



Lusail Real Estate Development Company

Health, Safety, Security, Environment, Logistics & Quality
Department

STANDARD OPERATION PROCEDURE – RISK MANAGEMENT

Document No LUS-HSE-SP2-431-003-03 Rev 3

Uncontrolled Copy Controlled Copy Date 20-Apr-2015

COMPANY PROPRIETARY INFORMATION

Prior to use, ensure this document is the most recent revision by checking the Master Document List. To request a change, submit a Document Change Request to the Document Control Representative. Master copy of this document will be maintained by the LREDC QA/QC Manager. Not controlled if printed.

Amendment Record

This document is reviewed to ensure its continuing relevance to the systems and process that it describes. A record of contextual additions or omissions is given below:

Rev .No	Description / Comments	Prepared By	Checked By	Approved By	Issue Date
1	(Pg. 4) Update and amend Purpose	Bruce Bester	Michael Ford	Uwe Krueger	25 th Feb '15
1	(Pg. 4) Insert Risk Management Process diagram	Bruce Bester	Michael Ford	Uwe Krueger	25 th Feb '15
1	(Pg. 4) Update and Amend Scope	Bruce Bester	Michael Ford	Uwe Krueger	25 th Feb '15
1	(Pg. 4-7) Update and Amend Terms & Definition	Bruce Bester	Michael Ford	Uwe Krueger	25 th Feb '15
1	(Pg. 8) Update and Amend Roles & Responsibilities	Bruce Bester	Michael Ford	Uwe Krueger	25 th Feb '15
1	(Pg. 8-16) Update, amend Procedure and include Risk Result Control Level	Bruce Bester	Michael Ford	Uwe Krueger	25 th Feb'15
2	(Pg. 1) Company Propriety Information – Not controlled if printed has been added.	HSE Working Group	Michael Ford	Uwe Krueger	1 st Apr '15
2	(Pg. 2) Revised Amendment Table	HSE Working Group	Michael Ford	Uwe Krueger	1 st Apr '15
2	(Pgs. 9, 13, 14, 15, 17, 19-26) Reference number updated	HSE Working Group	Michael Ford	Uwe Krueger	1 st Apr '15
2	(Pgs. 18) Sec. 7.0 – Appendix updated	HSE Working Group	Michael Ford	Uwe Krueger	1 st Apr '15
3	(Pg. 2) Review Amendment Table	HSE Working Group	Michael Ford	Uwe Krueger	12 th Apr '15
3	(Pg. 5) Scope – amended Risk Matrix to Risk Level Matrix and inserted doc no.	Bruce Bester	Michael Ford	Uwe Krueger	12 th Apr '15
3	(Pg.18) 6.4.3 Amended Employee Training Register	HSE Working Group	Michael Ford	Uwe Krueger	12 th Apr '15
3	(Pg.17) 6.3.4 Amended wording from MS to Management System	Bruce Bester	Michael Ford	Uwe Krueger	12 th Apr '15
3	(Pg.17) 6.4 Amened wording and Risk Register doc number	Bruce Bester	Michael Ford	Uwe Krueger	12 th Apr '15
3	(Pg.7) addition of Hierarchy of Controls into the definition list	Bruce Bester	Michael Ford	Uwe Krueger	12 th Apr '15
3	(Pg.11) Inserted 6.2.6 Hierarchy of Controls	Bruce Bester	Michael Ford	Uwe Krueger	12 th Apr '15
3	(Pg.11) 6.2.5 Amended to Hazard Identification - Identification of hazard...	Bruce Bester	Michael Ford	Uwe Krueger	12 th Apr '15
3	(P.17) 6.3.2 Amended, added • Any legal requirement changes	Bruce Bester	Michael Ford 20 April 2105 <i>Michael Ford</i>	Uwe Krueger	20 th Apr '15

Contents

1.0	INTRODUCTION & PURPOSE.....	4
2.0	SCOPE.....	5
3.0	DEFINITION & ABBREVIATION	5
4.0	REFERENCES	7
5.0	RESPONSIBILITIES	7
6.0	PROCEDURE.....	8
6.1	RISK ASSESSMENT METHODOLOGY	8
6.2	RISK ASSESSMENT AND CONTROL PROCEDURE.....	9
6.3	MONITORING & REVIEWING.....	17
6.4	COMMUNICATION OF RISK MANAGEMENT CONTROLS	18

