

## **APPENDIX R**

### **OCCUPATIONAL AND COMMUNITY HEALTH AND SAFETY PLAN TEMPLATE**

**OCCUPATIONAL AND COMMUNITY HEALTH AND SAFETY PLAN TEMPLATE**

**PROJECT NAME**

<b>REVISIONS DETAIL</b>					
<b>Rev.</b>	<b>Date</b>	<b>Detail of revision</b>	<b>Prepared By</b>	<b>Checked By</b>	<b>Approved By</b>

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**ABBREVIATIONS:**

## **INTRODUCTION**

### **1. Brief Description of the Project**

**Figure 1: SITE MAP**

**Figure 2: Project Camp Layout**





## **2. HEALTH AND SAFETY POLICY**

### **2. 2.1 COMPANY POLICY STATEMENT**

### **3. 2.2 CERTIFICATIONS**

## **3 HEALTH AND SAFETY RESPONSIBILITIES**

### **3.1 Management Responsibilities**

Contractor's Project Management must perform or adhere to the following:

- Provide and maintain constructional plant, equipment and systems of work that are lighted, safe and without risks to health;
- Execute suitable arrangements for ensuring safety and absence of risks to health in connection with the use, handling, storage, transport and disposal of articles and substances;
- Provide protective clothing and equipment, first aid stations with such personnel and equipment as are necessary and such information, instruction, training and supervision as are necessary to ensure the health and safety at work of all persons employed on the Works all in accordance with the Laws of Georgia.
- Hire lawfully aged employees (According to Georgian Labor Code no one to be employed under 18);
- Ensure that the Health and Safety Policy has been communicated to all staff,
- Enforce health and safety violations with progressive discipline;
- Take every reasonable precaution for the protection of a worker;
- Establish, maintain, and review at least annually a Health and Safety Plan, and document revisions to the plan arising from the annual review;
- Ensure that workers are properly trained and instructed in safe work practices.
- Establish and maintain Safety Trainings Records;
- Report accident and injuries to the Engineer and Employee as required by the Contract.
- Provide workers with health and safety information;
- Inspect projects and meet regularly with supervisors to monitor the Health & Safety Program and take corrective action where required;
- Consider accident prevention and safety performance when evaluating Supervisors and Workers.

A review of the management responsibilities will be done on an annual basis. This evaluation will measure each health & safety responsibility.

All management need to understand that they are accountable for health and safety performance. By including health and safety in performance evaluation systems, the Contractor demonstrates the importance of health and safety.

### **3.2 Health and Safety Officer Responsibilities**

- Arrange all Organizational procedures according to the Contract Terms, Health and Safety Plan and Georgian Regulations, Standards and Norms.
- Prepare Supplemented H&S Plans.
- Provide all necessary trainings, information, records and coordination relating Health and Safety issues.
- Conduct H&S Site inductions for new employees, subcontractors and visitors.
- Arrange communication between Management and Workforce.

- Conduct Daily H&S Inspections of the Project Site, Office, Camp and Plants.
- Provide Weekly, Monthly and Quarterly H&S Reporting.
- Assist the Project Management in H&S issues.
- Coordinate and Control Hazard Identification and Risk Assessment Program.
- Arrange all H&S Postings at workplaces and more attended places of employees.
- Cooperate with Supervisors and Workers to comply with their H&S obligations.
- Accident Investigation and Near Miss analyses.
- Prepare Site Emergency Plan.
- Ensure compliance with the Company HSE Policy by all outside suppliers, service providers and contractors.

### **3.3 Supervisor Responsibilities**

"Supervisor" means a person who has charge of a workplace or authority over a worker; A Supervisor must also be a competent person.

"Competent person" means a person who,

1. is qualified because of his knowledge, training and experience to organize the work and its performance,
2. is familiar with the provisions of the Act and the Regulations that apply to the work
3. has knowledge of any potential or actual danger to health or safety in the workplace;

Supervisor (s) must perform or adhere to the followings:

- Be responsible for on-site accident prevention;
- Review safe work procedures for the site;
- Take every reasonable precaution for the protection of the worker;
- Monitor the health and safety performance of subcontractors;
- Report accidents and injuries to management as required by this plan and regulations by using the forms provided with this manual;
- Investigate accidents and take actions to prevent reoccurrence;
- Ensure that the Health and Safety Plan is followed at the work level;
- Enforce disciplinary actions for violations of the Health and Safety Plan;
- Ensure that protective equipment provided, accessible, used and maintained properly by workers, and that workers understand the reasons for its use;
- Instruct personnel in proper work practices and update instructions as needed;
- Check work practices and work areas for hazards and take corrective action where required;
- Consult and co-operate with the Health and Safety Officer;
- Acquaint new workers with hazards and safe work procedures.

### **3.4 Worker Responsibilities**

"Worker" means a person who performs work for the Project.

- Comply with Health and Safety Plan and all relevant regulations, including legal duties of workers.

- Take every reasonable precaution necessary to prevent accidents;
- Use safety equipment, devices and clothing as required;
- Work in accordance with the Health and Safety Plan and Procedures;
- Work in a manner that will not endanger anyone;
- Refrain from using any dangerous equipment or machinery without authorization;
- Report unsafe situations immediately to their supervisor;
- Report injury or illness immediately to their supervisor;
- Help new employees recognize job hazards and follow proper procedures;
- Be aware that workers are subject to disciplinary action where either Company safety rules or government regulations are violated.

### **3.5 Subcontractor Responsibilities**

- The purpose of this policy is to establish minimum guidelines for Sub-Contractors in order to help provide and maintain a safe work environment for all employees.
- All Sub-Contractors are responsible for complying with the requirements of H&S Plan, other Health and Environmental Plans, Procedures, Instructions and Georgian Regulations, Norms and Standards.
- All Sub-Contractors must prove that his employees are trained and competent to implement their work.

### **3.6 Visitors**

To ensure the safety of all visitors the following responsibilities must be communicated. All employees are required to enforce this policy.

Each visitor must read the visitor responsibilities and sign in at reception. It is the responsibility of the company contact to remain with the visitor at all times.

Visitors must:

- Sign in and sign out in the log.
- Remain with their designated host.
- Wear the appropriate personal protective equipment when touring the Site.
- Not touch any company equipment or product.
- Remain out of restricted areas.
- Follow all posted signs and rules.
- In the event on an emergency follow the Emergency instructions and remain in the gathering area until given further instruction.

## 4. HEALTH AND SAFETY TRAINING AND INFORMATION

Company believes that training is crucial to establishing and maintaining the high safety standards expected in performing all job functions. We are committed to ensuring that all employees are adequately trained to perform their job functions safely. Workers must participate in their training and follow the instructions that they are given.

### 4.1 Planned Trainings

- Site Health and Safety Induction
- Overview of the Health and Safety Plan and the applicable Regulations.
- Hazard Identification and Risk Assessment
- WHMIS Information.
- Safe use of Tools and Equipment
- Confined space
- Specific Supervisor Training.
- Lockout/Tagout
- New Worker Orientation.
- Safe work procedures for road building operations.
- Use of Personal Protective Equipment.
- Traffic Control
- First Aid and Medical Care
- 5 Minute Safety Talks

### 4.2 New Worker Orientation

Inexperienced workers are generally involved in more accidents than veteran workers. Health and safety education should start with orientation as soon as a worker joins the organization or is given new duties.

**A record of the orientation will be placed in the employee's personnel file.**

New worker orientation shall include the following:

- Explanation and review of the Health and Safety Policy and Plan by H&S Officer;
- Introduction to the co-workers and explanation of all job functions at the workplace by Supervisor;
- Introduction to the Health and Safety Representative, where applicable;
- Orientation of the workplace and/or jobsite with attention to the site specific hazards;
- Identification of the location of the first aid kit or first aid station, fire extinguishers, telephone and washrooms;
- Explanation of the proper use of the personal protection equipment applicable to the particular work being performed;
- A reminder that the worker has the right to refuse to perform hazardous work and that a hazardous conditions should be reported immediately to the supervisor;
- Explanation of emergency procedures;
- Partnering of the new worker with a more experienced worker, where possible.

### **4.3 Policy Violation**

Policy Violation procedure has the following steps:

1. Step one: Supervisor gives a verbal warning and provides corrective action to worker. Worker must acknowledge receiving verbal warning by signing the Discipline Acknowledgement form. The form will be placed on the worker file, and removed after 12 months.
2. Step two: Worker receives a written warning using the Written Discipline form. This will outline the issue, corrective and timeframes for compliance. The worker must sign the form in the presence of their supervisor and a Health and Safety Officer. The form will be placed on the worker file for a period of 24 months.
3. Step three: Should the worker not abide with the corrective action, then suspension or termination will occur.

The severity of the violation will determine the step that is applied to the worker. For example inappropriate use of an excavator will result in immediate termination.

### **4.4 Health and Safety Policy Acknowledgement form**

All employees of our company are subject to:

- Take every reasonable precaution to ensure the safety of himself and his fellow-workers.
- Wear the proper personal protective equipment (PPE) and use the protective devices as provided by the company (example hardhats, vest, safety goggles and any other special equipment required to do your job, the employee is responsible for the own safety shoes).
- Not use or be under the influence of alcohol or mind altering drugs while on the jobsites.
- Must take every preventive measure when operating machinery and/or equipment to ensure the safety of the employee and co- workers.
- Report any unsafe work practices or unsafe site conditions as well as any accidents or injury immediately to your foreman or supervisor and obtain treatment as necessary.

I agree to abide by and work in accordance with the Health and Safety Plan and Procedures, Management's safety directions and Safety policy.

Employee's Signature: \_\_\_\_\_

Date:

### **4.5 WHMIS- Workplace Hazardous Materials Information Systems**

Workplace Hazardous Materials Information Systems (WHMIS) is a materials labeling system which addresses the workers "Right to Know".

WHMIS training shall include:

- Education in the content, purpose and significance of information on label and Material Safety Data Sheets (MSDS).
- Education in the use of types of identification.
- Training in the procedures for the safe storage, handling, use and disposal of controlled products.
- Training in emergency procedures involving controlled products.
- Training in procedures to follow when fugitive emissions are present.
- The joint health and safety committee or the health and safety representative will be consulted during the development, implementation and review of the job specific WHMIS training program.
- The Company will ensure, as far as reasonably practical, that this WHMIS training program results in the worker being able to apply the information as needed to protect health and safety.

The Company shall also be responsible to ensure that:

- All materials have supplier labels.
- Workplace labels are provided.
- Material Safety Data Sheet (MSDSs) is readily available in the workplace.
- A current MSDS is obtained on or before the date of the first shipment of every controlled product.
- The MSDSs are kept updated.

The Worker shall be responsible to:

- Learn the information on controlled products which the Contractor is required to provide.
- Follow the instructions provided and the information in the MSDS.
- Both the Company and Workers are responsible to ensure that no product that requires a Material Safety Data Sheet is permitted on the jobsite or in the workplace unless an MSDS accompanies it.

## 5. INSPECTIONS, HAZARD REPORTING AND INVESTIGATION PROCEDURE

### 5.1 Workplace Inspections and Hazard Reporting

Workplace health and safety inspections are vital to maintaining a safe workplace and identifying existing or potential hazards in order that appropriate corrective action can be taken.

An assessment should be made by the Health and Safety Officer in conjunction with the supervisor of the frequency of inspections required based on the potential hazards and dangers at the workplace or project. These inspections must be conducted on a monthly basis, a minimum. Workplace specific checklists should be developed by supervisors and used for regularly-scheduled inspections. Completed reports should be forwarded to management promptly.

It is important to observe both conditions and procedures during the inspection. If a hazard poses an immediate threat, take immediate action to eliminate the hazard.

A follow-up of all reports and action taken to eliminate hazards must be completed in a timely manner. Subsequent workplace inspection will review the items from previous inspections to ensure that remedial action has resolved the concern.

### 5.2 Accident Investigation and Reporting

#### **PURPOSE**

To identify all immediate and basic causes of the incident and make the necessary recommendations to prevent the injury/incident from recurring.

#### **SCOPE**

Review once a year reports of the following injury/incident types to determine any investigative needs:

- First aid
- Accidents
- Incidents
- Near miss

#### **Definitions:**

##### ***First Aid:***

- Includes but is not limited to: cleaning minor cuts, scrapes or scratches ;treating a minor burn, applying bandage sand/or dressings, cold compress, cold pack, splint, changing a bandage or a dressing after a follow-up observation visit and any follow-up for observation purposes only

##### ***HealthCare:***



- An injury that results in attention received from a recognized health care provider but that does not result in time away from scheduled work nor a wage loss.

**Near Miss:**

- An event that under different circumstances could have resulted in physical harm to an individual or damage to the environment, equipment, property and/or material.

The following categories of injury/incidents may produce a loss to people, equipment, material and environment .Immediate investigation of the following is required:

**Fatality:**

- An injury that results in the loss of life

**Lost time:**

- A work related injury that results in the injured employee missing scheduled time from work resulting in a wage loss.

**Property Damage:**

- An event where contact is made between two objects resulting in alteration to one or both of the objects.

**Occupational Illness:**

- A condition that results from exposure in a workplace to a physical, chemical or biological agent to the extent that normal physiological mechanisms are affected and the health of the worker is impaired.

**Environmental Release:**

- An accidental discharge of a physical, biological or chemical substance into the workplace and/or community.

**Fire/Explosion:**

- An event where undesired combustion occurs.

**PROCEDURE:**

In the event of a workplace accident/incident, ensure the following:

- Arrange for prompt medical treatment for the injured worker(s)
- Secure and do not disturb the accident scene until proper people are notified
- Call Health and Safety Officer and Security Supervisor immediately
- Notify supervisor
- Investigate accident/incident
- Notify the Engineer
- Decline any comment to media and refer them to Senior Management

In case of First Aid Treatment only:

- Provide first aid if trained
- Record what first aid was given and materials taken out of first aid kit
- Treatment recorded

- In the event he/she does seek outside medical treatment they must notify the supervisor
- Investigate accident, as a preventative measure to ensure that future occurrences do not occur

In case of near misses:

- All near misses to be reported to supervisor
- Near misses must be investigated, as a means of prevention. Corrective action to be taken and communicated to all employees to prevent future occurrences resulting in accidents

In case of Medical Aid/HealthCare:

- Provide first aid where possible
- Arrange transportation to medical center
- Where possible a Functional Abilities Form should be given to the worker to take to their treating agency in the event it becomes a lost time incident.
- Investigate the accident scene to determine what caused the accident and have a form completed
- Ensure that preventative measures are put in place to avoid future occurrences
- Take witness statement regarding accident/incident
- Notify the Engineer

Fire/explosion:

- Call Health and Safety Officer or Security Supervisor immediately
- Inform Supervisor and all workers around
- Notify the Engineer and Emergency Services

Property/equipment damage:

- Inform supervisor immediately
- Inform Senior Management
- Document the details of the damaged goods and complete an investigation report
- If necessary, photographs can be taken of the damage equipment/property
- Ensure that damaged equipment/property is fixed promptly
- If motor vehicle accident, stop at scene, obtain first aid if required
- Contact Police officials if necessary
- Advise supervisor/management of accident location
- Obtain details of third party name and driver's license numbers, vehicle plate number and description of the vehicle and damage
- If necessary obtain names and addresses of eyewitness to the accident
- Notify the Engineer

Chemical/environment releases:

- Notify the Engineer and emergency services immediately.
- Comply with Spill Response Procedure

## **COMMUNICATION**

The results and the injury/incidents will be communicated to the employees in a number of ways:

- Minutes of the health & safety committee meetings
- Supervisors holding safety talks with employees
- Through postings on safety bulletin boards
- Testimonial by the involved employees.

## **INVESTIGATOR RESPONSIBILITIES:**

Collect Information:

- Interview workers involved,
- Interview witnesses
- Interview outside experts if applicable i.e. suppliers, equipment designers etc.
- Insure the interviews are conducted as soon as reasonably possible.
- The interviews should be conducted in a quiet place, one on one.
- The interview must be documented.

Scene assessment

- Make observations, on site assessment of the scene (site, equipment, material).
- Use photographs/sketches/drawings etc.

Identify Contributing Factors

- Factors to consider are People, Equipment, Material, Environment and Process.

Write Report:

- Use the injury investigation report form to identify contributing factors through a review of items such as maintenance records, plant layout, training records, time of day, length of service in this-work area, etc. Considerations given to lack of safety equipment and/or the need for safety equipment.
- The standard investigation reporting system (form) must capture all the requirements contained in the investigation procedure.
- Copies of the investigation report are sent to the appropriate people.

Recommendations for corrective action:

- Responsibilities must be assigned
- Recommendations are documented on a standard form.
- The recommendations must focus on corrective actions(s) to all the contributing factors identified.

## 6. WORKPLACE SAFETY AND WELFARE

### ***Offices, Workshops, Dormitories, Kitchen, Concrete Plant, Asphalt Plant, Road Construction Sites, Borrow Pits, Bridge Construction***

#### 6.1 Workplace Safety - General

- Fence the site against unauthorized entry
- Take measures to prevent objects from falling from height
- Provide and keep safe egress and access to the each place of work located at site
- Put up appropriate signs including traffic routes, authorized personnel only etc.
- Keep the site tidy, well lit and well laid out
- Provide sufficient welfare and first aid facilities
- Provide adequate fire precautions such as fire extinguishers, escape routes
- Ensure that existing power lines (buried or overhead) are identified and associated safe systems of work in place
- Take necessary precautions to ensure that electrical systems are well maintained in a safe condition
- Ensure that vehicles and people are kept apart, with traffic routes maintained in a safe condition
- Minimize and eliminate risk of manual handling by the use of mechanical equipment, or arrange material to be supplied in manageable sizes and weights to reduce the risk of back injury
- Take all measures to reduce exposure to noise and vibration
- Ensure that holes are protected, with clear marking and fixed covers to prevent falls

#### 6.2 Site Security

- Erect suitable barricades, fencing, and hoarding
- Proper signage and lighting in suitable places when passers-by or entry by public is likely
- Footpaths kept clean and free from debris
- Site access controlled
- Traffic control procedures in place

#### 6.3 Traffic And Pedestrian Arrangement

- Improved design and layout of the workplace to minimize transport accidents
- Signs to be used as a secondary measure where risks cannot be eliminated
- Avoiding the need for reversing by better layout design
- Segregating pedestrian and vehicle traffic routes if feasible
- Posting adequate warnings in conspicuous places
- Ensuring suitable pedestrian crossing points on vehicle routes
- Introducing a one-way traffic system, if possible, to reduce the risk of head-on collision
- Checking to see if vehicle traffic routes are suitable for the types and flow of vehicles that use them

- Keeping all floor and road surfaces in good condition
- Removing obstructions or otherwise, making sure they are clearly visible
- Avoiding sharp bends in road layouts
- Providing suitable fixed mirrors at blind corners
- Suitable direction, speed limit and priority signs
- Suitable physical speed restrictions such as speed bumps
- Edges of loading bays, pits etc must be clearly marked and fitted with either a temporary or permanent barrier

## **6.4 Housekeeping**

- Nothing should be left lying around the site unnecessarily. When equipment is in use it should be sited so as to minimise health, safety and environmental risks. For example it should not create a trip hazard and plant should not be located over site drains.
- Materials and equipment should be stored away from doorways and gangways. In particular in will not be allowed to block fire exits.
- Once work is finished for the day all portable tools and equipment should be put away tidily. Where appropriate tools must be cleaned. However, used oil will not be used for cleaning.
- Kitchen, canteen and living areas must be kept clean and tidy.
- Where possible avoid vehicles tacking mud from the construction site onto the highway.

## **6.5 Storage Areas**

- Storage areas must be kept tidy with materials properly labeled.
- Drums and containers must be kept upright, in good condition and with lids and bungs in place.
- Hazardous material storage locations should be on hard standing and must have a bund or drip tray. Secondary containment must be sufficient to contain 110% of the contents stored.
- Bunds and drip trays will be emptied on a regular basis. If contaminated the contents should be disposed of as hazardous waste. If the bund contains oil or fuel storage contaminated water will have a sheen on the top. If the bund contains chemical storage it may be more difficult to tell if the contents are contaminated. If in any doubt the contents must be disposed of as hazardous waste. Contaminated bund water must never be poured down the drain.
- When not in use materials must be returned to their storage location. If hazardous materials are required at their point of use for a period of time they must be kept in a drip tray.
- Drip trays must be used under stationary or parked plant.

## **6.6 Waste Areas**

- All wastes must be segregated and stored correctly in designated areas.
- All wastes must be correctly labeled.
- Burning or burying waste on site is strictly prohibited.

## **6.7 Spill Control**

- Nozzles or funnels must always be used for decanting and refueling.
- Plant and machinery will be inspected for leaks.
- When used spill cleanup material must be restocked.
- All spills must be reported to the Construction Superintendent.

## **6.8 Passageways**

- Unobstructed and clearly defined
- Provide adequate lighting
- Ensure clear sightline at breaks and corners

## **6.9 Lighting**

- Adequate and free from glare
- Lighting clean and efficient
- No flickering
- Maintain steady lights
- Provide and maintain all emergency lighting systems

## **6.10 Access to Worksites**

- Keep all walkways and stairways clear of debris and other materials such as used boxes, wooden scrap, loose gravel, oil leakage, tools and supplies to prevent tripping and slipping
- Put them in a bin or debris area to prevent fire and tripping hazards
- Provide adequate lighting to prevent accidents

## **6.11 Stacking Of Materials**

- Ensure the proper heights and correct stacking
- Allow sufficient space for moving stock
- Store materials in racks/bins
- Keep shelves free of rubbish
- Keep floors around stacks and racks clear
- Check drums and ensure pallets in good repair
- Heavier items stored low and without danger of falling objects
- Avoid sharp edges and provide safe means of accessing high shelves

## **6.12 Maintenance of Stairs, Steps And Landings:**

- Replace or remove worn-out or broken steps

- Keep handrails and fencings in good repair
- Keep clear of all obstructions
- Maintain adequate lighting
- Provide and maintain emergency lighting
- Ensure non-slip treatment/treads in good condition
- Keep clear of debris and spills

### **6.13 Fire Fighting General Rules:**

- Prepare Fire Fighting Procedure (See H&S Procedures)
- Ensure all extinguishers and firefighting equipment serviced and marked
- Provide adequate fire alarm and communication system
- Restrict smoking/naked flame
- Avoid storage of excess quantities of flammable substances at worksites
- Establish storage procedures for flammable substances
- Provide fire extinguishers near all diesel tanks, generators, welding, oxy-acetylene cutting or other sources of ignition
- Keep fire extinguishers easy to locate and reach in case of an emergency
- Never store flammable or combustible materials in common areas, stairways or exits
- Avoid spraying of paint, solvents, or other types of flammable substances in areas with poor ventilation to avoid build-up of fumes and vapors leading to explosions or fires
- Store gasoline and other flammable liquids in a safety can in a ventilated place or an approved storage facility
- Ensure that leaks or spills of flammable or combustible materials are cleaned up promptly

### **6.14 Emergency Response:**

- Prepare Emergency Response Plan (supplemented Plan)
- Employ and train emergency personnel
- Ensure emergency procedures are documented and issued
- Display emergency telephone numbers
- Conduct regular fire alarm checks
- Perform periodic testing and trial evacuations

### **6.15 Welfare and Toilet Facilities**

Matters to be considered when planning the welfare and toilet facilities include:

- The work to be carried out and the health risks associated with it
- The duration and spread of the site locations
- The number of people working at different locations
- The distance from rest places and welfare facilities

## **6.16 Toilet Facilities**

Fixed Installation:

- at the site base, usually near the site office,
- at different satellite locations, especially when the coverage of worksite is wide and far from the base

Portable Installation on the Worksite

## **6.17 Washing Facilities**

- Hand basins or bowls
- Water tap with buckets or receptacles
- Shower or eye-bath where necessary

## **6.18 Rest Areas**

- Fixed installation:
  - at the site base location
  - at different satellite locations
- Temporary installations on the worksite



## **7. VEHICLE / EQUIPMENT AND TOOLS SAFETY**

### **7.1. Maintenance of Vehicles and Equipment Procedure**

#### **Standards:**

All vehicles, machinery and equipment are serviced with respect to:

- Manufactures recommendations
- Industrial standards
- Legislated requirements
- Contractor's best practices

To ensure the safe operating condition of all equipment, our daily/seasonal pre-inspection and our preventive practice is based on the highest protocol.

#### **Schedule**

All equipment will be inspected to the manufactures recommendations, industrial standards and legislated requirements.

- Pre-use inspection-daily
- Pre-use inspection, complete mechanical, at season beginning
- Schedule preventative inspection/maintenance

#### **Preventative Maintenance Schedule**

All maintenance on all vehicles, machinery and equipment to be done yearly and as required.

#### **Standard Recording System**

The system uses Daily Inspection Book for recording the inspections and listing required maintenance. The book records the following:

- List of items to be inspected for each significant piece of equipment
- Inspectors name and signature
- The date of the inspection
- Description of required work to be performed, if required
- Reporting of any suspected problems for correction
- General recommendations for correction of any deficiencies recorded

All out of service equipment, machinery or vehicles has designated area assigned so employees cannot put equipment, machinery accidentally back into service.

#### **Qualified Person**

All inspections and specifically, repairs and service can only be performed by qualified, competent persons. They are either qualified by an outside source or by our own competency program.

**The Supervisor** is responsible to help identify any equipment deficiencies or items requiring maintenance or preventative maintenance and activate the prescribed corrective action or required preventative maintenance.

**All Employees** are responsible to report any defects, deficiencies or hazards pertaining to the workplace and or equipment.

### **Operator pre–use inspections of equipment**

The inspection will be performed by the competent operator that will be using the equipment at the beginning of the day or the first time the operator is going to use the equipment each day.

#### **Mobile Equipment:**

- Operator observes the equipment in place to ensure that the surrounding environment is safe and the equipment is in a safe location and on stable ground to be inspected.
- The operator retrieves the inspection book/form and proceeds with the pre-use inspection for the day and/or first time use that day.
- Any issue identified on the checklist that is deficient, will be checked off and comments added. The equipment is taken out of service and tagged until a qualified person has looked at the identified deficiency and corrected it.
- Once corrected, the operator will once again inspect the equipment immediately before use.
- Should the operator leave the equipment for any reason and it is out of sight and control of the operator for any length of time during the same day, the operator will perform a walk around and cursory inspection of the equipment before continuing its use.

#### **The following information will be included on the inspection forms:**

- Name and identification of equipment inspected
- Inspectors name/or initials
- Date of inspection
- Listing of the components to be inspected with minimum standard expected
- Description of the hazard(comments section)
- Recommendations for corrective action(comments section and given to the mechanic)
- Action taken(the repair report from the mechanic or their organization)

#### **Non-Mobile Powered Equipment:**

- Operator observes the equipment in place to ensure that the surrounding environment is safe and the equipment is in a safe location and on stable ground to be inspected.
- The operator will inspect the power equipment in compliance to the manufacturer's recommendations and in conformance to procedure.

- Any piece of equipment found deficient will be taken out of service and corrected it.
- Once corrected, the operator will once again inspect the equipment immediately before use.
- Should the operator leave the equipment for any reason and is out of sight and control of the operator for any length of time during the same day, the operator will perform cursory inspection of the equipment before continuing its use.

### **Corrective Action**

Any piece of equipment, whether Mobile Powered Equipment or hand operated power equipment, that is found to have deficiencies or in a sub-standard condition, will immediately tagged and/or locked out of service as per procedure.

The equipment will only be brought back into service after corrective action by a competent repair service and an inspection by a competent person.

The equipment being returned for use will and must be accompanied with a repair document from service provider with a description of the corrective action, a date and a signature of a competent provider.

### **Follow Up**

Once the corrective action or repair has been made on the equipment and there is documentation on the repair/corrective action with an authorized signature, the equipment will be inspected to ensure the integrity of the repair/corrective action. This inspection will include testing of the function of the equipment.

