
- product stewardship
- renewable and low carbon technologies.

### 10.1.2 Occupational Health and Safety Management System audit skills

The audit knowledge required for an OHSAS 18001auditor is related to the following:

- hazard identification, including those and other factors affecting human performance in the workplace (such as physical, chemical and biological factors, as well as gender, age, handicap or other physiological, psychological or health factors)
- risk assessment, determining controls, and risk communication. The determining of controls should be based on the "hierarchy of controls" as per OHSAS 18001
- the evaluation of health and human factors (including physiological and psychological factors) and the principles for assessing them
- method for exposure monitoring and assessment of occupational health and safety risks (including those arising out of the human factors mentioned above or relating to occupational hygiene) and related strategies for eliminating or minimizing such exposures
- human behaviour, person-to-person interactions and the interaction of humans to machines, processes and the work environment (including workplace, ergonomic and safe design principles, information and communication technologies)

- the evaluation of the different types and levels of occupational health and safety competence required across an organization and the assessment of that competence
- methods to encourage employee participation and involvement
- methods to encourage employee wellness or well-being and self-responsibility (in relation to smoking, drugs, alcohol, weight-related issues, exercise, stress, aggressive behaviour, etc.), both during working hours and in their private lives
- the development, use and evaluation of proactive and reactive performance measures and metrics
- the principles and practices for identifying potential emergency situations and for emergency planning, prevention, response and recovery

**10.2 EHSMS audit checkpoints**
These checkpoints are included as a guide and can be modified to suit specific contract requirements.

**1. Health and Safety Systems**
- OH&S policy displayed
- Accident report book
- Induction records
- Rehabilitation policy available
- Workplace inspection records
- Emergency procedures
- Training records
- Documented safe work procedures
- Protective clothing & equipment records
- Health & safety systems manual available
- H&S representatives appointed
- Management safety representative appointed
- Contract risk assessment available
- Contract Health & Safety Co-ordination Plan available

**2. Housekeeping**
- Work areas free from rubbish & obstructions
- Surfaces safe and suitable
- Free from slip/trip hazards
- Floor openings covered
- Stock/material stored safely
- AISLES
- Unobstructed and clearly defined
- Adequate lighting
- Vision at corners
- Wide enough

**3. Electrical**
- No broken plugs, sockets, switches
- No frayed or defective leads
- Power tools in good condition
- No work near exposed live electrical equipment
- Tools and leads inspected and tagged
- No strained leads
- No cable-trip hazards
- Switches/circuits identified
- Lock-out procedures/danger tags in place
- Earth leakage systems used
- Start/stop switches clearly identified
- Switchboards secured
- Appropriate firefighting equipment

4. Mobile Plant and Equipment
- Plant and equipment in good condition
- Daily safety inspection procedures/checklists
- Fault reporting/rectification system used
- Operators trained and licensed
- Warning and instructions displayed
- Warning lights operational
- Reversing alarm operational
- Satisfactory operating practices
- Fire extinguisher
- Tyres satisfactory
- SWL of lifting/carrying equipment displayed

**5. Machinery and Workbenches**
- Adequate work space
- Clean and tidy
- Free from excess oil and grease
- Adequately guarded
- Warnings or instructions displayed
- Emergency stops placed and identifiable
- Operated safely and correctly
- Workbenches clear of rubbish
- Tools in proper place
- Duckboards or floor mats provided

**6. Hazardous Substances**
- Stored appropriately
- Containers labelled correctly
- Adequate ventilation/exhaust systems
- Protective clothing/equipment available/used
- Personal hygiene - dermatitis control
- Waste disposal procedures
- Material safety data sheets available
- Chemical handling procedures followed
- Chemical register developed
- Appropriate emergency/first aid equipment - shower, eye bath, extinguishers
- Hazchem signing displayed

**7. Welding**
- Gas bottles securely fixed to trolley
- Welding fumes well ventilated
- Fire extinguisher near work area
- Only flint guns used to light torch
- Flash back spark arresters fitted
- Vision screens used for electric welding
- LPG bottles within year stamp
- PPE provided and worn
- Hot Work permit system used

8. **Excavations**
   - Shoring in place and in sound condition
   - Excavation well secured
   - Signage displayed
   - Banks battered correctly and spoil away from edge
   - Clear and safe access around excavation
   - Separate access and egress points from excavation
   - Safe work procedure in place

9. **Prevention of Falls**
   - All work platforms have secure handrails, guarding or fence panels
   - Harness and lanyard or belts provided
   - All floor penetrations covered or barricaded
   - Unsafe areas signposted and fenced
   - Safe work procedure in place

10. **Stairs, steps and landings**
    - No worn or broken steps
    - Handrails in good repair
    - Clear of obstructions
    - Adequate lighting
    - Emergency lighting
    - Non-slip treatments/treads in good condition
    - Kick plates where required
    - Clear of debris and spills
    - Used correctly

11. **Ladders**
    - Ladders in good condition
    - Ladders not used to support planks for working platforms
    - Correct angle to structure :
    - Extended metre above top landing
    - Straight/extension ladders safely fixed at top
    - Metal ladders not used near live exposed electrical equipment

12. **Personal Protection**
    - Employees provided with PPE
    - PPE being worn by employees
    - Sun cream and sunglasses provided
    - Correct signage at access points

13. **Manual Handling**
    - Mechanical aids provided and used
    - Safe work procedures in place
    - Manual handling risk assessment performed
    - Manual handling controls implemented