1.0 INTRODUCTION & PURPOSE

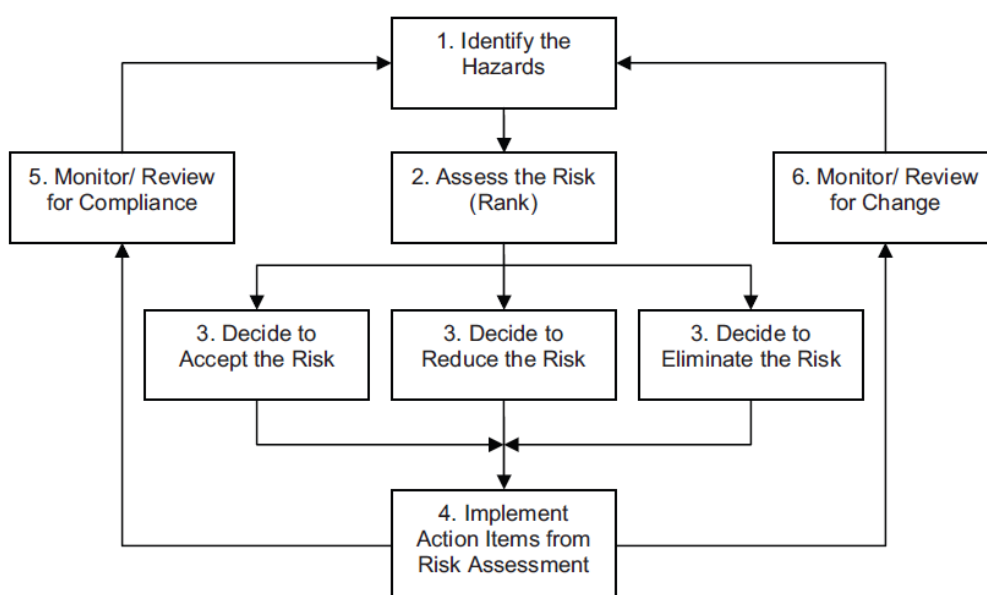
Preventing work related accidents and injuries are the primary concern for all those involved in health and safety. Work related accidents and injuries are caused by hazards, which are either not controlled or are inadequately controlled. The management of risks is a key component in an organisation's safety management system and an effective risk assessment and control process is a fundamental "duty of care" obligation on employers. To be effective, this process must include the systematic identification and assessment of hazards across a site to determine all of the undesired or unwanted events that could result in harm to people, damage to property and the environment and loss to process. Once identified and assessed, formal controls should be implemented and then re-assessed to determine their effectiveness and level of residual risk

This procedure describes the process that Lusail Real Estate Development Company (LREDC), Services Providers and Developers/Contractors personnel are expected to follow to ensure the above outcomes are achieved. It is recognised that there may be a need for some site specific supporting procedures to address some details not covered in this document.

Risk Assessment is a basic management tool and a fundamental process in meeting the Employer's Duty of Care obligation to provide safe systems of work and a safe working environment where employees are not exposed to hazards. Risk Assessments are also statutory.

This procedure is intended to provide guidance in identifying and assessing hazards. It details the process for conducting systematic risk assessments, which can then be used to develop detailed risk management or risk reduction plans. These risk assessments are conducted as part of an effective way to manage the risks encountered in day-to-day operations.

An overview of the risk management process is:



1. Identify the Potential Hazards – For each step of job or operation.
2. Assess the Risk –Likelihood of hazard occurring and consequence should it occur - Rank high to low.
3. Decide – Make a decision what you are going to do about the risk. Determine what controls are required.
4. Take Action – Implement the controls.
5. Monitor for Compliance - Controls and processes are in place and working (If not, back to step 1)
6. Monitor for Change – Identify any changes that may introduce new hazards (If changes, back to step 1)

The purpose of this procedure is therefore to ensure:

1. Risk assessments are conducted in a systematic way by appropriately trained and experienced persons using an appropriate process;
2. Risk assessments are undertaken to a consistent quality; and
3. The results of risk assessments are used as intended.

This procedure is also consistent with current industry standards, including QCS Section 11 Part 2.4 Risk Assessment Guides.

2.0 SCOPE

This procedure applies to all LREDC' areas in Qatar, including joint ventures and similar partnerships managed by LREDC.

Risk Assessment within LREDC involves a detailed and systematic review of a particular work practice/ method, process, equipment or work environment and identifying the various hazards involved. The likelihood and potential consequences of unwanted events associated with the hazards are then determined, and the "level" of inherent risk and "risk-rank" calculated using the "Risk Level Matrix" [LUS-HSE-FM4-431-006](#) - Risk Level Matrix.

For inherent risks that exceed an acceptable level (outside the risk appetite), existing controls are then identified and reviewed to determine their effectiveness. The residual risk is then assessed (based on consequences and likelihood with controls in place) to determine any further risk reduction requirements. New controls may be required (e.g. re-designing or modifying the task/ process/ equipment) to eliminate or reduce the level of risk to an acceptable level, the effectiveness of these controls can be assessed using the "Controls Matrix".

The Inherent Risk Rank is also used as the basis for determining the nature and frequency of the reviews of the ongoing effectiveness of any implemented control measures.

Risk Assessment not only contributes to Safety and Health but also helps to improve productivity by identifying problems and correcting them before they occur.

3.0 DEFINITION & ABBREVIATION

ACTIVITY HAZARD ANALYSIS (AHA)	Systematic method of hazard recognition, evaluation and control that can be used to devise control measures to eliminate hazards and protect persons and the environment in a workplace.
ALARP	As Low As Reasonably Practicable.
ANALYSIS	Describe the likelihood of an event arising and its consequences. These can be adapted or adjusted to suit the circumstances and different descriptions may be used for different tasks in the process.
CONSEQUENCE	The outcomes of an event expressed qualitatively or quantitatively, being a loss, injury, disadvantage or gain. There may be a range of possible outcomes associated with an event.
FREQUENCY	A measure of the rate of occurrence of an event expressed as a number of consequences of an event in a given time. See also Likelihood and Probability.