## **7.2 Key Points of Equipment Maintenance**

<b>MANAGER/SUPERVISOR</b>	<b>WORKER</b>
Ensure that all vehicles and equipment are maintained in safe and good working order	Obtain training to operate vehicle or equipment in a competent and safe manner
Have a competent worker inspect and repair vehicles and equipment	Other
Ensure a copy of the operating manual for vehicles or equipment is available	
Assign qualified worker to operate the equipment/vehicles	
Provide a cab or a screen when the driver or operator is exposed to overhead hazard	
Provide and maintain a log for all vehicles and equipment	
Install handrails, footholds that would facilitate mounting and dismounting	
Ensure Roll Over Protection are installed	

<b>MANAGER/SUPERVISOR</b>	<b>WORKER</b>
<b>ON SITE PREPARATION</b>	
Provide a copy of operating manual for all vehicles and equipment on site	Review maintenance and safety procedures with supervisor
Review maintenance and safety procedures with all operators and drivers	Perform inspection of equipment and vehicles prior to the start of each project
	Other
<b>DURING CONSTRUCTION</b>	
Ensure that daily inspection and maintenance is done	Every morning
Repair all reported and detected defects	Circle check equipment and vehicle for leaks
Periodically inspect logbooks	Check for crack, bent, loose or missing components
Other	Check operation of: windshield wipers/washers, seatbelts, horn beacon, turn signals, brake lights, four-way flashers, all gauges ,reverse alarm
	Check tire pressure ,loose or missing wheel nuts
	Adjust mirrors, clean windshields
	Other
<b>OFFICE STAFF OR SUPERVISOR</b>	<b>WORKERS</b>
During construction (Continued)	During construction (Continued) After starting the engine, check air brake pressure
	For aerial devices:Check basket leveling for proper tension Inspect buckets for damage Check for cracks around welds, hinge pins and boltsInspect cables for fraying or flattening of cables Check for loose material inside the boom Check hydraulic system and all control levers of boom

<b>MANAGER/SUPERVISOR</b>	<b>WORKER</b>
	<p>For hydraulic equipment:                      Check low pressure devices to ensure they work properly                      Check all outrigger and holding valves to ensure that they are working                      If repair, adjustment or replacement was done to the vehicle, check to make sure the part is operational                      Check all levers to make sure that they are working properly</p>
<b>ANY TIME DURING THE DAY</b>	
	<p>If low pressure warning device comes on at any time, <b>STOP IMMEDIATELY IN THE SAFEST AVAILABLE PLACE</b> and correct loss of pressure before proceeding.</p>
Ensure that buckets and hydraulic devices are properly parked and blocked	Report any defects to supervisor and stop using equipment or vehicle
Provide blocking for dismantling, altering or repairing equipment	Never leave buckets or any hydraulic devices unsupported
Ensure that workers do not use fork-lift truck, frontend loader or similar machines as workplace platform	Use blocking when dismantling, altering or repairing equipment

### 7.3 Work Shop and Field Mechanics

<b>MANAGER/SUPERVISOR</b>	<b>WORKERS, DRIVERS, OPERATORS, MECHANICS</b>
In General	In General
Ensure that workers are properly licensed and competent to do the job	Ensure proper training and familiarity with equipment
Ensure good working order of all tools, especially cranes, booms, lifting devices and power tools	Follow all recommendations in operating, service and maintenance manual. Always refer to the manual when in doubt
Ensure availability of manual of all equipment being repaired	Ensure clean work area and keep it free of spilled oil, grease and slipping hazards
Schedule regular inspection and maintenance of equipment and machinery at least as recommended by the manufacturer	Refrain from smoking at all times when working near fuel, batteries and ether
Provide means of proper storage and secure material inside all shop vehicles	Do not wear jewellery or loose fitting clothes

<b>MANAGER/SUPERVISOR</b>	<b>WORKERS, DRIVERS, OPERATORS, MECHANICS</b>
Ensure clean work area	Position equipment/machine on hard/level surface
Determine required PPE	Disengage power and stop engines before servicing
Ensure adequate ventilation and lighting	Support equipment with blocks or stands; never work on machine if only supported by life jacks or hoist
Provide necessary equipment to complete job safely	Lower all equipment attachments to ground, if not, secure it by proper blocking
Provide replacement parts recommended by manufacturer	Relieve all pressure in air, oil, and water systems before disconnecting
	Allow systems to cool down before repairing
	Engage all safety locks before working on equipment
	Post "Do Not Operate" signs at operator's station and disconnect battery to prevent inadvertent start up
	Use proper tools to complete the job safely
	Read and understand warning plates and decals
	Use appropriate PPE
	Change oily clothing as needed
<b>Shop Operation</b>	<b>Shop Operation</b>
Provide adequate floor space for work anticipated	Ensure adequate ventilation at all times
Designate special areas for duties such as welding, cleaning and painting	Maintain shop in a clean and orderly manner by cleaning up as you go
Provide separate rooms for the delivery and storage of parts, equipment and tools	Ensure clear pathway to fire extinguishers and emergency exits
Provide proper lunch and wash-up areas	Keep cleaning solvents away from sparks, flame and ignition sources
Provide adequate heating	
Ensure adequate ventilation at all times	
Ensure good housekeeping practice in keeping the shop free of fire hazards, oil, and debris	
<b>Field Repairs</b>	<b>Field Repairs</b>
Ensure that traffic control devices are available	Secure all material from spilling in the service vehicle
Ensure that each service vehicle is in good working order	Ensure that the first aid kit and fire extinguisher are in working order

<b>MANAGER/SUPERVISOR</b>	<b>WORKERS, DRIVERS, OPERATORS, MECHANICS</b>
Equip each vehicle with a fire extinguisher and first aid kit	Obey road signs at all times
Perform periodic inspection of service vehicles	Remove equipment or machine from traffic and construction activities or isolate the equipment so that it will not be accidentally moved during repair
	Ensure that the equipment or machine is secured before commencing work

### 7.3 Safe Operating Procedures for The Heavy Equipment:

- Backhoe
- Dozers
- Loaders
- Road Graders
- Skid steers
- Trucks

#### 7.3.1 Backhoes

- Know the working range of the machine.
- Be sure attachment or load doesn't catch on obstructions when lifting or swinging.
- When lifting a load, do not lift, swing or stop unnecessarily fast.
- Be sure everyone is in the clear before swinging or moving in any direction. NEVER swing or position attachment or load over personnel or vehicle cabs.
- Never allow personnel to walk or work under any part of the machine or load while the machine is operating.
- Never allow anyone to ride the attachment or the load. This is an extremely dangerous practice.
- Do not load a truck unless the driver is in a safe place. Then, load the truck from the rear or side.
- Use a signal person. The signal person must be in direct communication with the operator, and the operator must pay close attention to the signals.
- Never exceed the lifting capacity of the machine. Stay within the lifting limits shown on the Load Rating Chart. Remember - you may be able to lift the load in close, at ground level, but as the load radius and elevation change, the lifting capacity of the excavator may decrease.
- Keep the machine well back from the edge of an excavation. Avoid undercutting the machine. If necessary, provide adequate shoring to prevent the machine from falling into the excavation.
- Level off the work area if possible.
- Avoid swinging or extending the bucket farther than necessary in a downhill direction. This will reduce the stability of the machine.

- Avoid working with the tracks across the slope, as this reduces stability and increases the tendency for the machine to slide.
- Always be sure that slings or chains used to lift the load are of adequate strength and that they are in good condition.
- Watch your boom clearance at all times.
- Turn off the engine and allow the machine to cool before working on the machine. Most fluids on the excavator are hot enough to cause severe burns at normal operating temperatures.

NEVER leave the machine without first lowering the bucket, stopping the engine, setting the parking brake, and placing the shift in park. Dismount the machine carefully. Do not jump out of the machine.

### **7.3.2 Dozers**

- Operate the controls only with the engine running.
- Do not allow riders on the machine unless additional seat, seat belt, and rollover protection are provided.
- The operator must satisfy himself that no one will be endangered before moving the machine.
- Report any needed repairs noted during operation.
- Carry implements close to the ground, approximately 40cm (15 in) above ground level.
- Stay a safe distance from the edge of cliffs, overhangs, and slide areas.
- If the machine begins to sideslip on a grade, immediately dispose of the load and turn the machine downhill.
- Be careful to avoid the condition which could lead to tipping when working on hills, banks, or slopes, and when crossing ditches, ridges, or other obstructions.
- Work up and down slopes, rather than sideways, whenever possible.
- Keep the machine under control and do not work it over its capacity.
- Be sure hitch points and the towing device are adequate.
- Connect trailing equipment to a drawbar or hitch only.
- Never straddle a cable, wire rope, or similar device nor allow others to do so.
- Personnel are prohibited to be between the machine and trailing equipment when maneuvering to connect them. Block the tongue or hitch of trailing equipment to align it with the drawbar or hitch.
- This is a one-person machine, **NO RIDERS ALLOWED**.
- Know the pinch points and wrap points on the loader.
- Operate at a speed consistent with working conditions, visibility, and terrain.
- Ensure loader has an adequate rear counterweight
- When crossing exposed railroad tracks, ditches, ridges, or curbs reduce speed and cross at an angle.
- Carry loaded buckets as close to the ground as possible. The further a loaded bucket is from the ground the more unstable the loader becomes.
- Use extreme caution when operating a loader on a side slope. Slow down and carry the bucket, loaded or empty, as close to the ground as possible.
- Stay in gear when traveling downhill - this will help control speed.
- Never move a load above the heads of other workers.



- When back filling, use extreme caution. The weight of the material plus the weight of the machine could cause the new construction to collapse.
- Keep work area level; avoid developing ruts by occasionally back dragging the bucket to smooth the surface.

NEVER leave the machine without first lowering the bucket, stopping the engine, setting the parking brake, and placing the shift in park. Dismount the machine carefully. Do not jump out of the machine.

### **7.3.3 Road Grader**

- Do not permit riders in or on the grader. Grader is a one-person piece of equipment.
- Do not dismount from the grader with the engine running - lower all attachments and stop engine first.
- Before backing up, use extra care to ensure persons and vehicles are clear of the grader.
- Know and use hand signals required for particular jobs and know who has the responsibility for signaling.
- Select a gear that will prevent excessive speed when going downhill. Do not coast downhill.
- Note and avoid all hazards and obstructions such as overhangs, ledges, slide areas, electrical lines, underground cables, water mains, or gas lines.
- Watch for bystanders and never allow anyone to be under or to reach into the grader and its attachments while operating.
- Check the local traffic laws for correct traveling requirements. If necessary, pull over and allow traffic to pass.
- When working near traffic areas or at night, use extra care. Use precautions, such as flares or reflectors, cones, red flags or red lights, barricades, flashing lights, and flagmen.
- Do not operate the grader in areas where volatile gases, dust, and combustibles may be present.
- Ensure the grader is properly equipped for grading in dry or forested areas.
- Avoid lubrication or mechanical adjustments with the grader in motion or the engine operating.
- Keep your head, body, limbs, feet, and hands away from all moving parts.
- Use extreme care when working with hydraulic systems. Relieve the hydraulic system pressure before performing any service.
- Match speed of the vehicle to job conditions.
- Be careful when operating with the wheels at right angle to a slope.
- When hooking up trailing equipment, keep all personnel away.
- Know your stopping distance at any given speed.
- Use caution when crossing side hills, ridges, ditches, and other obstructions.
- Keep close to inside bank when working on a side hill road or cut. Extend the blade to material near outer edge.
- Use extreme care to avoid tipping when working on hills, banks, or slopes.
- Cross obstacles at an angle and at slow speed. Be alert for sudden movement of machine when going over center of obstacle.
- Operate the vehicle only on level surface when cutting high banks.

NEVER leave the machine without first lowering the bucket, stopping the engine, setting the parking brake, and placing the shift in park. Dismount the machine carefully. Do not jump out of the machine.

#### **7.3.4 Skid Steers**

- Check to see that counterweights as recommended by the manufacturer are in place.

NOTE: This is very important as improperly balanced skid-steer loaders are easily upset.

- Clean steps, pedals, and floor of any slippery substances
- Clear the driving compartment for loose items that might interfere with the controls.
- Check the work area for hazards such as holes, soft spots, and obstructions. Check overhead for utility lines, doorway clearances, or other obstructions.
- Mount the machine wearing clean, dry shoes using the grab bars or handrails provided.
- Adjust the seat, fasten the seat belt, set the brake, and place transmission in park or neutral before cranking the engine.
- Visually check for the presence of others in the area and warn them away. Be especially alert for children.
- If the machine is garaged, leave the door or some windows open for ventilating the exhaust. CARBON MONOXIDE KILLS!
- Start the engine and check all controls to see that they are functioning properly.
- Check horn and backup alarm to see that they are working.
- Operate with caution on uneven surfaces. Avoid steep slopes completely.
- Carry the load as low as possible. Avoid sharp turns and slopes with a raised load.
- Travel straight up or down, with the heavy end of the machine pointed uphill.
- Operate with extreme caution near areas with sharp drop-offs.
- NEVER leave the machine without first lowering the bucket, stopping the engine, setting the parking brake, and placing the shift in park or neutral. Dismount the machine carefully. Do not jump out of the loader.
- If stopping for any length of time, lock the ignition and remove the key.

#### **7.3.5 Trucks**

- Truck drivers will be properly and thoroughly trained before attempting to do any work with or on any type of truck.
- Our motor vehicle policy, prohibit the operation of commercial motor vehicles by individuals who do not have the proper training and license. Do not attempt to operate any dump truck unless you have the proper license and training.
- Always use the steps and grab irons and face the vehicle when getting in or out of the truck.
- Place the gearshift into neutral and set the parking brake before starting the engine.
- Allow the engine to reach operating temperature and the air pressure to build to operating pressure before placing the truck into motion.
- Carefully check the area around the truck before placing it into motion. Objects or people that are very close to the truck may not be visible from the driver's seat.

- Always make sure that your seatbelt is properly fastened before driving the truck.
- Allow adequate stopping distance between the truck and the vehicles in front of it.
- Check the area around the truck for obstructions (tree limbs, overhead wires, etc.) before raising the dump box. Make sure that the spreader chains aren't set if you intend to dump in a pile.
- Always try to be on a level surface when you raise the dump box. As the box raises the truck's center of gravity goes up and the truck becomes less stable and more apt to tip over. If you must dump on a slope place the truck so that it faces straight up, or down the slope. Do not try to raise the box with the truck parked parallel with the slope. Remember that a dump truck is much more apt to tip over (or run into overhead obstructions) when spreading material than it is when dumping in a pile.
- NEVER work under a raised box (not even "for just a little bit") unless the box is adequately supported by a prop rod or cribbing. Do not rely on the truck's hydraulic system to hold the box up while you work under it.

NEVER leave the machine without first stopping the engine, setting the parking brake and placing the shift in park. Dismount the machine carefully. Do not jump out of the machine.

## **7.4 Vehicle Management Procedure**

### **7.4.1 Construction Vehicle Management**

Contractor will manage construction vehicle movements to ensure that all traffic associated with the works can safely travel on the road network to and from the construction site, safely enter and exit the site access points, maneuver to and from traffic streams and turn at work areas, depots, stockpile sites and quarries. Contractor will plan all construction vehicle movements with the aim to minimize the risk to other road users and keep the traffic generated by the project to minimum.

Contractor will monitor the use of local roads by construction heavy vehicle traffic in consultation with Local Traffic Police to minimize and/or restrict use of local roads by heavy vehicle traffic as far as reasonable and practicable.

The types of construction vehicle movements may include: deliveries of materials, supplies, plant or equipment to site; transportation of over dimension loads; Haulage of materials on and off site associated with earthworks operations; deliveries of soil, gravel, asphalt, concrete and bitumen from batching plants to pavers; and regular trips by construction personnel in work trucks.

### **7.4.2 Heavy Equipment Operation (General)**

All vehicles must have:

- A service brake system, an emergency brake system, and a parking brake system
- Working headlights, tail lights, and brake lights
- An audible warning device (horn)
- Intact windshield with working windshield wipers

- Ensure that all operators have been trained on the equipment they will use
- Check vehicles at the beginning of each shift to ensure that the parts, equipment, and accessories are in safe operating condition. Repair or replace any defective parts or equipment prior to use
- Do not operate vehicle in reverse with an obstructed rear view unless it has a reverse signal alarm capable of being heard above ambient noise levels or a signal observer indicates that it is safe to move
- Vehicles loaded from the top (e.g., dump trucks) must have cab shields or canopies to protect the operator while loading
- Ensure that vehicles used to transport workers have seats, with operable seat belts, firmly secured and adequate for the number of workers to be carried
- Equipment should have roll-over protection and protection from falling debris hazards as needed
- Prior to permitting construction equipment or vehicles onto an access roadway or grade, verify that the roadway or grade is constructed and maintained to safely accommodate the equipment and vehicles involved
- Do not modify the equipment's capacity or safety features without the manufacturer's written approval
- Where possible, do not allow debris collection work or other operations involving heavy equipment under overhead lines

#### **7.4.3 Material Falling from Vehicles**

- Do not overload vehicles
- Ensure that loads are balanced and are fully contained within the vehicle. Trim loads, where necessary, to ensure loads do not extend beyond the sides or top of the vehicle
- Cover with tarpaulin and secure loads before moving the vehicle

#### **7.4.4 Driver Responsibilities**

All drivers employed on the project, whether direct employees or subcontractors, have a responsibility to drive safely and in accordance with the Georgian Traffic Rules and any other safe driving instructions issued on the project.

Drivers must exercise care at all times and work in accordance with Vehicle Movement Plans (VMPs).

#### **7.4.5 Hazardous Movements**

When planning construction vehicle movements, the following hazardous movements will require particular consideration:

- Entering and exiting work sites to and from adjacent travel lanes;
- U-turn movements across travel lanes and at median crossover points between dual carriageways;

- Reversing maneuvers within the work area and in the adjacent travel lane; travelling through the work area between construction personnel and hazards; and the stopping of construction vehicles within adjacent travel lanes.

Contractor will apply controls and measures to mitigate the risk of these hazardous movements including the restriction of specific movements (e.g. turning bans);

- The provision of temporary traffic controls;
- The installation of deceleration, acceleration and turning lanes outside of the through lanes;
- Educating drivers;
- The installation of warning devices on vehicles;
- The implementation and compliance with project Vehicle Management Plans.

#### **7.4.6 Planning Vehicle Movements**

It is essential that satisfactory arrangements are planned and implemented for vehicles associated with the construction works. This mainly involves entering and leaving the traffic stream at work areas, accesses and side roads, or turning around.

Locations for turning across lanes carrying traffic and for entry and exit to and from work areas for vehicles associated with the work will be restricted to well defined points selected after considering relevant factors including:

Sight distance;

- Vertical grades horizontal grades
- Traffic volumes of through traffic;
- Approach speeds of through traffic;
- Areas clear of traffic lanes for accelerating and decelerating.

When planning construction vehicle movements Contractor will comply with all relevant environmental approvals;

- Minimize the number of vehicle movements by balancing earthworks and recycling excavated materials;
- Conduct a risk assessment to identify specific hazards and to facilitate the application mitigation measures;
- Promote safe driving principles;
- Develop on-road haulage routes that not only provide an efficient operation but minimizes the impact on the road network and local community;
- Analyze, assess and mitigate the impacts of the traffic generated by the construction works;
- Set-up depots, stock piles and batching plants at locations that minimize travel distances and impacts;
- Limit haulage operations to the construction corridor as much as feasible;
- Limit the number of access points and haul road crossings;

- Evaluate the need for temporary traffic control; implement appropriate environmental controls; provide an efficient and well maintained vehicle fleet;
- Determine the most appropriate hours of operation that will minimise the impact on the road network and local communities.

#### **7.4.7 On-Site Construction Vehicle Movements**

Construction vehicle movements on the construction site need to be carefully planned to address the various hazards and conflict points that occur within the work area and where a number of work areas interface with each other including the presence of workers on foot adjacent to working plant, mixing light vehicles with heavy vehicles, rough surfaces, poor sight distance and alignments, deep excavations and steep embankments.

To address these risks Contractor will ensure that:

- Regular toolbox meetings are held to discuss on-site vehicles movements;
- All plant are fitted with the appropriate safety features;
- All plant are regularly inspected for road-worthiness and are deemed 'fit-for-purpose';
- All access tracks are clearly defined and sign posted;
- Pedestrian tracks and crossing points are provided where necessary and clearly sign posted;
- Large plants, such as scrapers are separated from small plant items where possible;
- Workers do not operate within exclusion zones of moving plant;
- Exclusion zones at work areas and around plant are clearly delineated and where possible, physical separation is provided;
- Spotters and traffic controllers are positioned to assist and warn workers who are operating in close proximity to access roads and moving plant;
- Appropriate temporary traffic controls are installed where required;
- Consideration is given to the installation of reduced on-site speed limits;
- Site escorts are considered at locations where high-risk activities are being undertaken.

#### **7.4.8 Road Network Construction Vehicle Movements**

Contractor will plan all vehicle movements to minimize the impact on the road network. However, where on-road haulage operations are required Contractor will:

- Conduct traffic analysis to determine the number of vehicle movements and assess the potential impact on the road network;
- Develop a route that maximizes the use of the arterial roads and minimizes the use of local roads;
- Consult with Traffic Police during the development of haulage plans;
- Where possible, avoid movements during peak periods; develop a detailed VMP and toolbox all drivers; and ensure that the fleet are regularly maintained.

### **7.4.9 Construction Access Points**

The most hazardous movement for construction vehicles occur when the vehicle is entering or exiting the construction site to and from the adjacent travel lane. When planning construction access points Contractor will:

- Consider the use of existing local road junctions to access construction work areas where feasible;
- keep the number of access points to a minimum;
- Ensure that the new construction access points do not adversely impact on any existing
- Intersections, traffic facilities or traffic generating developments;
- Ensure that all access points comply with the Road Design guide standards in relation to sight distance, turning paths appropriate for the vehicle usage, intersection layouts, lane widths, acceleration and deceleration lanes and right turn bays to protect the right turn movement;
- Ensure the junction configuration has sufficient capacity to accommodate the traffic generated by the construction site;
- Ensure that security fences and gates at access points are indented to enable vehicles to park clear of the adjacent travel lanes;
- Ensure that access points are constructed of a suitable all weather surface that prevents debris from being tracked onto the adjacent travel lanes;
- ensure that all access points are clearly visible to approaching traffic and signposted accordingly;
- Consider the use of temporary traffic control to facilitate short-term major haulage operations and the movement of over-dimension vehicles where required.
- Each site access will show the exact entry and exit points for works vehicles and the associated signage.

## **7.5 Tools Safety Procedure**

### **7.5.1 General Requirements**

- A.** Broken, defective, burned, or mushroomed tools should not be used. They should be reported and turned in for replacement.
- B.** The proper tool and equipment should be selected and used for each task. For example, a wrench should not be used as a hammer or a screwdriver as a chisel.
- C.** Leaving tools on scaffolds, ladders, or any overhead working surfaces is hazardous because they may fall. Racks, bins, hooks, or other suitable storage space must be provided to permit convenient arrangement of tools.
- D.** Striking two hardened steel surfaces together is hazardous because pieces of metal may break off; i.e., two hammers, or a hammer and hardened steel shafts should not be struck together.
- E.** The practice of throwing tools from one location to another, from one employee to another, or dropping them to lower levels should be

prohibited. When it is necessary to pass tools or material under the above conditions, suitable containers and/or ropes must be used.

- F.** Wooden tool handles must be sound, smooth, and in good condition and securely fastened to the tool.
- G.** Sharp-edged or pointed tools should never be carried in employee's pockets.
- H.** Only non-sparking tools shall be used in locations where sources of ignition may cause a fire or explosion.
- I.** Tools requiring heat treating should be tempered, formed, dressed, and sharpened by workmen experienced in these operations.
- J.** Tools designed to accommodate guards must be equipped with such guards when in use.
- K.** All rotating, reciprocating or moving parts of equipment (belts, gears, shafts, flywheels, etc.) must be guarded to prevent contact by employees using such equipment.
- L.** All hand-held power tools (e.g., circular saws, chain saws, and percussion tools) without a positive accessory holding means must be equipped with a constant pressure switch that will shut off the power when pressure is released.
- M.** Besides safety hazards, the use of power tools sometimes creates potential health hazards as well. The use of jackhammer and chiseling equipment often results in silica and nuisance dust exposures that can sometimes be controlled by wetting the work surfaces. Many times, however, the use of dust/mist respirators is required to prevent overexposures.
- N.** In addition to dust hazards, the hand vibration inherent in the use of some power tools may result in a restriction of blood flow to the hands and fingers, causing numbness or tingling. If workers consistently experience these symptoms after the use of power tools, they should contact their supervisor so that steps may be taken to prevent further harm to the nerves and blood vessels in their hands. The use of a different tool, changes to the offending tool to reduce vibrations, and/or the use of special gloves may be recommended to deal with the vibration problems.



## **8. SAFE SYSTEMS OF WORK**

### **8.1 Risk Assessment Procedure**

#### **1 Introduction**

##### **1.1 Purpose**

It is a requirement of the Permit to Work procedure that a Risk Assessment is carried out before a permit is issued to carry out work on any site.

The purpose of this procedure is to describe only the Risk Assessment process in support of the Permit to Work System.

#### **2 Responsibilities**

##### **2.1 Area Authority- Supervisor**

Area Authorities are responsible for:

- Determining the extent of Risk Assessment required to support any Permit to Work application
- Organizing and participating in the Risk Assessment process.

##### **2.2 Performing Authority - Foremen**

Performing Authorities are responsible for taking part in the Risk Assessment process and disseminating the output from the Risk Assessment process to the personnel who will be doing the work.

#### **3 Risk Assessment Categories**

##### **3.1 Risk Assessment Levels**

Three escalating levels of Risk Assessment can be used depending upon the complexity and inherent risks of the task. Tasks may be classified as:

- tasks carried out without a Permit to Work
- tasks classified as moderately low risk
- tasks and activities requiring a formal Risk Assessment.

All Risk Assessments require input from those who will be doing the work. In addition, most formal Risk Assessments will require the input of expertise from outside the normal site team.

##### **3.2 Tasks Carried Out Without a Permit to Work**

Routine jobs frequently do not require a Permit to Work.

For this type of work, assessment through a periodic review of training needs is appropriate. In this way, the risk is minimised by ensuring that all personnel are trained and competent to undertake the tasks that they are required to do.

##### **3.3 Moderately Low Risk Tasks**

Tasks of a moderately low risk are carried out under permit control. The process of issuing the Permit to Work requires the identification of hazards and mitigating measures through the use of a simple Risk Assessment.

The Permit to Work form provides the prompt list and structured approach for this type of Risk Assessment.

As a general guide this level of Risk Assessment is appropriate to tasks which do not require authorisation of the permit by the Supervisor.

**Note:** Discussing the job with the workforce involved is an important part of this process.

### **3.4 Formal Risk Assessment**

Tasks require a formal Risk Assessment:

- the Permit to Work process indicates that authorisation is required by the Supervisor
- the risks to people, the environment or property may not be adequately controlled by the normal safeguards because:
  - ⇒ those safeguards cannot be used
  - or...
  - ⇒ the task is of an unusual nature or is new to the operation
- the task involves an interface between two operations.

A formal Risk Assessment must **always** be undertaken for any job which requires:

- entry into a confined space
- heavy lifts (more than 50 T)
- lifts over power lines or process plant

A formal Risk Assessment is carried out against a check list (see *Appendix A Risk Assessment Check Lists*) and usually involves specialist / expert input.

The risks identified during a formal Risk Assessment are weighted.

### **3.5 All Risk Assessments**

All Risk Assessments require a practical input from the people who will be doing and controlling the job. Only the formal Risk Assessment may require external input.

## **4 Formal Risk Assessment Team**

The objective of a formal Risk Assessment is to use local knowledge and specialist knowledge in a structured way in order to achieve a practicable reduction in the risk involved in an activity to an acceptable level.

The Risk Assessment team should include:

- the Area Authorities for the areas in which the task will be carried out
- the Performing Authority
- the person who will undertake the task
- a specialist from inside and external to the operation as required
- an HSE specialist who is responsible for ensuring that the Risk Assessment is carried out in accordance with this procedure and for recording the results.

## 5 The Stages of Formal Risk Assessment

### 5.1 Define the Task to be Assessed

The Risk Assessment team must first ensure that they fully understand the task and its implications. The overall task may need breaking into steps to facilitate carrying out the Risk Assessment.

### 5.2 Identify the Hazards

A visit to the work site will usually be necessary in order to assess the layout of the area, site conditions and adjacent plant and activities. The check lists in *Appendix A* are designed to assist in this process.

**Note:** These checklists are supplied as a guide for reference purposes only. They should not be considered as being comprehensive.

### 5.3 Evaluate the Risk

Once familiar with the task to be carried out, the team should list all the significant hazards. This should be done in a group discussion, using the check list for formal Risk Assessments as a prompt. The main input at this stage should come from the knowledge and experience of the team.

The team should also consider the possibility of the interaction of different hazards, including those related to:

- Location
- Critical Activities
- Simultaneous Activities.

#### i) Location

Attention should focus on the proximity to other plant or equipment, e.g., Fuel tanks, ventilation systems, drains, ignition sources.

#### ii) Critical Activities

Critical activities include isolation, confined space entry, work at height, hot work, heavy lifting, use of power tools, temporary power and air supplies, radiography.

#### iii) Simultaneous Activities

Simultaneous activities should be investigated both within the task itself and with other unrelated activities taking place nearby.

#### iv) Formal Risk Assessment Check Sheet

The list of established hazards is entered onto the Formal Risk Assessment Check Sheet (see *Figure 3*). Any safeguards which are already in place are then entered in the second column of the table.

**Note:** Hazards are given a weighting **taking into account the safeguards already in place** based on the potential severity of the “effects” of hazard should things go wrong and the likelihood (probability) of the hazard occurring.

Risk Assessment No. .... / .....

Activity ..... No. Involved in Activity ..... Department. ....

Assessed by ..... Date of Assessment .....

Hazard	Safeguards already in place	Sev.	Prob.	Risk	Additional safeguards required	ALARP	Final risk

Notes

Sev = Severity if hazard occurs. Prob = Probability of hazard occurring with existing safeguards in place. Risk = Sev x Prob. Final Risk to be low or medium.

Review Team						
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Figure 3 Formal Risk Assessment Check Sheet

v)

**vi) Risk Matrix**

Having identified the risks, the Risk Matrix (see *Figure 4*) is then used to estimate severity of the hazardous effect and probability as high, medium or low. The risk ratings are then entered on the Risk Assessment check sheet.

**Figure 4 Risk Matrix**

Leve	Likelihood	Description
A	Almost	Is expected to occur during the project, 90% or > probability
B	Likely	Will probably occur during the project, ~50% probability
C	Moderate	Might occur at sometime during the project, ~10% probability
D	Unlikely	Could occur at some time during the project, ~1% probability
E	Rare	Only occur in exceptional circumstances, < 1% probability

Level	Consequenc	Description
1	Insignificant	Insignificant Breach of Environmental Statutes
2	Minor	Minor Breach of Environmental Statutes
3	Moderate	Moderate Breach of Environmental Statutes
4	Major	Major Breach of Environmental Statutes
5	Severe	Shutdown of Project Due to Environmental Breach

Likelihood	Consequen				
	1 Insignifica	2 Mino	3 Modera	4 Majo	5 Sever
A (Almost B (Likely)	Medium	Significan t	Hig h	Hig h	Extreme
C (Moderate)	Medium	Medium	Significan t	Hig h	Extreme
D (Unlikely)	Lo w	Medium	Significan t	Hig h	Hig h
E (Rare)	Lo w	Lo w	Medium	Significan t	Hig h

**5.4 Determine the Additional Safeguards Required**

The team must next work through the list of identified hazards and determine the safeguards needed to reduce the risks to an acceptable level. Risk levels are determined as being either low, medium, or high.

