

# Guide to Good Industry Practices HSE Management Systems

GOOD  
INDUSTRY  
PRACTICES

## The World LPG Association

The World LPG Association (WLPGA) was established in 1987 in Dublin, Ireland, under the initial name of The World LPG Forum.

The WLPGA unites the broad interests of the vast worldwide LPG industry in one organisation. It was granted Category II Consultative Status with the United Nations Economic and Social Council (ECOSOC) in 1989.

The WLPGA exists to provide representation of LPG use through leadership of the industry worldwide.

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# Chapter One

## Background

The WLPGA is committed to providing independent advice to LPG stakeholders to ensure safety in the operation of LPG equipment and how to run LPG businesses safely.

The two WLPGA Guidelines – [Good Business Practices](#) and [Good Safety Practices](#) have been used extensively during the last fifteen years all over the world to provide guidance across all areas of the LPG industry.

These two Guidelines have been designed to provide general advice to all stakeholders on best practices throughout the supply and distribution chain.

Following the success of these guidelines it was decided to develop and publish more detailed advice in certain areas of the supply and distribution chain that are considered more critical and where more prescriptive advice would be helpful.

The first of these Guides covered the important subject of [LPG Cylinder Management](#). This Guide addressed the life cycle of a LPG cylinder from acquisition through to disposal.

This latest Guide focuses on how the Health, Safety and Environmental (HSE) issues of a business can be managed. This *Guide to HSE Management Systems* provides advice to stakeholders in setting up an HSE Management System. The Guide may also be used as a check list for those wishing to review their HSE Management System already in place.

This Guide serves as an essential reference for staff in the planning and implementation of business operations to meet HSE objectives. It also provides an understanding of the mechanisms that need to be put in place to ensure continuous improvement of HSE performance. And finally, it gives interested parties an understanding of how HSE can be managed within the LPG business.

Examples of how an HSE Management System can be practically applied are given throughout.

## Chapter Two

# Introduction Scope and Purpose

The safety track record of the LPG industry has been very good but as the global business continues to grow, and that growth brings more new personnel into it every year, and with operating risks increasing, the need to be vigilant continues to be essential.

LPG companies are required to conduct their activities in such a way that they take foremost account of the health and safety of their employees, customers, contractors, communities, and that they give proper regard to, and promote the protection of, the environment.

Effective Health, Safety and Environmental (HSE) management is more crucial than ever. None more so than in the LPG industry where, because of the nature of the product – unless there are strict controls over the storage, handling, distribution and use of LPG – serious consequences may result.

Public expectations are high, and legislation is becoming more stringent. This is reflected below in the Statement of General Business Principles of a large LPG organisation:

*“... It is our policy to conduct all activities in such a way as to take foremost account of the health and safety of our employees and of other persons, and to give proper regard to the conservation of the environment. Our companies pursue a policy of continuous improvement in the measures taken to protect the health, safety and environment of those who may be affected by our activities. Our companies establish health, safety and environmental policies, programmes and practices and ensure they are integrated in a commercially sound manner into each business as an essential element of management...”*

This Guide to HSE Management Systems has been developed to meet these needs in a practical and efficient manner. It builds on experience with management systems in several member companies. Although requiring additional effort to put it into place, the rewards in terms of better management and reduced risks will make it well worthwhile.

This document provides direction and conceptual guidance. It describes the main elements necessary to develop, implement and maintain an HSE Management System.

A sound HSE Management System reflects the pyramid outlined in Figure 1 which flows right through an organisation.

This Guide gives examples of some typical objectives. It does not lay down specific performance requirements but provides examples of what could be applied together with some examples of performance measures that could be used.

It may be used by companies and managers to review their own policies and to set their own objectives, taking account of information about significant hazards and environmental effects in their businesses.

Companies of course must comply with the requirements of any local legislation where they operate but they must implement a systematic approach to health, safety and environmental management, involving staff at all levels in the organisation. This structured approach, led by top management, is the key to sustainability in HSE performance and continuous improvement.

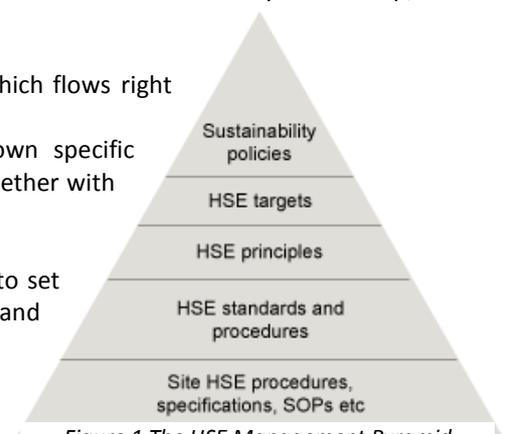


Figure 1 The HSE Management Pyramid

This Guide to HSE Management Systems defines the primary elements of an HSE Management System. It aims to:

- Serve as an essential reference for staff in the planning and implementation of business operations to meet HSE objectives
- Enable everyone to understand the mechanism put in place to ensure continuous improvement of HSE performance
- Give interested parties an understanding of how HSE can be managed

## Chapter Three

# Main Components and Structure of an HSE Management System

Key HSE management principles start at the very top of the organisation, at Chief Executive (CEO) or Chief Operating Officer (COO) level. And from there, there must be visible management commitment throughout the organisation.

A typical HSE Management System structure is shown in Figure 2 where sound HSE policy is set out in the policy and strategic objectives of the organisation.

It provides for all the main elements that are found in any Quality Management System, from the setting of objectives to management review of the system.

The key requirements of each of these elements in Figure 2 are described in this Guide in Chapter Five.



Figure 2 - Typical structure of an HSE Management System

There must be line responsibility for HSE, supported by competent HSE advisors/implementors. The HSE standards must be set high, be well understood, and backed up with effective HSE training.

Tough, but realistic HSE targets and objectives must be set.