HAZARD	Source or situation with a potential for harm in terms of injury or ill-health, damage to property, damage to the workplace environment, damage to the natural environment, or a combination of these.
HAZARD IDENTIFICATION	Process of recognising that a hazard exists and defining its characteristics.
HAZOP STUDY	Examination of a task or process by a team of people familiar with the process to identify actual and potential hazards in the operations , so that they may be eliminated or mitigated.
LIKELIHOOD	Used as a qualitative descriptor of probability or frequency.
PROBABILITY	The likelihood of a specific outcome, measured by the ratio of specific outcomes to the total number of possible outcomes. Probability is expressed as a percentage between 0% and 100%, with 0% indicating an impossible event or outcome and 100% indicating an event or outcome is certain.
QUANTITATIVE ANALYSIS	This uses numerical values (rather than the descriptive scales used in qualitative analysis) for both consequence and likelihood using data from a variety of sources. The value of the analysis depends on the accuracy and completeness of the numerical data used..
INHERENT RISK	The risk associated with an unwanted event before any consideration / mitigation of the existing controls is taken into account
RESIDUAL RISK	The risk associated with an unwanted event after consideration of the existing / mitigating control measures is taken into account.
RISK	The chance of an event occurring that will have an impact on objectives .
RISK APPETITE	At the organisational level, is the amount of risk expose, or potential adverse impact from an event, that the organisation is willing to accept/retain
<p>Note: A “risk” is often specified in terms of an event or circumstance and the consequences that may flow from it. It is measured in terms of a combination of the consequences of an event and their likelihood. A risk may have either a positive or negative impact on a project.</p>	
RISK ASSESSMENT	Overall process of estimating the magnitude of risk and deciding whether the risk is tolerable or not.
RISK REGISTER	A register that summarises all of the risk assessments and can act as a management tool for the monitoring and updating of risk assessments.
RISK EVALUATION	The process used to determine risk management priorities by comparing the level of risk against predetermined standards, target risk levels or other criteria.
RISK FACTOR	A risk level number generated from an assessment of the likelihood and severity of injuries arising from a hazard.
RISK MANAGEMENT	The systematic application of management policies, procedures and practices to the tasks of communicating, establishing the context, identifying, analyzing, evaluating, treating, monitoring and reviewing.

RISK MANAGEMENT FRAMEWORK	<p>Set of elements of an organisation's management system concerned with managing risks</p> <p>Note 1: Management system elements can include strategic planning, decision making and other strategies, processes and practises for dealing with risk.</p> <p>Note 2: The culture of an organisation is reflected in its risk management system.</p>
RISK REDUCTION	Actions taken to lessen the likelihood, negative consequences, or both associated with risk.
RISK RETENTION	Acceptance of the burden of loss, or benefit of gain from a particular risk.
RISK SHARING	Sharing with another party the burden of loss, or benefit of gain from a particular risk
RISK TREATMENT	Process of selection and implementation of measures to modify risk.
UNWANTED EVENT	The undesired or unwanted event that could arise from a hazard i.e. manifestation of harm or potential harm to people, damage to property and the environment and loss to process as a result of hazard
SEVERITY	Used as a qualitative descriptor of an undesirable outcome.
HSE	Health, Safety and Environmental
TOLERABLE RISK	Risks that has been reduced to a level that can be endured by LREDC projects/offices having regard to its legal obligations and its own 'Occupational Health and Safety' and 'Environmental' policy.
HIERARCHY OF CONTROL	Is a list of control measures, in priority order, that can be used to eliminate or minimise exposure to the hazard

4.0 REFERENCES

- Qatar Construction Specifications 2010
- LREDC Management Framework – Section 4.3.1 Hazard Identification:
- Lusail HSE General Requirements – Section 8.1, 8.2, 8.3 and 8.4

5.0 RESPONSIBILITIES

The following personnel have responsibilities mentioned in this procedure:

5.1 Project Manager(s)

- Has the responsibility to ensure that hazards are identified; risks assessed and risk reduction measures implemented in areas under their control.

5.2 Department Manager(s)

- Are responsible to ensure that where it is required to conduct risk assessments, they ensure they are conducted and make available personnel under their control for participation in the process. They are also responsible to ensure that identified corrective actions are reviewed and implemented, and that feedback is provided to employees.

5.3 Supervisors

- Are responsible for checking the status of completed actions through regular auditing and providing feedback to management on the effectiveness of this procedure

5.4 Employees

- Including Managers, Team Leaders and Technical personnel are responsible for participating in the risk assessment process when invited to be a Risk Assessment team member.

5.5 LREDC HSE COMMITTEE

- Advise on changes to HSE Risk policies.

5.6 Project/Office Manager(s) PROJECT/OFFICE MANAGER(S)

- Review and approve HSE Risk Register

5.7 HSE REPRESENTATIVE

- Maintain and update the HSE Risk Register. Ensures communication of HSE Risks to all workers in office or on site during induction and throughout employment.

5.8 SITE HSE COMMITTEE

- Communicate changes in Risk levels and control measures to employees on site.