Risks determined as “low” at this stage need not be considered further. Transfer the risk rating to the right hand column of the check sheet.

Additional safeguards must be considered for all risks not determined as “low”. The greater the risk, the greater the number and quality of the safeguards which should be in place.

**Note:** Controls and safeguards which prevent the hazard being realised should be used in preference to controls which reduce the effect of a hazard.

Typical controls and safeguards that may be used include, but are not limited to:

- **Physical:** disconnect a power supply
- **Procedural:** test for toxic or flammable atmosphere; control of adjacent work
- **Human:** use of specialist personnel; special briefing of workers
- **Time:** planning to avoid simultaneous adjacent work; limiting work to daylight hours
- **Contingency:** additional ESD (Engineering Safety Devices) provision; special PPE; provision of rescue equipment.

The measures to be adopted should be recorded in the “Additional Safeguards” column of the check sheet.

### **5.6 Re-evaluate the Risks for Acceptability**

The team must then re-evaluate the risk for all those hazards for which extra safeguards have been determined. The new risk level (high, medium or low) should be determined and the team should consider whether the risk is now as low as reasonably practicable.

If the risk is not as low as reasonably practicable, the review team must decide what further safeguards need to be put in place. The ALARP status and final risk are entered into the right hand columns of the check sheet.

If at this stage any hazard has a high risk against it in the Final Risk column of the check sheet, the task in its present form must be abandoned.

The team must finally decide on the acceptability of the overall remaining risk for the task. Individual hazards with a medium risk may be acceptable provided the overall risk of the task is considered low. If the team decides that even with the safeguards in place, there are too many hazards which still have a medium risk, this must be recorded and the task in its present form must be abandoned.

The team must finally sign off the check sheet in the review team boxes.

## **6 Management of Risk**

### **6.1 Approval**

On completion of the Risk Assessment, the Risk Assessment Check Sheet must be attached to the permit application for the job. It must be reviewed and signed by the Supervisor before he approves the associated Permit(s) to Work.

Should the Supervisor feel that the task presents risks beyond his level of accountability, he must refer to his Manager for guidance, and if necessary request a more sophisticated analysis of the risks and mitigation than can be provided by the method described in this procedure.

## **6.2 Implementing Safeguards**

The safeguards specified by the team must be implemented by the Supervisor before the permit is issued.

The Supervisor must ensure that any training requirements or special pre-task briefings are completed before work commences.

## **7 Recording the Risk Assessment**

Where a task is likely to be repeated, a record of the Risk Assessment should, at the permit issuer's discretion, be retained for future reference. In any event Risk Assessments which include hazards to the health of those undertaking the task must be attached to the permit(s) for the job and retained for 12 months.

## **Appendix A Formal Risk Assessment - Checklists**

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**Note:** These checklists are for guidance only. They should not be regarded as comprehensive in nature and do not replace sound judgment in the recognition of all hazards associated with any task undergoing assessment.

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Several check lists are provided below AS A STARTING POINT FOR FORMAL RISK ASSESSMENTS. The team should choose the list which it feels is the best starting point for the assessment to be carried out.

The Incident Causation Check List or the General Check List can be used for guidance on all tasks, in combination with a more specific checklist if appropriate.

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### **Hazard Checklist - General**

Falling from height	Noise
Manual Handling	Vibration
Lifting operations	Pressure
Falling object	Biological agents
Noise	Welding/cutting
Lighting	Power tools
Fume/dust	Hand tools
Minimise potential for ignition	Work on safety systems
Collision	Transport by sea/air
Hand tools	Storage
Machinery	Water jetting
Asphyxiation	Grit blasting
Cold/Heat	Loss of containment from nearby system
Mental Stress	Loss of containment from system being worked on
Ionising Radiation	Ignition
Chemical hazard	Fire
Inert gas	Explosion
Flammable gas	Structural damage
Flammable liquid	Personal injury
Electricity	Barriers/access restrictions
Static Electricity	Weather

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## **Hazard Checklist - Confined Space Entry**

Residual gases/vapours

Sludge which may give rise to vapours/gases when disturbed

LSA scale

Adequacy of ventilation

Need for air movers during entry.

Communication difficulties within the Confined Space or with the standby man

Standby man communication with the CCR

Ingress of gases/vapours from other nearby activities or systems

Use of mechanical tools/power tools/electrical equipment

Slip hazards within the Confined Space or at the point of entry

Ionising radiation; nucleonic instrumentation

Danger of falling into Confined Space boots or sumps

Noise, general

Noise when using power tools

Visibility within the Confined Space

Adequacy of lighting within the Confined Space

Temperature effects

Oxygen enrichment

Oxygen deficiency

Frequency of gas testing

Location of rescue kits

Competency of standby man

Disposal of Confined Space cleanings

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## **Appendix B - Definitions**

List of Definitions

<b>Confined Space Entry:</b>	where there is inadequate ventilation to dispel injurious or flammable fumes, vapor or gas or to provide sufficient oxygen. Also includes areas where access / egress is restricted.
<b>Hazard:</b>	the potential for human injury or loss of life, damage to the environment or to material assets or a combination of these.
<b>Hazardous Consequence:</b>	the result when a hazard is realised.
<b>Inhibition:</b>	the isolation of the executive action of a protective system. Where practicable, this should not prevent the operation of the visual / audible warning system.
<b>Isolation:</b>	<ul style="list-style-type: none"><li>• Process Isolation involves the closing and locking of valves. This may include depressurising, flushing and purging, e.g. single valve isolations.</li><li>• A Positive Isolation involves the disconnection of plant, equipment and systems from sources of motive power, liquids and gases.</li><li>• Electrical Isolation - The secure, disconnection and separation of a circuit, or item of equipment, from every source of electrical energy. This may involve electrical, instrument and communication isolations.</li><li>• Long Term Isolation - An isolation that remains in place after permit cancellation, and recorded as "Long Term".</li></ul>
<b>Isolation Certificate Board:</b>	a board used to display the status of Isolation Certificates, Isolation Certificate Continuation Sheets and Boundary Isolation Certificates, maintained by the Area Authority.
<b>Isolation Certificate Register:</b>	a register maintained in the control room identifying the status of all Isolation Certificates by the Control Room Operator-referenced to individual permits.
<b>Likelihood:</b>	the chance of occurrence of an event. Likelihood can be expressed as a probability, frequency, class, rank etc.
<b>Permit:</b>	an authorising document approved by management, specifying the required precautions and conditions under which potentially hazardous or interacting activities can take place
<b>Permit Display Board:</b>	a board used to display the status of active and suspended permits.

<b>Permit Register:</b>	a register maintained in the control room identifying the status of all permits.
<b>Risk:</b>	a combination of the likelihood of a hazardous event and the severity of the possible consequences of that hazardous event.
<b>Risk Assessment:</b>	the overall process of risk analysis and risk evaluation.
<b>Risk Evaluation:</b>	the process to support management decisions as to acceptability or risk reduction requirements by comparing the estimated risk against relevant criteria.
<b>Safeguards:</b>	steps taken to reduce either the likelihood or consequences, or both of a particular risk.

## 8.2 Excavation and Backfilling Procedure

### 1 Introduction

#### 1.1 Document Purpose

This document sets out the precautions and conditions considered necessary for the safety of all excavation works.

#### 1.2 Document Scope

This document refers to:

- Method of excavation
- Excavation and protection of third party pipelines and services
- Excavation of oil contaminated soils
- Backfilling guidelines.

### 2 Responsibilities

#### 2.1 Site Supervisor

- The Site Supervisor is responsible for the safety of all personnel on site and the safe execution of all work carried out on the site
- The implementation of, and compliance with, this Safe System of Work on site
- Ensuring that only suitably trained and qualified personnel are employed on site and for using only those contractors who employ suitably competent and experienced personnel
- Ensuring that a risk assessment is carried out for the work site by a competent person
- Reviewing all Risk Assessments carried out on site
- Maintenance of site records including those for Risk Assessments, equipment inspections and training.

## **2.2 Area Authority**

Area Authorities are responsible for:

- Compliance with this Safe System of Work within their area of authority
- The safety of personnel and the safe execution of activities within their area
- Ensuring daily equipment checks are completed on equipment within their area and that equipment is maintained in good working order.

## **2.3 Machinery Operator**

Machinery operators are responsible for:

- The safe and responsible operation of machinery under their control
- Immediately reporting to their supervisor if they believe the equipment they are using is in a dangerous or unsafe condition
- Ensuring that the machinery or equipment they use has all the safety devices and guards in place and that all guards are properly fitted.

## **2.4 Banksmen**

Banksmen are responsible for:

- Preventing access to working areas under their control by unauthorised personnel
- Providing safe guidance and assisting in the safe operation of machinery under their direction.

## **2.5 All Personnel**

All personnel are responsible for:

- Carrying out their duties in a safe and responsible manner
- For halting any work where they feel that conditions are unsafe and for bringing this to the attention of their immediate supervisor.

## **2.6 ENVIRONMENTAL MANAGER**

ENVIRONMENTAL MANAGER is responsible for:

- Providing advice and assistance to the Site Supervisor on environmental matters as and when required
- Providing Information regarding natural, archaeological and other important features within and adjacent to the excavation site.

**Note:** Photographs of important features should also be provided if required.

## **3 Access Routes**

Access routes to proposed sites shall be properly surveyed and reconnoitred. In particular, for all access routes:

- Risk assessments shall be made, and actions documented, for all crossing points and other points of difficulty recognised on the route
- Method statements shall be produced for negotiating all crossing points and other points of difficulty

- The route shall be clearly marked.

## **4 Route Identification and preparation**

### **4.1 Locating and Marking Existing Pipelines**

**Note:** At locations where there is hydrocarbon or a suspected leak a gas survey must be carried out before pipeline location activities begin.

Prior to the commencement of any excavation a site survey shall be carried out in order to:

- Locate, identify and mark any existing pipelines and foreign services and utilities and any cathodic protection system components, using pipe locating equipment and hand excavated trial holes
- Peg out the pipeline routing
- Define and log the point of excavation.

### **4.2 Pipeline Crossing Points**

#### **Requirements**

Construction traffic and other plant shall cross the pipeline only by:

- Public roads
- Previously agreed and clearly marked crossing lanes or bridges.

#### **Construction**

All crossing lanes shall be fenced on both sides over a width to be specified and agreed by the Pipeline Patrolman as far as is reasonably practicable as dictated by local conditions and acts of vandalism. These fences shall be returned along the edge of the wayleave strip for a distance of 6 m away from the crossing.

Where it is necessary at crossing points to install a temporary bridge to protect the pipeline. Such a bridge will consist of the laying of steel plates of adequate thickness with hard core laid in, or an approved sleeper raft, or a combination of these methods. The design and construction of such bridges and crossings shall be by a competent person or approved civil engineering subcontractor where it is deemed necessary.

#### **Markings**

Any temporary crossing or bridge, must be clearly marked by appropriate notices and flags, and additionally with lights at dusk, at night or in foggy conditions.

## **5 Site Safety**

### **5.1 Access and Security**

#### **Guards and Barricades**

Open excavations in a plant or near public areas must be

- attended by a watchman  
or...
- protected by a barricade and mark with a warning sign.

All other open excavations should be attended by a watchman, marked or barricaded. If there is a recognised chance of people or cattle falling into the excavation, a decision may be taken regarding the use of a night watchman.

**Note:** If a night watchman is used, he shall be equipped with appropriate communications and shelter for use in case of prowling animals, sickness or other emergency. Vehicle for night watchman to be provided as far as is reasonably practicable.

### **Fencing, Gates and Safety Notices**

Erection of stock fencing, gates and bunting safety notices, etc., shall be undertaken over access ways and worksites.

## **5.2 Vehicle Traffic**

Vehicular traffic should not operate within 1 m of a trench or excavation. Vibration created by traffic may cause cave-ins.

## **5.3 Personnel**

### **Protective Equipment (PPE)**

With temperatures experienced in Georgia use of Inherently Fire Resistant or Flame Retardant Coveralls during summer where personnel are working all day outside could be unbearable. An alternative to IFR/FR coveralls for the low flash risk applications is 100% cotton. Personnel involved in specific work activities should wear Flame Retardant coveralls.

During all activities on site all personnel shall wear minimum PPE (helmet, safety boots/shoes, fire coveralls, and eye protection).

Personnel involved in specific work activities shall wear additional PPE to suit the requirements of the work as agreed/detailed at the pre-work toolbox talk.

### **Excavator Operators**

Only experienced operators shall operate the excavating equipment.

### **Banksmen**

Trained and qualified banksmen shall attend all operations involving excavating equipment and movement of heavy plant to prevent personnel entering the field of work and to ensure safe working of the equipment.

## **5.4 Equipment**

### **Type and Location**

All equipment shall be checked and registered on the appropriate checklists and registered in accordance with the site operating procedures. All operatives' certificates shall be checked and logged prior to works commencing.

**Warning:** Machinery vibration may cause cave-in. No running plant shall be located within 1 m of an excavation.

## **Equipment Inspection**

Equipment shall be inspected daily and maintained as necessary to ensure that it is in good working order. This includes the inspection of brakes, pivot pins, hydraulic cylinders, hoses, snap rings, main attaching bolts, etc.

## **Adjustments and Repairs**

- **Do not** lubricate or make mechanical adjustments to the unit while the unit is in motion or the engine is running.
- **Do not** repair or tighten hydraulic hoses or fittings when the:
  - system is under pressure
  - engine is running
  - or...
- equipment hydraulic cylinders are under a load.

## **Refuelling**

A method statement covering spill containment and management of personnel injury risks shall be prepared for all refuelling operations

In all cases, equipment shall be shut down prior to being refuelled.

## **Lighting**

All lighting shall be either explosion proof or located outside Zone 2.

## **5.5 The Use of Mechanical Equipment Near Overhead Power Lines**

### **Introduction**

All personnel working near overhead power lines with a machine or mechanical equipment shall be made aware of:

- the dangers associated with power lines
- the precautions they should follow to deal with those dangers
- what to do if they make contact with a power line.

**Warning:** Physical contact with high-voltage overhead power lines is likely to be fatal or cause severe and irreversible maiming.

It is impossible to say whether an overhead cable is a power line or a telephone line from observation alone. The only sure method is to make contact with the line owner.

### **Safe Vertical Working Clearance**

The minimum safe working distance between mechanical excavation equipment and live overhead power lines will vary according to:

- type of power line (for example, insulated or uninsulated)
- voltage carried by the power line
- ground and weather conditions.

To establish and maintain safe **vertical** working distances between mechanical equipment and overhead power lines the following practice shall always apply:

1. Establish and record the maximum vertical reach of all machines on site.

2. Identify the routes of all overhead lines on or near the land to be excavated and clearly mark these routes on site plans.
3. For each overhead power line, identify the line owner.
4. From the line owner find out:
  - a. if the line can be conveniently made DEAD
  - b. the line type (for example, insulated or uninsulated)
  - c. the voltage carried
  - d. minimum safe working clearance for mechanical machinery operating near the power line.
5. If the line cannot conveniently be made DEAD then the established minimum safe operating clearance shall be adhered to at all times.

### **Reducing the Risk from Overhead Power Lines**

Risks associated with working close to overhead power lines can be reduced by:

- Taking care not to damage poles and stays
- Fitting shorter radio aerials or repositioning existing ones on high machines so they cannot cause danger
- Carrying long items (for example, pipes or ladders) horizontally and not storing pipes or other materials and equipment near or under power lines and their supports
- Designating safe areas for high-risk activities; for example, tipping trailers
- Using barriers and goalposts: by erecting goalposts and barriers, machines which have to pass beneath lines can be limited to a safe height – an option especially suited to gateways and tracks.

### **If Contact is made With an Overhead Power Line**

- Never touch an overhead line – even if it has been brought down by machinery, or has fallen through other means.
- Never assume that lines are dead.
- When a machine is in contact with an overhead line, electrocution is possible if anyone touches both the machine and the ground. Stay in the machine and lower any raised parts that are in contact or drive the machines out of the lines if you can.
- If you need to get out to summon help or because of fire, jump out as far as you can without touching any wires or the machine – keep upright and away from the machine.
- Get the line owners to disconnect the power supply. Even if the line appears dead, do not touch it – automatic switching may reconnect the power.

### **5.6 Working Hours**

Excavation work shall only be carried out during daylight hours where practicable. If the task overruns dayshift then the area will be barriered off and illuminated using approved outside site lighting. Preferably this should be a mobile tower, diesel driven arc light if available. These are additional requirements in addition to the site being fenced off.



## **5.7 Fires**

Storage of material for lighting of fires in the vicinity of above ground installations associated with it **is not** permitted.

## **6 Pre-excavation requirements and Procedure**

**6.1 Excavation activity should preferably be undertaken in the summer as far as is reasonably practicable, in order to minimise both ground disturbance and soil compaction.**

### **6.2 Landowners**

Ensure that access has been granted by the landowner, that a pre-entry survey with photographs has been done and that compensation, access route and area protection have also been agreed.

Landowners and neighbours in close proximity to the proposed excavation must be informed that work is about to begin and that the inspection is of a routine nature.

**Note:** This requirement may be negated under an emergency situation.

### **6.3 Third Party Services**

Owners of third party services shall be contacted before the excavation of their services begins. A No Objection Certificate shall be obtained when applicable.

### **6.4 Excavation Boundaries**

The extent of required excavation shall be clearly marked out prior to commencement of the work.

### **6.5 Excavation design requirements**

#### **Access**

Whenever personnel will be in an excavation, ramps, stairways or ladders should be kept within 7.6m of workers for all excavations over 1.2m deep.

#### **Windsocks**

Wherever the presence of hydrocarbons is reasonably suspected, for example in all Red Zones, windsocks or flags must be positioned on both sides of the excavation in order to determine wind direction.

#### **Planning for Water Accumulation**

Works shall be suspended / re-scheduled during periods of severe/inclement weather. A portable diesel driven dewatering pump with a suitable length of hose shall be in attendance to drain the excavation if required.

When someone will be working in an excavation where water may accumulate, consideration **should** be given to:

- Special support or shield systems
- Water removal equipment, and
- Emergency rescue procedures.

#### **Confined Spaces**

If the depth of excavation is 1.2m or greater, it shall be treated as a confined space. Risk Assessment should stipulate if all confined space entry requirements are to be met. Gas testing must be carried out prior to entry. Where hazardous atmospheric

conditions may exist or develop in an excavation/confined space, controls such as proper respiratory protection (BA sets, respirators), ventilation, availability of trained and competent Rescue Teams and Emergency Rescue equipment must be provided.

## **7 Excavation Procedures**

### **7.1 Excavation Inspections**

Where personnel are required to work in excavations of 1.2m or deeper a safety inspection by a competent person must be carried out on each shift as follows:

- before work is started
- after rainstorms
- after other occurrences which may increase the hazard of cave-ins.

All high-risk excavations as defined by the Risk Assessment must be attended by a geo-technical engineer/person trained in soil analysis.

### **7.2 Toolbox Talks**

A toolbox talk shall be carried out prior to works commencing with all parties involved in the works. Talks shall be carried out during the works when the initial shift handover takes place and when new works come on site.

**Note:** Toolbox talks shall be recorded.

### **7.3 Operating restrictions**

The following are operating restrictions for excavating equipment.

- Tracked vehicles **should be used in preference** to wheeled equipment on the side of the excavation to minimise soil compaction.
- Equipment **must** be operated within its rated capacity.
- Personnel **must** stay clear of excavating equipment while in operation.  
Examples of unsafe areas include: under or beside the bucket of a backhoe, near hydraulic rams of a bulldozer, etc.
- A seat belt **must** be installed on equipment manufactured with a ROPS.
- Do **not** use equipment if the ROPS has been removed.

**Note:** "Pure" ditching machines (those without blades or backhoe attachments) are excluded from ROPS requirements.

### **Operators**

Equipment operators must:

- be trained in the use of the equipment
- be properly seated when operating equipment controls
- wear seat belts if the equipment is in operation and furnished from the manufacturer with a Roll Over Protective Structure (ROPS)

**Note:** Seat belts **should not** be worn if the equipment is not fitted with a ROPS.

- use care at all times to maintain equipment stability
- always drive at safe speeds for the conditions encountered (for example, on rough ground, slopes, crossing ditches, turning, etc)
- always use steps and handles provided when mounting or dismounting equipment.

Equipment operators must not:

- start the engine unless seated in the driver’s seat
- allow other personnel to ride on the equipment unless it is designated for more than one occupant
- get off the equipment while it is in motion, except in an emergency.

### Parking and Moving Equipment

The table below describes the operator requirements for specific excavating equipment.

Activity	Precautions
Parking excavating equipment	<ul style="list-style-type: none"> <li>• Park the unit on the level ground if possible and...</li> <li>• Lower the boom to a relaxed position</li> </ul>
Parking a backhoe on an incline	<ul style="list-style-type: none"> <li>• Lower the bucket so that the cutting lip contacts the ground</li> <li>• Apply the parking brake and...</li> <li>• Securely chock the wheels.</li> </ul>
Loading equipment on a trailer	<ul style="list-style-type: none"> <li>• Use the crawl gear.</li> </ul>
Storing or transporting a ditcher on a trailer	<ul style="list-style-type: none"> <li>• Use trainer ramps</li> <li>• Lower the boom</li> <li>• Place the transmission in gear and...</li> <li>• Fasten the ditcher securely to the trailer.</li> </ul>

### Using Backhoes

The following precautions apply whenever a backhoe is used during excavation:

- Personnel **must not** be in an excavation within the full reach of the backhoe while it is excavating
- The boom must be raised and centered before engaging or disengaging the transport.
- Avoid using the full reach or swinging a loaded bucket to the downhill side.

**Note:** This will prevent upsets when operating in a slope.

- Attach towlines at a point below the rear axle.

**Note:** Attaching above this level increases the risk of rollover.

### Waste Management

Waste Management Plan to be referred to.

### Power Lines

Before operating equipment, all utility lines and overhead power lines must be located and identified.

## **7.4 Excavated Materials**

Excavated material shall be placed at least 1m away from the edge of the excavation and shall be stockpiled within the Right of Way area.

### **Topsoil**

The stripped topsoil shall be stored for re-use away from the side of the excavation and separate from the sub-soil.

The height of stored soils should be limited to 3 m in order to reduce erosion problems and prevent the development of anaerobic conditions within the stockpile. Weed growth may need to be controlled by spraying with approved herbicides.

**Warning: Do not** pile topsoil under overhead power lines.

### **Subsoil**

The stripped sub-soil shall be stored for re-use away from the side of the excavation and separate from the topsoil.

**Warning: Do not** pile subsoil under overhead power lines.

### **Contaminated Soil**

**Note:** Any excavation where contaminated ground is encountered shall have a Hazard Risk Assessment completed. This Risk Assessment shall take into consideration the duration that the excavation is expected to be open.

## **8 Backfilling Procedures**

### **8.1 Preparation**

#### **Backfill Materials**

No perishable materials such as vegetable growth, timber bush, etc are to be filled into the trench.

#### **Backfilling Guidelines**

Backfilling operations in well-compacted layers should be carried out in such a manner as to prevent heavy loads passing over the pipeline. Allowance should be made for sufficient overfilling or mounding of the filled trench to compensate for subsequent settlement.

The following guidelines apply to backfilling operations:

**Note:** If a compactor is used, area gas monitoring shall be conducted throughout the compacting activity

1. All water shall be removed from the trench before backfilling commences.
2. The bottom of the trench shall be padded as far as is reasonably practicable with a minimum of 150mm of suitable granular material, i.e., building sand.

**Note:** The removal of any fine materials from riverbanks and / or riverbeds is strictly prohibited.

3. The original topsoil is to be replaced in the top of the trench with the same depth as that on the working width.
4. All surplus excavated materials, rock, welding rods, waste and all unwanted material shall be removed from the site of the works and the site left in a tidy

condition.

5. On completion of backfilling all fields, verges, tracks, paths, garage drives and access roads should be permanently reinstated to a condition equivalent to that before the commencement of the work.
6. Any damage to field drains etc must be repaired and local farmer/land owner be invited to inspect the repair(s) prior to backfill.

## **9 Site Reinstatement**

Reinstatement of the site shall be implemented in accordance with the Contract Specifications.

### **9.1 Drainage**

Any field drains that have been damaged should be repaired or replaced.

Drainage patterns should be returned to their original state by using the same permeable materials that were excavated.

Topsoil reinstatement should take place in dry conditions to prevent permeability and drainage characteristics from being altered through compaction.

### **9.2 Topography**

In addition, excavated soils should be redistributed across the entire right-of-way to restore the natural topography. Any areas outside the trench area that have been compacted by moving vehicles should be loosened using deep-tine cultivators.

The responsible department in order to ensure that restoration is satisfactory or to ensure that monitoring should continue should carry out a final inspection.

## **8.3 Fire Fighting Procedure**

## **1 Introduction**

### **1.1 Document Purpose**

This Safe System of Work provides the information necessary for ensuring the safety of personnel, buildings, installations, and plant with regard to fire prevention, detection and protection.

### **1.2 Document Scope**

The contents of this Safe System of Work apply to all personnel employed on this project.

This Safe System of Work does not remove the responsibility for compliance with local legislation and statutory requirements, which shall be complied with at all times.

## **2 Responsibilities**

### **2.1 AREA AUTHORITY - SITE SUPERVISOR**

Within their particular areas, Area Authorities are responsible for ensuring:

- compliance with this safe System of Work
- that fire prevention and housekeeping standards are maintained at all times
- that all fire fighting equipment is in date and fully functional
- that all activities are carried out in a safe and responsible manner with regard to fire risks, and that Risk Assessments are carried out wherever necessary.

## **2.2 All Personnel**

All personnel, including contractors, are responsible for the prevention and detection of fire. In particular, all personnel are responsible for:

- immediately informing their supervisor of any situation that they consider to be a potential fire risk
- conducting themselves and their work in a fire-safe manner
- ensuring that they are aware of and fully understand the actions they must take in the event of a fire alarm
- ensuring that they are fully aware of the actions they must take on discovering a fire.

## **3 Fire Prevention**

Prevention is the first line of defence against fire. All reasonably practicable measures shall be taken to reduce the fire risks to as low as reasonably practicable.

### **3.1 Housekeeping and Procedures**

Properly established and applied housekeeping procedures are required in order to reduce both the risk of fire and the ultimate consequences should a fire occur.

#### **Work Areas and Walkways**

No materials, flammable or otherwise, should be allowed to accumulate in the workplace or in walkways, where they can present direct fire hazards or obstruct attempts to deal with a fire.

- Work areas and walkways should be kept free of any unnecessary flammable materials, including:
  - flammable materials or agents no longer required for the activity
  - combustible waste (for example, wood shavings, flammable dust)
  - packaging materials, particularly plastics and polyester foam waste which, when ignited, can give off large amounts of dense, black smoke and toxic fumes.
- All spills involving flammable liquids shall be cleaned up immediately. Where necessary, suitable cleaning materials should be provided and used.
- Flammable liquids should be dispensed over a drip tray, the contents of which should be disposed of at frequent regular intervals (for example, on completion of dispensing activities)
- Where necessary, working areas should be kept free of flammable dust accumulation by regular cleaning, and vacuuming spillages as they occur.

#### **Waste Materials**

- Suitable containers must be provided for waste materials. These containers must be clearly labelled with regard to their use and contents.
- Oily or paint soaked rags, waste, or clothing shall be placed in closed, metal containers that shall be emptied frequently, ensuring safe disposal of their contents.
- Contaminated waste materials should be disposed of safely in accordance with the Environmental Management Plan. If necessary, waste disposal experts should be used.

## **Working Practices**

- Keep containers closed when not in use. If possible, use safety containers with self-closing lids.
- Only dispense flammable liquids in a safe place where there is good ventilation and no source of ignition.
- Take extra care when dealing with, or working close to, engine fuels, solvents and thinners. Nearly all refined liquid petroleum products will emit a flammable vapour and may convert naturally to a gaseous state at or below temperatures found in a normal working environment
- Do not use flammable liquids for cleaning machinery or machine parts.
- Suitable signs should be posted in areas where ignition sources or flammable materials are likely to be in use
- Identified fire risks should be dealt with immediately

## **3.2 Risk Assessments**

### **All Activities**

Risk Assessments shall assess the potential for a fire and its possible consequences. In particular, Risk Assessments should address the:

- existence of planned and accidental ignition sources
- proximity of combustible materials to the work area or storage area
- possible consequences of fire and the possibility of the fire spreading to adjacent areas
- provision of suitable and adequate fire fighting equipment and personnel
- requirement for contingency plans in the event of a fire or spillage
- competency of personnel involved in the work and of those who may be required to deal with the initial outbreak of a fire.

### **Hot Work**

Hot Work, spark potential or naked flame, shall only take place under the control of a Permit to Work that is supported by a formal Risk Assessment.

See also *3.4 Hazardous Areas*.

## **3.3 Hazardous Areas**

### **Area Classification**

Areas are classified as hazardous or non-hazardous using recognised standards. The process of identification of hazardous areas is a multi-discipline task performed by Process and Safety Engineers in the development of a hazardous area classification. The areas may be classified as:

**Zone 0:** in which a flammable atmosphere is continuously present or present for long periods.

**Zone 1:** in which a flammable atmosphere is likely to occur in normal operation.

**Zone 2:** in which a flammable atmosphere is not likely to occur in normal operation, and if it does it will exist for only a short time.

**Non-Hazardous:** in which an area is not one of Zone 0, 1 and 2.

### **Plant and Equipment in Hazardous Areas**

Equipment and plant used in Zones 0, 1, and 2 must be explosion proof and electrical devices must be intrinsically safe.

Any source of unplanned ignition, including mobile phones, matches and cigarette lighters **shall not** be taken into these areas.

