

RAS TEK PVT LTD
An ISO 9001:2008 certified Company

Health, Safety and Environmental Management System Manual

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HSE Policy

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1.1 Ras Tek Corporate HSE Policy

Ras Tek recognizes its responsibilities and is totally committed to the health and safety of its employees and to the protection of the environment. In this context, Ras Tek will conduct its activities to ensure:

- The health Safety of all employees wherever they may be working.
- The safe operation and maintenance of all plants and equipments.
- The protection of the environment from pollution and damage.
- The prevention of personnel injury and property damage to third parties, arising from the company's operations.

Ras Tek expects its employees and contractors to be responsible for meeting HSE objectives. All employees and contractors are empowered by the Ras Tek Management to stop any Ras Tek activity that they consider a threat to HSE. As well as being empowered, staff and contractors have a duty to intervene if any activity does not meet the Ras Tek standards.

Line Management is responsible and accountable for HSE performance. HSE performance is measured against ambitious targets and pursued through continuous improvements. Through the full use of all available work practices, everyone involved in Ras Tek Operations must strive for a HSE incident free work place.

HSE is an integral part of staff performance and appraisal. Appropriate training (formal and "on the job") is provided to meet the required HSE and technical competencies.

All HSE hazards is identified and risk reduction measures applied to reduce the risk to as low as reasonably practical (ALARP). Risk reduction methods e.g. QRA, HAZID, etc., are applied during project design and procedure reviews through to execution.

Emergency procedures are reviewed frequently, updated and regular emergency scenario exercises are carried out.

Ras Tek has produced a set of instructions, policies and procedures, in compliance with relevant legislation governing occupational health, safety and environmental matters. They are set out in Ras Tek HSE manual and in the annual HSE plan issued by the company.



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This Policy and the pursuit of the Company's objectives is based on the conviction that as well as reducing individual suffering and loss, a resolute determination to ensure that all activities are carried out in a healthy, safe and environmentally sensitive manner will contribute directly to the efficiency and success of its core business.

Ras Tek – Director

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1.1.1 Ras Tek HSE Slogan

This could be:

To Do a Job Safe is to Do a Job Right

Or

Safety Is Everybody's Business

Or

Safety Always Comes First

Or

Safety Does Not Happen By Chance



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1.2 HSE Policy Hierarchy

Ras Tek has '**ONE**' top level HSE policy supported by '**SEVEN**' other HSE policies. These **seven** policies cover specific areas, which complement the Corporate HSE Policy.

TOP LEVEL

1. Ras Tek Corporate HSE Policy

SECOND TIER

2. Ras Tek Occupational Health Policy
3. Ras Tek Safety Policy (incl. drugs and alcohol)
4. Ras Tek Environment Policy (incl. waste mgmt)

THIRD TIER

5. Ras Tek Technical Integrity HSE Policy
6. Ras Tek HSE Auditing Policy (incl. sub-contractors)
7. Ras Tek HSE Training Policy
8. Ras Tek HSE Emergency Preparedness Policy

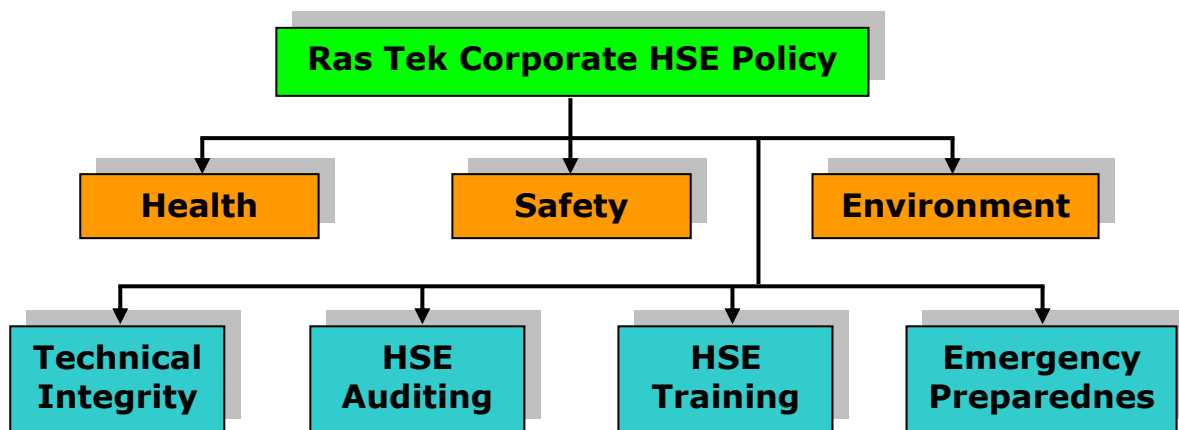


Figure 1.2 - Ras Tek HSE Policy Hierarchy



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1.2.1 Ras Tek Occupational Health Policy

Ras Tek has two parts to the health policy:

1. To promote and maintain the highest degree of physical and mental health, and social well-being of all Ras Tek employees. Sub-contractor employees health is monitored as appropriate.
2. To prevent work related illnesses relating to Ras Tek work programmes.

To achieve this, Ras Tek uses a health programme consisting of:

- Line advice on medical and OH matters.
- Health monitoring and support of individual Ras Tek staff:
 - 1) Pre-employment medicals
 - 2) Check-ups (post illness / accident medical / service extension).
 - 3) Special health assessment and risk related health surveillance.
 - 4) Adequate primary and appropriate secondary medical care (through private clinics and hospitals)
- Health monitoring of critical sub-contractor staff medical certificates.
- First aid will be available for effective paramedic response through to MEDIVAC at all Ras Tek work sites.
- Health education of the workforce and prevention of disease through immunization programmes.
- OH inspections and audits to ensure prevention procedures are in place.
- Public Health matters including food, water safety, personal hygiene, pest control and accommodation standards.
- Health Risk Assessment and control of health hazards to ALARP.
- Chemical and biological assessments of products used by Ras Tek

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1.2.2 Ras Tek Safety Policy

Ras Tek recognizes its responsibilities with regard to ensuring the safety of its employees and preventing accidents in its operations.

All necessary steps are taken to ensure the health and safety of employees and contractors wherever they may be working. All accidents and near misses are investigated to prevent re-occurrence.

Each employee and contractor must take every possible care to protect their own safety and the safety of others. While at a place of work, the employee and/ or contractor will use all equipment provided in the correct manner, obey all instructions of supervisors, and comply with all policies published or approved by Ras Tek with the aim of ensuring safety.

These instructions and policies are in accordance with the relevant legislation governing occupational health and safety matters. They are set out in Ras Tek HSE manual and in the annual HSE plan issued by the company.

Any employee or contractor who fails to abide by these rules will be disciplined and in the appropriate case, may be dismissed.

Any employee or contractor, who has any comments, information or suggestions, on how to improve the working environment, should not hesitate in contacting his or her Supervisor or the nearest Ras Tek operations centre.

All safety incidents are preventable through:

- HSE Management commitment being visible throughout Ras Tek.
- HSE Management System being used to ensure all HSE aspects are regularly and thoroughly reviewed throughout Ras Tek, and gaps are closed.
- Risk registers provided to ensure high level risks are controlled. New activities and changes to equipment, processes and procedures are re-assessed to confirm full compliance with safety standards. Products and services will be used in accordance with HSE advice.
- Safety awareness being kept at a high level for all Ras Tek staff and all contractors.
- All are expected to maintain and promote the highest possible standards of safety awareness and discipline. This requires that before any job is



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started the risks are assessed and reduced so no injury or accident will be caused.

- HSE Targets which are comprehensive, quantified, monitored and actively discussed to drive HSE performance.
- Alcohol and drugs: Ras Tek has a zero tolerance to alcohol and drugs if found or detected.

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1.2.3 Ras Tek Environmental Policy

Ras Tek will operate its facilities and equipments in compliance with applicable international and local environmental legislation.

Ras Tek is committed to develop and implement additional internal environmental protection requirements to ensure that environmental matters arising from specific Ras Tek operations requirements.

Ras Tek is dedicated to the implementation and the continual improvement of Environmental Management.

Ras Tek is committed to a pollution prevention strategy.

Ras Tek will identify, document and review environmental aspects, objectives and targets to performing our operations in a way that:

- Minimize to ALARP the risk to the environment.
- Minimize discharges to the environment by focusing on waste volume reduction efforts.

Ras Tek will adequately train its employees to ensure awareness, understanding and implementation of environmental roles, responsibilities and accountabilities.

Ras Tek Facility Managers will ensure that this policy is followed and they are familiar with the environmental issues at their facility.

Ras Tek Corporate Management will fully support the implementation of this environmental policy and commit the necessary resources to ensure a level of dedication appropriate to its importance.

Ras Tek Environmental Policy will be displayed as appropriate and communicated to Ras Tek employees, clients, contractors, and the public. It will be reviewed at planned intervals as part of the Management Review to ensure the policy continues to be appropriate to the nature, scale and environmental impact of Ras Tek activities, products and services.

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1.2.4 Technical Integrity HSE Policy

The technical integrity of all Ras Tek assets has top priority for Ras Tek and should be considered along with HSE requirements. Support for work on technical integrity includes the application of a Project HSE Review for projects and quality management through the Ras Tek organization structure the following will be applied as required:

- **Project HSE Review process** to ensure HSE and risks are considered throughout new projects.
- Document and **data control**.
- **Management of Change**.
- **Hazard and Operability Studies (HAZOP)**.
- **Qualitative and Quantitative Risk Assessments**.
- **Purchase** of high quality products, materials and services including product delivery control and vendor documentation requirements.
- **Inspection** and testing.
- Control of non-conforming products.
- **Audits**.
- Training and **qualifications**.
- **Certification** requirements.
- Original Equipment Manufacturer (**OEM**) for HSE critical equipment.

Many of these requirements are set out in the Corporate quality assurance and quality control manual.



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1.2.5 HSE Auditing Policy

Ras Tek will ensure HSE systems are effective through a comprehensive compliance monitoring plan. This annual Ras Tek plan will be risk based and comprise of:

- **Internal HSE Audit Programme**
- **External Audits Third Parties and Clients**
- **Management Facility Inspections**
- **Facility Cross Inspections**

The audits will consider facilities, systems, equipment, contractors and sub-contractors. All follow-up and action points will be tracked via a HSE department run system with closeout percentages reported monthly.

This Ras Tek compliance monitoring plan will be supplemented through client inspections and reviews. Audit leaders will be formally trained. All internal audits will include participation by Ras Tek line departments.



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1.2.6 HSE Training Policy

Competencies and the attitudes of individuals and teams will be developed to support the Corporate HSE Policy of providing safe and healthy working conditions, protecting the environment and preserving the Company assets.

The required training will be planned through training matrix (which include contractual and other obligations), need identification and programme design. An assessment of the training effectiveness will be used to update future programmes.

The competency of contractors and sub-contractors will be confirmed through contractual requirements and monitored through audits and inspections. Client contractors competencies will be assessed upon arrival at the Ras Tek facility.



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1.2.7 HSE Emergency Preparedness Policy

Ras Tek will minimize harm from events which may occur in the course of Ras Tek operations by applying emergency procedures when required.

Ras Tek will establish, maintain and apply response procedures for the following emergencies, which will be developed in full consultation with clients, the relevant authorities and emergency services.