6.0 PROCEDURE

6.1 RISK ASSESSMENT METHODOLOGY

There are several different methods for conducting risk assessments. Generally the more serious the perceived hazard, the more formal and more “process driven” the method. Complex planned risk assessments should carefully consider at least these 12 areas:

1. Defining the objective based on the expected deliverable
2. Identifying and describing the system to be reviewed, the physical and /or process boundaries
3. Identifying and understanding the potential hazards (including health hazards)
4. Selecting Risk Assessment Method - the Means of Systematically Identifying the Risks
5. Selecting Risk Analysis Method - the Means of Calculating and Examining the Level of Risk
6. Range of External Influences to be considered
7. Consequences of Interest
8. Core Assumptions
9. Selecting a facilitator for the risk assessment
10. Determining the composition of the team or work group
11. Deciding the time required (and venue)
12. Providing risk assessment results and the desired deliverables with accountabilities and timelines

A team of suitable personnel (based on knowledge and experience) is picked, a team leader appointed and the assessment conducted. Recommendations from the risk assessment (i.e. proposed controls) are then presented to management for consideration and implementation, if appropriate.

Key success factors are:

- Use of a trained and experienced Facilitator;
- Use of a team with the relevant knowledge, experience and motivation;

-
- Appointment of an appropriately qualified and competent Team Leader;
 - Proper scoping of the risk assessment, including:
 - Definition of the key questions/ problems to be addressed by the assessment;
 - Definition of the level of “acceptable” and “unacceptable” risk;
 - Consideration of likely outcomes;
 - No perceived pressure on the Team to come up with a pre-determined outcome (e.g. To justify a management decision already made) i.e. must be seen as objective and done with integrity;
 - Use of a detailed and systematic approach for hazard/ risk identification;
 - Adherence to the risk assessment tool
 - Proper documentation and reporting of the assessment;
 - Adequate review of the assessment results by management; and
 - Feedback by Management to the Risk Assessment Team on subsequent actions.

The above factors are critical to successful completion of a risk assessment exercise.

6.1.1 WHEN TO CONDUCT A RISK ASSESSMENT

Personnel are expected to apply this procedure to systematically identify hazards and assess risks associated with all aspects of its operations. Risk assessments should also be conducted:

- a) For all safety-critical processes, plant/ equipment, tasks or for working environments likely to be hazardous;
- b) Whenever any new plant/ equipment, processes or work methods/ systems are introduced;
- c) Whenever existing plant/ equipment is used in a substantially different manner;
- d) Whenever existing plant/ equipment is substantially modified or changed and;
- e) Whenever any other changes occur in the workplace, which are reasonably likely to impact employee safety.
- f) When legislative obligations (including regulations) change

6.1.2 COMMITTEES

Risk committees need to be established from time to time to manage the risk profile of the operation or department and to provide effective formal consultation between management and employees on matters arising from the nature of work.

6.1.3 ESTABLISHING COMMITTEES

The business may establish committees as it deems necessary or convenient for the governance for both construction and operation of risk management.

The business determines the constitution of its committees, including membership and terms of reference, and the reporting requirements and communication channels between and within them.

6.2 RISK ASSESSMENT AND CONTROL PROCEDURE

6.2.1 OBJECTIVES – RISK OR HAZARD REGISTER DEVELOPMENT

The objective of creating a Risk or Hazard Register is to prepare a document that lists, outlines and prioritises the risks in an operation or organisation. As such it is an exposure document intended to communicate and monitor the current status of priority risks on the site. Normally, communication is the primary intention of a “*Risk Register Active Records*”- [LUS-HSE-FM4-431-007- Risk Register Active Records](#)

Obviously, regular review of the Risk Register is important due to changes in exposure over time and possibly a better understanding of the hazards and consequences. (Hazards change, methods change, etc.)

The inputs to a Risk or hazard Register may come from a wide variety of sources including:

- Major Hazards from risk analysis studies
- Information from Safety Case
- Information developed through Management of Change
- OH&S Hazards from
 - Incident Reports
 - Hazard reports
 - Job Hazard Analyses (JHA's)
 - Audit Reports
 - Inspection Reports
 - Reviews
- Environmental Hazard Report

6.2.2 RISK ASSESSMENT TEAM

As it is difficult to derive reliable estimates of risk for all the types and varying conditions under which activities are conducted in our industry, it is essential that we draw on our previous experience or experience of the industry in determining the likely consequences and probability of an event occurring. The best way to do this is to draw together several people with relevant experience and form a small team to conduct the assessment. The experienced judgement of team members, together with accident / incident histories are utilised to determine the consequences and probability. The strength of the team will determine the level of confidence in the result. This should be conducted with a cross section of the workforce engaged in the task being assessed

6.2.3 SELECTING THE TEAM

The Risk Assessment Team should be a blend of the following:

- Operational / Construction (e.g. process, maintenance) personnel
- Technical (e.g. process engineers, environmental technicians) personnel; and
- Management (e.g. team leader, process and business unit manager).

Team members should have both knowledge and experience of the hazards associated with the process, system, and plant/ equipment, operation or work area that is the subject of the assessment. It is essential that operators who have direct and current knowledge and experience of the operational aspects be included in all risk assessments. This will help ensure employee involvement and ownership of the controls arising from the risk assessment.