### **Motor Vehicles and Internal Combustion Engines**

Special precautions are required for the use of motor vehicles and internal combustion engines. In particular:

- motor vehicles and internal combustion engines shall not be allowed in Zones 0 and 1
- motor vehicles and internal combustion engines shall only be allowed into Zone 2 under a Hot Work (Spark Potential) Permit.

#### **Hot Work in Hazardous Areas**

All hot work, in a hazardous area or otherwise, shall only be carried out under the control of a Hot Work permit, either spark potential or naked flame. The issue of a Hot Work permit is dependent upon the results of a formal Risk Assessment that shall fully address the fire risks involved and the Hazardous Zone classification.

## **3.4 Handling and Storage of Flammable Substances**

### **Handling**

- Site Managers and Area Supervisors shall be aware of hazardous and flammable materials that are used or stored within their areas of responsibility and shall have contingency plans in place for dealing with spills and fires involving these materials
- Personnel handling flammable materials shall be suitably qualified and trained in the use and properties associated with those materials
- Personnel handling or dealing with flammable substances shall be equipped with suitable personal protective equipment, including but not necessarily limited to face protection, hand protection and fire-proof overalls
- Suitable fire fighting equipment shall be made available in areas where flammable substances are handled.

### **vii) Storage**

- Site Managers and Area Authorities shall be aware of all flammable materials stored within their areas of authority
- Flammable substances shall not be stored near to sources (potential or real) of flame, high heat or near other combustible materials
- Flammable substances shall be stored in secure storage areas or facilities
- Storage areas for flammable liquids and gases shall be well ventilated in order to promote rapid dispersal of vapours given off from leaks, spills or unplanned releases
- Storage areas for flammable substances shall have signs and notices clearly posted warning personnel that flammable substances are present



- Where necessary, storage areas shall be equipped with adequate containment facilities, for example trays or bunding, to prevent spills from spreading to other areas
- Containers used for flammable materials shall be clearly and accurately labelled with regard to their contents
- Glass containers shall not be used for storing flammable liquids.

### **3.5 Fire Protection of Buildings and Plant**

As a minimum, building work shall comply with local authority requirements.

New and altered buildings / installations and work sites shall be formally assessed and adequate provision made for:

- fire detection
- fire fighting equipment (fixed and portable)
- personnel escape routes.

**Note:** Any buildings, installations, or sites undergoing structural alterations or a change of use must be reassessed for the above points.

## **4 Fire Detection**

### **4.1 Fixed Fire Detection Systems**

#### **Description and Types**

**Heat detectors** (electro-pneumatic; electronic; heat sensing wire; quartzoid bulbs)

**Smoke detectors** (photo-electric cell, ionisation detectors, continuous air sampling)

**Flame detectors** (infra-red detectors, ultra violet detectors)

#### **Location and Use**

As a minimum, fixed fire detection systems shall be located and used in accordance with the manufacturer's recommendations and in accordance with local legislation.

Detection systems shall not be modified in any way without undergoing a thorough Risk Assessment.

All modifications shall be recorded and held on site.

#### **Operation**

Fire detection systems shall include an automatic alarm system that:

- alerts personnel to an outbreak of fire
- provides indication of where the fire is.
- activates a fire suppression system (for example, sprinkler system).

If for any reason these facilities must be overridden:

- personnel must be informed (for example by public announcement)
- smoking shall not take place in the affected area
- any hot work in the affected area shall only be allowed under the control of a Permit to Work and only when alternative arrangements for fire detection and protection have been arranged (for example, the use of fire watchers).

#### **Inspection and Maintenance**

Fire detection systems should be inspected and maintained by a competent person and in accordance with the manufacturer's instructions and recommendations. The

Site Manager shall ensure that a suitable inspection and maintenance programme is in place for fixed detection systems.

Inspection results and any repairs carried out to a fixed fire detection system must be recorded and held on site for future reference.

## **4.2 Manual Fire Detection**

### **Site Specific Procedures**

Personnel shall be made aware of site-specific fire and emergency procedures during their initial safety induction. The induction should cover:

- action to take in the event of a fire
- escape routes and muster points
- manual alarm point locations
- extinguisher locations

In addition, fire and muster instructions shall be posted at strategic locations around the site.

**Note:** At all times, personnel are responsible for making themselves aware of the fire and emergency procedures relevant to their location.

### **Person Discovering Fire**

Personnel discovering a fire should:

1. Raise the alarm the alarm by shouting "FIRE FIRE FIRE".
2. If the fire is small and easily extinguishable and a suitable extinguisher is available, attempt to put out the fire without endangering themselves or others or...  
if the fire is not easily extinguishable or the initial attempt to extinguish the fire fails, evacuate the area closing any doors en route.
3. Follow the fire and emergency procedures specific to the site / installation.

## **4.3 Personnel Response to Fire Alarm**

Upon hearing the fire alarm, personnel should:

1. Switch off / make safe the equipment they are using and leave the area / building by the nearest safe exit, closing doors and windows behind them
2. Proceed in accordance with local fire and emergency procedures.

**Note:** Personnel should not delay from evacuating to collect their personal belongings.

# **5 Fire Protection**

## **5.1 Fixed Fire fighting Equipment**

### **Description and Types**

The most common types of fixed fire fighting systems are:

- Sprinklers
- High Velocity Water Spray (Automatic and Manual)
- Medium Velocity Water Spray (Automatic and Manual)
- High Expansion Foam Flooding Systems (Fixed and Portable)
- CO<sub>2</sub> Fire Suppression Systems (may be used in unmanned areas).

## **Location and Operation**

As a minimum, fixed fire fighting systems shall be located and used in accordance with the manufacturer's recommendations and in accordance with local legislation.

Fixed fire fighting systems shall not be modified in any way without undergoing a thorough Risk Assessment.

All modifications shall be recorded and held on site.

## **Inspection and Maintenance**

As a minimum, fixed fire fighting systems should be inspected and maintained by a competent person and in accordance with the manufacturer's instructions and recommendations and local legislation. The Site Manager shall ensure that a suitable inspection and maintenance programme is in place for fixed fire fighting systems.

Inspection results and any repairs carried out to a fixed fire fighting system must be recorded and held on site for future reference.

## **5.2 Portable Fire fighting Equipment**

### **Description and Types**

- **Water:** Water filled extinguishes are suitable for use on fires involving paper, wood, and rubbish.

**Warning:** Water extinguishers must not be used on electrical fires where there is a possibility of the water coming into contact with electrical sources.

- **Foam:** Foam filled fire extinguishers may be used successfully on fires involving paper, wood and general rubbish. However, foam fire extinguishers are primarily designed for use on oil fires.

**Warning:** Foam extinguishers must not be used on electrical fires where there is a possibility of the foam coming into contact with electrical sources.

- **Dry Powder:** Dry powder filled extinguishers may be used on fires involving rubbish and oil and may also be used on electrical fires. However, the use of dry powder on electrical equipment usually makes that equipment unusable.
- **Carbon Dioxide (CO<sub>2</sub>):** CO<sub>2</sub> extinguishers are intended for use on electrical fires only. If used on fires involving rubbish and debris, the pressure from the extinguisher is likely to disturb the seat of the fire and spread burning material. For the same reason they are not suitable for oil based fires.

### **Location**

Portable fire fighting equipment must be placed in accordance with local fire regulations, national fire protection guidelines and any other requirements.

The location of all portable fire fighting equipment should be shown on safety plans placed at strategic locations around the site / installation.

### **Operation and Use - Recharging**

All extinguishers must be recharged immediately after each use. Chemicals must never be mixed, as the resulting chemical reactions may damage the extinguisher.

Recharging must only be done by trained personnel.

## **Inspection and Maintenance**

All maintenance of portable fire fighting equipment must be carried out by a competent person and in accordance with the manufacturer's recommendations and local legislation.

The following inspections represent the minimum requirements of any inspection programme:

- All extinguisher units must be in the designated location and clearly visible. Signs or painted red backgrounds may be used to identify extinguisher locations.
- All extinguishers must be visually checked every month to ensure operational reliability (for example, seals are in place, nozzles and hoses are free from damage and the units can be accessed easily).
- Annual inspections must be performed as per manufacturer's specifications and applicable regulations.
- Inspection results shall be documented for each extinguisher unit and retained on file at the local site.

## **6 Training and Drills**

### **6.1 Training Programme**

All personnel are required to be knowledgeable on the common causes and types of fire and must be familiar with the use of fire fighting equipment. This is achieved by the use of a comprehensive training programme that includes:

- established training courses for all personnel
- regular on-site drills and practices.

### **6.2 Training Records**

Training records for all personnel shall be held on site.

### **6.3 Practice Drills**

Practice drills shall be held at regular intervals according to an established programme. The drills shall be used to practice and improve personnel skills and knowledge in fire fighting techniques and also to highlight any shortcomings in established fire fighting procedures.

## Appendix A - Definitions

### List of Definitions

<b>Fire Protection:</b>	All measures used to minimise injury and loss through fire, including procedures, design, selection, installation and maintenance.
<b>Fire Prevention:</b>	Procedures used to minimise or prevent fire.
<b>Fire Detection Systems:</b>	Equipment designed to detect fire and raise the alarm.
<b>Fire Suppression Systems:</b>	Systems designed to suppress or extinguish fires through automatic or manual activation.
<b>Emergency Procedures:</b>	Planned measures designed to minimise the risk of injury in an emergency situation.
<b>Combustible:</b>	The property of any material or substance that will readily burn.
<b>Flammable:</b>	The property of a substance that ignites easily, burns intensely and has a rapid flame-spread.
<b>Flash Point:</b>	The lowest temperature at which a flammable or combustible liquid gives off vapours to form an ignitable mixture with air.
<b>Ignition Temperature:</b>	The lowest temperature at which a mixture of vapour and air will ignite without a spark or flame. The term also applies to the temperature of a hot surface that can ignite flammable vapours.
<b>Flammable or Explosive Range:</b>	The range between the smallest and largest amounts of vapour in a given quantity of air that will explode or burn. The amount is usually given in percentages and are based on normal atmospheric temperatures and pressures.
<b>Water Solubility:</b>	The capability of a flammable or combustible liquid to be soluble in water.
<b>Spontaneous Combustion:</b>	Ignition due to the rapid oxidation of a substance that generates enough heat for ignition to occur.

### Appendix B – Checklist for Fire Safety Management

**Note:** This checklist in this appendix is provided as an *aide memoir* only, and is not intended for use as an approved test certificate or an official document:

#### CHECKLIST FOR FIRE SAFETY MANAGEMENT

- Ensure that written fire safety and emergency evacuation instructions are provided, properly displayed and regularly updated.
- Ensure that all means of escape from buildings, installations and work areas are properly indicated and readily accessible.
- Ensure that adequate fire fighting equipment is provided, correctly located and indicated.
- Make all personnel aware of the location of escape routes, fire alarms and fire fighting equipment.
- Arrange training in the use of fire fighting equipment.
- Keep readily combustible materials and flammable liquids to a minimum consistent with reasonable requirements and ensure that relevant statutory requirements, codes and client standards are observed, particularly during cutting and welding operations.
- Ensure that good housekeeping is practised, for example, the removal of unwanted rubbish and packing materials from the work area.
- Ensure that an annual fire safety audit of all premises is carried out.
- Refer to the HSE Adviser in the event of queries.

## **8.4 Work at Height Safety Procedure**

### **1 Introduction**

#### **1.1 Document Purpose**

This Safe System of Work provides the guidelines and precautions that must be adhered to in order to reduce the risks involved with personnel working at heights to as low as reasonably practicable.

#### **1.2 Document Scope**

The contents of this Safe System of Work apply wherever personnel are required to work at heights of 2m or above on this Project.

This document should be used in conjunction with Safe Systems of Work Procedure Scaffolding.

#### **1.3 Requirement to Work at Height**

The guidelines in this document only reduce the risks involved with working at height to a point where they are as low as reasonably practicable. They do not remove the risks entirely. For this reason, wherever possible, every effort shall be made to minimise the need for personnel to work at elevated positions.

In addition, all personnel have an obligation to halt any activity that they believe to be unsafe.

### **2 Responsibilities**

#### **2.1 PROJECT MANAGER**

The Site Manger / OIM is responsible for:

- ensuring the requirements of this Safe System of Work are fully implemented

and followed on the site / installation

- appointing competent person(s) to inspect and certify fall arrest equipment and associated systems, scaffolds, etc., as safe to use.

## **2.2 Supervisors**

Supervisors of personnel working at height are responsible for following and implementing the guidelines and precautions included in this safe System of Work and shall ensure that all personnel under their supervision comply with the same.

## **2.3 Competent Person**

The competent person shall be suitably trained, experienced and qualified to carry out the inspections and examinations, etc., as detailed in this Safe System of Work.

## **3 Working Platforms**

The preferred system for working at heights requires the use of fixed platforms with guardrails or handrails fitted, and approved for use by a competent person, for personnel working at raised elevations. Fixed platforms may include:

- Aerial lifts (boom, scissor and snorkel types) used in accordance with manufacturers recommendations.
- Industrial trucks that are fitted with specifically designed personnel work platforms
- Scaffolding that has been erected to meet all requirements (refer to *Scaffolding Procedure*)
- Man lifts, specifically designed and used in accordance with requirements.

## **4 Fall Arrest Equipment**

### **4.1 Use of Fall Arrest Equipment**

Where work at height must take place without a fixed working platform, fall arrest equipment shall be used at all times.

Fall arrest equipment shall:

- be capable of limiting a fall to two metres or less
- be capable of supporting a static load of 5000lb (2275kg) per person
- be fitted to a proper anchor point (preferably overhead)
- include a full body harness with double latch self-locking snap hooks at each location
- use only synthetic fibre lanyards
- include a shock absorber

Harnesses, inertial reels, lanyards and lifelines, shall not be used for purposes other than protection of personnel.

### **4.2 Maintenance of Fall Arrest Equipment**

All fall arrest equipment and systems shall be visually inspected at regular intervals and tested in accordance with the manufacturer's recommendations. Any equipment that is damaged or has been activated shall be removed from service immediately.

Any harness, lanyard or lifeline that has been subject to in service loading shall be removed from service.

Safety harnesses, inertial reels, lanyards and lifelines shall be inspected before each use and by a competent person. Any damaged items shall be removed from service immediately.

Any used fall arrest equipment must be cleaned regularly.

## **5 Movement and Working At Height**

### **5.1 Access**

Use only the safe means of access provided. Do not climb bracing or frames that are not specifically designed for climbing.

**Note:** All personnel are responsible, where necessary for insisting that proper and safe means of access are provided.

### **5.2 Movement**

While working at height, personnel shall take care to move and climb safely. In particular, when on ladders:

- face the rungs as you climb up or down.
- use both hands on the ladder and maintain 'three point' contact (keep one hand firmly on frame or ladder at all times)
- do not try to carry materials while you climb
- ensure footing and balance before releasing hand grips
- do not work on slippery rungs.

### **5.3 Working on Roofs**

#### **Shallow Sloped Roofs**

Work on roofs with slopes less than or equal to 4 in 12 (vertical to horizontal), with unprotected sides and edges 2m or more above lower levels, shall require fall protection measures that may include:

- guard rail systems
- personnel fall arrest systems
- combination of warning line system and guardrail system, or safety monitoring system.

#### **Steep Sloped Roofs**

Work on roofs with slopes greater than 4 in 12, with unprotected sides and edges 2m or more above lower levels, shall require fall protection in the form of guard rail systems with toe boards, safety net systems or personal fall arrest systems.

### **5.4 Working on Scaffolding**

All scaffolding must have:

- guard rails on all open sides: top rail 42 inches above the work platform surface, middle rail 21 inches above the work surface.
- toe boards on all sides
- side screens on sides adjacent to passageways or thoroughfares
- scaffold boards in good condition and extending not less than six inches, nor more than 12 inches, beyond their end supporters (unless otherwise secured from being dislodged)
- an access ladder secured to the scaffold with minimum required clearances



between ladder rungs and away from obstacles that interfere with safe use of the ladder.

**Note:** Loose articles and materials must be kept to an absolute minimum on scaffolding platforms. All necessary precautions must be taken to prevent objects from falling from scaffolds, e.g., by use of toe boards.

### **5.5 Safe Use of Ladders**

Ladders may be used as a short-term alternative to scaffolding or as means of access to scaffolding, providing the points listed in this section are considered.

**Note:** Ladders are potentially dangerous. The most common type of accident occurs through a ladder slipping.

- Always place a ladder on a firm base, set the angle near to 75°
- Make sure the ladder projects well above the level at which the user stands.
- Ensure sufficient overlap between stages of extension ladders.
- Do not load ladder beyond maximum intended load.
- Barricade traffic areas in vicinity of ladder use, and lock, barricade, or guard doorways in which a ladder is placed.
- Keep area around the top and bottom of ladder clear.
- Use only non-conductive side rails around live electrical equipment.
- Do not use top or top step for standing/stepping.
- Do not stand on cross bracing.
- Always face the ladder when ascending or descending.
- Always maintain 3 points of contact with the ladder (2 feet/1 hand or 2 hands/1 foot should be in contact with ladder at all times).
- Carry tools in pouches around waist; use a rope to raise or lower large items such as toolboxes or materials.
- Do not overextend sideways. Use the belt buckle rule: keep your belt buckle positioned between the side rails at all times, which will maintain your centre of gravity.
- Never allow more than one worker on the ladder at a time.
- Do not erect ladders on sloping surface, leaning to one side or at too steep an angle.
- Do not erect ladders for use as a plank or bridge.

### **Training**

All personnel required to perform elevated work shall be fully trained in appropriate, safe work practices, including the wearing and care of associated safety equipment and the safe use of all elevated work equipment.

## 8.5 Scaffolding Safety Procedure

### Introduction

#### 1.1 Document Purpose

This document contains the guidelines necessary for the safe:

- \* construction, use, dismantling and control of scaffolding
- \* use of ladders.

#### 1.2 Scaffolding Definition

Scaffolding is a temporary structure on which persons work and which provides support for the materials used in construction, maintenance, repair or demolition work. It can also be used to obtain access to certain areas of equipment.

Where work cannot safely be carried out from ground level or from part of a building or other permanent structure, there must be provided either scaffolding or, where appropriate, ladders or other means of support.

**Note:** The erection, dismantling and alteration of scaffolding must be carried out by competent workmen under competent supervision

## 2 Responsibilities

### 2.1 Project Manager

The Project Manager is responsible for:

- \* ensuring the requirements of this standard are implemented on their facilities
- \* appointing a competent person to inspect and certify scaffolds as safe to use.

## 3 Scaffolding Design requirements

### 3.1 Materials

#### All Materials

Before use, a competent person must inspect all scaffolding and material used in construction in order to ensure:

- \* it is in good condition and is serviceable

**Note:** Damaged or deteriorated equipment **shall not** be used

- \* It is in compliance with this Procedure.

#### Wood Planks

Wood plank should be inspected to see that it is:

- \* graded for scaffold use

**Note:** Wood planks used for scaffolding must be specifically graded for scaffold use by a nationally recognised grading agency.

- \* is sound and in good condition
- \* straight grained, free from saw cuts, splits and holes.
- \* In the case of 38mm thick, are banded at either end or nail plates fitted

## 3.2 Construction

### National Requirements

The scaffold assembly must be designed to comply with local state and International Safety requirements, whichever is the higher.

Scaffolds required with a loading capacity greater than 2.5kn/m<sup>2</sup> must always be subject to qualified scaffold designer input / approval.

### Load Calculations

Frame spacing and mud sill size can only be determined after the total loads to be imposed on the scaffold and the strength of the supporting soil or structure are calculated and considered. A qualified person prior to the scaffold structure being built must do this analysis.

**Note:** Manufacturers load carrying information shall be used for design calculations

### Construction, Dismantling and Alteration

Competent workmen under competent supervision must carry out the erection, dismantling and alteration of scaffolding.

Plumb and level scaffold until connections can be made with ease. Do not force members to fit. Be sure scaffold stays level and plumb as erection progresses.

During dismantling of scaffolding, poles and fittings shall not be dropped to the ground but always carefully lowered. Poles shall be stacked flat and fittings collected into bags or containers.

### Support and Bracing

Scaffolding must be securely supported or suspended, and where necessary braced to ensure stability. Unless constructed as freestanding independent scaffolding, it must be rigidly connected with the building or structure (not to pipe work).

Ties, guys, bracing and/or outriggers may be needed to assure a safe stable scaffold assembly. Determine the need for stability bracing.

### If in doubt – ask.

The requirement for stability bracing is dependent upon:

- \* the height of the scaffold in relation to the minimum base width

**Note:** Freestanding Scaffolds with a height in excess of 4 times internally or 3.5 times externally, the minimum base width dimension must always be secured to a rigid structure or seek alternative means of support.

**Internally = no wind loading**

**Externally = relatively sheltered locations / minor wind loading**

- \* wind loads
- \* the use of brackets or cantilevered platforms
- \* imposed scaffold loads.

### Ties:

- \* The bottom tie must be placed no higher than four (4) times the minimum base width and every four (4) meters vertically thereafter. Ties should be placed as close to the top of the scaffold as possible and, in no case, more

than three (3) times the minimum base width of the scaffold from the top.

- \* Vertical ties should be placed at the ends of scaffold runs and at no more than 4 meters horizontal intervals in between.
- \* Ties should be installed as the erection progresses and not removed until the scaffold is dismantled to that height.
- \* Ties should be constructed to 6.25kn (slipload) unsheeted & 12.5kn sheeted

### **Guys:**

- \* Each leg of a freestanding tower must be guyed at the intervals outlined above or otherwise restrained to prevent tipping or overturning.

**Note:** Circular scaffolds erected completely around or within a structure may be restrained from tipping by the use of "stand off" bracing members.

### **Planks**

- \* Work platforms must be fully planked either with scaffold graded solid sawn or laminated plank, in good sound condition, or with fabricated platforms in good condition.
- \* Each plank must overlap the support by a minimum of 1.5 x thickness or be cleated / securely tied for example, 3 metre planks on 2.8 meter spans must be cleated/securely tied.
- \* Plank must not extend beyond the support by more than 4.5 x thickness. Such overhangs should be separated from the work platform by guard-railing so that they cannot be walked on.
- \* Spans of full thickness, 50mm by 250mm scaffold grade planks, should never exceed 2.6m. Loads on plank should be evenly distributed and not exceed the allowable loads for the type of plank being used.
- \* Spans of normal thickness (38mm) boards should never exceed 1.5m.
- \* Planks and/or platforms should always be secured to scaffolding to prevent uplift or displacement due to high winds or other job conditions.

### **Guardrails and Toe Boards**

- \* The scaffolds shall be supplied with the toe boards and guardrails when the height of planks location is 1,3 m and over.
- \* The height of the top guardrails shall be between 910mm & 1150mm and distance between the posts of guardrails should not exceed 2.7 metres.
- \* Guardrails must be used on all open sides and ends of scaffold platforms. Both top and mid-rails are required. Local codes specify the minimum heights where guardrails are required, however, use at lower heights if falls can cause injury.

### **Transoms**

A transom is a length of scaffold tubular used as a cross-member to support planking on working lifts & provide lateral structural support on non-working lifts. Particular care and attention shall be paid to the use of transoms. In particular:

- \* transoms should overhang the support points by at least 150mm
- \* transoms hangers shall be used with bolts fastened to support transoms on frames

- \* transoms spans greater than 2.7m (very light duty), 2.4m (light duty) or 2.1m (general purpose) require knee bracing and lateral support
- \* transoms used as side or end brackets need special bracing.

**Note:** Transoms **must not** be used for the storage of materials.

### **Scaffold Access**

Access must be provided to all work platforms. If it is not available from the structure, access ladders, frames with built-in ladders, or stairways must be provided. When frames with built-in ladders are used, cleated plank or fabricated plank must be used at platform levels to minimize or eliminate platform overhang. Access ladders must extend at least 1 metre above platforms.

### **Bridging Scaffold**

Bridging between towers should not be done with plank or stages unless the overturning moments have been compensated for & suitable guardrails, ties etc are fitted.

### **Mud Sills and Screw Jacks**

Mud sills must be of adequate size to distribute the loads on the scaffolding to the soil or supporting structure. Sills should be level and in full contact with the supporting surface.

Base plates or screw jacks with base plates must be in firm contact with both the sills and the legs of the scaffolding. Compensate for uneven ground with screw jacks with base plates. DO NOT USE unstable objects such as blocks, loose bricks, etc.

### **Dismantling Scaffold**

## **3.3 Rolling Scaffolds**

The tower height must not exceed 3.5 times internally or 3 times externally the minimum base dimension. Outrigger frames or outrigger units on both sides of the tower may be used to increase base width dimension when necessary.

All casters must be secured to frame legs or screw jacks with a nut and bolt or other secure means. Total weight of tower + men, materials & tools etc should not exceed the capacity of the casters.

Screw jacks must not be extended more than 300mm above caster base. Tower must be kept level and plumb at all times.

Horizontal/diagonal (plan) bracing must be used at the bottom and top of tower and at least every alternate lift. Fabricated planks with hooks may replace the top diagonal brace.

- \* All frames must be fully cross-braced.
- \* Only prefabricated plank or cleated / tied planks should be used.
- \* Casters must be locked at all times the scaffold is not being moved.

## **4 Inspections and Scafftags**

### **4.1 Site Inspection (Pre-Construction)**

The job site should be inspected to determine ground conditions or strength of supporting structure, and for proximity of electric power lines, overhead obstructions, wind conditions, the need for overhead protection or weather protection coverings.

Special care is needed when scaffolding is to be erected on fill or other soft ground or on frozen ground. These conditions must be evaluated and suitably provided for.

## **4.2 Site Inspection (Post-Construction)**

A competent person shall inspect scaffolding:

- \* before it is first used and then at least once every week
- \* following any alteration
- \* if it has been exposed to weather conditions likely to affect its strength or stability.

Details of inspections must be recorded.

## **4.3 Scafftags**

“Scafftags” shall be used on all scaffold structures, whether complete or part complete/dismantled to indicate whether or not the scaffolding is safe to use.

Scafftags must be positioned prominently at access points to scaffold structures.

When scaffolding is incomplete (whether partly erected or dismantled) or considered to be unsafe for any reason, the green scafftag must be pulled to display the red (Do Not Use) tag.

In addition, access to the scaffold shall be barriered off as soon as practicable.

## **Scaffolding Use**

### **5.1 Inspection**

Inspect the scaffold assembly before each use. In particular, check:

- \* the Scafftag – Pay particular attention to the load rating
- \* that the scaffold is assembled correctly:
  - \* that it is level and plumb
  - \* base plates are in firm contact with sills
  - \* bracing is in place and connected
  - \* platforms are fully planked with guardrails in place
  - \* safe access is provided
  - \* that the scaffold is properly tied and/or guyed
- \* there are no overhead obstructions or electric lines within 4 meters of the scaffold assembly.

### **5.2 Access**

Use only the safe means of access provided. Do not climb bracing or frames not specifically designed for climbing. If access is not provided, insist that it be provided.

### **5.3 Working Safely**

#### **Personnel Movement on Scaffold**

While working on scaffold, personnel shall take care to climb safely. The following work practices shall apply:

- \* Climb safely. In particular, when on ladders:
  - \* face the rungs as you climb up or down.
  - \* use both hands on the ladder and maintain ‘three point’ contact (keep one hand firmly on frame or ladder at all times)
  - \* do not try to carry materials while you climb

- \* ensure footing and balance before releasing hand grips
- \* do not work on slippery rungs.
- \* do not overload platforms with materials
- \* **Never** add sheeting to a scaffold structure without consulting a qualified person.
- \* do not extend working heights by using planking guardrails or by use of boxes or ladders on scaffold platforms
- \* Do not remove any component of a completed scaffold assembly. Alterations shall only be carried out by suitably qualified / authorised personnel under the supervision of a qualified person.

**Note:** Any removed component should be immediately replaced.

### **Dropped Objects**

Loose articles and materials must be kept to an absolute minimum on scaffolding platforms. All necessary precautions must be taken to prevent objects from falling from scaffolds, e.g. by use of toe boards.

### **Cantilevered Platforms**

Materials should never be placed on cantilevered platforms unless the assembly has been designed to support material loads. (These types of platforms cause overturning and uplift forces, which must be compensated for. All frames should be fastened together to prevent uplift an overturning moment compensated for with counterweights or adequate ties).

### **Hoisting and Lifting**

Scaffold should not be used as material hoist towers or for mounting derricks unless the assembly is designed for that purpose.

## **5.4 Rolling Scaffolding**

- \* Do not ride manually propelled rolling scaffold. No personnel should be on the tower while it is being moved.
- \* Lock all casters before getting on the tower.
- \* Work only within the platform area: do not try to extend overhead work area by reaching out over guard railing.
- \* Do not bridge between two rolling towers with plank or stages.
- \* Secure all materials before moving scaffolds.
- \* Be sure floor surface is clear of obstructions or holes before moving scaffold.
- \* Be sure there are no overhead obstructions or electric power lines in the path of rolling scaffold.
- \* Rolling towers must only be used on level surfaces.
- \* Move rolling towers by pushing at the base level only. Do not pull from the top.

## **5.5 “Quick Erect” Aluminium Scaffolding**

The use of “quick erect” aluminium scaffold systems can be used subject to local controls such as restricting use to non-hazardous areas and appropriate storage.

## 6 Ladders

Ladders may be used as a short-term alternative to scaffolding or as means of access to scaffolding, providing the points listed in this section are considered.

**Note:** Ladders are potentially dangerous. The most common type of accident occurs through a ladder slipping.

### 6.1 Transporting and Moving Ladders

Unless space restrictions dictate otherwise, always carry ladders parallel to the ground.

Do not move, shift, or extend a ladder while the ladder is occupied.

**Note:** **Do not** walk a ladder

Tie ladders down securely when transporting.

### 6.2 Maintenance

Ladders shall be inspected and maintained by a competent person. The record of inspections shall be registered not be longer than six months.

Maintain ladders free of oil, grease, and other hazards.

**Do not use** any ladder with structural defects; properly tag the ladder with a "Do Not Use" notice and withdraw the ladder from service.