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HSE Goals and Objectives

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2.1 HSE Goals and Objectives

This manual presents the principles and philosophy of Ras Tek for ensuring the safety of its employees, contractors, and assets; protecting the environment; and complying with the requirements of legislative and governmental agencies, regulatory bodies, and Ras Tek Health, Safety, and Environmental (HSE) Policy. The HSE Manual is an integral part of the overall management system in effect at Ras Tek Facility.

Ras Tek HSE Management System has the following goals:

- Provide guidance for all employees and establish the policies and procedures to ensure that goals of Ras Tek safety and environmental policy are met.
- Ensure the safety of Ras Tek employees, the environment, contractors, and others affected by the operations Ras Tek facilities.
- Establish a means of continuously evaluating regulatory changes that may affect the operations of Ras Tek facilities, and allow the company to influence proposed changes and manage compliance with the regulations.
- Comply with the regulatory requirements that affect the operations of Ras Tek facilities or operations.
- Provide flexibility so that no matter what area of the world a Ras Tek facility is operating, it is in compliance with the safety and environmental regulations of the governing country or other jurisdictional bodies.
- Provide a systematic means for Ras Tek facilities to evaluate the impact of their operations on the safety of employees, the environment, contractors, and others impacted by operation of the facility.
- Ensure that Ras Tek facilities are properly designed, operated and maintained with safe and environmentally sound procedures.
- Establish both regional and corporate-wide performance targets for safety and environmental performance that can be measured and tracked to allow all levels of the organization to clearly understand how they are performing and where improvements are required.



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- Provide the company the means of managing the requirements of share holders, customers, employees, regulators, and the general public affected by Ras Tek operations.
- Provide an effective response to all emergencies that affect Ras Tek Facilities and operations.

The objective of this HSE Management System is to create an integrated and systematic approach for ensuring the safety and health of Ras Tek employees and the environment, while at the same time successfully managing business. Ras Tek aims to continuously improve safety and protect the environment throughout its operations, and its HSE Management System has several basic tools to allow the company to manage and meet its goals:

- Annual HSE plans that clearly define the company's objectives in meeting and improving its performance related to the safety and environmental performance of its operations.
- Identification and evaluation of hazards associated with Ras Tek operations that might affect employees, the environment, or other stakeholders.
- Management of change so that any changes made to Ras Tek facilities, either due to physical modifications, environmental changes, or procedural or personnel changes, are prudently completed with respect to safety and environmental concerns.
- Development of written operating procedures designed to enhance efficient, safe, and environmentally sound operations.
- Establishment of safe work practices and policies that minimize the risk associated with the operations, maintenance, or modification of the facility.
- Employee training and competency to ensure that all employees have the skills and knowledge to conduct their assigned duties and are aware of the safety and environmental hazards associated with their duties and the established policies and procedures in place to mitigate or control the potential hazards.
- Maintenance and modification procedures to ensure that critical equipment is designed, fabricated, installed, tested, operated, and maintained in a manner:
Consistent with the service it is being used for and within manufacturer recommendations and/or industry standards.



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- A procedure for commissioning of new or repaired equipment that ensures the equipment is properly placed in service, which includes the inspection and evaluation of third-party equipment prior to being placed in service.
- Emergency response plans ready for immediate implementation in the event that an emergency arises as well as the ongoing training of employees, coupled with periodic drills and exercises, to prepare the employees for anticipated emergency conditions.
- Investigation of incidents with serious safety, environmental, or performance-related consequences, identifying causes and corrective actions to prevent reoccurrence and improve overall response; corrective action and follow-up to ensure that recommendations for improvement are implemented.
- Periodic audits to ensure compliance with regulatory and company policies and procedures relating to the requirements of the SEMS; audits and management assessments evaluate both the results of the system as well as evaluation of the system itself for potential improvement.

These tools work together within the Company's overall quality management system to promote ongoing systematic safety and environmental protection throughout Ras Tek operations worldwide. Where local requirements differ from those described in this documentation, Ras Tek will work to meet the needs of the local requirements and maintain the highest standards applicable under internal or external regulation. This may require that some procedures be modified to meet the local requirements. Those changes will be approved, modified and documented in accordance with Ras Tek operations procedures for bridging documentation.



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2.2 HSE Organisation Roles and Responsibilities

2.2.1 Organisation

Ras Tek Organization is shown in diagram 2.2.1 below:

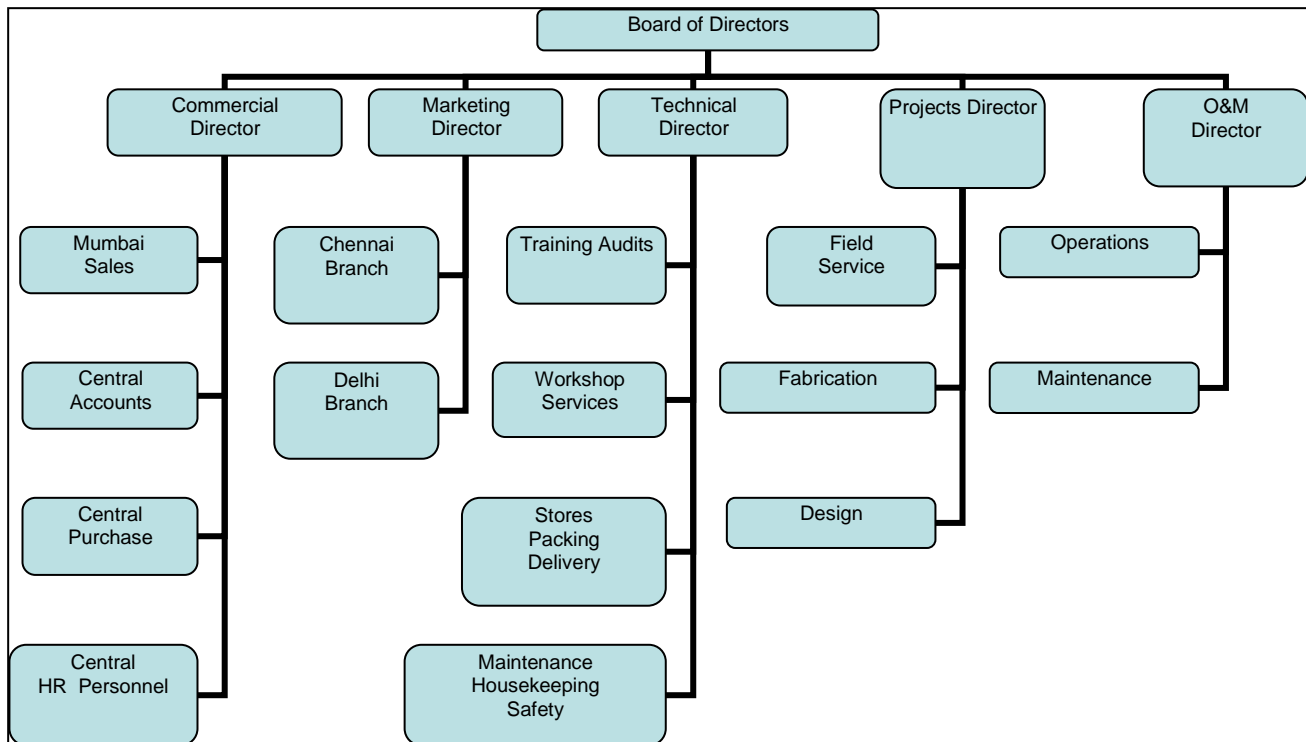


Diagram 2.2.1 Ras Tek Organisation



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2.2.2 Roles and Responsibilities

Responsibilities

The responsibilities, which are specifically applicable to HSE issues are described below. The specific roles associated with Ras Tek positions are defined in individual job descriptions and are indicated in the applicable policies and procedures of Ras Tek.

Corporate Level Responsibilities

- Establish the strategic direction of Ras Tek and assure that the value placed on safety and the environment is never compromised.
- Communicate and demonstrate a positive approach to safety and environmental protection.
- Be accountable for the implementation of Ras Tek HSE Policy.
- Authorize necessary resources.
- Develop and implement HSE strategy.
- Review policies, procedures, and related documentation applicable to safety and the environment.
- Implement safety policies, procedures, measures, and management system documentation.
- Assist with the investigation of incidents as required.
- Ensure operation in accordance with applicable regulatory, safety, and environmental requirements.
- Monitor performance through measurement and internal auditing.

Regional Responsibilities

- Oversee the operation of designated equipments safely, efficiently, and profitably.
- To assist in the development and implementation of procedures and policies for safety, environmental, emergency and related documentation, and HSE objectives associated with safety and environmental goals and activity plans.
- Assist with the investigation of incidents, accidents, and illnesses.
- Initiate actions necessary to ensure that all operations comply with Ras tek safety policies, procedures, and management system documentation, as well as local regulations.
- Perform internal safety audits at appropriate intervals, and initiate actions necessary to ensure that operations comply with established safety and environmental policies, procedures, and management system documentation.
- Coordinate implementation of feasible safety and environmental improvement ideas.



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- Identify and evaluate training programs and maintain the regional training matrix.
- Coordinate with regulatory authorities and clients on safety and compliance issues.
- Review and evaluate local suppliers, services, and contractors for inclusion on the Approved Vendors List.
- Ensure that hazardous materials distributed through the company supply base are evaluated and accompanied by the appropriate documentation (e.g., certification, MSDS, etc.) and are fit for the intended purpose.

Installation Responsibilities

- Implement and promote the safety policies, plans, safety procedures, environmental controls, emergency response and associated documentation specific to the site, as well as rig-specific HSE goals/objectives and HSE activity plan.
- Assist with the investigation of incidents, accidents, and illnesses per Ras Tek procedures.
- Ensure all personnel assigned to the job receive an induction, instruction, and training in key safety and operational areas including work permits, fire prevention, emergency response.
- Conduct safety meetings and emergency drills and see to it that team members actively participate.
- Conduct safety inspections to ensure that equipment, plant operations, and safe working practices comply with standards and procedures.
- Participate fully in safety meetings and safety programs including the Health and Safety Committee/Team (as required).
- Work with customer representatives to make technical decisions based on policies and procedures.
- Keep office management informed of critical operation and potential problems, particularly with respect to well problems.
- Coordinate the gathering and distribution of required safety documentation and statistics to the appropriate personnel.
- Provide safety training to employees as required and conduct safety inductions with all new personnel.
- Maintain a databank of all MSDSs for all chemicals and dangerous substances and maintain hazard register.



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- Inspect the equipment, operations, and safety practices meet safety standards, operating parameters, and operating procedures.
- Make sure appropriate safety equipment is readily available and used correctly.

Employee Responsibilities

All personnel shall be responsible for working safely, fostering a safe working environment, and developing positive environmental attitudes and practices. Ras Tek personnel responsibilities are described below:

- Become familiar with all applicable safety and environmental policies, rules, and procedures.
- Be accountable for individual behavior and responsible for individual safety.
- Attend and actively participate in weekly safety meetings, weekly emergency drills.
- Participate in the HSE Observation Program.
- Assist with the investigation of incidents, accidents, and illnesses as required.
- Serve as a member of the Health and Safety Committee/Team, if elected.
- Work in accordance with Ras Tek health, safety, and environmental standards, procedures, and work instructions.
- Report accidents, incidents, illnesses, and hazards or potential hazards to a supervisor immediately.
- Use all safety equipment appropriately.

Be familiar with work procedures and the Job Safety Analysis that apply to the work to be performed.



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2.3 Risk Management and Technical Integrity

Ensure that all risks to personnel and assets have been identified and that measures are in place to manage these risks to as low as is reasonably practicable.