Knowledge of possible hazard controls is also important and may require some lateral thinking in order to determine the best controls to use. Designers and planning personnel (e.g. planning engineers, external suppliers or manufacturers) are useful in this regard.

Management representation is equally important, as it will provide some credibility to the risk assessment results. This means it is more likely that management will accept the recommendations and action them accordingly. This person may also be a good choice for Team Leader.

Other key selection requirements are the ability of individuals to provide sound judgement and to work together in a team environment. Members must also be prepared to think beyond the usual "procedural" controls and apply the concept of "Hierarchy of Control".

In general, the Team should comprise not less than 4 or more than 10 persons, with 6 to 8 being ideal. Note that the number and variety of persons will largely depend on the scope of the risk assessment.

When required, a trained facilitator should be used to guide the Team through the risk assessment process. One member of the Team should also be selected as Team Leader. This person will act as the liaison between the Site and the Team and be responsible for ensuring the final report is provided on time. Roles of these persons are described below.

6.2.4 WORKPLACE INSPECTION

Ideally, the Risk Assessment Team should conduct a “site visit” prior to the commencement of the formal risk assessment. This means actually visiting the workplace to view the process, system, plant, equipment or work area that is the subject of the assessment. Digital Photos or short video clips can be critically useful tools for stimulating discussion on likely hazards present in the workplace.

6.2.5 HAZARD IDENTIFICATION

The Facilitator using a systematic approach to cover the full field of possibilities should conduct this hazard identification exercise. The key question to be posed by the Facilitator is “what if?” The purpose of the site visit is to familiarise all members of the Team with the physical aspects and to assist in identifying all the hazards. The aim is to be confident (rather than certain) that all of the main hazards and most of the routes by which a major incident could arise are identified.

It is important to consider all types of hazards, not just the obvious “physical’ ones.

Identification of hazard shall take into account:

- Routine or non-routine activities
- Activities of all persons having access to the workplace (including contractors and visitors);
- Human behaviour, capabilities and other human factors;
- Identified hazards originating outside the workplace capable of adversely affecting the health and safety of persons under the control of the organization within the workplace;
- Hazards created in the vicinity of the workplace by work-related activities under the control of the organization;
- Infrastructure, equipment and material at the workplace, whether provided by the organization or others;
- Change or proposed changes in the organization, its activities, or material
- Modifications to the OH&S Management System, including temporary changes, and their impact on operations, processes and activities;
- Any applicable legal obligations related to the Risk Assessment and the implementation of the necessary controls
- The design of work areas, process, installation, machinery/equipment, operating procedures and working organization, including their adaptation to human capabilities

Environmental aspects should be considered (e.g. ventilation, lighting, temperature) and consideration given to likely changes in conditions at various times in the operational life cycle.

The “systems” used to ensure safe work are also important to consider as failures in these can often result in the manifestation of hazards as ‘unwanted events’. Human behavioural aspects should also be considered together with the impact of such things as ergonomics of equipment and the workplace, on the ability of persons to work safely.

6.2.6 HIERARCHY OF CONTROL

Having identified a hazard consideration needs to be taken on what action/s (control measures) need to be put in place to control the risk. There are a number of control strategies available, and this is referred to as the "Hierarchy of Control".

It is important to note the further down the list of options, the controls become less reliable, more costly and require more work to ensure they are maintained. In most situations, the actual method for controlling the risk is a combination of options in the hierarchy.

In high-risk situations, short-term control measures might need to be applied while the most appropriate long-term controls are identified, designed and implemented.

The Hierarchy of Control

- **Elimination** - The first and the best way to eliminate the hazard is by removing the initial element or cause, machine or the process all together
- **Substitution** - Substitute with an alternative non-hazardous or less hazardous material, machine or process
- **Engineering controls** - If a hazard cannot be eliminated or there is no alternative that can be found, then the next step is to use engineering controls, such as a machine guard.
- **Administrative controls** - Next is the administrative controls, such as warnings, labelling, signs, alarms, training, isolation, exposure control and monitoring etc.
- **Personal protective equipment (PPE)** - It is the least effective method and should be used only while other more effective controls are being developed or installed. PPE is not fool-proof, not comfortable, not popular and can actually create hazards.

6.2.7 CONDUCTING THE RISK ASSESSMENT

The formal part of the risk assessment is usually undertaken in an area away from the work place (e.g. training room, conference room etc.) where distractions can be minimised.

For large (e.g. site-wide) risk assessments, full-time secretarial support is recommended.

Otherwise, an electronic whiteboard should be used but will require entry into the Risk Assessment Record form at a later date.

6.2.7 RISK ASSESSMENT PROCESS

The risk assessment process followed by the Team comprises the following steps:

Step 1 - Introduce Scope & Process to be used.

Step 2 - Analyse the "Subject" to breakdown into components.

Step 3 - Identify "Unwanted Events" that can result from the various hazards.

Step 4 - Determine the 'Maximum Reasonable' Consequences of Unwanted Events.

Step 5 - Determine the Likelihood of the Unwanted Event with associated Consequences.