### 6.3 Preparation

Inspect ladder prior to EVERY use.

Before using a ladder, ensure that it is the correct item of equipment for the job in hand and that it is in good condition

**Warning:** Aluminium ladders **must not** be used in hazardous areas due to the danger of sparks when the ladder impacts steel).

Use ladders only for the purpose for which they were designed (refer to manufacturer's labelling and recommendations).

### 6.4 Safe Use of ladders

- \* Always place a ladder on a firm base, set the angle near to 75°.
- \* Make sure the ladder projects well above the level at which the user stands.
- \* Ensure sufficient overlap between stages of extension ladders.
- \* Secure the ladder in place wherever reasonably practicable.
- \* A standby person should remain at the base of the ladder whenever the ladder is in use.
- \* Do not load ladder beyond maximum intended load.
- \* Barricade traffic areas in vicinity of ladder use, and lock, barricade, or guard doorways in which a ladder is placed.
- \* Keep area around the top and bottom of ladder clear.
- \* Use only non-conductive side rails around live electrical equipment.
- \* Do not use top or top step for standing/stepping.
- \* Do not stand on cross bracing.
- \* Always face the ladder when ascending or descending.
- \* Always maintain 3 points of contact with the ladder (2 feet/1 hand or 2 hands/1 foot should be in contact with ladder at all times).
- \* Carry tools in pouches around waist; use a rope to raise or lower large items



such as tool boxes or materials.

- \* Do not overextend sideways. Use the belt buckle rule: keep your belt buckle positioned between the side rails at all times, which will maintain your centre of gravity.
- \* Never allow more than one worker on the ladder at a time.
- \* Do not erect ladders on sloping surface ,leaning to one side or at to steep an angle.
- \* Do not erect ladders for use as a plank or bridge.

## 8.6 Confined Space Entry Procedure

### 1 Introduction

**Note: A Hazard Assessment must be completed before any entry into a confined space (See *Risk Assessment Procedure*).**

The Hazard Assessment should identify the:

- sequence of work to be performed in the confined space
- specific hazards known or anticipated
- control measures to be implemented to eliminate or reduce each of the hazards to an acceptable level.

**No entry** shall be permitted until the Hazard Assessment has been reviewed and discussed by all persons engaged in the activity.

**Personnel who enter a confined space must be informed of all known or potential hazards associated with the confined space to be entered.**

#### 1.1 Purpose

The purpose of this procedure is to:

- identify and define confined spaces
- describe the proper procedures and preparations to protect the health and safety of all personnel who must work in confined spaces.

#### 1.2 Scope

This mandatory procedure applies to road construction project of XXXX

#### 1.3 Confined Space - Definition

##### Properties of a Confined Space

A “**confined space**” is any enclosed or partially enclosed space which:

- is large enough for any person to bodily enter it and perform assigned work
- has limited or restricted means of entry or exit
- has unfavourable natural ventilation
- is not designed for continuous occupancy.

**Note:** Confined spaces often present, or have the potential to present, hazards related to atmospheric conditions (e.g., toxic, flammable, asphyxiating), engulfment, or entrapment.

##### Confined Space Examples

The general definition of a confined space shows that many types of space may be considered confined and therefore hazardous, including:

- tanks
- vessels
- ducts
- sewers
- pits
- flues

### **Other Confined Space Examples**

The definition also includes any space in which dangerous levels of contaminants can accumulate and ventilation is restricted, which can include:

- excavations (normally deeper than 1.2m)
- the space above floating roofs on floating roof tanks
- open topped tanks
- closed or unventilated rooms
- sumps and culverts
- any other poorly ventilated area.

### **1.4 Confined Space - Hazards**

The hazards associated with entering and working in confined spaces are capable of causing bodily injury, illness, and death to the worker. Hazards commonly encountered in confined spaces include:

- toxic substances in hazardous concentrations, e.g., hydrogen sulphide (H<sub>2</sub>S), benzene and hydrocarbon gases
- flammable gases, vapours and liquids with potential for fire or explosion; above 10% of the lower explosive limit (LEL) or above 0% LEL if hotwork is required
- gas, vapour or fumes produced by operations carried out in the confined space, e.g., welding and cutting, brush and spray painting, and the use of adhesives and solvents
- lack / insufficient oxygen supply, causing asphyxiation (oxygen content below 19.5 % by volume is considered oxygen deficient atmosphere)
- oxygen enriched atmospheres (oxygen content above 23% by volume)
- electric shock or ignition of flammable gases from portable lights, tools, or associated electrical equipment
- injury from mechanical equipment such as mixers, conveyors, etc., inadvertently activated
- direct contact with corrosives or irritants
- contaminants entering from other areas through ducts, piping, etc
- ignition from static electricity
- sources of ionising radiation (e.g., level gauges, naturally occurring radioactive materials)
- general safety hazards, including communication problems and physical hazards. For example:

- ⇒ falling objects, inadequate visibility, excessive temperature / noise / vibration, etc
- ⇒ possible collapse of excavations.

## **2 Training and Responsibilities**

### **2.1 Training**

Employees who will be involved in the entry must be fully conversant with the Emergency Action Plan and be trained in:

- hazard recognition
- Safe Systems of Work - permit to work procedures, isolation procedures, purging and/or ventilation procedures
- the use of gas detectors
- the use of safety equipment such as breathing apparatus (BA set), respirator, retrieval harness and lines
- the use of communication equipment
- self rescue.

### **2.2 Responsibilities**

**Note:** For all confined space work, the responsibility for safety, during the entire operation, rests with the Performing Authority, Rescue Team personnel and Authorised Entrants. These personnel must ensure that adequate steps have been taken to eliminate or control the hazards present.

#### **Area Authority**

The Area Authorities are responsible for:

- identifying all confined spaces existing within their areas of responsibility
- identifying and labeling Entry Certificate Controlled Confined Spaces
- providing training in confined space entry
- reviewing entry operations to ensure personnel are protected from confined space hazards
- canceling or suspending the Confined Space Entry Certificate when the job is complete or when unacceptable conditions arise.

#### **Performing Authority**

The Performing Authority shall:

- know and recognise hazards that may be faced during entry
- authorise entry and allow entry to begin (provided that the requirements of this procedure have been met)
- ensure that responsibilities are safely and effectively transferred
- ensure that personnel entering a confined space have all necessary personal protective equipment
- ensure that rescue services are available and that the means for summoning those services are operable
- ensure acceptable entry conditions are maintained and that they remain consistent with the terms of the Confined Space Entry Certificate.

## **Authorised Entrants**

The authorised entrants shall:

- follow established safety standards and practices
- know and recognise the hazards that may be faced during entry including signs or symptoms, and consequences of the exposure
- make proper use of equipment and protective devices
- maintain communication with the attendant to enable the attendant to monitor the entrant's status as well as to alert the entrant to exit the confined space if there is a hazard noted
- alert the attendant if a prohibited condition exists or when symptoms of exposure appear
- exit from the space as soon as possible when:
  - ⇒ ordered by the attendant
  - ⇒ the entrant recognises the warning signs or symptoms of exposure
  - ⇒ a prohibited condition exists.

## **Confined Space Attendant**

The attendant must be properly trained to carry out his duties. He must remain outside the confined space, **in a safe atmosphere**, at all times during a confined entry operation and perform the assigned duties under this procedure. He must also:

- maintain an accurate count of all persons in the space by:
  - ⇒ using a tally board on which the name, entry and exit times for all personnel entering or leaving the confined space shall be recorded
  - ⇒ airlines and / or safety lines are marked so that each individual inside the tank is clearly identified in the event of a problem
- be aware of the hazards that may be faced during entry, including the mode, signs or symptoms, and consequences of any exposure
- monitor conditions and activities inside and outside the space to determine if it is safe for entrants
- remain outside the confined space during entry operations until relieved by another attendant
- maintain effective and continuous communication with authorised entrants during entry
- order authorised entrants to evacuate the confined space immediately if:
  - ⇒ a condition is observed that is not allowed
  - ⇒ behavioral effects of hazard exposure are detected
  - ⇒ a situation occurs outside the confined space that could endanger the entrants
  - ⇒ an uncontrolled hazard is detected inside the confined space
  - ⇒ the attendant must leave the work station
- summon rescue and other emergency services in emergencies.
- take necessary actions when unauthorised persons approach or enter a confined space while entry is underway.

## **3 Rescue Team**

### **3.1 The Rescue Team**

The Rescue Team should respond immediately to rescue calls from the Attendant or any other person recognizing a need for rescue from the confined space.

The Rescue Team must be trained to perform the assigned rescue functions. In particular, members must be trained in the proper use of personal protective and rescue equipment, including breathing apparatus. Also, at least one Rescue Team member shall be certified in first aid and in cardiopulmonary resuscitation (CPR).

**Note:** New personnel **shall not** be assigned to the confined space entry tasks, unless under training and accompanied by a competent person who is familiar with the hazards of confined space entry.

### **3.2 The Rescue Plan**

The rescue plan should be formulated to include as a minimum:

- an assessment of the hazards associated with the confined space
- the required gas testing/monitoring equipment
- the personnel required to perform the rescue
- all precautions to be taken while in the confined space
- the required personnel protective equipment
- the required rescue equipment
- the required tools and any other special equipment.

A means of communication shall be provided and a system of signals agreed and understood by all personnel involved. These communication arrangements shall be maintained throughout the duration of the entry.

In all cases of confined space entry, a trained attendant shall be posted outside the entry/exit in order to handle emergencies. Circumstances may require an assistant to the attendant or more than one attendant posted at different access/entry points. The attendant(s) must be aware of their responsibilities and be trained as rescue team members.

## **4 Personal Protective Equipment**

### **4.1 Personal Protection**

Appropriate personal protection, e.g., head, foot, hand, eye, ear, face, body and respiratory protection, must be worn when entering an Entry Certificate Controlled Confined Space.

A life line attached to a full body harness must be used by all entrants during entry into a confined space.

### **4.2 Respiratory Protection**

Dependent upon the type and concentration of contaminants, respiratory protection may range from a simple cartridge respirator to air-supplied respiratory equipment.

When the level of airborne contaminants is beyond the filtration capability of a respirator or where there is an oxygen deficiency, then breathing apparatus must be used.

## **Breathing Air Standards**

The need to ensure a continued provision of good quality breathing air relies on regular changing of air filters and maintenance of dryers, supported by periodical analysis of the breathing air supply.

**Note:** Breathing air shall conform to *BS 4275, "Recommendations for the Selection, Use and Maintenance of Respiratory Protective Equipment"*.

### **Air Line Mask**

Air line breathing apparatus shall be approved and conform to *EN 139*. The full face mask enables the wearer to work for a long periods in harmful atmospheres, whilst breathing air is supplied by either portable air compressors fitted with reservoir air tanks, or a battery of compressed air bottles.

Connections to the air line mask hose are made via instantaneous bayonet spring couplings. These couplings must be kept in good condition and **must not** be used for any purpose other than supplying air to breathing apparatus.

### **Using Portable Air Compressors**

Where no compressed air bottle supply is available, portable air compressors having a reservoir air tank may be used. In such cases:

- the compressor air intake(s) of the compressor must be upwind of any known source of contamination to ensure clear air being fed to the user (a wind sock indicating wind direction should be flown in the vicinity of the intake to the compressor)
- the system of air supply employed should incorporate a receiver of sufficient capacity to enable persons to escape from an irrespirable atmosphere in the event of a failure of the prime mover supplying the air
- the air must be passed through suitable filters to remove excess moisture and oil mist.

**Note:** To ensure that an adequate supply of air is available and being received by the wearers, a suitably competent person must be appointed who is responsible for checking the pressure in the air receiver, and for ensuring the filters are functioning properly.

### **Self Contained Compressed Air Breathing Apparatus (SCCABA)**

SCCABA shall conform to *EN 137 "Self Contained Compressed Breathing Apparatus"*. These sets are provided where a portable supply of air is required for a short period of time.

The air for this apparatus is supplied under pressure either from compressed air cylinders carried by the wearer or from trolley sets.

## **4.3 Escape Breathing Apparatus**

Any person entering a Confined Space using an airline Breathing Apparatus or a SCCABA set shall be provided with an Escape Breathing Apparatus set with a bottle capable of supplying an emergency air supply for approximately 10 minutes. This set shall also conform to *EN 137 "Self Contained Compressed Breathing Apparatus"*.

All persons required to use breathing apparatus must receive initial training and refresher training at intervals not exceeding six months. The training shall be recorded.

## **5 Confined Space Entry Precautions**

These precautions shall be applied on each occasion of confined space entry.

### **5.1 Confined Space Entry Certificate**

A Confined Space Entry Certificate must be completed before an approval can be given to enter an Entry Certificate Controlled Confined Space.

A copy of the certificate should be kept at the job site for the duration of the job. If the circumstances cause an interruption in the work or a change in the rescue arrangements for which the Confined Space Entry Certificate was approved, a new Confined Space Entry Certificate must be completed.

### **5.2 Pre-entry Briefing**

Before the entry, the Performing Authority must brief entrants, attendants and supervisors on their responsibilities and the hazards and controls for safe entry.

### **5.3 Isolation**

The confined space must be positively isolated from All Energy sources and flooding.

### **5.4 Cleaning**

Before entering the interior of any vessel or tank, depending on the nature of its content, it must be emptied of residual material by being drained, pumped out, washed, and made clean by hot or cold water flushing, steaming, chemical neutralisation, inert gas or air purge.

#### **Use of Chemical Cleaners**

If chemical cleaners are to be used then the MSDS for the chemical should be consulted and a risk assessment conducted in accordance with procedure *Chemicals Risk Management* prior to use.

When introducing a chemical into a confined space, the compatibility of that chemical with the contents of the confined space must be checked. If any doubts exist regarding the compatibility of a chemical, the HEALTH AND SAFETY Department shall be consulted.

Sludge and spent cleaning fluids must be contained and disposed of in a safe and environmentally acceptable manner.

#### **Bonding and Grounding**

To reduce the possibility of static electricity build up, proper bonding and grounding procedures must be followed.

#### **Welding**

Before any welding, cutting and grinding may be carried out in a confined space, the space shall be proved completely gas free, and free of all flammable residuals.

### **5.5 Ventilation**

#### **Clean-out Doors**

Where confined spaces are provided with clean out doors, these doors shall be opened after purging, and the confined space thoroughly ventilated.

#### **Use of Ventilation Equipment**

Ventilation shall preferably be accomplished using a positive method of mechanical ventilation that is arranged to:

- introduce sufficient fresh air and remove contaminants from all pockets or corners of the confined space
- avoid re-circulating contaminated air.

Even after the confined space is cleaned and ventilated, the mechanical ventilation equipment must be kept operating to provide secondary protection:

- in case of accidental introduction of harmful substances
- to remove contamination or heat that may be produced by the work (e.g., welding and cutting, painting, coating).

The atmosphere must continue to be gas tested and monitored for hazardous atmospheres while personnel are inside the confined space.

### **Ventilation Air Source**

The ventilation air used will be from either:

- an electrical blower
- or...
- an air driven blower.

The air intakes for these devices shall be located where no contaminants may enter the stream.

### **Disposal of Confined Space Atmosphere**

Outlets for power driven blowers, pneumatic air eductors, or air/steam eductors used to draw vapours out of a confined space must be directed to a safe place far from possible sources of ignition.

## **5.6 Atmospheric Testing**

Confined space atmospheres must be tested by qualified personnel (i.e., an Authorised Gas Tester Level 1) before entry is allowed. Tests shall be conducted for:

- oxygen deficiency or excess
- flammable gases and vapours
- toxic vapours and gases.

### **Test Requirements**

Testing must be carried out in accordance with the following requirements:

- Ventilation equipment must be shut off before the tests commence.
- The atmosphere must be tested at the bottom, top, and the middle of all confined spaces.
- The atmosphere inside must be continuously monitored while work is being conducted in the confined space.
- If the confined space is left for any reason, the atmosphere shall be re-tested before re-entry may be permitted.

### **Testing from Within a Confined Space**

Where practicable, the gas test shall be carried out from outside the confined space, e.g., using extension probes. If it is not possible to perform sufficient testing from the outside of the confined space then upon initial entry to a confined space to conduct any testing, self-contained or air-supplied breathing apparatus must be worn.

**Note:** If breathing apparatus has to be worn, the Authorised Gas Tester shall, if practicable, also wear a harness and a life line.



### Test Equipment

Testing instruments must be calibrated and operationally checked before and after use in accordance with manufacturer specifications.

### Test Record

The atmospheric tests and operational checks shall be recorded on the entry certificate.

## 5.7 Lighting and Portable Tools

### Temporary Lighting

The following precautions shall be observed when using temporary lighting:

- Where the confined space has not been declared gas free, air driven flameproof lights or certified battery powered torches must be used.
- Confined spaces, which have been certified gas free but where flammable residues could remain, may be illuminated as above; or by extra low voltage (25V ac) portable lighting equipment.
- Where the confined space has been cleaned of all flammable residues and certified gas free, or is a confined space by virtue of restricted access alone and there has never been the possibility of it containing a flammable atmosphere, standard low voltage industrial lighting may be used.
- The supply cables to the transformers, for extra low voltage portable lights, must always be supported above ground and the transformers never taken inside the Confined Space.

### Tools

If the atmosphere inside the confined space is classified as flammable/combustible no electrical tools must be used by the entrants. Air-driven tools only may be used. No tools with the potential to produce sparks, e.g., grinders or needle guns must be used.

## 6 JOB COMPLETION

The Entry Certificate must be canceled upon completion of the entry and after all entrants have exited.

At the end of a job, a thorough check must be made by performing authority to ensure that no personnel, tools or equipment have been left behind.

### Appendix A - Definitions

List of Definitions

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**Acceptable  
Entry  
Conditions**

Conditions that must exist in a Confined Space to ensure that employees can safely enter and perform work.

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**Attendant**

An individual stationed outside the confined space who monitors the authorised entrant(s) and performs attendant's duties defined in this procedure.

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<b>Authorised Entrant</b>	An employee who is authorised and trained to enter a confined space.
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<b>Authorised Gas Tester</b>	An individual designated by the area authority to undertake gas test in confined spaces.
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<b>Breathing Apparatus (BA set)</b>	A device which ensures that the wearer has a continuously available supply of uncontaminated air through a face mask, helmet or mouthpiece.
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<b>Entry</b>	The action by which a person passes through an opening into a Confined Space.
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<b>Engulfment</b>	The surrounding and effective capture of a person by a liquid or finely divided (flowable) solid substance that can be aspirated to cause death by filling or plugging the respiratory system or that can exert enough force on the body to cause death by strangulation, constriction or crushing.
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<b>Entry Certificate</b>	A document to allow and control entry into an entry certificate controlled confined space.
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<b>Entry Certificate Controlled Confined Space</b>	<p>A confined space that has one or more of the following characteristics:</p> <ol style="list-style-type: none"><li>1. Contains or has a potential to contain a hazardous atmosphere.</li><li>2. Contains a material that has the potential to engulf an entrant.</li><li>3. Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly-converging walls or by a floor that slopes downward and tapers to a smaller cross-section.</li><li>4. Contains any other recognised serious safety or health hazard.</li></ol> <p>Spaces in which dangerous contaminants can accumulate and ventilation is restricted, e.g. excavations (normally deeper than 1.2 m or 4 feet) the space above floating roof tanks, open-topped tanks and other poorly ventilated areas are also considered as Entry Certificate Controlled Confined Spaces.</p>
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<b>Hazardous Atmosphere</b>	An atmosphere that may expose authorised entrant(s) to the risk of death, impairment of ability to self-rescue, injury or acute illness.
<b>Ionising Radiation</b>	Gamma rays, X-rays or corpuscular radiation, such as alpha and beta, which are capable of producing ions either directly or indirectly.
<b>Naturally Occurring Radioactive Material</b>	Radioactive material produced in conjunction with oil and gas as deposits within process equipment.
<b>Performing Authority (Entry Supervisor)</b>	A designated supervisor appointed by area authority to accept the Confined Space Entry Certificate and subsequently be in charge of the confined space entry work. This person is responsible for ensuring that all precautionary measures stipulated on the Confined Space Entry Certificate and accompanying documentation are followed.
<b>Rescue Team</b>	The personnel designated to rescue entrants from confined space.

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## 8.7 Permit to Work Procedure

### 1. Introduction

#### 1.1 Purpose

This procedure describes the Permit to Work system which is used to provide the controls necessary in achieving the safe performance of a specified range of potentially hazardous tasks.

**Note:** All personnel should be aware that the Permit to Work system is not an absolute safeguard in itself. It is the responsibility of each individual to be alert to hazardous situations that may arise during the operation.

#### 1.2 Scope

The control of tasks on sites without High Risk Potential, e.g., supply bases and offices, will generally be satisfied by the use of an Application to Perform Work and an associated procedure. However, Permits to Work and supporting procedures shall be used where assessment of the risks indicates that they are necessary.

## **2 Responsibilities**

**Note:** Within the activities controlled by the Permit to Work and Isolations procedures, a person may have more than one role, e.g., the Performing Authority and Isolator may be the same individual provided that all relevant training and competence requirements are completed.

### **2.1 Site Manager**

The Site Manager is responsible for:

- the safety of all personnel on the site and for the safe execution of all work carried out on the site
- the implementation of the Permit to Work procedure in accordance with this procedure and its supporting procedures (and any local rules) at the site
- ensuring that the Permit to Work system is subject to active assurance, acting upon all recommendations and proposing system improvements
- ensuring that the personnel appointed under this procedure are competent to carry out the task for which they are authorised
- communicating the responsibilities of key participants within the Permit to Work and Isolations procedures, to those personnel under his direction
- reviewing the risk assessments and ensuring that they have been carried out for all permits that they are required to authorise prior to issue

**Note:** Site Managers shall request a higher level of risk assessment should they consider that risks have not been fully addressed

- approval and revalidation all Hot Work (Naked Flame), Hot Work(Spark Potential) and Cold Work(Special Task) Permits and Confined Space Entry Certificates in Hazardous Zones (see Hazardous Zones- Risk Assessment Procedure)
- auditing compliance with this procedure.

### **2.2 Area Authority - Supervisor**

The Area Authority is responsible for:

- the safety of personnel and the safe execution of all activities undertaken within his area of authority
- processing all Applications to Perform Work and all applications for Permits to work
- the operation of the Permit to Work System and its supporting procedures in his area
- determining the extent of risk assessment required to support any permit application and for organizing and participating in the risk assessment process
- facilitating the identification of the hazards and precautions to be taken before, during and after all tasks covered by all Permits to Work and Supplementary Certificates

- identifying the impact of tasks and precautions on other areas and informing the Affected Area Authority of the proposed activities (this includes specifying the precautions which may be necessary as a result of activities in another area and ensuring that these are disseminated to all affected personnel)
- providing accurate and up to date cross-referencing between Permits and Supplementary Certificates including those in other areas
- ensuring that work site inspections are undertaken before, during and after the performance of each task (some of the inspection may be delegated to an appropriately competent person)
- the issue of Permits etc., to Performing Authorities in his area and subsequent re-validation (subject to approval by the Site Manager in appropriate cases)
- ensuring that adequate hand over takes place at shift change, crew change or other change-out of Area Authorities, Performing Authorities and Isolating Authorities
- maintaining a display board of all Permits and Certificates in use in his area of authority, together with a separate display board for Isolation Confirmation Certificates under which a Sanctioned Test is being performed and for long-term Isolation Confirmation Certificates.

### **2.3 Affected Area Authority**

An Affected Area Authority is an Area Authority whose area of responsibility will be affected by work being undertaken principally in another area and under the control of another Area Authority.

The Affected Area Authority is required to be aware of, and in agreement with, work activities taking place which have a potential impact on his area of responsibility and control.

### **2.4 Performing Authority**

The Performing Authority is the person who requires the work to be done (or who will do the work) and is the senior person in charge of the work controlled by a permit.

**Note:** The same person **shall not** have the role of both Area Authority and Performing Authority for the same Permit to Work.

The Performing Authority is responsible for

- safety at the work site
- taking part in the risk assessment process and disseminating the resulting output to the personnel who will be doing the work.
- ensuring that only those activities included in the Specification of Work detailed on the Permit to Work are undertaken
- immediately informing the Area Authority of any event which might impact on the safe performance of a task or on the associated precautions

- ensuring that adequate handover takes place at shift change, crew change or other change-out of Performing Authority
- ensuring that the work team have been withdrawn and the work site is left in a safe and clean condition on completion (or suspension) of the task.

## **2.5 Authorised Gas Tester**

After appropriate training, the Authorised Gas Tester is authorised to test for the presence of flammable gas or vapor for Permit to Work compliance.

## **2.6 Authorised Electrical Persons and Senior Authorised Electrical Persons**

Authorised Electrical Persons and Senior Authorised Electrical Persons are authorised for specific types of electrical / instrument work, and are responsible for defining and carrying out electrical isolations in co-ordination with the Area Authority.

All Authorised Electrical Persons shall be competent to the level of Electrical Technician or Instrument Technician and authorised for work on low voltage systems. The Senior Authorised Electrical Person shall be competent to the level of Electrical Supervisor and authorised for work on high voltage systems. The voltage (low or high) for which the person is authorised shall be stated on the authorisation certificate.

## **2.7 Process Isolators**

Process Isolators are responsible for:

- the specification, application, removal and recording of process isolations (process / mechanical Isolations) in accordance with the Area Authority's request on the Isolation Confirmation Certificate
- immediately informing the Area Authority of any event which might impact on the security of the isolations.

## **2.8 The Control Room Operator**

The Control Room Operator shall:

- inhibit and re-instate sections of the Detection or Protection systems according to requests made by the Area Authority on the Permit to Work
- immediately inform the Area Authority of any event which might impact on the safe performance of a task or on the associated precautions
- maintain up to date written or computer-based registers of Permits and Supplementary Certificates, together with cross-references, unless local rules assign this responsibility to someone else
- maintain a display board of all Permits and Certificates in use **over the whole site**, together with a separate display board for Isolation Confirmation Certificates under which a Sanctioned Test is being performed and for long-term Isolation Confirmation Certificates.

## 2.9 Fire Watchers

Personnel appointed as Fire Watchers shall monitor work areas and the precautionary measures taken in those areas, when specified by the Area Authority on the Permit to Work, and shall undertake response activities as required.

## 2.10 The HEALTH AND SAFETY OFFICER

The HEALTH AND SAFETY OFFICER is responsible for:

- providing Permit to Work system design, including master documentation
- providing an advisory service on request
- arranging independent audits
- collating information on operating experience, from all sources, and initiating periodic system reviews aimed at further improvement.

## 3 TYPES OF PERMIT to Work

### 3.1 Permit to Work Categories

In the Permit to Work System tasks are allocated to one of the following categories:

- Hot Work (Naked Flame)
- Hot Work (Spark Potential)
- Cold Work (Special Task)
- Cold Work (Other Task)
- Formal Procedure
- No Permit Required.

Details of Permit colors, re-validation, maximum lives and senior signatories are shown in *Table 1*.

	Hot Work (Naked Flame)	Hot Work (Spark Pot.)	Cold Work (Special Task)	Cold Work (Other Task)	Formal Procedu re	No Permit Require d
Color	Red	Green	Yellow	Blue	White	N/A
Re- validati on	At shift change of Performing Authority or 12 hours				Implicit at each shift change of Area Authority or Performing Authority	
Max Life	24 hours	72 hours	72 hours	7 day	Review Annually	N/A
Senior signator y	Site Manager	Site Manager	Site Manager	Area Authority	Area Authority	Area Authority

**Table 1 Permit to Work Validation Details**

### **3.2 Application to Perform Work**

An Application to Perform Work form is used in the case of a formal procedure or where no Permit to Work is required. Its completion by the Area Authority provides a written record that personnel performing the task have been authorised to do so without a Permit to Work.

### **3.3 Supplementary Certificates**

Five supplementary certificates are provided for use where specialist activities have to be performed before a Permit to Work can be safely issued:

- Isolation Confirmation Certificate
- Confined Space Entry Certificate
- Plant Contamination Certificate
- Clearance for Excavation
- Clearance to Move Heavy Equipment.

Provision is made for cross referencing the Permits and their associated certificates. The relationships between the Permits, the certificates and other components of the system are shown in *Figure 5*.

### **3.4 Hot Work (Naked Flame) Permit (RED)**

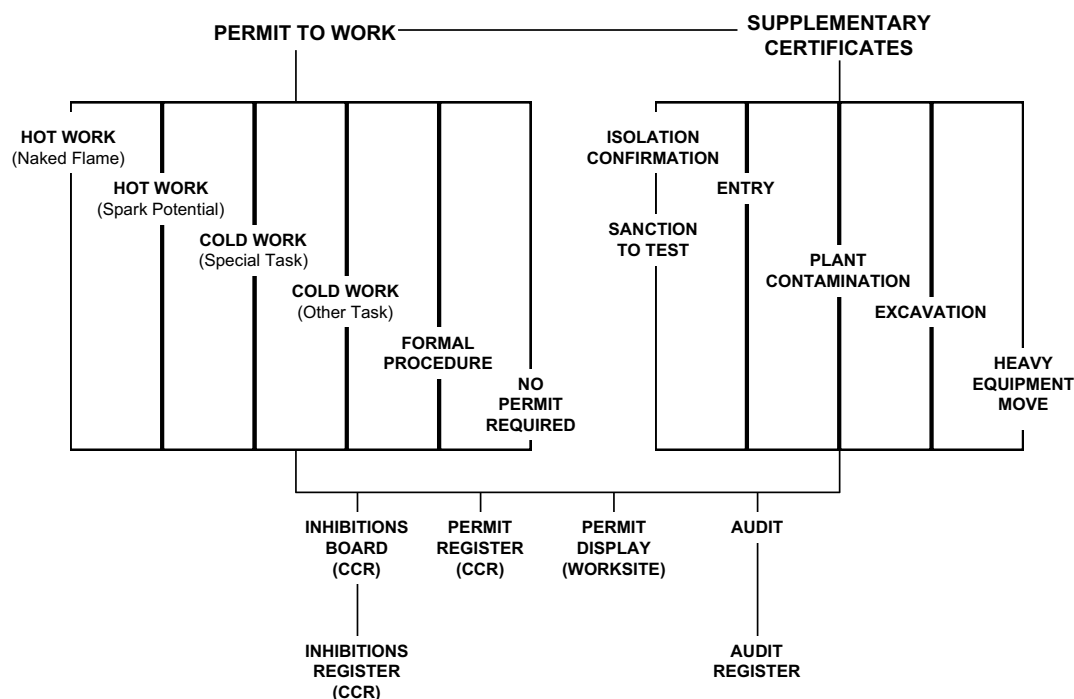
This permit is used for tasks involving the use of a naked flame or ignition source, including:

- welding / flame cutting
- electrical induction pre-heating / stress relieving
- use of heat shrink blowers
- grinding.