2.3.1 Risk Assessment

2.3.1.1 Risk Management Process

In simplistic terms, risk management simply consists of:

- What can go wrong / right?
- How bad / good can it be?
- What can we do about it?

The basic risk management process is illustrated in the Figure 2.3.1.1 below. The process is well known and may be found in a similar form irrespective of where it is used. It is widely used throughout fields such as insurance, corporate finance, safety, environment, business process, sports, military and medicine.

Risk management can be a subjective area. Certainly, there can be a number of ways to tackle a particular problem, and this leads to variation in the approach that may be taken by risk management specialists. No singular approach should be thought of as being the only way to achieve the desired outcome. It is not unusual to find that different risk management specialists will have different ways of conducting qualitative risk assessments.



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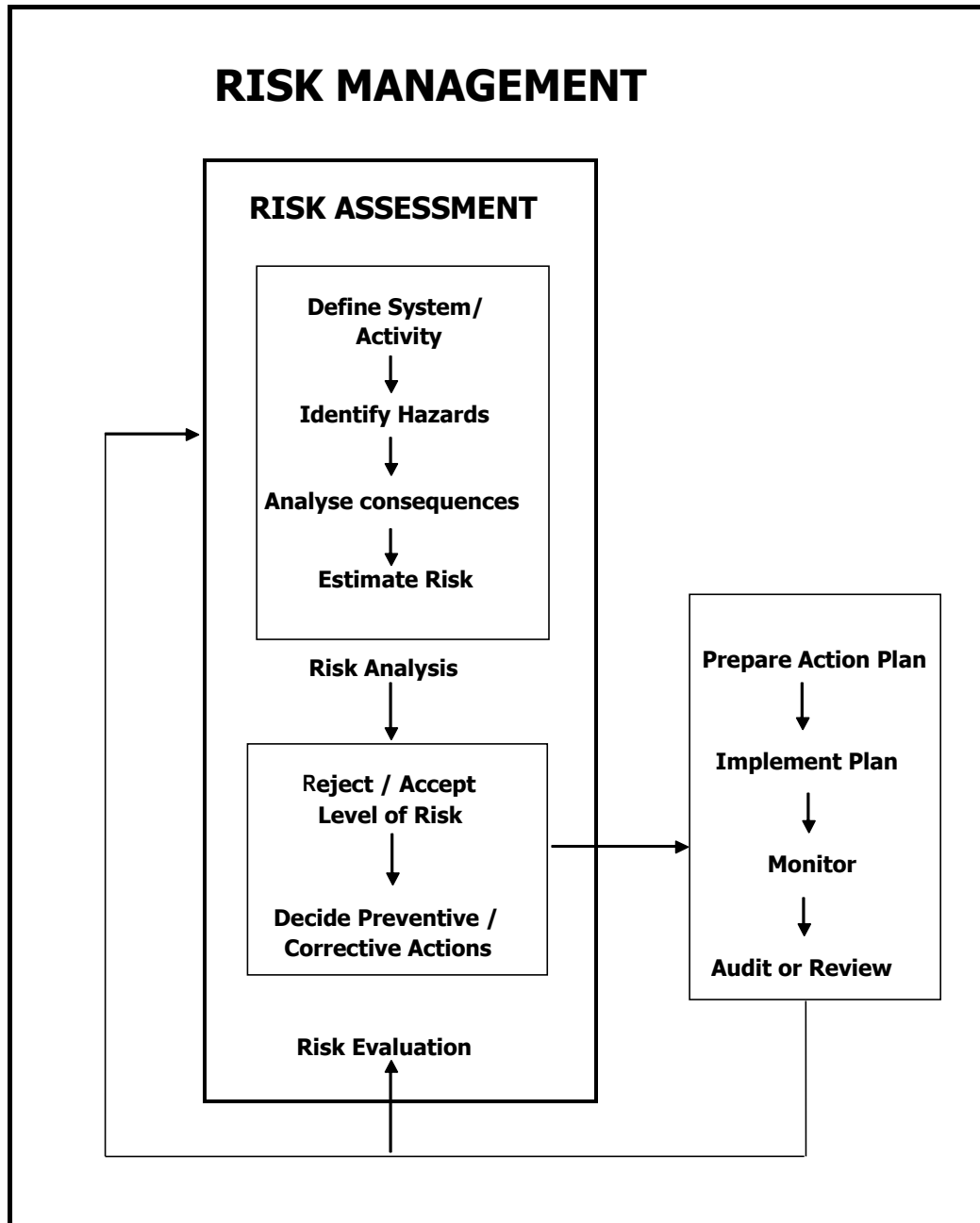


Figure 2.3.1.1 Framework for Risk Assessment and Risk Management



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2.3.1.2 **Definitions**

Terminology is an important part of the risk management process. Because different words mean different things to people, it is useful to start with a common definition of some of the more common terms.

Hazard:

Something which has the potential to cause harm.

Hazardous Event:

The realization of a hazard.

Consequences:

Consequences can result from the development of an incident over time (immediately after or over an extended period). The concept of consequence includes, within its scope, the potential adverse impacts/effects on people, the environment, plant or property, or a combination of these.

Likelihood:

Likelihood is the qualitative description of probability or frequency in relation to the chance that something will occur. The likelihood term is used in qualitative risk approaches.

Frequency:

Frequency is defined as the number of times something may occur within a specified timeframe. The frequency term is used in quantitative risk approaches.

Probability:

Probability is a mathematical expression of the chance of a particular outcome. By definition, probability must be expressed as a number between 0 and 1 or converted to a percentage. The probability term is used in quantitative risk approaches.

2.3.1.3 **Risk Management Context**

Risk Assessment is an integral part of everyday activities, e.g. if we light a match, we unconsciously assess the risk of burning ourselves, likewise, when we cross the road, we assess the risk of danger from traffic. These are but two examples where we use risk assessment – it is an automatic process.



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An assessment of risk is a clearly defined required duty, one of the techniques available to industry for reducing the cost of largely preventable hazards, incidents, accidents, damage and injuries.

The assessments of risk are mandatory requirements and should be classed as major considerations when carrying out work at any Ras Tek site or installation.

This is the most important part of the risk management process. It 'sets the scene' for the remainder of the risk management process. The goals, objectives, scope and boundaries of the activity, or project, to which the risk process is being applied, needs to be determined.

Considerations may include:

- What project / activity are we looking at?
- Are we looking at health, safety, environment, all three or other things as well?
- Are we assessing these risks at Site, Project, Business Group or Company level?
- What phase of the business or project life cycle is being assessed?
- How are we going to break down the project / activity into sensible parts?
- What project / activity life are we looking at – activity / 1 yr / whole life?

Establishing which part of the life cycle is involved will help in setting the scope and boundaries of the activities being assessed. Each phase (design, acquisition / commission, operation, divesture / decommission) has associated risks.

2.3.1.4 Bow-Tie Diagram Concept

The Bow Tie Diagram Concept is an important one in the world of risk management. It is a simple concept, which shows that there are many things that need to happen before a Hazardous Event can occur, and once it has occurred; there are many things that can happen after it.

The causes are usually described by way of a fault tree and the consequences are usually described by way of an event tree. It is important to note that there are logic gates associated with the fault tree, which affect the likelihood estimates.



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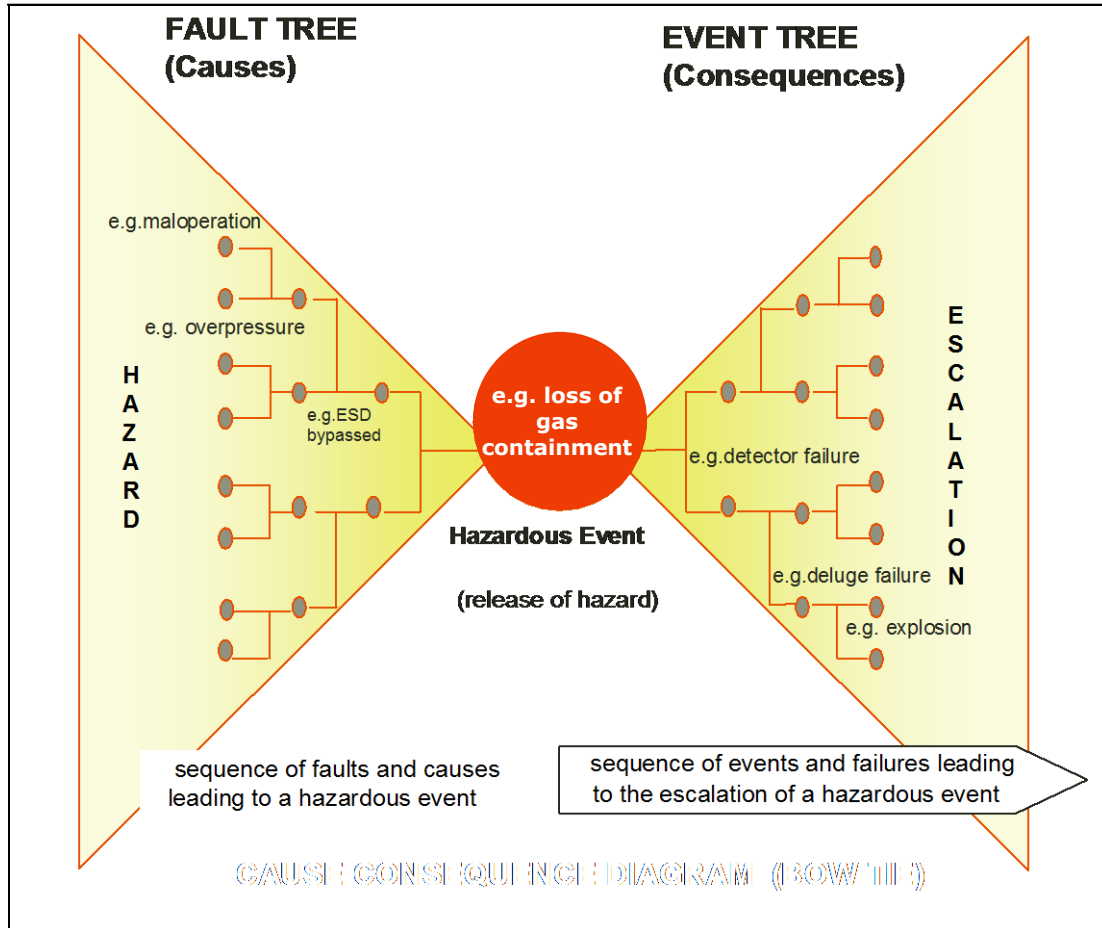


Figure 2.3.1.4 Bow-Tie Diagram



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2.3.1.5 Risk Matrix

The Risk Matrix is the heart of the qualitative risk assessment, which involves the combination of a consequence and likelihood. This combination results in a risk level. The Risk Matrix is shown below, along with guidelines for the selection of a consequence and a likelihood.

The Risk Matrix is divided into three risk categories as defined below:

High Risk

Unacceptably high

This level of risk exposes the company to intolerable losses to People, Assets, Environment or Reputation. The hazard should be eliminated or its risk reduced to tolerable levels immediately.

ACTION MUST BE TAKEN IMMEDIATELY TO LOWER THE RISK.

Medium Risk

Acceptable but must be managed at ALARP (As Low As is Reasonably Practicable)

The hazard(s) must be managed to reduce the frequency and/or the severity of the hazardous events to ALARP.

Risk reduction measures must be planned and documented.

Low Risk

Acceptable without required further action.

Correction(s) may be applied as resources allow.