The organisation must display effective motivation and communication and use techniques for measuring HSE performance and seek continuous improvement.

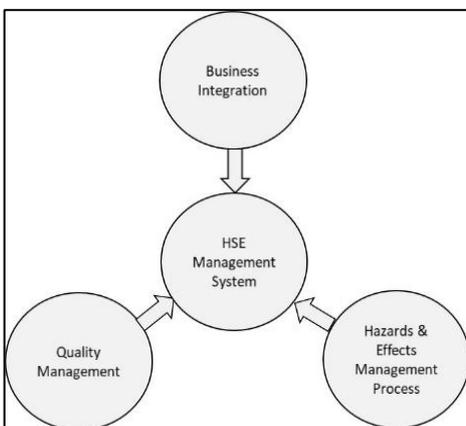


Figure 3 - HSE Management System Model

Incidents must be thoroughly investigated and followed up, and there must be regular audits of HSE standards and practices.

An HSE Management System is just one part of the overall system for managing the business. A typical HSE Management System model is shown in Figure 3.

Application of the Hazards and Effects Management Process (HEMP) ensures that the identified risks to Health, Safety and the Environment are adequately addressed, and that focus is maintained on those activities critical to HSE.

This Guide to HSE Management System aims to provide the tools to consistently and effectively manage HSE in an LPG organisation.

The system contains the eight elements outlined above – and detailed in Chapter Five – and is built on three key principles:

- (i) Integration of HSE into a business operation through the application of appropriate management controls and accountabilities at all levels critical to HSE
- (ii) Identification and control of HSE hazards and risks in all areas of the business and activities via the application of the hazards and risk management tools and processes
- (iii) Application of a Quality Management system loop of Plan-Do-Check-Act to ensure the HSE Management System is 'live' and working

Any HSE Management System needs to be reviewed annually and updated accordingly. The owner of the HSE Management System should always be someone very senior in the Organisation, preferably the CEO or COO.

# Establishing an HSE Management System

HSE management is just one aspect of managing an LPG business. But for an HSE Management System to be fully sustainable and effective, line managers must be responsible for HSE management within their organisation.

HSE requirements should be incorporated into policies, planning, programs and procedures in a manner that aids the proper conduct of the business and that is understood throughout the organisation. This integration into the business will also make the most efficient use of management resources and help to achieve results without harm to people or the environment in which the company operates.

Individual programmes to implement this system will reflect the wide diversity that exists among businesses.

The introduction of an HSE Management System and related requirements will need significant effort and will take time and require resources. It is however possible to introduce an HSE Management System in stages, for example by:

- Introducing the HSE Management System first, basing it on known hazards, incidents/accidents experienced and existing controls, and completing the system by filling in the gaps
- Starting with the Hazards and Effects Management Process, demonstrating the results for an operation or facility, and structuring the HSE Management System on that basis
- Completing a Safety Management System first, and then extending this to cover health and the environment

A pilot project may help to develop an effective approach.

Whatever the approach, the key objectives of the HSE Management System should be kept in mind:

- It builds on existing principles and guidelines to establish an effective and efficient management system for HSE
- It is set up to eliminate or minimise risks to people and other interested parties who could be exposed to safety and environmental hazards associated with the company's activities
- It enables management to obtain assurance that hazards and effects are identified and controlled to an agreed standard
- It forms a starting point for continuous improvement, or improvement in steps

# Elements of an HSE Management System

There are eight key elements to the HSE Management System described in this Guide and perhaps the most important one is having commitment from the very top of the organisation under review.

### 5.1 Leadership and Commitment

The very senior management of an organisation should demonstrate strong, visible leadership and commitment. They should allocate sufficient resources to develop, operate and maintain the HSE Management System and thereby attain the organisation's policies and strategic objectives.

Line management should ensure that the HSE policy is properly observed and should provide support and resources for local actions needed to be taken to protect health, safety and the environment.

The organisation should create and sustain a culture that supports the HSE Management System through its policy, strategies and action plans, and through the individual contributions of employees and contractors. Each employee, at all levels, must be aware of his/her role and personal responsibilities in carrying out their duties.

An example of a typical objective:

- To create and sustain an organisational culture that supports an effective HSE management system through demonstrable leadership and commitment to HSE by managers, supervisors, employees and contractors at all levels in the organisation.

Some examples of typical key requirements:

- (i) Management at all levels demonstrates strong commitment and visible leadership to HSE through the following measurable actions:
  - Comply with all applicable laws and regulations, and internal company requirements, and take appropriate actions to correct deficiencies
  - Integrate requirements of the HSE Management System into business plans and operations and provide adequate resources to assure HSE objectives are met
  - Ensure HSE policies, targets, objectives and action plans are communicated, understood, and implemented at the appropriate levels in the organisation
  - Review and discuss HSE performance and issues during management meetings as the first item on the agenda
  - Conduct regular site inspections and observe for unsafe acts and conditions during these plant walkabouts
  - Include HSE in individual performance targets and appraisals of employees at all levels

- Participate in reviews of HSE incidents appropriate to the severity of the actual and potential consequence
  - Recognise good HSE performance and proactive initiatives with appropriate rewards and incentives and at the same time implement consequence management for HSE violations.
  - Senior leaders should discuss HSE matters and participate in HSE initiatives during visits
  - There should be passion in the organisation for HSE, led from the top of the organisation and driven by passionate HSE managers
- (ii) All employees and contractors are required to contribute to the continuous improvement of HSE performance within their organisation and have a clear understanding of the consequences for not complying with HSE requirements
- (iii) Employees and contractors understand they have the right and responsibility to stop work where there are circumstances that may cause HSE harm, and to immediately bring those situations to the attention of management

Some examples of typical performance measures:

- Senior management HSE targets
- Individual safety performance targets of employees
- Publication and distribution of HSE information
- Deployment of HSE Management System
- Safety and environmental KPI's of sites

## 5.2 Policy and Strategic Objectives

The HSE policy of an organisation, or site, is a statement of intentions and principles of action and expresses the vision of the organisation or company in HSE matters. It should be based on the organisation's Statement of General Business Principles and the Policy Guidelines on Health, Safety and the Environment.