Step 6 - Calculate the "Level" of Risk (i.e. extreme, high, moderate, low) using Risk Matrix.

Step 7 - Determine the Existing Controls for 'Unacceptable' Risks.

Step 8 - Assess the adequacy & status of Existing Controls (based on number, type, effectiveness etc.)

Step 9 - Where Risk is "extreme" or "high", identify new controls (using "Hierarchy of Control") or other action to reduce level of risk.

Step 10 - Develop "Risk Reduction Plan" with actions/ responsibilities/ time-frames for implementing risk reduction actions.

Step 11 - Produce Risk Assessment Report.

6.2.8 RISK ASSESSMENT PROCESS STEPS

The steps are explained briefly as follows:

6.2.8.1 Step 1: Introduction

The facilitator should start by reviewing the scope of the risk assessment and confirming it is fully understood by the Team members. The expectations of the Site should also be clearly explained and any amendments to the scope should also be noted.

The roles of the Team Members, Team Leader and Facilitator should be explained. The method to be used (i.e. WRAC / Bowtie HAZOP etc.) should then be discussed in as much detail as is needed for the team members to reach a common understanding of the process. This should be done via an overhead presentation.

6.2.8.2 Step 2: Analyze the “Subject”

The process, system, plant/ equipment, operation or work area that is the “subject” of the assessment should be analysed and broken down into definable sections, components or steps (these will vary with different assessment methods).

Where possible, use a visual means to display these e.g. cards on the wall, drawing or process map on whiteboard etc. This helps break the subject down into bite-sized “chunks” (‘how do you eat an elephant?’) so that the team can focus more easily on specific tasks, activities or components when identifying hazards and potential unwanted incidents or events.

Examples of this are as follows:

- A new process could be broken down into inputs, process and outputs;
- A processing plant could be broken down to crushing, grinding, leaching and tailings disposal;
- Virtually anything can be broken down according to its “life cycle” (see appendix 8), e.g. delivery, commissioning, operation, maintenance and disposal design and manufacture are usually outside the scope of a site assessment);
- Use of people can be broken down into selection, induction, orientation, training, competence assessment, refresher, skills up-grade etc.;
- A piece of equipment can be broken down to its main components e.g. for a loader – tyres, bucket, cab, engine, hydraulics, transmission etc.;
- An operating cycle or task can be broken down into its various steps.

The following question needs to be asked which form the Hierarchy of Control: se specific tasks issues that should be discussed include:

6.2.8.3 Step 3: Identify the Unwanted Events

As a guide, the “Energy Concept” can be used to help focus attention i.e. what are the various energies that can impact people, equipment, procedures / systems and the working environment.

In general there are two types of unwanted events to look for which are based on two types of hazards, namely:

1. Active or ‘task-related’ hazards or those associated with actually undertaking a task or performing an activity (e.g. while undertaking a maintenance inspection of vehicle brakes, a fitter may be working in a confined space, touching hot brake parts, coming into contact with sharp surfaces etc.)
2. Passive or ‘system-related’ hazards or those that can occur as a result of not doing a task or performing an activity properly or not performing a task at all. These normally impact someone else at a later time (e.g. if a fitter does not perform the brake inspection properly he or she may fail to find a fault; this could result in a brake failure, the vehicle losing control and the driver being injured in a collision).

These are often “system” or procedural failures.

An “incident” is an unwanted event (e.g. unwanted release of energy) which results from a hazard. A hazard itself poses no threat on its own but only becomes a problem when it ‘manifests’ itself through human interaction.

In general, it is not essential that every single unwanted event be identified for a successful risk assessment. It is however crucial that all those that have significant impact be identified.

Consideration of Impacts

The types of impacts to consider will depend largely on the purpose of the risk assessment determined in the scoping session.

6.2.8.4 Step 4: Determine Maximum Reasonable Consequence

“Risk” is the combination of the likelihood or probability of a specific unwanted event (i.e. an incident) resulting from a hazard and the potential consequences if it occurs.

For each potential incident identified in Step 3, the **maximum reasonable consequences** must be determined to identify the “inherent risk”. This is the consequences that could occur in a **reasonable** “worst case” scenario without consideration of any controls that might be in place to minimise the consequences. The issue here is to focus on the hazard/unwanted event itself.

The consequence can be considered as the “worst case scenario” or outcome, that can be **reasonably** expected, should an incident occur (i.e. *maximum reasonable consequence*).

6.2.8.5 Step 5: Determine Likelihood of the Event and Associated Consequences

The likelihood (often called “probability”) of an unwanted event occurring is largely dependent on the frequency of exposure and the number of times the task or activity is undertaken. The following aspects should be considered when making this decision:

- The number of times tasks/ cycles/ situations occur;
- The number of people performing the tasks or exposed to a risk; and

What has happened in the past here or elsewhere in similar situations (i.e. Have incidents occurred previously, how often have they occurred etc.).

The likelihood also includes consideration of the maximum reasonable consequences.

That is, it is the likelihood of the unwanted event occurring together with its associated consequences.