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Figure 2.3.1.5 Risk Potential Matrix

					Probability				
					A	B	C	D	E
					Improbable 1 in100,000 years	Remote 1 in10,000 years	Occasional 1 in1000 years	Probable 1 in100 years	Frequent 1 in10 years
Severity	People	Assets	Environment	Reputation	Never heard of in Industry	Heard of in Industry but not Ras Tek	Has occurred in Ras Tek	Occurs several times a year in Ras Tek	Occurs several times a year at the same site
5. Catastrophic	Multiple fatalities or permanent total disabilities	Extensive damage	Massive effect	International Impact	High Risk				
4. Severe	Single fatality or permanent total disability	Major damage	Major effect	National Impact					
3. Critical	Major injury or health effects	Local damage	Localized effect	Considerable Impact	Medium Risk				
2. Marginal	Minor injury or health effects	Minor damage	Minor impact	Minor Impact					
1. Negligible	Slight injury or health effects	Slight damage	Slight impact	Slight Impact	Low Risk				



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2.3.1.6 Risk Assessment Procedure

The risk assessment stages are as follows:

Step 1

Hazard Identification

On the assessment sheet (Appendix) ensure that all relevant hazards (the potential to cause harm) are considered.

Step 2

Cause (s) and Consequence (s)

Identify all potential cause(s) and consequence(s)

Step 3

Controls (both Preventative and Mitigative)

List all control measures currently provided.

Step 4

Risk Evaluation

Using the information gathered in steps 1 and 3. Now evaluate the risks involved (the likelihood of the hazard causing actual harm)

Probability of Occurrence -

How often could the hazard occur?
Consider the frequency, duration, method of work, employees involved.
Is it a low, medium or high occurrence?

Hazard Severity -

How serious would the hazard effect be?
Consider the type of hazard, biological, ergonomic, physical, chemical
Would the outcome be negligible, serious, or perhaps catastrophic?

In evaluating the probability and severity, this will produce a risk rating of High Medium or Low risk

Step 5

Additional Control Measures

Taking into consideration the control measures currently provided, assess the risks from the identical hazards and check if all adequate controls are in place, and are systematic.



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Ask the following questions:

- Can the hazard be completely eliminated / substituted?
- Can the risk be effectively controlled, i.e. isolated?
- Are the current control measures in place sufficient?

If the answer is no to the above questions, list additional controls **required**.

Step 6 Residual Risk

Undertake a post assessment check, to ascertain if the controls implemented in step 5 will successfully eliminate or significantly reduce the risks.

- If the result is positive, sign and date the assessment.
- Ensure that all aspects of the work activity are reviewed.



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2.3.2 Hazard and Operability Studies (HAZOP)

A Hazard and Operability (HAZOP) Study is essentially a structured review of relevant process and instrumentation diagrams (P&IDs) to discover hazards and operability problems using a systematic guide word technique.

A formalised procedure for undertaking this type of study is presented to provide a consistent and structured approach for all HAZOPs undertaken. The traditional HAZOP methodology has been expanded to take advantage of the personnel brought together for the study to collect additional information covering legislative/corporate requirements relating to hazard identification.

The HAZOP technique has been expanded to also include issues associated with:

- Major Incidents
- Health and safety
- Plant safety (equipment hazard analysis issues)
- Environment
- Quality
- Unit upset potential
- Economic costs
- Safety Devices inspection frequency ranking
- Alarm prioritisation

The HAZOP process can be used as the risk assessment tool for equipment systems such as DG sets, Air Systems, cooling water, Fuel distribution systems, electrical Distribution systems etc.

Hazards that are identified and recorded will contain critical information regarding potential causes, consequences and breach of controls, safeguards and barriers.

2.3.2.1 HAZOP Process

A Hazard and Operability (HAZOP) Study is essentially a structured review of relevant process and instrumentation diagrams (P&IDs) to discover hazards and operability problems using a systematic guide word technique.

The primary objectives of the HAZOP process are:

- To identify and evaluate safety hazards in the process.



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- To identify operability problems which could compromise the plants ability to perform as required.

The HAZOP process has also been extended to cover a range of other issues. These additional objectives are:

- To identify all hazards leading to major incidents.
- To capture HAZOP team collective knowledge regarding existing controls / safeguards and barriers.
- To capture any risk control measures or enhancements identified by the HAZOP team.
- To specifically identify plant safety/equipment hazard analysis issues.
- To analyse safety devices and rank them, in order to determine inspection frequencies.
- To review alarms and prioritise them.
- To collect specific design intent information for the equipment considered.

2.3.2.2 Hazard Identification Performance Measures

The following performance measures will indicate a successful outcome.

- A well managed, formalised approach with appropriate documentation.
- HAZOP Workshops conducted using a facilitated multi-disciplinary team based approach.
- Facilitation by a suitably qualified and experienced independent person (a trained HAZOP Leader).
- Sufficient involvement of suitably experienced and qualified personnel.
- Sufficient consultation with employees and health and safety representatives.
- Systematically and comprehensively defined major incidents with associated causes, consequences and breach of defenses (if any).
- Effective recording of the major incidents and other hazards identified.

2.3.2.3 Overview of HAZOP Process

The key steps in the process for Unit HAZOPs and Project HAZOPs are as follows:

Unit HAZOPs

- Planning and preparation.
- Scoping phase.
- Division of the unit into logical equipment nodes.



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- Optimise HAZOP process by means of preplanning work involving stakeholders (operations, maintenance, technical and safety personnel).
- Conduct facilitated HAZOP workshops using the methodology developed.
- Rank recommendations and distribute for action according to ranking system.
- Review and screen results to determine major incidents that have been identified for further analysis.

Project HAZOPs

- Planning and preparation.
- As part of the engineering project evaluation, if there are any outstanding recommendations from previously completed Unit HAZOP, then these recommendations should be reviewed to determine if they could be economically incorporated into the project.
- Division of the project into logical nodes.
- Optimise HAZOP process by means of preplanning work involving stakeholders (operations, maintenance, technical and safety personnel).
- Conduct facilitated HAZOP sessions using the methodology developed.
- All recommendations must be closed out before commissioning.

Planning and Preparation

The following steps will be involved:

1. Initial consensus to be reached between parties regarding the methodology.
2. Appropriate computer software to be used for HAZOP sessions. This will ensure effective participation and recording of information.
3. Set up of project for recording.

Scoping Phase

All the unit HAZOPs will have a scoping phase undertaken before the HAZOP workshop takes place. This will ensure the maximum efficiency in the workshop.

Briefly these are:

1. Review P&IDs and schematic diagrams to ensure accuracy. In-accuracies are to be documented and corrected prior to the workshop
2. Confirm nodes to be studied in the HAZOP.
3. Review and enter the design intent for each node into the HAZOP program
4. Review and enter all relevant process equipment, including safety critical equipment for each node into the HAZOP program.



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5. Review and enter all relevant equipment design parameters for each node into the HAZOP program. This should include review of the knowledge based the HAZOP questions and collection of appropriate information.
6. Review and enter safety device Nos. and any set points for each node into the HAZOP program.

Design Intent

The design intent section of the study is provided for recording critical operating parameters for each equipment node. During the scoping study, the following preliminary work is undertaken with the assistance of the process engineer for the unit:

1. Enter a description of the design intent for each equipment node into the HAZOP program
2. Enter all relevant process equipment, including safety critical equipment for each node into the HAZOP program.
3. Enter all relevant equipment design parameters for each node into the HAZOP program.
4. Enter applicable safety device Nos. and set points in each equipment node into the HAZOP program.
5. Review and enter the ACAPS data for each node into the HAZOP program

During the HAZOP workshop this information is reviewed, expanded and accepted by the group.

An Example of the detailed information collected is listed in Table 1.



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Table 1 Design Intent Data Required

Item	No.	Information
Pumps	Pump No.	Seal type
		Pump type
		Design flow (L/min)
		Head (m)
		Differential pressure (kPa)
Exchangers	Exchanger No.	Type
		Pressure (kPa)
		Temperature (°C)
Vessel	Vessel No.	Pressure (kPa)
		Temperature (°C)
		Throughput (m ³ /hr)
Safety Device	Tag No.	Setting
Compressors	Tag No.	Capacity (m ³ /hr)
		Driver (kW@rpm)
		Differential pressure (kPa)
Heaters	Tag No.	Heat Duty (kW)
		Normal operating temperature (°C).

Major Incident Evaluation

The Major Incident list will be deliverable of the process. As many of the HAZOP fields should include the followings:

1. Incident scenarios, their causes and consequences.
2. Potential major incidents.
3. Protection / mitigation measures.
4. Consequences (fire/explosion), including the possible number of fatalities (single or multiple).
5. Frequency (likely / unlikely).

The following key information would have been identified at the end of the process:

1. Potential major incidents
2. Potential major incidents relating to the above hazards with primary causes. These will be added to the "initial" major incidents register and screened into high, medium and low risk categories



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3. Preventative and mitigating measures relating to the above causes which are currently in place.

Alarm Prioritisation

Every node that contains alarms must be reviewed as part of the study.

Risk Calculations

For a project study, all of the recommendations must be closed out before commissioning commences. Risk calculations for recommendations should be undertaken at appropriate times during the HAZOP.

Report

A report will be produced for the study undertaken.

A project report is to consist of the following table of contents format:

1. Executive summary
2. Scope of report
3. Project Description
4. HAZOP Team Members
5. Methodology

2.3.2.4 HAZOP Workshop Procedure

A Hazard and Operability (HAZOP) Study is essentially a structured review of relevant process and instrumentation diagrams (P&IDs) to discover hazards and operability problems using a systematic guide word technique.

The procedure examines process equipment on a system by system basis, reviewing the process parameters such as flow, pressure, temperature, concentration, etc. using a checklist of guide words which suggest deviations from the normal operating conditions.

The guidewords traditionally used for a HAZOP are:

- no/not
- more of
- as well as
- less of
- part of
- other than

The process parameters traditionally examined are normally: flow, pressure, temperature, composition and level. Other deviation or property words are



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developed during analysis of the process to ensure compliance with process design requirements.