The HSE strategic objectives of an organisation are a description of the HSE performance that the organisation wishes to achieve based upon the company vision and HSE policy. These objectives should be quantified wherever practicable.

An example of a typical objective:

- To establish, communicate, and maintain a sound, brief (written on one page), HSE policy and coherent objectives appropriate to the products, services and activities of the organisation

Some examples of typical key requirements:

- (i) HSE Policy shall apply to all companies, subsidiaries and joint ventures that are under the operational control of the organisation, including contractors performing services on its behalf. The requirements in the HSE Management System shall apply across the organisation
- (ii) Each company within the group must establish its HSE policy aligned with the organisation's HSE Policy. The Policy must be signed, distributed, displayed at all sites, and made available to all employees and contractors
- (iii) The overall HSE objective of the organisation is to reduce risks associated with the business to as low as reasonably practicable (ALARP)

- (iv) A strategy of continuous improvement in HSE performance for every part of the organisation shall be pursued and a process implemented to attain a proactive HSE culture across the organisation
- (v) HSE objectives must be documented and contain the organisation's short and long-term goals. In support of this, annual HSE plans and targets measurable at all levels of the organisation must be established
- (vi) Management throughout the organisation should communicate progress against HSE plans and targets across the organisation through various means i.e. bulletins, internet, etc. Senior managers should likewise report this during regular engagement with staff
- (vii) (For international organisations) Country management are responsible for establishing and implementing country specific requirements as needed

Some examples of typical performance measures:

- HSE policy signed and displayed at all sites
- HSE objectives communicated across the organisation
- HSE plans and targets established down to individual units
- Monitoring HSE KPI's

### **5.3 Organisation, Responsibilities, Resources, Standards and Documentation**

Successful handling of HSE matters is a line management responsibility requiring active participation of all levels of management and supervision. This should be reflected in the organisational structure, definition of responsibilities, resources applied and required competencies, with accountabilities defined at every organisational level in the HSE program.

Any contractors should be required to operate a management system consistent with the requirements and provisions of the organisation's HSE Management System.

The organisation should set HSE Standards as references to which activities should be carried out, using HSE guidance documents and industry standards where applicable.

Accurate, consistent and verifiable HSE performance data should be generated and documented.

An organisation should have a communications programme that recognises the concerns of shareholders, employees and society on HSE matters and that programme should provide relevant information.

The HSE Management System and its elements should be documented to enable consistent application and efficient auditing.

Some examples of typical objectives:

- To establish and maintain an organisation which supports effective HSE Management
- To implement an effective document control system in support of HSE management

Some examples of typical key requirements:

- (i) Management shall ensure that the organisation is designed and supported with adequate resources - i.e. human, financial, and infrastructure - to comply with any local laws and regulations and to support effective HSE management, including the implementation of all the requirements of an HSE Management System

- (ii) Responsibilities and accountabilities of personnel involved in HSE management shall be clearly described, communicated, and understood at all levels. Such positions may include but not limited to the following:
- The Chief Executive (or Managing Director) – is ultimately responsible for HSE performance of the organisation. He / She is responsible for:
    - Setting the overall HSE vision, objectives and targets of the organisation
    - Ensuring the HSE Policy and requirements of the HSE Management System are effectively implemented
    - Making appropriate resources available to provide HSE advice and support to business activities
    - Putting in place a mechanism to demonstrate compliance with all legal and company standards
    - Ensuring fully documented material is available to confirm risks associated with critical operations and the facilities are controlled to ALARP
  - General Manager – is responsible for the HSE performance of the organisation. He/she is the owner of the HSE Management System in his/her area of business. Specific responsibilities might include:
    - Establishing the organisation and controls to ensure that all activities are conducted in accordance with the HSE Management System
    - Promoting and maintaining a high level of HSE awareness and commitment amongst all staff
    - Ensuring that decisions involving HSE issues are given equal importance to any other critical business activity
    - Providing adequate resources to meet HSE policy requirements and objectives
    - Formulating and adopting safe and environmentally sound working systems, procedures and practices which meet company standards and comply with local statutory requirements
    - Maintaining the technical integrity of the plant and depot assets
    - Ensuring that HSE responsibilities of all employees and contractors under his/her control are clearly defined
    - Developing HSE objectives that are consistent with the company objectives
    - Monitoring the performance of the company against HSE objectives and the performance of line managers with respect to departmental targets
    - Establishing individual HSE targets and monitoring the performance of each employee and contractor against these targets through the staff appraisal and contractor review processes
    - Preparation of, and input to, annual HSE Plans
    - Participating in HSE audits and reviews
    - Responsibility for short-term and long-term HSE objectives and plans
  - HSE Manager - is responsible for providing specialist advice and support to the local team to assist them in the discharge of their HSE responsibilities. He/she is the custodian of the HSE Management System in his/her company. Specific responsibilities might include:
    - Developing and assisting in the implementation and maintenance of policies and guidelines on HSE
    - Responsible in formulating short-term HSE objectives and plans
    - Assisting in formulating long-term HSE objectives and plans