**Note 1:** A Hot Work (Naked Flame) Permit is not required for operations involving ignited gas flares or permanently mounted plant using an enclosed flame (boilers, inert gas generators, etc).

**Note 2:** It is Company policy to avoid hot work in hazardous areas wherever practicable. It is the role of engineers planning the work to minimise the need for hot work and provide cost effective alternatives by careful consideration during the design and planning phase.





**Figure 5 Relationship Between Permit to Work and Supporting Certification**

### 3.5 Hot Work (Spark Potential) Permit (GREEN)

This permit shall be used if the task might produce or expose a possible source of ignition. For example:

- use of electrical / electronic equipment which has not been certified as suitable for use in flammable atmospheres
- opening live junction boxes
- use of air or hydraulic powered metal cutting, chipping or caulking tools
- use of electrical soldering irons
- use of explosives and perforating guns, including Slapper-Activated Firing Equipment
- use of powered steel wire brushes
- dry grit / shot blasting

### 3.6 Cold Work (Special Task) Permit (YELLOW)

This permit shall be used for a task which does not involve hot work but has a high risk potential. For example:

- actual or possible breaking of containment of systems under pressure or systems which contain substances which are flammable, toxic or corrosive
- any work affecting the integrity or availability of safety or emergency systems e.g., fire pumps, fire mains, shutdown systems, fire and gas detection
- pressure testing of plant and equipment

### 3.7 Cold Work (Other Task) Permit (BLUE)

This permit shall be used for tasks which do not fall into the preceding categories of Permit to Work but still require to be covered by a permit. For example:

- brush painting in Confined Space

- general maintenance
- erection and dismantling of scaffolds
- work on isolated electrical equipment

### **3.8 Formal Procedures and Standing Orders**

#### **Formal Procedures**

Certain low risk residual tasks of a routine and continuous nature may be performed under a written formal procedure rather than a Permit to Work. The formal procedure shall identify the full scope of the task together with the hazards and precautions, and shall be authorised by the Site Manager.

Tasks performed under a formal procedure shall only be performed by suitably competent personnel.

Formal procedures shall only be used where any isolations fall within the scope of Personal Isolations (see *Section 4.1 Isolation Confirmation Certificate*) and they shall be reviewed at least annually. Examples include:

- fire and gas detector head checks and repairs
- public address system checks and repairs
- telephone system checks and repairs
- planned maintenance.

#### **Standing Orders**

Standing Orders, issued under the authority of the Site Manager, may be used to cover hot work tasks in workshops. Such orders shall specify the workshop concerned, the authorised use of only permanent facilities, the hazards involved and the precautions to be taken.

### **3.9 No Permit Required**

The Area Authority may allow certain specific, routine, non-hazardous tasks to be performed in his area without the issue of a permit or a formal procedure provided that the tasks do not impact on another area.

The Area Authority shall satisfy himself that the risks are as low as reasonably practicable and that the tasks are performed by suitably competent personnel.

Many of the tasks that do not require a permit or the use of a formal procedure are themselves the subject of written procedures that have been risk assessed when originally produced. Such routines include:

- routine crane operations using fixed cranes, excluding heavy lifts and maintenance
- general cold work in workshops
- routine work in offices, and domestic activities.
- visual inspections, excluding Confined Spaces.

## **4 Supplementary Certificates**

### **4.1 Isolation Confirmation Certificate**

The Isolation Confirmation Certificate supports the Permit to Work by providing the means of:

- recording the isolations which are required before the task detailed on the associated Permit to Work can proceed
- confirming isolations have been made so that the task can proceed (subject to authorisation of other certificates e.g., Confined Space Entry)
- authorisation and recording of de-isolations and isolations which may be required to test equipment under a sanction to test
- authorisation and recording of de-isolation on completion of the task detailed on the associated Permit to Work.

**Note:** The Isolation Confirmation Certificate must be completed before the relevant Permit to Work can be authorised.

Under certain circumstances, e.g., for short duration low risk tasks, the Area Authority may authorise isolation by the Performing Authority (Personal Isolation/De-isolation). However, an Isolation Confirmation Certificate shall always be raised and details entered in the Isolation Certificate Register. The Isolation Certificate shall be displayed on the isolation certificate board in the control room.

For full details of the Isolation Confirmation Certificate see *Isolation Process Safety procedure*.

### **4.2 Confined Space Entry Certificate**

A Confined Space Entry Certificate shall be raised when it is necessary for personnel to enter confined spaces as defined in *Confined Space Entry procedure*.

This certificate provides the means of:

- declaring that the confined space is isolated so that the Authorised Gas Tester can enter, subject to any special conditions
- authorizing entry by the Authorised Gas Tester
- recording the gas test and re-test results
- declaring the confined space safe for entry under a Permit to Work
- specifying whether or not Breathing Apparatus is required
- written communication between the Authorised Gas Tester and Area Authority.

### **4.3 Plant Contamination Certificate**

A Plant Contamination Certificate shall be used to cover the handling or transport of equipment which is, or has been, contaminated.

The certificate provides the means of:

- declaring that a contaminated piece of equipment has been cleaned, specifying the method(s) used
- defining the substances with which a piece of equipment is contaminated if it has not been cleaned

- specifying the precautions to be taken when handling a piece of contaminated equipment.

The certificate shall be securely attached to the equipment and a copy included with the manifest if the equipment is to be transported from the installation / site.

#### **4.4 Clearance for Excavation Certificate**

A Clearance for Excavation Certificate shall be used where any excavation or stake driving is planned, on any site.

The certificate provides the means of:

- applying for permission to excavate as specified
- recording the consent of those engineers responsible for the technical integrity of any underground equipment or services, subject to any specified precautions
- recording the consent of the Area Authority, subject to the issue of a Permit to Work
- acceptance by the Performing Authority, and his undertaking to observe the required precautions and to obtain the necessary Permit to Work before starting excavation.

#### **4.5 Clearance to Move Heavy Equipment**

A Clearance to Move Heavy Equipment Certificate shall be used when it is planned to move heavy equipment.

The certificate provides the means of:

- applying for permission to move the heavy equipment as specified
- specifying the precautions to be taken to avoid damage to underground, overhead, surface and surface mounted services and facilities
- recording the consent of the Area Authority subject to the issue of a Permit to Work
- acceptance by the Performing Authority, and his undertaking to observe the required precautions and to obtain the necessary Permit to Work before starting the move.

## **5 The Permit to Work Process**

The sequence of compiling a typical Permit to Work form is summarised in *Table 2*.

<b>Section</b>	<b>Action by</b>	<b>Action to be Taken</b>
1	Performing Authority	<ul style="list-style-type: none"> <li>• Provides sufficient information for subsequent personnel to assess the task. Estimates duration and signs the section.</li> </ul>
2	Area Authority	<ul style="list-style-type: none"> <li>• Identifies the hazards in the task, work area and adjacent or associated work.</li> </ul>
3	Area Authority	<ul style="list-style-type: none"> <li>• Lists precautions he will take to control hazards identified in Section 2.</li> <li>• Notes any inhibits required.</li> <li>• Consults with Affected Area Authorities who sign this section.</li> </ul>

4	Area Authority	<ul style="list-style-type: none"> <li>• Specifies the protective clothing to be worn and equipment to be carried.</li> </ul>
5	Area Authority	<ul style="list-style-type: none"> <li>• Lists the precautions to be taken by the Performing Authority.</li> </ul>
6	Area Authority	<ul style="list-style-type: none"> <li>• Lists the Supplementary Certificates raised in connection with the Permit.</li> </ul>
7	Site Manager	<ul style="list-style-type: none"> <li>• Examines and signs to approve the Permit.</li> <li>• Satisfies himself that a Formal Risk Assessment is/is not required.</li> </ul>
8	Gas Tester	<ul style="list-style-type: none"> <li>• Gas tests equipment/work area where required. Logs and signs the results</li> </ul>
9	Area Authority/Delegate & Performing Authority	<ul style="list-style-type: none"> <li>• Formal hand over to Performing Authority, after specified work site inspection.</li> </ul>
	Control Room Operator	<ul style="list-style-type: none"> <li>• Permit entered into the Central Control Room Register and Permit numbered. Inhibits instituted.</li> </ul>
10	Performing Authority	<ul style="list-style-type: none"> <li>• Statement of completion or non-completion of task and work site inspection with Area Authority/Delegate.</li> </ul>
	Area Authority/Delegate	<ul style="list-style-type: none"> <li>• Acceptance by Area Authority of state of completion and work site inspection.</li> <li>• Declares that systems can be returned to normal operation.</li> </ul>
11	Control Room Operator	<ul style="list-style-type: none"> <li>• Completes Central Control Room Register. Cancels Inhibits.</li> </ul>

**Table 2 Permit to Work Process**

## 6 AUDIT

Each Contractor project shall:

- undertake self-regulatory audits of the operation of the Permit to Work System at each site
- maintain an Audit Register
- have in place a system for tracking recommendations through to close-out.

Use of a Standard Audit Checklist is recommended, to allow comparison with external audit results.

## Appendix A - Definitions

### List of Definitions

<b>Confined Space Entry:</b>	where there is inadequate ventilation to dispel injurious or flammable fumes, vapor or gas or to provide sufficient oxygen. Also includes areas where access / egress is restricted.
<b>Hazard:</b>	the potential for human injury or loss of life, damage to the environment or to material assets or a combination of these.
<b>Hazardous Consequence:</b>	the result when a hazard is realised.
<b>Inhibition:</b>	the isolation of the executive action of a protective system. Where practicable, this should not prevent the operation of the visual / audible warning system
<b>Isolation:</b>	<ul style="list-style-type: none"><li>• Process Isolation involves the closing and locking of valves. This may include depressurising, flushing and purging, e.g. single valve isolations.</li><li>• A Positive Isolation involves the disconnection of plant, equipment and systems from sources of motive power, liquids and gases.</li><li>• Electrical Isolation - The secure, disconnection and separation of a circuit, or item of equipment, from every source of electrical energy. This may involve electrical, instrument and communication isolations.</li><li>• Long Term Isolation - An isolation that remains in place after permit cancellation, and recorded as "Long Term".</li></ul>
<b>Isolation Certificate Board:</b>	a board used to display the status of Isolation Certificates, Isolation Certificate Continuation Sheets and Boundary Isolation Certificates, maintained by the Area Authority.
<b>Isolation Certificate Register:</b>	a register maintained in the control room identifying the status of all Isolation Certificates by the Control Room Operator-referenced to individual permits.
<b>Likelihood:</b>	the chance of occurrence of an event. Likelihood can be expressed as a probability, frequency, class, rank etc.
<b>Permit::</b>	an authorizing document approved by management, specifying the required precautions and conditions under which potentially hazardous or interacting activities can take place

<b>Permit Display Board:</b>	a board used to display the status of active and suspended permits.
<b>Permit Register:</b>	a register maintained in the control room identifying the status of all permits.
<b>Risk</b>	a combination of the likelihood of a hazardous event and the severity of the possible consequences of that hazardous event.
<b>Risk Assessment:</b>	the overall process of risk analysis and risk evaluation.
<b>Risk Evaluation:</b>	the process to support management decisions as to acceptability or risk reduction requirements by comparing the estimated risk against relevant criteria.
<b>Safeguards:</b>	steps taken to reduce either the likelihood or consequences, or both of a particular risk.

## 8.8 Welding and Cutting Safety Procedure

### 1 Introduction

#### 1.1 Document Purpose

This document provides the information necessary to ensure that welding, burning and associated activities are carried out in a safe and efficient manner, without harm to personnel or damage to equipment and the environment.

#### 1.2 Document Scope

The activities covered by this document include the:

- storage and maintenance of welding and burning equipment
- preparations and precautions to prevent fire and explosion (including the safe storage and handling of equipment)
- preparations and precautions to be taken during specific welding and burning activities, e.g., welding in confined spaces, welding on tanks, etc.

#### 1.3 Associated Procedures

Depending upon the nature and circumstances of the activity, this procedure should be used in conjunction with:

- *Permit to Work*
- *Confined Space Entry*.

**Note:** Welding, burning, grinding or any other operation that generates heat or sparks, e.g., abrasive cutting, shall be carried out under the control of the Permit to Work System.

The conditions laid down on the permit to Work will be adhered to at all times.

## **2 Responsibilities**

### **2.1 Site Manager**

Site Managers have overall responsibility for the safe use of welding and burning equipment on their sites and shall:

- use only welding and burning contractors who employ suitably competent and experienced personnel
- advise all welding and burning contractors with regard to flammable materials and hazardous conditions
- establish approved areas for burning and welding
- establish approval procedures for burning and welding.

### **2.2 Area Authority - Supervisor**

The Area Authority is responsible for the safe execution of burning and welding within his area of authority and shall:

- inspect the work site before welding or burning is permitted and at least once per day during the work
- ensure that welding and burning equipment is maintained in satisfactory operating condition and in good repair
- ensure that welding and burning activities are carried out under the appropriate supervision.

### **2.3 Performing Authority**

The Performing Authority is responsible for:

- the safe use of the burning or welding equipment
- determining the nature and quantity of combustible materials and hazardous areas present at the work site
- obtaining a Permit to Work from the Area Authority
- ensuring that fire protection and extinguishing equipment are properly located at the site
- ensuring fire watches are available at the site when required
- making a final check of the work site 30 minutes after the completion of burning or welding operations
- ensuring that combustibles are safe from ignition by:
  - moving the work to a location free from dangerous combustibles
  - or...**
  - having the combustibles moved to a safe location
  - or...**
  - having the combustibles properly shielded against ignition
- ensuring wherever possible that any operation that might expose combustibles to the risk of ignition is not scheduled during burning or welding activities.

### **2.4 Welder**

The Cutter and / or Welder shall:

- have approval by the Performing Authority before starting to cut or weld
- cut or weld only where conditions are safe
- stop working if conditions change from those under which the Permit to Work was granted
- after finishing work, ensure nothing is burning or smouldering near the work



site.

## 2.5 Fire Watcher

A fire watch shall be maintained for at least 30 minutes after the completion of burning or welding operations, in order to detect and extinguish smouldering fires.

Fire Watchers shall:

- have fire extinguishing equipment readily available and be trained in its use (including practice on test fires)
- be familiar with the facilities and procedures for sounding an alarm in the event of a fire
- watch for fires in all exposed areas, and shall:
  - try to extinguish them (only when obviously within the capacity of the equipment available)
 and...
  - sound the alarm immediately.

## 3 Gas Welding and Burning Equipment

### 3.1 Identification of Cylinders

#### Cylinder Markings

All cylinders shall be permanently and legibly labeled or stamped with the following:

- trade symbol of manufacturer
- serial number
- calculated quantity (tare) of empty mass
- manufacturing date (month, year)
- next inspection/test date, adjacent to the previous one (month, year)
- service pressure (psi/bar)
- test pressure (psi/bar)
- capacity (cubic feet/litres).

All markings shall be stamped on the shoulder of cylinders near valves.

**Note:** Do not remove or change any numbers or marks stamped on cylinders.

#### Cylinder Colour Coding

Compressed gas cylinders are painted in accordance with the National Color Coding System to properly identify their contents. The required color codes are listed in *Table 1*.

**Note:** Where the cylinders cannot be identified in accordance with this colour coding standard, they shall not be used, and shall be returned to the supplier.

Gas	Bottle Colour	Label Text	Label Colour
Propane	Red	PROPANE	White
Acetylene	White	ACETYLENE	Red
Butane	Red	BUTANE	White

<b>Air</b>	Black	COMPRESSED AIR	White
<b>Oxygen</b>	Blue	OXYGEN	Black
<b>Carbon dioxide</b>	Black	CARBON DIOXIDE	Yellow

Reference: *Regulation of "Structure (working principles) and Safe Operation of Pressure Vessels" – Moscow 1976*

**Table 3 Compressed Gas Cylinder Identification**

### 3.2 Cylinder Storage

#### All Cylinders

All cylinders **shall be stored** in a cool, well ventilated area preferably in the open air. They should be chained or otherwise secured and valve caps should be kept in place when cylinders are not in use.

Cylinders **should not be stored** in enclosed spaces such as workshops, accommodation.

All cylinders **shall be stored away from:**

- the direct rays of the sun or from radiant heat, e.g., flares
- locations where the temperature may exceed 45°C (113°F)
- locations exposed to adverse weather

**Note:** Weather protection shall be provided if required

- possible sources of ignition
- flammable materials
- corrosive liquids
- any direct contact with soft or damp ground, or any other location where water can accumulate, thereby increasing exposure to the possible effects of corrosion.

**Empty cylinders** shall be marked with "EMPTY" or "MT", and stored separately from full cylinders.

**Note:** Regardless of whether or not cylinders have been marked, all cylinders shall be handled and treated as if they were full.

#### Oxygen Cylinders

**Warning:** Oils and greases are spontaneously combustible in the presence of oxygen.

Oxygen cylinders and their fittings, including hoses, **must not** be stored or used where they can come into contact with oil or grease. This includes handling the equipment with oily hands, gloves or rags.

Oxygen cylinders must be stored apart from fuel gas cylinders by a minimum distance of 3 metres (10 feet). Separation by using cylinders of non-flammable gases is acceptable. This separation must be maintained.

The preferred practice is to store oxygen cylinders vertically, valve end up. However, it is acceptable to store oxygen cylinders horizontally provided that:

- the stacks shall not exceed a maximum height of three cylinders

- the largest cylinders must be at the bottom
- the row must be securely wedged.

### **Acetylene and Propane Cylinders**

**Warning:** Acetylene cylinders **must not** be stored or used in a horizontal position. All acetylene cylinders, full or empty, shall be stored and used in the vertical, valve end up position.

### **Damaged Cylinders**

Cylinders that may have been damaged in any way shall be returned to the supplier. Leaking cylinders shall immediately be moved to a freely ventilated area away from any source of ignition or places where leaking gas will become trapped.

### **Cylinders Exposed to Fire**

In the event of gas cylinders being involved in a fire, they must be kept cool with water spray, e.g., a fog nozzle, and where possible, removed to a safe area. Such cylinders must be returned to the manufacturer for checking prior to re-use.

In the case of acetylene cylinders that have been so exposed, prolonged cooling is necessary for several hours after the incident to prevent exothermic decomposition.

## **3.3 Cylinder Handling**

### **Lifting**

If cylinders are lifted by crane, a suitable cradle or similar device should be used. If a trolley is used as a cradle during lifting, care should be taken to ensure that its base is strong enough to take the weight of the cylinders.

Cylinders **shall not** be lifted using:

- the cylinder valves
- chain or wire rope slings (these can allow the cylinder to slip during lifting).

### **Movement of Cylinders on Site**

**Note:** Cylinders **shall not** be dropped, dragged, rolled, or used as supports. In addition, the cylinder valves must be protected from damage at all times.

Cylinders should be transferred to, and moved within, the working area on trolleys specifically designed for that purpose, or in suitable containers providing stable and secure positioning of the cylinders.

All valves must be closed before a cylinder is moved and, if the correct trolley is not being used, regulators and hoses should be detached from the cylinders.

### **Electric Cables**

Cylinders and gas hoses shall not be allowed to come into contact with current carrying wires. Therefore:

- special attention should be paid to the places where electro-welding and gas burning of metals are carried out simultaneously
- the distance from oxygen or fuel gas cylinders to electro-welding cables shall be not less than 1 m.

### 3.4 Cylinder Fittings

#### Acetylene Fittings

**Warning:** Wherever copper comes into direct contact with acetylene, the explosive compound Copper Acetylide may be formed.

Only approved alloys of less than 70% copper shall be used for acetylene fittings.

Where approved fittings are silver soldered, the solder should contain no more than 40% silver and 20% copper.

#### Regulators

Only automatic pressure regulators and pressure gauges as recommended by the gas cylinder supplier shall be fitted to oxygen and fuel gas cylinders. These pressure regulators provide the following safety features:

- provision of a filtered supply of gas at a constant delivery pressure
- safety diaphragms that burst before the bonnet is blown off
- pressure gauges with safety backs that deflect the venting gas.

**Note:** The adjustable screw on the regulator must always be released before the cylinder is opened.

#### Valves

To avoid leaks and possible dangerous gas build-up, valves and fittings shall be kept scrupulously clean, and care taken to ensure that no grit or foreign matter is allowed to remain on them.

**Note:** The use of any kind of packing in the valve joints is strictly forbidden. Packing, particularly lead or copper, can easily be forced into the orifice, causing a blockage.

#### Valve Keys

Only standard valve keys shall be used, and cylinder valves shall always be opened slowly by gently tapping the key.

Keys with long leverage should never be employed to force a valve shut.

#### Blowpipes

Only high pressure blowpipes may be used with high pressure equipment.

All blowpipes shall be dismantled and cleaned internally at regular intervals. During use, accumulated slag should be frequently removed from the blowpipe tip during operation. To avoid severe blockage, care should be taken to avoid dipping the blowpipe tip into molten metal.

Only the manufacturer's recommended tip clear should be used for cleaning or altering the blowpipe tip.

**Note:** Hard metal reamers shall not be used to clear the blowpipe tip.

#### Hoses

Unnecessarily long lengths of hose should be avoided. Oxygen and fuel gas hoses should be the same length.

Only good quality hoses fitted with check valves (to prevent gas flowing back from the blowpipe) are acceptable for use. Faulty or damaged hoses **must not** be used.

Hoses are supplied with connections suitable for standard regulators and blowpipes. If required, hose lengths should be joined by the use of crimped connecting fittings, not hose clips.

In order to identify and / or prevent possible blockage, hoses should be blown through with air before being connected to regulators and blowpipes.

**Warning:** Under no circumstances shall oxygen be used for ventilation or to blow through acetylene hoses. Explosions can occur when acetylene gas is present in air in any proportion between 2.5% and 80% by volume.

When in use, hoses should be protected from damage, and laid out in such a manner as to avoid being a tripping hazard.

### **Flashback Arrestors**

Flashback arrestors, which quench flashback flames and cut off the gas flow automatically, must be incorporated in all oxygen lines and fuel gas lines.

### **Damaged / Faulty Cylinders and Fittings**

Cylinders with faulty outlet valve connections, e.g., damaged threads, seized valve spindles, etc., must be returned immediately to stores with a note stating the cylinder number, the nature of the fault and whether the cylinder is charged.

**Note:** Under no circumstances may the user of the cylinder attempt any repair whatsoever.

Cylinders with leaking valves that cannot be shut off must be removed to a safe area away from any possible source of ignition and drainage, where they shall be allowed to vent off slowly until empty. Stores shall be advised of the fault.

**Note:** Propane and Butane are heavier than air and may accumulate in dips and hollows.

## **4 Electric Arc welding and burning Equipment**

### **4.1 Welding Sets**

All welding sets must be maintained in good condition, and be of adequate capacity. Where stationary transformers or generator sets are used, a suitable switch must be mounted adjacent to the equipment to provide isolation from the supply main.

Diesel driven welding sets shall not be used except with the formal agreement of the Site Manager for each occasion of use. If used, the sets must be approved for the area in which they are sited.

**Note:** The engine must not be refuelled whilst in operation.

In order to protect the trailing leads and the equipment, portable transformers or generator sets with trailing leads, must be provided with interlocked fused switch sockets and plugs.

Under no circumstances shall the welder:

- connect and disconnect the welding device from the electricity supply network when the connection is anything other than a plug and socket
- repair electro-welding machines (such repairs shall be carried out by a competent electrician only).

## **4.2 Cables and Connections**

All cables, connectors and terminators must be maintained in good condition, and be of adequate capacity. To avoid long lengths of power cables the machine must be sited as close as possible to the workplace.

All supplies for welding equipment must be made of approved cables and connections, and must be controlled from a circuit which includes protection sensitive to earth fault currents.

Welding leads and returns shall comprise flexible, tough rubber covered cables, using approved cable couplers where necessary. Leads shall be properly terminated and cable couplers and terminations must be of adequate carrying capacity.

Welding leads must be inspected daily for any damage. In the case of worn or torn cable sheaths, or flattened or kinked cables, the affected part should be removed.

Welding return leads must always be used to prevent uncontrolled welding currents passing back from the work-site to the generator through the structure and/or plant items. This could give rise to sparks or cause damage to bearings in machines, etc. Particular attention should be paid to welding returns when welding on pedestal crane booms, so that currents cannot pass through main slew bearings.

**Note:** It is prohibited for the welder to commence or continue welding operations with faulty cables, starting devices or electrode holders.

## **4.3 Electrode Holders**

Electrode holders shall be provided with a handle of tough, insulating non-ignitable material with a guard disc of similar material between the hand of the operator and the projecting line portion.

A fully insulated holder or hook should be provided for the live electrode holder when not in use. Laying live electrode holders on gloves, face screens or handing them up by the electric cable where it could come in contact with other equipment etc., is discouraged.

**Warning:** Electrode holders under voltage **must not** be left unattended.

## **4.4 Earthing and Bonding**

For all AC welding transformers, the transformer low voltage winding must not be earthed but the transformer case must be effectively bonded to an earthing system adjacent to the equipment.

The DC welding output of all AC driven DC welding generators must not be grounded. The machine frame must be effectively bonded to ground.

For engine driven DC welding generators, no earth connection must be applied to the generator output terminals.

The work piece must be bonded to earth by means of a heavy section conductor having suitable clamped or bolted connections.

## **5 Welding and Burning - Hazards and Precautions**

### **5.1 Personal Protection Equipment**

Personnel engaged in, or working in close proximity to, welding, burning, chipping and grinding operations must use the appropriate protective clothing/equipment, e.g., goggles, face shields, welding helmets, welding screens, gloves, leather aprons, etc. The necessity for protective clothing against sparks and pieces of hot metal, depends upon the position of the arc in reference to the welder's body.

For some classes of welding, e.g., where the welder is standing at a bench, the head screen and gauntlets may well provide sufficient protection.

A thick apron of leather or other suitable material may be needed if the welder is sitting at his work position, where molten metal may fall upon his thighs and legs.

If the arc is above the level of his shoulders or overhead, complete protection for the head, arms and upper part of the body is necessary.

#### **Welding Helmets, Welding Shields and Flip-Front Goggles**

The specifications for welding helmets, welding shields and flip-front goggles shall comply with:

- *EN 169 "Specification for filters for PPE used in welding"*
- *EN 175 "PPE for eye and face during welding"*
- *EN 166 "Eye protection".*

#### **Wide Vision Welding Goggles**

The lenses of wide-vision welding goggles shall conform to *BS 679* and their frames to *BS 1542*.

#### **Coveralls**

Flame retardant welders coveralls shall be approved to:

- *BSEN 470*
- *BSEN 531*.

#### **Gauntlets**

**Note:** For gauntlets used for electric arc welding, see *Additional Protection for Electric Arc Welding* below.

Gauntlets used for welding, brazing and burning shall conform to:

- *BSEN 407*
- *BSEN 388 (Mechanical Risk)*
- *BSEN 420 (General Requirements)*.

#### **Additional Protection for Electric Arc Welding**

Gloves or gauntlets made of non-ignitable material are required for shielding the hands and arms from sparks and heat radiation of the welding arc. Leather gloves and gauntlets give no protection against electrical hazards. In particular, for electric arc welding, oiled or greased clothes and gloves shall not be worn.

As well as normal protective clothing, while performing electric arc-welding in hazardous conditions (welding of wet structures) electric welders shall use:

- dielectric gloves (*BSEN 388*)
- overshoes (*BSEN 345*)
- rubber mats.

## **5.2 Fumes and Gas Risk**

Welding, burning, and brazing operations, etc., can produce toxic fumes and gases, the composition of which depends on welding temperature, arc intensity, electrode material and the gas mixture being used. Therefore, it must be ensured that:

- any organic coatings are removed prior to any welding and burning
- gases/fumes are removed either by natural ventilation or forced mechanical ventilation
- a suitable respiratory system should be available as a back up if the ventilation system is inadequate.

**Warning:** Respiratory protection must be worn where the welding or burning of cadmium alloys or a cadmium-coated material takes place.

## **5.3 Fire and Explosion Prevention**

**Note:** Welders and helpers must always be alert to the danger of fire and explosion.

### **Restrictions on Welding and Cutting**

Cutting or welding is only permitted in areas that are fire safe.

Welding or burning shall not take place in restricted areas without a Hot Work (Naked Flame) Permit. In addition, the conditions laid down on that permit must be strictly observed.

### **Approved Welding and Cutting Areas**

Within the confines of an operating plant or building, the burning and welding work area shall be either:

- a specific area designed or approved for such work, i.e., a maintenance shop or...
- a detached outside location of non-combustible or fire-resistive construction, essentially free of combustible and flammable contents, and suitably segregated from adjacent areas.

Where work cannot be moved practically, as in most construction work, the area shall be made fire safe by removing combustibles or protecting combustibles from ignition sources.

### **Area Preparation**

Fully charged and operable fire extinguishers, appropriate for the type of possible fire, shall be available at the work area. Where hose lines are available, they shall be connected and ready for service.