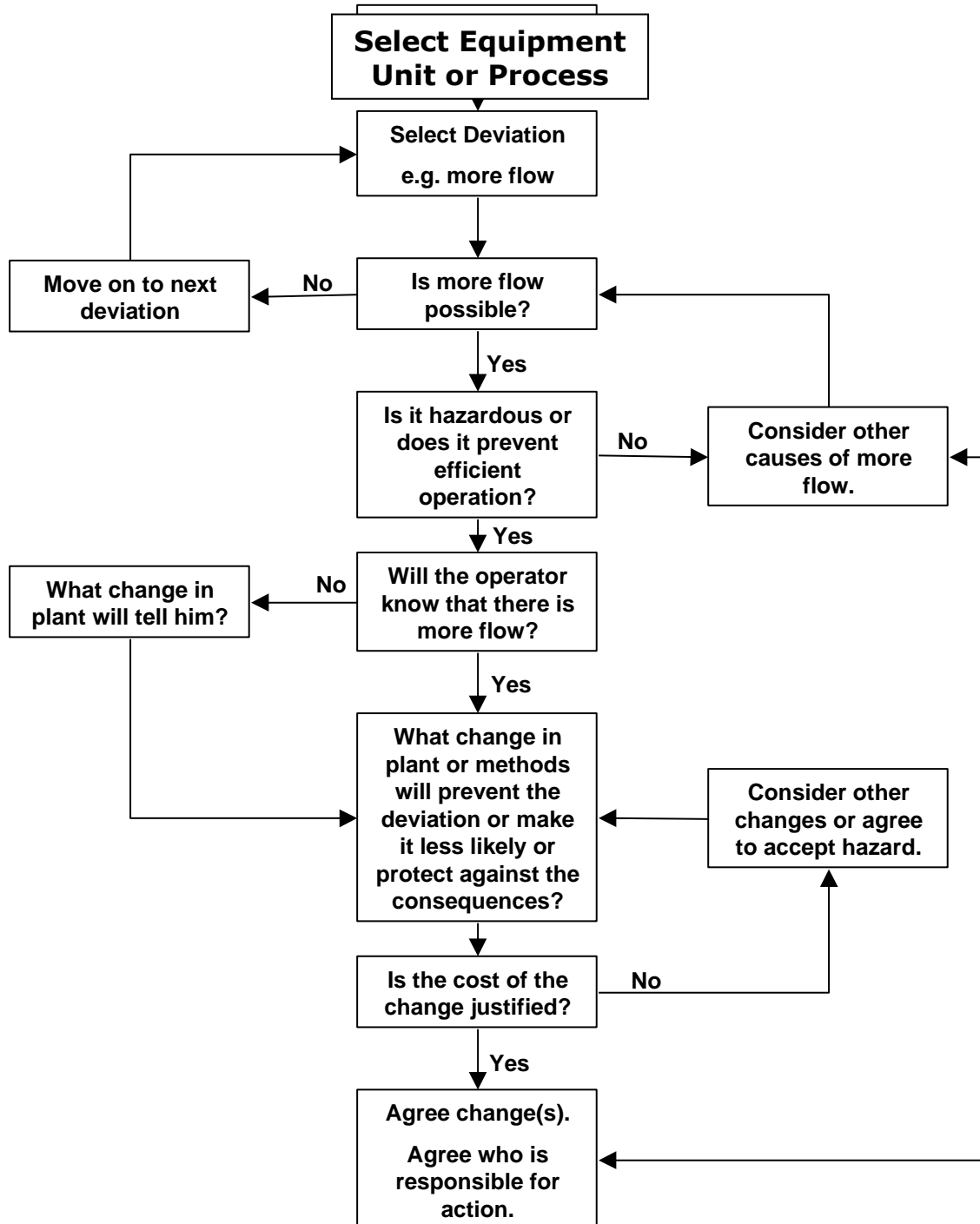
A specific list of guidewords and deviations can be prepared as part of the development of this HAZOP process. These include prompts for the additional requirements of the HAZOP process.

The sequence of examination of a P&ID or schematic will be:

- a) Select an equipment unit and explain the general intention of the unit, including the system control. Give the normal operating conditions: fluid phase, flow rates, pressure, temperature, etc. Mark the system on the diagram.
- b) Select the first process deviation.
- c) Apply the first guideword to the deviation.
- d) While specifically looking at each line or item of equipment within the system, develop meaningful deviations.
- e) Examine the associations and implications of the deviation consequences. The consequences can be given hazard categories and severity categories.
- f) Examine possible cause.
- g) Repeat c. -> f. for all guide words.
- h) Repeat b. -> g. for all deviation words.



Figure 2.3.2.4 . Illustrates a diagrammatic representation of the process.





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2.3.2.5 HAZOP Review Check List

During a HAZOP review, the adequacy of the following issues must be considered for all process systems/equipment:

1. Design pressure and design temperatures
2. Emergency isolation facilities
3. Emergency shutdown facilities
4. Emergency depressurisation
5. Piping flange rating
6. Overpressure protection facilities
7. Potential for liquid discharge to atmosphere
8. Machinery seal selection
9. Impact of alternate operations
10. Expected process upsets; changes in composition, temperature or pressure
11. Impact of utility failures: general, individual equipment
12. Impact of reverse flow
13. Impact of operator errors
14. Impact of blow-through
15. Interconnection with other units
16. Impact of upsets on downstream units or run down to tankage
17. Thermal expansion overpressure of blocked liquid



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2.3.3 Project Health, Safety and Environmental Review (PHSER)

2.3.3.1 Introduction

HSE plays an important role in all Ras Tek projects.

An effective way of ensuring that this HSE focus is on projects, is by carrying out a PHSER (Project Health Safety and Environmental Review).

These directives below, set out the way in which PHSER are to be carried out.

2.3.3.2 Purpose

The main objective of a PHSE review is to provide assurance to Ras Tek projects that HSE sensitive areas have been identified and provide confidence that the appropriate project, engineering and operational procedures, including those for Occupational Health Safety, and Environmental Control have been or will be developed to control the identified risks. The PHSER is not a guarantee that these objectives will be met.

The objective of a PHSER team is to conduct, within an agreed timetable and budget allocation, a qualitative audit at a level of enquiry which generally avoids getting involved in detail. The team must review the information as presented. Any aspects which the PHSER team consider unsatisfactory must be referred back for action.

2.3.3.3 PHSER Stages

PHSER Stage	Project Stage	Project Phase
1	Design Specification	Pre-Project requirements
2	Detailed engineering design	Project
3	Construction	Project
4	Commissioning	Project/Operator
5	Post-commissioning	Post Project/Operator

It is recommended that at an early stage of the project development a programme of PHSERs is developed and adhered to as part of the Project HSE Plan.

The timing and implementation of stages should be such as not to cause delay to the overall project timetable. This requires the agreement to clear Terms of Reference, timely stage initiation by the Initiating Authority, firm



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chairmanship, competent team membership, full Project/Operator co-operation in providing the necessary documentation and responses to team enquiries, and prompt issue of the PHSER report and recommendations on completion.

2.3.3.4 PHSER Scope

The PHSER procedure is intended to apply to all projects involving the provision of new facilities or the upgrading of existing facilities.

Each PHSER stage will review documentation relevant to each particular project phase, agreed actions arising from previous stage reports, and any specialist studies such as QRA, HAZOPS, HAZIDS, FMEA, Environmental Impact Assessments, etc. The role of the PHSER team is to satisfy itself that studies have been conducted properly and to confirm that any health, safety or environmental recommendations arising have been given adequate consideration.

The PHSER team will ensure that sufficient specialist studies have been undertaken to adequately cover HSE issues, they may request additional studies if they feel HSE issues are not covered. The PHSER team may also request any additional project information which is considered relevant.

The depth to which a review team will delve will differ from project to project and will be controlled by the Chairman who needs sufficient experience, skill and authority to do this. The team is limited by the documentation available, by the time the Chairman chooses to make available to complete the task and by the absolute necessity of not going outside its HSE responsibility.

2.3.3.5 PHSER Stage Objectives

Design Specification

- To confirm that significant HSE issues have been identified.
- To verify that all relevant regulations and company expectations have been identified.
- To confirm that an adequate HSE plan has been established.
- To confirm that an adequate HSE risk management strategy has been established.
- To confirm that appropriate specialist studies have been defined and that they are appropriate for the project.
- To verify that HSE studies, including specialist reviews have been satisfactorily addressed and followed up.



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- To ensure that the HSE related aspects of the engineering designs meet or exceed regulatory requirements and that satisfactory project codes and standards have been established.
- To confirm that engineering assurance processes are in place.
- To confirm that Management of Change procedures are in place.
- To ensure that documentation requirements have been addressed.

Detailed Engineering Design

- To confirm that HSE studies are complete and their recommendations are being addressed satisfactorily.
- To confirm that Management of Change procedures are being applied and appropriate hazard review of changes has been instigated to maintain HSE integrity.
- To confirm that, appropriate specialist reviews have been carried out and their outcomes are being satisfactorily addressed
- To verify that engineering controls and checks are in place.
- To confirm that an HSE Management System including an HSE Plan is being implemented effectively.
- To review the products of detailed engineering to confirm that HSE aspects have been adequately considered and that they are appropriate for construction.

Construction

- To verify that project quality controls are sufficient to deliver plant integrity.
- To confirm that Management of Change procedures are being applied.
- To confirm that construction workforce training and competence assessment arrangements are in place.
- To verify that HSE management is in place, is being implemented, and will assure HSE performance during construction.

Commissioning

- To verify that pre-commissioning has been satisfactorily completed and the plant is ready for commissioning.
- To confirm that commissioning and operational personnel are adequately trained, equipped and competent, and that all necessary procedures are available.
- To confirm that adequate preparations have been made for start-up.
- To confirm that emergency response arrangements and procedures have been established.
- To verify that deviations from design have been satisfactorily addressed and will not compromise HSE performance.



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Post Commissioning (after 1-2 years of operation)

- To verify that HSE performance of the operating facility meets design intent.
- To ensure that HSE lessons learned from the execution of the project and early operation of the plant are captured and shared Ras Tek Group.

2.3.3.6 PHSER Team

The Chairman and team membership will be selected according to the requirements of each PHSER stage and the nature of the Project.

A Project Representative, who is not a team member, will be provided by the project to perform a liaison role to ensure the interfaces between the PHSER and the Project are operating smoothly.

The PHSER team can co-opt members and may wish to seek the advice of various specialists on aspects of the Project. These specialists are not considered PHSER team members.

Project personnel are not normally included in the PHSER team in order not to compromise its independence. If it is unavoidable that the project does provide major skills to the team it is important that one of the team members is also familiar with that field of speciality. Continuity of PHSER team members between PHSER stages is desirable, to maintain knowledge gained in previous Stages.

The PHSER team should be independent, especially the Chairman and the Technical Safety specialist. Independence in this context means not being directly associated with the Project. The Chairman, and other team members should have knowledge of the particular technologies or activities under review. Where the experience of individuals on the PHSER team is exceeded and specialist advice is needed, the Chairman should be free to obtain this from any appropriate independent source by co-option of relevant specialists on to the team.

2.3.3.7 Roles

Operations Department

- It is the Operations Department responsibility to initiate a PHSER.
- The Operations Department will make a direct request to the Health and Safety Department for a Stage 1 review to be carried out.
- The Project Manager will initiate Stage 2, 3, and 4 of the PHSER.



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- The Operations Manager of the facility will initiate stage 5 of the PHSER.
- The report findings will be delivered to the Operations Department.

Health and Safety Department

- The Health and Safety Department is responsible for assembling the PHSER team.
- The Health and Safety Department will also provide as a minimum one Technical Safety Specialist. The Chairman may also be from the Health and Safety Department.
- The Health and Safety Department will also be responsible for the administration of the PHSER. This will include budget and resource allocation.
- The report findings will be delivered to the Health and Safety Department.

Chairman

The Chairman's responsibility is to achieve the Objective. This requires being involved in finalising the review scope based on the Terms of Reference being involved in selecting PHSER team members, leading and motivating the team and meeting the agreed Terms of Reference and timetable. Through the Secretary, he must ensure timely minutes of meeting and final PHSER report.

The task of chairing a PHSER meeting involves the usual chairmanship skills with added emphasis on reaching agreed conclusions as quickly as possible and ensuring accurate recording.

At the initial meeting, the Chairman must brief the team thoroughly on the Terms of Reference, the review scope, the timetable, the budget and the general conduct of the review.

It is not the function of the review to improve the design or operability of the installation. The Chairman's leadership must be firm without destroying the consensus requirements of a PHSER meeting.

The Chairman is the formal point of contact for the PHSER team of the project. He must be prepared to discuss any difficulties of interpretation which may arise with them. When he is unable to fulfil his Terms of Reference or when issues are raised which require urgent resolution, every effort must be made to resolve the issues of the Project.



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Team Members

Team members should remind themselves constantly of the PHSER objectives. They must not use the review meeting to propound alternative design solutions or to evaluate non-health, safety or environment related aspects.