- Preparing for approval and coordinating the implementation of HSE plans
  - Monitoring, evaluating and reporting HSE performance against plans and targets
  - Developing initiatives to sustain awareness and commitment to HSE
  - Maintaining HSE auditing expertise and ensuring execution of the HSE audit programme
  - Obtaining and providing specialist technical support and advice on any of the HSE Management System elements whenever needed
  - Responsible for incident investigation and review with assistance from line managers
  - Maintaining contact with external parties regarding HSE issues, including government authorities, legislative bodies and industry groups
  - Conducting company activities such as safety quizzes / suggestion schemes / competitions etc. to encourage the participation of employees
  - Ensuring written information about processes, chemicals - including MSDS and equipment - is accessible to employees
  - Preparing critical procedures & instructions in English – and in the local language – to be fully understood by everyone
- Line managers and supervisors – are responsible for the HSE performance in their area of the business. Specific responsibilities might include:
    - Promoting and maintaining a high level of HSE commitment amongst all staff in their department
    - Ensuring sufficient resources in their area of responsibility are in place to meet HSE policy requirements and objectives
    - Ensuring the identified hazards and risks in his/her area of responsibility are managed to ALARP in accordance to the HSE Management System
    - Establishing the organisation and controls to ensure that all activities are conducted in accordance with the requirements of HSE policies and standards
    - Monitoring the performance of the department against HSE objectives
    - Participating in HSE audits
    - Assisting HSE manager in incident investigation and review
- Employees and Contractors – are responsible for cooperating fully in the implementation of all HSE policies and plans. Specific responsibilities might include:
    - Complying with all HSE rules and procedures against a clear written action plan
    - Working in a manner that does not pose a risk to themselves, others and the environment
    - Reporting all near misses, incidents, hazards, defects and inadequacies in procedures
    - Involvement in Internal Safety Audits and Job Safety Analysis
    - Understanding the operation of the plant, including health and safety hazards associated with products & the work environment
    - Be trained on the use of personal protective equipment (PPE)
    - Be informed about relevant safety & health issues
    - Participating in HSE committees at floor level to review HSE plant issues
    - Be involved in management of change related to process & equipment
- Off the job safety - analysis of the off-the job injuries normally shows that they are more costly than lost time on-the-job injuries. Encouraging employees to be safe away from the work place helps to preserve

skills that could be temporarily or permanently lost. It has the added advantage of keeping the absenteeism low.

Being careful everywhere creates a good mind-set. Individual's concentration on the job is likely to be enhanced by concentration off-the-job and the plant or office is a healthier and safer environment because of it.

The benefits are widely shared throughout the plant or office communities and the following measures might be adopted to encourage off-the-job safety:

- The organisation should have policies to encourage off-the job safety of employees
  - The reporting and analysis of the off-the-job injuries to employees and their families should be encouraged
  - Findings of the analysis of any off-the-job injuries should be known to all the employees through newsletters / magazines / bulletins
  - There should be topics covering off-the-job safety incorporated in the newsletters / magazines / bulletins
  - Safety quizzes, contests and competitions should be organised for the family members of employees to motivate them towards off-the-job safety
- (iii) Management at all levels in the organisation have the responsibility to ensure that the employees and contractors carrying out HSE critical tasks are competent
- (iv) HSE critical positions in the organisation should be identified, and their respective competency requirements established and reviewed regularly
- (v) Competency assessments are undertaken for all staff in HSE critical positions. Supervisors must prepare a competence development plan to close out identified gaps and ensure appropriate mitigating measures are in place until staff have attained full competency requirements of their positions
- (vi) Contractors should be required to implement an equivalent competence assurance process
- (vii) Procedures should be established that identifies and accesses all relevant HSE laws, regulations, approvals, licenses, permits and other requirements for legal compliance. Procedures should be documented in a compliance register that is regularly reviewed, updated and communicated to pertinent staff
- (viii) Companies should maintain a document control system that identifies documents to be controlled and ensure that only controlled versions of the document are made available to employees. Controlled documents may include as-built drawings, design data, standards, operating procedures, and relevant HSE records
- (ix) The document control system should include the following:
- Document Control System Owner
  - Document Custodian
  - Document Number
  - Date of Issue
  - Frequency of Review
  - Revision History

- Retention period (if applicable)
- (x) Employee health and medical reports should be kept and retained as necessary subject to confidentiality requirements

Some examples of typical performance measures:

- HSE Competence key performance indicators (KPI's)
- Responsibility Matrix
- Legal compliance KPI's
- Document Control system

## 5.4 Hazards and Effects Management

Identifying and managing hazards and adverse effects of activities is a vital part of HSE Management. The Hazards and Effects Management Process (HEMP) is designed to do this and consists of four basic steps: identify, assess, control and recover.

These four steps are inherent in many existing techniques used in HSE. Hazards and effects management is not a new concept.

This systematic process ensures effective management of HSE by selecting controls for each relevant threat capable of triggering a hazard or causing an effect.

It can be applied by starting with the hazard or effect directly, or by first applying it to the activity or work being done.

The four steps of the Hazards and Effects Management Process are shown in Figure 4.

- Identify – What hazards are present? Are people, the environment, the organisation’s reputation or assets exposed to these hazards?
- Assess – Can the hazard be eliminated? What are the threats that can release the hazard? What are the credible scenarios and how likely are they? What are the potential consequences? What is the potential likelihood of the hazardous event? What is the risk?
- Control – How are the hazards and their risks managed? What are the controls and barriers? How effective are they?
- Recover – When a hazard is released, what are the recovery measures in place? How can the consequences be mitigated or minimised?

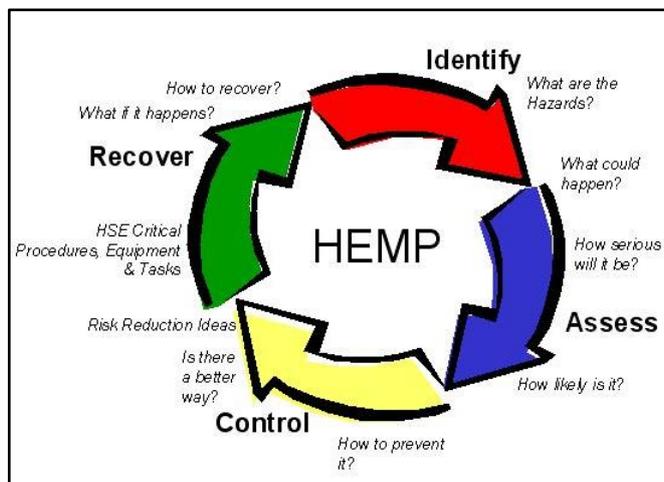


Figure 4 - The 4 steps in the HEMP Process

In practice, the stages are not always distinct, and many decisions about the overall process are taken as a whole.