14. **Workplace Ergonomics**
    - Workstation and seating design acceptable
    - Ergonomic factors considered in work layout and task design
    - Use of excessive force and repetitive movements minimized
    - Appropriate training provided

15. **Material Storage**
    - Stacks stable
    - Heights correct
    - Sufficient space for moving stock
    - Material stored in racks/bins
    - Shelves free of rubbish
    - Floors around stacks and racks clear
    - Drums checked
    - Pallets in good repair
    - Heavier items stored low
    - No danger of falling objects
    - No sharp edges
    - Safe means of accessing high shelves
    - Racks clear of lights/sprinklers

16. **Confined Spaces**
    - Risk assessment undertaken
    - Communication and rescue plan in place
    - Safety equipment in good working condition
    - Suitable training provided to employees
    - Confined space permit used

17. **Lasers**
    - Operator has laser operator licence
    - Signage displayed
    - Laser not used to endanger other persons

18. **Demolition**
    - Risk assessment undertaken in advance
    - Access prevented to demolition area
    - Overhead protection in place
    - Protection of general public
    - Safe work procedure in place

19. **Public Protection**
    - Appropriate barricades, fencing, hoarding, gantry secure and in place
    - Signage in place
    - Suitable lighting for public access
    - Footpaths clean and free from debris
    - Dust and noise controls in place
    - Site access controlled
    - Traffic control procedures in place
    - Public complaints actioned

20. **Amenities**
    - Washrooms clean
    - Toilets clean
    - Lockers clean
    - Meal rooms clean and tidy
    - Rubbish bins available - covered

21. **First Aid**
    - Cabinets and contents clean and orderly
    - Stocks meet requirements
    - First aiders names displayed
    - First aiders location and phone numbers
    - Qualified first aider(s)
    - Record of treatment

22. **Lighting**
    - Adequate and free from glare
    - Lighting clean and efficient
    - Windows clean
    - No flickering or inoperable lights
    - Emergency lighting system

**23. Fire Control**
- Extinguishers in place
- Fire fighting equipment serviced/tagged
- Appropriate signing of extinguishers
- Extinguishers appropriate to hazard
- Emergency exit signage
- Exit doors easily opened from inside
- Exit path ways clear of obstruction
- Alarm/communication system - adequate
- Smoking/naked flame restrictions observed
- Minimum quantities of flammables at workstation
- Flammable storage procedures
- Emergency personnel identified and trained
- Emergency procedures documented - issued
- Emergency telephone numbers displayed
- Alarms tested
- Trial evacuations conducted
- Personnel trained in use of firefighting equipment

## XI. Discussion

There are costs associated with implementing an EHSMS management system in conformance to ISO 14001 and OHSAS 18001. If companies make this investment, then it is extremely important that they are able to derive positive benefits and a financial return on that investment. There following are the reasons why any organization would consider ISO 14001 and OHSAS 18001 certification:
- Minimize health and safety risks to employees and others
- Improve business performance
- Assist organizations in establishing a responsible image within their marketplace or industry sector
- Ensure an impartial, credible assessment of the OH&S management system

Some direct benefits to employees and to the financial bottom line of the organization include:
- Reductions in downtime and associated costs
- Recognized demonstration of legal and regulatory compliance
- Increased access to new customers and winning additional work (especially with governmental agencies)
- Reduction of public liability insurance costs
- Reductions in the number of incident reports for several consecutive periods
- Due to the results achieved, certain organization's top management has justified direct re-bates to employees for safety shoes and other safety equipment, and existing PPE was often enhanced.
- Procedures were updated to reflect current practices; Records were maintained and standardized, which resulted in a more reliable reporting system and more meaningful data.
- All employees or those working on the organization's behalf have been trained and/ or refresher training has been provided, and training has been extended into new employee orientation programs. Evacuation drills were held as well as specialized training in CPR, proper fire extinguisher use, spill cleanup, pollution prevention, and conservation of energy and resources.
- Turnover rate has decreased.

## XII. Recommendation

The benefits discussed above provide a strong basis to make an informed decision as to whether ISO 14001 and OHSAS 18001 should be in the organization's plans. If the organisation makes a determination that ISO 14001 and OHSAS 18001 should be in its future, it should not wait until its best customers, a governmental agency or an industry association, requires the organisation to get certified in six or nine months in order to continue to do business with them.

The organisation should
- Comply with all applicable laws and regulations.
- Attain incident free operations through the systematic risk identification and mitigation.
- Use resources efficiently and minimize environmental impact.
- Ensure a safe, healthy and secure work place.
- Provide the employees and contractors with the knowledge and capability to achieve HSE excellence, including empowering them to stop work they believe is unsafe.
- Set operational and compliance objectives and be accountable for our performance.
- Communicate the principles and results to employees, contractors, regulators, communities and other stakeholders.

Organisation should implement the action plan and be recognized for EHSMS excellence through active leadership and employee ownership.

## XIII.    Conclusion

Organisation should be committed to the safety of everyone who works in its facilities. It should conduct the business with care for the environment and strive for world class operating excellence by integrating Health, Occupational Safety, Process Safety and Environmental principles throughout the businesses with a commitment to continuous improvement.

## References

[1].    ISO (International Organization for Standardization). Quality and Environmental Management.  ttp://www.iso.org/iso/en/iso9000-14000/index.html
[2].    Yassi, A. et al. 1998. Basic Environmental Health. WHO/EHG/98.19. Office of Global and Integrated Environmental Health, World Health Organization, Geneva.
[3].    Policy on Occupational Health and Safety Risk Management; The Northcott Society; 2007
[4].    Managing Health and Safety Risk; University Newcastle Australia; 2012