PHSER team members should individually feel free to bring any health, safety or environmental matter which is not within the review scope to the attention of the PHSER Chairman. The Chairman will judge the relevance of this and transmit the matter as appropriate, independent of the PHSER in progress if necessary.

Third Parties

Generally the PHSER team will be made up of Ras Tek personnel. However, if a particular expertise is required outside contractors may be brought in.

2.3.3.8 Deliverables

- Categorised Recommendations
 - Critical
 - Major
 - Minor
- Interim Report
- Full Report
 - Front Page
 - Title
 - Distribution
 - Report Issue Date
 - Management Summary
 - Review purpose
 - Scope
 - Conclusions
 - Major Findings
 - Detail of Report
 - Team Members
 - Review Dates
 - Test including main points / Worksheets
 - Findings
 - Recommendations
 - Appendix
 - Terms of Reference
 - Index of Findings / Action Plan
 - Topic List



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2.3.4 Job Safety Analysis (JSA)

Job Safety Analysis (JSA) is the application of the hazards and effects management process at the task level, identifying and assessing the hazards of each element of the task and defining the appropriate controls and recovery measures. This process will help in providing the site personnel performing the job with written safe work practices and procedures to eliminate the hazards or reduce the severity of the consequences.

It is the objective of Ras Tek group to make all work safe and incident free by actively involving persons who will be performing the jobs in the pre-job planning. Through use of JSA, personnel will improve job planning and safety awareness.

JSA's are normally applied to all jobs (including new) prior to performing the job. JSA's may be performed in cases where work instructions are not in place.

JSA's should be used at any time by the person(s) performing a job, however they are most suitable for review during toolbox talks and pre-shift meetings.

The Site in charge will ensure that all JSA's are fully utilised throughout the site operations. He has a check responsibility to ensure that the JSA's are properly used and all jobs are covered by JSA's.

The plant Safety Representative is responsible for the direct monitoring of the JSA application by ensuring JSA procedures are followed and assisting in the development or review of JSA's.

Supervisors use JSA's for all jobs, highlight gaps and develop new and reviewed JSA's.

Results of the JSA should be tabulated on a form as shown at the end of this section. These forms should be stored in a JSA file, which is available at the workplace for use as a site reference.

Where site specific procedures require a permit for new or non-routine tasks, the work permit and associated risk assessments shall not be superseded by performing job safety analysis.



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2.3.4.1 Carrying Out a JSA

JSA is normally a team exercise involving three to five people. The person involved in leading the analysis should have a level of technical competence relevant to the job to be analyzed and be a competent JSA Leader. The composition of the team depends on the individual task being analyzed and front line supervisors and each area of skill should be represented. For simpler tasks, a small team led by the supervisor of the activity should be sufficient. Tasks of greater complexity may involve the Plant manager and the Safety Representative.

1. JSA Application

A JSA can be completed in five (5) basic steps:

- i) Selecting the job.
- ii) Observation and discussion
- iii) Breaking the job down into steps.
- iv) Identification and assessment of hazards.
- v) Development of controls and recovery measures.

i) Selecting the job

JSA is appropriate for any task where the hazards and control measures need to be formally assessed. The most common areas of application are:

- Routine tasks that have the potential for serious incidents
- Routine tasks having a history of incidents, including near misses.
- New tasks or tasks introducing new work methods
- Routine tasks being carried out in unusual circumstances.
- Non-routine.

ii) Observation and discussion

JSA's may be conducted on an existing task or prior to a task, during the planning stage.

Two principal ways of conducting JSA's are discussed below:

- a) Direct observation.
 - b) Group Discussion
- a) Direct Observation



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In this method the persons doing the analysis actually observes the job being done.

They may observe the process a number of times before they identify the separate steps, estimate the potential accidents and develop controls and recovery measures. In addition they may observe different employees doing the same job to establish variations in job execution.

b) Group Discussion

A group of people familiar with the job, under the guidance of the supervisor, use their collective experience to identify the job steps, the potential accidents in each and develop good solutions.

The participants in the discussion should be those with most knowledge about the job. In either case, the supervisor needs to be competent in JSA group discussion techniques. He should be able to stimulate a group to obtain the maximum contribution from each of its members and guide the discussion down the most productive paths.

iii) Breaking Down the Task

- Break down the task into its basic steps, describing what is to be done, and in what sequence.
- In defining the steps a balance must be made between too much and too little detail.
- As a general rule, the demarcation between steps will be marked by some change, either in activity or location that would result in different hazards or exposure.
- Experience has shown that most tasks that are the subject of JSA's can be broken down into ten steps or less.
- If more than 15 steps are identified and it is not feasible to merge some steps without losing essential detail, it is recommended that the task itself is split and separate JSA's are conducted for each part.
- To record the breakdown, number the job steps consecutively. Each step tells what is done, not how. The wording for each step should begin with an action word like "*remove,*" "*open,*" or "*inform.*" The action is completed by naming the item to which the action applies, for example, "*remove extinguisher,*" "*move to site floor.*"

iv) Identifying Hazards

- Examine each basic step for hazards that could be present as a result of the task itself or of the work environment.



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- At the same time, consider the departures from expected circumstances that could release or expose the hazard, and the potential incident that could result.
- The observation method described in the above point: ii) a., provides a good opportunity to assess hazards in the context of the work environment and discuss them with operators.
- The key activity in a JSA is to determine the hazards and potential incidents associated with each particular step.
- Structured questions such as the following should be applied to each step to stimulate discussion about the various risk factors:
 - Is there a danger of striking against, being struck by, or otherwise making harmful contact with an object?
 - Can the employee be caught in, by, or between objects?
 - Is there a potential for a slip or trip?
 - Can pollution of the environment occur?
 - Can the employee fall on the same level or to another?
 - Can pushing, lifting, bending, or twisting cause strain?
 - Can damage to equipment occur?

Hazards Assessment

- In some cases, it may be beneficial for the team to assess the risk associated with a hazard or the consequence of a hazardous event and the likelihood of its occurring.
- Such assessments can be used to set the level of control and recovery, and to prioritise actions to be taken.
- The assessment is a coarse approximation and should be reached without protracted debate but high-risk hazards identified could be the subject of a more detailed assessment later.
- The simplified Risk Matrix below, will be used for the Job Hazard Analysis.

The Risk Matrix is the heart of the qualitative risk assessment, which involves the combination of a severity and a probability. This combination results in a risk level. The Risk Matrix is shown below, along with guidelines for the selection of a severity and a probability.



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Figure 2.3.4.1 Risk Potential Matrix

					Probability				
					A	B	C	D	E
					Improbable 1 in100,000 years	Remote 1 in10,000 years	Occasional 1 in1000 years	Probable 1 in100 years	Frequent 1 in10 years
Severity	People	Assets	Environment	Reputation	Never heard of in Industry	Heard of in Industry but not in ras tek operations	Has occurred in ras tek operations	Occurs several times a year in ras tek operatins	Occurs several times a year at the same site
5. Catastrophic	Multiple fatalities or permanent total disabilities	Extensive damage	Massive effect	International Impact	High Risk				
4. Severe	Single fatality or permanent total disability	Major damage	Major effect	National Impact					
3. Critical	Major injury or health effects	Local damage	Localized effect	Considerable Impact	Medium Risk				
2. Marginal	Minor injury or health effects	Minor damage	Minor impact	Minor Impact					
1. Negligible	Slight injury or health effects	Slight damage	Slight impact	Slight Impact	Low Risk				



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The Risk Matrix is divided into three risk categories as defined below:

High Risk

Unacceptably high

This level of risk exposes the company to intolerable losses to People, Assets, Environment or Reputation. The hazard should be eliminated or its risk reduced to tolerable levels immediately.

ACTION MUST BE TAKEN IMMEDIATELY TO LOWER THE RISK.

Medium Risk

Acceptable but must be managed at ALARP (As Low As is Reasonably Practicable)

The hazard(s) must be managed to reduce the frequency and/or the severity of the hazardous events to ALARP.

Risk reduction measures must be planned and documented.

Low Risk

Acceptable without required further action.

Correction(s) may be applied as resources allow.

v) Controls and Recovery Measures

- Controls and recovery measures should be developed first from an overview of the complete task and the risks involved.
- If the task as described involves a number of high risks, a change in the entire task may present a better solution than controlling each hazard individually.
- If no radical solution presents itself, each hazard and potential incident should be examined and control measures identified.
- A useful hierarchy of solutions to bear in mind is shown below (ranked broadly in order of effectiveness):



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- a) Eliminating the hazard (e.g. buying ready sawn timber rather than using a circular saw).
 - b) Substitution (using a less hazardous material or process).
 - c) Reducing the frequency of a hazardous task.
 - d) Enclosing the hazard.
 - e) Guarding/segregating people.
 - f) Additional procedures.
 - g) Additional supervision.
 - h) Additional training.
 - i) Instructions/information (handouts/signs).
 - j) (Some) personal protective equipment.
- In addition to defining controls, recovery measures should also be developed to take into account the possibility of control failure. Recovery measures to consider , include:
 - (some) personal protective equipment
 - secondary containment
 - detection and alarm devices
 - escape and rescue equipment
 - emergency procedures

2.3.4.2 Direct Observation

Key points in the observation method of JSA are:

- Select the right employee to observe.
When you have more than one person doing the job which you plan to analyse, choose the one who will be able to help you most. He should be experienced and co-operative. It is also a good idea to observe more than one employee.
- Explain what you intend to do.
"Make sure the employee fully understands the purpose of your observation. Emphasise that the study is of the job and not of him. The best approach is to invite the employee to share the task with you. 'I'll do the writing, and you help me with the ideas'".
- Observe to get the step-by-step breakdown.
"Keep in mind that you are observing to identify the basic steps. Don't breakdown the activity into too many steps. On the other hand, don't make the steps so broad that critical aspects are overlooked.



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If the job is a lengthy one, develop a preliminary breakdown by recall then check it with the employees. Where there is full agreement, there may be no need to observe that task element. Observation can then concentrate on the task elements where there is uncertainty”.

- Check your job step breakdown with the employee.
“When you complete your observation, check your breakdown with the employee observed. Get agreement on what is done and in what order, not on how it is done. Don't discuss hazards or precautions at this stage”.
- Record the job step breakdown.
“After you have checked the job step breakdown with the employee, record the steps. If you have observed one employee, check the breakdown with other experienced employees ”.

2.3.4.3 Breaking Down The Task -Example

A step-by-step breakdown for the job of testing a relief valve is:

- Step 1 Set-up relief valve (RV) on test bench
- Step 2 Engage clamp jacks
- Step 3 Check lift pressure
- Step 4 Reset at correct pressure
- Step 5 Fit plug and hose; complete bubble test
- Step 6 Remove plug, hose and exhaust valve
- Step 7 Release clamps
- Step 8 Remove RV from test bench
- Step 9 Certify RV

Note the following:

- Each step tells generally what must be done, and with no reference to how no hazards are mentioned and no safety precautions are prescribed. These come later.
- The job steps are described in their normal order of occurrence
- The description of each step starts with an action word, i.e. position, remove, tighten, etc
- It usually takes only a few words to describe a job step.

Two errors to be avoided in this part of the JSA are:

- Making the job steps too 'fine'.
This results in an unnecessarily large number of job steps. For example, in the following 'expansion' of Step 6, the steps are of similar actions, performed at the same time and having similar hazards:



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- Step 6 Remove plug
- Step 7 Remove hose
- Step 8 Remove exhaust valve

- Making the job steps too 'broad'.