The Hazards and Effects Management Process should be applied to past, current and new activities, operations, products and services. It involves the assessment of HSE impacts - or potential impacts - on people, on the environment and on assets. The process should include the full life cycle of the activity from inception to termination.

Process Hazard Analysis (PHA) can be applied when assessing the hazards, and their risks, of a process. This is done to minimise the likelihood of the occurrence, and the consequences, of a dangerous substance release by identifying, evaluating and controlling the events that could lead to the release.

A PHA provides information which assists in making decisions for improving safety and reducing the consequences of unwanted or unplanned releases of hazardous chemicals, including LPG.

The PHA of existing facilities should be performed in order of priority in terms of hazards of the process. A preliminary hazard analysis may be useful in determining the coverage of the process safety management standard. Factors such as quantities, susceptibility to failure, mode of failure, proximity, severity, process complexity, operating history etc. should be considered while establishing priority.

In performing the PHA for a new process or facility, special consideration should be given to previous experience with the process and design circumstances. These may include shorter-than-normal design periods, or changes in the design team, or the design itself after the project is under way.

Some basic steps to be incorporated in PHA should include:

- (i) Identification - Based on the process safety information, expertise and experience with similar facilities, failure scenarios that could result in catastrophic release
- (ii) Assessment - The likelihood and consequences of the failure scenarios should be assessed using qualitative or quantitative techniques judged to be appropriate
- (iii) Alternatives - Feasible changes to reduce the risk of occurrence and the consequences of the failure scenarios should be identified

An example of a typical objective:

- To ensure a systematic and proactive approach to identifying, assessing and managing HSE hazards and risks associated with the company's activities to prevent or reduce the likelihood and consequence of incidents

Some examples of typical key requirements:

- (i) Risk is managed by identifying hazards, assessing consequences and likelihood, controlling the causes, implementing preventive measures and preparing recovery plans if control fails
- (ii) Companies should maintain an HSE risk register that contains inventory of all applicable hazards (health, safety and environmental), their assessed risk, risk causes, and worst possible consequences to people, assets, the environment and reputation of the organisation
- (iii) Where risk cannot be eliminated, control measures should be selected and implemented to effectively manage the risk to ALARP and its associated recovery plans in case control is lost. The hierarchy of controls to be applied is always as follows:
  - Eliminate: Remove the hazard if possible
  - Substitute: Replace the hazard by a lesser hazard
  - Engineering: Make changes to processes, plant, equipment to reduce the hazard
  - Procedure: Put in place procedures to minimise risk to workers
  - Behaviour: Follow safe work practices
  - PPE: Use Personal Protective Equipment as a barrier against the hazard

- (iv) Companies must identify all critical activities in their business that has been risk assessed as significant i.e. possible consequence of serious injury to people, serious environmental impact etc. A detailed analysis of the risk shall be undertaken to identify and select the critical controls necessary to reduce risk to ALARP, and record this in the Hazard Register
- (v) Where risk cannot be reduced to ALARP level, the local management should escalate this to higher management for further action
- (vi) Risk assessment should only be conducted by a competent person with relevant knowledge and experience of the location and operation
- (vii) The HSE Risk Register should be reviewed at least annually, and following a significant change or significant incident to reflect new learning and changes
- (viii) Employees and contractors should be made aware of the hazards and risks associated with their work and understand the necessary mitigating measures to be taken to minimise risk through a work permit system
- (ix) Health risk assessment should be performed to address chemical, biological, physical, ergonomic and psychological health hazards at all worksites. Any health risks identified should be managed through preventative and protective measures
- (x) Employees in HSE Critical positions should be assessed for their fitness for work through a medical assessment. Contractors should assess their own employees for fitness to work
- (xi) Product Stewardship principles should be applied at all stages of the product life cycle. This includes the following:
  - Conduct assessment of new products and services prior to marketing or distribution to identify health, safety and environmental hazards associated with their normal use and potential misuse, and their ultimate disposal
  - Implement a system to record and assess customer complaints on product safety and quality and respond to emergency request for product safety information
  - Issue warnings and recall notices in case a product defect may give rise to health, safety and environmental hazards
  - Material Safety Data Sheets (MSDS) for hazardous materials to be made available to employees, contractors, distributors and customers in accordance with legal and customer requirements, and when information changes
- (xii) All significant changes to organisations, personnel, processes, equipment and procedures shall be assessed and managed to ensure the HSE risk arising from these changes are at acceptable levels. A documented procedure should be in place to ensure all necessary actions are identified, approved and completed and all relevant documentation updated
- (xiii) Environmental effects for all major activities and facility developments - or significant modifications to existing ones - should be identified, assessed and monitored. Where statutory requirements apply, the environmental effects assessment or environmental impact study should be compliant with local laws and regulations. Specialist advice should be sought and used where appropriate

- (xiv) Environmental risks should be reviewed and reassessed regularly
- (xv) Security threats and vulnerabilities, together with their potential impact, should be assessed for each location. Security measures proportionate to the assessed risks should be put in place and maintained. They should apply to all business assets, including people, equipment, buildings, information and reputation
- (xvi) Security risks should be reassessed at least annually
- (xvii) An HSE assessment should be conducted prior to any proposals for acquisition, divestment or merger of business entities
- (xviii) All joint ventures that are not under operational control should be assessed for HSE related business risks

Some examples of typical performance measures:

- HSE Risk Register
- Control measures identified and implemented
- Management of Change procedure
- Work Permit System
- MSDS for hazardous material

## 5.5 Planning, Procedure and Promotion

Companies should maintain, within overall work programmes, plans for achieving HSE strategic objectives and the performance criteria, and the plans for risk reduction measures, which have been selected through the Hazards and Effects Management Process. These should include planning for existing operations, managing changes and safeguarding asset integrity.