Work must be screened to prevent sparks from flying outside the immediate welding area and all combustible material must be removed or covered with fire resistant material. Combustible materials such as paper clippings, wood shaving, or textile fibres on the floor shall be swept clean.

If welding is to be carried out on a metal wall, partition, ceiling, or roof, precautions shall be taken to prevent ignition of combustibles on the other side due to conduction or radiation. The preferred precaution is to relocate combustibles. However, where it is not possible for the combustibles to be relocated, a fire watch on the opposite side from the work shall be provided.



Any drains in the area must be plugged, gullies cleaned and if possible water filled and finally covered with fire blanket.

Openings or cracks in walls, floors, or ducts within 11m of the site shall be tightly covered to prevent the passage of sparks to adjacent areas.

Conveyor systems that might carry sparks to distant combustibles shall be protected. Combustible floors shall be kept wet, covered with damp sand, or protected by fire-resistant shields.

**Warning: Do not** wet down floors where electric arc welding or burning equipment is to be used.

### **Removal of Slag**

Slag shall not be cleaned from newly welded joints until it has had time to cool.

Safety goggles must be used for slag removal.

### **Welding on Tanks and Vessels**

**Note:** Before welding on tanks and vessels may take place, inspection by the Area Authority will be necessary to decide on the precautions to be taken.

All tanks, vessels and equipment on which welding, cutting, burning, brazing and soldering work is carried out, must be either free from flammable gases and vapours and cleaned of all traces of liquid, wax or solid hydrocarbons, or provision made for excluding oxygen, e.g., filled with nitrogen, high expansion foam or similar product.

The space between double plates or wear plates, where flammable material may be found, must be considered. Work on a main deck forming the root of an in-deck tank must be given special consideration.

Before cutting the bottom plates of any tank, test holes must be drilled and a gas test taken, to ensure that conditions are safe under the tank floor.

### **Unattended Welding Equipment**

Blowpipes and hoses, if not in use, must not be left in vessels or enclosed spaces. If blowpipes and hoses cannot be removed from the space, the connections must be disconnected at the cylinders.

**Note:** Closing the cylinder valves is not classified as a disconnection.

Whenever equipment is to be left unattended, gas cylinder valves shall be shut, hoses de-pressurised and disconnected.

Electrical power supply for welding machines shall be switched off and disconnected.

Any diesel driven welding sets shall be shut down.

### **Work Using Scaffolding**

Gas cutting or welding operations involving the use of scaffolding is allowed only after taking measures to prevent the scaffold boards from ignition and molten metal falling on people below.

Maximum height of gas cutting point above lower located tier (metres)	0	2	5	7	10
Radius of sparks scattering (metres)	6	8	10	12	14

## **Fire Watchers**

An active fire watch shall comprise at least one nominated person, whose sole duty consists of fire watching. This person shall be provided with suitable portable fire extinguishing equipment. In addition fire blankets and a pressurised fire hose may be provided depending on location/site conditions.

The fire watch shall ensure that the areas are left in a safe condition by inspecting the work area and any adjacent areas that may be affected 30 minutes after welding or burning work ceases.

Trained and competent personnel to act as fire watch shall be required by the Area Authority whenever burning or welding is performed in locations where:

- fire and gas detection systems have been inhibited to permit burning or welding to take place
- appreciable combustible material in building construction or contents is closer than 11 metres to the point of operation
- appreciable combustible materials are more than 11 metres away but are easily ignited by sparks
- wall or floor openings are within an 11 metre radius and give access to combustible material in adjacent areas, including concealed spaces in walls or floors
- combustible materials are adjacent to the opposite side of metal partitions, walls, ceiling, or roofs and are likely to be ignited by conduction or radiation.

## **5.4 Confined Spaces**

All personnel involved in welding and burning operations in confined spaces must comply with the requirements of this procedure and the requirements defined in:

- Permit to Work
- Confined Space Entry.

In particular, when welding or burning in a confined space:

- **forced ventilation** shall be maintained in the space at all times
- **organic coatings** shall be removed prior to any welding and burning
- **gas cylinders** shall not be taken into the space at any time; they shall be sited outside the space with the hoses laid through suitable transits and protected from damage
- **welding transformers** shall not be placed inside the space; they shall be sited outside the space with the cables laid through suitable transits and protected from damage
- where work in confined spaces takes place over several days, welding hoses and equipment shall be removed from the space overnight in case of gas build-up due to leakage
- **lighting** inside the confined space during welding operations shall be provided by mobile light fixtures with a voltage of no more than 25V. Lights shall be fitted with wire protection cages

## **5.5 Welding and Burning on Small Containers**

Before any hot work is carried out on any container that may have been used to store petroleum products or other flammable or combustible materials the following guidelines must be followed, and the Safety Adviser must certify the container free of gas and chemicals.

1. Drain the container of all contents.

2. Steam out the container thoroughly **or** submerge the container in boiling water for at least one hour.

**Note:** Compressed air purging or washing out with hot / cold water may not sufficiently clean the vessel of flammable materials and therefore **shall not** be used as methods of preparation for repair purposes.

3. Blow through the container with compressed air until the container is dry. During repairs, air (**not oxygen**) must be blown through the vessel to prevent the build-up of unburned gases.

## 8.9 Compressed Gas Cylinders

### 1 Introduction

#### 1.1 Document Purpose

This procedure specifies the requirements necessary for the safe handling, use, storage, and transportation of compressed gas cylinders.

#### 1.2 Document Scope

Where necessary, this procedure should be used in conjunction with procedure *Welding and Cutting* which provides advice specifically for the storage and use of compressed gas cylinders for welding and cutting activities.

### 2 Responsibilities

#### 2.1 Site Manager

Site Managers have overall responsibility for the safe storage and use of compressed gas cylinders on their sites and shall ensure that:

- compressed gas cylinder inspection procedures for receipt, safe use and storage, are established and observed on site
- compressed gas cylinders are stored in accordance with these guidelines
- inspection, storage and use of compressed gas cylinders are carried out by suitably competent and qualified personnel.

#### 2.2 Area Authority - Supervisor

Area Authorities are responsible for ensuring that the contents of these guidelines are observed within their areas of authority.

### 3 Receipt of Cylinders on site

#### 3.1 Cylinder Inspection

Compressed gas cylinders shipped to any BP site shall be thoroughly inspected by qualified and competent personnel before being accepted. Cylinders shall be inspected for corrosion, dents, general distortion, scorch marks, or any defect.

**Note:** Defective cylinders shall be returned to the supplier/manufacturer.

Cylinders with faulty outlet valve connections, e.g., damaged threads, seized valve spindles, etc., must be returned immediately to stores with a note stating the cylinder number, the nature of the fault and whether the cylinder is charged.

**Note:** Under no circumstances may the user of the cylinder attempt any repair.

### 3.2 Cylinder Identification

Compressed gas cylinders are painted in accordance with the National Color Coding System to properly identify their contents. The required color codes are listed in *Table 1*.

**Note (01):** If cylinders cannot be identified in accordance with this colour coding standard, they shall not be accepted or used on site, but shall be returned to the supplier.

**Note (02):** This colour coding system does not apply to Diving Gases which are covered under separate standards and practices applicable to diving and subsea operations.

	<b>Gas</b>	<b>Bottle Colour</b>	<b>Label Text</b>	<b>Label Colour</b>	<b>Stripe Colour</b>
1	<b>Nitrogen</b>	Black	NITROGEN	Yellow	Brown
2	<b>Ammonia</b>	Yellow	AMMONIA	Black	-
3	<b>Propane</b>	Red	PROPANE	White	-
4	<b>Technical Argon</b>	Black	TECHNICAL ARGON	Dark blue	Dark blue
5	<b>Acetylene</b>	White	ACETYLENE	Red	-
6	<b>Associated gas</b>	Grey	ASSOCIATED GAS	Red	-
7	<b>Butane</b>	Red	BUTANE	White	-
8	<b>Hydrogen</b>	Dark green	HYDROGEN	Red	-
9	<b>Air</b>	Black	COMPRESSED AIR	White	-
10	<b>Helium</b>	Brown	HELIUM	White	-
11	<b>Oxygen</b>	Blue	OXYGEN	Black	-
12	<b>Medical Oxygen</b>	Blue	MEDICAL OXYGEN	Black	-
13	<b>Hydrogen Sulfide</b>	White	HYDROGEN SULPHIDE	Red	Red
14	<b>Sulphur Dioxide</b>	Black	SULPHUR DIOXIDE	White	Yellow
15	<b>Carbon dioxide</b>	Black	CARBON DIOXIDE	Yellow	-

16	Chlorine	Khaki	CHLORINE	-	Green
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Reference: *Regulation of "Structure (working principles) and Safe Operation of Pressure Vessels" – Moscow 1976*

#### Table 4 Compressed Gas Cylinder Identification

### 3.3 Cylinder Markings

All cylinders shall be permanently and legibly labeled or stamped with the following:

- trade symbol of manufacturer
- serial number
- calculated quantity (tare) of empty mass
- manufacturing date (month, year)
- next inspection/test date, adjacent to the previous one (month, year)
- service pressure (psi/bar)
- test pressure (psi/bar)
- capacity (cubic feet/litres).

All markings shall be stamped on the shoulder of cylinders near valves.

**Note:** Do not remove or change any numbers or marks stamped on cylinders. Any cylinders that do not comply with this system shall not be accepted or used on site but shall be returned to the manufacturer/supplier.

## 4 Cylinder Storage

### 4.1 All Cylinders

All cylinders **shall be stored** in a cool, well ventilated area preferably in the open air and at least 3 metres (10 feet) from combustible materials.

Cylinders should be chained or otherwise secured, with valves shut and valve caps in place when cylinders are not in use.

Cylinders **should not be stored** in enclosed spaces such as workshops, accommodations.

All cylinders **shall be stored away from:**

- the direct rays of the sun or from radiant heat, e.g., flares
- locations where the temperature may exceed 45°C (113°F)
- locations exposed to adverse weather

**Note:** Weather protection shall be provided if required

- possible sources of ignition
- flammable materials
- corrosive liquids
- any direct contact with soft or damp ground, or any other location where water can accumulate, thereby increasing exposure to the possible effects of corrosion.

**Cylinders containing different gases** must be stored separately and in accordance

with established spacing requirements. Oxygen cylinders shall be separated from the cylinders containing flammable gas by at least 3 meters or by non-combustible barrier at least 2 meters high.

**Empty cylinders** shall be marked with “EMPTY” or “MT”, and stored separately from full cylinders.

**Leaking cylinders or cylinders with leaking valves** that cannot be shut off must be removed to a safe area away from any possible source of ignition and drainage, where they shall be allowed to vent off slowly until empty. Stores shall be advised of the fault.

**Note:** Propane and Butane are heavier than air and may therefore accumulate in dips and hollows.

**Note:** Regardless of whether or not cylinders have been marked, all cylinders shall be handled and treated as if they were full.

## 4.2 Oxygen Cylinders

**Warning:** Oils and greases are spontaneously combustible in the presence of oxygen.

Oxygen cylinders and their fittings, including hoses, **must not** be stored or used where they can come into contact with oil or grease.

This includes handling the equipment with oily hands, gloves or rags.

Oxygen cylinders must be stored apart from fuel gas cylinders by a minimum distance of 3 metres (10 feet). Separation by using cylinders of non-flammable gases is acceptable. This separation must be maintained.

The preferred practice is to store oxygen cylinders vertically, valve end up. However, it is acceptable to store oxygen cylinders horizontally provided that:

- the stacks shall not exceed a maximum height of three cylinders
- the largest cylinders must be at the bottom
- the row must be securely wedged.

## 4.3 Acetylene and Propane Cylinders

**Warning:** Acetylene cylinders **must not** be stored or used in a horizontal position. All acetylene cylinders, full or empty, shall be stored and used in the vertical, valve end up position.

## 4.4 Damaged Cylinders

Cylinders that may have been damaged in any way shall be returned to the supplier. Leaking cylinders shall immediately be moved to a freely ventilated area away from any source of ignition or places where leaking gas will become trapped.

## 5 Cylinders Exposed to Fire

In the event of gas cylinders being involved in a fire, they must be kept cool with water spray, e.g., a fog nozzle, and where possible, removed to a safe area. Such cylinders must be returned to the manufacturer for checking prior to re-use.

In the case of acetylene cylinders that have been so exposed, prolonged cooling is necessary for several hours after the incident to prevent exothermic decomposition.

## 6 Cylinder Handling

### 6.1 Transport

Fit suitable protective valve caps and covers before transporting.

Ensure cylinders are securely stowed to prevent moving. Cylinders should be stowed in the upright position unless instructions for transport specifically say otherwise.

Do not let gas cylinders project beyond the sides or end of a vehicle.

### 6.2 Lifting

If cylinders are lifted by crane, a suitable cradle or similar device should be used. If a trolley is used as a cradle during lifting, care should be taken to ensure that its base is strong enough to take the weight of the cylinders.

Cylinders **shall not** be lifted using:

- the cylinder valves
- chain or wire rope slings (these can allow the cylinder to slip during lifting)
- lifting magnets.

### 6.3 Movement of Cylinders on Site

**Note:** Cylinders **shall not** be dropped, dragged, rolled, or used as supports, and **must be** protected from damage at all times.

#### Cylinder Trolleys

Cylinders should be transferred to, and moved within, the working area on trolleys specifically designed for that purpose, or in suitable containers providing stable and secure positioning of the cylinders.

All valves must be closed before a cylinder is moved and, if the correct trolley is not being used, regulators and hoses should be detached from the cylinders.

#### Electric Cables

Cylinders and gas hoses shall not be allowed to come into contact with current carrying wires. Therefore:

- special attention should be paid to the places where electro-welding and gas burning of metals are carried out simultaneously
- the distance from oxygen or fuel gas cylinders to electro-welding cables shall be not less than 1 m.

When in use, hoses should be protected from damage, and laid out in such a manner as to avoid being a tripping hazard.

## 7 Cylinder Use

Many of the specific uses of gases will vary from gas to gas but there are several points that apply to all of them:

- Keep the cylinders away from operations that create sparks, heat, fire and electrical circuits.
- Don't use oil or grease on cylinders or handle them with oily hands or gloves. Don't let oxygen spray on an oily or greasy surface, or on your clothes.
- Use cylinders in ventilated areas only.
- Keep cylinders secured upright in cylinder racks.
- Open valves by hand, not with a wrench or other tool. If they cannot be opened

by hand, notify the supplier/manufacturer.

- Do not tamper with safety devices.
- If a cylinder has a leaky valve or fitting which cannot be stopped by closing the valve, the cylinder must be taken outdoors away from sources of ignition. Tag the cylinder as in bad order and promptly notify the supplier. Do not try to fix a leaking cylinder or valve. Dented cylinders should never be used.
- Ensure that hosing/tubing for use in oxygen service is completely degreased and dust free before each use
- Always open valves slowly. If a valve cannot be opened by hand with the key or hand wheel provided, the cylinder shall be returned to the supplier/manufacturer. Do not force the valve open using wrenches or other hand tools.

## **8.10 Lifting Operations Safety Procedure**

### **1 Introduction**

#### **1.1 Document Purpose**

This document is prepared for Safe Lifting Operations of Contractor Construction Projects.

#### **1.2 Document Scope**

The equipment to which this document applies includes, but is not limited to:

- pedestal cranes
- mobile cranes
- overhead gantry cranes
- loose lifting gear (chain hoists, lever hoists, slings, shackles, pendants etc)
- wireline masts
- lifts for persons or goods
- abseiling equipment
- sling-sets attached to containers or pieces of equipment
- runway beams and padeyes to which lifting equipment is anchored or fixed

The contents of this document apply to the above equipment regardless of whether it is new, existing, second-hand or leased.

### **2 Responsibilities**

#### **2.1 PROJECT MANAGER**

The SITE MANAGER shall be responsible and accountable for the application of this procedure on his work site. In particular the SITE MANAGER shall ensure:

- that no lifting equipment is used or allowed on site unless it is accompanied by all relevant certification and in date test certificates
- that proper records are maintained for all lifting equipment, including certification and examination and test reports.



## **2.2 Competent Person**

The term **Competent Person** is used to identify a number of different roles. In practical terms the competency of a person may be confirmed by formal, vocational qualification or through first hand knowledge of planning or supervising the lifting operations or using the equipment.

The Competent Person's responsibilities are described in each relevant section of this document.

## **2.3 Area Authority - Supervisor**

The Area Authority shall be responsible for the application of this standard within his area of responsibility.

## **2.4 Personnel In Charge of Lifting Operations**

Personnel in charge of lifting operations are responsible for ensuring:

- the immediate safety of all personnel involved in the lifting activity
- that all equipment used is suitable for the task and is within test date
- that the lifting operation has been risk assessed and planned
- that the activity is executed in accordance with the plan
- that lifting operations are halted if an unsafe situation occurs.

## **2.5 Subcontractors**

Subcontractors providing lifting services for Contractor shall comply with the relevant sections of this procedure, according to their contractual conditions.

# **3 Positioning and Installation of Lifting Equipment**

## **3.1 Permanent and Semi-permanent Lifting Equipment**

All permanent and semi-permanent lifting equipment shall be designed, installed and positioned so that as far as reasonably practicable:

- the need to lift loads over people is minimised
- crushing is prevented at extreme operating positions; in particular, trapping points are prevented or access limited on travelling or slewing equipment
- loads are prevented from:
  - falling freely - through the fitting of suitable devices such as multiple ropes, safety gear or check valves
  - being unintentionally released during a loss of power to the lifting equipment or through the collision of equipment or their loads; for example, through the use of hooks with safety catches, motion limiting devices and safe systems of work
- loads moving along a fixed path (rails, runway beams, etc) are suitably protected to minimise the risk of the load or equipment striking a person

**Note:** Drifting - runway beams should be level and tag lines used to control the movement of long or awkwardly shaped loads.

- personnel are prevented from falling down shafts or hoistways; for example, by the use of safety gates with interlocks

### **Overhead Gantry Cranes**

Beneath the full travel of an overhead gantry crane, painted lines on the floor (where practicable) shall be used to delineate a path and indicate its width. This path shall be kept free of materials and stores. Warning notices shall be posted in prominent positions, especially at access points.

An audible and visual warning device should operate automatically when an over-head crane is tracking.

### **3.2 Mobile Lifting Equipment**

Mobile lifting equipment shall be subject to the same precautions as those listed for permanent and semi-permanent lifting equipment above. However, it shall be the specific responsibility of the person in charge of the lifting operation to ensure that these precautions are properly addressed throughout the lifting operation.

#### **Wheeled Cranes**

- Hooks must be properly secured whilst cranes are in transit, and the jib kept in the shutdown position.
- An audible and visual warning device should operate automatically when the crane is reversing.

## **4 Strength and Stability of Lifting Equipment**

The strength and stability of fixed / permanent lifting equipment, for example platform cranes, gantry cranes, etc., is mainly dependent upon the design, construction and initial installation.

For temporary / mobile lifting equipment the strength and stability is dependent upon its installation, assembly and location.

However, the continuing strength and stability of all lifting equipment is dependent upon the purpose and method of use, and the application of a suitable system of regular examination, inspection and maintenance.

### **4.1 Design and Installation**

#### **All Lifting Equipment**

During the design and installation stages for fixed lifting equipment it is necessary to:

- take account of the combination of forces which the equipment may be subjected to (including destabilising forces), for example, load, wind, frequency of use, etc
- ensure that the equipment is not susceptible to in-service failure modes (fracture, wear or fatigue), for example by choosing materials and components taking into account the combination of forces the equipment may be subjected to and by establishing an adequate maintenance and inspection routine
- where appropriate, lifting equipment shall be fitted with a Rated Capacity Indicator (previously known as a Safe Load Indicator)
- a table, showing the safe working load / radii limitations of the crane shall be fitted in every crane cab
- where the SWL changes with the operating radius of the equipment then a load-limiting device may need to be fitted to inhibit the equipment and provide visual and/or audible warnings

- build in an appropriate factor of safety against foreseeable failure modes
- provide rail mounted equipment with devices to prevent derailing
- lay rails so that they provide suitable support for rail mounted equipment.

Where there is a significant risk of overload, for example where lifting equipment may be used to offload a supply vessel onto a platform, the lifting equipment should be fitted with equipment which provides an audible and/or visual warning before an overload situation is reached.

### **Mobile Equipment**

In addition to the factors listed for all lifting equipment, the initial strength and stability of mobile and semi-permanent lifting equipment is greatly dependent upon its positioning and its assembly.

In particular:

- mobile cranes shall only be used on flat and level ground
- when a wheeled crane with outriggers is used, the outriggers shall be extended and firmly jacked down upon a spread support before lifting operations commence
- the ground where spread supports are to be used shall be inspected by a Competent Person before deployment of the spread supports
- wheeled cranes shall only leave recognised roads under the authority of a Permit to Work

## **4.2 During Lifting**

### **General Usage**

During lifting operations:

- the lifting appliance shall not be loaded beyond the safe working load marked on it (except for the purpose of proof load testing by a Competent Person).
- the hoisting mechanism of a crane shall not be used for any purpose other than raising or lowering a load vertically.
- mobile cranes must not be used to transport loads, unless specifically designed for this purpose.

### **Load**

The weight of all loads should be known and particular care must be taken when calculating the weight of any plant or equipment prior to lifting, especially when it may contain a liquid (for example, coiled tubing reels, heat exchangers, etc).

The crane driver/operator must be advised of the weight of each load to be lifted and shall operate within the limits dictated by the **safe working load / radius tables** displayed within the crane cab. It is the responsibility of the crane driver/operator not to lift, or continue to lift, a load which causes the Rated Capacity Indicators (formerly Safe Load Indicators) to alarm. In particular, crane drivers/operators must not use the load/radius alarms as an indication of working within safe limits.

**Note:** On any change of boom length, the safe working load/radius limitations table must be changed to show clearly the new SWL radius limitations.

## **Wind Speed**

Cranes shall not be operated in wind speeds in excess of manufacturer's recommended limitations or Georgian Legislation (whichever wind speed is the lesser). Sites and installations may impose lower limits as a result of operating experience.

The operating limitations shall be clearly displayed in the crane cab.

## **4.3 Lifetime of Equipment**

### **Certification, Examination and Testing**

All lifting equipment shall be properly certified at regular intervals in accordance with these guidelines and with any required legislation. In addition all lifting equipment shall be subjected to regular examination and testing in accordance with *Paragraph 7 Certification, Examinations, and Inspections*.

### **Rated Capacity Indicators**

Rated Capacity Indicators (formerly Safe Working Load Indicators), or any other alarms fitted to lifting appliances, shall not be disconnected or made unserviceable at any time whilst the equipment is in service. Wherever such warning devices have been disconnected or made unservicable, the lifting equipment shall be taken out of service immediately and remain so until the devices are reinstated.

## **4.4 Other Equipment**

### **Gin Poles and Derricks**

- Gin poles must be constructed of steel, with attachments at the head for suspending the load and guying, and be fitted with proper base plates.
- Guys for gin poles must be attached to "dead men", earth screws or substantial steel structures.
- Clearance for Excavation and the relevant Permit to Work must be obtained before driving stakes, etc. into the ground for gin poles.

## **4.5 Fork Lift Trucks**

- Any fault affecting the safe operation of the fork lift truck prohibits its use until rectified.
- The fork lift truck must not be used to lift loads greater than the maximum Safe Working Load for which the equipment is rated. Only secure loads are allowed to be moved.

# **5 Lifting Equipment Markings**

## **5.1 Safe Working Load**

### **All Equipment**

Where possible all lifting equipment should be hard stamped with the safe working load. Where it is not possible to hard stamp the safe working load directly onto the equipment the following alternatives are acceptable:

- hard stamp the safe working load on ferrules (for example, on wire slings)
- hard stamp the safe working load on a metal plate securely attached to equipment (for example, on chain hoists)
- paint the safe working load onto the equipment (for example, runway beams).

**Note:** Colour coding of lifting equipment alone might not meet the requirements of the *Lifting Operations and Lifting Equipment Regulations 1998*.

### **Variable Safe Working Load**

If the safe working load is dependent upon the configuration of the equipment then the safe working load for each configuration shall either be marked on the equipment or the information kept with the equipment where it is readily available to the operator, for example on load-radius charts in crane cabs.

### **5.2 Lifting Accessories and Seperable Lifting Equipment Components**

Any structural components of lifting equipment which can be separated from the equipment (boom section, slewing, etc.) shall be marked to indicate the equipment of which it is a part.

Where a number of accessories are brought together and not dismantled, for example a spreader beam with slings and shackles, the assembly should be marked to indicate its safety characteristics.

Lifting equipment and accessories should be marked with any relevant safety information such as the thickness of plates which may be lifted with a plate clamp.

### **5.3 Personnel Lifting Devices**

#### **General**

Lifting equipment designed for lifting persons should be marked as such. The carrier should display the SWL and maximum number of persons which may be carried.

#### **Winches**

Where there is more than one winch, for example in a drilling derrick, it may be possible for a winch which has not been designated for man-riding to be used for lifting of persons. Where it is possible for this to occur, all winches shall be clearly marked as either suitable for lifting of persons or not.

## **6 Control of Lifting Operations**

### **6.1 Personnel**

#### **Banksman**

With the exception of overhead cranes that are designed to be operated from ground level, no lifting operation shall take place without an appointed and easily identifiable banksman. The banksman must be suitably trained and have adequate experience for his role.

#### **Crane Driver / Operator**

Cranes shall only be operated by properly trained and qualified personnel.

**All crane drivers/operators** must have good eyesight (corrected by spectacles if necessary) and good hearing. They must also have a sound working knowledge of safe slinging practices.

**Contract crane drivers**, in addition to the above, must hold a certificate of competence issued by their employer which shall be available for inspection.

#### **Riggers and Slingers**

All personnel who use rigging equipment must have completed a basic rigging/training course.

## **Operators of Industrial Power Trucks, Fork Lifts and Hydraulic Work Platforms**

**All drivers** of industrial power trucks, fork lifts and operators of hydraulic work platforms must be properly trained in their use. Training should generally be in accordance with the United Kingdom Health and Safety Executive Code of Practice titled *The Basic Training of Operators of Counterbalanced and Reach Lift Trucks*.

**Fork-lift drivers** must undertake a course of training and testing generally in accordance with the approved code of practice and supplementary guidance: *Rider Operated Lift Trucks - Operator Training*. Drivers must provide evidence of having attended and successfully completed such a training course before driving any fork lift vehicle.

### **6.2 Risk Assessment and Planning**

#### **Risk Assessment**

**Non-routine lifting operations** must undergo a risk assessment in accordance with Safe Systems of Work procedure *Risk Assessment*.

**Routine lifting operations** shall be reviewed on a regular basis to ensure that the original Risk Assessments remain valid.

For all lifting operations, the degree of risk identified during the Risk Assessment shall determine the level of supervision required for the operation and the required experience of the personnel involved. In particular, the Risk Assessment should account for:

- working under suspended loads
- attaching and detaching the load
- overloading
- overturning
- breakdown in communication during lifting (especially blind lifting)
- the environment and location
- proximity hazards
- lifting personnel with non-dedicated equipment
- pre-use checks by the operator
- deterioration in the condition of lifting accessories
- the experience, competence and training of available personnel.

#### **Planning**

Following a Risk Assessment, and the preparation of a standard instruction or procedure, the person using the equipment can normally plan routine lifts on an individual basis. In any event, the person planning the operation shall have adequate practical and theoretical knowledge and experience of planning lifting operations.

The degree of planning will vary depending upon the:

- type of lifting equipment
- complexity of the lifting operation
- degree of risk involved.

As a minimum, the plan shall address the risks identified and should identify all resources, procedures and responsibilities necessary to ensure a safe operation.

## **6.3 Control of Operations**

### **Equipment Restrictions**

- Crane activities shall stop (once the load has been made safe) in the event of a general alarm or emergency.
- No parts of the crane including the boom must be permitted to work within 9m (30 ft) of high voltage electrical lines on wooden poles or 15m (50 ft) on steel towers, unless the cables have been isolated electrically.
- Tracked cranes shall not travel within a width restricted area unless accompanied by a Banksman, whose duty it is to direct the Driver/Operator and other road users.

### **Personnel Restrictions**

- Whilst the crane is in operation, the Crane Driver/Operator must not perform other work, and must not leave his position at the controls until the load has been safely landed.
- Man-riding on loads, hooks or buckets intended for general cargo movement is not permitted.

**Note:** It is strictly forbidden for anyone to ride on a fork lift truck as a passenger. Fork lifts are not to be used as elevated working platforms unless approved modifications have been carried out.

### **Load Restrictions**

Pre-slung loads must not be accepted, unless the supplier/owner produces a current examination certificate for slinging arrangements, which will be monitored at supply base prior to shipping.

### **Operating Restrictions (Gantry Cranes and Crane Tracks)**

Work which necessitates the presence of men closer than 6m (20 ft) to electrically driven overhead gantry cranes, or crane tracks, must not be started until the crane has been rendered inoperative by the removal of fuses or locking off of circuit breakers by an Authorised Electrical Isolating Authority. In addition, if practicable, the crane power supply switch must be padlocked in the open position.

Where work is carried out on or near the wheel tracks of a crane and it is required that the crane remains in operation, it is necessary to ensure that the crane does not approach too close to the area of work. A minimum separation distance of 6m (20 ft) shall be maintained in these circumstances. Stop blocks shall be used to ensure that this separation is maintained.

## **7 Certification, Examinations and Inspections**

### **7.1 Lifting Equipment Certification and Examination Records**

All lifting equipment supplied and used on the Project must be in possession of all relevant up to date certification and a valid thorough examination record. The Site

Manager shall ensure that all necessary certification and examination records have been provided before accepting the equipment on site.

The Site Manager shall also ensure that all lifting equipment that requires thorough examination is identified and recorded.

**Note:** Lifting equipment testing is not mandatory under Lifting Operations and Lifting Equipment Regulations 1998 but may still be required as part of an examination scheme prepared by a Competent Person.