For example:

- Step 1 Set up relief valve (RV) on test bench
- Step 2 Check lift pressure; complete bubble test
- Step 3 Remove RV from test bench

These steps are too general and omit activities that could contain potential accidents. When this happens the whole JSA is weakened.



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2.4 HSE Systems

2.4.1 Permit-to-Work System

2.4.1.1 Permit-to-Work Policy

No potentially hazardous non-routine work can be performed on any site / facility by any employee, contractor, or other party, without a formal, written "Permit to Work" that follows the requirements of the Permit to Work System. Failure to follow the procedures established by the Permit to Work System is grounds for immediate disciplinary action, including termination of employment or contractual agreements.

Ras Tek goal is to manage risks inherent to potentially hazardous work on a Ras Tek facility. The Permit to Work System is a formal process for controlling these potential hazards. Before any work begins which might be hazardous to Ras Tek employees, contractors, or other parties, the system requires written authorization.

Ras Tek site management will ensure that:

- An appropriate Permit to Work System is in force
- Personnel are properly trained to administer, implement, and use the Permit to Work System
- A process to audit compliance with and effectiveness of the Permit to Work System is in place and in use

2.4.1.2 Objectives

The objectives of the Permit to Work System are to:

- Ensure the safety of personnel involved in or affected by the work.
- Specify precautions that employees should take (e.g. isolation of equipment and use of personal protective equipment).
- Explain the hazards involved in a job or activity and any limitations to the extent of the work or the time during which the work can be performed.
- Identify and control potential hazards.
- Ensure that work is authorized before starting.
- Ensure that supervisors are aware of all work performed in their areas.
- Provide a formal procedure for suspending work before completion.
- Provide a formal handover procedure when work continues past the end of one tour or when permit signatories change.
- Display all work permits properly at the job site.
- Audit and evaluate the use and effectiveness of the permit system.



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2.4.1.3 Work Requiring a Permit

Work permits are typically required for all non-routine work. Non-routine work requiring a work permit includes all activities outside the regular operation of the equipment.

Work permits are required for the following:

- Entry into a confined space.
- Hot work in any area except inside the welding shop.
- Any work that directly affects critical safety systems.
- Any construction work, overhauls, or repairs on systems or equipment in classified areas.
- Work by contractors in classified areas.
- Hydrostatic or pneumatic-pressure testing.
- Activities involving radioactive sources such as non-destructive testing.
- Activities when a known hazard exists, such as isolation or lockout/ tagout.
- Any work the Person in Charge (PIC) determines is non routine and requires a work permit.
- Special or engineered lifts.

2.4.1.4 Work Not Requiring a Permit

These activities do not require a permit:

- Routine operations including startups, changes in operational modes, and shutdowns.
- Routine work, including first-line maintenance by operations personnel, such as topping up oil or water, tuning controllers, and so on.
- Work in designated maintenance or construction areas.
- Work that controls or prevents the escalation of an emergency.



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2.4.2 Management of Change

Ras Tek have established a formalized method to identify and control hazards associated with changes to facilities, procedures, or personnel; to maintain the accuracy of safety information, and, to document and communicate the change and its effects to all involved parties, including Management.

2.4.2.1 Approval Authority

Any waiver from or change to Company policy or a change to a documented procedure contained in the company's formal management systems must be approved and signed by the Company assigned "document owner" that originated the policy or procedure.

In international areas, there may be additional area specific requirements.

2.4.2.2 Procedures

The continual change to improve safety and operability, increase efficiency, introduce technical innovations, and implement mechanical improvements. It is sometimes necessary to make temporary repairs or other modifications to maintain operating capability.

These changes may introduce new hazards or compromise the safeguards incorporated into the original design. The impact these changes may have on personal safety, environmental protection, processes and procedures, or structural integrity must be identified prior to making the change, and a plan for elimination of hazards or mitigation of the effects to be put in place.

The details of the change, as well as the resulting modifications to processes or procedures, must be communicated to all personnel. Special training, if required, must be initiated immediately to ensure personnel are familiar with all aspects of the result of the change.

Revised operating procedures must be documented and incorporated into the Operating Manual.



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For the purpose of this policy, change will be divided into three categories, each of which will be addressed by appropriate procedures, documentation and audits.

	Facilities/New Equipments	Form
1	New construction/installations	Engineering Change Request or Technical Service Request
2	Modifications to:	
2.1	Facility or equipment design	
2.2	Upgrade to existing equipment	
2.3	Structural support	
2.4	Layout / configuration	

	Procedures	Form
1	Operations outside the scope of current written operating procedures	Management of Change
2	Modifications to meet special circumstances	
3	Change of process or design as a result of HAZOP	
4	Procedures necessary due to other changes	

	Personnel, as a result of :	Form
1	Sale or acquisition of assets or business units	Ras Tek Organizational changes
2	Promotion	
3	Termination	
4	Upsize/ Staff- up	
5	Downsize / reduction in force (RIF)	



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2.4.2.3 Management of Change Process

1. Initiate Change Request

- Define the scope of the change
- Present justification for the change
- Obtain necessary approvals to proceed

2. Risk Assessment

- Perform safety assessment
- Perform environmental impact assessment
- Perform regulatory assessment
- Perform operational productivity impact assessment
- Perform economic impact assessment
- Obtain necessary approvals to proceed

3. Define scope of work

- Complete time estimate
- Complete cost estimate
- Define resources required
- Set logistics schedule
- Produce AFE
- Obtain necessary AFE approvals to proceed

4. Planning and preparation

- Assign project management
- Assemble or produce engineering drawings
- Acquire necessary permits
- Initiate material procurement
- Hold pre-project planning meeting
- Obtain necessary approvals to proceed

5. Implementation

- Mobilize material
- Mobilize personnel
- Complete the project
- Obtain necessary scope of work completion approvals

6. Project Completion

- Perform necessary testing
- Perform certification and commissioning
- Finalize all documentation
- Perform project review
- Close project



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2.4.2.4. Documentation

The original of the Management of Change Form for Policy and Procedures should be kept on the site or in the department who is initiating the form. After appropriate approvals, a copy should be sent to the site Management in Head Office for review.

MOCs for international area specific requirements, approved by the Ras Tek management, will be kept on file in the local HSEQ section.



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2.4.3 Accident and Incident Reporting

This procedure is intended as a guide to define the responsibility and authority for dealing with accidents, incidents, non-conformances and to control or eliminate them.

2.4.3.1 Definitions and Abbreviations

Accident:

An undesired event which results in death, ill health/injury to people, emission to the atmosphere, discharge to water and land, other damage/loss to people or environment.

Incident:

An undesired event which has the potential to lead to an accident.

Near – miss:

An undesired event that did not result in injury, illness or damage - but it had the potential to do so.

Non-conformance:

Any deviation from work standards, practices, procedures, regulations, management system performance etc that could either directly or indirectly lead to injury or illness, property damage, damage to environment, or a combination of these.

Investigation:

An action that analyses the immediate and basic (root) cause of the incident/accident, and the preventive/corrective action required to mitigate those risks or environmental impact, and provide a plan to fulfill all the actions called for in the report.

2.4.3.2 Respond to accident, incident, non-conformance and notify to governmental organization in case of serious accident

Depending on the level of accident, incident, near-miss or non-conformance, appropriate immediate action or emergency response shall be taken to minimize the extent and impact of these.



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In case of a serious accident such as a fatality or an event that could have an impact on the community, the appropriate Governmental organization should be notified immediately for support so as to minimize its extent.

Fatalities at work, due either to natural or accidental causes, require that immediate action be taken by key personnel. A fatality must be notified at the nearest Police Station and other Governmental Authorities as required.

2.4.3.3 Accident, Incident, Near-miss and Non-Conformances

All Accidents, Incidents, Non-Conformances shall be reported to the Manager, Team Leader or Supervisor immediately. For the serious cases, the reporting responsibility shall follow the procedure outlined in the Emergency Response Plan.

Accidents reported to the Head Office by telephone shall be confirmed by fax or e-mail as soon as possible (not exceeding 12 hours after the event).

All Accidents, Incidents and Non-Conformance shall be reported on an Accident/Incident/Non-conformance/Investigation Report (**HOLD**). The originals must then be sent to the Head Office and copies are to be retained at the site.

More serious accidents or incidents may require more detailed investigation, this will be at the discretion of the responsible Manager, or Team Leader depending on the severity.

Accident/Incident/Non-Conformance/Investigation information shall be shared throughout the entire company and/or other interested parties for the prevention of further similar incidents.



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2.4.3.4 Investigative Process

The following are examples of the type of accidents, incidents, near-misses which must be investigated completely.

- All fatalities.
- All serious injuries and occupational illness.
- All minor injuries and occupational illness where the event had a high potential risk.
- Fire and explosion.
- Property damage above **US\$3,000**.
- Hazardous or toxic material release.
- Incidents with a high potential.

Accident-Incident analysis:

When conducting an investigation for the reported accident, the investigators shall analyze immediate causes and basic causes (root causes) then determine the probability of recurrence and establish appropriate corrective actions.

Accident, Incident and Near-miss Investigation:

- The purpose of any investigation is not to apportion blame to any person or people, but to ascertain the cause and to recommend measures to prevent a recurrence.
- Whenever investigations into accidents/incident are carried out personnel shall give all possible assistance and co-operation.
- Drawings, photographs, video film, maps, plans etc., are of great assistance and should be provided wherever possible

Propose Corrective, Preventive actions:

- Following the completion of the Accident-Incident, Investigation Report (**HOLD**), it will be necessary for the Team Leader to assign corrective and preventive actions to specific individuals who will co-ordinate the follow-up.

2.4.3.5 Analyze risk before remedial action

Before conducting any remedial action proposed in the Investigation Report, the team in charge of follow-up action should carry out a risk assessment for the event that occurred, and assess the potential risk when taking corrective, preventive actions to prevent a recurrence of further accidents, incidents, impact to people or environment. The lesson learnt from the accident should



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be noted and communicated to whom it may concern. (See section 2.3.1 Risk Assessment).

2.4.3.6 Corrective and Preventive Action

- Following the Accident, Incident and Near-miss Investigation, the personnel assigned to take the proposed actions shall prepare a program for completion or plan of action.
- In the case of Accidents/Incidents/Near-miss in the workshop, remote worksite, the Manager on the site shall be responsible for the actions at his location. He will prepare the follow-up program and send it to his direct Management and a copy to the Head Office.

2.4.3.7 Monitoring follow up action

- The progress of follow-up actions shall be reported at Safety Meetings and reviewed in the Company Quarterly HSE Meetings or at more frequent intervals if deemed necessary by the HSEQ Manager.
- If there is a problem that is not within the follower's capability, he shall report to his direct Management for support.
- Follow-up actions may only be closed-out following completion of the actions and the agreement between the HSEQ Manager and the Manager of Site.

2.4.3.8 Review Accident, Incident, Non-Conformance

At quarterly HSE meeting, every Manager and the Director of the Enterprises shall:

- Report the results of the corrective, preventive actions taken for the previous accident, incident, non-conformance which has occurred at his location.
- Propose any change, if necessary, on corrective-preventive actions suitable to the actual circumstances.
- Review overall operational safety performance and a full lost time/cost analysis of all incidents.
- Suggest, if any, changes to Procedures for update and improvement of the system or for preventing any recurrence of the accident, incident or nonconformance. The Top Management shall have ultimate responsibility to decide on suitable changes to the system, if needed.