Procedures and work instructions are required to ensure that activities and tasks are carried out in a manner meeting the required standards. The promotion of these plans and procedures should be an active part of this process.

Some examples of typical objectives:

- To incorporate HSE management into business plans, work plans and procedures
- To put in place measures for ensuring operational safety and asset integrity
- To provide an effective response to crisis and emergencies.

Some examples of typical key requirements:

- (i) HSE planning is an integral part of business planning at all levels in the organisation
- (ii) At the corporate level, HSE goals, objectives and targets are set annually consistent with the HSE Policy to drive continuous improvement of HSE performance across the company. These goals, objectives and targets are linked to measurable leading and lagging indicators which are documented, monitored, communicated and reviewed regularly

- (iii) Companies should set their annual HSE targets and plans in a consistent manner and consider significant risks identified, legal and other compliance requirements, findings from internal and external audits, and local business requirements. HSE action plans should include responsible parties, timelines to close and resources needed to achieve the targets
- (iv) Individual HSE KPI's are set that support the achievement of these goals and targets. They are assessed as part of a rewards scheme and included in yearly employee performance appraisal process
- (v) Documented operating procedures and work instructions are available for all HSE Critical activities
- (vi) Operating procedures and work instructions are stated simply and unambiguously and indicate the responsible parties, methods to use, and where appropriate performance standards and criteria to be met
- (vii) Each procedure and work instruction shall have a designated owner who will ensure it is reviewed and updated as necessary
- (viii) Design, construction and commissioning of new or modified facilities and assets must take into consideration the projected HSE risks and follow technical standards that are compliant with legal requirements, relevant industry codes of practice and standards. Deviation from approved designs must be formally approved by a technical authority designated by the organisation
- (ix) Asset Register and Safety Critical Equipment lists are maintained by the Company detailing all assets and equipment, their design, construction and commissioning records. The full inventory shall be updated for new constructions, acquisitions and disposals annually
- (x) A proactive maintenance plan should be implemented for all safety critical equipment to ensure asset integrity and compliance with legal requirements. The maintenance plan shall indicate the inspection schedule, responsible person and scope of work to be done. All inspections and maintenance works done are documented and records kept according to approved retention period
- (xi) Emergency response plans for individual facilities and operations are developed that address all possible emergency scenarios that have been identified for the facility and operation including medical and environmental emergencies
- (xii) Simulations and drills are periodically conducted (at least quarterly) to test the effectiveness of the plan and the readiness of the emergency response team to carry out their roles and responsibilities in an emergency. On an annual basis, a collaborative emergency exercise must involve external entities and stakeholders as appropriate and learnings incorporated into the emergency response plans
- (xiii) Safety promotion using visuals play an important role in reminding personnel of safety information
- (xiv) Displaying posters, slogans - and graphs showing safety performance – especially in safety critical areas, is a constant reminder of the risks
- (xv) Displaying information reminding personnel of the Do's and Don'ts is a simple way of communicating safety reminders, especially at toxic chemical handling/storage and operational areas
- (xvi) The wearing of helmet and other Personal Protective Equipment (PPEs)

- (xvii) Clear labelling of chemicals and the risks of handling them
- (xviii) Availability of Material Safety Data Sheets (MSDS)
- (xix) Prominent positioning of safety manuals, rules and regulations
- (xx) Regular and interesting safety newsletters & bulletins
- (xxi) Wide dissipation of incident information

Some examples of typical performance measures:

- Annual HSE Targets and Plans
- Individual HSE targets
- Documented Operational Procedures and Work Instruction
- Asset Register and Safety Critical Equipment List
- Annual maintenance plans
- Emergency Response Plan
- Emergency drills planned and conducted

## 5.6 Implementation, Monitoring and Corrective Action

Activities and tasks should be carried out in accordance with procedures and work instructions developed at the program stage or earlier.

Key performance indicators (KPI's) should be monitored and results recorded to demonstrate the extent of compliance with the HSE Management System. The actual performance of activities critical to HSE should be compared with the management controls and the risk levels established during application of the Hazards and Effects Management Process.

Systems in plants and terminals should to be monitored regularly for effective implementation:

- Checking of safety interlocks
- Internal audits of plants/facilities
- Management of change
- Testing/Inspection of equipment
- Checking of fire detection and protection system

The primary line of defence is to operate and maintain the plant and the process as designed, and to keep any hazardous materials contained. This is backed up by possible controlled release of materials through venting to scrubbers or flares, or to surge or overflow tanks which are designed to prevent unwanted releases.

The secondary line of defence would include fixed fire protection system such as sprinklers, water sprays or deluge systems, monitors etc. Designed drainage systems, dykes and other systems will control or mitigate hazardous chemicals once an unwanted release occurs. Remembering that LPG vapour is heavier than air.

The primary and secondary lines of defence should be protected by mechanical integrity programs and strengthened wherever necessary.

One of the most critical periods in an operation is the start-up of the process. Before a new or modified unit is started, a systematic check should be made to ensure that the equipment has been installed properly, operating procedures have been reviewed, items needing attention from PHA's have been resolved and personnel have been trained.

Management should perform a pre-start-up safety audit for new facilities, for modified facilities when the modification is significant enough to require a change in the process safety information, as well as for start-up of existing facility/plant after turn-around. This confirms that the construction is in accordance with design specifications, and safety, operating, maintenance and emergency procedures are in place and are adequate.

For new facilities, process hazard analysis must be performed, and any recommendations have been resolved or implemented before start-up. Modified facilities must meet the requirements contained in management of change.