For example, a cord lying across a passageway can be considered a potential trip hazard. The likelihood of someone tripping is a function of how many people travel along the passageway (e.g. probability is higher for 100 people per day as opposed to 10) and general knowledge that people have tripped on cords in the past (i.e. it has happened before). The “unwanted event” is that someone could step over the cord, trip and break their leg (i.e. the maximum reasonable consequence). The likelihood of someone just tripping and sustaining a bruise is likely to be higher but is likely to be of lower risk.

The [LUS-HSE-FM4-431-006](#) - Risk Level Matrix can be used to help determine likelihood. Note that these are very subjective and experienced-based. Once again, the likelihood should be considered with consideration of any controls that might be in place to minimise the probability of an unwanted event occurring with due regard for reliability or otherwise of the existing controls.

6.2.8.6 Step 6: Calculate the Level of Inherent Risk

Once the maximum reasonable consequence and likelihood of each potential unwanted event has been determined, the corresponding **number** (for consequence) and **letter** (for

likelihood) can be recorded on the “HSE Risk Assessment Form” [LUS-HSE-FM4-431-004 – HSE Risk Assessment Form](#).

Here, there are 4 levels of risk, namely:

Risk Result Control Level

Risk Level	Result	Authority To Sign Off
Extreme	Unacceptable	CEO / COO
High	Undesirable	Lusail Project Manager
Moderate	Tolerable but risk should be reduced if reasonably practicable	Supervisory Staff
Low	Broadly Acceptable	Procedural Control

Once the risk level is determined (i.e. E, H, M, or L) it can be recorded on [LUS-HSE-FM4-431-004 – HSE Risk Assessment Form](#).

Once the risk level is determined a decision is made as to those risks that have an “acceptable” level of risk and will, therefore, not be further evaluated as part of the risk assessment. This decision is usually done at the scoping phase e.g. it may be decided not to deal with any risks determined as low level – (all “Low” risks become “acceptable” for the purposes of the risk assessment).

To provide guidance as to “acceptability of risk”- Many environmental regulatory agencies require that risk to the public from activities on a proposed new industrial site be less than 1 in one million fatalities per year. Social research has indicated that the community considers acceptable occupational fatality risk to be 1 in one hundred thousand, or ten times higher than public risk. However, there is no figure currently specified in any mining related regulations.

The remaining risks are those that are considered “unacceptable” and will be subject to further review and analysis in the risk assessment. It is recommended that you complete down to Step 6 for all unwanted events before reviewing effectiveness of existing controls or additional controls or action plans.

6.2.8.6 Step 7: Determine Existing Controls for “Unacceptable” Risks

The remaining steps only apply to those inherent risks that are ranked as having an “unacceptable” level of risk, as determined in the initial scoping exercise.

Starting with the “highest” level of unacceptable risk, the Facilitator should help the Team identify all of the existing controls which are currently in place to prevent or reduce the likelihood and consequences of the unwanted event.

The various controls (procedures, protective equipment, guards, barriers, management systems, competency requirements, training, etc.) should be listed on the [LUS-HSE-FM4-431-004 - HSE Risk Assessment Form](#).

6.2.8.7 Step 8: Assess the Adequacy of Existing Controls

Once the Existing Controls have been identified and recorded, the Team must consider whether the controls are effective in controlling the risk. Before commencing, the Facilitator should provide an overview of the “Hierarchy of Controls” to assist the Team in determining what effective controls are required.

The issues that should be discussed include:

- Number of controls in place
- Type of controls (e.g. “hard” or “soft” - engineering, procedural, PPE etc.)
- How effective are they? (i.e. how robust are the controls)

- How much information is available to support our assessment? (e.g. Audit/inspection results)
- What is the quality of the information?

To determine whether controls are adequate the facilitator should consider the following options.

1. **Use the Rule-of-Two** – at least two engineering or more effective controls per unwanted event (including contingency response), should be in place for an Extreme or high risk.
2. **Use the Control Rating Code** – use the CRC to discuss or formally analyse control effectiveness
3. **Use a quantitative approach** - calculate control reliability as part of event probability

High

Difference between Uncontrolled Risk Rank (URR, table 6.4) & Control Rating code (CRC, table 6.3) = 0 or higher indicates controls are strong and operating properly, providing a good level of assurance that they are in place and are effective. A good level of 'hard' information is available to support this assessment (e.g. audit & inspection results).

Moderate

Difference between URR & CRC = minus 1 indicates some weakness or inefficiencies have been identified but are not considered serious; some improvements are required to provide a good level of assurance. Some hard data is available but mainly based on informal inspections or assessments.

Low

Difference between URR & CRC = minus 2 or less indicates controls are not effective (e.g. mainly rely on Admin or PPE) and many deficiencies exist. Controls do not provide reasonable assurance that risks are being managed. No hard data is available. Informal data also indicates ineffective control.

The result of this analysis should then be recorded on the "HSE Risk Assessment Form" [LUS-HSE-FM4-431-004](#) – HSE Risk Assessment Form.

Note - *If any "Extreme" risks have been identified which have ineffective controls and are considered to pose an immediate threat to personnel it may be necessary to immediately notify the responsible manager so that he or she is made aware of the situation.*

6.2.8.8 Step 9: Determine New Controls/ Risk Reduction Actions

Where the "Inherent Risk" is determined as being either "Extreme" or "High", the Team must further review the controls to identify what actions are required to improve their level of effectiveness (i.e. what actions are required to ensure the controls have a "high" level of effectiveness). This review must also occur if the "Inherent Risk" exceeds the level of "acceptable" risk as determined in the scoping document e.g. the scope may also include "Moderate" risks.