## **7.2 Scheme of Examination**

For all equipment which requires examination, a Competent Person must prepare a scheme of examination which identifies:

- parts to be examined
- resources required
- parts requiring testing
- test and examination frequency.

The examination must be able to detect defects or weaknesses that would have an adverse effect on safety. This may involve strip-down, load testing or NDT of equipment.

In general a specialist service provider will be appointed to undertake the preparation of an equipment register and examination scheme.

**Note:** The examination should be carried out by a competent person who is impartial, although they need not necessarily be independent of the employer. In practice, however, the appointment of a specialist examination company would ensure impartiality. The body appointed to carry out examinations should be accredited by various types of bodies performing inspection.

## **7.3 Pre-Service Examinations and Inspections**

A thorough examination must be carried out:

- before using lifting equipment on site for the first time, unless the equipment has not been used elsewhere before and is accompanied by the valid certificate not more than 12 months old
- if the safety of the lifting equipment is dependant upon installation or assembly conditions.

Inspections would include pre-operation visual checks and function tests and the equipment operator (particularly crane operators) are considered competent to perform such tasks.

## **7.4 In-Service Examination and Inspections**

### **Frequency**

All lifting equipment deteriorates in use and therefore a thorough examination must be carried out at specified intervals. The intervals between thorough examinations of lifting equipment and accessories are:

- every 6 months regardless of whether the equipment is used for lifting persons or otherwise
- every 12 months for fixed lifting equipment (runway beams, padeyes, etc).



These examination frequencies are more stringent than those specified in the Lifting Operations and Lifting Equipment Regulations.

### **Additional Examinations and Inspections**

A thorough examination must be carried out following exceptional circumstances where the integrity of the equipment may have been jeopardised; for example, following an overload or changeout of a major load path item.

In addition to thorough examinations, inspections shall be carried out wherever user risks are identified. The inspections should include visual checks and function tests and shall only be carried out by a Competent Person.

**Note:** Equipment currently under a scheme of thorough examination need not be examined under this Practice until the next required under the existing scheme.

## **7.4 Examination Reports and Defects**

### **Competent Person**

The Competent Person carrying out the examination shall:

- immediately report any defects to the employer and equipment users if the defect could cause the equipment to become a danger to personnel
- complete an authenticated written report of examination and submit this within 28 days to the employer and equipment hirer (if applicable)
- forward a copy of the report to the relevant enforcing authority (the Safety Regulator of the country of origin of the equipment) if any equipment defects that could cause an imminent risk of serious personal injury.

### **PROJECT MANAGER**

The SITE MANAGER shall:

- immediately withdraw the equipment from service if notified of a defect which poses an immediate threat to persons and not re-use it until the defect has been rectified
- if notified that a defect will become dangerous if not rectified within a specific period specified by the Competent Person:
  - withdraw the equipment from service if the necessary repairs are not completed within that period specified
  - and...**
  - not re-use the equipment until rectification is complete.

## **8 Records**

### **8.1 Certificates of Conformity**

Lifting equipment will be supplied with a certificate of conformity from the country from which it has been supplied and the employer must retain such records for so long as he uses the equipment.

### **8.2 Examination Reports**

#### **Pre-First Use**

If lifting equipment has undergone a thorough examination prior to first use then a copy of this report must be kept until the employer ceases to use the lifting equipment.

### Post-Installation/Assembly

Where a report of thorough examination has been issued following installation or assembly of lifting equipment a copy of this report must be retained until the equipment ceases to be used at that location.

### 8.3 Inspection Reports

Inspection reports must be retained until the next report is available.

### 8.4 Storage and Availability of Records

The SITE MANAGER shall ensure that the records are properly maintained and are in order.

Normally, reports are stored at the location where equipment is being used. However, if this is not possible they can be kept elsewhere provided they are easily accessible. Records may be kept in hard copy form, stored electronically or on computer disc. Computer systems should be able to provide written copy when necessary. Certification, examination and inspection records and reports shall be readily available to inspectors, inspection authorities and enforcement authorities upon request.

## Appendix A – Definitions

### List of Definitions

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<b>Competent Person:</b>	A person with appropriate practical and theoretical knowledge and experience
<b>Examination scheme:</b>	A suitable scheme drawn up by a <b>competent person</b> for such <b>thorough examination</b> of lifting equipment at such intervals as may be appropriate in accordance with these guidelines.
<b>Lifting accessory:</b>	Work equipment for attaching loads to machinery for lifting (eg., pendant, sling, shackle, etc). <b>Note:</b> An accessory is also an item of lifting equipment as far as application of the UK <i>Lifting Operations and Lifting Equipment Regulations</i> are concerned.
<b>Lifting equipment:</b>	Work equipment used for <b>lifting</b> or <b>lowering</b> loads, including any <b>attachments</b> for anchoring, fixing or supporting it.
<b>Load:</b>	Whatever is lifted or lowered by the lifting equipment and accessories, including any carrier used to hold materials, persons or animals.
<b>Thorough examination:</b>	A thorough examination by a <b>competent person</b> including such testing as is appropriate for the purpose

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## **9 METHOD STATEMENTS HEALTH AND SAFETY CONTROLS**

### **9.1 Safe Work Method Statement Form**

#### **SAFE WORK METHOD STATEMENT**

##### **Hierarchy of Controls**

**Eliminate** – ‘Design out’ the hazard when new materials, equipment and work systems are being purchased for the workplace;

**Substitute** - Substitute less hazardous materials, equipment or substances and use smaller sized containers;

**Isolate** – separate the workers from hazards using barriers, enclosing noisy equipment and providing exhaust or ventilation systems;

**Engineering** – use engineering controls to reduce the risks such as guards on equipment, hoists or other lifting and moving equipment;

**Administrative** – Minimise the risk by adopting safe working practices or providing appropriate training, instruction or information.

**Personal Protective Equipment** – Make sure that appropriate PPE is available and used correctly.

SWMS FOR SITE PREPARATION				
Task Breakdown	Potential Hazards	Critical Safety Practices	PPE and Equipment	Monitoring Devices
	Electrical Shock	Provide an equipment-grounding conductor program or employ ground-fault circuit interrupters	Lockout / Tagout Devices	
		Use qualified electricians to hook up electrical circuits		
		Inspect all extension cords daily for structural integrity, ground continuity, and damaged insulation		
		Cover or elevate electric wire or flexible cord passing through work areas to protect from damage		
		Keep all plugs and receptacles out of water		
		Use approved water-proof, weather-proof type if exposure to moisture is likely		
		Inspect all electrical power circuits prior to commencing work		
	High Noise Levels	Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period)		
		Assess noise level with sound level meter if possibility exists to exceed 85 db A TWA		
		Observe proper lifting techniques		
		Obey sensible lifting limits (25 kg. maximum per person manual lifting)		
		Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads		
		Avoid carrying heavy objects above shoulder level		
		Avoid actions/activities that contribute to overexertion		
	High / Low Ambient Temperature	Monitor for Heat/Cold stress	Insulated Clothing ambient temperature	
Provide fluids to prevent worker dehydration				
Establish work/rest schedule				
<b>EQUIPMENT TO BE USED</b>		<b>INSPECTION REQUIREMENTS</b>	<b>TRAINING REQUIREMENTS</b>	
Forklift, backhoe, loader		Inspect equipment and tools daily per manufacturers requirements	Proper use of equipment	
Seatbelt, back up alarm				
First-aid kit, fire extinguisher				
Operations manual for the equipment		Inspect all emergency equipment (i.e.: first aid kits, fire extinguishers)	Review JSA with all site personnel	
Hand tools and lifting devices				

SWMS FOR SITE PREPARATION					
Task Breakdown	Potential Hazards	Critical Safety Practices	PPE and Equipment	Monitoring Devices	
Equipment/ Facility Set-up	Slips, Trips, Falls	Clear walkways work areas of equipment, tools, vegetation, excavated material and debris	Body harnesses / lanyard (elevated platforms)		
		Mark, identify, or barricade other obstructions			
		Evaluate fall hazards above 2 m.; use fall protection equipment (harness/lanyard), standard guardrails or other fall protection systems when working on elevated platforms above 2 m			
		Use heavy duty industrial (type IA) ladders			
		Install and inspect scaffolds according to manufacturers requirements			
		Only trained operators are permitted to use aerial lifts			
		Tie-off all straight/extension ladders or manually hold by co-worker at base			
		Anchorage points for fall arrest systems must support at least 2 400 kg for each worker			
		Halt roof, exterior scaffold work in high winds, severe weather			
	Struck By/ Against Heavy Equipment	Wear reflective warning vests when exposed to vehicular traffic	Warning vests, Hard hat, Safety glasses, Steel toe work boots		
					Isolate equipment swing areas
					Make eye contact with operators before approaching equipment
					Understand and review hand signals
	Burns	Wear proper work gloves, face shield/safety goggles, and leather apron to protect workers from skin burns when welding, cutting, and burning	Tinted face shield		
					Inspect burning/welding equipment, lines, valves, hoses before using equipment
					Post fire watch for remote locations
Sharp Objects	Wear cut resistant work gloves when lacerations or other injury may be caused by sharp edges or objects	Leather gloves			
				Maintain all hand and power tools in a safe condition	
				Keep guards in place during use	
	De-energize or shut off utility lines at their source before work begins				
				Use double insulated or properly grounded electric power-operated tools	
				Maintain tools in a safe condition	

SWMS FOR SITE PREPARATION				
Task Breakdown	Potential Hazards	Critical Safety Practices	PPE and Equipment	Monitoring Devices
Clearing, Grubbing	Struck By/ Against Heavy Equipment	Wear reflective hi-vis vests worn when exposed to vehicular traffic	Hi-vis vests, Hard hat, safety glasses, Steel toe work boots	
		Isolate equipment swing areas		
		Make eye contact with operators before approaching equipment		
		Understand and review hand signals		
	Slips, Trips, Falls	Clear walkways work areas of equipment, tools, vegetation, excavated material and debris		
		Mark, identify, or barricade other obstructions		
		Maintain 3 point contact when ascending/descending ladders/ mounting/dismounting from heavy equipment		
		Halt exterior work in high winds, lightning, severe weather		
	Handling Heavy Objects	Observe proper lifting techniques		
		Obey sensible lifting limits ( Refer to Manual handling procedure ) Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads		
	Eye Injuries	Wear face shield, goggles when operating powered clearing / grubbing equipment	Face shield, goggles	
	Sharp Objects	Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects	Leather gloves	
		Maintain all hand and power tools in a safe condition		
Keep guards in place during use				
Close doors, windows on heavy equipment to prevent injuries from tree branches and other vegetation				
High Noise Levels	Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period)	Ear plugs	Sound Level Meter	
	Assess noise level with sound level meter if possibility exists that level may exceed 85 dBA			
Insect / Snake Bites	Review injury potential and types of snakes with workers	Coveralls, duct tape bottom of coveralls to boots		
	Avoid insect nests areas, likely habitats of snakes outside work areas			
Contact Dermatitis	Wear PPE to avoid skin contact with contaminated soil, plants, or other skin irritants	Tyvek coveralls, duct tape bottom of coveralls to boots or latex boot		
	Identify and review poisonous plants with workers			
	Apply protective cream/lotion to exposed skin to prevent poison oak or similar reactions			
	Wear eye, face, hand & hearing protection when operating power clearing equipment Shut-off / idle power tools walking between work areas	Face shield,		

SWMS FOR SITE PREPARATION				
Task Breakdown	Potential Hazards	Critical Safety Practices	PPE and Equipment	Monitoring Devices
	Operations of power clearing tools ( brush saws, weed wackers)	Store flammable liquids in well ventilated areas, away from work areas Shut off equipment during re-fueling Allow equipment to cool before re-fueling Use funnels to avoid fuel spillage Prohibit smoking while operating clearing equipment Provide ABC (or equivalent) fire extinguishers for all work areas	goggles, leather gloves, ear plugs, Steel toe work boots, chaps	
	High/Low Ambient Temperature	Monitor for Heat/Cold stress Provide fluids to prevent worker dehydration Establish work/rest	Insulated Clothing (ambient)	Meteorological Equipment
<b>EQUIPMENT TO BE USED</b>		<b>INSPECTION REQUIREMENTS</b>	<b>TRAINING REQUIREMENTS</b>	
Brush saws, weed wackers, mowers		Inspect equipment and tools daily per manufacturers requirements	Proper use of equipment	
First-aid kit, insect repellent				
Fire extinguisher				
Personal protective equipment		Inspect all emergency equipment (i.e.: first aid kits, fire extinguishers)	Review JSA with all site personnel	
Hand tools				
	Underground/ Overhead Utilities	Identify all utilities around the site before work commences	Hard hat, safety glasses, steel toe work boots	
		Cease work immediately if unknown utility markers are uncovered		
		Use manual excavation within 1 meter of known utilities		
		Utility clearance shall conform with Excavation Safety Procedure		
		Construct diversion ditches or dikes to prevent surface water from entering excavation		
		Provide good drainage of area adjacent to excavation		
		Collect ground water/rain water from excavation and dispose of properly		
		Store excavated material at least 1 meter from the edge of the excavation; prevent excessive loading of the excavation face		
		Provide sufficient stairs, ladders, or ramps when workers enter excavations over 1,2 meter in depth		
		Place ladders no more than 7,5 meter apart laterally		
		Treat excavations over 1,2 meter deep as confined spaces		
		Complete confined space permit entry procedure		
		Monitor atmosphere for flammable/toxic vapors, and oxygen deficiency		
		Slope, bench, shore, or sheet excavations over 1,5 meter deep if worker entry is required		
		Assign a competent person to inspect, decide soil classification, proper sloping, the correct shoring, or sheeting		

## **10 COMMUNITY HEALTH AND SAFETY MANAGEMENT**

### **10.1 Objectives**

The objectives of this section of the plan are to:

- Continuously identify, evaluate and prioritise the risks and impacts of the Projects activities on the health, safety and security of local communities;
- Proactively prevent and avoid impacts to community health safety and security, and enhance any positive impacts related to community health, safety and security;
- Identify strategies that provide adequate health related information and prevention measures through which communities can manage their own health and safety in an optimum manner; and
- Implement security that protects employees, assets and business continuity in a manner that adheres to national legislation.

### **10.2 Purpose and Scope**

The purpose of this section of the plan is to provide a clear set of actions and responsibilities for the control of impacts affecting the health and safety of the communities within the Project's area of influence.

The scope covers construction phase of the Project.

The plan includes measures to respond to the following potential impacts identified in the EIA:

- Changes to community health profile including exposure to disease, changes in availability and quality of water resources;
- Changes to livelihoods and income generating opportunities and subsequent effects on community access to social and physical infrastructure;
- Changes to community health and wellbeing including changes to social and cultural cohesion; and
- Changes to community safety profile related to traffic, emergency responses, unplanned events, crime and conflict.

Community health includes the concept of well-being, which looks beyond physical health or absence of disease, and incorporates a broader psycho- social concept of mental and social health. Wellbeing also considers the ability of an individual to realise their potential within society, work productively, build strong and positive relationships with others and contribute to their community. Factors such as self-esteem, coping mechanisms, resilience and stress response are important in determining an individual's wellbeing.

### **10.2 Management During Construction**

#### **Potential Impacts**

The potential Impacts on the local community identified in the EIA include:



**Safety** - During the construction phase, the Project will be adding a mix of light, and heavy and slow-moving vehicles onto the road network. This will include vehicles transporting workers, trucks carrying heavy equipment between work areas and haul trucks moving spoil.

The potential impacts of Project construction include the increased risk of collisions and road transport accidents (potentially resulting in injury, death, or fuel or cargo spillage) and subsequent harm to animals, local shepherds and communities (including contamination of soils and groundwater).

In the Khada valley, there is currently very little traffic and any vehicles are not travelling at speed, thus the potential for collisions with livestock during construction is greater as the construction access roads will be paved (enabling greater speeds) and will be frequented by a mix of heavy and light vehicles.

Potential areas where community safety could be affected during the construction phase are highlighted in the following figures.

**Security** - There is the potential that an improved road will bring greater crime due to improved accessibility to the area to people outside the valley. During the construction phase, this will include the presence of road construction workers, which could have a potential effect of increased crime in the Project area.

## **Management Actions**

### General

During construction this will include measures to:

- Avoid, minimise or compensate for the potential for community exposure to hazardous materials and substances during construction;
- Avoid, minimise or compensate for the potential for traffic related accidents;
- Avoid, minimise or compensate for the proposed Project's direct impacts on the local environment which may result in subsequent impacts to local income generating opportunities;
- Avoid, minimise or compensate for the potential for community exposure to communicable and other diseases;
- Avoid, minimise or compensate for a decline in the availability and / or quality of water resources available to local communities;
- Assist and collaborate with the local communities, local government, and other relevant partners, in their preparations to respond effectively to emergency situations; and
- Assess and manage risks and impacts posed by the Projects security arrangements to those within and outside the Project site.
- In achieving these objectives the Contractor will consider the differentiated exposure of different local communities to impacts and the higher sensitivity of vulnerable groups.

### Specific

Hazardous Materials – An emergency response plan, spill management plan and waste management plan have been provided as part of the Project to manage this issue. In addition the following conditions will apply for the storage and use of hazardous materials (including bitumen):

- All hazardous materials will be stored (including within suitable sized bunds for liquids), handled and disposed of according to their Material Safety Data Sheet (MSDS).
- Copies of MSDS will be kept on site with all hazardous materials.
- A log of the type and volume of all hazardous wastes on site will be kept.

- A plan of site indicating where all hazardous materials are stored will be prepared and kept on site.

Income and Livelihoods – A Local Content Management Plan has been prepared by as part of the Project to address local income and livelihoods issues.

Traffic - The mitigation measures to be adopted for the Project's construction transport activities include the following, noting a degree of flexibility in the event of adverse weather or unforeseen circumstances:

- Stipulations that all driving is to occur during daytime hours where possible;
- Stipulations in regard to maximum driving hours per day and week;
- Strict adherence to speed limits;
- Strict adherence to spill response measures in the event of a spillage from a vehicle, particularly in the vicinity of the Khada River;
- Consultation with local households, community groups, police, and emergency services along the transport routes; and
- Driver training programs to ensure that Contractors staff are aware of community sensitivities, such as specific livestock movement periods.

Air Quality - The access roads will be paved to minimize dust affects to neighboring households and, indirectly, livestock through dust deposition on pasture.

Schools - The Contractor will provide a series of road safety awareness sessions for schools in the Project area. The sessions will be provided on a six-monthly basis throughout the construction phase. As part of the awareness sessions children will be given reflective badges to fix to their coats and school bags.

### **Community Complaints**

Ongoing community engagement will be required as well as the implementation of the grievance mechanism in order that any community or livestock safety issues are being adequately addressed and rectified.

## **APPENDIX A HEALTH & SAFETY CHECK LIST (HSCL)**

### **HEALTH & SAFETY CHECK LIST (HSCL)**

<b>THE EMPLOYER</b>	
<b>THE CONSULTANT</b>	
<b>THE CONTRACTOR</b>	

Monitoring period/	Reporting date/
<i>From/</i> <i>To/</i>	<i>Date/</i>
Reported by:	Checked by:
<i>Position/</i> Environmental Expert/ <i>Name/</i> <i>Signature/</i>	<i>Position/</i> <i>Name/</i> <i>Signature/</i>
<i>Date/</i> <i>Week No/</i>	<i>Date/</i> <i>Week No/</i>

<b>1</b>		<b>CONTRACTOR'S SITE ESTABLISHMENT</b>		
1. 1	Does an effective perimeter fence exists?			
1. 2	Are Health & Safety sign boards clearly displayed?			
1. 3	Is Health & Safety training taking place on a regular basis?			
1. 4	Have all workers been provided with the appropriate Personal Protective Equipment (PPE)?			
1. 5	All workers are wearing appropriate Personal Protective Equipment (PPE)?			<i>If 'No', assess the % of usage:</i>
1. 6	Are workers are using additional protective equipment for hazardous operations as required?			<i>If 'No', assess the % of usage:</i>
1.7	Are all working areas and trafficked areas effectively separated?			
1.8	Are all vehicles entering the site provided with a working audible reversing warning system?			
1.9	Are nominated Banksman provided and trained / qualified?			<i>Name of Banksman:</i>
	Are all vehicle movements involving manoeuvres on the highway or reversing in any location controlled by a Banksman?			
	Are Flagmen provided for all activities that could affect traffic, in a number and at locations to suit varying conditions of work?			
<b>2</b>		<b>TRAFFIC SAFETY &amp; MANAGEMENT</b>		
2. 1	Is the correct temporary signage provided on the Highway at all locations?			<i>If No - record exceptions/</i>

2. 2	Area working areas and trafficked areas effectively separated?			
2. 3	Have traffic flows been unreasonably disrupted?			
2. 4	Have there been any collisions / accidents involving Contractor's equipment / materials?			
2. 5	Are all vehicles entering the site provided with a working audible reversing warning system?			
2. 6	Are all vehicle movements involving manoeuvres on the highway or reversing in any location controlled by a Banksman?			
2.7	Are Flagmen provided for all activities that could affect traffic, in a number and at locations to suit varying conditions of work?			
<b>3</b>	<b>CONTRACTOR'S SITE OPERATIONS</b>			
<b>3.1</b>	<b>General</b>			
3.1.1	Have all workers been provided with appropriate Personal Protective Equipment (PPE)?			
3.1.2	Are all workers wearing appropriate Personal Protective Equipment (PPE)?			<i>If 'No', assess the % of usage:</i>
3.1.3	Are workers using additional protective equipment for hazardous operations as required?			<i>If 'No', assess the % of usage:</i>
3.1.4	Are all vehicles entering the site provided with a working audible reversing warning system?			

3.1.5	Are all vehicle movements involving manoeuvres on the highway or reversing in any location controlled by a Banksman?			
3.1.6	Are Flagmen provided in a number and at locations to suit varying conditions of work for all activities that could affect traffic?			
<b>3.2</b>	<b>Excavations</b>			
3.2.1	Have existing underground utilities been located by means of trial holes and clearly identified on site? Have all utilities drawings have been checked by the Contractor's Engineer responsible for such works?			<i>Name of nominated person:</i>
	Have CAT Scans have been carried out?			
3.2.2	Are existing overhead cables protected by means of goal posts? Are any excavators working under power lines or within the restricted area of the goal posts?			
3.2.3	Within all current working areas, have goal posts been erected to protect Workers from danger, and prevent possible damage from, and to, the overhead power lines?			
3.2.4	For current working locations has the Contractor's nominated engineer contacted the relevant utilities providers with regard to excavation and possible effects / precautions / notifications that the utility provider may require? Chainage: Chainage:			<i>Name of nominated engineer/</i>
3.2.5	Is excavation work being supervised by a competent person?			<i>Name of competent person/</i>
3.2.6	Are Excavator Drivers competent and qualified?			<i>Certificate No</i>

3.2.7	Are nominated Banksmen provided and trained / qualified?			<i>Name of Banksmen</i>
3.2.8	Are all trench excavations in poor ground conditions (where the sides will not stand up), supported?			<i>State the method of support/</i>
3.2.9	Are trench excavations greater than 1.2m deep supported (in any type of ground)?			<i>State the method of support /</i>
3.2.10	<p>* Alternative methods of support for trench excavations:</p> <p>Examples: Drag Box / Trench Box / Bench Cut or Sloped Sides / Battered Back*</p>			
3.2.11	Is spoil from trench excavations, or any 'imported' material, stockpiled at a safe distance from the trench?			<i>State distance from trench:</i>
3.2.12	Are plant / equipment movements along trench excavations kept to a minimum and at a safe distance from the edge of trench?			<i>State distance from trench:</i>
3.2.13	Is backfilling of trenches carried out within an acceptable time frame?			<i>State time frame:</i>
3.2.14	Are physical barriers and signage for trench excavations in place?			
3.2.15	Is there flow of water into trench excavations?			<i>If yes, how is the water being controlled:</i>
<b>3.3</b>	<p><b>Bridges</b>          (Please Note: The default is that if 'Yes' is ticked it means that <u>all</u> bridges are OK)</p>			
<b>3.3.1</b>	<b>General</b>			
3.3.1.1	Have all workers been provided with appropriate Personal Protective Equipment (PPE)?			

3.3.1.2	Are all workers wearing appropriate Personal Protective Equipment (PPE)?			<i>If 'No', assess the % of usage:</i>
3.3.1.3	Are workers using additional protective equipment for hazardous operations as required?			<i>If 'No', assess the % of usage:</i>
3.3.1.4	Are all vehicles entering the site provided with a working audible reversing warning system?			
3.3.1.5	Are all vehicle movements involving manoeuvres on the highway or reversing in any location controlled by a Banksman?			
3.3.1.6	Are Flagmen provided for all activities that could affect traffic, in a number and locations to suit varying conditions of work?			
<b>3.3.2</b>	<b>Excavations /</b>			
3.3.2.1	Have existing underground utilities been located by means of trial holes and clearly identified on site? All utilities drawings have been checked by the Contractor's Engineer responsible for such works?			<i>Name of nominated person:</i>
	Have CAT Scan been carried out?			
3.3.2.2	Are existing overhead cables protected by means of goal posts? Are any excavators working under power lines or within the restricted area of the goal posts?			
3.3.2.3	Within all current working areas, have goal posts been erected to protect Workers from danger, and prevent possible damage from, and to, the overhead power lines?			



3.3.2.4	Has the Contractor's nominated engineer contacted the relevant utilities providers with regard to excavation and possible effects / precautions / notifications that the utility provider may require? Bridge No. Bridge No.			<i>Name of nominated engineer:</i>
3.3.2.5	Is excavation being supervised by a competent person?			<i>Name of competent person:</i>
3.3.2.6	Is the excavator driver competent and qualified?			<i>Certificate No./</i>
3.3.2.7	Are nominated Banksmen provided and trained / qualified?			<i>Name(s) of Banksman/</i>
3.3.2.8	Are all trench excavations in poor ground conditions (where the sides will not stand up), supported?			<i>State the method of support *:</i>
3.3.2.9	Are trench excavations greater than 1.2m deep supported (in any type of ground)?			<i>State the method of support *:</i>
3.3.2.10	* Alternative methods of support for trench excavations:  Examples: Drag Box / Trench Box / Bench Cut or Sloped Sides / Battered Back*			
3.3.2.11	Is spoil from trench excavations, or any 'imported' materials, stockpiled at a safe distance from the trench?			<i>State distance from trench:</i>
3.3.2.12	Are plant / equipment movements along trench excavations kept to a minimum and at a safe distance from the edge of trench?			<i>State distance from trench:</i>
3.3.2.13	Is backfilling of trenches carried out within an acceptable time frame?			<i>State time frame:</i>
3.3.2.14	Are physical barriers and signage for trench excavations in place?			

3.3.2.1 5	Is there flow of water into trench excavations?			<i>If yes, how is the water being controlled:</i>
<b>3.3.3</b>	<b>Scaffolding</b>			
3.3.3.1	Has all scaffolding been erected by a competent person?			<i>Name of competent person:</i>
3.3.3.2	Is all scaffolding approved for use by a competent person?			<i>Name of competent person:</i>
3.3.3.3	Is scaffold identification in place?			<i>Red Tag / Green Tag Basic International Procedure implemented</i>
3.3.3.4	Has all scaffolding been inspected and signed off by a competent person on a weekly basis (Register to be kept of inspections)?			<i>Name of competent person:</i>
3.3.3.5	Scaffold boards – have they checked for damage / missing / correct placement? Date of last check:			
3.3.3.6	Toe boards – have they been checked for damage / missing / correct placement? Date of last check:			
3.3.3.7	Hand rails – have they been checked for damage / missing / incorrect placement? Date of last check:			
3.3.3.8	Loading Bays – have they been checked for overloading, damage, scaffold boards, hand rails and guard protection all in place and in good working order? Date of last check:			

3.3.3.9	Are the ground conditions on which scaffolding has been erected satisfactory (level and stable)?			
3.3.3.1 0	Are base plates used (with or without screw jacks)?			
3.3.3.1 1	Is timber for load bearing placed under base plates?			
3.3.3.1 2	Have access ladders (and walkways) been checked for: suitable length, damage, missing rungs, etc. Are all parts tied and secured effectively? Date of last check:			
3.3.3.1 3	Are factory produced ladders in use?			
	If not, what is the construction/condition/safety of the ladders in use			
<b>3.3.4</b>	<b>Crane Lifting Operations</b>			
3.3.4.1	Do cranes have the required certification documentation?			<i>Certificate No./</i>
3.3.4.2	Are Crane Drivers qualified to operate the cranes?			<i>Qualification Ref. Nos.:</i>
3.3.4.3	Do lifting chains, slings, shackles have all the relevant SWL marked on them?			
3.3.4.4	Do lifting chains, slings, shackles have relevant Serial / Plant / ID numbers or references that can be checked against test certification documents?			
3.3.4.5	Are nominated Banksmen provided and trained / qualified?			<i>Name of Banksmen:</i>
3.3.4.6	Are any cranes operating with out-riggers fully extended?			

3.3.4.7	Are cranes set up on reasonably level and stable ground?			
3.3.4.8	Are cranes set up on soft unstable ground?			<i>If yes, what precautions are in place:</i>
3.3.4.9	Are cranes set up close to underground utilities?			<i>If yes, state which underground utility and the distance:</i>
3.3.4.10	If the answer is 'yes' to the above, is the location of the out-riggers directly above underground utilities?			<i>State the precautions taken/</i>
3.3.4.11	Does each crane driver have a 'Banksman' (who is trained / qualified) guiding him?			<i>Name of Banksman/</i>
3.3.4.12	Are any cranes slewing or operating over live traffic?			<i>State precautions taken/</i>
3.3.4.13	Are overhead power lines or any overhead utilities within the operating radius of the any crane? Location:			<i>State precautions taken/</i>
3.3.4.14	Are all personnel working within crane 'areas' wearing helmets and high visibility vests / jackets?			