For non-routine work authorisation, the following issues should be considered:

- All non-routine jobs should be carried out in line with local instructions
- Non-routine jobs should be listed, and procedures defined to carry them out
- Roles and responsibilities for work authorisation, issue/receipt of permit, handing over and taking over, should be documented and implemented
- A system of proper authorisation should be instituted for any changes to procedures and practices

Any confidential formula, pattern, process, device, information or compilation of information that is used in the business and could provide an opportunity to obtain an advantage over competitors, who do not know or use it, must be protected.

However, information needed about a process or product must be made available in such a way that both employee and contractor personnel understand any hazard that may be present and what precautions are necessary to protect them from exposure to these hazards.

This information is required for compiling process safety information, developing PHAs, developing operating procedures, incident investigations, emergency planning and responses etc.

If required, confidentiality agreements may need to be made with the supplier. The objective is to prevent casual access to critical technical information about a process or product by limiting the access to certain proprietary data.

An organisation should define the responsibility and authority for initiating investigations and corrective actions in the event of non-compliance with specified requirements relating to the HSE Management System, its operation or its results. Instances of substantial non-conformance should be reported to senior management.

Some examples of typical objectives:

- To ensure effective implementation of procedures
- To provide a systematic process for monitoring HSE performance and reporting incidents

Some examples of typical key requirements:

- (i) Employees and contractors should be made aware of the proper HSE behaviour expected of them and have a clear understanding of the consequences of inappropriate conduct or violation of rules and procedures. Systems are in place that recognise, reinforce and reward HSE innovation, initiatives, desired behaviour and results
- (ii) Procedures are in place at the companies for monitoring, measuring, recording, and analysing HSE performance using key performance indicators (KPI's) and reporting the results to internal and external stakeholders as appropriate. Some common KPI's used are as follows:

- Proactive KPI's indicate positive actions taken to improve HSE performance.
    - Completion rate of Annual HSE Plan
    - Completion rate of HSE Training Plan
    - Number of Emergency drills conducted versus the plan
    - Number of HSE audits/inspection conducted versus the plan
    - HSE Audit Findings Corrective Action Closure Rate
    - Number of Potential Incidents reported and addressed
  - Reactive KPI's indicate failures in HSE
    - Number of Fatalities
    - Number of Total Recordable Case (TRC)
    - Number of Lost Time Injuries (LTI)
    - Number of Total Recordable Occupational Illnesses (TROI)
    - Number of Uncontrolled Releases of LPG
    - Volume of leakages/spills
    - Number of Road Transport Incidents
    - Number of Overdue Inspections
    - HSE Fines and Penalties
- (iii) Companies should include targets for other KPI's at their discretion to drive HSE performance improvement
- (iv) HSE Performance data should be reported on a monthly and quarterly basis. Low values versus targets of proactive KPI's and high values of reactive KPI's indicate there are shortcomings and require further investigation and corrective actions
- (v) All employees and contractors have a responsibility for reporting work-related incidents that have resulted in injury to people, damage to property, equipment and the environment as well as near misses. Organisations should encourage the report of these issues and adopt a 'no blame policy'. Incidents are classified according to the severity of consequence and reported to the General Manager according to the following timelines:
- Minor Incident - Near Misses, First Aid Cases, Minor Asset damages (within 48 Hours)
  - Major Incident - Incidents resulting to major injuries and asset damages (within 24 hours)
  - Serious Incident - Incidents resulting to single or multiple fatalities and plant/depot shutdown (within 12 hours, or immediately if very serious)
- (vi) Every incident should be investigated, and a detailed investigation report compiled. Major incidents are investigated by a cross-functional team led by a management team member. Investigation of serious incidents should involve the Managing Director. The investigation must:
- Identify the immediate and root causes of the incident
  - Develop corrective actions to prevent a recurrence of a similar incident
  - Communicate the lessons learned from the incident across the organisation
- (vii) All incident investigations should be completed within a time frame not exceeding 30 days from the date of the incident
- (viii) Contractors should be HSE prequalified and evaluated for work prior to any bid evaluation and contract award. Contractors should be prequalified using the following criteria:
- Commitment to HSE
  - Effectiveness of their HSE Management System

- Technical and Professional competencies
  - Past HSE performance records
- (ix) Contracts should include the HSE requirements that contractors are expected to comply with. It is the responsibility of the contract owner to monitor compliance through regular contract reviews and apply sanctions in case of deviation from the contract HSE requirements
- (x) Contractors are required to identify the hazards and risks associated with their service and work, and provide the information on the measures to be taken to control them, prior to commencement of service or work
- (xi) The HSE performance of Contractors performing services on behalf of a company should be considered within the company's overall HSE performance

Some examples of typical reporting of HSE KPI's

- Incident Investigation and Report
- Contractor Pre-qualification procedure
- List of Approved Contractors
- Method Statements and risk assessments
- Permit to Work System

## 5.7 Audit, Corrective Action and Improvement

In any organisation, safety should be ensured through repeatedly highlighting its role in preventing injury and loss of life, damage to and loss of property and damage to an organisation's reputation. This can be helped through the provision of training/retraining to employees in safe working practices.

Some examples of how safety is enforced in an organisation are:

- Work Permit Systems
- Job safety analysis
- Training of employees and contractors
- Surprise checks
- Drills
- Operating manuals/Safety manual
- Periodic management information system (MIS) reports for monitoring by top management

The organisation should maintain procedures for audits to be carried out, as a normal part of business control, to determine whether elements and activities of the HSE Management System conform to planned arrangements and are implemented effectively.

These audits should be carried out by competent staff on a regular and agreed basis according to an established program and procedure.

Audits may result in corrective actions and areas for continuous improvement. Any substantial non-compliance should be reported to senior management. The company should develop and update a corrective action and improvements plan with the aim, where possible and practicable, of continuous improvement in HSE performance.

An example of a typical objective:

- To assess through periodic audits compliance with HSE policies and requirements and drive continuous improvement.