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2.4.3.9 Recording

- The Accident and Incident Report shall be filed in the HSE folder of each Rig, Enterprise and a copy maintained in the HSEQ Dept.
- Investigation Reports shall be kept by the Manager, Team Leader or Supervisor and the relevant HSE officer for monitoring the follow up actions.
- The HSEQ Dept. will summarize all the Accident-Incident reports of the whole company and prepare a report indicating the impact for the accidents and incidents that have occurred on an annual basis.
- The HSEQ Dept. shall summarize all immediate causes and basic (root) causes for all Accidents and Incidents that have occurred together with a list of the measures taken to eliminate these causes and their effectiveness.



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2.4.4 HSE Training

Ras Tek has a comprehensive HSE Training program. The following matrix illustrates this program. The aim of the matrix is to support Human Resources Training Staff and Line Staff to ensure HSE training is targeted, managed, effective and comprehensive. A suitable training matrix is produced for each work site.

HSE Matrix	Risk Management	Crane Operation	Basic Fire fighting	Advanced Fire fighting	Basic first aid	HSE Management	JSA	Permit to work	Incident reporting
Personnel Titles									
Director	X			X	X	X			
General Manager	X		X	X	X	X			X
Sr.Manager / Manager	X	X	X	X	X	X	X	X	X
Engineer operations		X	X	X	X	X	X	X	X
Engineer Maintenance		X	X	X	X	X	X	X	X
Electrician		X	X		X		X	X	X
Technician		X	X		X		X	X	X
Sales & Marketing	X		X	X	X	X			
Admin and accounts	X		X	X	X	X			
Helpers			X		X			X	



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2.4.5 Employee Safety Recognition and Awards

The aim of the Ras Tek Safety Award Program is to enhance and stimulate safety awareness throughout company, while rewarding employees for their safe working habits. It further seeks to ensure uniformity in various locations, while providing Ras Tek personnel with a procedure for an effective system.

This program is applicable to all Ras Tek employees, regardless of their place of employment or residence.

For the purposes of this Safety Award Program, Ras Tek classifies any incident that results in time lost from regular assigned duties as a Recordable Doctor Case and/or Lost Time. The HSE Department will be responsible for classifying all incidents.

2.4.5.1 Safety Awards Program – Domestic Operations Quarterly Awards

1. All eligible employees who complete a calendar without incurring either classification of a Recordable Doctor Case will be given 100 points or an equivalent award. Points may be redeemed for items on the quarterly award certificate.
2. If points are awarded to an employee where an injury turns into a Recordable Doctor Case after the quarter has ended, the Safety Representative will eliminate that crew's points in the next quarter.
3. If the employee sustains an RDC and rendered ineligible for a quarter, but this person has points carried over from a previous quarter, they are free to use those carry over points. The disqualification is from receiving new points for that quarter.

NOTE: If an employee chooses to bank points, it is that employees Responsibility to safe keep his certificates until redemption. The employee is then to turn enough certificates to cover his selection in to the Safety Department at the same time. These certificates are the same as cash, so if carrying over, be sure to keep them safe.

The following personnel, sections and departments are eligible to participate in the Safety Award Program:



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- All site Ras Tek Personnel
- Customer operator Representatives
- Department Managers
- HSE Department

2.4.6 HSE Meetings

2.4.6.1 Safety Meetings

To drive the HSE message throughout the Ras Tek workforce. it is the responsibility of the Site or Facility Manager to ensure the messages reach all levels in the workforce.

One of the major methods to ensure the message is passed to the workforce is through HSE meeting. This section lists the HSE meetings held and the subjects, which should be discussed at each meeting.

The ownership of these meetings allows key supervisors to demonstrate HSE commitment.

One part of the HSE Manual should be discussed at each monthly meeting. The meeting also, will play a role to activate the use of JSA's documents. Planned jobs should be reviewed to decide which JSA's are applicable. These JSA's should then be systematically reported back to the staff that will be involved in the operation through daily meetings, pre-job meetings and toolbox meetings.

Details of meeting formats and attendance are given in the table at the end of this section.

2.4.6.2 Site Safety Meetings

The following meetings will be held on the site on a regular basis as mentioned beside each:

Weekly Meeting:

The Weekly Meeting tends to focus on Corporate Ras Tek matters and concentrate more on activities of the site or facility. The duration of this meeting should not be more than 1 hour maximum.

Daily Meeting:

This meeting will be held daily at a convenient time between site Manager and



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Site Supervisor for maximum 20 minutes, in which the work plan will be given by the Client Rep to the site manager. A similar meeting must also be held by the Site Manager with site key personnel, communicating the outcome of Client Rep meeting. Maximum duration is 15 to 20 minutes.

Pre-job Meeting:

This meeting will be held prior to starting non-routine jobs (especially jobs with known hazards). It shall be held by the Supervisor to acquaint each person involved in the operation with scope of work, hazards and specific procedures to be followed. This meeting will be attended by all the engaged members and will last about 10 minutes max.

Toolbox Meeting:

It is a pre-job meeting as above but for other routine jobs. It will be short, concise and preferably held on the site where the work will be done. Also a toolbox meeting will be held in case of non-routine operations, at the start of every shift and when the Supervisor feels that:

- The crew is not experienced enough for a certain task
- The operation deviates from the plan
- A work permit is necessary.

Post Emergency Drill meeting:

After each emergency drill (Fire, electrical shock etc.), a meeting will be held at an appropriate time as a close out meeting chaired by site Manager with all personnel to highlight the drill results, areas of concerns and recommendations with required actions. The duration of this meeting shall take not more than 1/2 hour.

Meeting Structure:

See table below



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NO.	FREQ.	CHAIRMAN and SECRETARY	ATTENDEES	OBJECTIVE	AGENDA
1.	Weekly	<u>Department Manager</u> <u>HSE REP</u> (Formal minutes)	All team members	feedback and information	<ol style="list-style-type: none"> 1. Discuss Safety Alerts / Flashes recently issued. 2. Discuss incidents / accidents / near miss which occurred last week. 3. Take one JSA from Ras Tek JSA manual and review the related hazards. 4. Discuss any topic resulted from the bi-weekly meeting.
2.	Daily	<u>Department Manager</u> <u>Client Rep</u> (Formal minutes)	Manager Client Rep	It be held Every morning, in which, Client Rep gives work plan to Site MANAGER in order to allow him communicate it to site key staff.	<ol style="list-style-type: none"> 1. Daily work plan, however, this meeting will be held prior to the pre-shift meeting between Site Manager and site team to ensure a proper communication of the given plan to staff. 2. The Site manager will communicate plan as discussed with Client Rep to key personnel
3.	Pre-shift	Supervisor Record in tour report	All site team members	General brief on the day work (especially for critical ones) as given by Client Rep	<ol style="list-style-type: none"> 1. Discuss work plans. 2. Select relevant JSAs for discussion. 3. Ask about additional risks. What could go wrong? 4. Discuss work permits and any interference between work areas. 5. Pick subject for discussion (e.g. lifting and slinging, working at height, etc).
4.	Pre-job	Supervisor Record in tour report.	Job site team members	To acquaint each person involved in the operation with scope of work, hazards and specific procedures to be followed	<ol style="list-style-type: none"> 1. The job or task in hand. 2. The procedures to be followed. 3. Responsibilities of each team members. 4. Access and Egress to the job site. 5. Possible hazards. 6. Tools and equipment to be used. 7. Material required. 8. Interface with other activities. 9. PPE. 10. Confirm team understanding.
5.	Toolbox talk	Supervisor Record in tour report	Job team members	Short and concise brief on work related hazards.	<ol style="list-style-type: none"> 1. The job or task in hand. 2. The procedures to be followed. 3. Responsibilities of each team members. 4. Access and Egress to the job site. 5. Possible hazards (Hazard Identification package to be used). 6. Tools and equipment to be used. 7. Material required. 8. Interface with other activities. 9. PPE. 10. Confirm team understanding.
6.	Emergency Response drill	Site Mgr. HSE Rep Formal minutes.	All site team members	Feedback on ER drill results/concerns	Areas of concerns, findings and recommendations.



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2.4.7 HSE Audits and Reporting

Audits are part of the company cyclic program in which Ras Tek work sites are periodically subject to audits conducted by the company HSE audit function.

The objectives of audits are to assess the effectiveness of the HSE MS as applicable to the Ras Tek relevant activities. To this effect it will be verified that:

- Operations are conducted and systems are operated in accordance with applicable standards and appropriate procedures.
- HSE risks are adequately identified and managed at ALARP levels.

The scope of HSE Audits includes the management of all operations and maintenance activities at Ras Tek worksites. This will include all interfaces with relevant facilities.

Specific attention should be paid to the following topics:

- Technical integrity management with a view to the potential risks.
- Adequacy of measures (planned or in place) to rectify shortcomings identified in previous reviews and audits (by internal and external auditors).
- Adequacy of emergency response and recovery measures.

2.4.7.1 Audit Team

Team Selection

Audit team will consist of HSE audit leader from the company's HSE audit function. The required expertise and experience profile of the remaining audit team members is dependent on the assessment scope.

As general guidelines, there should be adequate expertise in the team regarding:

- HSE MS Implementation
- HSE issues as related to the audit scope
- Audit and interviewing techniques



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Team Size

The number of auditors will be decided by the management depending on the assessment scope. However team size should be optimum in order to allow for adequate flexibility when distributing the tasks and to allow the team meetings to be effective and manageable.

2.4.7.2 Types of Audit

In connection with the HSE MS there are essentially two types of audit in addition to the self-assessment performed by company line management themselves or by nominated staff.

- Internal Audit
- External Audit

The basic procedures for the two types of audit are almost the same. The difference between them lies in the scope and depth of the audit and in the relationship between auditor and auditee.

Internal Audit

Appropriately qualified personnel perform this audit on behalf of the company management, and it is purely a company "internal" affair.

External Audit

This kind of audit is performed by the company on its contractors or on Ras Tek, by persons usually employed by clients.

2.4.7.3 Verification, Follow up and extraordinary audits

- Verification audits are performed once a year for company offices, workshops and facilities. They serve to verify the ongoing compliance of the HSE MS.
- Follow-up audits may be required by the Management. They are normally not full scope audits but aimed at specific areas to verify the implementation of corrective action.
- Extraordinary audits may be required in cases where an otherwise functioning HSE MS suddenly shows serious deficiencies, for instance after a HSE MS incident, perhaps involving personal injury.



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2.4.7.4 Audit Planning

The first step to be taken in the verification process is the planning of audits. The audit plan covering one to two years has proved to be practical. Preferably the designated person on behalf of and in agreement with the company management should draft the annual audit plan and circulate it to all departments. They discuss the plan and notify the designated person on the results, perhaps with some counter proposals. Having received this feedback the designated person finalizes the annual audit plan and issues it.

2.4.7.5 Audit Preparation

The success of an audit is to a great extent determined by its careful preparation. One of the first steps is most likely, the appointment of the Auditors.

2.4.7.6 Reporting

The audit plan should provide for sometime at the end of the audit for the auditor(s) to retreat and prepare the audit report. The results will be presented to the principal auditee and management at a close out presentation at the end of the audit. A draft report will be made available to the principal auditee prior to the end of the audit visit. The formal and final report will be sent to the principal auditee later on. The report will contain major observations and recommended actions in which only items of significant HSE risk potential will be reported.

2.4.7.7 Follow-up

The Principal auditee will review the audit findings and will prepare an action plan. Where he agrees with or rejects the audit findings, these will be documented in full and approved by the management.