Where the effectiveness of existing controls cannot be improved, the Team should try to identify any additional controls that can be implemented to further reduce the level of risk. The "Hierarchy of Controls" should be used to help determine additional controls.

6.2.8.9 Step 10: Develop Risk Reduction Plan

The "Residual Risk" is essentially the level of risk that indicates how effective the risk management process is likely to be in the workplace. This is the 'real' or remaining risk that exists after controls have been implemented. It is likely to be the one that is used to measure whether or not the employer has met its "duty of care" obligations to ensure employees are not exposed to hazards.

This Plan must contain details of what actions are recommended to reduce residual risk to an acceptable level and will include the following information:

- Hazard/ unwanted event;
- Residual risk level/ rank;
- Proposed action to improve effectiveness of existing control or develop/ implement a new control;
- Person responsible for undertaking the action;
- The Expected completion date.

The proposed actions must relate to specific tasks (e.g. install barricades, alarms, interlocks, conduct specific training etc.) and not be “generic” statements (e.g. improve guarding, improve training).

Controls hold also includes reviews that ensure the controls themselves are in place and working effectively (e.g. audits and inspections. Note that it is the Inherent Risk Rank that is used as the basis for determining the nature and frequency of the reviews of the ongoing effectiveness of any implemented control measures.

This is because if the controls become ineffective over time, the risk may rise back up to the Inherent Risk level).

6.2.8.10 Step 11: Produce the Risk Assessment Report

The Risk Assessment Report contains all the details of the risk assessment and acts as a permanent record of the results. A Report on the risk assessment may be compiled and provided to the Site within the specified time.

This report should include:

- List of team members
- Overview of process
- Copy of scope
- Dates and venue
- Risk Assessment Record form
- Recommendations for new or amended controls
- Risk Reduction Plan Draft (if required)

6.3 MONITORING & REVIEWING

6.3.1 MONITORING

Ongoing monitoring of the effectiveness of the control measures will be undertaken by the HSE Representative through actions such as observation/inspections, review of maintenance logs, and discussion with workers undertaking the activity

Adequate supervision should be provided to verify that the new control measures are being implemented and used correctly.

6.3.2 REVIEW

The risk management process for a particular task or process shall be reviewed:

- As a result of any incident or near miss associated with the works;
- Any change in the method of work;
- Any legal requirement changes
- At the end of the task if it is considered that a better method could be employed;
- Prior to the task commencing the next time;
- As a result of an inspection or audit finding; and/or;
 - I. Prior to the task commencing on the next activity.

- II. At least once annually for tasks and activities with implementation periods exceeding 12 months.

Where it is considered that a better way or more effective controls could be used, or in the light of any incident, the risk management process shall be reviewed and revised accordingly. Any changes shall be approved by the appropriate Manager and communicated to all relevant persons both in and out of the workplace in a timely manner.

6.3.3 RECORDS

The HSE Risk Register, AHA and shall be kept in a designated file for record and reference purposes by the HSE Department.

6.3.4 AUDIT

The risk management process shall be audited as part of the HSE Management System Audit according to the audit schedule and appropriate recommendations made and subsequently implemented as required.

6.4 COMMUNICATION OF RISK MANAGEMENT CONTROLS

Workers and other relevant parties identified through the risk management process as being at risk shall be given suitable information and training in the risk management controls selected and documented on the [LUS-HSE-FM4-431-008.00](#) - HSE Risk Register. Records of attendance will be kept and maintained.

6.4.1 COMMUNICATION TOOLS

The information is usually disseminated to the workplace through Induction, training and Tool Box Meetings. Should there be specialist training identified (e.g. Tag Out/Lock Out, special insurance requirements, etc.), this shall be given by suitably qualified personnel to those people who require it.

The outcomes of risk assessments shall then be communicated as Procedures, office Instructions, Work Method Statements, AHA's as required and will be posted in the workplace.

6.4.2 COMPETENT PERSON

Those carrying out risk assessments should be competent to do so as certain situations will require that person to have a high level of knowledge and experience of the subject along with an understanding of the process being assessed.

LREDC will check that the competent person has the appropriate HSE qualification (some of which may be competency based and/or industry specific) or membership of a professional body or similar appropriate organisation to confirm that they have a sufficient level of competence. In certain situations, additional support in the form of an industry expert for complex processes and/or employees who undertake the task in question

6.4.3 TRAINING

Those persons performing, facilitating and reviewing the Risk Assessment processes of the organisation or project should undergo formal training in LREDC Risk Assessment methodology. A record will be kept and maintained of those who attended the training

The Workplace Manager and/or HSE Representative shall carry out site-specific hazard recognition training when new or unrealized hazards are identified, for all workplace based employees that are exposed to potentially hazardous work zone activities and environments, before work commences.

The Workplace Manager shall ensure the Contractor carries out similar hazard recognition and safety orientations for their employees which is to be documented and accessible for review.