Some examples of typical key requirements:

- (i) An annual audit plan is prepared covering both internal and external audits to assess their conformance with this requirement and effectiveness of the HSE Management System
- (ii) Internal audits conducted by companies shall include the following:
  - Technical/Operational Integrity/Security/Health/Environmental audits
  - Compliance audit for all facilities and operations
  - Unsafe acts and unsafe condition audits
- (iii) Internal audits cover not only the company's facilities and activities but also those of any contractor under operational control
- (iv) Internal Audits should be carried out with multidisciplinary audit teams. The composition of the team should include personnel who have the necessary experience and background to undertake in-depth audits and be selected from various disciplines
- (v) External or independent audits should be conducted by a multi-disciplinary team of people from outside the business to check the compliance to the requirements of this HSE Management System. It should be scheduled based on the risk profile of the company to be audited and should be no longer than every 3 years
- (vi) The duration of the audit will depend on the nature and type/complexity but could be from 2 to 7 days
- (vii) Check lists are a useful tool for undertaking systematic safety audits. Check lists ensure that no important aspect is overlooked or forgotten. They also help to benchmark and maintain uniformity
- (viii) Performance improvement plans are a key output of an audit. The General Manager of the company audited should be responsible for ensuring all audit action items are implemented, monitored and regularly reported. The performance improvement plan should identify the corrective actions to be taken, designate the responsible parties and establish reasonable timeline to close out each action
- (ix) Further information can also be gathered through discussions (formal & informal), with site personnel and installation/plant managers, or other site officers who are responsible for the area being audited

Some examples of typical performance measures:

- Annual Audit Plan
- Audit Reports
- Performance Improvement Plan
- Number of overdue actions from audits

## 5.8 Management Review, Corrective Action and Improvement

Senior management should, at appropriate intervals, review the HSE Management System, its performance and results, to ensure its continuing suitability, and effectiveness, and where appropriate to implement continuous improvements and corrective actions.

This type of management review should include an overall assessment of the HSE Management System including the setting of policy and strategic objectives in the light of industry, societal, legal and regulatory developments.

An example of a typical objective:

- To establish requirements for management reviews of HSE performance

Some examples of typical key requirements:

- (i) Management reviews their HSE performance quarterly to:
  - Assess whether the targets and objectives are being achieved satisfactorily
  - Identify areas of concern that need further attention
- (ii) Management reviews the HSE Management System annually to assess:
  - Effectiveness and adequacy of the system
  - Continuing suitability of the system considering any changes to the business, legislation or external factors
- (iii) This annual review should take into consideration audit findings, incident reports, performance records and inputs of relevant stakeholders in the organisation
- (iv) An HSE performance improvement plan should be developed from the management review complete with corrective actions, responsible parties and timelines and its implementation tracked and monitored
- (v) Management of each company should submit to the Managing Director an annual HSE assurance letter summarising the status of the implementation of the HSE Policy, the requirements of this HSE Management System and compliance with HSE laws and regulations

Some examples of typical performance measures:

- Minutes of HSE Management System review
- Corrective Action Plan in place
- Number of overdue actions from the HSE Management System Review

## Chapter Six

# The HSE Report (Case)

The HSE report (HSE Case) is a documented demonstration of the effective working of the HSE Management System in an activity (e.g. operations) critical to HSE.

It aims to provide a simple, methodical and auditable reference document of all information relevant to the HSE aspects of an activity under review. It should show that an HSE assessment has been carried out and systematically applied.

HSE reports should be prepared and owned by those directly involved in the activity. They should be updated regularly.

The HSE report should conclude with a statement confirming that within the framework of the HSE Management System, the appropriate action has, or will be, taken:

- To meet the company's strategic objectives and performance criteria
- To reduce the risks in the execution of the work envisaged to a level that is considered as low as reasonably practicable (ALARP)

The manager in charge should sign off on this conclusion. It is an important report and legal advice should be obtained before signing.

# Appendix

## Definitions

**As Low as Reasonably Practicable (ALARP):** an acceptable risk level where further risk reduction measures will entail disproportionate resources compared to the benefits that would be gained

**Critical activity:** an activity which if performed outside of its expected parameters can lead to an incident

**Critical Controls:** equipment, procedures, personnel or a combination of any of these deployed as barrier to prevent an incident from occurring

**Hazard:** Source or situation or something with the potential to cause harm in terms of human injury or ill health, damage in property, damage to the workplace environment, or a combination of these.

**Hazard identification:** process of recognising that a hazard exists and defining its characteristics

**HSE Audit:** A process used to provide a systematic, independent assessment of the consistent and effective application of all or part of an HSE Management System

**HSE Critical Position:** any role in the organisation where the incumbent has key responsibilities that can impact on HSE

**Incident:** an unplanned and undesired event that has caused, or could have caused, damage, death, injury or ill health led (to people, assets, the environment or company reputation)

**Key Performance Indicator (KPI):** is a performance measurement; KPI's evaluate the success of an organisation, or of a particular activity (such as projects, programs, products and other initiatives), in which it engages

**Material Safety Data Sheet (MSDS):** document containing information on the potential health effects of and proper handling procedures for a chemical product

**Near Miss:** an incident that results in no injury or damage, but which had the potential to do so

**Operational Control:** having direct supervision over the activities and decision of an organisation

**Product Stewardship:** a concept where the health and environmental protection is focused around the product itself

**Risk:** The likelihood that a hazard will cause harm in combination with the severity of injury, damage or loss that might foreseeably occur

**Risk assessment:** overall process of estimating the magnitude of risk and deciding whether the risk is acceptable and determining the measures required to comply with statutory duty under, for example, the Health and Safety at Work Act 1974 and associated regulations, by reducing the level of incidents/accidents

**Safety Critical Equipment:** equipment whose failure to perform to its design specifications can lead to an incident

**Significant Risk:** risks with potential and actual consequence of serious injury to people and/or serious damage to asset or environment or company reputation

**Technical Authority:** a competent person authorised by the company to review technical matters

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